

ALAN M. ARAKAWA  
Mayor



DAVID TAYLOR, P.E.  
Director

PAUL J. MEYER  
Deputy Director

**DEPARTMENT OF WATER SUPPLY**

**COUNTY OF MAUI**

200 SOUTH HIGH STREET  
WAILUKU, MAUI, HAWAII 96793-2155  
www.mauiwater.org

26 DT  
February 4, 2015

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

**FILE COPY**

MAR 23 2015

OFFICE OF ENVIRONMENTAL  
QUALITY CONTROL

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**RECEIVED**

Dear Director:

**SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (EA) FOR PROPOSED IAO WATER TREATMENT PLANT UPGRADES AT TMK NOS.: (2)3-5-001:067(POR.) AND 091(POR.)**

The County of Maui, Department of Water Supply has reviewed the Draft Environmental Assessment (EA) for the subject project, and anticipates a Finding of No Significant Impact (AFONSI) determination. Please publish notice of availability for this project in the next available Office of Environmental Quality Control (OEQC) Environmental Notice.

Enclosed is a completed OEQC Publication Form, two copies of the DEA-AFONSI, an Adobe Acrobat PDF file of the same, and an electronic copy of the publication form in MS Word. If there are any questions, please contact Tessa Munekiyo Ng of Munekiyo & Hiraga, Inc. at (808) 983-1233 if you have any questions.

Very truly yours,

DAVID TAYLOR, P.E.  
DWS Director

Attachments

cc: Ivan Nakatsuka, Austin Tsutsumi & Associates, Inc. (w/one copy of Draft EA)  
Tessa Munekiyo Ng, Munekiyo & Hiraga, Inc. (w/out attachments)

*"By Water All Things Find Life"*

**AGENCY ACTIONS  
SECTION 343-5(B), HRS  
PUBLICATION FORM (FEBRUARY 2013 REVISION)**

**Project Name** Proposed Iao Water Treatment Plant Upgrades  
**Island:** Maui  
**District:** Wailuku  
**TMK:** (2)3-5-001:067(por.) and 091 (por.)  
**Permits:** Building Permit, Grading Permit, NPDES permit, and Project District Development Applications, Phase II and III

**Proposing/Determination Agency:** County of Maui  
*(Address, Contact Person, Telephone)* Department of Water Supply  
200 South High Street, 5<sup>th</sup> Floor  
Wailuku, Hawaii 96793; Contact Person: Dave Taylor,  
Director; Telephone: (808) 270-7816

**Accepting Authority:** Not Applicable  
*(for EIS submittals only)*

**Consultant:** Munekiyo & Hiraga, Inc.  
*(Address, Contact Person, Telephone)* 305 High Street, Suite 104, Wailuku, Hawaii 96793; Contact  
Person: Tessa Munekiyo Ng, Vice President; Telephone:  
(808) 983-1233

**Status (check one only):**

- DEA-AFNSI** Submit the proposing agency notice of determination/transmittal on agency letterhead, a hard copy of DEA, a completed OEQC publication form, along with an electronic word processing summary and a PDF copy (you may send both summary and PDF to [oeqchawaii@doh.hawaii.gov](mailto:oeqchawaii@doh.hawaii.gov)); a 30-day comment period ensues upon publication in the periodic bulletin.
- FEA-FONSI** Submit the proposing agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and a PDF copy (send both summary and PDF to [oeqchawaii@doh.hawaii.gov](mailto:oeqchawaii@doh.hawaii.gov)); no comment period ensues upon publication in the periodic bulletin.
- FEA-EISPN** Submit the proposing agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and PDF copy (you may send both summary and PDF to [oeqchawaii@doh.hawaii.gov](mailto:oeqchawaii@doh.hawaii.gov)); a 30-day consultation period ensues upon publication in the periodic bulletin.
- Act 172-12 EISPN** Submit the proposing agency notice of determination on agency letterhead, an OEQC publication form, and an electronic word processing summary (you may send the summary to [oeqchawaii@doh.hawaii.gov](mailto:oeqchawaii@doh.hawaii.gov)). NO environmental assessment is required and a 30-day consultation period upon publication in the periodic bulletin.
- DEIS** The proposing agency simultaneously transmits to both the OEQC and the accepting authority, a hard copy of the DEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the DEIS (you may send both the summary and PDF to [oeqchawaii@doh.hawaii.gov](mailto:oeqchawaii@doh.hawaii.gov)); a 45-day comment period ensues upon publication in the periodic bulletin.
- FEIS** The proposing agency simultaneously transmits to both the OEQC and the accepting authority, a hard copy of the FEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the FEIS (you may send both the summary and PDF to [oeqchawaii@doh.hawaii.gov](mailto:oeqchawaii@doh.hawaii.gov)); no comment period ensues upon publication in the periodic bulletin.
- Section 11-200-23  
Determination** The accepting authority simultaneously transmits its determination of acceptance or nonacceptance (pursuant to Section 11-200-23, HAR) of the FEIS to both OEQC and the proposing agency. No comment period ensues upon publication in the periodic bulletin.
- Section 11-200-27**

Determination

The accepting authority simultaneously transmits its notice to both the proposing agency and the OEQC that it has reviewed (pursuant to Section 11-200-27, HAR) the previously accepted FEIS and determines that a supplemental EIS is not required. No EA is required and no comment period ensues upon publication in the periodic bulletin.

\_\_Withdrawal (explain)

**Summary** (Provide proposed action and purpose/need in less than 200 words. Please keep the summary brief and on this one page):

The County of Maui, Department of Water Supply (DWS) proposes to replace/relocate the existing Iao Water Treatment Plant (WTP). The Iao WTP will be on West Alu Road near its intersection with Iao Valley Road and West Main Street on a portion (approximately 2.6 acres) of a parcel identified as Tax Map Key (TMK) (2) 3-5-001:067. Access to the site will be off West Alu Road through the adjacent parcel, TMK (2) 3-5-001:091.

The currently vacant and undeveloped project site is owned by RCFC Kehalani LLC, lies adjacent to an existing Maui Electric Company, Ltd. (MECO) substation and the existing DWS's WTP and 3.0 million gallon Iao Tank site. The existing WTP produces approximately 1.7 million gallons per day (mgd) of treated water. The new WTP will produce approximately 3.2 mgd of treated water.

Existing temporary membrane filtration units on the existing WTP site were initially sheltered within a large tent that has since been removed leaving the units exposed to the elements for a number of years. Therefore, replacement of the units was deemed necessary by DWS. Also, the water treatment production capacity needs to be increased to meet future projected population demands.

K:\DATA\ATA\Iao WTF Upgrades\Draft EA\OEQC Publication Form.doc



Planning Project Management Sustainable Solutions

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TO: Jessica Wooley, Director
Office of Environmental Quality Control
State of Hawaii
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

DATE: March 9, 2015
SUBJECT: Proposed Iao Water Treatment
Plant Upgrades at TMK Nos. (2) 3-
5-001:067(por.) and 091 (por.)

Enclosed is/are:

Table with 3 columns: Copies, Date, Description. Rows include: Orig. 2/26/15 Transmittal Letter from Department of Water Supply (DWS); 2 + 1 (CD) March 2015 Draft Environmental Assessment (EA); 1 ---- OEQC Publication Form with Project Summary

X For your information
For necessary action
For your review
For your files
For your use
As requested
For your signature
Returning

REMARKS: The attached documents are provided for publication in the next OEQC Bulletin on March 23, 2015.

Should you have any questions, please do not hesitate to call me at (808) 244-2015.

Signed: [Signature]
Karlynn Fukuda
Executive Vice President

KF:Ih
Copy to: Ivan Nakatsuka, Austin Tsutsumi & Associates, Inc. (w/one (1) copy of Draft EA)
Tom Ochwat, Department of Water Supply (w/out attachment)

K:\DATA\ATAI\Iao WTF Upgrades\Draft EA\DraftEA OEQC Trans.doc

**HRS 343-5(b) – AGENCY ACTION ENVIRONMENTAL ASSESSMENT CHECKLIST**

Name of Action: Proposed Iao Water Treatment Plant Upgrades  
 Island and Tax Map Key: Maui, (2)3-5-001:067 (por.) and 091 (por.)  
 Proposing Agency: County of Maui, Department of Water Supply

FOR OEQC USE ONLY
Date Received:
Date Published:
Staff reviewer:
Comment Deadline:
Public Library:

**PART A: Draft Environmental Assessment (accompanied by Anticipated Finding of No Significant Impact (AFONSI) determination by the proposing agency with 30-day public comment period)**

**Identification of Section 343-5(a), HRS, trigger(s):**

Applicable sections (*check all that apply*):

- Use of state or county lands or funds  Use in the Waikiki district
- Use in the conservation district  Amendment to county general plan
- Use within shoreline setback area  Reclassification of conservation lands to urban
- Use of historic site or district  Construction or modification of helicopter facilities
- Waste water facility, waste-to-energy facility, landfill, oil refinery, or power-generating facility

**Content Requirements (see HAR §11-200-10, items 1 thru 13)**

- Notice of determination<sup>2</sup> letter from the proposing agency requesting publication of its notice of determination of an anticipated finding of no significant impact (AFONSI) based on the attached draft environmental assessment.
- Identification of agencies, citizen groups, and individuals consulted in making the assessment
- General description of the action's technical, economic, social, and environmental characteristics; time frame; funding source
- Summary description of the affected environment, including cultural resources and practices, suitable and adequate regional, location and site maps such as Flood Insurance Rate Maps, Floodway Boundary Maps, or United States Geological Survey topographic maps
- Identification and summary of impacts (direct, indirect and cumulative) to the affected environment described above and proposed mitigation measures
- Alternatives considered
- Discussion of findings and reasons supporting the agency anticipated determination
- List of all required permits and approvals (both discretionary and ministerial at the state, federal, or county levels), if any
- Written comments and responses to comments under the early consultation provisions under HAR 11-200-9(a)(1), and 11-200-9(b)(1)

**PART B: Final Environmental Assessment (accompanied by Finding of No Significant Impact (FONSI) determination by the proposing agency with no public comment period)**

- Notice of determination<sup>3</sup> letter from the proposing agency requesting publication of its notice of determination of a finding of no significant impact (FONSI) based on the attached final environmental assessment.
- Written comments and responses to the comments under the statutorily prescribed public review periods for the draft environmental assessment

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Date Received:
Date Published:

<sup>2</sup> AFONSI – by rule (Section 11-200-11.1, HAR), the notice of determination from the proposing agency shall indicate: (1) the identity of the proposing agency; (2) the identity of the accepting authority; (3) a brief description of the proposed action; (4) the determination by the proposing agency; (5) the reasons supporting the determination; and (6), the name, address, and telephone number of a person at the proposing agency to contact for more information.

<sup>3</sup> FONSI – by rule (Section 11-200-11.2, HAR), the notice of determination from the proposing agency shall indicate: (1) the identity of the proposing agency; (2) the identity of the accepting authority if an EIS was required; (3) a brief description of the proposed action; (4) the determination by the proposing agency; (5) the reasons supporting the determination; and (6), the name, address, and telephone number of a person at the proposing agency to contact for more information.

**PART C: Final Environmental Assessment (accompanied by Environmental Impact Statement Preparation Notice (EISPN) determination by the proposing agency with 30-day public comment period)**

<b>FOR OEQC USE ONLY</b>
Date Received:
Date Published:
Staff reviewer:
Comment Deadline:

**Identification of Section 343-5(a), HRS, trigger(s) (omit if this is a FEA-EISPN following a DEA):**

Applicable sections (check all that apply):

- |   |  |
|---|--|
| <input type="checkbox"/> Use of state or county lands or funds  | <input type="checkbox"/> Use in the Waikiki district                           |
| <input type="checkbox"/> Use in the conservation district   | <input type="checkbox"/> Amendment to county general plan                      |
| <input type="checkbox"/> Use within shoreline setback area  | <input type="checkbox"/> Reclassification of conservation lands to urban       |
| <input type="checkbox"/> Use of historic site or district   | <input type="checkbox"/> Construction or modification of helicopter facilities |
| <input type="checkbox"/> Waste water facility, waste-to-energy facility, landfill, oil refinery, or power-generating facility |  |

**Content Requirements (see HAR §11-200-10, items 1 thru 13)**

- Notice of determination<sup>4</sup> letter from the proposing agency requesting publication of its notice of determination of an environmental impact statement preparation notice (EISPN) based on the attached final environmental assessment
- Identification of proposing agency
- Identification of agencies, citizen groups, and individuals consulted in making the assessment
- General description of the action's technical, economic, social, and environmental characteristics; time frame; funding source
- Summary description of the affected environment, including cultural resources and practices, suitable and adequate regional location and site maps such as Flood Insurance Rate Maps, Floodway Boundary Maps, or United States Geological Survey topographic maps
- Identification and summary of impacts (direct, indirect and cumulative) to the affected environment described above and proposed mitigation measures
- Alternatives considered
- Discussion of findings and reasons supporting the agency determination
- List of all required permits and approvals (both discretionary and ministerial at the state, federal, and county levels), if any
- Written comments and responses to the comments under the early consultation under HAR 11-200-9(a)(1), 11-200-9(b)(1), and 11-200-15

*With the submittal of the draft environmental impact statement, an HRS 343-5(b) AGENCY ACTIONS EIS CHECKLIST will be generated and used until the completion of the EIS process (acceptance or non-acceptance).*

<sup>4</sup> EISPN – by rule (Section 11-200-11.2, HAR), a notice of determination from the proposing agency shall indicate: (1) the identity of the proposing agency; (2) the identity of the accepting authority; (3) a brief description of the proposed action; (4) the determination by the proposing agency; (5) the reasons supporting the determination; and (6), the name, address, and telephone number of a person to contact at the proposing agency for more information.

# **Draft Environmental Assessment**

## **PROPOSED IAO WATER TREATMENT PLANT UPGRADES (TMK (2)3-5-001:067 (por.) and 091 (por.))**

**Prepared for the Approving Agency:  
County of Maui,  
Department of Water Supply**

**March 2015**

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## LIST OF ACRONYMS

2010 D&O	June 10, 2010 Commission on Water Resource Management Findings of Fact, Conclusions of Law and Decision and Order
AFONSI	Anticipated Finding of No Significant Impact
ALISH	Agricultural Lands of Importance to the State of Hawaii
BMP	Best Management Practice
CCT	Chlorine Contact Tank
CFS	Cubic Feet Per Second
CWRM	Commission on Water Resource Management
CZM	Coastal Zone Management
DLIR	Department of Labor and Industrial Relations
DOE	Department of Education
DWS	Department of Water Supply
DWSRF	Drinking Water State Revolving Fund
EA	Environmental Assessment
FEMA	Federal Emergency Management Agency
HAR	Hawaii Administrative Rules
HC&S	Hawaiian Commercial & Sugar Company
HRS	Hawaii Revised Statutes
Hui/MTF	Hui O Na Wai Eha and Maui Tomorrow Foundation, Inc.
IIFS	Interim Instream Flow Standards
KMD	Kehalani Mauka Development
LSB	Land Study Bureau
MECO	Maui Electric Company, Ltd.
MG	Million Gallons
MGD	Million Gallons per Day
MIP	Maui Island Plan
MSL	Mean Sea Level
NRCS	Natural Resources Conservation Service
OHA	Office of Hawaiian Affairs
PDR	Preliminary Drainage Report
PER	Preliminary Engineering Report
RGB	Rural Growth Boundary
rRR	Rough Broken Land
SCS	Scientific Consulting Services
SHPD	State Historic Preservation Division
SMA	Special Management Area
SRB	Small Town Boundary
SWUPA	Surface Water Use Permit Applications
SWUPA-E	Surface Water Use Permit Application Existing Use
SWUPA-N	Surface Water Use Permit Application New Use
TPB	Treatment Plant Building
TMK	Tax Map Key
UGB	Urban Growth Boundary

USDA	U. S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WUDP	Water Use and Development Plan
WTP	Water Treatment Plant
WUP	Water Use Permit
WvB	Wailuku Silty Clay, 3-7 percent slopes (soil type)
WWC	Wailuku Water Company
WWRD	Wastewater Reclamation Division
WWRF	Wastewater Reclamation Facility
WWTP	Wastewater Treatment Plant

## Executive Summary

**Project Name:** Proposed Iao Water Treatment Plant Upgrades

**Type of Document:** Draft Environmental Assessment

**Legal Authority:** Chapter 343, Hawaii Revised Statutes

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

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

**Location:** Island of Maui  
Wailuku  
TMK No.: (2)3-5-001:067 (por.) and 091 (por.)

**Applicant:** County of Maui  
Department of Water Supply  
200 South High Street, 5<sup>th</sup> Floor  
Wailuku, Hawaii 96793  
Contact: Thomas Ochwat  
Phone: (808) 270-7816

**Approving Agency:** County of Maui  
Department of Water Supply  
200 South High Street, 5<sup>th</sup> Floor  
Wailuku, Hawaii 96793  
Contact: David Taylor, Director  
Phone: (808) 270-7816

**Consultant:** Munekiyo & Hiraga, Inc.  
305 High Street, Suite 104  
Wailuku, Hawaii 96793  
Contact: Tessa Ng, AICP, Vice President  
Phone: (808) 983-1233

**Project Summary:**

The County of Maui, Department of Water Supply (DWS) proposes to replace the existing Iao Water Treatment Plant (WTP) with a new WTP. The Iao WTP is located on West Alu Road near its intersection with Iao Valley Road and West Main Street on a portion of a parcel identified as Tax Map Key (TMK) (2)3-5-001:067. Access to the site will be provided by a driveway off of West Alu Road through the adjacent parcel, TMK (2)3-5-001:091. The existing WTP, which is located at the site of DWS' 3.0 million gallon Iao Tank, consists of three (3) pressure membrane units that produce approximately 1.7 million gallons per day (mgd) of treated water. The existing membrane filtration units were meant to be temporary, and were initially sheltered within a large tent that has since been removed, leaving the units exposed to the elements for a number of years. Therefore, replacement of the units and a permanent structure were deemed necessary by DWS.

The proposed project involves installing new membrane filtration units within a building to produce an average of up to 3.2 mgd of treated water on approximately 2.6 acres of Parcel 67. The treated water flow from the WTP of 3.2 mgd is in accordance with an agreement between DWS and Wailuku Water Company, LLC (WWC), which allows for DWS to withdraw up to 3.2 mgd of water over a 24-hour period from the Iao-Waikapu Ditch. This amount is exclusive of the backwash water from the treatment plant process, as long as the backwash water is placed back into WWC's water system. The new WTP will treat approximately 3.4 mgd of raw water from the ditch to produce 3.2 mgd of treated water. The difference of approximately 140,000 gallons per day is the treated water being used for backwashing and cleaning of the membranes, which will be placed back into WWC's water system by ultimately being discharged into WWC's Waihee Ditch. The proposed WTP will include a Treatment Plant Building, Chlorine Contact Tank, Sludge Lagoon, and other accessory equipment and facilities.

The project site is part of a large parcel (Parcel 67) owned by RCFC Kehalani LLC. DWS is in the process of acquiring the land for the Iao WTP. Access to the site will be provided by a driveway off of West Alu Road through the adjacent parcel, TMK (2)3-5-001:091. DWS intends to purchase this adjacent Parcel 091 (Lot T-1) from owner RCFC Kehalani LLC.

The Iao WTP project will be funded by the State of Hawaii and County of Maui. The use of public funds and lands is a trigger for the preparation of an Environmental Assessment (EA) pursuant to Chapter 343, Hawaii Revised Statutes (HRS) and Section 11-200, Hawaii Administrative Rules (HAR).

# **I. PROJECT OVERVIEW**

# I. PROJECT OVERVIEW

## A. PROPERTY LOCATION, EXISTING USE, AND LAND OWNERSHIP

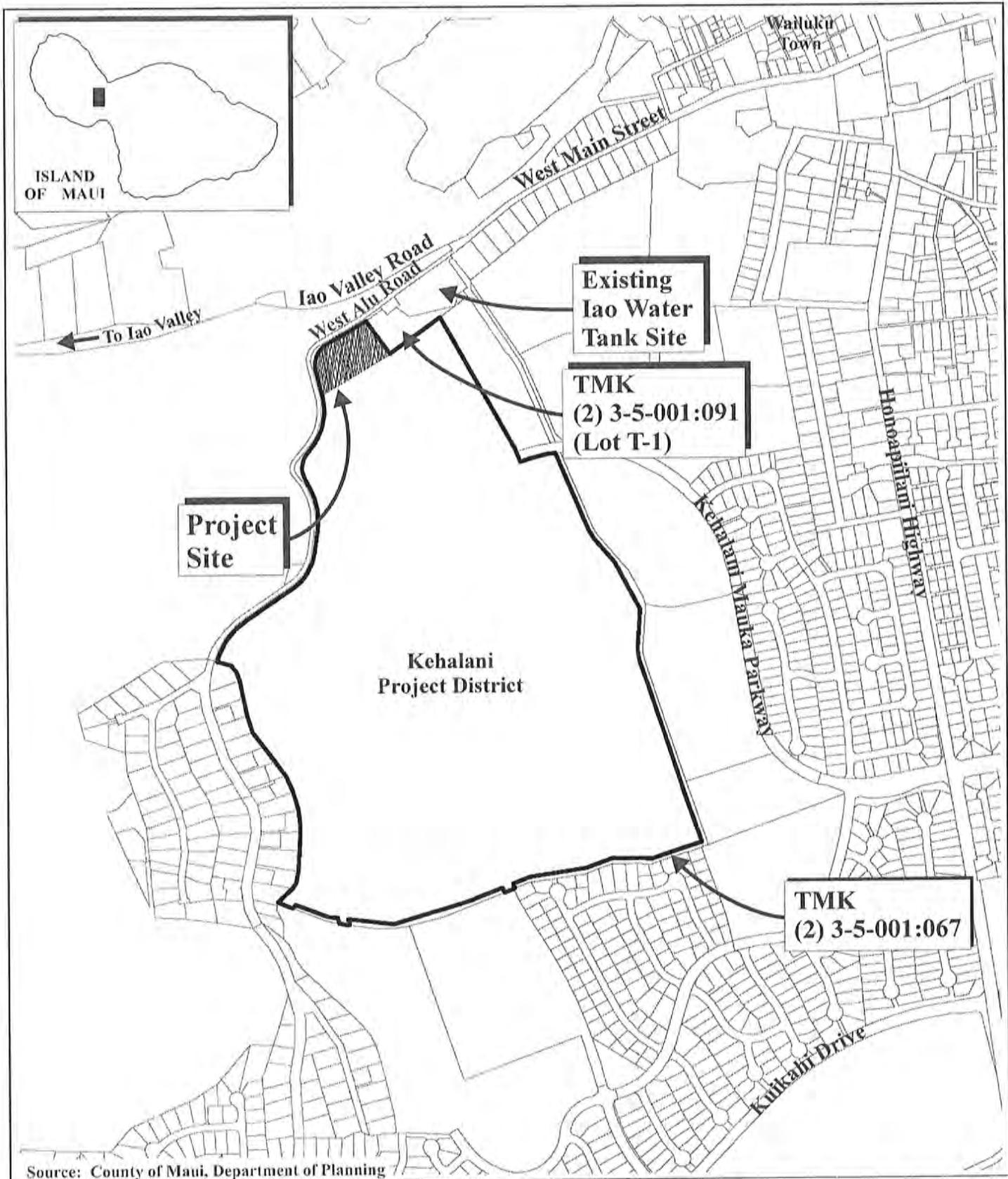
The Maui County, Department of Water Supply (DWS) proposes to replace/relocate the existing Iao Water Treatment Plant (WTP) with a new WTP. The Iao WTP will be located on West Alu Road near its intersection with Iao Valley Road and West Main Street on a portion of a parcel identified as Tax Map Key (TMK) (2)3-5-001:067 (Parcel 67). See **Figure 1**. Access to the site will be provided by a driveway off of West Alu Road through the adjacent parcel, TMK (2)3-5-001:091 (Parcel 91).

The project site is currently vacant and undeveloped. It lies west of and adjacent to an existing Maui Electric Company, Ltd. (MECO) substation and the existing WTP site. The existing WTP, which is located at the site of DWS's 3.0 million gallon Iao Tank, produces approximately 1.7 million gallons per day (mgd) of treated water. See **Figure 2**.

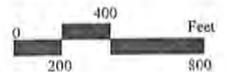
The project site is part of a large parcel (Parcel 67) owned by RCFC Kehalani LLC. Approximately 2.6 acres will be utilized from Parcel 67 for the proposed project. DWS is in the process of acquiring the land for the Iao WTP. The adjacent parcel, TMK (2)3-5-001:091, through which access will be provided, is also owned by RCFC Kehalani LLC. DWS intends to purchase this parcel as well. If construction of the proposed WTP occurs prior to the purchase, DWS will acquire a temporary construction easement for the driveway and waterlines through Parcel 091.

## B. PROJECT NEED

The existing WTP consists of three (3) pressure membrane units that produce approximately 1.7 million gallons per day (mgd) of treated water. The existing membrane filtration units were meant to be temporary, and were initially sheltered within a large tent that has since been removed, leaving the units exposed to the elements for a number of years. Therefore, replacement of the units and a permanent structure were deemed necessary by DWS. The proposed Iao WTP will be built to produce approximately 3.2 mgd of treated water to meet future projected population demands. See **Appendix "A"**, Preliminary Engineering Report (PER).



**Figure 1** Proposed Iao Water Treatment Plant Upgrades  
Regional Location Map



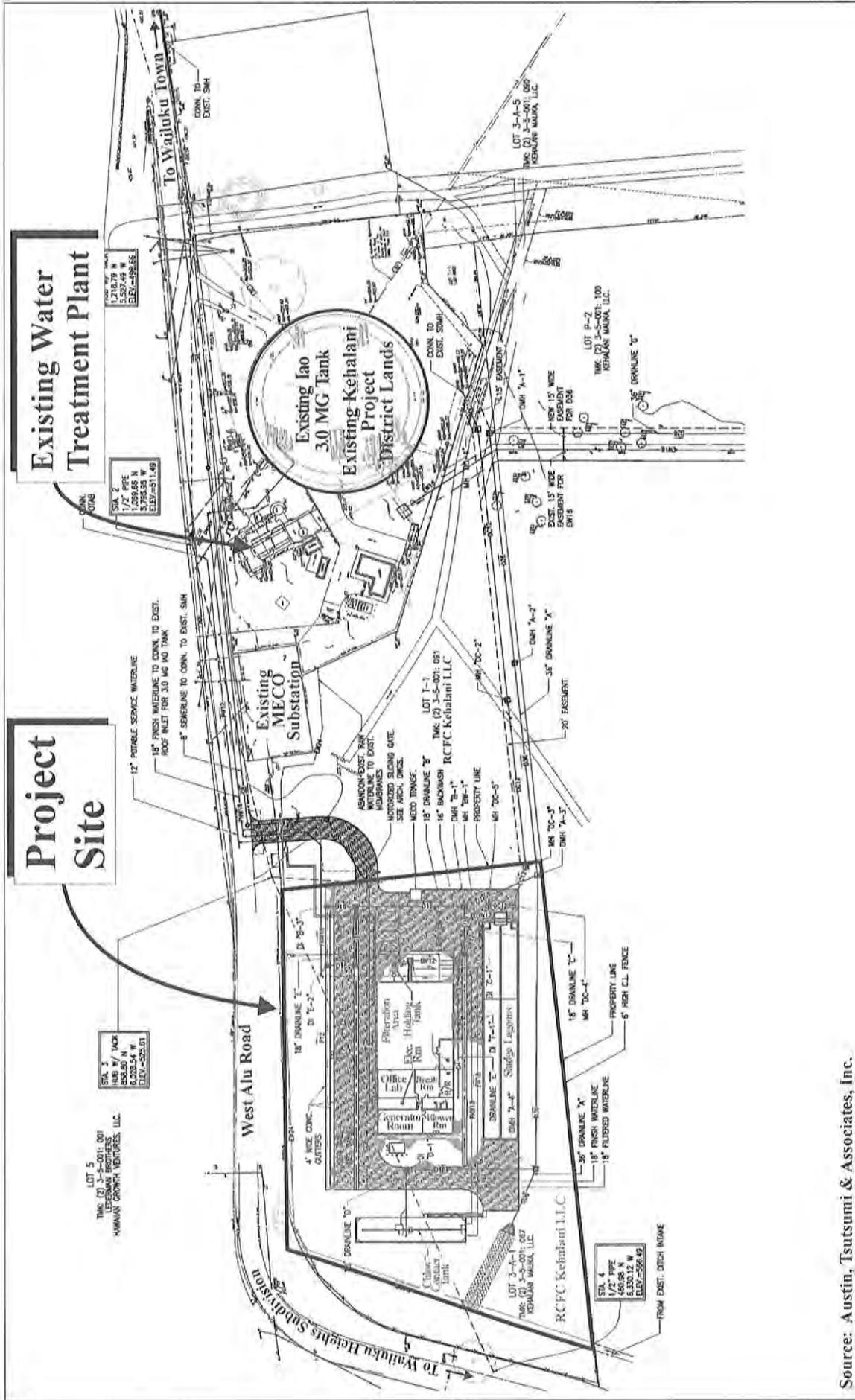


Figure 2 Proposed Iao Water Treatment Plant Upgrades Site Plan



Source: Austin, Tsutsumi & Associates, Inc.

NOT TO SCALE

Prepared for: County of Maui, Department of Water Supply



ATAI Iao WTF Upgrades Site Plan

## C. PROPOSED ACTION

DWS proposes to replace the existing Iao WTP with a new WTP. This project will involve installing new membrane filtration units within a building to produce an average of up to 3.2 mgd, which is based on a maximum average raw water flow to the WTP of approximately 3.4 mgd, in accordance with an agreement between DWS and Wailuku Water Company, LLC.

The major components for the project will be as follows:

- The Treatment Plant Building (TPB) which will include a “Filtration Area” as well as separate rooms for office/laboratory, break room with restroom, storage rooms, electrical room, and generator room. The Filtration Area will house four (4) membrane filtration units. Other equipment will also be housed in the Filtration Area.
- An aboveground 2,000 gallon diesel fuel tank as part of the generator system.
- A dual-compartment Sludge Lagoon constructed of concrete to contain the backwash water and other discharge waters from the membrane treatment process.
- A Chlorine Contact Tank (CCT) that allows for disinfection of the filtered water with sodium hypochlorite to produce the finish water.
- A finish water line from the CCT to a connection point with an existing pipe that discharges into the Iao Tank through a roof inlet. A portion of this water line would be within West Alu Road.
- A gravity wastewater line from the restroom within the TPB to the uppermost existing sewer manhole on South Alu Road.
- A drainage system that would convey on-site runoff and off-site runoff that currently discharges on to the project site to a connection point with the Kehalani Parkway storm drain system.

Refer to **Figure 2** and see **Appendix “C”**, Preliminary Plans.

Upon completion of the new WTP facility, the existing Iao WTP will be decommissioned.

## D. PROJECT COSTS AND IMPLEMENTATION

The cost of the proposed project is estimated to be \$12 to \$15 million. Construction of the Iao WTP is anticipated to begin in the summer of 2016 and take approximately two (2) years to complete.

**E. CHAPTER 343, HAWAII REVISED STATUTES (HRS)  
REQUIREMENTS**

The Iao WTP project will be funded by the County of Maui and State of Hawaii. The use of public funds and lands triggers compliance with the Hawaii Revised Statutes (HRS), Chapter 343 requirements. Therefore, this Environmental Assessment (EA) is being prepared pursuant to Title 11, Chapter 200, Hawaii Administrative Rules (HAR), Environmental Impact Statement Rules to evaluate the proposed project's technical characteristics, environmental and socio-economic impacts, and alternatives, as well as to advance findings relative to the significance of the project's potential impacts and proposed mitigation measures. The Approving Agency for the EA is the DWS.

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

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

### **A. PHYSICAL SETTING**

#### **1. Surrounding Land Uses**

##### **a. Existing Conditions**

The existing Iao Water Treatment Plant is located west of Old Wailuku Town and west of the intersection of Iao Valley Road and West Alu Road at the entrance to Iao Valley. The proposed project site is currently vacant and undeveloped. The site is west of and adjacent to a MECO substation and the existing Iao WTP site. The surrounding area to the south of the project site is currently vacant and undeveloped. Land to the south is proposed to be developed as part of the Kehalani Project District.

Wailuku Town is located further north and east of the project site, beyond the Kehalani Mauka development. Wailuku serves as the County seat and the primary location of many State and Federal offices. Wailuku Town is also characterized by a mix of commercial uses, including offices, shops, and restaurants. The existing residential developments of Wailuku Heights and Kehalani are located further west and south, respectively, to the project site. Additionally, there are existing single-family residences located further east of the project site.

##### **b. Potential Impacts and Mitigation Measures**

The proposed project involves replacement of the existing Iao WTP. The project site is on lands that are undeveloped. As such, its specific siting provides a buffer from nearby residential homes of which the closest home is approximately 600 feet away. Furthermore, the construction of the proposed improvements to the Iao Water Treatment Plant facilities represents an augmentation of the existing system to increase productivity.

Due to the nature of the proposed project, the proposed action is not anticipated to have adverse impacts to existing land uses in the vicinity.

DWS is coordinating with RCFC Kehalani LLC on future development of Kehalani Project District adjacent to the project site.

2. **Climate**

a. **Existing Conditions**

Like most areas of Hawaii, the climate in Wailuku is relatively uniform year-round. Characteristic of Maui's climate, the project site experiences mild and uniform temperatures, moderate humidity and relatively consistent northeasterly tradewinds. This stability is attributed to Maui's tropical latitude, relative to the Pacific anticyclone and storm tracts, and the surrounding ocean currents. Variations in climate among the different regions in Maui are largely due to local terrain.

Historically, in the region, daily temperatures range from an average low of 67 degrees Fahrenheit (measured at Kahului Airport) to an average high of 84 degrees Fahrenheit. The warmest month is August while the coolest month is February (County of Maui, Office of Economic Development, 2011).

Rainfall in the region is seasonal, with most precipitation occurring between October and March. Annual rainfall data for Central Maui shows an average of 18.49 inches (County of Maui, Office of Economic Development, 2011).

b. **Potential Impacts and Mitigation Measures**

The proposed project is limited to the replacement of the existing water treatment facilities. As such, significant adverse impacts to climatic conditions are not anticipated as a result of the proposed project.

3. **Agricultural Lands**

a. **Existing Conditions**

In 1977, the State of Hawaii, Department of Agriculture developed a classification system to identify Agricultural Lands of Importance to the State of Hawaii (ALISH), based primarily, though not exclusively, on soil characteristics of the underlying land. The three (3) classes of ALISH lands are "Prime", "Unique", and "Other Important" agricultural land, with the remaining non-classified lands termed "Unclassified". When

utilized with modern farming methods, “Prime” agricultural lands have soil quality, growing season, and moisture supply needed to produce sustained crop yields economically; while “Unique” agricultural lands contain a combination of soil quality, growing season, and moisture supply to produce sustained yields of a specific crop. “Other Important” agricultural lands include those important agricultural lands that have not been rated as “Prime” or “Unique”.

The project site is located on lands that are designated as “Prime” by the ALISH map. See **Figure 3**.

Additionally, the University of Hawaii, Land Study Bureau (LSB) developed the Overall Productivity Rating, which classified soils according to five (5) levels, with “A” representing the class of highest productivity soils and “E” representing the lowest. The LSB does not classify the lands underlying the proposed project site. See **Figure 4**.

The project site and surrounding areas were cultivated with sugar cane from the mid-1800s through the 1990s. When sugar production ended in the 1990s, the area was converted to cattle grazing. Grazing activity ended approximately nine (9) years ago. The site is currently zoned within the County’s “Project District 3, Wailuku”. Currently, the project site and surrounding areas to the south and west, are vacant with no active agricultural activities.

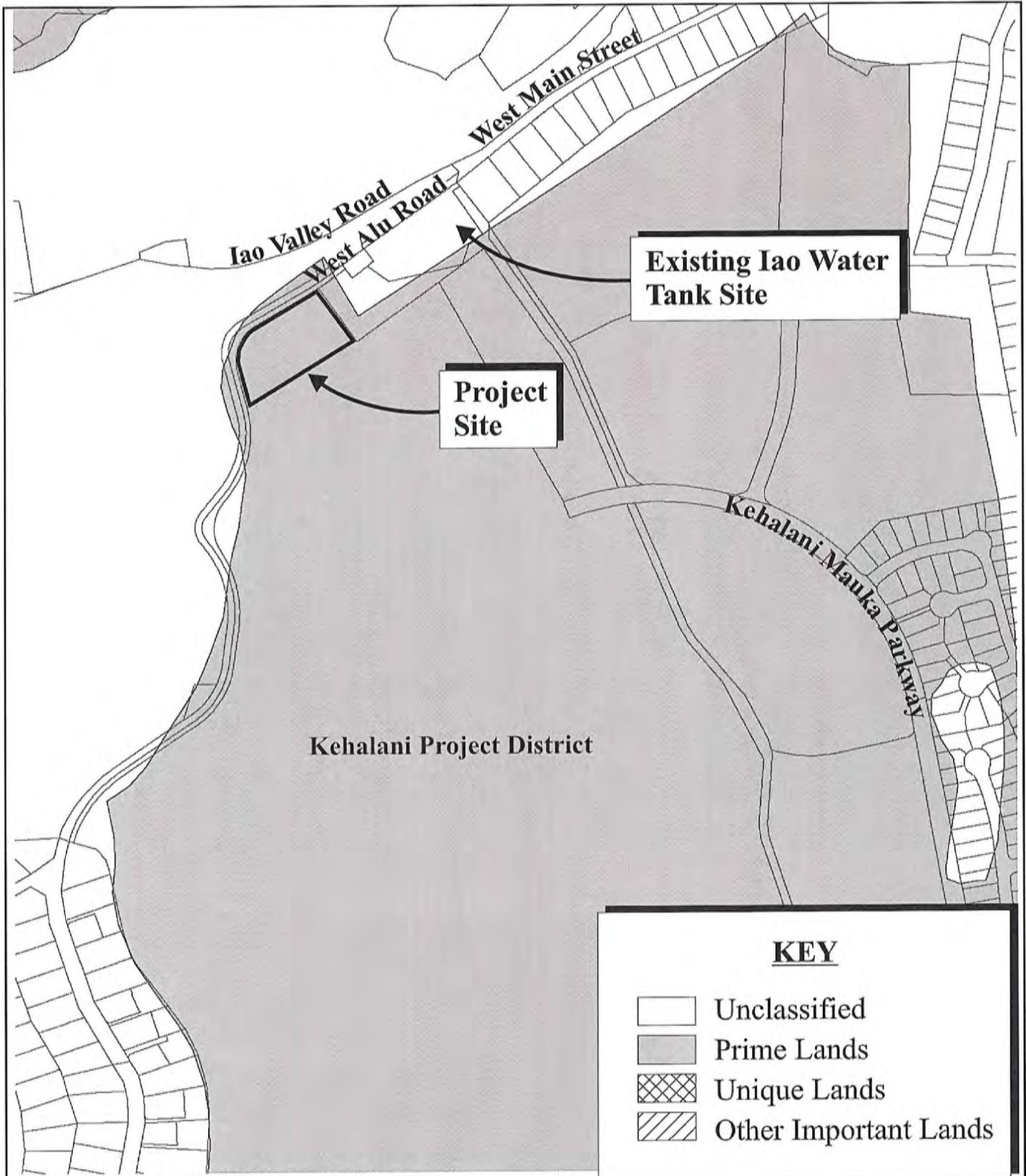
**b. Potential Impacts and Mitigation Measures**

The site is designated within the “Project District 3, Wailuku” area and has not been in active agricultural production since 1992. Given the discontinued agricultural use at the site and the land’s designation for urban use, adverse impacts to agricultural productivity are not anticipated as a result of the proposed project.

**4. Topography and Soils Characteristics**

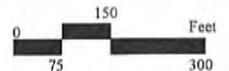
**a. Existing Conditions**

The project site slopes in the west to east (mauka to makai) direction, with approximate ground mean sea level (msl) elevations being 560 feet at the upper end to 508 feet at the lower end. Refer to **Appendix “A”**.



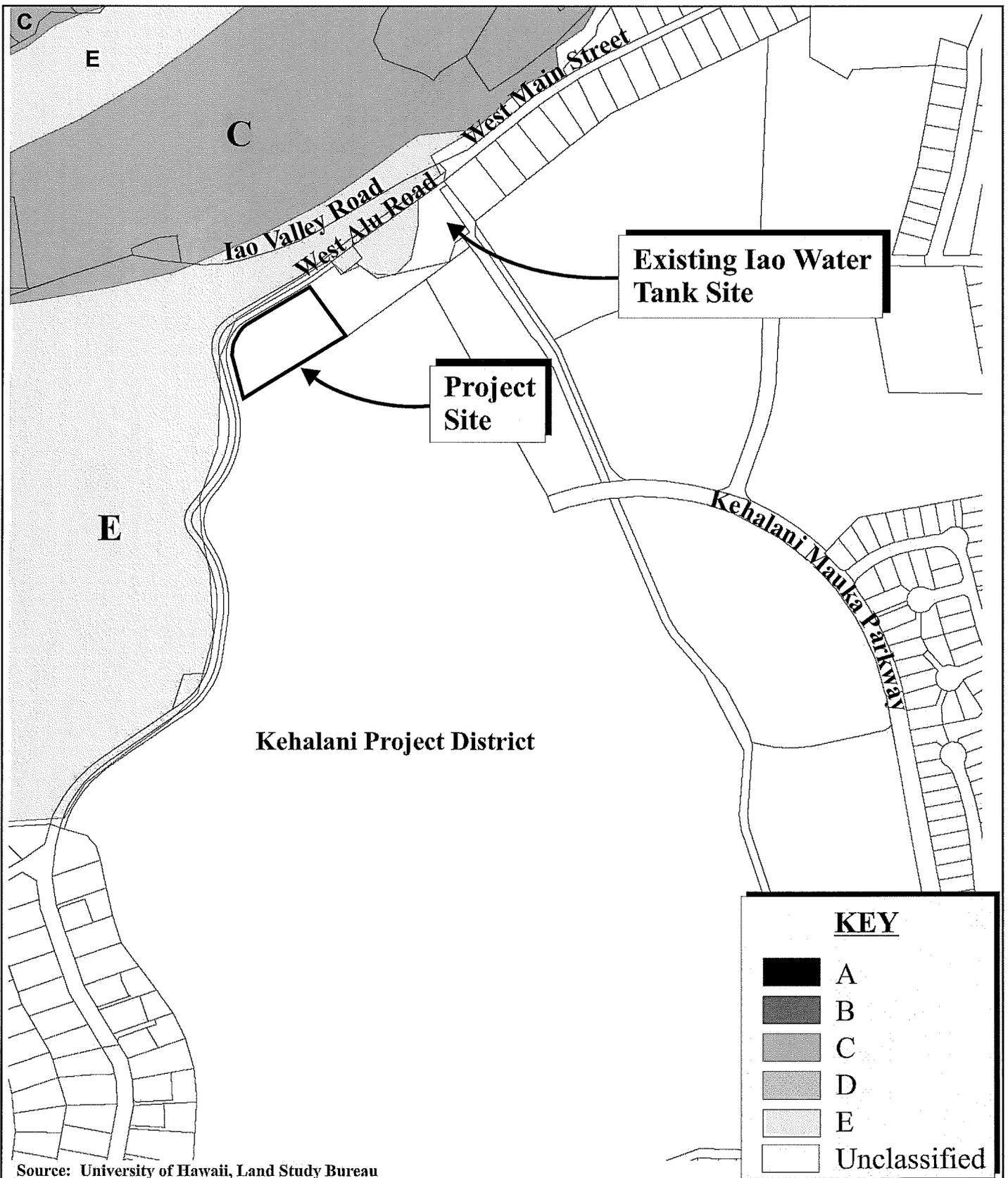
Source: State of Hawaii, Department of Agriculture

**Figure 3** Proposed Iao Water Treatment Plant Upgrades  
 Agricultural Lands of Importance to the State of Hawaii



Prepared for: County of Maui, Department of Water Supply





**Figure 4 Proposed Iao Water Treatment Plant Upgrades**

Land Study Bureau Soil Productivity Rating



The project site consists of soils within the Waiakoa-Keahua-Molokai association, which is found on low uplands and is characterized by moderately deep and deep, nearly level to moderately steep, well-drained soils that have a moderately fine textured subsoil (USDA, 1972). See **Figure 5**. Underlying the project site is Wailuku Silty Clay, 3 to 7 percent slopes (WvB) and Rough Broken Land (rRR). See **Figure 6**.

Wailuku Silty Clay, 3 to 7 percent slopes (WvB) is a dark reddish-brown silty clay that is about 12 inches thick. Permeability is moderate, runoff is slow and the erosion hazard is slight (USDA, 1972). Rough Broken Land (rRR) is very steep land broken by numerous intermittent drainage channels and contains variable soils 20 to more than 60 inches deep over soft weathered rock.

**b. Potential Impacts and Mitigation Measures**

Based on a foundation investigation of the proposed project site, it was determined that conventional shallow foundations may be used to support proposed structures for the WTP. The project site will be graded to allow for construction of and access to the new structures. However, adverse impacts to underlying soil conditions and topography are not anticipated to result from the proposed project. Refer to **Appendix “A”**.

**5. Flood and Tsunami Hazards**

**a. Existing Conditions**

The project site is located near the eastern base of the West Maui Mountains. As indicated by the Flood Insurance Rate Map for the County of Maui, the project site is located within Zone X. Zone X is the flood insurance rate zone that corresponds to areas of minimal flooding or areas determined to be outside the 0.2 percent annual chance flood plain. See **Figure 7**.

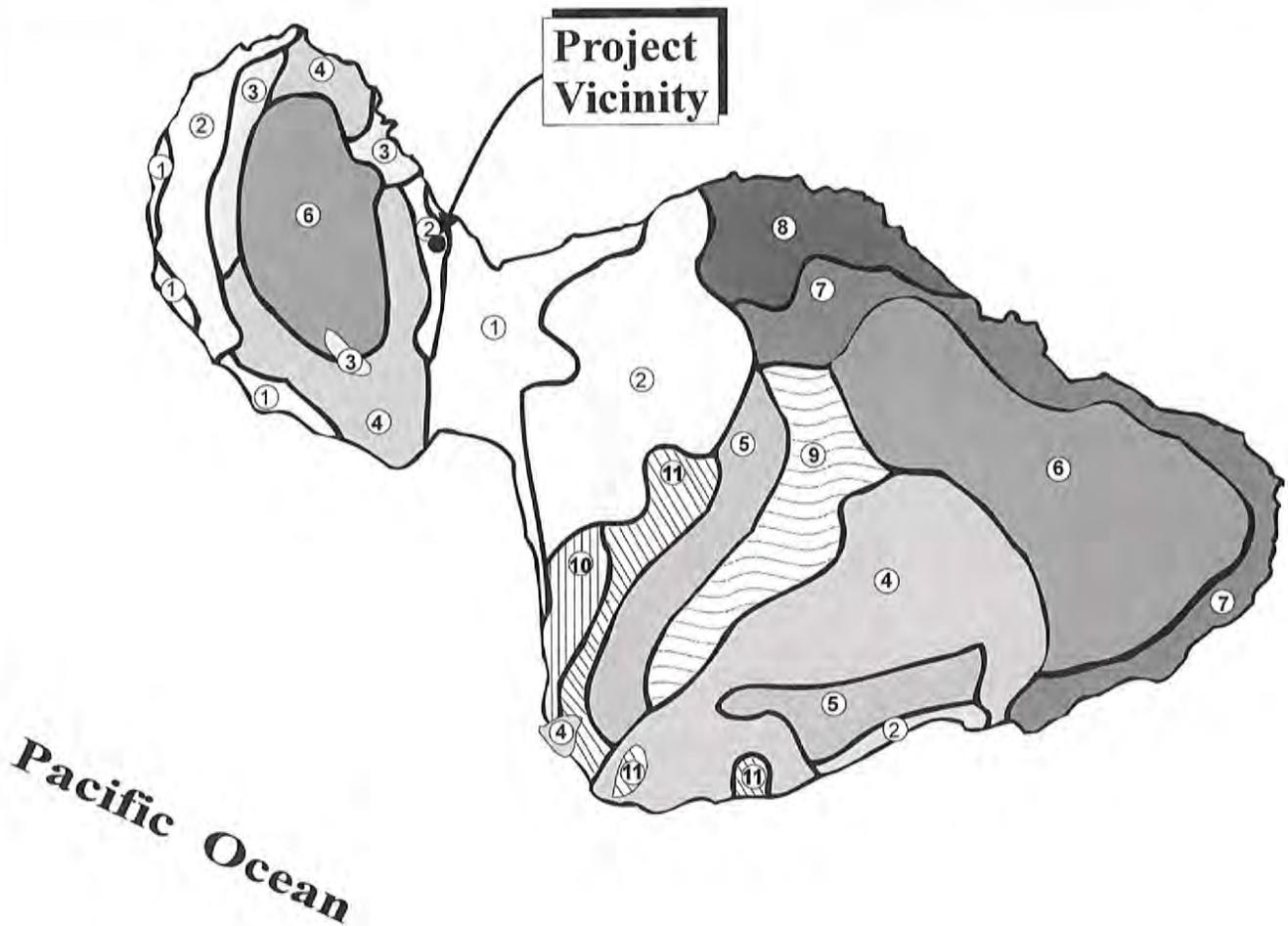
The project site is located inland and outside the tsunami inundation zone.

**b. Potential Impacts and Mitigation Measures**

Given the location of the project site within Flood Zone X and outside of the tsunami inundation zone, there are no anticipated adverse effects to the proposed project from flooding or tsunami related events.

# LEGEND

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



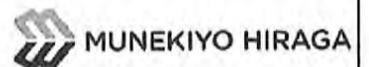
Map Source: USDA Soil Conservation Service

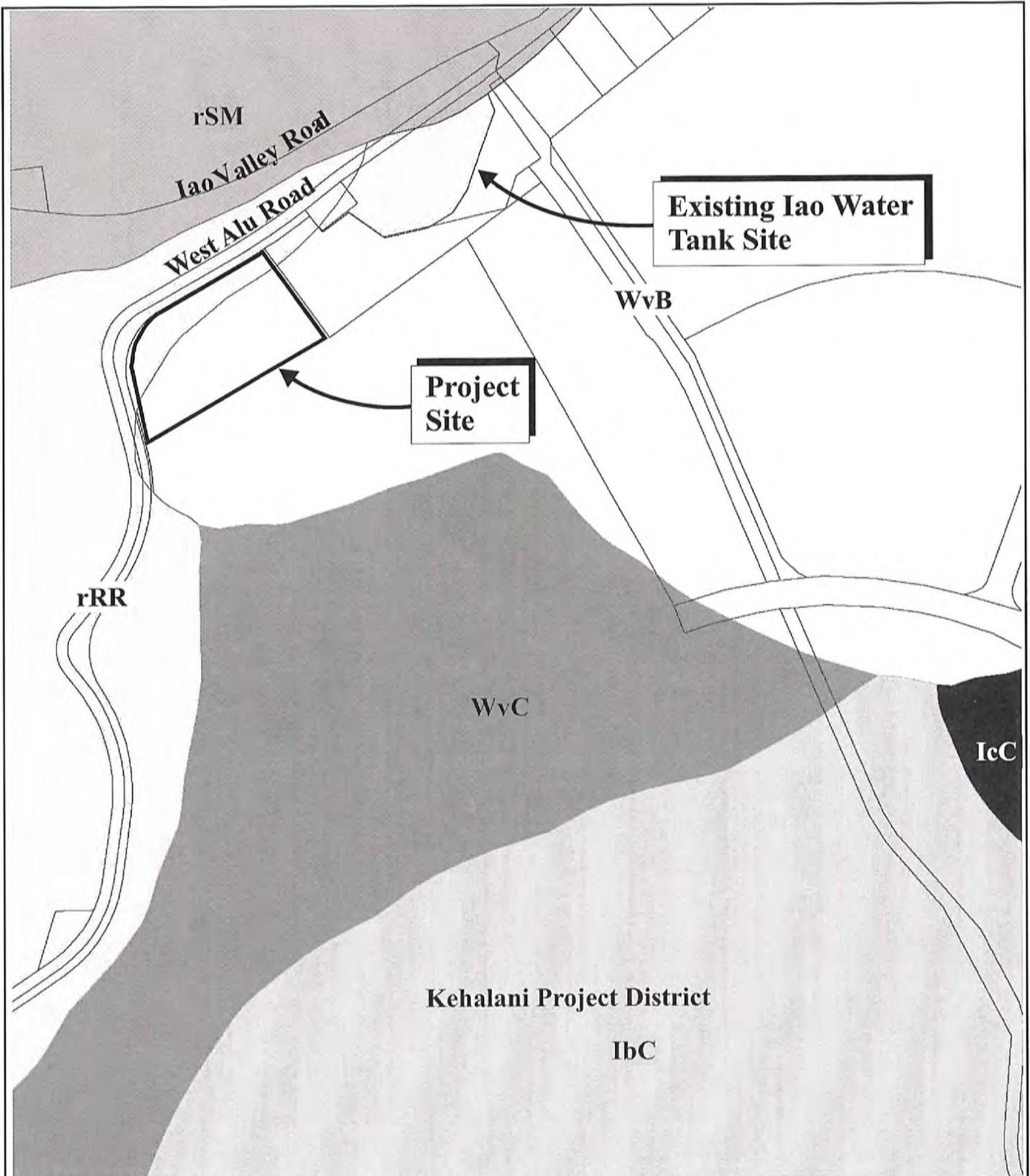
**Figure 5** Proposed Iao Water Treatment Plant Upgrades Soil Association Map

NOT TO SCALE



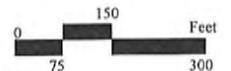
Prepared for: County of Maui, Department of Water Supply

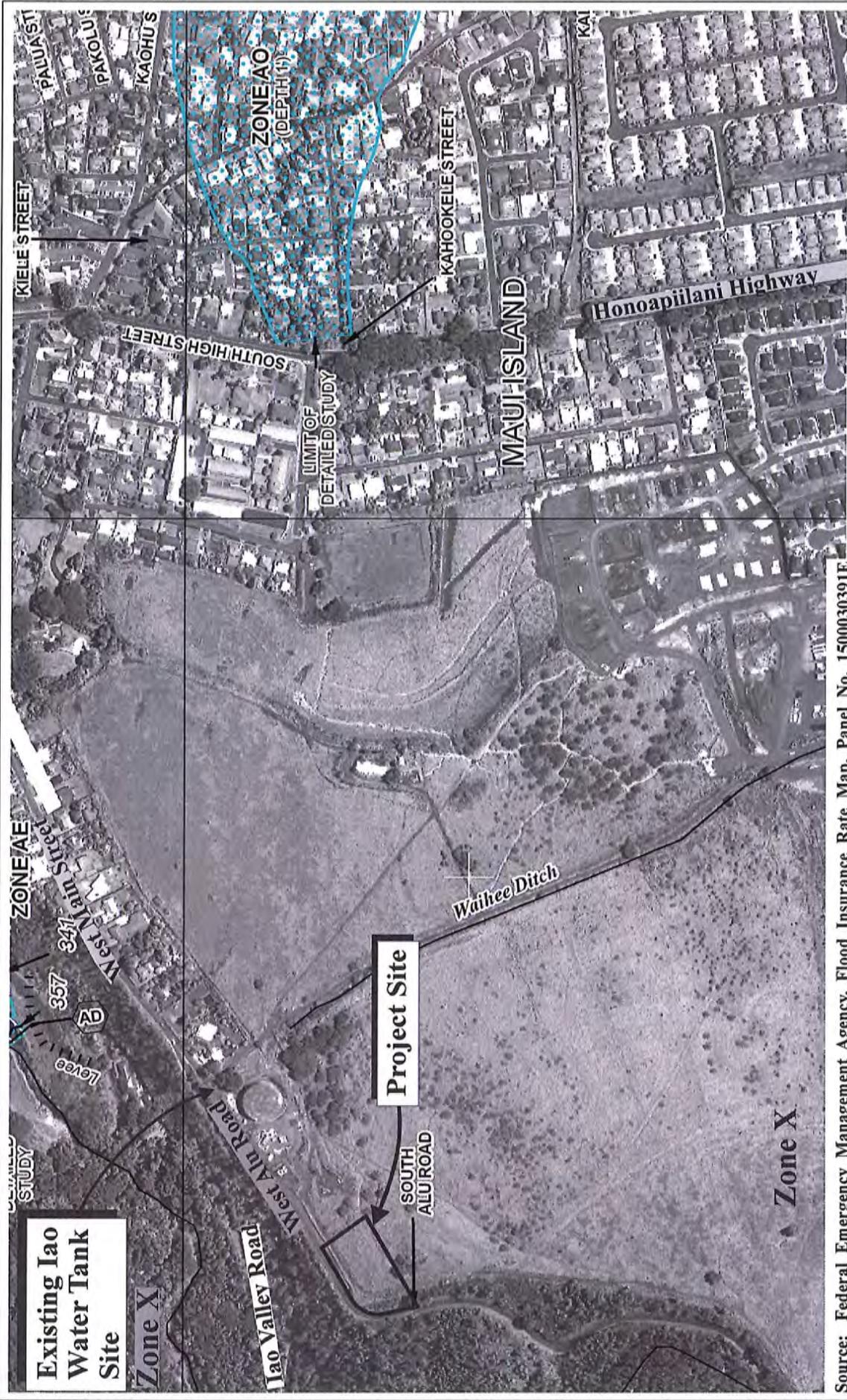




Source: USDA Natural Resources Conservation Service, Soil Survey Geographic Database, 2006

**Figure 6** Proposed Iao Water Treatment Plant Upgrades  
Soil Classification Map





Source: Federal Emergency Management Agency, Flood Insurance Rate Map, Panel No. 1500030391E

**Figure 7** Proposed Iao Water Treatment Plant Upgrades  
Flood Insurance Rate Map



Prepared for: County of Maui, Department of Water Supply



ATA\Iao WTF Upgrades\FIRM

**6. Streams and Wetlands**

**a. Existing Conditions**

There are no streams or wetlands within the project site. Iao Stream is located approximately 500 feet north of the project site. The stream is north of Iao Valley Road and generally runs west to east. This stream is listed by the State of Hawaii, Department of Health as an impaired water, indicating that the water quality within the stream may not meet State of Hawaii water quality criteria for streams. Iao Stream is one (1) of the four (4) streams in the Wailuku District that comprises Na Wai Eha. The three (3) other streams are Waihee River, Waiehu Stream, and Waikapu Stream.

On June 25, 2004, Earthjustice, on behalf of Hui O Na Wai Eha and Maui Tomorrow Foundation, Inc. (Hui/MTF), filed a Petition to Amend the Interim Instream Flow Standards (IIFS) for the Waihee River and the Waiehu, Iao, and Waikapu Streams. The State of Hawaii Commission on Water Resource Management (CWRM) held 23 days of hearings between December 3, 2007 and March 4, 2008. On June 10, 2010, CWRM released its final Findings of Fact, Conclusions of Law, Decision and Order.

On August 15, 2012, following an appeal by Petitioners Hui/MTF and the Office of Hawaiian Affairs (OHA), the Hawaii Supreme Court issued a decision vacating CWRM's Findings of Fact, Conclusions of Law, and Decision and Order issued on June 10, 2010 (the 2010 D&O) and remanded the matter to CWRM for further proceedings consistent with the court's decision.

In April 2014, the parties in the case (Hui/MTF, OHA, Hawaiian Commercial and Sugar Company, Wailuku Water Company (WWC), and the County of Maui Department of Water Supply (DWS)) reached an agreement with respect to the IIFS for the Waihee River and the Waiehu, Iao, and Waikapu Streams. The agreement was approved by CWRM on April 17, 2014.

Regarding Iao Stream and DWS specifically, CWRM reaffirmed its prior conclusion (from the 2010 D&O) that the 3.2 mgd of water for DWS's Iao Water Treatment Facility is a reasonable current and future use of water

diverted from Iao Stream for purposes of the restoration of stream flows under an amended IIFS.

Further, the amended IIFS for Iao Stream is as follows:

The IIFS just below the diversion operated by WWC on Iao Stream above the Iao-Waikapu and the Iao-Maniania Ditches shall be 10 mgd; provided, however, that when the average daily flow measured at USGS stream-gauge station 16604500 on Iao Stream is between 15 mgd and 10 mgd and has continued in that range for three (3) consecutive days, the greater of one-third (1/3) of the stream flow or 3.9 mgd may be diverted for noninstream use until the flow returns to 15 mgd or above.

Further, when the average flow for any day falls below 10 mgd, commencing the next day and continuing until the average daily flow returns to at least 10 mgd, 3.4 mgd may be diverted for noninstream use.

The intent is to provide adequate water to accommodate DWS's 3.2 mgd for its water treatment plant and the estimated 0.2 mgd used by kuleana users served exclusively by the Iao-Waikapu Ditch.

However, this decision nonetheless is without prejudice to the rights of any party and of CWRM to revisit this issue in the context of any proceeding involving a water use permit application by DWS, in which proceeding DWS will have the burden of justifying its water use.

On March 31, 2009, DWS submitted Surface Water Use Permit Applications (SWUPAs) to CWRM: SWUPA-E for its existing use of 1.784 mgd and SWUPA-N for a new use of 1.416 mgd from the Iao-Waikapu Ditch, for a total of 3.2 mgd. However, the water use permit application proceedings have yet to begin. CWRM has continued the hearings on all existing use SWUPAs and has not yet taken up the matters of the new use SWUPAs.

Hawaii Revised Statutes (HRS) Section 174C-49 sets forth the criteria that must be met for water use permits. Under HRS Section 174C-49, an applicant for a water use permit must establish that the proposed use of water (1) can be accommodated with the available water source, (2) is a reasonable-beneficial use as defined in HRS Section 174C-3, (3) will not interfere with any existing legal use of water, (4) is consistent with the public interest, (5) is consistent with state and county general plans and

land use designations, (6) is consistent with county land use plans and policies, and (7) will not interfere with the rights of the Department of Hawaiian Home Lands. Each of DWS's SWUPAs demonstrate that the proposed use of water can meet each of these criteria.

The closest wetland is the Kanaha Pond Wildlife Sanctuary located approximately 3.5 miles northwest of the project site.

Waihee Ditch, an irrigation canal built in the early 1900s, is located approximately 600 feet east of the project site. The irrigation canal flows in a southerly direction and ends at a reservoir in Maalaea. If the reservoir at Maalaea overflows, it discharges into Pohakea Gulch, which terminates in Kealia Pond, a wetland between Kihei and Maalaea.

**b. Potential Impacts and Mitigation Measures**

The source water for the Iao WTP is the watershed area draining into the upper reaches of Iao Stream. There is a ditch intake in Iao Stream, near Iao Valley State Park, that diverts stream water into Iao Ditch. Shortly downstream of the Iao Ditch intake, the ditch divides into two (2) ditches. The Iao-Maniania Ditch flows north towards Waiehu, and the Iao-Waikapu Ditch flows south towards Maalaea. Where the Iao-Waikapu Ditch crosses Alu Road, an intake diverts water from the ditch into the raw water transmission line that conveys the water to the existing Iao WTP. Refer to **Appendix "A"**.

According to the agreement approved by CWRM, the proposed 3.2 mgd water for the Iao WTP is a reasonable amount and future use of water from Iao Stream for purposes of the restoration of stream flows under an amended IIFS. Based on the provisions of the agreement for the IIFS, there are no anticipated impacts to the Iao Stream.

Under existing conditions, stormwater runoff sheetflows east of the project site. Runoff normally infiltrates into the open field lands, but in intense storm events, runoff may reach and enter the Waihee Ditch, which is approximately 600 feet from the project site. The proposed project involves the development of a storm drain system which will reduce the runoff flowing into the Waihee Ditch. More detailed discussion on the drainage system is provided later in this chapter.

The proposed project also involves the construction of a dual-compartment concrete sludge lagoon for gravity solids-liquid separation of backwash water from the filtration membrane units. The decanted treated water will be conveyed by a 12-inch drainline from the sludge lagoon to a discharge point into Waihee Ditch. An NPDES permit will be required for this discharge.

The water quality of discharges into the Waihee Ditch will meet levels acceptable to State of Hawaii Department of Health – Clean Water Branch (CWB) under their permitting requirements and comply with the State’s Water Quality Standards.

7. **Flora and Fauna**

a. **Existing Conditions**

The project site lies on former agricultural lands that slope gently down to the east from the West Maui Mountains. Original vegetation in the area consisted of a dense low saturated native forest and shrubland. However, the area was cleared for sugar cane cultivation in the mid 1800s and the land was plowed, planted, burned, and harvested in continuous cycles for over 100 years. When sugar production ended in the 1990s, the area was converted to cattle grazing. These agricultural practices, along with recent fires, have resulted in an environment that is nearly lacking native plants and animal species.

A Biological Resources Survey was conducted for the project site by Robert Hobdy in August 2013. See **Appendix “D”**. The vegetation throughout the project area is dominated by non-native species that are of no particular environmental interest or concern. Just one (1) common indigenous plant, uhaloa, was found growing in a recently disturbed area. No federally listed Endangered or Threatened plant species (USFWS, 2013) were found, nor do any plants that are candidates for such status occur on the project area. No special plant habitats occur on or near the project and no potential wetlands occur in this dry upland site.

Just one (1) non-native mammal, the mongoose (*Herpestes auro-punctatus*), was observed during two (2) site visits to the project area. Deep dense grass made it difficult to see small terrestrial mammals but one would expect there to also be mice (*Mus domesticus*), rats (*Rattus* spp.), and

perhaps feral cats (*Felis catus*) in the project area. A special effort was made to look for the native Hawaiian hoary bat by making an evening survey of the area. When present in an area these bats can be easily identified as they forage for insects, their distinctive flight patterns clearly visible in the glow of twilight. No evidence of such activity was observed though visibility was excellent. Birdlife was rather sparse in and around the project area due to the lack of habitat diversity and food resources. Just six (6) species of non-native birds were recorded during two (2) site visits.

In summary, the wildlife within and around this project area is composed almost entirely of non-native species. Of a total of one (1) mammal, six (6) birds, one (1) reptile, eight (8) insects, only one (1) indigenous dragonfly, the green darner (*Anax junius*) was recorded. This dragonfly, which is widespread in Hawaii, also occurs on the American mainland. No endangered or threatened native animals were found during the survey, nor were any found that are candidates for such status. No special wildlife habitats were found.

**b. Potential Impacts and Mitigation Measures**

There are no endangered or threatened species of flora or fauna found within the project site. The Biological Resources Study concluded that the proposed project is not expected to have any significant negative impacts on the botanical resources in this part of Maui. No recommendations regarding botanical resources are deemed necessary or appropriate. The development of this proposed project is not expected to have a significant negative impact on the native wildlife resources in this part of the island.

While no protected seabirds were found on the property, the uau or dark rumped petrel (*Pterodroma sandwichensis*) and ao or Newell's shearwater (*Puffinus newelli*) are known to overfly the area at dawn and dusk to their burrows high in the mountains between the months of March and November. In late fall, young birds fledge from their burrows to take their first tentative flights out to sea. These inexperienced birds are easily confused and distracted by bright lights and often crash to the ground where they are particularly vulnerable to being run over by vehicles or killed by predators. It is recommended that any significant outdoor lighting such as street lights or flood lights that are incorporated into the

project design be shielded to direct the light downward so that it is not visible from above. Refer to **Appendix “D”**.

## **8. Archaeological Resources**

### **a. Existing Conditions**

An Archaeological Assessment of the project area was completed by Scientific Consultant Services, Inc. (SCS) on October 2013. See **Appendix “E”**. The assessment involved conducting an Archaeological Inventory Survey comprised of historic background research and a pedestrian survey. The assessment was done to determine the presence or absence of architecture, midden deposits, and/or artifact deposits on the surface of the project area, and assess the potential for presence of subsurface cultural deposits.

As previously mentioned, the project site is part of a larger agricultural parcel that was previously used for sugar cane cultivation and land for pasture. The parcel has clearly experienced land alteration by earthmoving activities associated with construction of the adjacent water tank facility and previous agricultural and road building activities.

Fieldwork investigation conducted on August 30, 2013 by SCS revealed no surface materials and areas thought to potentially contain subsurface cultural materials. Also, no new sites, surface features or midden scatters were identified during the pedestrian survey. The ground surface and subterranean reaches of the parcel have been heavily modified through time by intensive industrial sugar cane plantation cultivation.

### **b. Potential Impacts and Mitigation Measures**

The Archaeological Assessment’s 100 percent pedestrian survey of the project area did not lead to the identification of any surface cultural remains. Historic and modern era agricultural and water storage construction activities have likely disturbed any previously existing sites or surface deposits. The Archaeological Assessment report concluded that the proposed project will not have an adverse impact on any archaeological sites or features. The Archaeological Assessment was filed with SHPD for review and approval.

Archaeological Monitoring is not recommended during construction activities for the project. However, should the inadvertent discovery of significant cultural materials and/or burials occur during construction, all work in the immediate area of the find shall cease and SHPD will be notified to discuss mitigation. Refer to **Appendix “E”**.

9. **Cultural Resources**

a. **Existing Conditions**

Within the Hawaiian cultural context, the project site is located within Wailuku ahupuaa, which translated means “water [of] destruction,” referring to the battle of Ke Pani Wai, between Kamehameha I and Kalanikupule.

The Wailuku area is known for the occupancy of chiefly individuals, with many chiefs and much of the area’s population residing near or within portions of Iao Valley and lower Wailuku. The Wailuku District and Wailuku ahupuaa are frequently mentioned in historical texts and oral-tradition accounts as being politically, ceremonially, and geographically important areas during traditional times. The area was likely settled between c. A.D. 1100 and A.D. 1200. Scattered amongst the agricultural and habitation sites were other places of cultural significance. The Wailuku District was a center of political power often at war with its rival in Hana.

During the Great Mahele of 1848, the Wailuku District was declared Crown Land. Approximately 180 Land Commission Awards (LCA) were granted in Wailuku ahupuaa and 100 were granted in the neighboring Waikapu ahupuaa. While a handful of foreigners gained control of large parcels of land that would later be used for commercial sugar cane production, the majority of LCAs were awarded to Native Hawaiians, suggesting that the area was densely populated in the mid-19<sup>th</sup> century. The project site falls under LCA 387, which was awarded to the American Board of Commissioners for Foreign Missions.

Land use in and around the project area in the mid-19<sup>th</sup> and early 20<sup>th</sup> centuries was largely devoted to commercial sugar cane and pineapple production. Sugar plantations and mills have been located in the Wailuku and Waikapu area since the 1860s. The Hopoi Sugar Camp, which shows

up on maps dated to 1922, was located just south of the project area near the Hopoi Reservoir. Refer to **Appendix “E”**.

A Cultural Impact Assessment interview was conducted on October 19, 2013 with Mr. Carl Izumi who lived in the house located directly below the existing Iao Water Tank site. Prior to moving into the house below the water tank, their family lived a couple miles away at a different location in Wailuku town on Vineyard Street. During the times he lived next to the water tank and through the years his family owned the house after him leaving the island over 40 years ago, he does not recall any cultural practices taking place in the vicinity of the Iao Water Tank. See **Appendix “F”**.

Another Cultural Impact Assessment interview was conducted on November 19, 2014 with Mrs. Tomiko “Helen” Yamagata at her residence on Vineyard Street which is about 0.57 miles from the project site. Mrs. Yamagata lived at this location in Wailuku for the past 68 years after being married. Prior to living on Vineyard Street, she lived on Kahookele Street in Wailuku and worked as a seamstress at the Wailuku Hotel next to Kress Store off of Market Street. She later was a self-employed seamstress working from her home while raising her children. She babysat for one (1) of her daughters that lived in Wailuku Heights so she and her husband frequently drove by the project site to and from their residence. She was also an avid runner and later walker that covered many routes and long distances in the Wailuku area daily. Her recollection of the area was that it was all in cane field cultivation and throughout the decades, she has not observed any cultural or gathering practices on the project site and surrounding area. Refer to **Appendix “F”**.

Although the slopes of the West Maui Mountains and the nearby Iao Valley are both culturally significant areas to Native Hawaiians, the land underlying the proposed WTP itself does not appear to host any cultural practices.

**b. Potential Impacts and Mitigation Measures**

From a recent historical perspective, land underlying the proposed project site was primarily used for commercial sugar cane cultivation and pastureland. Also, the Cultural Impact Assessment interviews revealed no

indications of cultural practices, such as gathering, access, or religious traditions, known to be associated with the existing tank and adjacent project site.

With reference to the project site, no adverse impact to cultural resources, practices, and traditions anticipated.

## 10. Air Quality

### a. Existing Conditions

The project site, in general, does not experience adverse air quality conditions. There are no point sources of airborne emissions within close proximity to the project site. Point sources in the surrounding Central Maui region include the Maalaea Power Plant, Puunene Sugar Mill, and rock quarry at Puunene, all of which are well over two (2) miles from the project site. Non-point sources of pollution in the vicinity of the project site include: vehicular exhaust from High Street, Honoapiilani Highway and other nearby roadways; dust generated by construction activities in the Kehalani Mauka development; and/or burning activities from sugar cane harvesting and cultivation operations conducted in the central valley area. Emissions from these sources, however, are quickly dispersed by prevailing tradewinds.

### b. Potential Impacts and Mitigation Measures

During construction, airborne particulates as a result of construction-related activities may temporarily affect the ambient air quality within the immediate vicinity of the project site. The project will comply with regulations established in Hawaii Administrative Rules (HAR), Chapter 11.60.1, "Air Pollution Control" and Section 11-60.1-33, "Fugitive Dust". Mitigative measures will include utilization of water wagons and sprinklers to control dust, as well as other appropriate Best Management Practices to ensure that fugitive dust from the project area is minimized. By effectively employing these mitigative measures, construction-related activities are not anticipated to pose a significant impact to the air quality in the surrounding area.

From a long-term perspective, adverse impacts to air quality are not anticipated.

## 11. Noise

### a. Existing Conditions

The predominant source of noise in the vicinity of the project site stems from traffic traveling along Iao Valley Road, South Alu Road, West Alu Road, and other roadways in the area. The lands abutting the site are former agricultural lands that are currently vacant and undeveloped. Single-family homes located to the south, west, and east of the project site are not major noise-generators.

### b. Potential Impacts and Mitigation Measures

Ambient noise conditions may be temporarily affected by construction-related activities. Heavy construction machinery and equipment are anticipated to be the dominant noise-generating sources during the construction period. Mitigation measures for construction-related activities will include using proper equipment and conducting regular vehicle maintenance, both of which are anticipated to reduce noise levels. Equipment mufflers or other noise attenuating equipment may also be employed as required. Noisy construction activities will be restricted to hours between 7:00 a.m. and 3:30 p.m., Monday through Friday, excluding holidays. The project will comply with HAR, Chapter 11-46, "Community Noise Control" and obtain a noise permit, as applicable. By effectively employing these measures, potential noise-related impacts from construction-related activities will be mitigated to an acceptable level. Ambient noise impacts associated with the project will be limited to a 24-month time frame during which the construction of the project will be completed.

Upon completion of the project, equipment such as compressors, blowers, and the standby generator within the TPB will generate noise. These equipment items will be housed within sound attenuated rooms inside the TPB such that applicable State of Hawaii Department of Health day-time and nighttime noise limits at the property lines are met for the compressor and blower. Refer to **Appendix "A"**.

From a long-term perspective, the proposed Iao WTP is not anticipated to result in adverse noise impacts.

## 12. Scenic and Open Space Resources

### a. Existing Conditions

Scenic resources in the vicinity of the project site include the West Maui Mountains to the West and the Central Maui's isthmus and Haleakala to the east. Open space resources in the region include the slopes of the West Maui Mountains. Background views beyond the existing site from ground level are limited due to the terrain and natural vegetation and trees that surround the area. Scenic and open space views looking makai are best seen when travelling downhill along West Alu Road from the Old Wailuku Heights area. Ground views looking mauka up towards the West Maui Mountains are obscured by the terrain and dense tree forest.

### b. Potential Impacts and Mitigation Measures

The proposed project involves constructing a Treatment Plant Building (TPB) and related facilities mauka of the existing Iao water tank. West Alu Road, that perimeters the north and west boundaries of the site, rises from an elevation of 527.2 feet up to 557.85 feet. Contour elevations of the site gently rise up to meet with the road elevations. The higher side of the site will be excavated down to create a level pad for the TPB and Chlorine Contact Tank (CCT) and appurtenant facilities. The maximum heights from the finished grade to the top of the TPB and CCT are about 29 feet and 28 feet, respectively. Views down to the slopes of Haleakala and Central Maui's isthmus will still be visible from West Alu Road's upper elevation approach. Additionally, DWS will install landscaping on the southern boundary of the project site to provide visual mitigation for the facility. Refer to **Appendix "C"**, Preliminary Development Plans, Sheet L-3. As such, the proposed project will not negatively affect scenic resources. Furthermore, the TPB and CCT footprints will occupy only 9,800 square feet and 2,180 square feet, respectively. Therefore, the project is not anticipated to adversely affect open space resources.

## 13. Beach and Mountain Access

### a. Existing Conditions

The project site is located approximately 2.5 miles from the nearest beach and approximately a quarter of a mile from the foot of the West Maui Mountains. Further, cultural interviews conducted for the proposed

project concluded that there are no activities related to gathering, access, or other customary activities occurring at the project site.

**b. Potential Impacts and Mitigation Measures**

There are no traditional access corridors identified by the Cultural Assessment within the project site and due to the distances to the nearest beach and mountain, there are no anticipated adverse impacts to beach and mountain access from the proposed project.

**B. SOCIO-ECONOMIC ENVIRONMENT**

**1. Population**

**a. Existing Conditions**

The population of the County of Maui has exhibited relatively strong growth over the past decade. In 2010, there were 154,834 residents in the County, a 21 percent increase in the resident population since 2000. The Wailuku-Kahului region is the most populous region in the County and has grown at a faster rate than the County as a whole. In 2010, there were approximately 54,400 residents living in the Wailuku-Kahului region, a 31 percent increase over the last decade (U.S. Census Bureau, 2000 and 2010). Population in the County of Maui is projected to grow to 199,550 residents by 2030 while the Wailuku-Kahului region is anticipated to have approximately 71,200 residents (County of Maui, Department of Planning, 2006).

**b. Potential Impacts and Mitigation Measures**

The proposed project involves the replacement of the existing Iao WTP and is not considered a population generator. As such, significant impacts to population are not anticipated to result from project implementation.

**2. Economy**

**a. Existing Conditions**

The Wailuku region is Maui County's center of governmental activity. Along with neighboring Kahului, the region encompasses a broad range of commercial, service, and public sector activities. In addition, the region is surrounded by approximately 32,000 acres of sugar cane. This vast

expanse of agricultural land, managed by Hawaiian Commercial & Sugar Company (HC&S), is a key contributor to the local economy.

Not-seasonally-adjusted unemployment rates for both Maui County and the Island of Maui in December 2014, were 3.8 percent and 3.6 percent, respectively. These rates both decreased from the December 2013 when unemployment rates stood at 4.7 percent and 4.5 percent, respectively (DLIR, January 2015).

**b. Potential Impacts and Mitigation Measures**

In the short term, the proposed project will provide construction-related revenue and employment. Accordingly, the project will have a beneficial impact on the local economy during the construction phase.

In the long term, the facility is not anticipated to significantly impact Maui County's economy. DWS anticipates two (2) to three (3) employees at the Iao WTP during the week once completed. No new positions are expected to be required to staff the replacement facility.

**C. PUBLIC SERVICES**

**1. Police and Fire Protection**

**a. Existing Conditions**

Police protection for the Wailuku and Waikapu region is provided by the Maui County Police Department headquartered on Mahalani Street, approximately 1.5 miles north of the project site. The region is served by the Department's Central Maui station, which is divided in three (3) sectors. Each sector is divided into three (3) beats, each patrolled by a single officer.

Fire prevention, suppression, and protection services for the Waiehu, Waihee, and Wailuku regions are provided by the County Department of Fire and Public Safety's Wailuku station, located on Kinipopo Street in Wailuku Town, approximately 0.9 mile northeast of the project site. The region is also served by the Department's Kahului Station, located on Dairy Road, approximately 3.7 miles east of the project site.

**b. Potential Impacts and Mitigation Measures**

The proposed project will not affect the service area limits or personnel for police and fire protection. The proposed facility is not anticipated to impact calls for service for police and fire personnel.

**2. Medical Services**

**a. Existing Conditions**

The island's major medical facility is Maui Memorial Medical Center, located approximately 3.0 miles north of the project site, midway between Wailuku and Kahului. Acute, general, and emergency care services are provided at the 231-bed facility. Other private medical service providers in the Central Maui region, which have regular hours, include Maui Medical Group and Kaiser Permanente.

**b. Potential Impacts and Mitigation Measures**

As a non-habitable project, the proposed facility will not affect requirements for medical services. As with police and fire protection services, service area limits for medical emergency responders will not be affected by the proposed project.

**3. Solid Waste**

**a. Existing Conditions**

Single-family residential solid waste collection service is provided by the County of Maui. Residential solid waste collected by County crews is disposed at the County's Central Maui Landfill, located four (4) miles southeast of the Kahului Airport. Commercial waste from private collection companies is also disposed at the Central Maui Landfill. A County-operated green waste recycling facility is located at the Central Maui Landfill.

Maui Demolition and Construction Landfill, a privately owned facility, accepts solid waste and concrete from demolition and construction activities. This facility is located at Maalaea, south of the project site, near Honoapiilani Highway's junction with North Kihei Road and Kuihelani Highway.

b. **Potential Impacts and Mitigation Measures**

Construction waste which may be generated from implementation of the project will be recycled or disposed of at the appropriate construction waste disposal location. With these solid waste management measures, the contribution of construction waste to the landfills will be minimized. Thus, the proposed action is not anticipated to adversely affect capacity parameters of the County's solid waste system.

4. **Recreational Resources**

a. **Existing Conditions**

The County's Wailuku Elementary School Park is located less than a quarter of a mile from the site, providing baseball/softball fields, basketball courts, a volleyball court, and a playground.

b. **Potential Impacts and Mitigation Measures**

As the proposed project is not considered to be a population generator, it will not create a need for additional recreational facilities. Therefore, the proposed project is not anticipated to adversely impact existing public recreational facilities.

5. **Schools**

a. **Existing Conditions**

The Wailuku-Kahului region is served by the State Department of Education's (DOE) public school system and by several privately operated schools. Public schools operated by DOE in the Kahului area include Lihikai, Kahului, and Pomaikai Elementary Schools (Grades K-5); Maui Waena Intermediate School (Grades 6-8); and Maui High School (Grades 9-12). Existing DOE public schools in the Wailuku area include Wailuku Elementary School (Grades K-5); Iao Intermediate School (Grades 6-8); and Baldwin High School (Grades 9-12). The University of Hawaii-Maui College, located north of the project site in Kahului, serves as the island's primary higher education institution. A new public elementary school, the Puu Kukui Elementary School (Grades K-5), recently opened within the Kehalani Mauka development.

b. **Potential Impacts and Mitigation Measures**

The proposed facility is a non-residential project and is not anticipated to impact school enrollments or facility requirements.

**D. INFRASTRUCTURE**

1. **Roadways**

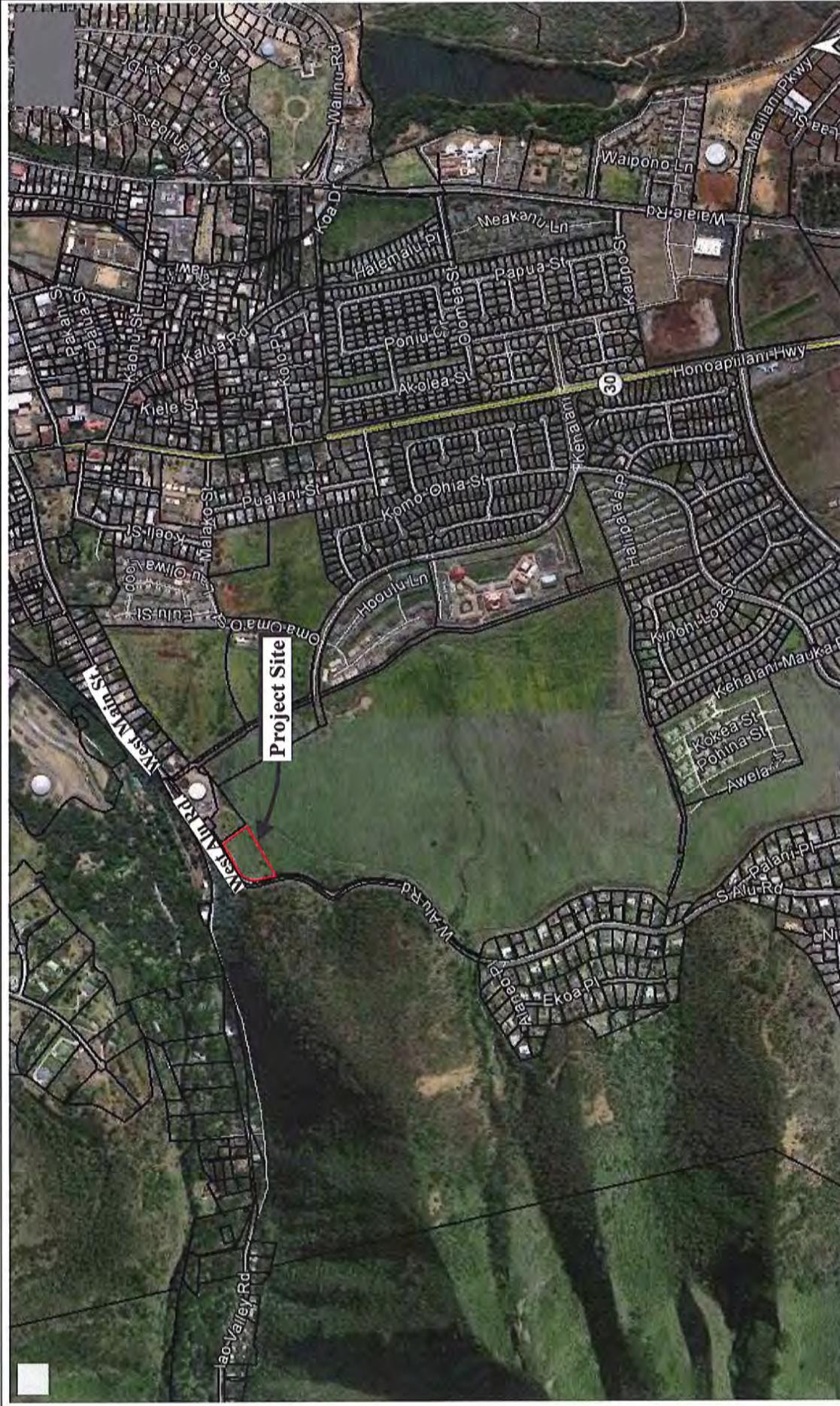
a. **Existing Conditions**

The proposed Iao WTP site will be located on an undeveloped parcel adjacent to West Alu Road. Currently, there is no vehicular access to the proposed project site.

West Alu Road is a two-lane roadway that originates at the junction with Iao Valley Road and West Main Street. West Alu Road provides access through the Wailuku Heights residential neighborhood while Iao Valley Road continues west into Iao Valley. West Main Street is a two-lane east-west roadway that runs through Wailuku Town. See **Figure 8**.

b. **Potential Impacts and Mitigation Measures**

Access to the project site will be by a new driveway off of West Alu Road. No roadway improvements are included in the WTP design other than the proposed driveway entrance. There will be a short-term increase in traffic during construction of the new Iao WTP associated with construction workers and equipment entering and leaving the project site. A maximum of 20 to 25 construction employees are expected to work at the project site. Parking for construction employees will be located on the project site to minimize additional traffic impacts. Limited construction access use will be confined to the two (2) year construction period. Construction of the proposed project is not anticipated to significantly impact pedestrian or vehicular movement and minimal road or lane closures are expected during the course of the project.



Source: Google Earth Pro

**Figure 8** Proposed Iao Water Treatment Plant Upgrades  
Regional Roadway Map



NOT TO SCALE

Prepared for: County of Maui, Department of Water Supply



ATA:Iao WTF Upgrades\RegionalRoadwayMap

Once the facility is in operation, there will be two (2) to three (3) DWS employees working at the WTP, seven days a week. Based on this anticipated level of maintenance and monitoring, significant long-term impacts to traffic conditions in the vicinity of the WTP site are not anticipated.

## 2. Water

### a. Existing Conditions

The source raw water for the Iao WTP for treatment is the watershed area draining into the upper reaches of Iao Stream. There is a ditch intake in Iao Stream, near Iao Valley State Park, that diverts stream water into Iao Ditch. Shortly downstream of the Iao Ditch intake, the ditch divides into two (2) ditches. The Iao-Maniania Ditch flows north towards Waiehu, and the Iao-Waikapu Ditch flows south towards Maalaea. Where the Iao-Waikapu Ditch crosses Alu Road, an intake diverts water from the ditch into the raw water transmission line that conveys the water to the Iao WTP. Refer to **Appendix "A"**.

As previously noted, the amount of water allowed for use at the Iao Water Treatment Plant was arrived at in a recent agreement accepted by all parties (Hui o Na Wai Eha, Maui Tomorrow Foundation, the Office of Hawaiian Affairs, Hawaiian Commercial and Sugar Company, Wailuku Water Company, the County of Maui Department of Water Supply, and the State of Hawaii Commission on Water Resource Management). Impacts to streams were taken into consideration during discussions on the agreement. With anticipated growth in the Central Maui system that encompasses customers from Hookipa to Makena, and the fact that the Iao aquifer is nearing its sustainable yield, surface water is needed to provide water for future growth.

### b. Potential Impacts and Mitigation Measures

The proposed project involves replacing the existing Iao WTP, which has a capacity to produce approximately 1.7 mgd of treated water, with a new WTP. The new WTP is designed to produce an average of up to 3.2 mgd of treated water.

As previously noted, CWRM concluded that the water diverted from Iao Stream for the Iao WTP is a reasonable current and future use for purposes of the restoration of stream flows under an amended IIFS. Further, the IIFS agreement between the parties noted the 3.2 mgd for the DWS' Iao WTP. It is noted that DWS submitted Surface Water Use Permit Applications (SWUPAs) to CWRM: SWUPA-E for its existing use of 1.784 mgd and SWUPA-N for a new use of 1.416 mgd from the Iao-Waikapu Ditch, for a total of 3.2 mgd. However, the water use permit application proceedings are pending as CWRM has continued the hearings on all existing use SWUPAs and has not yet taken up the matters of the new use SWUPAs.

### **3. Wastewater**

#### **a. Existing Conditions**

The site is presently vacant and undeveloped with no wastewater being generated. There is an existing off-site 8-inch sewer gravity line and manhole along West Alu Road approximately 700 feet downhill of the site. The existing 8-inch sewerline is part of the Central Maui Wastewater Collection System which conveys wastewater for treatment to the Kahului Wastewater Reclamation Facility.

#### **b. Potential Impacts and Mitigation Measures**

Wastewater generated from the Restroom and Break Room in the TPB will be conveyed to an on-site 6-inch gravity line with cleanouts. The 6-inch gravity line will transition into an off-site 8-inch gravity line with manholes within West Alu Road. The 8-inch gravity line will then convey the wastewater to a discharge point into an existing sewer manhole along West Alu Road approximately 700 feet downhill of the project site. Refer to **Appendix "A"**.

The wastewater flow from the TPB is estimated to be 60 gallons per day, which is minimal. Therefore, wastewater generated from the TPB is not anticipated to negatively impact the existing sewer collection and treatment plant facilities in the central region.

#### 4. Drainage

##### a. Existing Conditions

The project site is currently undeveloped and covered with dense high grass. The land slopes from west to east averaging approximately nine (9) percent. Elevations range from 508 to 560 feet msl. West Alu Road is situated slightly higher and borders the site's north and west boundaries.

Annual rainfall is around 37 inches, making the climate semi-arid. Rainfall is also highly seasonal with 90 percent of the annual rainfall occurring between October and May. The 10- and 50-year, 1-hour rainfall is 2.5 and 3.6 inches, respectively.

Site runoff drains over land as sheet flow to the east through vacant open land. There are no drainageways or areas of concentrated flow. Runoff normally infiltrates into the open field lands but in intense storm events, runoff may reach and enter Waihee Ditch which is located approximately 600 feet makai of the site. Waihee Ditch flows to Waiale Reservoir via the Hopoi Chute and to irrigated agricultural fields. Refer to **Appendix "B"**.

Existing storm water runoff from the project site under the 10-year storm is 4.15 cubic feet per second (cfs). Mountainous offsite land above West Alu Road contributes an additional 33.15 cfs of runoff. The total runoff flowing through the project site to Waihee Ditch is 37.30 cfs.

The project site is not within any Federal Emergency Management Agency (FEMA) flood zone area. The area lies within Zone X, which are areas determined to be outside the 0.2 percent annual chance (500-year) floodplain. Refer to **Figure 7**.

##### b. Potential Impacts and Mitigation Measures

Proposed site grading will feature excavation on the mauka end and embankment of the makai end to create a relatively level pad area. Embankment slopes will be limited to two (2) feet horizontal to one (1) foot vertical with no retaining walls. Maximum cut will be about 16 feet and the maximum embankment will be 8 feet.

The proposed project is within the Kehalani Mauka Development (KMD) which has an approved drainage master plan by Warren S. Unemori Engineering titled "Drainage Report, Kehalani Offsite Drainage System – Phase 1, Wailuku, Maui, Hawaii, Revised January 2004". The report designed the current back-bone drainage system that collects and conveys KMD runoff to a downstream stormwater management system which includes the 490 acre-foot Waikapu Retention Basin located adjacent to Waiale Road.

The runoff from the proposed project site and its offsite contributing area will be collected and conveyed to the Waikapu Retention Basin. The proposed storm drainage system will consist of a 36-inch inlet headwall to collect offsite runoff entering the site from offsite mountainous areas from the west through the existing 36-inch West Alu Road culvert. Eight (8) grated drain inlets will collect runoff from the project site and other offsite areas. This runoff will be conveyed via adequately sized storm sewer pipes, approximately 1,500 feet to Kehalani Parkway to connect into a 54-inch storm drain pipe located within Kehalani Mauka Parkway and directed to the Waikapu Retention Basin. Management of peak runoff is provided by the Waikapu Retention Basin, which is designed to fully retain the 100-year, 24-hour runoff from full build out of all phase of the Kehalani Mauka Development plus its mauka offsite contributing areas.

The proposed improvements for this project will be designed in accordance with the Department of Public Works (DPW) Storm Drainage Rules and will conform to the drainage design set forth in the approved KMD Drainage Master Plan. With implementation of the proposed storm drain system, the runoff flowing into Waihee Ditch will decrease from 37.30 cfs under existing conditions to 1.21 cfs, a decrease of 36 cfs. Runoff that will be conveyed to the Waikapu Retention Basin will total 43.12 cfs. The runoff from this project will be completely retained in the basin resulting in zero discharge into any downstream drainage system.

During the construction phase of the project, temporary Best Management Practices (BMP) will be implemented to prevent pollution of downstream resources. In the long term, the basin will capture all suspended solids and potential pollutants to not contribute to any downstream drainageways. Furthermore, a Stormwater Runoff Control Practices and Maintenance Plan will be developed to properly manage permanent BMP features on the future site. Refer to **Appendix "B"**.

The proposed drainage design and development of a Stormwater Runoff Control Practices and Maintenance Plan will insure that the project will have no adverse effects on the existing facilities or on the surrounding environment.

**5. Electricity and Telephone Systems**

**a. Existing Conditions**

Electricity and telephone service in the project vicinity is provided by an overhead system along West Main Street and West Alu Road.

**b. Potential Impacts and Mitigation Measures**

The project will require at least one (1) new Maui Electric Company, Ltd. (MECO) pole to cross West Alu Road via overhead conductors. A riser from the last pole will convert to an underground feed to a new MECO pad-mounted transformer. A standby generator installed at the WTP will automatically start-up to provide full back-up power in the event of a utility outage.

The telephone service for the new treatment building will utilize at least one (1) new MECO pole to cross West Alu Road via overhead conductors.

Addition of these utility services is not anticipated to have adverse impacts on the electrical and telephone services in the area.

**E. CUMULATIVE AND SECONDARY IMPACTS**

Cumulative impacts are defined by Title 11, Chapter 200, HAR, Environmental Impact Statement Rules as:

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

A "secondary impact" or "indirect effect" from the proposed action are defined by Title 11, Chapter 200, HAR as

*"effects which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable."*

In this case, the context for analyzing secondary and cumulative impacts is defined by the time horizon within which “reasonably foreseeable” conditions may occur. From a local planning standpoint, the future context for water use and development is established by the Water Use and Development Plan (WUDP) and the Maui County General Plan. Both documents are inseparable, as the General Plan defines parameters for growth, while the WUDP provides a means for meeting the needs of this planned growth. The updated WUDP for Central Maui was adopted by the County Council in December 2010 while the General Plan was updated in 2012. Both documents plan for the horizon year 2030. Both planning documents utilize the same technical data base for planning consistency purposes. Thus, “reasonably foreseeable” conditions may be considered within this future context.

The Maui County General Plan, as set forth in Chapter 2.80.B of the Maui County Code, provides for the update of the County General Plan. The General Plan is a long-term, comprehensive blueprint for the physical, economic, environmental development and cultural identity of the County through 2030. The components of the General Plan include the following:

- The Countywide Policy Plan provides broad policies and objectives which portrays the desired direction of the County’s future. It includes a countywide vision, statement of core principles, and objectives and policies for population, land use, the environment, the economy, and housing.
- The Maui Island Plan (MIP) provides a land use strategy, water assessment, nearshore ecosystem assessment, an implementation strategy, and milestone measurements. An essential element of the MIP is a Managed and Directed Growth Plan which identifies existing and future land use patterns and determines planned growth.
- The nine (9) Community Plans provide implementing actions based on consistency with the Countywide Policy Plan and MIP’s vision, goals, objectives, and policies.

A discussion of how the proposed project is consistent with specific goals, objectives, and policies of the Countywide Policy Plan, Maui Island Plan, and Wailuku-Kahului Community Plan are presented in Chapter III of this EA document.

Whereas the Countywide Policy Plan covers planning goals and objectives at the broadest levels, and the regional Community Plans consider specific regional needs and opportunities, the MIP and the WUDP may be viewed as parallel plans, in that both address functional elements of the General Plan, and both address islandwide growth parameters which will ultimately dictate water consumption patterns on the island.

The MIP is used by the County Council, Maui Planning Commission, County administration and the community as a policy foundation for day-to-day decision making by doing the following:

- Providing direction for the development of future policies and regulations (for example, zoning and other ordinances, guidelines and area-specific plans that describe what kind of development can occur where);
- Providing policies to help determine the appropriateness of development proposals; and
- Assigning resource for capital investments and programmatic initiatives.

The Directed Growth Plan, which is a key element of the MIP, provides a framework for managing outcomes of growth based on analysis of natural hazards, sensitive lands, cultural resources, scenic corridors, and related environmental and human community parameters. An important component of the Directed Growth Plan is maps that delineate urban and rural growth areas. Referred to as Urban and Rural Growth Boundaries, these maps set the boundaries for the physical limits of development. In so doing, the Directed Growth Plan seeks to manage the use of non-urban and non-rural resources important in sustaining the island to the year 2030.

In light of the foregoing, the assessment of cumulative and secondary impacts is undertaken in the context of planned growth recommended by the General Plan update process, particularly the MIP and its Urban and Rural Growth boundary maps. The proposed urban and rural growth boundaries provide the basis for acknowledging that the proposed Iao WTP will facilitate implementation of the General Plan, as mandated by County Charter. Future housing and commercial development currently envisioned by the General Plan within the Central Maui Water Service Area represents the “reasonably foreseeable” future for considering potential impacts of the proposed project. The spatial order of development of these units is not defined, however, as development timelines are governed by market conditions, discretionary approval processes, and landowners’ financial capacity and preference to build. Notwithstanding, proposed water treatment capacity provided by the proposed project will, over time, support the County-planned growth in the region. It is noted that the Iao WTP is but one infrastructural component which is required to ensure that the MIP is implemented as required by the County Charter. Other infrastructure components include the need for sufficient wastewater collection, treatment and disposal capacity, and sufficient regional and local transportation system networks that will provide for community connectivity and mobility.

In summary, the proposed is being planned in consideration of the long-term infrastructural requirements necessary to support planned future growth in the Central Maui region. The proposed project is not anticipated to have a significant adverse impact on the physical environment. Assessing the project in the context of the future planned growth in the Central Maui region in the foreseeable future, the proposed action is not anticipated to result in significant adverse secondary or cumulative impacts.

### **III. RELATIONSHIP TO LAND USE PLANS, POLICIES, AND CONTROLS**

### **III. RELATIONSHIP TO LAND USE PLANS, POLICIES, AND CONTROLS**

#### **A. STATE LAND USE DISTRICTS**

Pursuant to Chapter 205, Hawaii Revised Statutes (HRS), all lands in the State have been placed into one (1) of four (4) land use districts by the State Land Use Commission. These land use districts have been designated “Urban”, “Rural”, “Agricultural”, and “Conservation”. The Iao WTP site (Parcels 67 and 91) is classified as mainly “Urban” with a small portion of Parcel 91 designated “Agricultural” and is a permitted use within both districts. See **Figure 9**.

#### **B. CHAPTER 226, HRS, HAWAII STATE PLAN**

Chapter 226, HRS, also known as the Hawaii State Plan, is a long-range comprehensive plan which serves as a guide for the future long-range development of the State by identifying goals, objectives, policies, and priorities, as well as implementation mechanisms. The proposed action is consistent with the following goals of the Hawaii State Plan:

*A strong, viable economy, characterized by stability, diversity, and growth, that enables the fulfillment of the needs and expectations of Hawaii's present and future generations.*

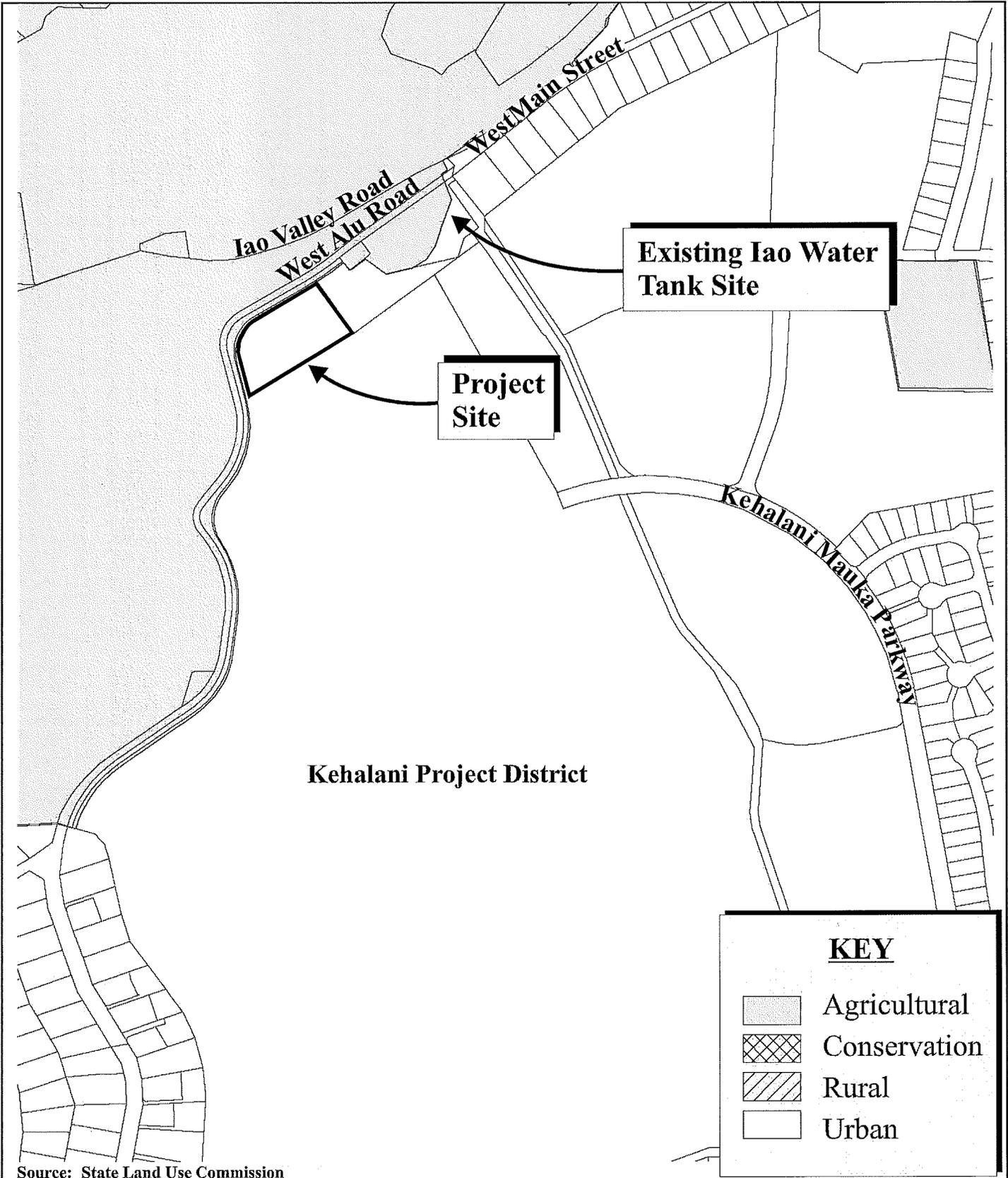
##### **1. Objectives and Policies of the Hawaii State Plan**

The proposed action is consistent with the following objectives and policies of the Hawaii State Plan:

##### **Chapter 226-11, HRS, Objectives and Policies for the Physical Environment - Land-Based, Shoreline, and Marine Resources**

**226-11(b)(3), HRS:** *Take into account the physical attributes of areas when planning and designing activities and facilities.*

**226-11(b)(4), HRS:** *Manage natural resources and environs to encourage their beneficial and multiple use without generating costly or irreparable environmental damage.*



Source: State Land Use Commission

**Figure 9** Proposed Iao Water Treatment Plant Upgrades  
State Land Use District Map



226-11(b)(8), HRS: *Pursue compatible relationships among activities, facilities, and natural resources.*

**Chapter 226-13, HRS, Objectives and Policies for the Physical Environment - Land, Air, and Water Quality**

226-13(b)(2), HRS: *Promote the proper management of Hawaii's land and water resources.*

226-13(b)(3), HRS: *Promote effective measures to achieve desired quality in Hawaii's surface, ground, and coastal waters.*

**Chapter 226-14, HRS, Objectives and Policies for the Facility Systems - In General**

226-14(b)(1), HRS: *Accommodate the needs of Hawaii's people through coordination of facility systems and capital improvement priorities in consonance with state and county plans.*

**Chapter 226-16, HRS, Objectives and Policies for the Facility Systems - Water**

226-16(b)(1), HRS: *Coordinate development of land use activities with existing and potential water supply.*

226-16(b)(4), HRS: *Assist in improving the quality, efficiency, service, and storage capabilities of water systems for domestic and agricultural use.*

**2. Priority Guidelines of the Hawaii State Plan**

The proposed action coincides with the following priority guidelines of the Hawaii State Plan.

**Chapter 226-103, HRS, Economic Priority Guidelines:**

226-103(e)(4), HRS: *Explore alternative funding sources and approaches to support future water development programs and water system improvements.*

## C. GENERAL PLAN OF THE COUNTY OF MAUI

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

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

Chapter 2.80B of the Maui County Code, relating to the General Plan and Community Plans, implements the foregoing Charter provision through enabling legislation which calls for a Countywide Policy Plan. The Countywide Policy Plan was adopted as Ordinance No. 3732 on March 24, 2010.

With regard to the Countywide Policy Plan, Section 2.80B.030 of the Maui County Code states the following.

*The countywide policy plan shall provide broad policies and objectives which portray the desired direction of the County's future. The countywide policy plan shall include:*

- 1. A vision for the County;*
- 2. A statement of core themes or principles for the County; and*
- 3. A list of countywide objectives and policies for population, land use, the environment, the economy, and housing.*

Core principles set forth in the Countywide Policy Plan are listed as follows:

- 1. Excellence in the stewardship of the natural environment and cultural resources;*
- 2. Compassion for and understanding of others;*
- 3. Respect for diversity;*
- 4. Engagement and empowerment of Maui County residents;*
- 5. Honor for all cultural traditions and histories;*

6. *Consideration of the contributions of past generations as well as the needs of future generations,*
7. *Commitment to self-sufficiency;*
8. *Wisdom and balance in decision making;*
9. *Thoughtful, island appropriate innovation; and*
10. *Nurturance of the health and well-being of our families and our communities.*

Congruent with these core principles, the Countywide Policy Plan identifies goals objectives, policies and implementing actions for pertinent functional planning categories, which are identified as follows:

1. *Natural environment*
2. *Local cultures and traditions*
3. *Education*
4. *Social and healthcare services*
5. *Housing opportunities for residents*
6. *Local economy*
7. *Parks and public facilities*
8. *Transportation options*
9. *Physical infrastructure*
10. *Sustainable land use and growth management*
11. *Good governance*

With respect to the proposed Iao WTP improvements, the following goals, objectives, policies and implementing actions are illustrative of the compliance with the Countywide Policy Plan.

## **IMPROVE PHYSICAL INFRASTRUCTURE**

### **Goal:**

*Maui County's physical infrastructure will be maintained in optimum condition and will provide for and effectively serve the needs of the County through clean and sustainable technologies.*

### **Objective:**

*Improve water systems to assure access to sustainable, clean, reliable, and affordable sources of water.*

### **Policies:**

- *Ensure that adequate supplies of water are available prior to approval of subdivision or construction documents.*
- *Develop and fund improved water-delivery systems.*
- *Retain and expand public control and ownership of water resources and delivery systems.*
- *Improve the management of water systems so that surface-water and groundwater resources are not degraded by overuse or pollution.*
- *Seek reliable long-term sources of water to serve developments that achieve consistency with the appropriate Community Plans.*

### **Objective:**

*Improve the planning and management of infrastructure systems.*

### **Policies:**

- *Provide a reliable and sufficient level of funding to enhance and maintain infrastructure system.*
- *Maintain inventories of infrastructure capacity, and project future infrastructure needs.*
- *Ensure that infrastructure is built concurrent with or prior to development.*

In summary, the proposed project is consistent with the above-noted themes and principles of the Countywide Policy Plan.

## **D. MAUI ISLAND PLAN**

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

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

1. *An island-wide land use strategy, including a managed and directed growth plan*
2. *A water element addressing supply, demand and quality parameters*
3. *A nearshore ecosystem element addressing nearshore waters and requirements for preservation and restoration*
4. *An implementation program which addresses the County's 20-year capital improvement requirements, financial program for implementation, and action implementation schedule*
5. *Milestone indicators designed to measure implementation progress of the MIP*

It is noted that Ordinance No. 4004 does not address the component relating to the implementation program. Chapter 2.80B of the Maui County Code, relating to the General Plan, was amended via Ordinance No. 3979, October 5, 2012, to provide that the implementation program component be adopted no later than one (1) year following the effective date of Ordinance No. 4004. The implementation program component of the MIP was adopted by Ordinance No. 4126 on May 29, 2014.

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

1. *Population*
2. *Heritage Resources*
3. *Natural Hazards*
4. *Economic Development*
5. *Housing*
6. *Infrastructure and Public Facilities*
7. *Land Use*

Additionally, an essential element of the MIP is its directed growth plan which provides a management framework for future growth in a manner that is fiscally, environmentally, and culturally prudent. Among the directed growth management tools developed through the MIP process are maps delineating urban growth boundaries (UGB), small town

boundaries (SRB) and rural growth boundaries (RGB). The respective boundaries identify areas appropriate for growth and their corresponding intent with respect to development character.

The proposed Iao WTP improvements project is located within the UGB. In this regard, it is consistent with the directed growth strategy defined via growth maps adopted in the MIP.

In addition, the proposed project has been reviewed with respect to pertinent goals, objectives, policies and implementing actions of the MIP. A summary of these policy statements are provided below:

## **INFRASTRUCTURE AND PUBLIC FACILITIES – WATER**

### **Goal:**

*6.3 Maui will have an environmentally sustainable, reliable, safe, and efficient water system.*

### **Objective:**

*6.3.2 Increase the efficiency and capacity of the water systems in striving to meet the needs and balance the island's water needs.*

### **Policies:**

*6.3.2.a Ensure the efficiency of all water system elements including well and stream intakes, water catchment, transmission lines, reservoirs, and all other system infrastructure.*

*6.3.2.d Work with appropriate State and County agencies to achieve a balance in resolving the needs of water users in keeping with the water allocation priorities of the MIP.*

### **Objective:**

*6.3.3 Improve water quality and the monitoring of public and private water systems.*

### **Policy:**

*6.3.3.a Protect and maintain water delivery systems.*

**E. WAILUKU-KAHULUI COMMUNITY PLAN**

The project site is located within the Wailuku-Kahului Community Plan region, one (1) of nine (9) community plan regions established in the County of Maui. Planning for each region is guided by the respective community plan, which is designed to implement the Maui County General Plan. Each community plan contains recommendations and standards which guide the sequencing, patterns and characteristics of future development in the region.

The Wailuku-Kahului Community Plan was adopted by the County of Maui and took effect in 2002. Land use guidelines are set forth by the Wailuku-Kahului Community Plan Land Use Map. The Iao WTP project is designated "Project District 3" by the Wailuku-Kahului Community Plan Map. See **Figure 10** and **Appendix "G"**. The guidelines for Project District 3 calls for:

*...units of all types, including single family detached, attached and various forms of multi-family units including townhouses and garden apartments. Alternatives to promote affordable housing such as experimental and demonstration housing shall be considered in the residential development.*

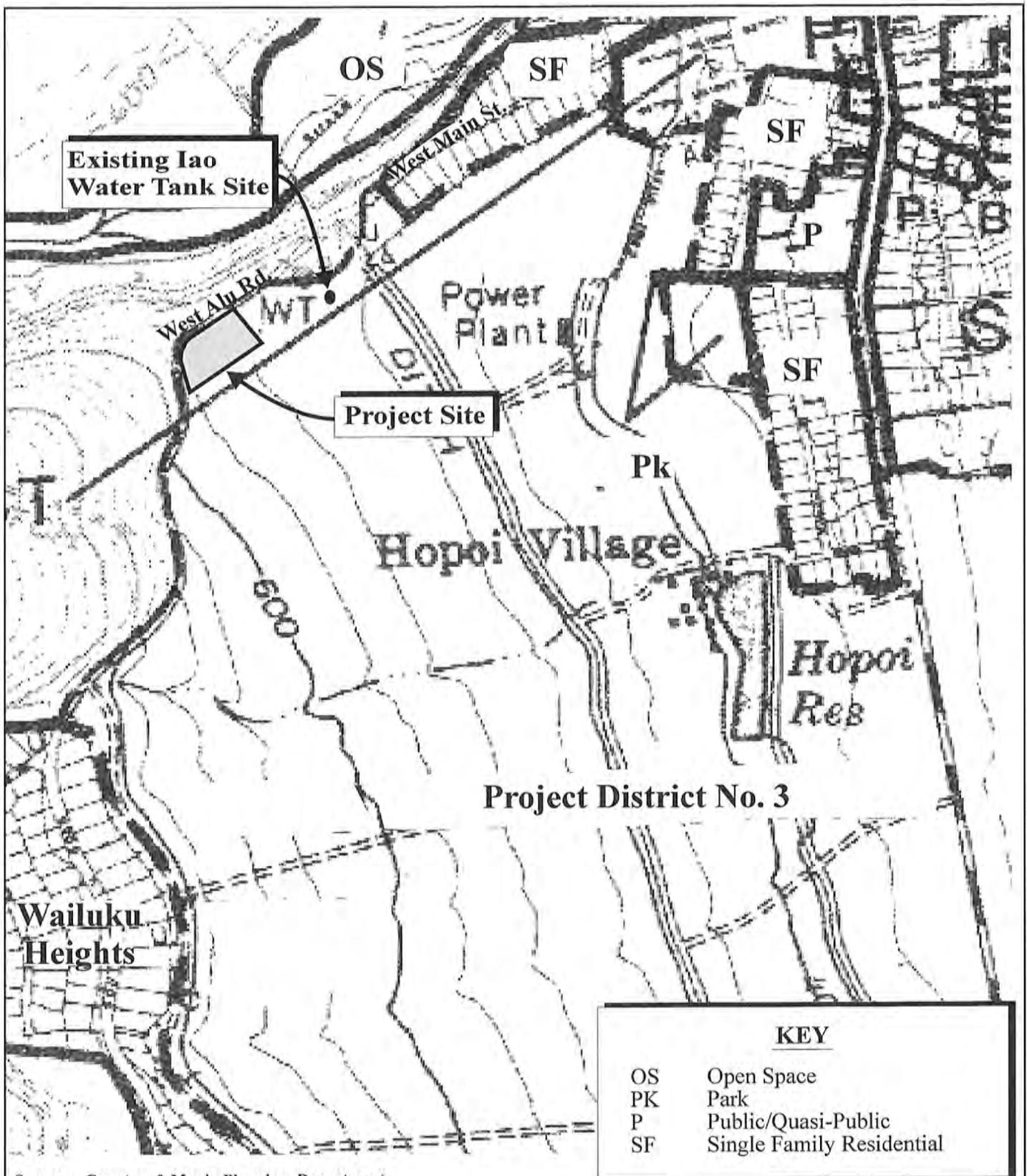
*A neighborhood commercial center of at least 20 acres should be provided with convenient access for residences of the project district and adjacent residential areas. Public amenities should include a continuous system of parks and open space areas which would include pedestrian ways and green-belts with buffer zones along the highway.*

*Public use areas should be reserved within the Project District to accommodate a school, park use and any other public facilities that may be required should the need arise in the future.*

*The immediate construction of the Waiale Road extension, from Honoapiilani Highway to its intersection with the Mahalani Road extension, will facilitate access between Kahului and Wailuku.*

*Recommended guidelines for spatial allocations within the project district are:*

<i>School (elementary)</i>	<i>10 acres</i>
<i>Park</i>	<i>20 acres</i>
<i>Community center</i>	<i>5 acres</i>
<i>Open Space, and drainage</i>	<i>94 Acres</i>



Source: County of Maui, Planning Department

**Figure 10** Proposed Iao Water Treatment Plant Upgrades  
Wailuku-Kahului Community Plan Map

NOT TO SCALE



<i>Neighborhood commercial center</i>	<i>20 acres</i>
<i>Residential use</i>	<i>396 acres</i>
<i>Residential units based on an average density of 5.1 units per acre</i>	<i>2,000 units</i>

The proposed action is consistent with the following goals, objectives, and policies of the Wailuku-Kahului Community Plan.

### **GOVERNMENT**

#### **Goal:**

*Government that demonstrates the highest standards of fairness; responsiveness to the needs of the community; fiscal integrity; effectiveness in planning and implementation of programs and projects; a fair and equitable approach to taxation and regulation; and efficient, results-oriented management.*

#### **Objectives and Policy:**

- *Ensure that adequate infrastructure is or will be available to accommodate planned development.*

### **INFRASTRUCTURE**

#### **Goal:**

*Timely and environmentally sound planning, development and maintenance of infrastructure systems which serve to protect and preserve the safety and health of the region's residents, commuters and visitors through the provision of clean water, effective waste disposal and drainage systems, and efficient transportation systems which meet the needs of the community.*

#### **Objectives and Policies:**

- *Coordinate water system improvement plans with growth areas to ensure adequate supply and a program to replace deteriorating portions of the distribution system. Future growth should be phased to be in concert with the service capacity of the water system.*
- *Improve the quality of domestic water.*

- *Protect water resources in the region from contamination, including protecting ground water recharge areas, and wellhead protection areas within a 1.25-mile radius from the wells.*
- *Coordinate the construction of all water and public roadway and utility improvements to minimize construction impacts and inconveniences to the public.*

## **F. COUNTY ZONING**

The Iao WTP site (Parcel 67) and Parcel 091 (Lot T-1), which will provide access to the Iao WTP, are located within the “Wailuku Project District 3 (Kehalani)”, according to Maui County zoning. The purpose of this project district is to “*provide for a flexible and creative approach to development which considers physical, environmental, social, and economic factors in a comprehensive manner*”. And, the intent of this project district is to “*establish a residential community along with an integrated open space and recreation system, future school sites, and community shopping facilities to serve the expanding Wailuku-Kahului population*”. The Iao WTP project site is designated for “single-family residential” use within the Wailuku Project District 3 (Kehalani) for TMK (2) 3-5-001:067(por.). The access driveway portion of the project is proposed within the adjacent TMK (2) 3-5-001:091(por.) that is designated as “Public/Quasi Public”. A Project District Phase II and III application will need to be submitted and approved in order for the proposed project to proceed. Refer to **Appendix “G”**.

Criteria considered in the assessment of a Phase II Project District approval for the proposed project are set forth in MCC Chapter 19.45 and are as follows:

### **1. Infrastructure Service for Project Site**

Infrastructure services to the proposed project site are provided as summarized below.

#### **a. Access**

Access to the project site will be provided by a driveway off of Alu Road through the adjacent parcel, TMK (2)3-5-001:091. DWS will acquire lands for the driveway through Parcel 091 (Lot T-1).

#### **b. Water**

Water service for the project site will be provided by the County DWS. A 12-inch service waterline will tap into DWS’s 12-inch main in West Alu

Road to provide service water to the WTP. The service line will provide source water for the WTP plumbing fixtures, washdown facilities, etc. The service line will also provide for fire protection for the WTF via an on-site fire hydrant.

c. **Wastewater**

Wastewater generated from the restroom, lunchroom and office/laboratory, and water from floor drains throughout the TPB will connect to an on-site 6-inch gravity line with cleanouts that transitions into an off-site 8-inch gravity line with manholes. This 8-inch gravity line will convey the wastewater to a discharge point into an existing sewer manhole along West Alu Road.

d. **Drainage Improvements and Erosion Control**

The proposed improvements for this project will be designed in accordance with the Department of Public Works (DPW) Storm Drainage Rules and will conform to the drainage design set forth in the approved Kehalani Mauka Development drainage master plan. The runoff from the proposed project site and its offsite contributing areas will be collected by a new onsite storm drain system. The proposed storm drain system will have adequate capacity and the post-development runoff will be retained.

Erosion control and water quality measures will be provided to minimize pollution during and after construction. Best Management Practices may include temporary sediment basins, temporary diversion berms and swales to intercept runoff, silt fences, dust fences, slope protection, stabilized construction entrances and truck wash-down areas. Periodic water spraying of loose soils will be employed to minimize air-borne dirt particles. The project will also need to apply for and meet the requirements of a National Pollution Discharge Elimination System (NPDES) permit.

The project will also comply with the County's recently adopted "Rules for the Design of Storm Water Treatment Best Management Practices".

e. **Landscaping**

The proposed project is for a water treatment plant and associated facilities. Landscaping will be included on the south boundary to offset the impacts of the WTP building and sludge lagoons. Refer to **Appendix “C”**, Sheet L-3.

2. **Proposals for Recreation and Community Facilities**

The proposed project involves the construction of a water treatment plant and related facilities. There are no proposals for recreation and community facilities associated with the proposed action.

3. **Proposals for Floor Area Ratios, Lot Coverage, Net Buildable Areas, Open Space**

The project site is approximately 2.6 acres in size. The proposed project includes an approximately 9,800 square foot Treatment Plant Building (TPB) which will house a filtration area, office, break room, generator room, storage, and other related uses. The TPB will cover approximately 9 percent of the lot. A site plan and plans for the TPB are provided in the Preliminary Engineering Report. Refer to **Appendix “A”**.

4. **Statement on Potential Environmental, Socioeconomic, and Aesthetic Impacts**

See Chapter II of the Draft EA.

**G. COASTAL ZONE MANAGEMENT OBJECTIVES AND POLICIES**

Pursuant to Chapter 205-A, Hawaii Revised Statutes, projects should be evaluated with respect to Coastal Zone Management (CZM) objectives, policies and guidelines. The project site is approximately 2.5 miles away from the coastline and will not involve work within the County of Maui’s Special Management Area (SMA). However, the applicability of coastal zone management considerations has been reviewed and assessed.

1. **Recreational Resources**

**Objective:**

*Provide coastal recreational opportunities accessible to the public.*

**Policies:**

- (a) *Improve coordination and funding of coastal recreational planning and management; and*
- (b) *Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:*
  - (i) *Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;*
  - (ii) *Requiring replacement of coastal resources having significant recreational value, including but not limited to surfing sites, fishponds, and sand beaches, when such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the state for recreation when replacement is not feasible or desirable;*
  - (iii) *Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;*
  - (iv) *Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;*
  - (v) *Ensuring public recreational use of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources;*
  - (vi) *Adopting water quality standards and regulating point and non-point sources of pollution to protect, and where feasible, restore the recreational value of coastal waters;*
  - (vii) *Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing; and*
  - (viii) *Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, county planning commissions; and crediting such dedication against the requirements of Section 46-6, HRS.*

**Response:** The project site is located inland, approximately 2.5 miles from the coastline. Based on the location of the project, there are no anticipated impacts on coastal recreational opportunities or existing public access to the shoreline.

## 2. **Historic Resources**

### **Objective:**

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

### **Policies:**

- (a) *Identify and analyze significant archeological resources;*
- (b) *Maximize information retention through preservation of remains and artifacts or salvage operations; and*
- (c) *Support state goals for protection, restoration, interpretation, and display of historic resources.*

**Response:** Cultural interviews were conducted for the project site. As discussed previously, the interviewees did not identify any cultural activities within the project area and concluded that the exercise of native Hawaiian rights, or any ethnic group, related to gathering, access or other customary activities will not be affected by the proposed project. Refer to **Appendix “F”**.

An Archaeological Assessment of the project site also did not identify any surface or subsurface cultural remains, historic surface features, or architecture. As such, the proposed project is not anticipated to have an adverse impact on any significant historic properties. Refer to **Appendix “E”**.

## 3. **Scenic and Open Space Resources**

### **Objective:**

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

### **Policies:**

- (a) *Identify valued scenic resources in the coastal zone management area;*

- (b) *Ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;*
- (c) *Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources; and*
- (d) *Encourage those developments which are not coastal dependent to locate in inland areas.*

**Response:** The project site does not lie within a coastal scenic view corridor nor along the shoreline. The infrastructure development at the Iao WTP facility will primarily entail low-profile improvements. The treatment plant building will be a single-story building. For these reasons, no adverse impacts on scenic or open space resources are anticipated.

#### **4. Coastal Ecosystems**

**Objective:**

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

**Policies:**

- (a) *Improve the technical basis for natural resource management;*
- (b) *Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;*
- (c) *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*
- (d) *Promote water quantity and quality planning and management practices which reflect the tolerance of fresh water and marine ecosystems and prohibit land and water uses which violate state water quality standards.*

**Response:** As previously noted, due to the project site's location (over two (2) miles) away from the shoreline, there are no anticipated impacts to coastal ecosystems from the proposed project.

5. **Economic Uses**

**Objective:**

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

**Policies:**

- (a) *Concentrate coastal dependent development in appropriate areas;*
- (b) *Ensure that coastal dependent development such as harbors and ports, and coastal related development such as visitor facilities and energy generating facilities, are located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area; and*
- (c) *Direct the location and expansion of coastal dependent developments to areas presently designated and used for such developments and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:*
  - (i) *Use of presently designated locations is not feasible;*
  - (ii) *Adverse environmental effects are minimized; and*
  - (iii) *The development is important to the State's economy.*

**Response:** The proposed project will generate short-term construction-related employment and spending which will benefit the local economy. The proposed action does not contradict the objectives and policies for economic uses. Furthermore, the proposed project is part of the County's efforts to maintain and improve potable water service to businesses and residents in the area.

6. **Coastal Hazards**

**Objective:**

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

**Policies:**

- (a) *Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and nonpoint source*

*pollution hazards;*

- (b) Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint pollution hazards;*
- (c) Ensure that developments comply with requirements of the Federal Flood Insurance Program;*
- (d) Prevent coastal flooding from inland projects; and*
- (e) Develop a coastal point and nonpoint source pollution control program.*

**Response:** The project site falls within Zone X, an area of minimal flooding, as indicated by the Flood Insurance Rate Map for the County of Maui. Refer to **Figure 7**. Best Management Practices (BMPs) will be implemented during the construction phase to mitigate potential erosion and stormwater impacts. BMPs include the installation of drain inlet filters and silt fences along the eastern, down-slope border of the project site. Upon completion of construction, all open areas will be covered with gravel or vegetation to provide adequate slope maintenance on the property.

## **7. Managing Development**

### **Objective:**

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

### **Policies:**

- (a) Use, implement, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development;*
- (b) Facilitate timely processing of applications for development permits and resolve overlapping of conflicting permit requirements; and*
- (c) Communicate the potential short and long-term impacts of proposed significant coastal developments early in their life-cycle and in terms understandable to the public to facilitate public participation in the planning and review process.*

**Response:** The HRS Chapter 343 EA involves review by governmental agencies and provide for public involvement opportunities to comment on the project. Applicable State and County requirements will be adhered to in the design and construction of the project. Further, opportunities for review of the proposed action are offered through the regulatory review process for the Project District permitting for the project.

8. **Public Participation**

**Objective:**

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

**Policies:**

- (a) *Maintain a public advisory body to identify coastal management problems and to provide policy advice and assistance to the coastal zone management program;*
- (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-related issues, developments, and government activities; and*
- (c) *Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.*

**Response:** The project will meet County public awareness, education and participation objectives. Opportunities for agency and public review will be provided as part of the notification review and comment process required for the EA as well as the Project District permitting. On January 20, 2015, the DWS presented the proposed project at a Kehalani Homeowners Association Board meeting to solicit input.

9. **Beach Protection**

**Objective:**

*Protect beaches for public use and recreation.*

**Policies:**

- (a) *Locate new structures inland from the shoreline setback to conserve open space and to 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.*

**Response:** The proposed project is located inland, approximately 2.5 miles from the shoreline. As a result, there are no anticipated adverse impacts on beach resources.

**10. Marine Resources**

**Objective:**

*Implement the State's ocean resources management plan.*

**Policies:**

- (a) *Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;*
- (b) *Assure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;*
- (c) *Coordinate the management of marine and coastal resources and activities management to improve effectiveness and efficiency;*
- (d) *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;*
- (e) *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*

- (f) *Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.*

**Response:** As previously stated, the project site is located inland, 2.5 miles away from the ocean and is therefore, not anticipated to have any adverse impact on marine or coastal resources.

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

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

- (1) *Directly illuminates the shoreline and ocean waters; or*
  - (2) *Is directed to travel across property boundaries toward the shoreline and ocean waters.*
- (b) *Subsection (a) shall not apply to special management area use permits for structures with:*

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

**Response:** The proposed project is not located on or near the shoreline. Nevertheless, project lighting will be shielded to direct light downward.

## **H. HAWAII DRINKING WATER STATE REVOLVING FUND ENVIRONMENTAL CROSSCUTTERS**

The proposed project will be funded in part by the Hawaii Drinking Water State Revolving Fund (DWSRF). As such, the project must comply with the Environmental Cross-Cutters and Federal Requirements for DWSRF projects. **Table 2** below provides a listing of the environmental cross-cutters as well as the documentation received for the proposed Iao WTP project in addressing the requirement criteria.

**Table 2. Environmental Cross-Cutters and Project Documentation**

Environmental Authority	Procedure	Responsible Agency	Response	Project Documentation
Archaeological and Historical Preservation Act of 1974	Obtain review for all projects	State Historic Preservation Division (SHPD)	An Archaeological Field Inspection was prepared in October 2013. The Draft EA will be provided to SHPD for review and comment. The Archaeological Assessment was submitted to SHPD for approval.	Refer to Archaeological Assessment in Appendix "E".
Clean Air Act	Coordinate to assure project conforms with State Implementation Plan (SIP)	State Department of Health, Clean Air Branch	The Draft EA will be provided to the Department of Health for review and comment.	See Chapter II (Section A-10) of Draft EA for discussion of potential air quality impacts and mitigation measures.
Coastal Barrier Resources Act	Obtain review if project is located on a coastal barrier island	State Coastal Zone Management Agency	Not applicable. Project site is not located on a coastal barrier island.	Not applicable.
Coastal Zone Management Act	Obtain review if project is located in coastal zone	State Coastal Zone Management Agency	Pursuant to Chapter 205A-1, the project site is within the Coastal Zone Management Area. The project site is, however, outside of the Special Management Area (SMA). A SMA permit is not required.	See Chapter III (Section G) of this EA document for discussion of the Coastal Zone Management Program review criteria.

Environmental Authority	Procedure	Responsible Agency	Response	Project Documentation
Endangered Species Act	Obtain review by U.S. Fish and Wildlife Service for all projects	U.S. Fish and Wildlife Service (USFWS)	A biological survey for the proposed project found no federally listed endangered or threatened species of flora or fauna and did not identify any critical habitats. The USFWS was consulted during the early consultation process for the Draft EA.	Refer to Appendix "D" for the biological survey. See Chapter VIII of this EA document for a copy of the USFWS early consultation comment letter.
Environmental Justice	Are low income and minority groups affected?	U.S. Environmental Protection Agency	No low-income or minority groups will be adversely affected as a result of the proposed project. The Draft EA will be provided to the U.S. Environmental Protection Agency for review and comment.	Refer to Chapter II (Section B) of this EA document for a discussion of socioeconomic and demographic parameters.
Floodplain Management	Obtain review if project is located in or affects 100-year flood plain	Federal Emergency Management Agency	Not applicable. Project site is located in Flood Zone X and is not located in nor will it affect a 100-year flood plain.	Refer to Chapter II (Section A-5) of this EA document
Protection of Wetlands	Obtain review if project area contains wetlands	U.S. Army Corps of Engineers (COE)	Not applicable. The project site does not contain any wetlands. The U.S. Army Corps of Engineers was consulted during the early consultation process for the Draft EA.	See comment letter from U.S. Army Corps of Engineers in Chapter VIII of this EA document.

Environmental Authority	Procedure	Responsible Agency	Response	Project Documentation
Farmland Protection Policy Act	Obtain review if project area contains prime farmland	Natural Resources Conservation Service (NRCS)	The site contains lands designated as "Prime" agricultural lands by the Agricultural Lands of Importance to the State of Hawaii (ALISH) map. The WTP site and surrounding areas were cultivated with sugar cane from the mid-1800s to the 1990s. However, this area is currently vacant and undeveloped and is slated for residential development.	Refer to Chapter II (Section A-3) of this EA document for a discussion of agricultural resources.
Fish and Wildlife Coordination Act	Obtain review for all projects	USFWS	Comments from USFWS were received in the early consultation process during the preparation of the Draft EA.	Refer to Chapter VIII of this EA document for the early consultation comments from USFWS.
National Historic Preservation Act	Obtain review for all projects	SHPD	An Archaeological Assessment was prepared in October 2013. The Draft EA will be provided to SHPD for review and comment. The Archaeological Field Inspection was submitted to SHPD for approval.	Refer to the Archaeological Assessment in Appendix "E".
Safe Drinking Water Act	Obtain review if project could affect sole source aquifer	State Department of Health, Safe Drinking Water Branch (SDWB)	The proposed project will not affect a sole source aquifer. The Draft EA will be provided to the Department of Health for review and comment.	Refer to Chapter II (Section A-6 and Section D-2) of this EA document for a discussion of water quality mitigation measures.

Environmental Authority	Procedure	Responsible Agency	Response	Project Documentation
Wild and Scenic Rivers Act	Obtain review if project is located in area with Wild and Scenic Rivers	National Park Service	The project site is not located in an area with Wild or Scenic Rivers. There are no Wild or Scenic Rivers in the State of Hawaii.	Not applicable.
Consultation Process Under the Magnuson-Stevens Fishery Conservation and Management Act	Obtain review if it will affect essential fish habitat	National Marine Fisheries Service	Not applicable. The project site is located approximately 2.5 miles inland of the nearest coastline. The proposed project will not affect essential fish habitats.	Not applicable.

**IV. UNAVOIDABLE ADVERSE  
ENVIRONMENTAL EFFECTS  
AND IRREVERSIBLE AND  
IRRIETRIEVABLE  
COMMITMENTS OF  
RESOURCES**

#### **IV. UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS AND IRREVERSIBLE AND IRRIETRIEVABLE COMMITMENTS OF RESOURCES**

In the short term, the proposed Iao WTP project will result in unavoidable construction-related impacts, including noise impacts generated by construction equipment and activities. In addition, there may be temporary air quality impacts associated with dust generated from site work and exhaust emissions from construction equipment and vehicles. These noise and air quality impacts will be temporary in nature, occurring only during the 24-month construction period, and will be mitigated to the extent practicable through implementation of Best Management Practices (BMPs).

The proposed project commits a small area of land, about 2.6 acres, for the construction of the Iao WTP. Other resources which will be committed in the implementation of the proposed action include material and fuel resources. The project will result in short-term beneficial impacts related to temporary construction employment and spending.

## **V. ALTERNATIVES TO THE PROPOSED ACTION**

## V. ALTERNATIVES TO THE PROPOSED ACTION

Alternatives to the preferred alternative, which is the proposed action, include the “no action”, “deferred action,” and “alternative site location”. These alternatives are addressed below.

### A. NO ACTION ALTERNATIVE

The existing Iao Water Treatment Plant (WTP) consists of three (3) pressure membrane units that were meant to be temporary and were initially sheltered within a large tent. The tent has since been removed, leaving the units exposed to the elements for a number of years. As a result, DWS deemed the replacement of the pressure membrane units to be necessary. The proposed Iao WTP project involves the construction of a filtration building that will house three (3) new pressure membrane units and providing shelter and protection for the equipment. The proposed project will also have a larger capacity with the ability to produce an average of up to 3.2 mgd of treated water. The “no action” alternative involves the continued reliance on a WTP that was intended for temporary use only and has been left unprotected for a number of years. In addition, the “no action” alternative does not provide for additional water treatment capacity that will be required for the long-term use of the facility. Based on the foregoing factors, the “no action” alternative was not pursued.

### B. DEFERRED ACTION ALTERNATIVE

Similar to the no action alternative, the deferred action alternative involves the continued use of the existing, temporary Iao WTP facilities. In addition, the deferred action alternative would likely result in higher implementation costs as the cost of construction and equipment rise in the future. For these reasons, the deferred action alternative was not selected by DWS.

### C. ALTERNATIVE SITE LOCATION ALTERNATIVE

This alternative would involve site selection and property acquisition to develop a replacement water treatment facility at a new location. This alternative was not pursued because the site identified in the preferred alternative is adjacent to the existing Iao WTP, the raw water source, and pertinent infrastructure, making it ideally suited for a replacement facility. An alternative site would be a greater distance from the existing facility that the project is replacing and, therefore, was not selected by DWS.

# **VI. SIGNIFICANCE CRITERIA ASSESSMENT**

## VI. SIGNIFICANCE CRITERIA ASSESSMENT

The proposed project involves the construction of the Iao WTP improvements in Wailuku. The Iao WTP improvements will consist of a number of improvements including the construction of a Treatment Plant Building (TPB), Chlorine Contact Tank and Sludge Lagoon.

Since the proposed action will involve the use of State and County funds and lands, compliance with Chapter 343, Hawaii Revised Statutes (HRS), and Chapter 200 (Title 11), Hawaii Administrative Rules, Environmental Impact Statement Rules is necessary. Every aspect of the proposed action, expected primary and secondary consequences, and the cumulative as well as the short-term and long-term effects of the action have been evaluated in accordance with the Significance Criteria of Section 11-200-12 of the Administrative Rules. Discussion of project conformance to the Significance Criteria is as follows:

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

The historic agricultural practices at the project site and in the surrounding areas, have resulted in an environment that is nearly totally lacking in native plants and animal species. There are no endangered or threatened flora or fauna on the site, nor are there any archaeological, historic or cultural resources that may be affected by the proposed project. No impacts to streams or wetlands are anticipated to result from the proposed action.

Based on the discussion provided above, the proposed project is not anticipated to involve an irrevocable commitment to loss or destruction of any natural or cultural resource.

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

There are no adverse impacts to climate, topography, or soils anticipated to result from the proposed project. There are also no known rare, threatened, or endangered species of flora, fauna, or avifauna located within the project site.

The proposed Iao WTP involves lands designated for urban uses. While the project site was historically used for sugar cane cultivation, active cultivation ended in the 1990s. Furthermore, the project commits a small area of land that is

in close proximity to existing DWS infrastructure. Based on the foregoing facts, the proposed project will not curtail the beneficial use of the site.

3. **Conflicts with the state's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders.**

The proposed project does not conflict with the State's Environmental Policy and Guidelines as set forth in Chapter 344, Hawaii Revised Statutes (HRS).

4. **Substantially affects the economic welfare, social welfare, and cultural practices of the community or State.**

The proposed project will directly benefit the local economy by providing construction and construction-related employment. Therefore, the proposed project will have a positive short-term effect on economic and social welfare. From a long-term perspective, the Iao WTP project will ensure that safe and clean drinking water is provided to residents and businesses within the Central Maui service area. The cultural impact assessment did not identify any ongoing cultural practices occurring within the project site. As such, adverse impacts to cultural practices are not anticipated.

5. **Substantially affects public health.**

During the 24-month construction period, appropriate Best Management Practices will be implemented to mitigate potential air quality and noise impacts. Following construction, long-term adverse public health impacts resulting from the proposed project are not anticipated. The proposed Iao WTP project will ensure that safe and clean drinking water continues to be provided to residents and businesses in Central Maui.

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

The proposed project is not anticipated to result in significant adverse secondary impacts. No significant population changes are anticipated as a result of the proposed replacement and upgrade to the existing Iao WTP. There are no anticipated adverse effects on public services, such as police, fire, medical,

educational, or solid waste collection, as service limits or service capacities will not be affected.

7. **Involves a substantial degradation of environmental quality.**

Construction activities will create temporary short-term nuisances related to noise and dust. Appropriate dust control and noise mitigation measures will be implemented by the contractor to ensure that fugitive dust and noise generated in connection with construction is minimized.

As previously discussed in Chapter II of this EA document, adverse impacts to natural resources, cultural resources, and the natural environment are not anticipated.

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

The proposed improvements to the Iao WTP are not anticipated to cumulatively have a negative impact on the physical environment. The project does not involve a commitment to larger actions.

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

Rare, threatened or endangered species of flora, fauna, avifauna or their habitats are not expected to be affected by the proposed project, due to the fact that there are no rare, threatened, or endangered species or their habitats found on or in the vicinity of the project site.

10. **Detrimentially affects air or water quality or ambient noise levels.**

Construction activities will result in short-term air quality and noise impacts. Best Management Practices (BMPs) for dust control measures, such as regular watering and sprinkling, and erection of dust screens will be implemented to minimize construction-related air quality impacts. Short-term noise impacts will occur primarily from construction equipment. Equipment mufflers or other noise attenuating equipment, as well as proper equipment and vehicle maintenance and other BMPs are anticipated to mitigate noise from construction activities. Erosion control measures, including the installation of a grated drain inlet filter and silt

fences, will reduce the amount of silt and stormwater runoff flowing into downstream properties.

Upon completion of the project, equipment such as compressors, blowers and the standby generator within the TPB will generate noise. These equipment items will be housed within sound attenuated rooms inside the TPB such that applicable State Department of Health day-time and nighttime noise limits at the property lines are met for the compressor and blower. Refer to **Appendix "A"**.

Based on the discussion provided above, the proposed project is not anticipated to detrimentally affect air or water quality or ambient noise levels.

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

The proposed project is not located within an environmentally sensitive area and, as such, there are no anticipated adverse effects as a result of the proposed project.

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

The proposed project is not anticipated to adversely affect scenic view corridors. The infrastructure development at the Iao WTP will primarily entail low-profile improvements. The structures proposed for the project site will have heights and footprints which are not anticipated to significantly impact scenic vistas and view planes.

13. **Requires substantial energy consumption.**

The proposed project is a replacement for the existing Iao WTP facility, substantial new energy requirements are not anticipated for the proposed project. Following County of Maui initiative, along with other DWS WTP facilities, solar panels may be installed on the roof in the future.

Based on the aforementioned findings, the proposed project is anticipated to result in a Findings of No Significant Impact (AFONSI).

## **VII. LIST OF PERMITS AND APPROVALS**

## **VII. LIST OF PERMITS AND APPROVALS**

The following permits and approvals will be required prior to the implementation of the project:

### **State of Hawaii**

1. Hawaii Administrative Rules, Chapter 343 Compliance
2. National Pollutant Elimination System (NPDES) Permit, as applicable
3. Commission on Water Resource Management (CWRM), Water Use Permit (WUP), as applicable
4. CWRM Pump Installation Permit
5. Department of Health Wellhead Protection Protocols
6. Community Noise Permit, as applicable
7. Oversize/Overweight Vehicle Transport over State Highways Permit, as applicable

### **County of Maui**

1. Construction Permits (i.e., grading permit)
2. Project District Phase II and III Approval

**VIII. PARTIES CONSULTED  
DURING THE PREPARATION  
OF THE DRAFT  
ENVIRONMENTAL  
ASSESSMENT; LETTERS  
RECEIVED AND RESPONSES  
TO SUBSTANTIVE  
COMMENTS**

# VIII. PARTIES CONSULTED DURING THE PREPARATION OF THE DRAFT ENVIRONMENTAL ASSESSMENT; LETTERS RECEIVED AND RESPONSES TO SUBSTANTIVE COMMENTS

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

## FEDERAL AGENCIES

1. Larry Yamamoto, State Conservationist  
U.S. Department of Agriculture  
Natural Resources Conservation Service  
P.O. Box 50004  
Honolulu, Hawaii 96850-0001
2. George Young, Chief, Regulatory Branch  
U.S. Department of the Army  
U.S. Army Engineer District,  
Honolulu  
Regulatory Branch, Building 230  
Fort Shafter, Hawaii 96858-5440
3. Wayne Nastri, Regional Administrator  
U.S. Environmental Protection Agency  
Region 9  
75 Hawthorne Street  
San Francisco, California 94105
4. Dave Wesley, Deputy Regional Director  
U. S. Fish and Wildlife Service  
Pacific Region  
911 NE 11th Avenue  
Portland, Oregon 97232
5. Loyal A. Mehrhoff, Field Supervisor  
U. S. Fish and Wildlife Service  
300 Ala Moana Blvd., Rm. 3-122  
Box 50088  
Honolulu, Hawaii 96813

## STATE AGENCIES

6. Dean H. Seki, Comptroller  
Department of Accounting and General Services  
1151 Punchbowl Street, #426  
Honolulu, Hawaii 96813
7. Russell Kokubun, Chair  
Department of Agriculture  
1428 South King Street  
Honolulu, Hawaii 96814-2512
8. Richard C. Lim, Director  
State of Hawaii  
Department of Business, Economic Development & Tourism  
P.O. Box 2359  
Honolulu, Hawaii 96804
9. Jobie Masagatani, Chairperson  
Hawaiian Home Lands Commission  
P.O. Box 1879  
Honolulu, Hawaii 96805
10. Loretta J. Fuddy, Director  
State of Hawaii  
Department of Health  
919 Ala Moana Blvd., Room 300  
Honolulu, Hawaii 96814
11. Alec Wong, P.E., Chief  
Clean Water Branch  
State of Hawaii  
Department of Health  
919 Ala Moana Blvd., Room 300  
Honolulu, Hawaii 96814

12. Patti Kitkowski, District Environmental Health Program Chief  
State of Hawaii  
Department of Health  
Maui Sanitation Branch  
54 South High Street, Room 300  
Wailuku, Hawaii 96793
13. Laura McIntyre, AICP, Office Manager  
Environmental Planning Office  
Department of Health  
919 Ala Moana Blvd., Suite 312  
Honolulu, Hawaii 96814
14. Lene Ichinotsubo  
Environmental Management Division  
State of Hawaii  
Department of Health  
919 Ala Moana Blvd., Room 212  
Honolulu, Hawaii 96814
15. William J. Aila, Jr., Chairperson  
State of Hawaii  
Department of Land and Natural Resources  
P. O. Box 621  
Honolulu, Hawaii 96809
16. Nicki Thompson, Interim Administrator  
State of Hawaii  
Department of Land and Natural Resources  
State Historic Preservation Division  
601 Kamokila Blvd., Room 555  
Kapolei, Hawaii 96707
17. Jenny Pickett, Maui Archaeologist  
State of Hawaii  
Department of Land and Natural Resources  
State Historic Preservation Division  
130 Mahalani Street  
Wailuku, Hawaii 96793
18. Glenn Okimoto, Director  
State of Hawaii  
Department of Transportation  
869 Punchbowl Street  
Honolulu, Hawaii 96813
19. Major General Darryll Wong, Director  
Hawaii State Civil Defense  
3949 Diamond Head Road  
Honolulu, Hawaii 96813-4495
20. Genevieve Salmonson, Acting Director  
Office of Environmental Quality Control  
235 S. Beretania Street, Suite 702  
Honolulu, Hawaii 96813
21. Dr. Kamana'opono Crabbe, Chief Executive Officer  
Office of Hawaiian Affairs  
711 Kapiolani Boulevard, Suite 500  
Honolulu, Hawaii 96813
22. Jesse Souki, Director  
State of Hawaii  
Office of Planning  
P. O. Box 2359  
Honolulu, Hawaii 96804
23. Gil Keith-Agaran, Senator  
Hawaii State Senate  
Hawaii State Capitol, Room 203  
415 S. Beretania Street  
Honolulu, Hawaii 96813
24. Joseph Souki, Representative  
House of Representatives  
Hawaii State Capitol, Room 431  
415 S. Beretania Street  
Honolulu, Hawaii 96813
- COUNTY AGENCIES**
25. Alan Arakawa, Mayor  
County of Maui  
200 South High Street  
Wailuku, Hawaii 96793
26. Teena Rasmussen, Coordinator  
County of Maui  
Office of Economic Development  
2200 Main Street, Suite 305  
Wailuku, Hawaii 96793
27. Anna Foust, Management Officer  
Maui Civil Defense Agency  
200 South High Street  
Wailuku, Hawaii 96793
28. Jeffrey A. Murray, Fire Chief  
County of Maui  
Department of Fire and Public Safety  
200 Dairy Road  
Kahului, Hawaii 96732

29. Jo-Ann Ridaio, Director  
County of Maui  
Department of Housing and Human  
Concerns  
One Main Plaza  
2200 Main Street, Suite 546  
Wailuku, Hawaii 96793
30. Glenn Correa, Director  
County of Maui  
Department of Parks and Recreation  
700 Halia Nakoia Street, Unit 2  
Wailuku, Hawaii 96793
31. William Spence, Director  
County of Maui  
Department of Planning  
2200 Main Street, Suite 315  
Wailuku, Hawaii 96793
32. Gary Yabuta, Chief  
County of Maui  
Police Department  
55 Mahalani Street  
Wailuku, Hawaii 96793
33. David Goode, Director  
County of Maui  
Department of Public Works  
200 South High Street  
Wailuku, Hawaii 96793
34. Kyle Ginoza, Director  
County of Maui  
Department of Environmental  
Management  
One Main Plaza  
2200 Main Street, Suite 100  
Wailuku, Hawaii 96793
35. Jo Anne Johnson Winer, Director  
County of Maui  
Department of Transportation  
200 South High Street  
Wailuku, Hawaii 96793
36. Council Chair Gladys Baisa  
Maui County Council  
200 South High Street  
Wailuku, Hawaii 96793
37. Councilmember Mike Victorino  
Maui County Council  
200 South High Street  
Wailuku, Hawaii 96793

#### UTILITIES

38. Dan Takahata, Manager – Engineering  
Maui Electric Company, Ltd.  
P.O. Box 398  
Kahului, Hawaii 96733
39. Hawaiian Telcom  
60 South Church Street  
Wailuku, Hawaii 96793

#### COMMUNITY ORGANIZATIONS

40. Wailuku Community Association  
40 Hoauna Street  
Wailuku, Hawaii 96793
41. Rick Papa, President  
Attention: Tiana Raymondo  
Kehalani Association  
P.O. Box 1530  
Wailuku, Hawaii 96793
42. RCFC Kehalani LLC  
c/o Brian Ige  
2005 East Main Street  
Wailuku, Hawaii 96793
43. Wailuku Water Company LLC  
P.O. Box 2790  
Wailuku, Hawaii 96793-7790

APR 21 2014



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

April 16, 2014

Regulatory Office

File No. POH-2013-0209

Tessa Munekiyo Ng  
Munekiyo & Hiraga, Inc.  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Dear Ms. Munekiyo Ng:

The U.S. Army Corps of Engineers (Corps) has evaluated the early consultation information submitted on October 25, 2013, for the replacement of the existing Iao Surface Water Treatment Plant on South Alu Road. The project site is located within TMK #235001067; Latitude 20.883110° N., Longitude 156.512693° W.; city of Wailuku, Island of Maui, Hawaii. Your project has been assigned number POA-2013-0209, which should be referred to in all correspondence with us.

Based on our review of the information you provided we are not able to determine if the subject project area contains waters of the U.S., and/or wetlands, under the Corps' regulatory jurisdiction. We encourage you to provide the Corps with a wetland delineation based on the guidelines presented in the Corps of Engineers Wetlands Delineation Manual dated January 1987 and the Regional Supplement for Hawaii and Pacific Island Regions dated February 2012.

The Corps' regulatory authorities are based on two laws: Section 10 of the Rivers and Harbors Act (RHA) of 1899 (33 USC 403), which prohibits the obstruction or alteration of navigable waters of the U.S. without a permit from the Corps; and Section 404 of the Clean Water Act (CWA), which prohibits the discharge of dredged or fill material into waters of the U.S., including wetlands, without a Corps' permit. Wetlands are defined as areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands include "muskegs", swamps, marshes, bogs, and similar areas.

You may contact Linda Speerstra via email at [linda.speerstra@usace.army.mil](mailto:linda.speerstra@usace.army.mil), by mail at the address above, or by phone at (808) 835-4300 if you have questions. We are interested in your experience with our Regulatory Program and encourage you to complete a customer service survey form. This form is available at [http://corpsmapu.usace.army.mil/cm\\_apex/f?p=regulatory\\_survey](http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey).

Sincerely,

A handwritten signature in black ink, appearing to read "George P. Young".

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



MICHAEL Y. MUNEKIYO  
PRESIDENT

KARLYNN FUKUDA  
EXECUTIVE VICE PRESIDENT

MARK ALEXANDER ROY  
VICE PRESIDENT

TESSA MUNEKIYO NG  
VICE PRESIDENT

OWEN DASHI HIRAGA  
SENIOR ADVISOR

MITSURU "MICK" HIRANO  
SENIOR ADVISOR

January 29, 2015

George P. Young, P.E.  
Chief, Regulatory Office  
Department of the Army  
U.S. Army Corps of Engineers, Honolulu District  
Fort Shafter, Hawaii 96858-5440

SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.) File No. POH-2013-0209

Dear Mr. Young:

Thank you for your correspondence dated April 16, 2014, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. On behalf of the County of Maui, Department of Water Supply (DWS) we offer the following information in response to the comments noted in your letter.

There are no streams or wetlands within the project site. Iao Stream is located approximately 500 feet north of the project site. The stream is north of Iao Valley Road and generally runs west to east lying at a much lower elevation than the project site. The project site falls within Zone X, an area of minimal flooding, as indicated by the Flood Insurance Rate Map for the County of Maui. Thus the area does not experience inundation or saturation by surface or groundwater at a frequency and duration sufficient to support vegetation typically adapted for life in saturated soil conditions, normally found in wetland area. The Draft Environmental Assessment will include a discussion of streams and wetlands.

MAUI  
305 High St., Suite 104 Wailuku, Hawaii 96793  
ph: (808)244-2015 fax: (808)244-8729  
OAHU  
735 Bishop St., Suite 238 Honolulu, Hawaii 96813 | ph: (808)983-1233

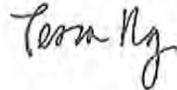
WWW.MUNEKIYOHIRAGA.COM

excellence in  
process  
management

George P. Young, P.E.  
January 29, 2015  
Page 2

We appreciate your input and will include a copy of your comment letter in the Draft Environmental Assessment. Should you have any questions or require further information regarding the proposed action, please contact me at (808) 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Manager

TMN:lh

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakatsuka, Austin Tsutsumi & Associates, Inc.

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**From:** Ian Bordenave <ian.bordenave@fws.gov>  
**Sent:** November 27, 2013 at 5:15:40 PM CST  
**To:** <planning@mhplanning.com>  
**Subject:** c/o Tessa Munekiyo Ng: 2014-TA-0037 Iao Water Treatment Plant Upgrades Project, Maui

In Reply Refer To:  
2013-TA-0037

Ms. Tessa Munekiyo Ng  
Senior Associate  
Munekiyo and Hiraga, Inc.  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Subject: Technical Assistance for the Proposed Iao Water Treatment Plant Upgrades Project, Maui

Dear Ms. Ng:

The U.S. Fish and Wildlife Service (Service) received your letter on October 28, 2013, requesting comment on proposed upgrades to the Iao Surface Water Treatment Plant located on South Alu Road in Wailuku [TMK (2) 3-5-001:067]. The proposed project site is to be located west of the existing Maui County, Department Water Supply facility.

#### *Project Description*

The County of Maui, Department of Water Supply, proposes to replace the existing Iao Water Treatment Plant with a permanent facility with greater production capacity. The existing treatment plant filtration units, located near the three million gallon Iao Water Tank, were initially sheltered within a large tent that has since been removed. Exposure to the elements has degraded the filtration equipment, which has made their replacement necessary. Filtration capacity of the existing plant is approximately 1.7 million gallons per day (gpd). The proposed plant, in addition to being housed in a permanent structure, will increase production capacity to 2.4 million gpd. Additional provisions may allow future expansion of production to increase to 3.0 million gpd.

#### *Species Affected*

Based on information you provided and pertinent information in our files, including data compiled by the Hawaii Biodiversity and Mapping Program, three species protected by the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*), are known to occur within the proposed action area and could be impacted by the proposed action: the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*), Hawaiian petrel (*Pterodroma sandwichensis*), and the threatened Newell's shearwater (*Puffinus auricularis newelli*). The Service offers the following recommendations to minimize and avoid impacts to listed species either on or in the vicinity of the proposed project:

- The Hawaiian hoary bat is known to occur throughout the island of Maui. This bat roosts in both exotic and native woody vegetation and, while foraging, leaves young unattended in "nursery" trees and shrubs. If trees or shrubs suitable for bat roosting are cleared during the hoary bat breeding season (June 1 to September 15), there is a risk that young bats could inadvertently be harmed or killed. As a result, the Service recommends that woody plants greater than 15 feet tall should not be removed or trimmed during the Hawaiian hoary bat breeding season. Additionally, Hawaiian hoary bats forage for insects from as low as three feet to higher than 500 feet above the ground. When barbed wire is used in fencing, Hawaiian hoary bats can become entangled. The Service therefore recommends that barbed wire not be used for fencing as part of this proposed action.

- The Hawaiian petrel and Newell's shearwater, collectively referred to as seabirds, may transit through the proposed action area while flying between the ocean and nesting sites in the mountains during their breeding season (March through December). Seabird fatalities resulting from collisions with artificial structures that extend above the surrounding vegetation have been documented in Hawaii where high densities of transiting seabirds occur. Additionally, artificial lighting, such as flood lighting for construction work and site security, can adversely impact seabirds by causing disorientation which may result in collision with utility lines, buildings, fences, and vehicles. Fledging seabirds are especially affected by artificial lighting and have a tendency to exhaust themselves while circling the light sources and become grounded. Too weak to fly, these birds become vulnerable to depredation by feral predators such as dogs, cats, and mongoose. Therefore, the Service recommends that no outdoor flood lighting be installed as part of the proposed action. Project-related lighting should be minimized. All project-related lights should be shielded so the bulb is not visible at or above bulb-height. Motion sensors and timers should be installed on any necessary project-related lighting to minimize periods of illumination.

#### *Impacts to Aquatic Resources*

Under the statutes of the Fish and Wildlife Coordination Act (FWCA) of 1958, as amended (16 U.s.c. 661 *et seq.*; 48 Stat. 401), any private or public entities operating under Federal permit or license are required to ensure that fish and wildlife conservation receives equal consideration with other proposed project objectives. A significant increase in water supply production capacity resulting from the implementation of the proposed project may have impacts on aquatic habitat functions necessary to support native stream fauna. The Service recommends that the applicant and action agencies involved in the proposed project coordinate with us to address the potential impacts that an additional 700,000 1,000,000+ gpd withdrawal from the Iao Stream watershed may incur on native stream fauna and concomitant aquatic resources.

If you have any questions regarding the recommendations or comments provided in this e-mail, please feel free to contact me during regular business hours using the information provided below.

Regards,

Ian Bordenave  
Biologist  
U.S. Fish and Wildlife Service  
Maui Nui Field Station  
Milepost 6 Mokulele Highway  
Kihei, HI. 96793  
Phone: (808) 270-1439  
E-Mail: [ian\\_\\_bordenave@fws.gov](mailto:ian__bordenave@fws.gov)

January 29, 2015

Ian Bordenave, Biologist  
Director of Transportation  
U.S. Fish and Wildlife Service  
Maui Nui Field Station  
Milepost 6 Mokulele Hwy  
Kihei, Hawaii 96793

SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.); 2013-TA-0037

Dear Mr. Bordenave:

Thank you for your correspondence dated November 27, 2013, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. The County of Maui, Department of Water Supply (DWS) offers the following information in response to the comments noted in your letter.

A biological resources survey for the proposed project was conducted by Robert W. Hobdy (Environmental Consultant) in August 2013. The report concludes that the project is not expected to have any significant negative impacts on the botanical resources in this part of Maui. No recommendations regarding botanical resources were deemed necessary or appropriate.

Despite the negative findings of the biological resources survey, DWS will address each of the concerns outlined in your letter as follows:

- **Hawaiian Hoary Bat:**

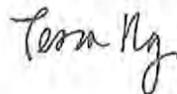
The biological resources survey made a special effort to look for the Hawaiian hoary bat, but no evidence of bat activity was detected. DWS will restrict clearing

and grubbing activities during the hoary bat breeding season from June 1 to September 15. Due to public health concerns and the need to secure the water treatment facility, barbed wire fencing must be used.

- **Hawaiian Petrel and Newell's Shearwater:**  
The site design will minimize outdoor lighting and implement other mitigating actions such as bulb shielding and installing motion sensors and timers. No night work is expected unless under an emergency situation.
- **Potential Impacts on Native Stream Fauna and Concomitant Aquatic Resources:**  
The amount of water allowed for use at the Iao Water Treatment Plant was arrived at in a recent agreement accepted by all parties (Hui o Na Wai Eha, Maui Tomorrow Foundation, the Office of Hawaiian Affairs, Hawaiian Commercial and Sugar Company, Wailuku Water Company, the Maui County Department of Water Supply, and the State Commission on Water Resource Management). Impacts to streams were taken into consideration during discussions on the agreement. With anticipated growth in the Central Maui system that encompasses customers from Hookipa to Makena, and the fact that the Iao aquifer is designated, surface water is needed to provide water for future growth.

We appreciate your input and will include a copy of your comment letter in the Draft Environmental Assessment. Should you have any questions or require further information regarding the proposed action, please contact me at (808) 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Vice President

TMN:mge

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakastuka, Austin, Tsutsumi & Associates, Inc.

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NOV 04 2013

NEIL ABERGROMBIE  
GOVERNOR



Dean H. Seki  
Comptroller  
Maria E. Ziellinski  
Deputy Comptroller

STATE OF HAWAII  
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES

P.O. BOX 119, HONOLULU, HAWAII 96810-0119

(P)1253.3

NOV 1 2013

Ms. Tessa Munekiyo Ng  
Munekiyo & Hiraga, Inc.  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Dear Ms. Munekiyo Ng:

Subject: Early Consultation Request for Proposed Iao Water Treatment Plant  
Upgrades, Wailuku, Maui, Hawaii: DWS Job No. 12-03  
TMK: (2) 3-5-001:067 (por) and 091 (por).

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

If you have any questions, please call me at 586-0400 or have your staff call Mr. Alva Nakamura of the Public Works Division at 586-0488.

Sincerely,

A handwritten signature in black ink, appearing to be "D. Seki", written over a horizontal line.

DEAN H. SEKI  
Comptroller

c: Mr. Tom Ochwat, County of Maui, Dept. of Water Supply  
Mr. Ivan Nakatsuka, Austin, Tsutsumi & Associates, Inc.

January 29, 2015

Dean H. Seki, Comptroller  
Department of Accounting and General Services  
State of Hawaii  
P.O. Box 119  
Honolulu, Hawaii 96810-0119

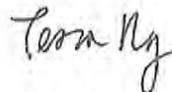
SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.)

Dear Mr. Seki:

Thank you for your letter, dated November 1, 2013, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. The County of Maui, Department of Water Supply (DWS) acknowledges your Department has no comments to offer on the proposed project at this time.

We appreciate your input and will include a copy of your response letter in the Draft Environmental Assessment. Should you have any questions or require further information regarding the proposed action, please contact me at 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Vice President

TMN:mge

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakastuka, Austin, Tsutsumi & Associates, Inc.

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305 High St., Suite 104 Wailuku, Hawaii 96793

ph: (808)244-2015 fax: (808)244-8729

735 Bishop St., Suite 238 Honolulu, Hawaii 96813 | ph: (808)983-1233

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NOV 06 2013

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

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

In reply, please refer to:  
EMD/CWB

10104PCM.13

October 31, 2013

Ms. Tessa Munekiyo Ng, AICP  
Senior Associate  
Munekiyo & Hiraga, Inc.  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Dear Ms. Munekiyo Ng:

**SUBJECT: Early Consultation Request for the  
Proposed Iao Water Treatment Plant Upgrades  
Wailuku, Island of Maui, Hawaii**

The Department of Health (DOH), Clean Water Branch (CWB), acknowledges receipt of your letter, dated October 25, 2013, requesting comments on your project. The DOH-CWB has reviewed the subject document and offers these comments. Please note that our review is based solely on the information provided in the subject document and its compliance with the Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55. You may be responsible for fulfilling additional requirements related to our program. We recommend that you also read our standard comments on our website at: <http://health.hawaii.gov/epo/files/2013/05/CWB-standardcomment.pdf>.

1. Any project and its potential impacts to State waters must meet the following criteria:
  - a. Antidegradation policy (HAR, Section 11-54-1.1), which requires that the existing uses and the level of water quality necessary to protect the existing uses of the receiving State water be maintained and protected.
  - b. Designated uses (HAR, Section 11-54-3), as determined by the classification of the receiving State waters.
  - c. Water quality criteria (HAR, Sections 11-54-4 through 11-54-8).
2. You may be required to obtain a National Pollutant Discharge Elimination System (NPDES) permit for discharges of wastewater, including storm water runoff, into State surface waters (HAR, Chapter 11-55). An application for an NPDES individual permit must be submitted at least 180 calendar days before the commencement of the discharge. To request NPDES permit coverage, you must submit the CWB Individual NPDES Form through the e-Permitting Portal and the hard copy certification statement with \$1,000 filing fee. Please open the [e-Permitting Portal](#)

Ms. Tessa Munekiyo Ng, AICP  
October 31, 2013  
Page 2

10104PCM.13

website at: <https://eha-cloud.doh.hawaii.gov/epermit/View/home.aspx>. You will be asked to do a one-time registration to obtain your login and password. After you register, click on the Application Finder tool and locate the "CWB Individual NPDES Form." Follow the instructions to complete and submit this form.

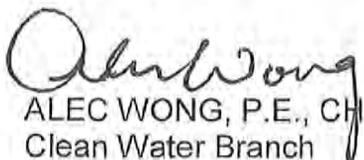
3. If your project involves work in, over, or under waters of the United States, it is highly recommend that you contact the Army Corp of Engineers, Regulatory Branch (Tel: 438-9258) regarding their permitting requirements.

Pursuant to Federal Water Pollution Control Act [commonly known as the "Clean Water Act" (CWA)], Paragraph 401(a)(1), a Section 401 Water Quality Certification (WQC) is required for "[a]ny applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may **result** in any discharge into the navigable waters..." (emphasis added). The term "discharge" is defined in CWA, Subsections 502(16), 502(12), and 502(6); Title 40 of the Code of Federal Regulations, Section 122.2; and Hawaii Administrative Rules (HAR), Chapter 11-54.

4. Please note that all discharges related to the project construction or operation activities, whether or not NPDES permit coverage and/or Section 401 WQC are required, must comply with the State's Water Quality Standards. Noncompliance with water quality requirements contained in HAR, Chapter 11-54, and/or permitting requirements, specified in HAR, Chapter 11-55, may be subject to penalties of \$25,000 per day per violation.

If you have any questions, please visit our website at:  
<http://health.hawaii.gov/cwb>, or contact the Engineering Section, CWB, at (808) 586-4309.

Sincerely,

  
ALEC WONG, P.E., CHIEF  
Clean Water Branch

CM:rh

January 29, 2015

Alec Wong, P.E., Chief  
Clean Water Branch  
State of Hawaii  
Department of Health  
P.O. Box 3378  
Honolulu, Hawaii 96801-3378

**SUBJECT:** Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.); EMD/CWB 10 104 PCM.13

Dear Mr. Wong:

Thank you for your letter, dated October 13, 2013, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. The County of Maui, Department of Water Supply (DWS) offers the following information in response to the comments noted in your letter.

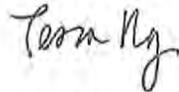
The County of Maui DWS will fully comply with Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55 and any additional requirements related to Department of Health – Clean Water Branch programs. More specifically, the following actions will be taken to address comments detailed in your letter as follows:

1. DWS will assess project impacts to State waters and meet criteria on antidegradation policy (FAR, Section 11-54-1.1), designated uses (HAR, Section 11-54-3), and water quality criteria (HAR, Sections 11-54-4 through 11-54-8).
2. If required per HAR, Chapter 11-55, an NPDES permit will be obtained.

3. The U.S. Army Corps of Engineers, Regulatory Branch has been consulted regarding the proposed project. A request for early consultation was submitted to the Corps and they will be provided with a copy of the Draft Environmental Assessment (EA).
4. Whether or not an NPDES permit applies, DWS will include all contractual requirements in the project's bid documents to insure Best Management Practices are implemented.

We appreciate your input and will include a copy of your comment letter in the Draft EA. Should you have any questions or require further information regarding the proposed action, please contact me at 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Vice President

TMN:mge

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakastuka, Austin, Tsutsumi & Associates, Inc.

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OCT 31 2013

NEIL ABERCROMBIE  
GOVERNOR OF HAWAII



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

LORRIN W. PANG, M.D., M.P.H.  
DISTRICT HEALTH OFFICER

**STATE OF HAWAII**  
**DEPARTMENT OF HEALTH**  
**MAUI DISTRICT HEALTH OFFICE**  
54 HIGH STREET  
WAILUKU, HAWAII 96793

October 30, 2013

Ms. Tessa Munekiyo Ng, AICP  
Senior Associate  
Munekiyo & Hiraga, Inc.  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Dear Ms. Munekiyo Ng:

**Subject: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Maui, Hawaii; DWS Job No. 12-03  
TMK: (2) 3-5-001:067 (por.) and 091 (por.)**

Thank you for the opportunity to review this project. We have the following comments to offer:

1. National Pollutant Discharge Elimination System (NPDES) permit coverage maybe required for this project. The Clean Water Branch should be contacted at 808 586-4309
2. The noise created during the construction phase of the project may exceed the maximum allowable levels as set forth in Hawaii Administrative Rules (HAR), Chapter 11-46, "Community Noise Control." A noise permit may be required and should be obtained before the commencement of work. The Indoor & Radiological Health Branch should be contacted at 808 586-4700.

It is strongly recommended that the Standard Comments found at the Department's website: <http://health.hawaii.gov/epo/home/landuse-planning-review-program/> be reviewed, and any comments specifically applicable to this project should be adhered to.

Ms. Tessa Munekiyo Ng  
October 30, 2013  
Page 2

Should you have any questions, please call me at 808 984-8230 or E-mail me at [patricia.kitkowski@doh.hawaii.gov](mailto:patricia.kitkowski@doh.hawaii.gov).

Sincerely,

A handwritten signature in cursive script that reads "Patti Kitkowski". The signature is written in black ink and is positioned above the printed name and title.

Patti Kitkowski  
District Environmental Health Program Chief

c EPO

January 29, 2015

Patti Kitkowski  
Maui District Environmental Health Program Chief  
Department of Health  
State of Hawaii  
54 High Street  
Wailuku, Hawaii 96793

SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.)

Dear Ms. Kitkowski:

Thank you for your letter, dated October 30, 2013, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. The County of Maui, Department of Water Supply (DWS) offers the following information in response to the comments noted in your letter.

The County of Maui DWS has received comments from the Department of Health (DOH), Clean Water Branch (CWB) on NPDES permit requirements and other regulatory requirements of that branch. DWS will comply as applicable.

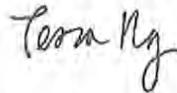
Should noise levels associated with project construction exceed the maximum allowable levels set forth in Hawaii Administrative Rules, HAR Chapter 11-46 "Community Noise Control", a noise permit will be obtained prior to initiation of construction.

It is also noted that the Standard Comments available on the Department's website will be reviewed and comments applicable to the project will be adhered to.

Patti Kitkowski, Program Chief  
January 29, 2015  
Page 2

We appreciate your input and will include a copy of your comment letter in the Draft Environmental Assessment. Should you have any questions or require further information regarding the proposed action, please contact me at (808) 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Vice President

TMN:mge

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakastuka, Austin, Tsutsumi & Associates, Inc.

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NOV 06 2013

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GOVERNOR OF HAWAII



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

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

In reply, please refer to:  
File:  
13-208  
Iao WTP Upgrades  
DWS Job No. 12-03

October 30, 2013

Munekiyo & Hiraga, Inc.  
Attention: Tessa Munekiyo Ng, AICP, Senior Associate  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Dear Ms. Ng:

**SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades,  
DWS Job No. 12-03  
Wailuku, Maui, Hawaii; TMK: (2) 3-5-01: 067 (por.) and 091 (por.)**

The Department of Health (DOH), Environmental Planning Office (EPO), acknowledges receipt of your letter dated October 25, 2013. Thank you for allowing us to review and comment on the subject document. The document was routed to the relevant Environmental Health divisions and offices. They will provide specific comments to you if necessary. EPO recommends that you review the standard comments at: <http://health.hawaii.gov/epo/home/landuse-planning-review-program/>. You are required to adhere to all standard comments specifically applicable to this application.

EPO suggests that you examine the many sources available on strategies to support the sustainable design of communities, including the:

State of Hawaii, Office of Planning: [www.planning.hawaii.gov](http://www.planning.hawaii.gov) and the new 2013 ORMP;  
U.H., School of Ocean and Earth Science and Technology: [www.soest.hawaii.edu](http://www.soest.hawaii.edu);  
U.S. Environmental Protection Agency's sustainability programs: [www.epa.gov/sustainability](http://www.epa.gov/sustainability); and  
U.S. Green Building Council's LEED program: [www.usgbc.org/leed](http://www.usgbc.org/leed).

The DOH encourages everyone to apply these sustainability strategies and principles early in the planning and review of projects. We also request that for future projects you consider conducting a Health Impact Assessment (HIA). More information is available at: [www.cdc.gov/healthyplaces/hia.htm](http://www.cdc.gov/healthyplaces/hia.htm). We request you share all of this information with others to increase community awareness on sustainable, innovative, inspirational, and healthy community design.

We require a written response confirming receipt of this letter and any other letters you receive from DOH in regards to this submission. You may mail your response to 919 Ala Moana Blvd., Ste. 312, Honolulu, Hawaii 96814. However, we would prefer an email submission to: [epo@doh.hawaii.gov](mailto:epo@doh.hawaii.gov). We anticipate that our letter(s) and your response(s) will be included in the final document. If you have any questions, please contact me at (808) 586-4337.

Mahalo,

  
Laura Leialoha Phillips McIntyre, AICP  
Manager, Environmental Planning Office

January 29, 2015

Laura Leialoha Phillips McIntyre, AICP  
Manager, Environmental Planning Office  
State of Hawaii  
Department of Health  
919 Ala Moana Blvd., Ste.312  
Honolulu, Hawaii 96814

SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.); 13-208 Iao WTP Upgrades DWS Job No. 12-03

Dear Ms. McIntyre:

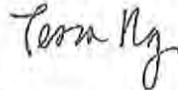
Thank you for your letter, dated October 30, 2013, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. The County of Maui, Department of Water Supply (DWS) offers the following information in response to the comments noted in your letter.

The County of Maui, DWS will review Department of Health, Environmental Planning Office's standard comments detailed in the website noted in your letter, and adhere to comments specifically applicable to the proposed project. Also, sustainable design strategies will be considered on the proposed project.

Laura Leialoha Phillips McIntyre, AICP  
January 29, 2015  
Page 2

We appreciate your input and will include a copy of your comment letter in the Draft Environmental Assessment. Should you have any questions or require further information regarding the proposed action, please contact me at 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Vice President

TMN:mge

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakastuka, Austin, Tsutsumi & Associates, Inc.

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NOV 18 2013

NEIL ABERCROMBIE  
GOVERNOR OF HAWAII



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

STATE OF HAWAII  
DEPARTMENT OF HEALTH  
SAFE DRINKING WATER BRANCH

919 ALA MOANA BLVD., ROOM 308  
HONOLULU, HI 96814-4920

In reply, please refer to:  
File: SDWB

laoWTP01.docx

November 13, 2013

Ms. Tessa Munekiyo Ng  
Senior Associate  
Munekiyo & Hiraga, Inc.  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Dear Ms. Munekiyo Ng:

SUBJECT: EARLY CONSULTATION REQUEST FOR PROPOSED  
IAO WATER TREATMENT PLANT UPGRADES  
WAILUKU, ISLAND OF MAUI, HAWAII

The Safe Drinking Water Branch (SDWB) acknowledges receipt of the letter dated October 25, 2013, from your office requesting our comments regarding the subject project.

The following are our comments regarding the subject application:

This project to replace the Iao water treatment plant appears to be a substantial modification to the County of Maui's Wailuku water system.

Projects proposing to develop new public water systems or proposing substantial modifications to existing public water systems must receive approval by the Director of Health prior to construction of the proposed system or modification in accordance with Hawaii Administrative Rule, Section 11-20-30, "New and modified public water systems." These projects include treatment, storage and distribution systems of public water systems. This requirement is not waived for county owned systems using a surface water source.

The requirement includes submission of plans, specifications, supporting information, and documents detailing the design of the proposed substantial modifications to the SDWB for approval.

If there are any questions, please call Mr. Craig Watanabe of the SDWB Engineering Section, at (808) 586-4258.

Sincerely,

A handwritten signature in cursive script that reads "Joanna L. Seto".

JOANNA L. SETO, P.E., CHIEF  
Safe Drinking Water Branch

CW:slm

c: EPO #13-208 [via email only]

January 29, 2015

Joanna L. Seto, P.E., Chief  
Safe Drinking Water Branch  
Department of Health  
State of Hawaii  
P.O. Box 3378  
Honolulu, Hawaii 96801-3378

SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.); SDWB Iao WTP 01.docx

Dear Ms. Seto:

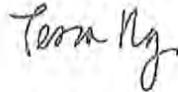
Thank you for your letter, dated November 13, 2013, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. The County of Maui, Department of Water Supply (DWS) offers the following information in response to the comments noted in your letter.

As advised, the County of Maui DWS will fully comply with Hawaii Administrative Rules (HAR), Chapters 11-20-301-55 "New and modified public water systems". Once the plans, specifications, supporting information, and documents detailing the project's design is developed, a package will be submitted to your branch for review and approval by the Director of Health.

Joanna L. Seto, P.E., Chief  
January 29, 2015  
Page 2

We appreciate your input and will include a copy of your response letter in the Draft Environmental Assessment. Should you have any questions or require further information regarding the proposed action, please contact me at 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Vice President

TMN:mge

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakastuka, Austin, Tsutsumi & Associates, Inc.

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NOV 19 2013

NEIL ABERCROMBIE  
GOVERNOR OF HAWAII



WILLIAM J. AILA, JR.  
CHAIRPERSON  
WILLIAM D. BALFOUR, JR.  
KAMANA BEAMER  
LORETTA J. FUDDY, A.C.S.W., M.P.H.  
MILTON D. PAVAO  
JONATHAN STARR  
TED YAMAMURA  
WILLIAM M. TAM  
DEPUTY DIRECTOR

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

November 15, 2013

REF: RFD.3862.6

Munekiyo & Hiraga, Inc.  
Attention: Tessa Munekiyo Ng, AICP, Senior Associate  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Dear Ms. Ng:

SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Maui, Hawaii

DWS Job No.: 12-03  
TMK NO.: (2) 3-5-001:067 (por.) and 091 (por.)

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://www.hawaii.gov/dlnr/cwrn>.

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 EPA 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://hawaii.gov/dbedt/czm/initiative/lid.php>.
- 6. We recommend the use of alternative water sources, wherever practicable.
- 7. 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.

Permits required by CWRM:

Additional information and forms are available at [http://hawaii.gov/dlnr/cwrw/info\\_permits.htm](http://hawaii.gov/dlnr/cwrw/info_permits.htm).

- 8. 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.
- 9. A Well Construction Permit(s) is (are) required before the commencement of any well construction work.
- 10. A Pump Installation Permit(s) is (are) required before ground water is developed as a source of supply for the project.
- 11. 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.
- 12. Ground-water withdrawals from this project may affect streamflows, which may require an instream flow standard amendment.
- 13. A Stream Channel Alteration Permit(s) is (are) required before any alteration can be made to the bed and/or banks of a stream channel.
- 14. A Stream Diversion Works Permit(s) is (are) required before any stream diversion works is constructed or altered.
- 15. A Petition to Amend the Interim Instream Flow Standard is required for any new or expanded diversion(s) of surface water.
- 16. 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:  
On March 31, 2009, the County of Maui Department of Water Supply (Maui DWS) submitted a Surface Water Use Permit Application for Existing Use in the Na Wai Eha, Maui, Surface Water Management Areas, requesting an amount of 1.784 million gallons per day (mgd). An accompanying Surface Water Use Permit Application for Proposed New Use was also submitted, requesting an additional amount of 1.416 mgd. At this time, the Commission on Water Resource Management is still in the process of determining instream flow standards for the Na Wai Eha Surface Water Management Areas, and no decisions have been made on the allocated use of surface water for Maui DWS. Please be aware that any expanded use of water by the Iao Water Treatment Plant will be subject to surface water use permit allocations once they are decided.

If there are any questions, please contact Dean Uyeno at (808) 587-0249.

Sincerely,



WILLIAM M. TAM  
Deputy Director

January 29, 2015

Mr. William M. Tam, Deputy Director  
Department of Land and Natural Resources  
Commission on Water Resource Management  
State of Hawaii  
P.O. Box 621  
Honolulu, Hawaii 96809

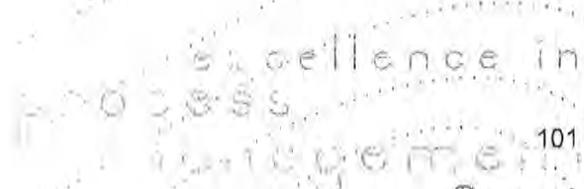
SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.); REF: RFD.3862.6

Dear Mr. Tam:

Thank you for your letter, dated November 15, 2013, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. The County of Maui, Department of Water Supply (DWS) offers the following information in response to the comments noted in your letter.

The County of Maui DWS acknowledges your comments noting that the proposed project will require a Commission on Water Resource Management (CWRM) Water Use Permit and that the Surface Water Use Permit Application (submitted March 31, 2009) for Existing Use in the Na Wai Eha, Maui surface Water Management Areas will be subject to the April 2014 Settlement Agreement in the Na Wai Eha contested case.

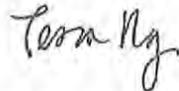
As the project moves further along to better define the project details, DWS will apply for a Water Use Permit with the CWRM and secure any other applicable approvals.



William M. Tam, Deputy Director  
January 29, 2015  
Page 2

We appreciate your input and will include a copy of your comment letter in the Draft Environmental Assessment. Should you have any questions or require further information regarding the proposed action, please contact me at 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Vice President

TMN:mge

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakastuka, Austin, Tsutsumi & Associates, Inc.

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NOV 21 2013

NEIL ABERCROMBIE  
GOVERNOR



STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
869 PUNCHBOWL STREET  
HONOLULU, HAWAII 96813-5097

GLENN M. OKIMOTO  
DIRECTOR

Deputy Directors  
JADE T. BUTAY  
FORD N. FUCHIGAMI  
RANDY GRUNE  
JADINE URASAKI

IN REPLY REFER TO:  
STP 8.1367

November 15, 2013

Ms. Tessa Munekiyo Ng, AICP  
Senior Associate  
Munekiyo and Hiraga, Inc.  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Dear Ms. Ng:

Subject: Iao Water Treatment Plant (WTP) Upgrades  
Early Consultation for Draft Environmental Assessment (DEA)  
TMK: (2) 3-5-001:067 (por.) and 091(por.)

Thank you for requesting the State Department of Transportation's (DOT) review of the subject project. DOT understands the Maui County Department of Water Supply (DWS) proposes to replace the existing WTP with a new WTP.

Given the project location and the nature of the project it is not expected to significantly impact the State highway facility. However, the DWS is required to obtain a permit from DOT Highways Division, Maui District Office, for the transport of oversized and/or overweight materials and equipment on State highway facilities.

DOT appreciates the opportunity to provide comments. If there are any questions, please contact Mr. Norren Kato of the DOT Statewide Transportation Planning Office at telephone number (808) 831-7977.

Very truly yours,

A handwritten signature in black ink, appearing to read "Glenn M. Okimoto", written over a light blue horizontal line.

GLENN M. OKIMOTO, Ph.D.  
Director of Transportation

January 29, 2015

Ford Fuchigami, Interim Director  
Department of Transportation  
State of Hawaii  
869 Punchbowl Street  
Honolulu, Hawaii 96813-5097

SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant  
Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03;  
TMK (2) 3-5-001:067 (por.) and 091 (por.); STP 8.1367

Dear Mr. Fuchigami:

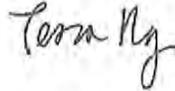
Thank you for your department's letter, dated November 15, 2013, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. The County of Maui, Department of Water Supply (DWS) offers the following information in response to the comments noted in your department's letter.

The County of Maui, DWS acknowledges that the project is not expected to significantly impact State highway facilities. Construction of the project will comply with State highway oversize and/or overweight vehicle regulations. DWS recognizes that the project site needs to be accessed via State highway facilities and will include language in the construction bid documents directing the contractor and its subcontractors and material suppliers to comply with obtaining the necessary permits from your Maui District office.

Ford Fuchigami, Director  
January 29, 2015  
Page 2

We appreciate your input and will include a copy of your department's comment letter in the Draft EA. Should you have any questions or require further information regarding the proposed action, please contact me at 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Vice President

TMN:mge

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakastuka, Austin, Tsutsumi & Associates, Inc.

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NOV 21 2013

NEIL ABERCROMBIE  
GOVERNOR



DARRYLL D. M. WONG  
MAJOR GENERAL  
ADJUTANT GENERAL

JOSEPH K. KIM  
BRIGADIER GENERAL  
DEPUTY ADJUTANT GENERAL

STATE OF HAWAII  
**DEPARTMENT OF DEFENSE**  
OFFICE OF THE ADJUTANT GENERAL  
3949 DIAMOND HEAD ROAD  
HONOLULU, HAWAII 96816-4495

NOV 19 2013

Ms. Tessa Munekiyo Ng, AICP  
Senior Associate  
Munekiyo & Hiraga, Inc.  
305 High Street, Suite 104  
Wailuku, Hawai'i 96793

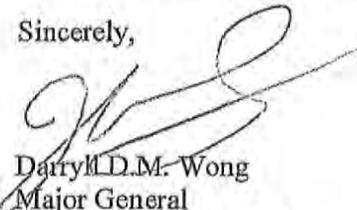
Subject: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Maui, Hawaii, DWS Job No. 12-03; TMK (2) 3-5-001: 67 (por.) and 091 (por.)

Dear Ms. Munekiyo Ng:

Thank you for the opportunity to comment on the above project. The State of Hawaii Department of Defense has no early consultation comments to offer relative to the project at this time, and defers to the appropriate State and federal agencies as to the protection of any cultural, historical, and environmental considerations for the proposed project.

Please contact this office upon completion of the Draft Environment Assessment. Should you have any questions or concerns, please have your staff contact Mr. Lloyd Maki, our Acting Chief Engineering Officer, on Oahu at (808) 733-4250.

Sincerely,

  
Darryll D.M. Wong  
Major General  
Hawaii National Guard  
Adjutant General

c: Mr. Ian Duncan, State Civil Defense

January 29, 2015

Major General Darryll D.M. Wong  
Hawaii National Guard  
Adjutant General  
Department of Defense  
3949 Diamond Head Road  
Honolulu, Hawaii 96816-4495

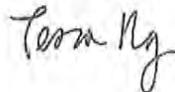
**SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.)**

Dear Major General Wong:

Thank you for your letter, dated November 19, 2013, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. The County of Maui, Department of Water Supply (DWS) acknowledges that the State of Hawaii Department of Defense has no comments to offer at this time.

We appreciate your input and will include a copy of your comment letter in the Draft Environmental Assessment. Should you have any questions or require further information regarding the proposed action, please contact me at 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Vice President

TMN:mge

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakastuka, Austin, Tsutsumi & Associates, Inc.

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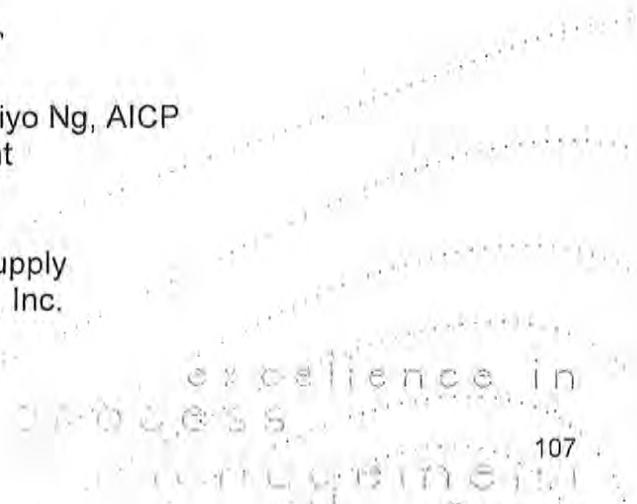
305 High St., Suite 104 Wailuku, Hawaii 96793

ph: (808)244-2015 fax: (808)244-8729

5010M

735 Bishop St., Suite 238 Honolulu, Hawaii 96813 | ph: (808)983-1233

WWW.MUNEKIYO.COM



NOV 18 2013



OFFICE OF PLANNING  
STATE OF HAWAII

NEIL ABERCROMBIE  
GOVERNOR

JESSE K. SOUKI  
DIRECTOR  
OFFICE OF PLANNING

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

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

Ref. No. P-14173

November 14, 2013

Ms. Tessa Munekiyo Ng, AICP  
Senior Associate  
Munekiyo & Hiraga, Inc.  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Dear Ms. Munekiyo Ng:

Subject: Early Consultation Request for the Proposed Iao Water Treatment Plant Upgrades; Wailuku, Maui; TMK: (2) 3-5-001:067 (por.) and 091 (por.)

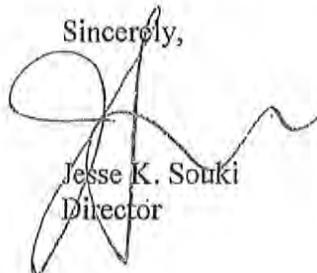
Thank you for the opportunity to provide comments on the Iao Water Treatment Plant Upgrades project.

We have reviewed the documents you submitted to us by letter dated October 25, 2013, and have the following comments to offer.

1. The entire state is defined to be within the Coastal Zone Management Area, see HRS §205A-1 (definition of "coastal zone management area"). The Draft Environmental Assessment (Draft EA) should include a discussion of the proposed project's ability to meet the objectives and policies set forth in HRS §205A-2.
2. The construction project may have nonpoint pollution impacts on coastal waters. Please review the Hawaii Watershed Guidance, which provides a summary and links to management measures that may be implemented to minimize coastal nonpoint pollution impact. Specifically, please examine the sections on: "Hawaii's Management Measures, Urban Areas," on page 109. The *Watershed Guidance* can be viewed or downloaded from the Office of Planning website at <http://files.hawaii.gov/dbedt/op/czm/initiative/nonpoint/HiWatershedGuidanceFinal.pdf>.
3. The Draft EA should include the Coastal Zone Management Act, HRS Chapter 205A, in the list of "Relationship to Land Use Plans, Policies, and Controls."

If you have any questions regarding this comment letter, please contact Josh Hekēkiā of our Hawaii CZM Program at (808) 587-2845.

Sincerely,



Jesse K. Souki  
Director

January 29, 2015

Leo R. Asuncion, Jr., AICP, Acting Director  
Office of Planning  
State of Hawaii  
P.O. Box 2359  
Honolulu, Hawaii 96804

**SUBJECT:** Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.); Ref. No. P-14173

Dear Mr. Asuncion:

Thank you for your department's letter, dated November 14, 2013, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. The County of Maui, Department of Water Supply (DWS) offers the following information in response to the comments noted in your department's letter.

The County of Maui DWS acknowledges that Coastal Zone Management Area rules as prescribed in HRS 205A-1 applies to the proposed project. Accordingly, the Draft Environmental Assessment (Draft EA) will be prepared to include discussions on the proposed project's ability to meet the objectives and policies set forth.

Regarding the concern of construction activities having nonpoint source (NPS) pollution impacts on coastal waters, we note that strict erosion control measures and best management practices will be implemented during the construction phase. In the Hawai'i Watershed Guidance document, one of the 12 management measures that apply to urban areas is Site Development Management Measures. The DWS will coordinate with Department of Health, Clean Water Branch and comply with applicable National Pollutant Discharge Elimination System (NPDES) permit requirements. These

excellence in  
process  
management

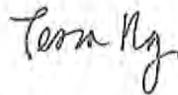
Leo R. Asuncion, Jr.  
January 29, 2015  
Page 2

pollution abatement measures will protect watersheds located downstream of the project site that contain wetlands and riparian areas.

Finally, the Draft EA will be prepared to include the Coastal Zone Management Act, HRS, Chapter 205A in the list of "Relationship to Land Use Plans, Policies, and Controls."

We appreciate your input and will include a copy of your department's comment letter in the Draft EA. Should you have any questions or require further information regarding the proposed action, please contact me at 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Vice President

TMN:mge

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakastuka, Austin, Tsutsumi & Associates, Inc.

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NOV 18 2013

ALAN M. ARAKAWA  
MAYOR



JEFFREY A. MURRAY  
CHIEF

ROBERT M. SHIMADA  
DEPUTY CHIEF

**COUNTY OF MAUI**  
DEPARTMENT OF FIRE AND PUBLIC SAFETY  
FIRE PREVENTION BUREAU

313 MANEA PLACE . WAILUKU, HAWAII 96793  
(808) 244-9161 . FAX (808) 244-1363

November 14, 2013

Munekiyo & Hiraga, Inc  
Attention: Tessa Munekiyo Ng, AICP, Senior Associate  
305 High St. Suite 104  
Wailuku, HI 96793

**Re: Proposed Iao Water Treatment Plant Upgrades**  
**Wailuku, Maui, Hawaii**  
**(2) 3-5-001: 067 (por.) & 091 (por.)**  
**DWS Job No. 12-03**

Dear Tessa:

Thank you for allowing our office the opportunity to comment on this subject. At this time, our office provides the following comments:

- Our office reserves the right to comment on the construction of any buildings during the building permit process when water supply for fire protection, fire apparatus access, and fire protection and life safety system requirements will be addressed.
- Permits for flammable & combustible liquid storage tanks are processed and approved at the Fire Prevention Bureau. A site plan indicating the tank location and distances to property lines and buildings will be required.

If there are any questions or comments, please feel free to contact me at 244-9161 ext. 23.

Sincerely,

A handwritten signature in black ink, appearing to read "Paul Haake", written over a horizontal line.

Paul Haake  
Captain, Fire Prevention Bureau

January 29, 2015

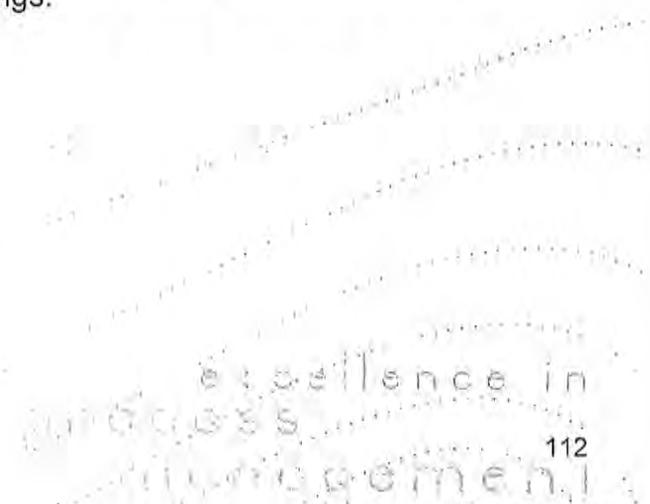
Paul Haake, Captain  
Department of Fire and Public Safety  
County of Maui  
313 Manea Place  
Wailuku, Hawaii 96793

SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.)

Dear Captain Haake:

Thank you for your letter dated November 14, 2013 providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. The County of Maui, Department of Water Supply (DWS) offers the following information in response to the comments noted in your letter.

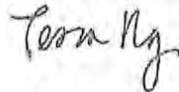
1. We acknowledge that your office reserves the right to comment on the project during the building permit process.
2. Any permits for flammable and combustible liquid storage tanks will be appropriately processed with your office and include a site plan indicating tank location, distances to property lines and buildings.



Paul Haake, Captain  
January 29, 2015  
Page 2

We appreciate your input and we will include a copy of your comment letter in the Draft Environmental Assessment. Should you have any questions or require further information regarding the proposed action, please contact me at (808) 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Vice President

TMN:mge

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakastuka, Austin, Tsutsumi & Associates, Inc.

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DEPARTMENT OF  
HOUSING AND HUMAN CONCERNS  
HOUSING DIVISION  
COUNTY OF MAUI

NOV 14 2013  
ALAN M. ARAKAWA  
Mayor  
JO-ANN T. RIDAO  
Director  
JAN SHISHIDO  
Deputy Director

35 LUNALILO STREET, SUITE 102 • WAILUKU, HAWAII 96793 • PHONE (808) 270-7351 • FAX (808) 270-6284

November 12, 2013

Ms. Tessa Munekiyo Ng, AICP  
Senior Associate  
Munekiyo & Hiraga  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Dear Ms. Ng:

**Subject: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.)**

The Department has reviewed the request for Early Consultation for the above subject project. Based on our review, we have determined that the subject project is not subject to Chapter 2.96, Maui County Code. At the present time, the Department has no additional comments to offer.

Please call Mr. Veranio Tongson Jr. of our Housing Division at (808) 270-1741 if you have any questions.

Sincerely,

WAYDE T. OSHIRO  
Housing Administrator

cc: Director of Housing and Human Concerns



MUNEKIYO, MUNEKIYO  
PRESIDENT

KARLYNN FUKUDA  
EXECUTIVE VICE PRESIDENT

MARK ALEXANDER ROY  
VICE PRESIDENT

TESSA MUNEKIYO MD  
VICE PRESIDENT

SHVEN CHASHI HIRAGA  
SENIOR ADVISOR

WALTER HIRAGA  
SENIOR ADVISOR

January 29, 2015

Wayde T. Oshiro, Administrator  
Department of Housing and Human Concerns  
County of Maui  
35 Lunalilo Street, Suite 102  
Wailuku, Hawaii 96793

**SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.)**

Dear Mr. Oshiro:

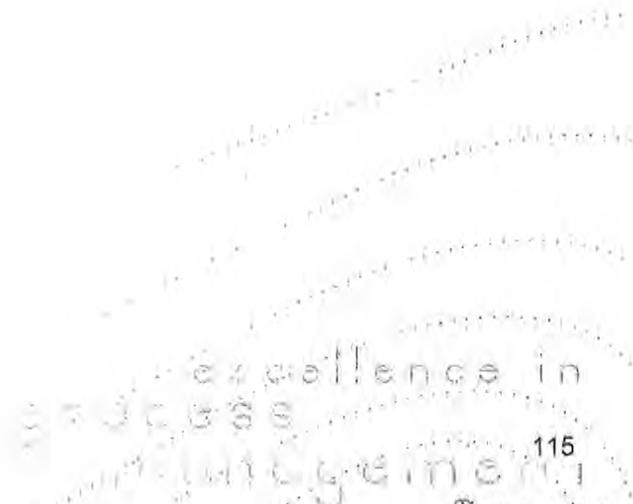
Thank you for your letter, dated November 1, 2013, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. The County of Maui, Department of Water Supply (DWS) offers the following information in response to the comments noted in your letter.

The County of Maui DWS acknowledges that the project is not subject to Chapter 2.96, Maui County Code relating to the County's residential work force housing policy.

MAUI  
305 High St., Suite 104 Wailuku, Hawaii 96793  
ph: (808)244-2015 fax: (808)244-8729

735 Bishop St., Suite 238 Honolulu, Hawaii 96813 | ph: (808)983-1233

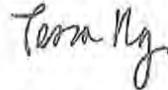
WWW.MHPLAMBERT.COM



Wayde T. Oshiro, Administrator  
January 29, 2015  
Page 2

We appreciate your input and will include a copy of your comment letter in the Draft Environmental Assessment. Should you have any questions or require further information regarding the proposed action, please contact me at (808) 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Manager

TMN:mge

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakastuka, Austin, Tsutsumi & Associates, Inc.

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ALAN M. ARAKAWA  
Mayor



NOV 06 2013 GLENN T. CORREA  
Director

BRIANNE SAVAGE  
Deputy Director

(808) 270-7230  
FAX (808) 270-7934

**DEPARTMENT OF PARKS & RECREATION**  
700 Hali'a Nako'a Street, Unit 2, Wailuku, Hawaii 96793

November 1, 2013

Tessa Munekiyo Ng, AICP, Senior Associate  
Munekiyo & Hiraga, Inc.  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

**SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Maui, Hawaii; DWS Job No. 12-03; TMK: (2) 3-5-001:067 (por.) and 091 (por.)**

Dear Ms. Ng:

We are in receipt of your October 25, 2013 request for early review and comment on the proposed project and have no comment at this time. Please keep our Department informed as the project progresses.

Should you have any questions or need of additional information, please contact me or Robert Halvorson at 808.870.5942 or [robert.halvorson@co.maui.hi.us](mailto:robert.halvorson@co.maui.hi.us)

Sincerely,

  
GLENN T. CORREA  
Director

c: Robert Halvorson, Planning & Development

GTC:RH:do

January 29, 2015

Brianne Savage, Interim Director  
County of Maui  
Department of Parks & Recreation  
700 Hali'a Nako'a Street, Unit 2  
Wailuku, Hawaii 96793

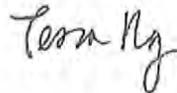
**SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.)**

Dear Ms. Savage:

Thank you for your letter, dated November 1, 2013, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. The County of Maui, Department of Water Supply (DWS) acknowledges your Department has no comments to offer on the proposed project at this time.

We appreciate your input and will include a copy of your department's response letter in the Draft Environmental Assessment. Should you have any questions or require further information regarding the proposed action, please contact me at (808) 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Vice President

TMN::mge

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakastuka, Austin, Tsutsumi & Associates, Inc.

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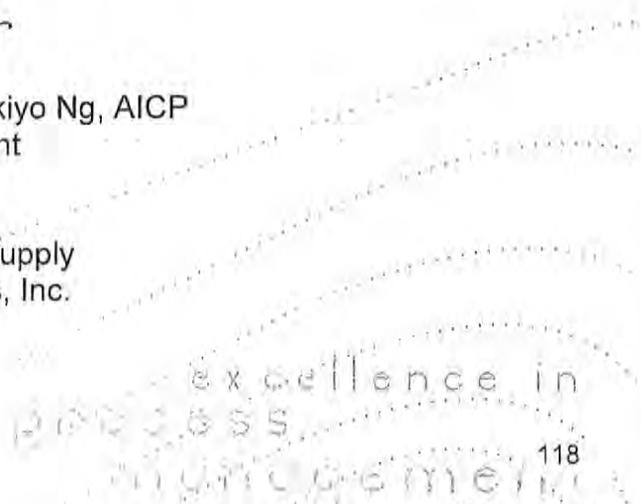
305 High St., Suite 104 Wailuku, Hawaii 96793

ph: (808)244-2015 fax: (808)244-8729

5/1/10

735 Bishop St., Suite 238 Honolulu, Hawaii 96813 | ph: (808)983-1233

WWW.MPLANNING.COM



ALAN M. ARAKAWA  
Mayor

WILLIAM R. SPENCE  
Director

MICHELE CHOUTEAU McLEAN  
Deputy Director



NOV 12 2013

COUNTY OF MAUI  
**DEPARTMENT OF PLANNING**

November 12, 2013

Ms. Tessa Munekiyo Ng  
Munekiyo & Hiraga, Inc.  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Dear Ms. Ng:

**SUBJECT: EARLY CONSULTATION COMMENTS FOR PROPOSED UPGRADES TO THE IAO WATER TREATMENT PLANT, LOCATED ALONG ALU ROAD IN WAILUKU, ISLAND OF MAUI, HAWAII; TMK: (2) 3-5-001: 091 (RFC 2013/0154)**

The Department of Planning (Department) is in receipt of the above-referenced request for early consultation comments on the above-referenced project. The Department understands the proposed action includes the following:

- The Applicant is the County of Maui, Department of Water Supply (DWS);
- The project will involve upgrades to the Iao Water Treatment Plant. Upgrades include, but are not limited to, the installation of new membrane filtration units, various tanks, dual sludge lagoons, holding tanks, waterlines, drainage system, and construction of a Treatment Plant Building;
- The property is currently owned by RCFC Kehalani LLC, Kehalani Mauka LLC, and Wailuku Water Company LLC. The DWS is in the process of acquiring the land for the proposed project; and
- The project triggers compliance with Hawaii Revised Statutes (HRS), Chapter 343;

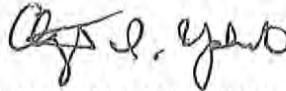
Based on the foregoing, the Department provides the following comments on the Draft Environmental Assessment (EA):

1. Please include a Zoning and Flood confirmation form from the Department's Zoning Administration and Enforcement Division;
2. That the Applicant include information on all permits required in order to complete the project; and
3. Please provide the Department with one (1) hard copy and one (1) electronic copy of the Draft EA.

Ms. Tessa Munekiyo Ng  
November 12, 2013  
Page 2

Thank you for the opportunity to comment. Should you require further clarification, please contact Staff Planner Danny Dias at [danny.dias@mauicounty.gov](mailto:danny.dias@mauicounty.gov) or at (808) 270-7557.

Sincerely,



CLAYTON I. YOSHIDA, AICP  
Planning Program Administrator

for WILLIAM SPENCE  
Planning Director

xc: John S. Rapacz, Planning Program Administrator (PDF)  
Danny A. Dias, Staff Planner (PDF)  
Project File  
General File

WRS:CIY:DD:aj

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January 29, 2015

William Spence, Director  
Department of Planning  
County of Maui  
2200 Main Street, Suite 315  
Wailuku, Hawaii 96793

SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.)

Dear Mr. Spence:

Thank you for your letter, dated November 12, 2013, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. The County of Maui, Department of Water Supply (DWS) offers the following information in response to the comments noted in your letter.

The County of Maui DWS acknowledges your comment advising that certain information be included in the Draft Environmental Assessment (EA).

DWS will include the following information in the Draft EA:

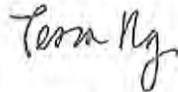
1. Zoning and Flood confirmation from the Planning Department's Zoning Administration and Enforcement Division and;
2. Information on all permits required to complete the proposed project.

Also, DWS will provide the Department with one (1) hard copy and one (1) electronic copy of the Draft EA.

William Spence, Planning Director  
January 29, 2015  
Page 2

We appreciate your input and will include a copy of your comment letter in the Draft Environmental Assessment. Should you have any questions or require further information regarding the proposed action, please contact me at (808) 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Vice President

TMN:mge

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakastuka, Austin, Tsutsumi & Associates, Inc.

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ALAN M. ARAKAWA  
MAYOR

OUR REFERENCE  
YOUR REFERENCE

**POLICE DEPARTMENT**  
COUNTY OF MAUI

55 MAHALANI STREET  
WAILUKU, HAWAII 96793  
(808) 244-6400  
FAX (808) 244-6411

November 13, 2013



NOV 18 2013

GARY A. YABUTA  
CHIEF OF POLICE

CLAYTON N.Y.W. TOM  
DEPUTY CHIEF OF POLICE

Ms. Tessa Munekiyo Ng  
AICP, Senior Associate  
Munekiyo & Hiraga, Inc.  
305 High Street, Suite 104  
Wailuku, HI 96793

Dear Ms. Munekiyo Ng:

SUBJECT: Early Consultation Request for the Proposed Iao Water Treatment  
Plant Upgrades, Wailuku, Maui  
DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.)

This is in response your request for comments on the above subject.

We have reviewed the information submitted for this project and have submitted our  
comments and/or recommendations. Thank you for giving us the opportunity to comment  
on this project.

Very truly yours,

Assistant Chief Victor Ramos  
for: Gary A. Yabuta  
Chief of Police

c: William Spence, Planning Department

TO : GARY YABUTA, CHIEF OF POLICE, COUNTY OF MAUI  
VIA : CHANNELS  
FROM : AYLETT WALLWORK, POLICE OFFICER III, COMMUNITY  
POLICING, WAILUKU PATROL DIVISION  
SUBJECT : RESPONSE TO A REQUEST FOR COMMENTS REGARDING  
IAO WATER TREATMENT PLANT UPGRADES

*James J. Aylett*  
11/7/13

This communication is submitted as a response to a request for comments by the Maui County, Department of Water Supply, who is proposing to replace the existing Iao Surface Water Treatment Plant with a new Water Treatment Plant.

PROJECT : PROPOSED IAO WATER TREATMENT  
PLANT UPGRADES  
LOCATION : AREA OF KEHALANI DEVELOPMENT WAILUKU, MAUI,  
HAWAII  
TMK : (2) 3 - 5 - 001:067

**RESPONSE:**

In review of the submitted documents, the concern from the police perspective is the impacts upon vehicular and pedestrian movement as well as the public's safety. Maui County Department of Water Supply is proposing to replace the existing Iao Water Treatment Plant with a new Water Treatment Plant (WTP), west of the existing plant. Construction should not have any impact to vehicular and pedestrian movements or the public's safety. There is adequate on-site parking for workers and their vehicles. The proposed site is not in an area that can be accessed by the roadway, but can be accessed through the existing Iao WTP site. At this time it is undetermined when this project will commence.

There are no objections to the progression of this project. It must be stated that all those involved in this project must remain cognizant in maintaining the safety of the general public.

Respectfully submitted for your review and approval.

*[Signature]* 11764  
Aylett Wallwork #11764  
P.O. III, Community Policing, Wailuku Patrol Division  
11/07/2013 @ 1000 hours

NOTED: Aylett Wallwork 11/8/13

NO CONCERNS AT THIS TIME.  
Sgt. James J. Aylett 11/7/13  
11-7-13 @ 1505

January 29, 2015

Tivoli Faaumu, Chief  
Police Department  
County of Maui  
55 Mahalani Street  
Wailuku, Hawaii 96793

**SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.)**

Dear Chief Faaumu:

Thank you for your Department's letter, dated November 13, 2013, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. The County of Maui, Department of Water Supply (DWS) offers the following information in response to the comments noted in your department's letter.

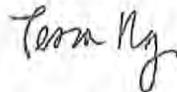
The County of Maui DWS acknowledges your department's comment that the construction phase of the project should not have any impact to vehicular and pedestrian movements or the public's safety and that adequate on-site parking for workers and their vehicles are accommodated. DWS will include provisions in the construction bid documents to ensure the general contractor implements adequate work zone traffic control plans and has adequate on-site construction vehicle parking areas.

We note that access to the proposed site will be via an access driveway off of Alu Road rather than through the existing water treatment plant site.

Tivoli Faaumu, Chief  
January 29, 2015  
Page 2

We appreciate your input and will include a copy of your department's comment letter in the Draft Environmental Assessment. Should you have any questions or require further information regarding the proposed action, please contact me at (808) 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Vice President

TMN:mge

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakastuka, Austin, Tsutsumi & Associates, Inc.

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NOV 13 2013

ALAN M. ARAKAWA  
Mayor

DAVID C. GOODE  
Director

ROWENA M. DAGDAG-ANDAYA  
Deputy Director



GLEN A. UENO, P.E., P.L.S.  
Development Services Administration

CARY YAMASHITA, P.E.  
Engineering Division

BRIAN HASHIRO, P.E.  
Highways Division

COUNTY OF MAUI  
DEPARTMENT OF PUBLIC WORKS

200 SOUTH HIGH STREET, ROOM NO. 434, WAILUKU, MAUI, HAWAII 96793  
Telephone: (808) 270-7845 • Fax: (808) 270-7955

November 7, 2013

Ms. Tessa Munekiyo Ng, AICP  
MUNEKIYO & HIRAGA, INC.  
305 High Street, Suite 104  
Wailuku, Maui, Hawaii 96793

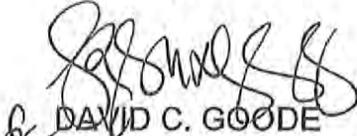
Dear Ms. Munekiyo Ng:

**SUBJECT: EARLY CONSULTATION REQUEST FOR THE  
PROPOSED IAO WATER TREATMENT PLANT  
UPGRADES; DWS JOB NO. 12-03; TMK: (2) 3-5-001:067  
(POR.) and 091 (POR.)**

We have no comments at this time, but wish to reserve our comments until the review of the Draft Environmental Assessment.

Please call Rowena M. Dagdag-Andaya at 270-7845 if you have any questions regarding this letter.

Sincerely,

  
DAVID C. GOODE  
Director of Public Works

DCG:RMDA:ls

xc: Highways Division  
Engineering Division

S:\LUCA\CZM\prop\_iao\_trmt\_plant\_upgrades\_35001067\_091\_pors\_ec\_ls.wpd

January 29, 2015

David C. Goode, Director  
Department of Public Works  
County of Maui  
200 South High Street, Suite 104  
Wailuku, Hawaii 96793

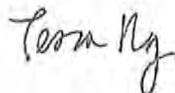
SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.)

Dear Mr. Goode:

Thank you for your letter, dated November 7, 2013, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. The County of Maui, Department of Water Supply (DWS) acknowledges your Department has no comments to offer on the proposed project at this time.

We appreciate your input and we will include a copy of your comment letter in the Draft Environmental Assessment. Should you have any questions or require further information regarding the proposed action, please contact me at (808) 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Vice President

TMN:mge

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakastuka, Austin, Tsutsumi & Associates, Inc.

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HAWAII

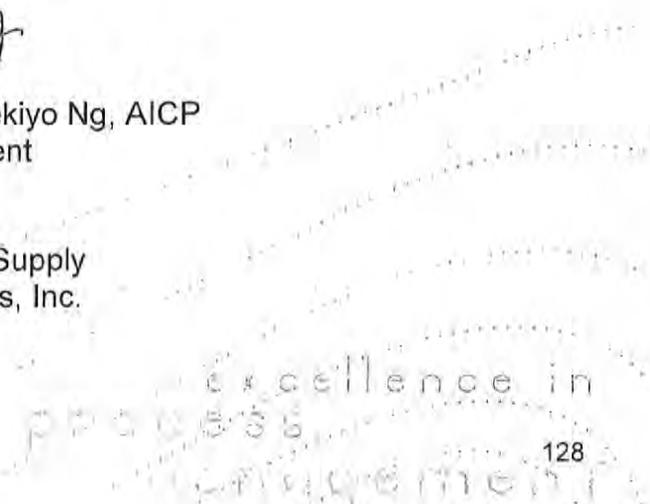
305 High St., Suite 104 Wailuku, Hawaii 96793

ph: (808)244-2015 Fax: (808)244-8729

OKAHI

735 Bishop St., Suite 238 Honolulu, Hawaii 96813 | ph: (808)983-1233

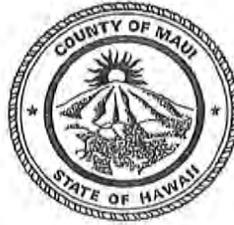
WWW.MUNEKIYOHIRAGA.COM



NOV 18 2013

ALAN M. ARAKAWA  
Mayor  
KYLE K. GINOZA, P.E.  
Director  
MICHAEL M. MIYAMOTO  
Deputy Director

TRACY TAKAMINE, P.E.  
Solid Waste Division  
ERIC NAKAGAWA, P.E.  
Wastewater Reclamation Division



**COUNTY OF MAUI  
DEPARTMENT OF  
ENVIRONMENTAL MANAGEMENT**  
2200 MAIN STREET, SUITE 100  
WAILUKU, MAUI, HAWAII 96793

November 13, 2013

Ms. Tessa Munekiyo Ng  
Munekiyo & Hiraga, Inc.  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Dear Ms. Ng:

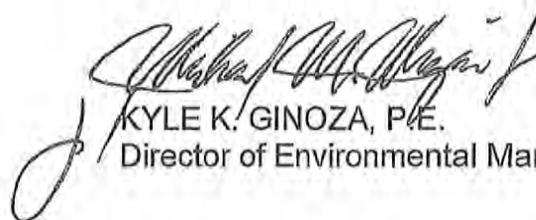
**SUBJECT: IAO WATER TREATMENT PLANT UPGRADES  
EARLY CONSULTATION  
TMK (2) 3-5-001:067 (POR.) AND 091 (POR.), WAILUKU**

We reviewed the subject application and have the following comments:

1. Solid Waste Division comments:
  - a. None.
2. Wastewater Reclamation Division (WWRD) comments:
  - a. None.

If you have any questions regarding this memorandum, please contact Michael Miyamoto at 270-8230.

Sincerely,

  
KYLE K. GINOZA, P.E.  
Director of Environmental Management

January 29, 2015

Kyle K. Ginoza, P.E.  
Department of Environmental Management  
County of Maui  
2200 South High Street, Suite 100  
Wailuku, Hawaii 96793

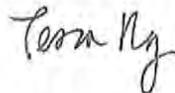
SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.)

Dear Mr. Ginoza:

Thank you for your letter, dated November 13, 2013, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. The County of Maui, Department of Water Supply (DWS) acknowledges your Department has no comments to offer on the proposed project at this time.

We appreciate your input and will include a copy of your response letter in the Draft Environmental Assessment. Should you have any questions or require further information regarding the proposed action, please contact me at (808) 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Vice President

TMN:mge

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakastuka, Austin, Tsutsumi & Associates, Inc.

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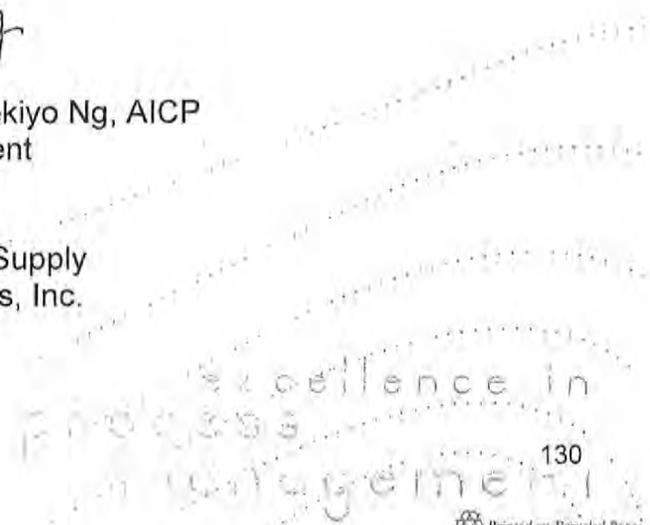
305 High St., Suite 104 Wailuku, Hawaii 96793

ph: (808)244-2015 fax: (808)244-8729

5555

735 Bishop St., Suite 238 Honolulu, Hawaii 96813 | ph: (808)983-1233

WWW.MUNEKIYOHIRAGA.COM



ALAN M. ARAKAWA  
Mayor



NOV 12 2013  
JO ANNE JOHNSON-WINER  
Director  
MARC I. TAKAMORI  
Deputy Director  
Telephone (808) 270-7511

DEPARTMENT OF TRANSPORTATION

COUNTY OF MAUI  
200 South High Street  
Wailuku, Hawaii, USA 96793-2155

October 30, 2013

Ms. Tessa Munekiyo Ng  
Munekiyo & Hiraga Inc.  
305 High Street, Suite 104  
Wailuku, Maui, Hawaii 96793

Subject: Proposed Iao Water Treatment Plant Upgrades

Dear Ms. Ng,

Thank you for the opportunity to comment on this project. We have no comments to make at this time.

Please feel free to contact me if you have any questions.

Sincerely,

  
Jo Anne Johnson-Winer  
Director

January 29, 2015

Jo Anne Johnson Winer, Director  
Department of Transportation  
County of Maui  
200 South High Street  
Wailuku, Hawaii 96793-2155

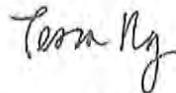
**SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.)**

Dear Ms. Johnson Winer:

Thank you for your letter, dated October 30, 2013, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. The County of Maui, Department of Water Supply (DWS) acknowledges your Department has no comments to offer on the proposed project at this time.

We appreciate your input and will include a copy of your comment letter in the Draft Environmental Assessment. Should you have any questions or require further information regarding the proposed action, please contact me at (808) 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Vice President

TMN:mge

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakastuka, Austin, Tsutsumi & Associates, Inc.

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JUN 16 2014

Maui Electric Company, Ltd. • 210 West Kamehameha Avenue • P. O. Box 398 • Kahului, Maui, HI 96733-0698 • (808) 871-8461



June 11, 2014

Munekiyo & Hiraga, Inc  
Attention: Ms. Tessa Munekiyo Ng, Senior Associate  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Subject: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades  
Tax Map Key: (2) 3-5-001:067 (por.) and 091 (por.)  
Wailuku, Maui, Hawaii

Dear Ms. Munekiyo Ng,

Thank you for allowing us to comment on the Early Consultation Request for the subject project.

In reviewing our records and the information received, Maui Electric Company (MECO) would highly encourage the customer's electrical consultant to submit electrical drawings to us as soon as practical to address and coordinate any possible relocations of our facilities. Since this project's anticipated electrical demand may have a substantial impact to our system, we encourage the customer's electrical consultant to submit the electrical demand requirements and project time schedule as soon as practical so that service can be provided on a timely basis. MECO may need to complete system upgrades to accommodate the anticipated electrical load.

Should you have any questions or concerns, please contact Kelcie Kawamura at 872-3246.

Sincerely,

A handwritten signature in black ink, appearing to read 'R. Okazaki', written in a cursive style.

Ray Okazaki  
Supervisor, Engineering

January 29, 2015

Ray Okazaki, Supervisor, Engineering  
Maui Electric Company, Ltd.  
P.O. Box 398  
Kahului, Hawaii 96733-0698

**SUBJECT:** Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.)

Dear Mr. Okazaki:

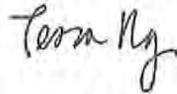
Thank you for your letter dated June 11, 2014, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. On behalf of the County of Maui, Department of Water Supply (DWS) we offer the following information in response to the comments noted in your letter.

The County of Maui, DWS and its electrical consultant will submit to MECO, the proposed upgraded facilities electrical demand requirements and project time schedule details as soon as available.

Ray Okazaki, Supervisor, Engineering  
January 29, 2015  
Page 2

We appreciate your input and will include a copy of your comment letter in the Draft Environmental Assessment. Should you have any questions or require further information regarding the proposed action, please contact me at (808) 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Manager

TMN:lh

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakatsuka, Austin Tsutsumi & Associates, Inc.

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## **IX. REFERENCES**

## IX. REFERENCES

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# **APPENDIX A.**

## **Preliminary Engineering Report**

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# PRELIMINARY ENGINEERING REPORT FOR THE IAO SURFACE WATER TREATMENT PLANT UPGRADES PROJECT

WAILUKU, MAUI, HAWAI'I

TMK: (2) 3-5-001: 067 (POR.) & 091 (POR.)

January 28, 2015

Prepared for:

County of Maui Dept. of Water Supply  
200 South High St, 5<sup>th</sup> Floor  
Wailuku, HI 96793

Prepared by:



*Austin, Tsutsumi & Associates, Inc.*

Civil Engineers • Surveyors

1871 Wili Pa Loop, Suite A

Wailuku, Hawai'i 96793

Telephone: (808) 244-8044

Facsimile: (808) 242-9163

E-mail: [atamaui@atahawaii.com](mailto:atamaui@atahawaii.com)

Honolulu • Wailuku • Hilo, Hawai'i

---

---

**PRELIMINARY ENGINEERING REPORT  
FOR THE IAO SURFACE WATER TREATMENT  
PLANT UPGRADES PROJECT**

Wailuku, Maui, Hawai'i

TMK: (2) 3-5-001: 067 (POR.) & 091 (POR.)

Prepared for:  
**County of Maui Dept. of Water Supply**

Prepared by:  
**Austin, Tsutsumi & Associates, Inc.**  
Civil Engineers • Surveyors  
Honolulu • Wailuku • Hilo, Hawaii

January 28, 2015

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### APPENDICES

- A. CHLORINE CONTACT TIME CALCULATIONS



TERRANCE S. ARASHIRO, P.E.  
STANLEY T. WATANABE  
IVAN K. NAKATSUKA, P.E.  
ADRIENNE W. L. H. WONG, P.E., LEED AP  
DEANNA HAYASHI, P.E.  
PAUL K. ARITA, P.E.  
ERIK S. KANESHIRO, L.P.L.S., LEED AP

## PRELIMINARY ENGINEERING REPORT FOR

### 3.2 MGD IAO SURFACE WATER TREATMENT PLANT UPGRADES

#### Wailuku, Maui, Hawaii

#### I. INTRODUCTION

The County of Maui Department of Water Supply (DWS) is proposing to replace the existing Iao Surface Water Treatment Plant (WTP) located within the site of the 3.0 MG Iao Tank with a new 3.2 million gallon per day (mgd) WTP to be located west (mauka) of the existing WTP. The site for the new WTP will be on land currently owned by Kehalani Mauka, LLC, Lot T-1 (TMK: (2) 3-5-001:067), adjacent to and mauka of the existing Maui Electric Co., Ltd. Substation. (Refer to Exhibit 1 for Location and Vicinity Map, and Exhibits 2 and 3 for General Site Plans).

Raw water for the WTP will continue to be from the Iao-Waikapu Ditch owned by Wailuku Water Company, LLC (WWC). An agreement between DWS and WWC allows for DWS to withdraw up to 3,200,000 gallons of water over a 24-hour period from the Iao-Waikapu Ditch for a fixed transportation fee of \$0.48 per thousand gallons delivered. This amount of water withdrawn from the ditch is exclusive of backwash water from the treatment process, as long as such backwash water is placed back into WWC's water system. Therefore, the new WTP will treat approximately 3.4 mgd of raw water from the ditch to produce 3.2 mgd of treated water. The difference between the raw water and treated water of approximately 200,000 gpd is the water that will be used for daily multiple backwashing, and to a lesser degree occasional chemical cleaning, of the membranes. This membrane backwashing and cleaning water will be placed back into WWC's water system by ultimately being discharged into WWC's Waihee Ditch, which runs just below the 3.0 MG Iao Tank.



The three high pressure membrane filtration units of the existing WTP were originally housed within a temporary structure that has since been removed. Therefore, these existing units are now in the open and exposed to the elements. The new WTP will consist of four low pressure membrane filtration units housed within a permanent structure.



## **II. CHARACTERISTICS OF PROJECT AREA**

### **A. Climate**

The average annual rainfall in the vicinity of Wailuku is approximately 37 inches per year, with 90% of the annual rainfall occurring between October and May. Prevailing tradewinds are from the northeast approximately 80-85% of the time, averaging 10-15 miles per hour during the afternoons with lighter winds during the mornings and nights. The average annual temperature is approximately 76 degrees Fahrenheit, with the high and low temperatures near 88 degrees and 63 degrees, respectively.

### **B. Topography**

The existing ground at the WTP is sloped in the west to east (mauka to makai) direction, with approximate ground mean sea level (msl) elevations being 560' at the upper end and 508' at the lower end. The project site is undeveloped and overgrown with weeds and grasses, low-lying brush and trees.

### **C. Soils**

A foundation investigation was conducted for the project site, whereby seven borings were drilled, ranging in depth from 15 to 25 feet. Neither seepage nor groundwater was encountered in any of the borings of the foundation investigation.

It was determined that the surface soil consisted of dark reddish brown to brown clayey silt of medium stiff to stiff condition, with only a slight expansion potential. Underlying the surface soil at depths ranging from 8 to 12 feet was mottled brown clayey silt with completely weathered rock fragment of medium stiff to stiff condition. This type of soil extended down to the maximum depths drilled, except for within one of the borings. Underlying this layer in this one boring at a depth of about 21 feet was highly to completely weathered rock of dense to medium hard condition.

Based on this investigation, it was determined that conventional shallow foundations may be used to support the proposed structures for the WTP.



#### **D. Earthquake**

Based on the 1997 Uniform Building Code, the WTP site is located within Seismic Zone 2B. Within Seismic Zone 2B, a seismic factor (Z) equal to 0.2 is recommended for calculation of shear and lateral load imparted on structures during an earthquake

#### **E. Drainage**

Site runoff drains as sheet flow west to east (mauka to makai), as there are no drainage ways or areas of concentrated flow. Normally most runoff is infiltrated into the open field land, but during intense storm events, runoff may reach and enter the Waihee Ditch, located approximately 600 feet makai of the project site.

The mountainous off-site land above West Alu Road also contributes runoff to the project site. This off-site runoff is intercepted by a roadside ditch on the mauka side of West Alu Road. The ditch runoff is eventually collected by a 36-inch culvert, which conveys the runoff under the roadway and into the project site, where it disperses into the open field land. Also, off-site runoff to the northwest sheet flows off West Alu Road and into the site.

#### **F. Noise**

As the site is currently undeveloped, there is no noise being generated by any on-site equipment or vehicles. However, upon completion of the project, there will be noise generated from equipment within the Treatment Plant Building (TPB), particularly from compressors, blowers and the standby generator. These equipment items will be housed within sound attenuated rooms within the TPB such that applicable State Department of Health day-time noise limits at the WTP property lines are met for the generator and night-time noise limits are met for the compressor and blower.



### **III. EXISTING WATER SYSTEM**

#### **A. Source Water and Ditch Intake**

The source water for the WTP is the from the watershed area draining into the upper reaches of lao Stream. There is a ditch intake in lao Stream, near lao Valley State Park, that diverts stream water into lao Ditch. Shortly downstream of the lao Ditch intake, the ditch divides into two ditches. The lao-Maniania Ditch flows north towards Waiehu, and the lao-Waikapu Ditch flows south towards Maalaea. Near where the lao-Waikapu Ditch crosses Alu Road, an intake diverts water from the ditch into the raw water transmission line that conveys the water to the lao WTP.

The intake at the lao-Waikapu Ditch consists of two manually-cleaned screens that are accessible through steel plate hatches. The screened water (raw water) enters a concrete box and exits the box through a 12" pipe with a 12" flow meter, 12" gate valve and air release valve. The elevation at the ditch is approximately 740'. (Refer to Photos 1 and 2.)

#### **B. Raw Water Transmission Line**

The first segment of the transmission line out of the concrete box at the intake is about 800' long. The end of this segment is where the water is discharged into a 3,000± gallon headbreaker tank (HBT) at elevation 617'. The differential elevation between the HBT and existing WTP allows for an inlet pressure at the WTP that is conducive towards operation of the membrane units of the existing WTP. (Refer to Photo 3.)

A little more than half of this first segment of the transmission line is 12" in size, before it increases in size to 24". The transmission line then reduces back down to 12" just before the HBT inlet, which has a 12" gate valve and 12" float control valve. The float valve regulates the discharge of water into the HBT. The differential between the open and close positions of the float is only a few inches.



The HBT outlet is initially 12" in size, with a 12" gate valve, but quickly increases back to 24" in size all the way to the existing WTP. There is no line with valve that connects the HBT inlet to its outlet. Therefore, bypassing of the HBT is not possible.

**C. Water Treatment Plant**

The major components of the existing treatment plant are three un-sheltered high pressure membrane filtration units with clean-in-place chemical system, a blower and compressor housed within a wooden shelter, an un-sheltered compressed air tank adjacent to this wooden shelter and a wooden building that serves as an office and laboratory. Disinfection is with chlorine gas. (Refer to Photos 4 and 5.)



#### IV. PROPOSED UPGRADES

The existing Iao Surface WTP located within the site of the 3.0 MG Iao Tank will be replaced with a new 3.2 mgd WTP to be located west (mauka) of the existing WTP. The new WTP will consist of four low pressure membrane filtration units housed within a permanent structure. There is no intention of expanding the WTP beyond the currently designed 3.2 mgd average production rate. Therefore, there is no room for expansion of the WTP in the future to increase the plant output capacity. The construction cost for the new WTP is expected to be in the range of \$12-15 million.

Raw water for the WTP will continue to be from the Iao-Waikapu Ditch. A new connection to the existing 24" raw waterline will be made to convey the raw water to the new WTP. The raw water will pass through a strainer to remove debris prior to the water entering the membrane units. After the water leaves the membrane units, the filtered water will be injected with chlorine prior to entering the chlorine contact tank (CCT) for disinfection. The finished water will flow by gravity from the CCT to the existing Iao 3.0 MG Tank.

A sample of the raw water, before it goes through the strainer, will be measured for turbidity. In the event that the turbidity of the raw water is too high to treat, a valve on the raw water line to the membrane units will automatically close, and a valve on a by-pass line will automatically open, allowing the high turbidity water to be conveyed to the new Sludge Lagoons, rather than have the raw water be treated. (Refer to Exhibit 4 for the Process Schematic.) The raw water will continue to be monitored for turbidity, and when the turbidity meets a pre-determined acceptable level, the automatic valve on the by-pass line will close the valve on the line to the membrane units will open, allowing the raw water to be treated.

The basic design criteria for the WTP are shown in Table 1, and the chemical usage design criteria are shown in Table 2.

Table 1. Basic Design Criteria

PARAMETER	VALUE	UNITS
PLANT PRODUCTION		
NUMBER OF MEMBRANE UNITS	4	EACH
AVE. PRODUCTION RATE PER MEMBRANE UNIT	1.2	MGD
MAX. PRODUCTION RATE PER MEMBRANE UNIT	1.6	MGD
AVERAGE PLANT PRODUCTION RATE	3.2	MGD
NUMBER OF MODULES PER UNIT	108	EACH
STRAINERS		
AUTOMATIC SELF CLEANING STRAINER		
NUMBER OF STRAINERS	2	EACH
CAPACITY, EACH	4800	GPM
SIZE	14	INCHES
HORSEPOWER, BACKWASH ARM	1/4	HP
CLEAN-IN-PLACE (CIP) SYSTEM		
CIP TANK		
NUMBER OF TANKS	1	EACH
VOLUME OF TANK	1800	GALLONS
CIP HEATER	60	KW
CIP PUMP		
NUMBER OF PUMPS	1	EACH
CAPACITY	720	GPM
TOTAL DYNAMIC HEAD	40	FT
HORSEPOWER	15	HP
NEUTRALIZATION TANK		
NUMBER OF TANKS	1	EACH
VOLUME OF TANK	5800	GALLONS
NEUTRALIZATION PUMPS		
NUMBER OF PUMPS	1	EACH
CAPACITY, EACH PUMP	120	GPM
TOTAL DYNAMIC HEAD	50	FT
HORSEPOWER, EACH PUMP	3	HP
AIR BLOWERS		
NUMBER OF BLOWERS	3	EACH
AIR FLOW, EACH BLOWER (@ 5 PSIG)	275	SCFM
HORSEPOWER, EACH BLOWER	20	HP
AIR COMPRESSORS		
NUMBER OF COMPRESSORS	2	EACH
AIR FLOW, EACH COMPRESSOR (@ 125 PSIG)	55.3	SCFM
HORSEPOWER, EACH COMPRESSOR	15	HP
AIR RECEIVERS		
CONTROL AIR RECEIVER TANK CAPACITY	120	GAL
TEST AIR RECEIVER TANK CAPACITY	620	GAL
CHLORINE CONTACT TANK		
VOLUME (AT OVERFLOW)	375,000	GALLONS
SLUDGE LAGOONS		
NUMBER OF CELLS	2	EA
VOLUME, EACH CELL	240,000	GAL

Table 2. Chemical Usage Design Criteria

PARAMETER	VALUE	UNITS
<b>SODIUM HYPOCHLORITE (NAOCL) 12.5% SOLUTION</b>		
MEMBRANES MAINTENANCE WASH		
TARGET DOSAGE (12.5% SOLUTION)	100	PPM
USAGE PER CLEAN PER UNIT	1.0	GAL
MAINTENANCE WASH INTERVAL	48	HOURS
CLEAN IN PLACE		
TARGET DOSAGE (12.5% SOLUTION)	500	PPM
USAGE PER CLEAN PER UNIT	5.1	GAL
CIP INTERVAL	30	DAYS
TOTAL USAGE PER YEAR (MEMBRANES)	1000	GAL
DISINFECTION		
TARGET DOSAGE (12.5% SOLUTION)	2.33	PPM
TARGET RESIDUAL	1.30	PPM
TOTAL USAGE PER YEAR (DISINFECTION)	21,800	GAL
OVERALL TOTAL USAGE PER YEAR	22,800	GAL
<b>CITRIC ACID 50% SOLUTION</b>		
CLEAN IN PLACE		
USAGE PER CLEAN PER UNIT	25	GAL
CIP INTERVAL	30	DAYS
TOTAL USAGE PER YEAR	1220	GAL
<b>SULFURIC ACID (H2S04) 50% SOLUTION</b>		
MAINTENACE WASH		
USAGE PER CLEAN PER UNIT	1.3	GAL
MAINTENANCE WASH INTERVAL	48	HOURS
CLEAN IN PLACE		
USAGE PER CLEAN PER UNIT	1.3	GAL
CIP INTERVAL	30	DAYS
TOTAL USAGE PER YEAR	1040	GAL
<b>SODIUM HYDROXIDE (NAOH) 50% SOLUTION FOR NEUTRALIZATION</b>		
MAINTENACE WASH		
USAGE PER CLEAN PER UNIT	1.0	GAL
MAINTENANCE WASH INTERVAL	48	HOURS
CLEAN IN PLACE		
USAGE PER CLEAN PER UNIT	18	GAL
CIP INTERVAL	30	DAYS
TOTAL USAGE PER YEAR	1580	GAL
<b>SODIUM BISULFITE (NAHSO3) 38% SOLUTION FOR NEUTRALIZATION</b>		
MAINTENACE WASH		
USAGE PER CLEAN PER UNIT	0.4	GAL
MAINTENANCE WASH INTERVAL	48	HOURS
CLEAN IN PLACE		
USAGE PER CLEAN PER UNIT	2.1	GAL
CIP INTERVAL	30	DAYS
TOTAL USAGE PER YEAR	410	GAL

NOTE: QUANTITIES BASED ON AVERAGE RAW WATER FLOW OF 3.2 MGD WITH 4 UNITS OPERATING



## A. Major On-site Components

This section describes the major components within the 2.5-acre fenced site of the new surface water treatment plant (WTP). (Refer to Exhibit 5 for WTP Site Plan.)

### 1. Treatment Plant Building

A 140' long x 70' wide x 28' high (at its highest point above finished grade) pre-engineered rigid-frame Treatment Plant Building (TPB) with lower wall portions of concrete masonry unit (CMU) and upper wall portions and roof of aluminum panels. The finish floor elevations of the lower Filtration Area and the multiple rooms of the upper area will vary to conform to the slope of the site. (Refer to Exhibits 6, 7, 8 and 9 for TPB floor plan and elevation views.)

The lower "Filtration Area" of the TPB will house the following major components:

- Two low-differential pressure, automatic backwashing strainers (one acting as a standby), to remove particles from the raw water that may damage the membranes.
- Two pressure reducing valves to reduce the pressure of the raw water that would otherwise damage the membranes. A pressure relief valve will be installed downstream of the pressure reducing valves as a safety feature to protect the membrane units in the event that the pressure reducing valves malfunction.
- Four low pressure membrane filtration units.
- Clean-In-Place (CIP) system used for cleaning the membranes, with CIP and Neutralization Tanks/Pumps, chemical drums and chemical dosing pumps.



- Sodium hypochlorite system with storage tank and peristaltic pumps for injection of sodium hypochlorite into the water for the purpose of disinfection. The sodium hypochlorite stored in the tank will also be used for cleaning of the membrane units, as part of the CIP system.

The upper area of the TPB will have the following separate rooms, with all of the rooms being air conditioned except for the Generator and Blower Rooms:

- Generator Room (sound attenuated) to house the standby generator and diesel fuel day tank
- Blower Room (sound attenuated) to house air blowers, air compressors and air receivers
- Electrical Room to house the motor control center
- Office/Laboratory
- Break Room
- Unisex restroom
- Storage Room

## 2. Fuel Tank

An aboveground, 2,000-gallon, double-containment, fuel tank for storage of diesel fuel to run the standby generator.

## 3. Chlorine Contact Tank

An aboveground concrete Chlorine Contact Tank (CCT) of dimensions 102' long x 24' wide x 28' high (at its highest point above finished grade) with a maximum water depth of 25' feet. The CCT will have



an interior longitudinal wall with an opening at one end. This will allow for serpentine flow from the inlet to the outlet to minimize short circuiting of the flow, thereby maximizing the contact time within the CCT. (Refer to Exhibit 10 for Chlorine Contact Tank Piping Plan and Sections, and Appendix A for Chlorine Contact Time Calculations.)

#### 4. Sludge Lagoon

A dual-compartment concrete Sludge Lagoon of dimensions 200' long x 30' wide with a maximum water depth of 18 feet for gravity solids-liquid separation of backwash water from the membrane units. High turbidity raw water, drain water from the raw water strainers, discharge from the raw water pressure relief valve and overflows from the CIP and Neutralization Tanks will also be conveyed to the Sludge Lagoons. (Refer to Exhibit 11 for Sludge Lagoon Plan and Sections.)

Each of the two compartments of the Sludge Lagoon will have an approximate volume of 240,000 gallons. One compartment will be shut-down at a time to allow for gravity settlement of the sludge.

The decanted liquid will discharge into the Waihee Ditch, for which an NPDES permit will be required, and the sludge would then be allowed to dry via evaporation within the Sludge Lagoons. When the sludge dries to a solids content of approximately 35 percent, the dried sludge will be removed from the compartment, and transported for off-site disposal at the County of Maui landfill.

### **B. Membrane Filtration System**

#### 1. General

The WTP will utilize a low pressure microfiltration system with polyvinylidene fluoride (PVDF) membranes that are resistant to chlorine. This membrane system will be designed to produce water that meets or exceeds all water quality requirements of the State of Hawaii Department of



Health (DOH) and the United States Environmental Protection Agency (EPA).

## 2. Membrane units

Four Memcor CP membrane units will be installed which will allow the WTP to produce an average of 3.2 mgd with three units in operation and one unit on standby.

The membrane units are composed of 108 membrane modules, with the capability of expanding up to 120 modules. However, there is no intention of expanding the WTP in the future beyond the currently designed average production rate of 3.2 mgd.

The Memcor CP filtration unit is a pre-engineered system that is factory assembly and skid mounted. The package comes in two parts; (1) a membrane array with its own frame, and (2) a valve, pipework and instrumentation skid supplied in a supporting frame. The two parts put together measure approximately 19 feet long by 12 feet high by 7 feet wide.

## 3. Membranes

For the lao WTP, Memcor's N Series membranes will be used, which are composed of PVDF and are resistant to chlorine. A pilot study was recently conducted at the existing Kamole Weir WTP which involved testing Memcor's V Series membranes in their L10V modules and their N Series membranes in their L10N modules. The intention is to have the Department of Health approve the N Series membranes for both the L10N and L20N membrane modules based on the results of the pilot study.

The main difference between the L10N and L20N membrane modules is the height of the modules. The L10N modules are 45.5 inches tall, while the L20N modules are 70.9 inches tall. The L20N modules are being proposed for the lao WTP, since L20N modules are used for systems



designed with flow rates greater than 0.5 mgd per membrane unit.. The L10N modules are utilized on small range pre-engineered Memcor skids.

The N Series membranes are stronger and more permeable than previous membranes, including the V Series membranes. The advantages of the N Series membranes are:

- Reduction in fiber repair rates
- Significant improvement in resistance to abrasion
- 20% greater permeability
- 15% higher operating flux rate on average
- Lower fouling rate
- Improved CIP recovery

The expectation for a L20N membrane module life is seven to ten year if properly maintained. The estimated replacement costs for the L20N module would be approximately \$1,200.

#### 4. Flux

Flux is a measure of the rate at which the treated water passes through the membrane per unit of outside surface area of membrane. The design flux rate will be 35-40 gallons per square foot per day (gfd). The maximum flux rate would be 60 gfd, which is expected to be the highest flux rate approved by DOH. The nominal membrane area per L20N module is 375 square feet (sf).

#### 5. Backwash

Over time, particles rejected by the filtering action of the membranes will build up on the outside of each fiber. As a result, the resistance to flow will increase until a backwash is performed. The backwash sequence will remove the build-up of solids and restore the resistance to filtration flow. A



backwash can either be initiated after a pre-set period of time or when the resistance to flow reaches a pre-determined set point.

The backwash is a physical process that uses a low-pressure air scour and air-assisted liquid backwash to remove accumulated particles – no chemicals are used during the backwash. The backwash usually lasts 3 to 4 minutes and occurs at an interval of 15 to 60 minutes, depending on the feed water characteristics. No filtrate backwash pumps are required. The backwash waste from the process discharges into the Sludge Lagoons.

Based on past experience with the existing Iao WTP, the average backwash interval is expected to be 30 minutes. However, during high turbidity events the interval is expected to be less. The estimated backwash waste volume, based on four units operating, is approximately 130,000 gpd. This amount includes backwash that occurs for each maintenance wash and CIP (which are discussed in following sections.)

## 6. Maintenance Wash

The maintenance wash procedure will be used to extend the time between Clean-in-Place (CIP) chemical cleans, as described in the following section. The frequency for a maintenance wash is expected to be 48 hours for chlorine and 48 hours for acid.

The maintenance wash sequence is a short-cycle chemical membrane clean, which uses a chlorine solution and citric acid or sulfuric acid. One wash would use chlorine, and the other wash would most likely use sulfuric acid, which is less expensive and requires fewer chemicals than washing with citric acid. Maintenance washes can occur automatically, or be initiated by an operator.

The maintenance wash sequence involves the following steps:

- CIP Tank Fill – the CIP tank is filled from one of the units in operation or from the common filtrate piping header. This step



is performed in preparation of conducting a maintenance wash and does not require a unit to be removed from operation.

- Backwash - The unit is backwashed to remove excess solids and maximize the chemical cleaning efficiency. The backwash waste is drained to the regular waste outlet.
- Hot Water Fill - The unit is filled with water from the CIP tank.
- Filtrate Recirculation and Chemical Dosing - The CIP transfer/recirculation pump starts to recirculate the water to the unit in a closed loop. The unit is fully isolated from the rest of the system. Acid or chlorine (as sodium hypochlorite) is added in the loop at the beginning of the recirculation sequence until the appropriate quantity of cleaning chemical is added.
- Recirculation – The cleaning solution is recirculated through the membranes.
- Soak - The modules are left to soak for a pre-set time.
- The cleaning solution is drained away from the unit to the neutralization system.
- Chemical Rinses - The unit is refilled with feed water and rinsed to remove residual chemical. All rinse water is directed to the neutralization system.
- Filtration to Waste – The unit is put into filtration but the filtrate with chemical residue is sent to drain or the neutralization system.

The complete maintenance wash sequence usually takes 45 minutes. However, shorter or longer maintenance wash sequences can be enabled if deemed necessary. The estimated waste associated with



maintenance washes, based on four units operating, is approximately 28,000 gpd.

#### 7. Clean-In-Place (CIP)

The CIP sequence will be used to maintain long-term membrane performance. The CIP sequence is usually initiated based on time, but can also be based on transmembrane pressure, resistance or the volume being filtered by the membranes. The time between CIP cleans is expected to be 30 days. The CIP sequence is similar to the maintenance wash, but with longer recirculation and soak sequences, and utilization of filtered water heated to a set temperature. In addition, the CIP sequence includes two sequential chemical cleanings. The first clean would be with citric acid and sulfuric acid together, and the second clean would be with chlorine.

The second cleaning regime uses chlorine typically containing 200 to 500 parts per million of free chlorine. For chlorine cleans, the sequence is similar to that of the maintenance wash, but with a longer duration of approximately 2 hours. The entire CIP cleaning process, using both citric/sulfuric acid and chlorine, takes approximately 8 hours. The estimated waste associated with the CIP cleaning process, based on four units operating, is approximately 1,900 gpd. However, it should be noted that this is based on an average over a 30-day CIP interval, and is not a daily waste flow. The waste per each CIP clean is approximately 14,000 gallons.

#### 8. Chemical Neutralization

Upon completion of a maintenance wash or CIP sequence, the dilute chemical solution from the unit is transferred to the neutralization tank. Neutralization is a fully automated batch process which occurs at the conclusion of either a CIP or maintenance wash.

A level sensor in the neutralization tank signals the start of the neutralization pump which creates a circulation loop. Sodium bisulfite will



be used for chlorine neutralization and sodium hydroxide for acid neutralization. The neutralization pump continues to run, turning over the tank through mixing eductors until a neutral condition is detected. Upon detecting a neutral condition, the tank contents will flow by gravity to the Sludge Lagoons.

9. Pressure Decay Test (PDT)

The PDT will be used to confirm the integrity of the membrane fibers. The test includes filtering to the backwash level (top of the modules), pressurizing the inside of the module fibers and header with air at 15 psig, isolating the cell from the air supply and monitoring the pressure decay over a period of time (typically 2 to 3 minutes.) The test confirms integrity of the membranes based on the rate of pressure decay. Each unit would be tested at regular time intervals, usually every 24 hours, adjustable by the operator.

10. Air Leak Test

If the PDT returns an alarm, the Air Leak Test would be used to assist in determining in which module the integrity loss has occurred. The faulty module can easily be isolated using a specially designed tool and removed from the unit. The isolation does not require the membrane unit to be drained or shutdown. The individual membrane fiber with the leak can then be found and "pinned", which involves inserting a long metal pin into the membrane to plug the membrane. The module with the pinned membrane is then put back into the unit and into operation.

**C. Chemical Systems**

1. Sodium Hypochlorite

Sodium hypochlorite will be used for cleaning the membranes during maintenance washes and during the CIP process. A duplex metering pump assembly (one duty pump, one standby pump) will pump the



sodium hypochlorite to an injection port on the CIP pump discharge line to accomplish these membrane cleaning processes.

Sodium hypochlorite will also be used for disinfection through injection into the filtered water to produce the finish water after achieving sufficient contact time within the Chlorine Contact Tank. A duplex metering pump assembly (one duty pump, one standby pump) will pump the sodium hypochlorite to the primary point of injection into the filtrate water line for disinfection. A third duplex pump assembly will be installed. One of the pumps of this assembly will pump the sodium hypochlorite to an injection port for injection into the raw water prior to the strainers to improve the quality of the raw water prior to filtration, if needed. The second pump will pump the sodium hypochlorite to an injection port into the finish water, if needed to increase its chlorine concentration before leaving the WTP.

As the amount of sodium hypochlorite to achieve these multiple functions is significantly more than the amount of chemicals to be used for just cleaning of the membranes, the sodium hypochlorite will be stored in a 1,000-gallon tank with an integral spill containment feature in the Filtration Area of the Treatment Plant Building (TPB). Filling of this tank will be through an outdoor fill connection just on the other side of the TPB wall from the tank.

## 2. Citric Acid

Citric acid will be used for cleaning the membranes during the CIP process. The solution will be stored in a 55-gallon drum situated over a secondary containment compartment in the Filtration Area of the TPB. A single, panel-mounted, air diaphragm pump will pump the citric acid to an injection port on the CIP pump discharge line.



### 3. Sulfuric Acid

Sulfuric acid will be used for cleaning the membranes during maintenance washes, and will be used with citric acid during the CIP process. The sulfuric acid will be stored in a 55-gallon drum situated over a secondary containment compartment in the Filtration Area of the TPB. A single, panel-mounted, air diaphragm pump will pump the sulfuric acid to an injection port on the CIP pump discharge line.

### 4. Sodium Hydroxide

Sodium hydroxide will be used to neutralize (increase the pH to approximately 7) the citric and sulfuric acids. The sodium hydroxide will be stored in a 55-gallon drum situated over a secondary containment compartment in the Filtration Area of the TPB. A single, panel-mounted, air diaphragm pump will be used to pump the sodium hydroxide to the injection port on the CIP neutralization pipe.

### 5. Sodium Bisulfite

Sodium bisulfite will be used to neutralize (de-chlorinate) the chlorinated water used for cleaning of the membranes. The sodium bisulfite will be stored in a 55-gallon drum situated over a secondary containment compartment in the Filtration Area of the TPB. A single, panel-mounted, air diaphragm pump will be used to pump the sodium bisulfite to the injection port on the CIP neutralization pipe.

### 6. Alternative Chemicals

The chemicals described above are intended to be the chemicals used at the Iao WTP. However, after the new WTP has been in operation for a while, experience may show that different chemicals may work better for cleaning the membranes. In lieu of using citric acid for cleaning, other options would be phosphoric acid or hydrochloric acid.



**D. Wastewater System**

Wastewater generated from the restroom, lunchroom and office/laboratory, and water from floor drains throughout the Filtration Area of the Treatment Plant Building will connect to an on-site 6" gravity line with cleanouts that transitions into an off-site 8" gravity line with manholes. This 8" gravity line will convey the wastewater to a discharge point into an existing sewer manhole along West Alu Road. (Refer to Exhibit 2.)

**E. Service Waterline**

A 12-inch service waterline will tap into DWS's 12-inch main in West Alu Road to provide service water to the WTP. The service line will provide source water for the WTP plumbing fixtures, washdown facilities, etc. The service line will also provide for fire protection for the WTP via an on-site fire hydrant. (Refer to Exhibits 2 and 5.)

**F. Monitoring and Recording Equipment**

All monitoring and recording equipment, with the exception of flow meters, will be installed within the Office/Laboratory within the Treatment Plant Building. Table 3 summarizes the parameters to be measured:



**Table 3. Summary of Measured Parameters**

Parameter	Location	No. of Sampling Points or Instruments
Turbidity	Raw Water (before strainers)	1
	Individual Filtered Water*	4
	Combined Filtered Water (before chlorine injection)	1
	Finish Water (compliance monitoring point)	1
pH	Combined Filtered Water (after chlorine injection)	1
	Finish Water (compliance monitoring point)	1
	CIP Line	1
	CIP Waste Drain	1
	Neutralized Waste	1
Temperature	Finish Water (compliance monitoring point)	1
	CIP Line	1
	CIP Waste Drain	1
Chlorine Residual	Combined Filtered Water (after chlorine injection)	1
	Finish Water (compliance monitoring point)	1
	Neutralized Waste	1
Flow	Raw Water	1
	Individual Filtered Water*	4
	Combined Filtered Water (before chlorine injection)	1
	Finish Water (compliance monitoring point)	1

\*For each membrane filtration unit



## **G. Electrical**

The WTP will require at least one (1) new Maui Electric Co., Ltd. (Meco) pole to cross West Alu Road via overhead conductors. A riser from the last pole will convert to an underground feed to a new Meco pad-mounted transformer. This transformer will provide underground electrical service rated at 480Y/120V, 3-phase, 4-wire to a switchgear contained inside the Electrical Room of the Treatment Plant Building. All electrical loads will be fed from this point throughout the facility. A standby generator will automatically start-up to provide full back-up power in the event of a utility outage.

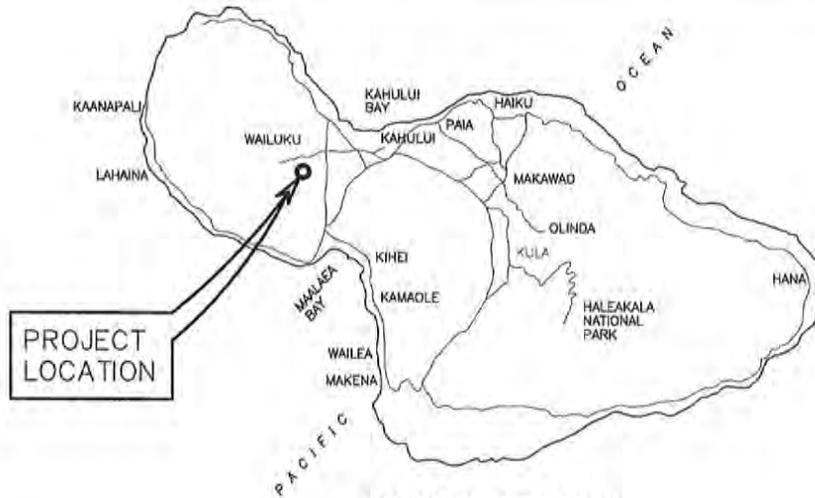
## **H. Telephone**

The telephone service for the new treatment building will utilize at least one (1) new Meco pole to cross West Alu Road via overhead conductors. A riser from the last pole will convert to an underground feed, possibly including a 2'x4' handhole, and terminate at a demarcation point within the Treatment Plant Building. The actual cabling requirement will be determined by the telephone company.

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# EXHIBITS

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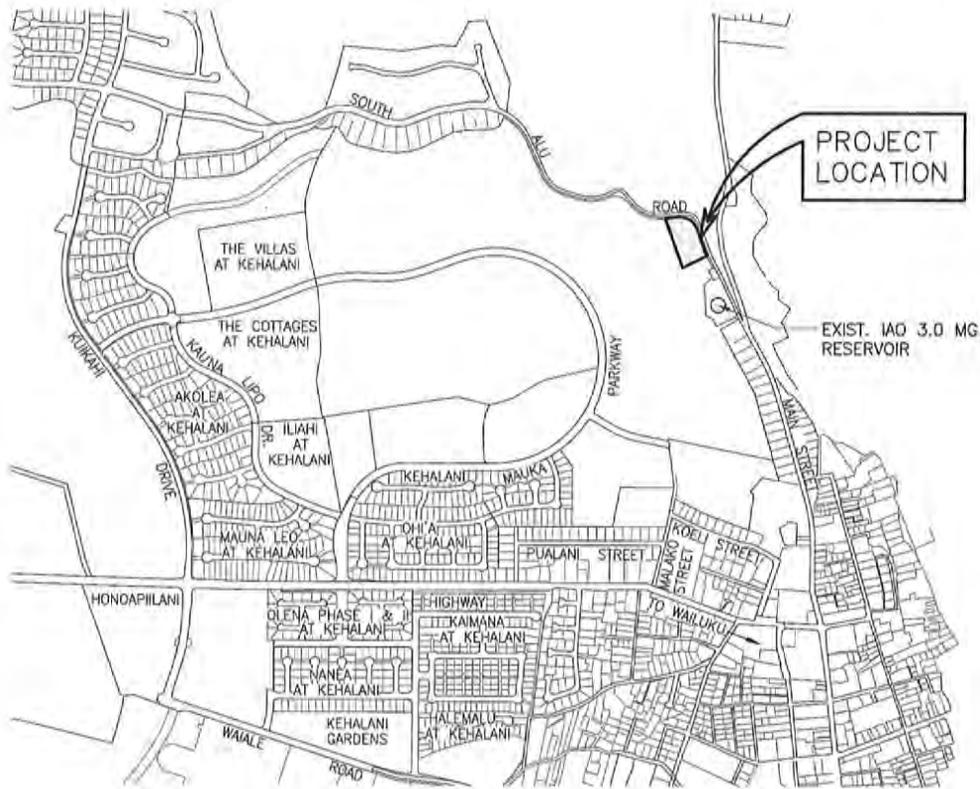


ISLAND OF MAUI



LOCATION MAP

NOT TO SCALE



VICINITY MAP

NOT TO SCALE

FILENAME: C:\2 - WORK FILES\PROJECT FOLDERS\2013\13-002 - IAO WTP\PER\EXHIBITS\EXH. 1 - LOCATION MAP.DWG Nov. 13, 2014-11:44 AM

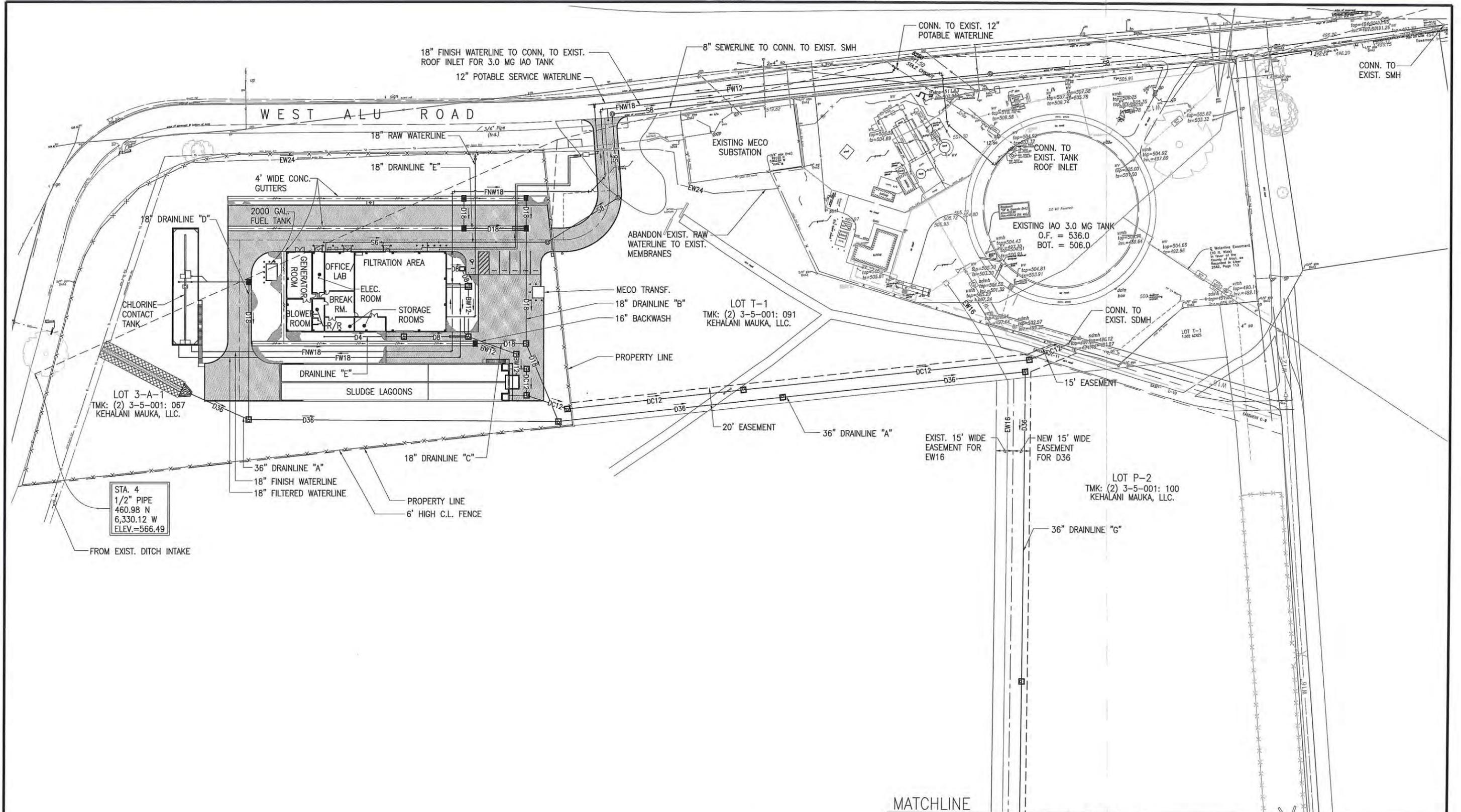
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EXHIBIT

LOCATION AND VICINITY MAP

1

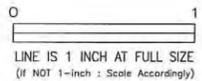


MATCHLINE  
SEE EXHIBIT 3 FOR CONTINUATION



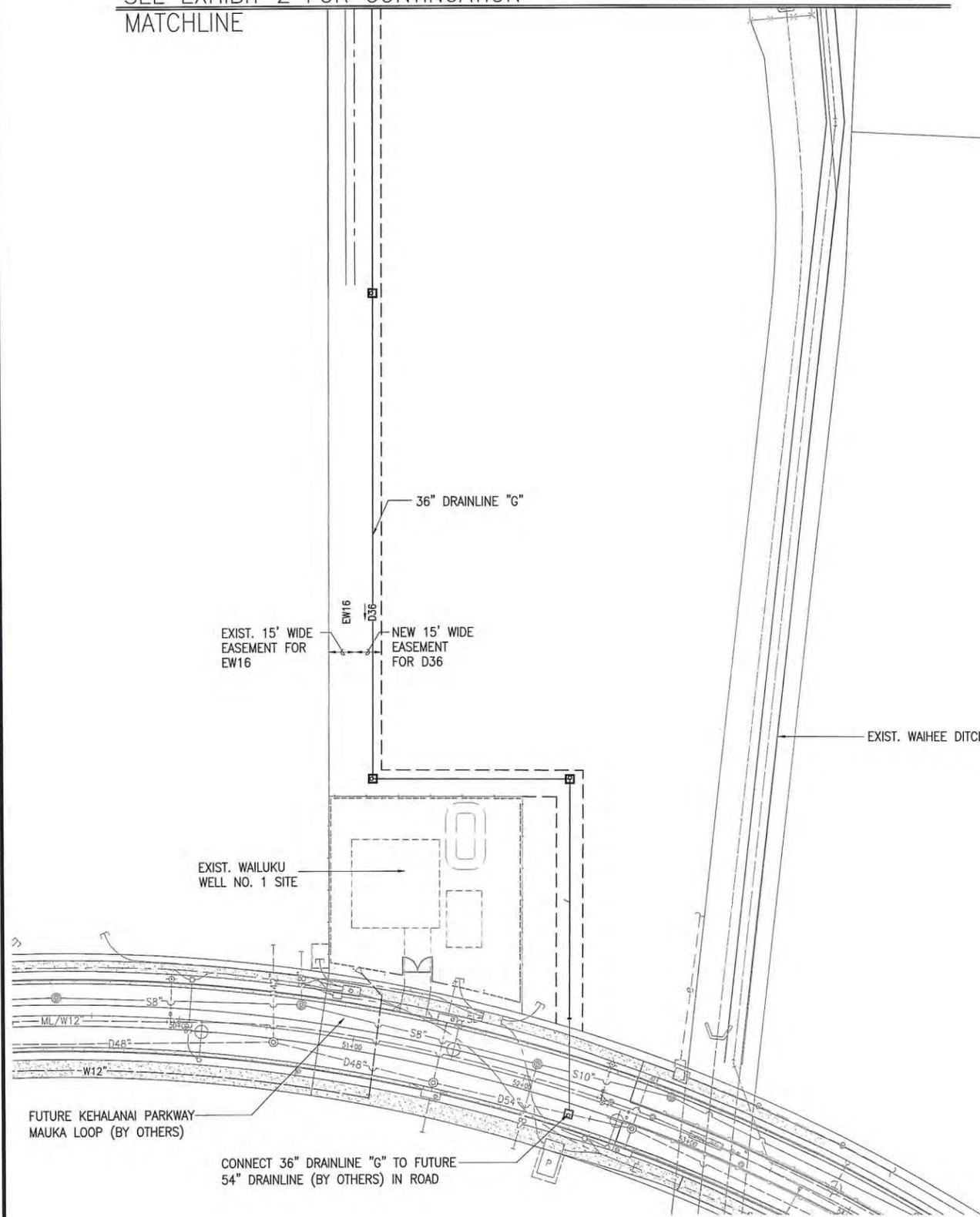
**GENERAL SITE PLAN - NORTH**

SCALE: 1" = 80'



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<p><b>GENERAL SITE PLAN - NORTH</b></p>		

SEE EXHIBIT 2 FOR CONTINUATION  
MATCHLINE



**GENERAL SITE PLAN - SOUTH**

SCALE: 1" = 80'



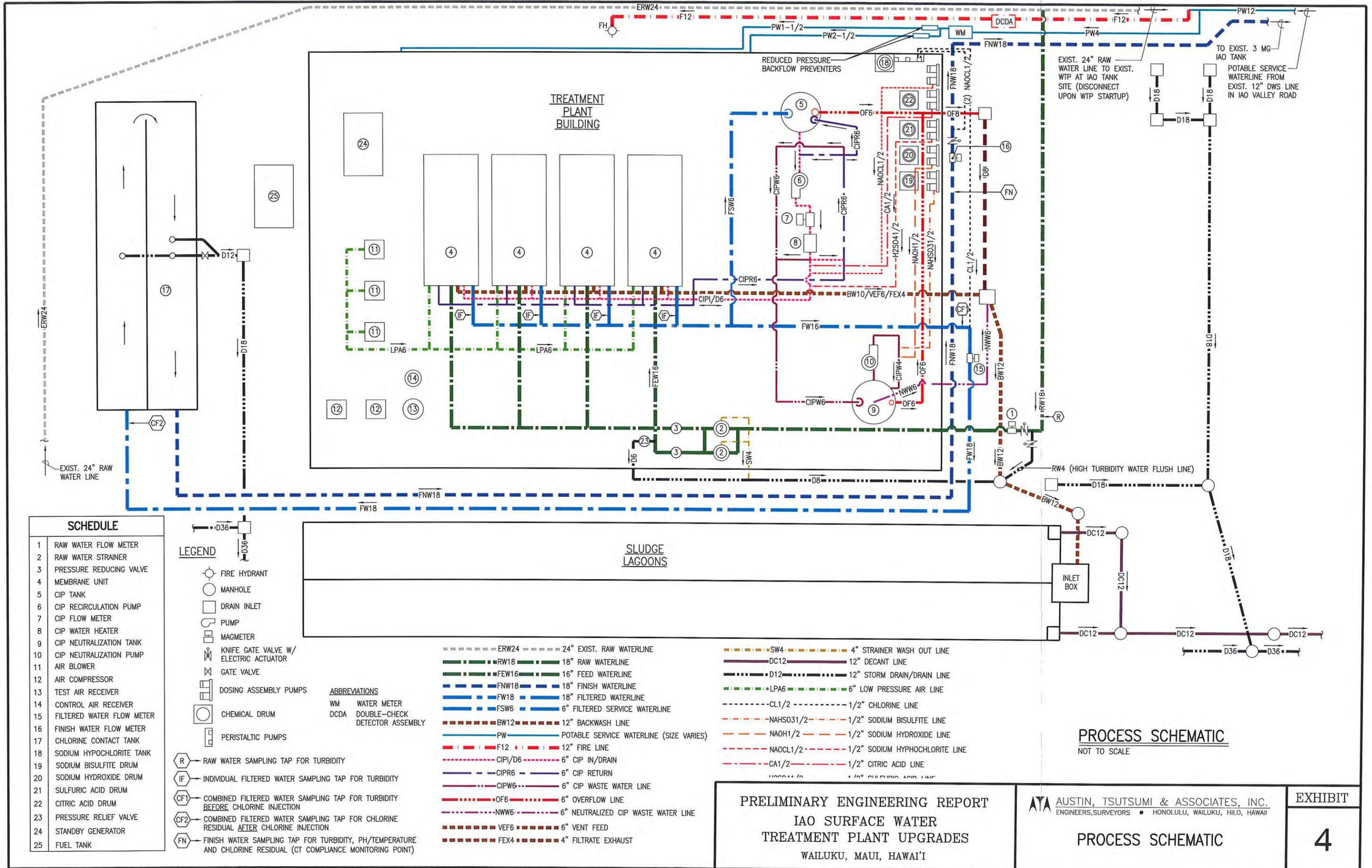
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GENERAL SITE PLAN - SOUTH

EXHIBIT

3



SCHEDULE	
1	RAW WATER FLOW METER
2	RAW WATER STRAINER
3	PRESSURE REDUCING VALVE
4	MEMBRANE UNIT
5	CIP TANK
6	CIP RECIRCULATION PUMP
7	CIP FLOW METER
8	CIP WATER HEATER
9	CIP NEUTRALIZATION TANK
10	CIP NEUTRALIZATION PUMP
11	AIR BLOWER
12	AIR COMPRESSOR
13	TEST AIR RECEIVER
14	CONTROL AIR RECEIVER
15	FILTERED WATER FLOW METER
16	FINISH WATER FLOW METER
17	CHLORINE CONTACT TANK
18	SODIUM HYPOCHLORITE TANK
19	SODIUM BISULFITE DRUM
20	SODIUM HYDROXIDE DRUM
21	SULFURIC ACID DRUM
22	CITRIC ACID DRUM
23	PRESSURE RELIEF VALVE
24	STANDBY GENERATOR
25	FUEL TANK

LEGEND	
	FIRE HYDRANT
	MANHOLE
	DRAIN INLET
	PUMP
	MAGMETER
	KNIFE GATE VALVE W/ ELECTRIC ACTUATOR
	GATE VALVE
	DOSING ASSEMBLY PUMPS
	CHEMICAL DRUM
	PERISTALTIC PUMPS
	RAW WATER SAMPLING TAP FOR TURBIDITY
	INDIVIDUAL FILTERED WATER SAMPLING TAP FOR TURBIDITY
	COMBINED FILTERED WATER SAMPLING TAP FOR TURBIDITY BEFORE CHLORINE INJECTION
	COMBINED FILTERED WATER SAMPLING TAP FOR CHLORINE RESIDUAL AFTER CHLORINE INJECTION
	FINISH WATER SAMPLING TAP FOR TURBIDITY, PH/TEMPERATURE AND CHLORINE RESIDUAL (CT COMPLIANCE MONITORING POINT)

ABBREVIATIONS	
WM	WATER METER
DCDA	DOUBLE-CHECK DETECTOR ASSEMBLY

ERW24	24" EXIST. RAW WATERLINE
RW18	18" RAW WATERLINE
FEW16	16" FEED WATERLINE
FNW18	18" FINISH WATERLINE
FW18	18" FILTERED WATERLINE
FSW6	6" FILTERED SERVICE WATERLINE
BW12	12" BACKWASH LINE
PW	POTABLE SERVICE WATERLINE (SIZE VARIES)
F12	12" FIRE LINE
CIP/D6	6" CIP IN/DRAIN
CIPR6	6" CIP RETURN
CIPW6	6" CIP WASTE WATER LINE
OF6	6" OVERFLOW LINE
NWW6	6" NEUTRALIZED CIP WASTE WATER LINE
VEF6	6" VENT FEED
FEX4	4" FILTRATE EXHAUST
SW4	4" STRAINER WASH OUT LINE
DC12	12" DECANT LINE
D12	12" STORM DRAIN/DRAIN LINE
LP6	6" LOW PRESSURE AIR LINE
CL1/2	1/2" CHLORINE LINE
NAHSO31/2	1/2" SODIUM BISULFITE LINE
NaOH1/2	1/2" SODIUM HYDROXIDE LINE
NaOCl1/2	1/2" SODIUM HYPOCHLORITE LINE
CA1/2	1/2" CITRIC ACID LINE

**PROCESS SCHEMATIC**  
NOT TO SCALE

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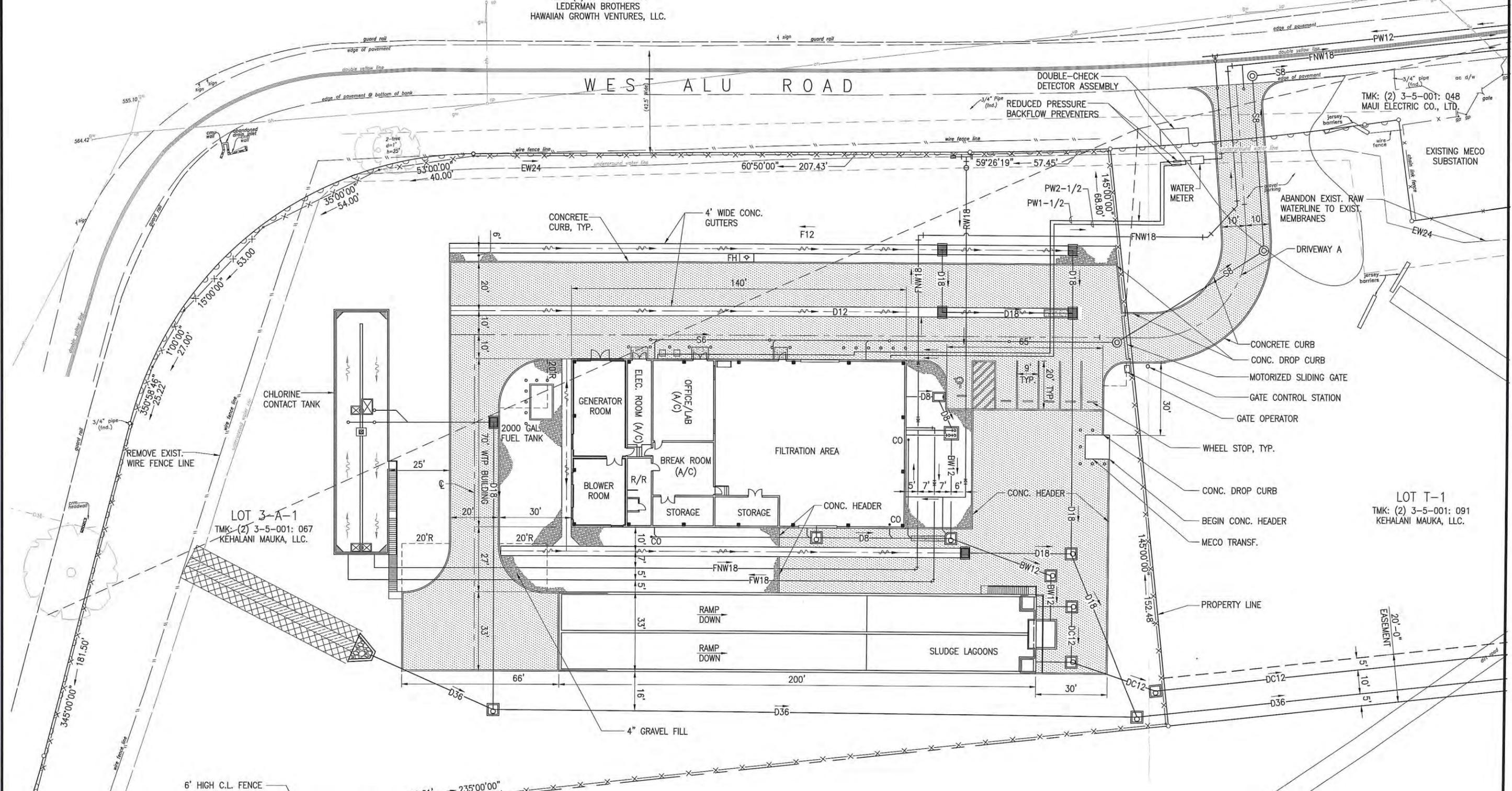
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**PROCESS SCHEMATIC**

EXHIBIT  
**4**

LOT 5  
 TMK: (2) 3-5-001: 001  
 LEDERMAN BROTHERS  
 HAWAIIAN GROWTH VENTURES, LLC.

WEST ALU ROAD



LOT 3-A-1  
 TMK: (2) 3-5-001: 067  
 KEHALANI MAUKA, LLC.

LOT T-1  
 TMK: (2) 3-5-001: 091  
 KEHALANI MAUKA, LLC.

**WTP SITE PLAN**  
 SCALE: 1" = 40'

0 1  
 LINE IS 1 INCH AT FULL SIZE  
 (IF NOT 1-INCH : SCALE ACCORDINGLY)

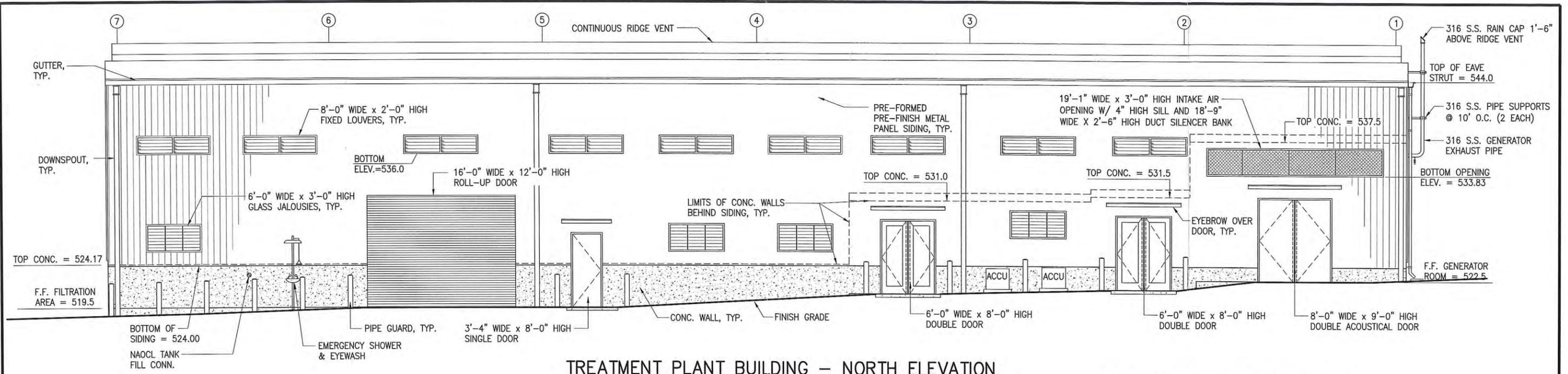
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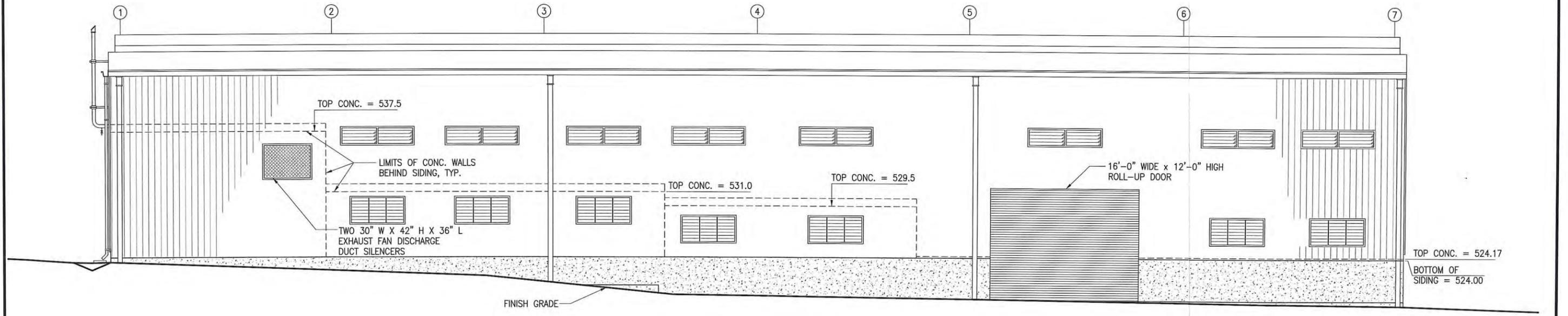
WTP SITE PLAN

EXHIBIT  
**5**

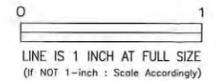




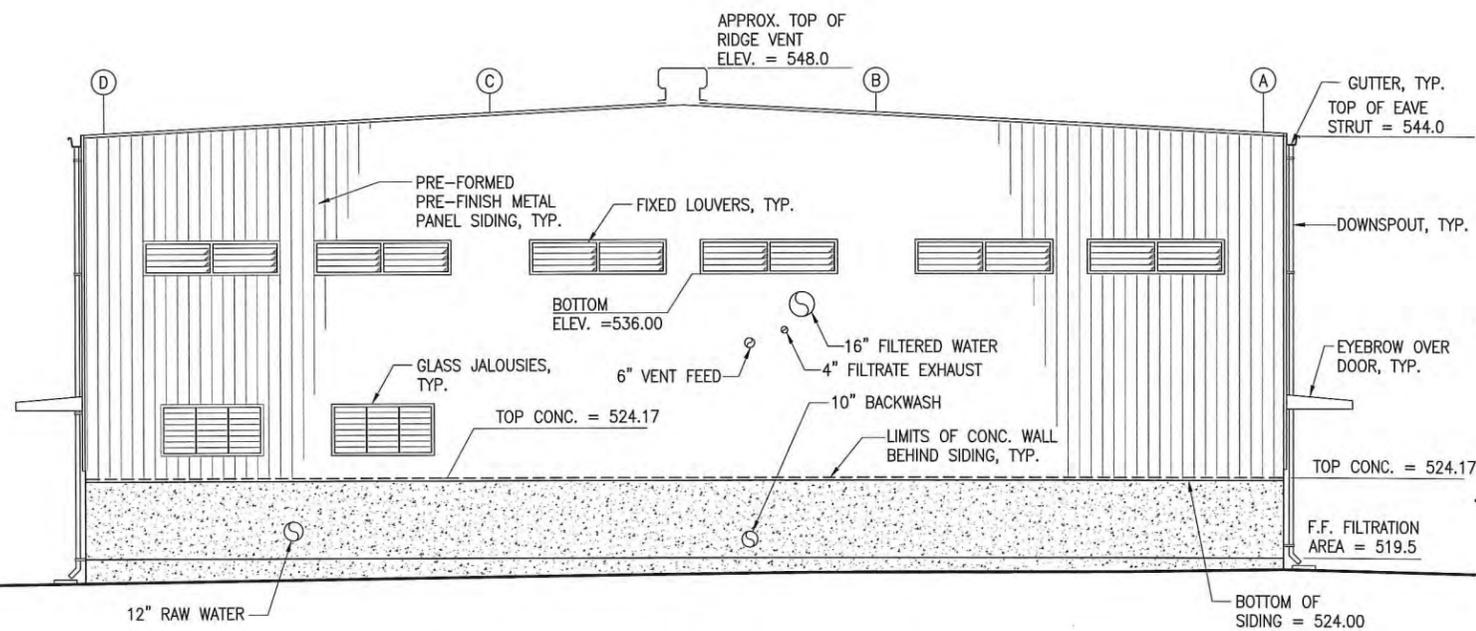
**TREATMENT PLANT BUILDING – NORTH ELEVATION**  
SCALE: 3/32"=1'-0"



**TREATMENT PLANT BUILDING – SOUTH ELEVATION**  
SCALE: 3/32"=1'-0"

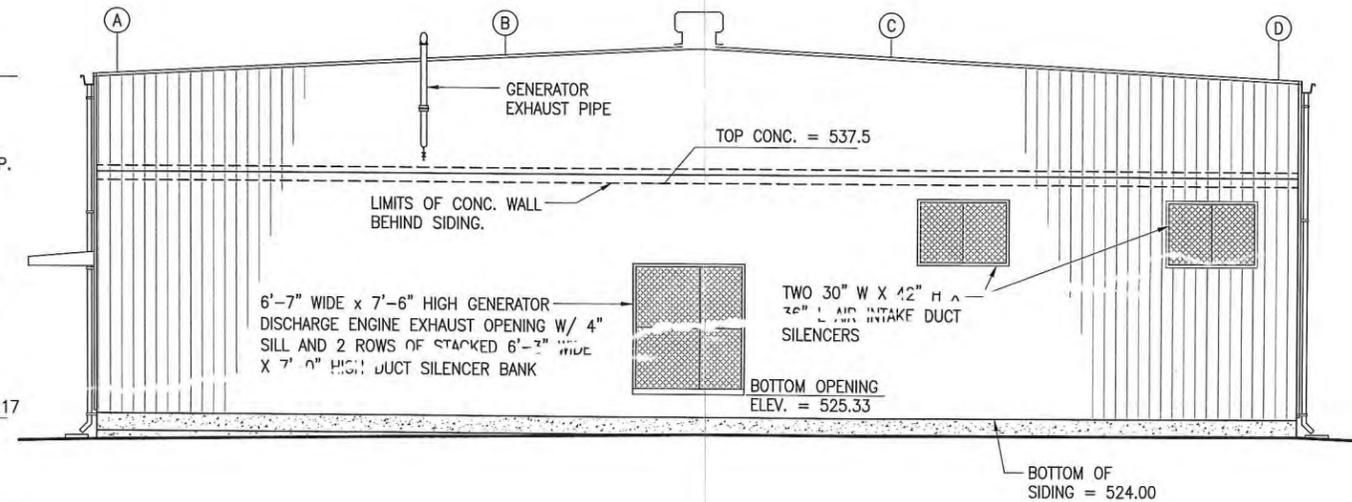


PRELIMINARY ENGINEERING REPORT IAO SURFACE WATER TREATMENT PLANT UPGRADES WAILUKU, MAUI, HAWAII	<b>AUSTIN, TSUTSUMI &amp; ASSOCIATES, INC.</b> ENGINEERS, SURVEYORS • HONOLULU, WAILUKU, HILO, HAWAII	EXHIBIT
		<b>TREATMENT PLANT BUILDING          ELEVATIONS – NORTH AND SOUTH</b>



**TREATMENT PLANT BUILDING – EAST ELEVATION**

SCALE: 3/32"=1'-0"



**TREATMENT PLANT BUILDING – WEST ELEVATION**

SCALE: 3/32"=1'-0"



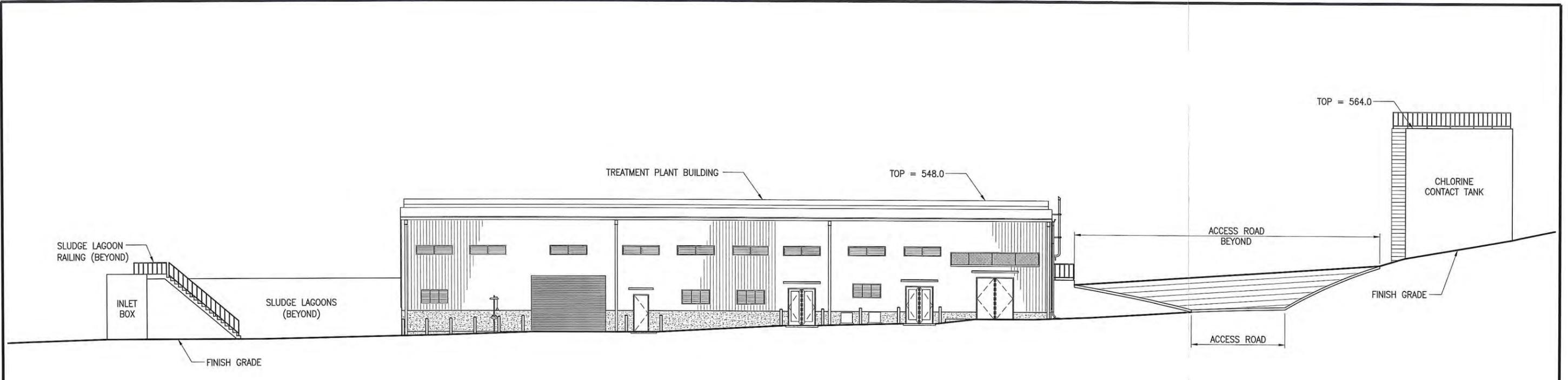
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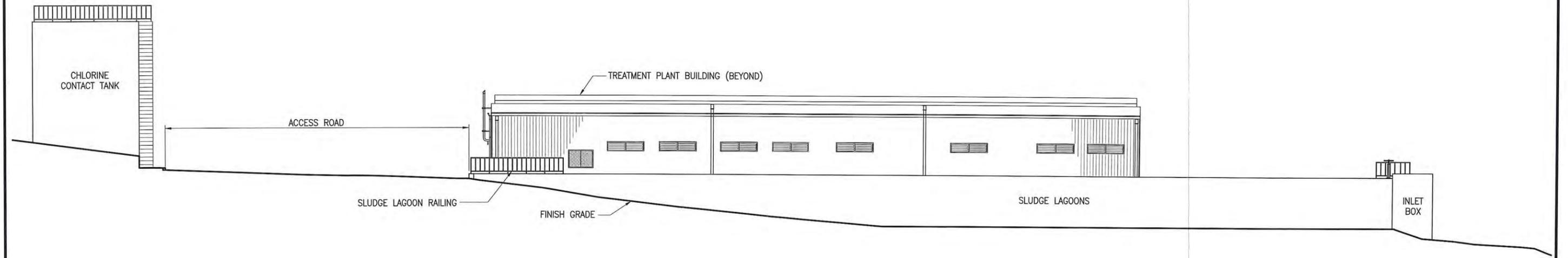
TREATMENT PLANT BUILDING  
 ELEVATIONS – EAST AND WEST

EXHIBIT

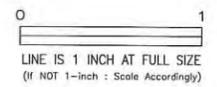
8



**TREATMENT PLANT SITE – NORTH ELEVATION**  
 SCALE: 3/64"=1'-0



**TREATMENT PLANT SITE – SOUTH ELEVATION**  
 SCALE: 3/64"=1'-0

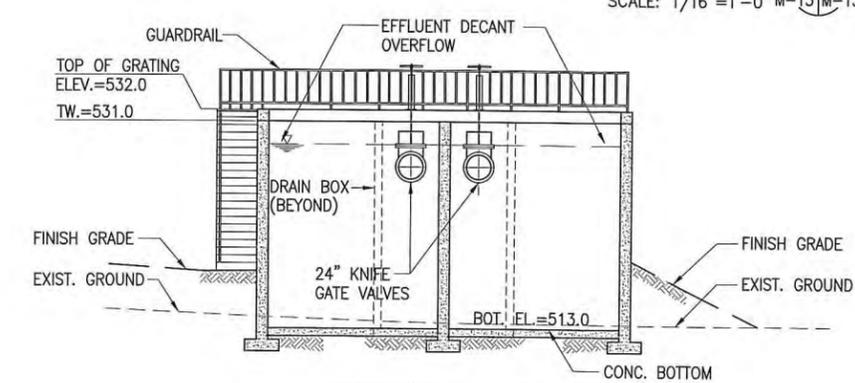
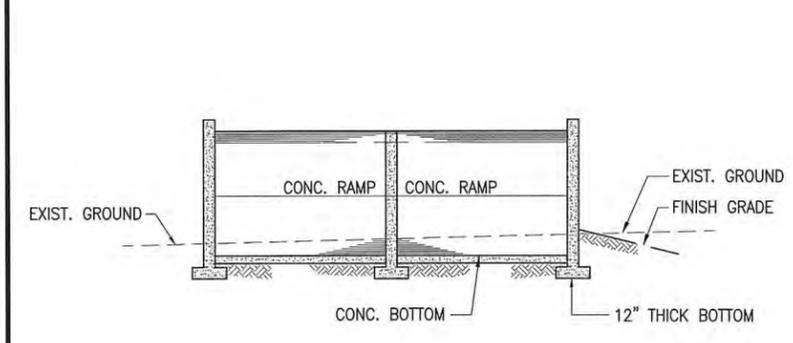
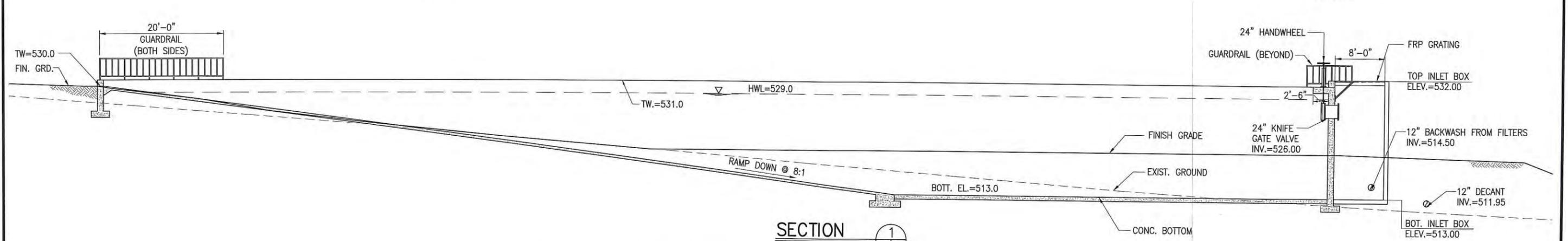
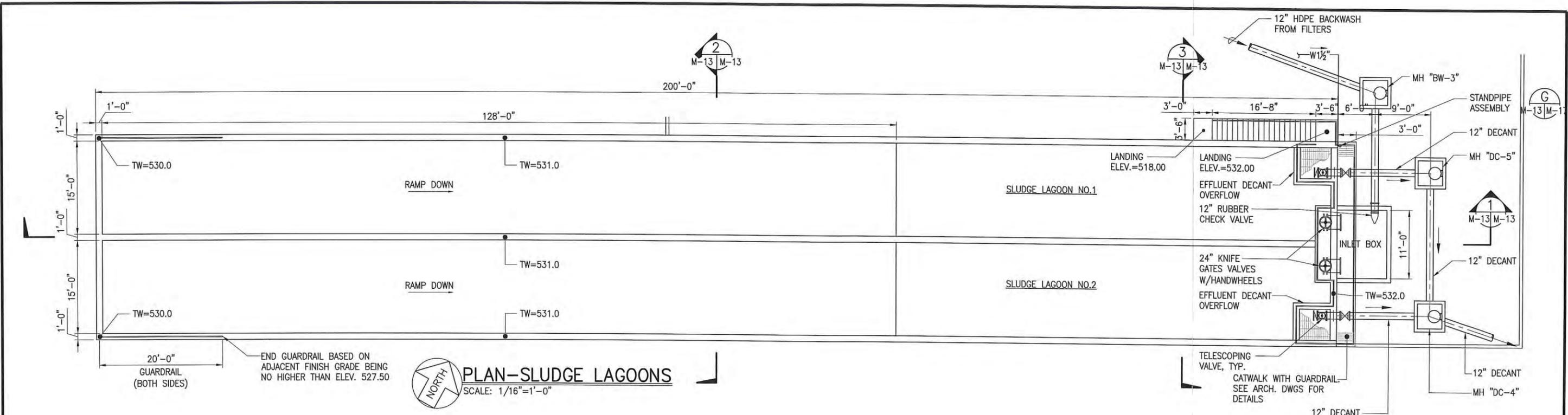


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 TREATMENT PLANT SITE ELEVATIONS

EXHIBIT  
**9**





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 SLUDGE LAGOON PLAN AND  
 SECTIONS

EXHIBIT  
 11

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**P H O T O S**

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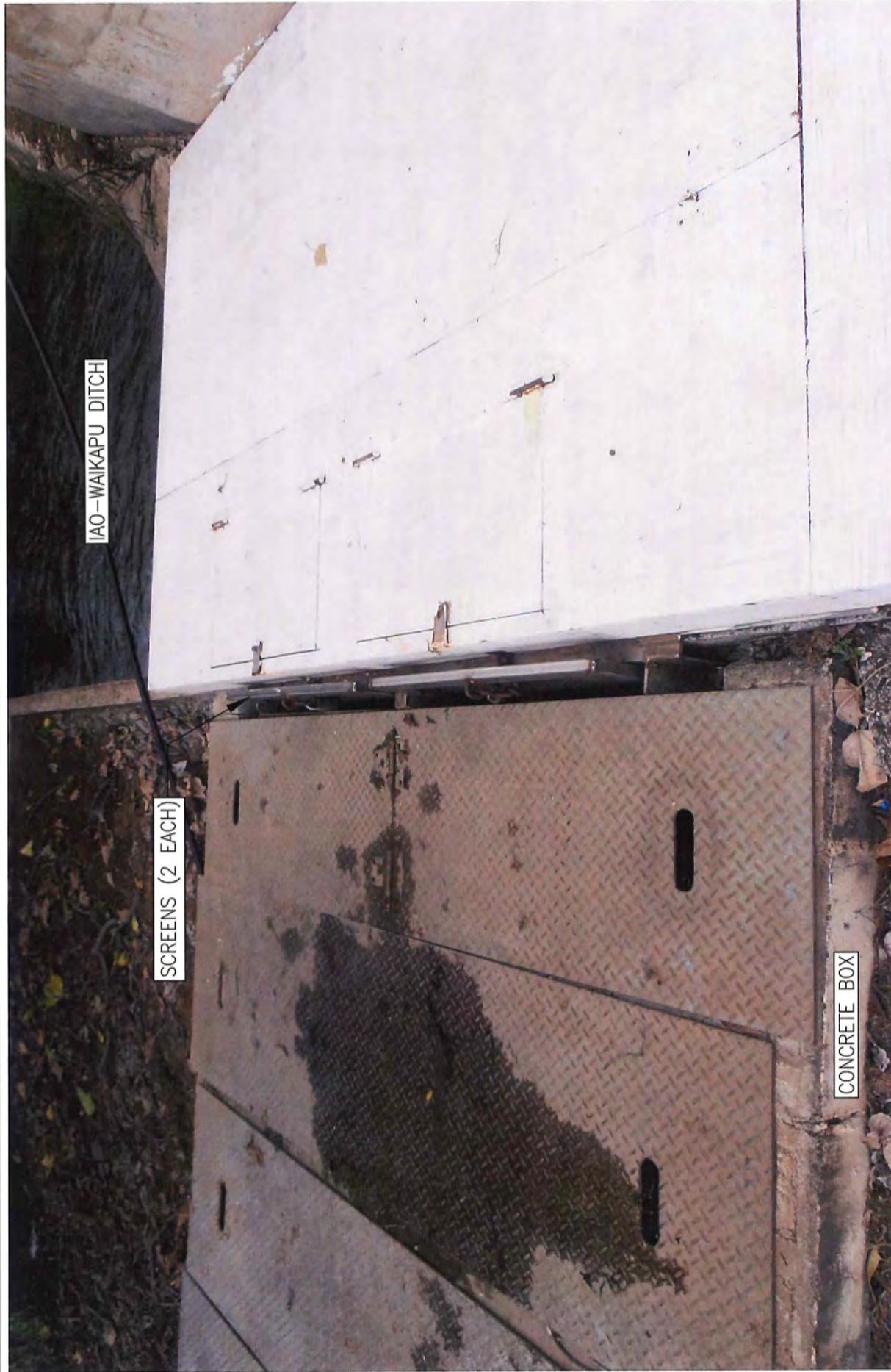
PHOTO

1

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**RAW WATER INTAKE AT  
 IAO-WAIKAPU DITCH**

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 IAO SURFACE WATER  
 TREATMENT PLANT UPGRADES  
 WAILUKU, MAUI, HAWAII**



IAO-WAIKAPU DITCH

SCREENS (2 EACH)

CONCRETE BOX

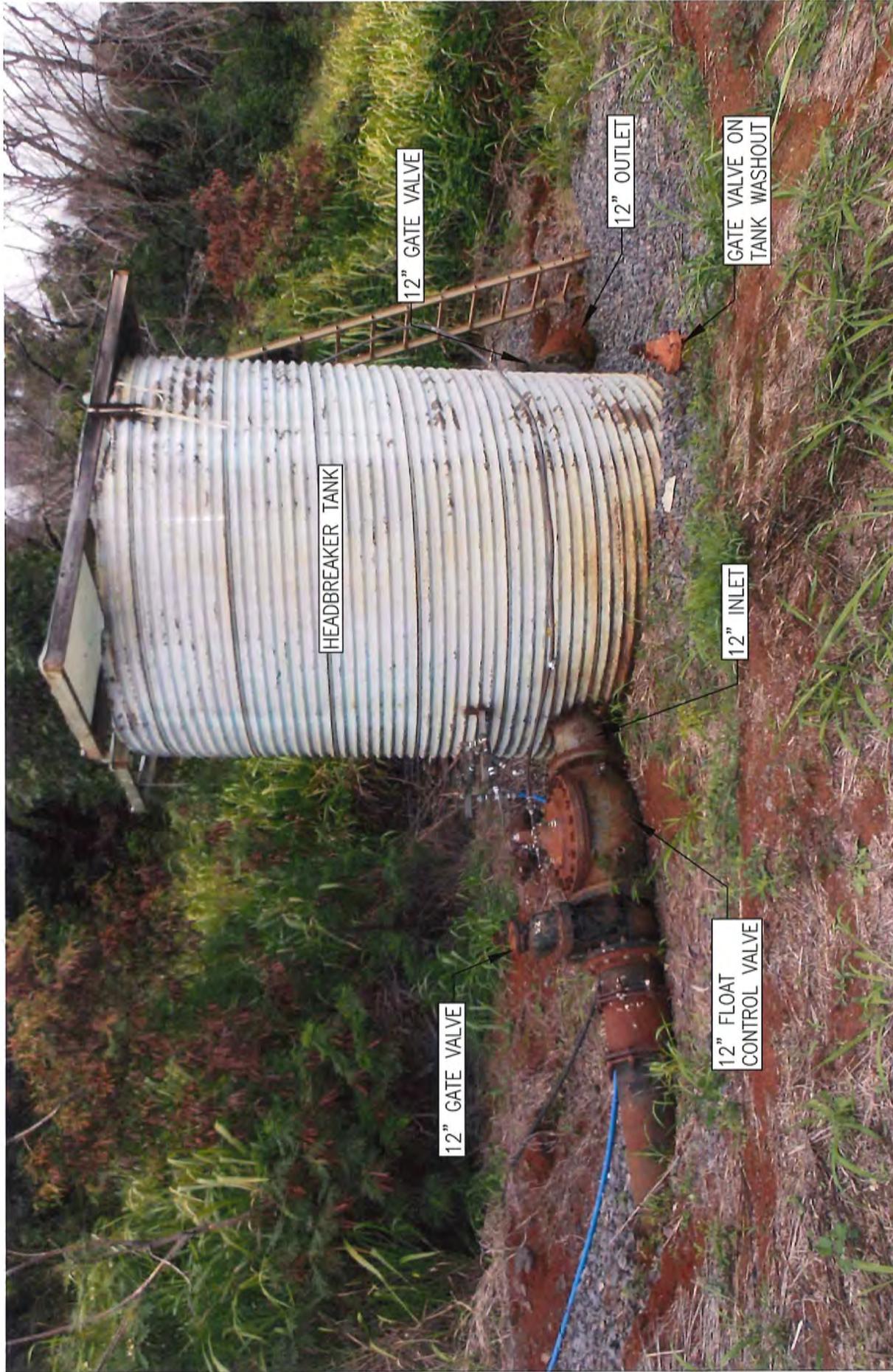
PHOTO

2

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**RAW WATER INTAKE AT  
IAO-WAIKAPU DITCH**

**PRELIMINARY ENGINEERING REPORT  
IAO SURFACE WATER  
TREATMENT PLANT UPGRADES  
WAILUKU, MAUI, HAWAII**



PRELIMINARY ENGINEERING REPORT  
IAO SURFACE WATER  
TREATMENT PLANT UPGRADES  
WAILUKU, MAUI, HAWAII

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HEADBREAKER TANK

PHOTO

3

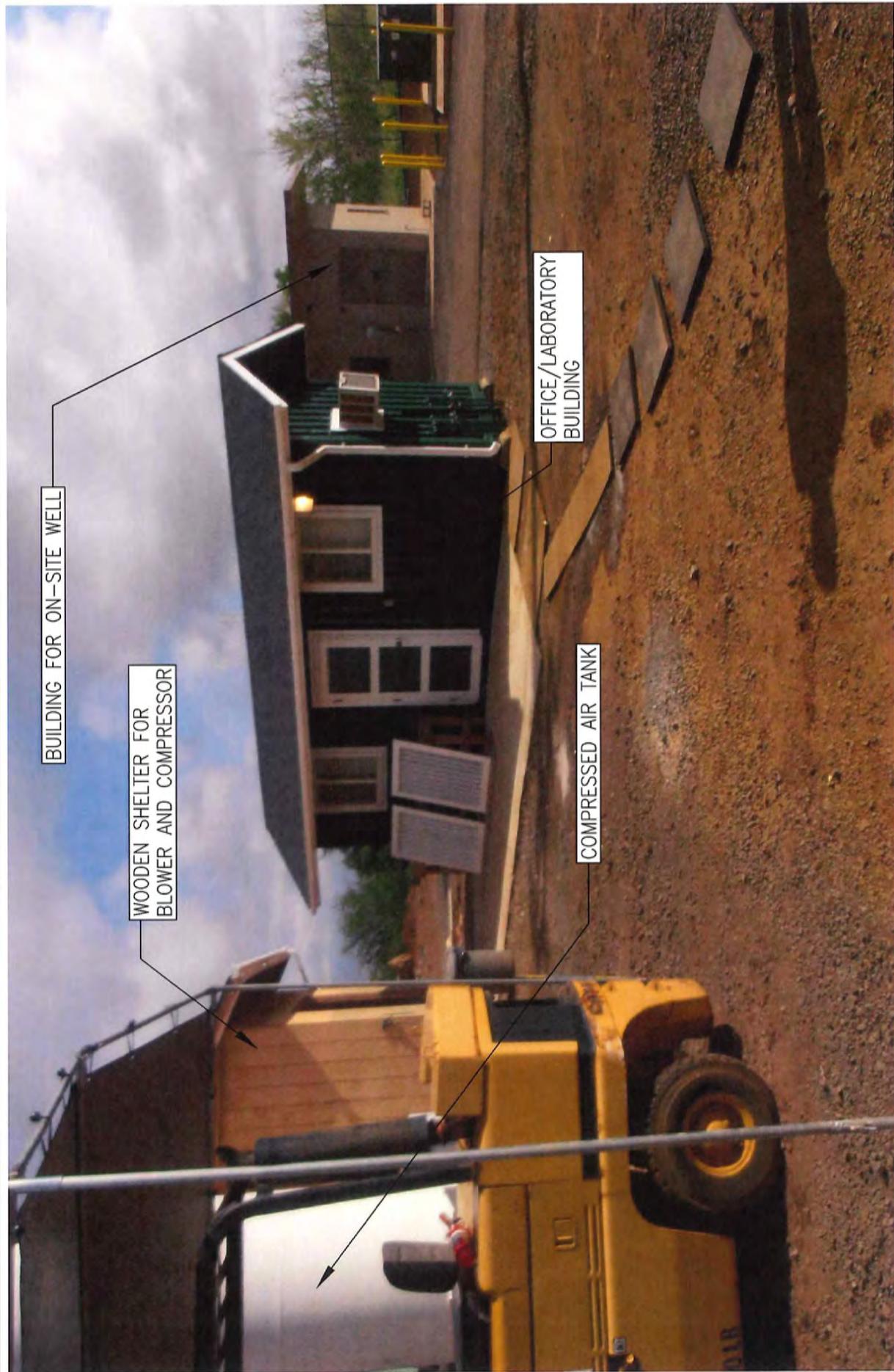


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EXISTING IAO WTP

PHOTO  
**4**



BUILDING FOR ON-SITE WELL

WOODEN SHELTER FOR BLOWER AND COMPRESSOR

OFFICE/LABORATORY BUILDING

COMPRESSED AIR TANK

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PHOTO

5

EXISTING IAO WTP

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# APPENDICES

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# **APPENDIX A**

## **CHLORINE CONTACT TIME CALCULATIONS**

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## CT VALUE CALCULATION FOR IAO SURFACE WATER TREATMENT PLANT UPGRADES

Disinfection will be by chlorination, since the Maui Department of Water Supply (DWS) has stated that disinfection with ammonia will not be used.

The disinfection procedure would involve injecting chlorine into the combined filtered water line immediately after the filtration units, before it enters the chlorine contact tank. The chlorine dosage would be controlled by a compound loop logic, based on the flow rate of the filtered water, and the chlorine concentration of the filtered water. The chlorine concentration would be measured by a chlorine residual monitor water, from a sampling point right after the filtered water flow meter, before it enters the chlorine contact tank.

Contact time for disinfection would be achieved in the on-site chlorine contact tank. From Table E-5 of the State of Hawaii Department of Health's (DOH's) Surface Water Treatment Rule (SWTR) Administrative Manual, dated July 1, 1994, (see Attachment 'A') the required minimum CT Value is 23, based on the following worst-case scenario:

Temperature = 20° C  
pH = 7.5  
Chlorine Concentration = 1.3 mg/L  
Required Minimum CT = 23

The maximum day production rate will be approximately 4.8 mgd. During high demand periods, the peak production rate could be as high as 6.4 mgd. However, the maximum production rate in a 24 hour period would be limited to 3.2 mgd, based on the current water agreement between DWS and Wailuku Water Company, LLC.

The overall inside dimensions of the chlorine contact tank are 21 feet by 100 feet. There will be a single baffle wall, dividing the tank into two equal 10-foot wide channels. (See Attachment 'B'.) From the American Water Works Association Research Foundation (AWWARF) publication, "Improving Clearwell Design for CT Compliance", the theoretical detention time (T10/T) would be approximately 0.59. (See Attachment 'C'.)

The finished water will flow by gravity from the CCT to the existing IAO 3.0 MG Tank. The water depth in the CCT will vary, based on the hydraulics between the CCT and the 3.0 MG Tank. For example, at a production rate of 4.8 mgd, the water level in the CCT would need to be about 17.6 feet for there to be enough head for the water to flow by gravity to the Tank.

At a production rate of 4.8 mgd, the residence time within the chlorine contact tank at a depth of 17.6 would be as follows:

$$\text{Contact Time} = \frac{(0.59)(264,000 \text{ gallons})(1440 \text{ minutes/day})}{(4,800,000 \text{ gallons per day})} = 46.7 \text{ minutes}$$

The CT Value would be as follows:

CT Value = (1.3 mg/l) (46.7 minutes) = 60.7, which is significantly greater than the required CT Value of 23.

Even at the peak production rate of 6.4 mgd, the CT Value is still significantly greater than 23.

CT Calculations for different production rates are shown in Attachment 'D'. As mentioned previously, the finished water will flow by gravity from the CCT to the existing 3.0 MG Tank. The water depth in the CCT will vary, based on the hydraulics between the CCT and the 3.0 MG Tank. For all flows, the water level in the CCT required to have the finished water flow by gravity is significantly higher than the minimum required depth to meet the CT value.

Attachments:

- 'A' DOH's SWTR Tables E-5
- 'B' Chlorine Contact Tank Drawing
- 'C' AWWARF Publication Excerpts
- 'D' Calculations

Attachment 'A'

TABLE E-5  
CT VALUES FOR INACTIVATION  
OF GIARDIA CYSTS BY FREE CHLORINE  
AT 20°C (68°F)

CHLORINE CONCENTRATION  (mg/L)	pH ≤ 6						pH = 6.5						pH = 7.0					
	Log Inactivations						Log Inactivations						Log Inactivations					
	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0
≤ 0.4	6	12	18	24	30	36	7	15	22	29	37	44	9	17	26	35	43	52
0.6	6	13	19	25	32	38	8	15	23	30	38	45	9	18	27	36	45	54
0.8	7	13	20	26	33	39	8	15	23	31	38	46	9	18	28	37	46	55
1.0	7	13	20	26	33	39	8	16	24	31	39	47	9	19	28	37	47	56
1.2	7	13	20	27	33	40	8	16	24	32	40	48	10	19	29	38	48	57
1.4	7	14	21	27	34	41	8	16	25	33	41	49	10	19	29	39	48	58
1.6	7	14	21	28	35	42	8	17	25	33	42	50	10	20	30	39	49	59
1.8	7	14	22	29	36	43	9	17	26	34	43	51	10	20	31	41	51	61
2.0	7	15	22	29	37	44	9	17	26	35	43	52	10	21	31	41	52	62
2.2	7	15	22	29	37	44	9	18	27	35	44	53	11	21	32	42	53	63
2.4	8	15	23	30	38	45	9	18	27	36	45	54	11	22	33	43	54	65
2.6	8	15	23	31	38	46	9	18	28	37	46	55	11	22	33	44	55	66
2.8	8	16	24	31	39	47	9	19	28	37	47	56	11	22	34	45	56	67
3.0	8	16	24	31	39	47	10	19	29	38	48	57	11	23	34	45	57	68

S-27

TABLE E-5 (CONTINUED)  
CT VALUES FOR INACTIVATION  
OF GIARDIA CYSTS BY FREE CHLORINE  
AT 20°C (68°F)

CHLORINE CONCENTRATION  (mg/L)	pH = 7.5						pH = 8.0						pH = 8.5					
	Log Inactivations						Log Inactivations						Log Inactivations					
	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0
≤ 0.4	10	21	31	41	52	62	12	25	37	49	62	74	15	30	45	59	74	89
0.6	11	21	32	43	53	64	13	26	39	51	64	77	15	31	46	61	77	92
0.8	11	22	33	44	55	66	13	26	40	53	66	79	16	32	48	63	79	95
1.0	11	22	34	45	56	67	14	27	41	54	68	81	16	33	49	65	82	98
1.2	12	23	35	46	58	69	14	28	42	55	69	83	17	33	50	67	83	100
1.4	12	23	35	47	58	70	14	28	43	57	71	85	17	34	52	69	86	103
1.6	12	24	36	48	60	72	15	29	44	58	73	87	18	35	53	70	88	105
1.8	12	25	37	49	62	74	15	30	45	59	74	89	18	36	54	72	90	108
2.0	13	25	38	50	63	75	15	30	46	61	76	91	18	37	55	73	92	110
2.2	13	26	39	51	64	77	16	31	47	62	78	93	19	38	57	75	94	113
2.4	13	26	39	52	65	78	16	32	48	63	79	95	19	38	58	77	96	115
2.6	13	27	40	53	67	80	16	32	49	65	81	97	20	39	59	78	98	117
2.8	14	27	41	54	68	81	17	33	50	66	83	99	20	40	60	79	99	119
3.0	14	28	42	55	69	83	17	34	51	67	84	101	20	41	61	81	102	122

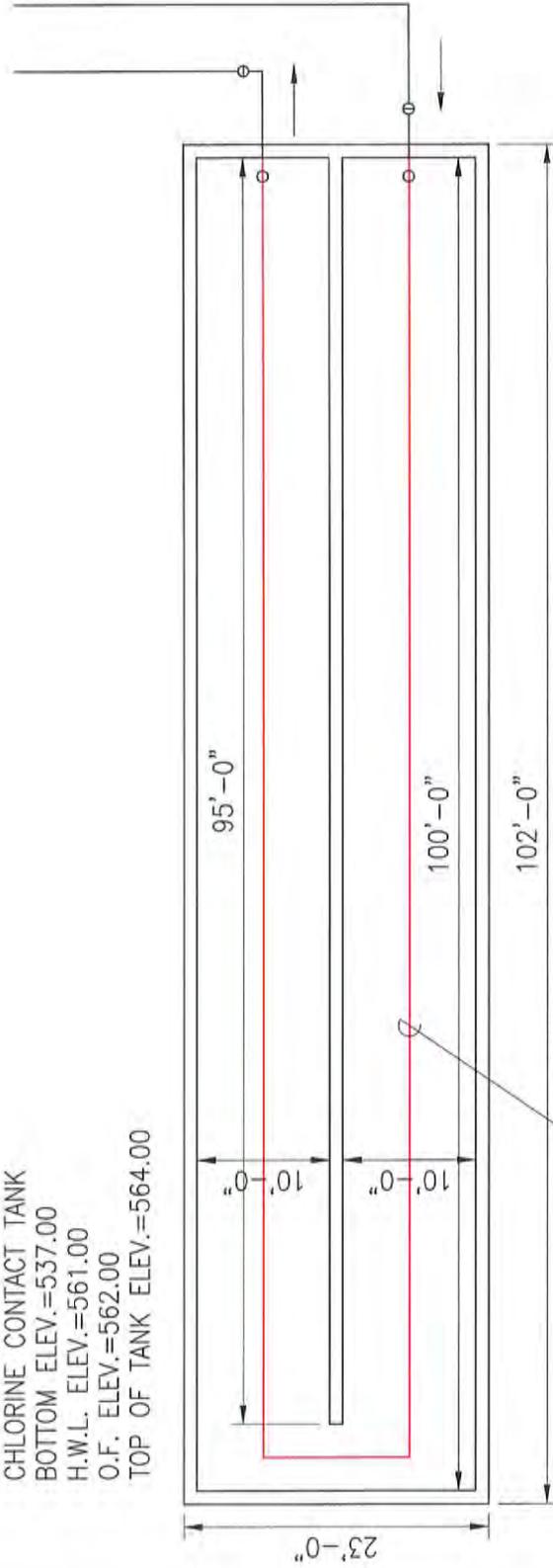
Target residual is 1.3 mg/L



23

ATTACHMENT 'B'

CHLORINE CONTACT TANK  
BOTTOM ELEV.=537.00  
H.W.L. ELEV.=561.00  
O.F. ELEV.=562.00  
TOP OF TANK ELEV.=564.00



LENGTH = 206'  
WIDTH = 10.0'  
L/W = 20.6  
T<sub>10</sub>/T = 0.59

CHLORINE CONTACT TANK  
NOT TO SCALE

Attachment 'C'

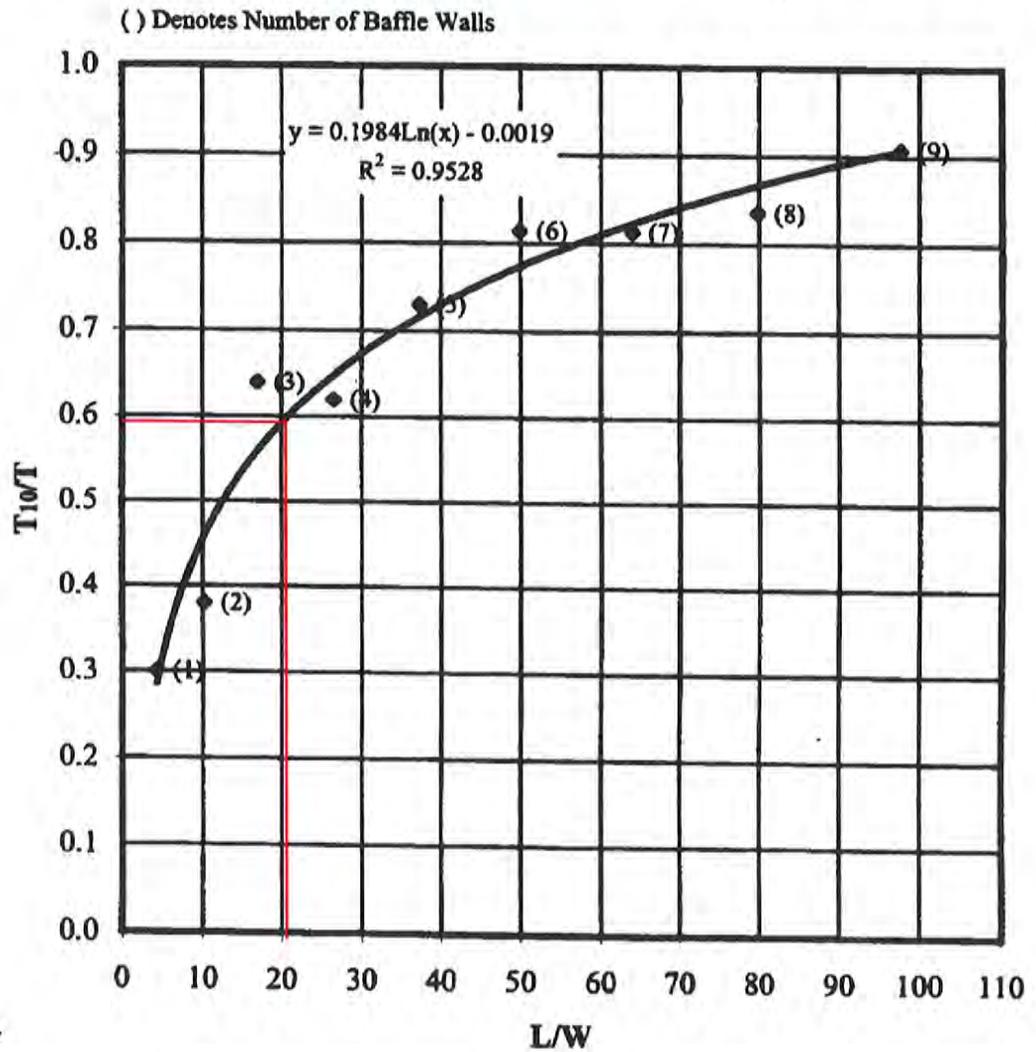


Figure 4.17 Impact of L/W on T<sub>10</sub>/T ratio for rectangular clearwells

**CT VALUE CALCULATION**

**Criteria:**

Temperature: 20 Degrees C

pH: 7.5

Chlorine Concentration: 1.3 mg/l

**Required Minimum CT: 23**

Avg. Day Production Rate = 3.2 mgd = 2,222 gpm  
 Max. Day Production Rate = 4.8 mgd = 3,333 gpm  
 Peak Day Production Rate = 6.4 mgd = 4,444 gpm

**Tank Volume:**

Bottom Elevation = 537 feet

High Water Elevation = 561 feet

Overflow Elevation = 562 feet

Length (inside) = 100 feet

Width (inside) = 21 feet

Inside Wall Length = 95 feet

Inside Wall Width = 1 foot

Area (including wall) = 2,100 sf

Wall Area = 95 sf

Number of Baffle Walls = 1

Working Area (excluding walls) = 2,005 sf

Volume at High Water Elevation = 48,120 cf = 359,986 gallons

Volume at Overflow Water Elevation = 50,125 cf = 374,985 gallons

**T10/T:**

L = Average Flow Path Length = 206 feet

W = Channel Width = 10 feet

L/W = 20.6

T10/T = 0.59 From Figure 4.17 (See Attachment B)

**CT Calculation:**

$CT = T10/T * \text{Min. Volume} / \text{Production Rate}$

Water Depth (ft)	CCT Volume (cf)	CCT Volume (gallons)	Production Rate (mgd)	Production Rate (gpm)	T10/T	Contact Time (min.)	CT Value	Comments
<b>Average Day Production</b>								
4.5	9,023	67,497	3.2	2222	0.59	17.9	23.3	minimum required depth for CT of 23
25.0	50,125	374,985	3.2	2222	0.59	99.6	129.4	maximum water depth
<b>Maximum Day Production</b>								
6.7	13,434	100,496	4.8	3333	0.59	17.8	23.1	minimum required depth for CT of 23
17.6	35,288	263,990	4.8	3333	0.59	46.7	60.7	CT at minimum required depth for flow to lao Tank
25.0	50,125	374,985	4.8	3333	0.59	66.4	86.3	maximum water depth
<b>Peak Day Production</b>								
8.9	17,845	133,495	6.4	4444	0.59	17.7	23.0	minimum required depth for CT of 23
25.0	50,125	374,985	6.4	4444	0.59	49.8	64.7	maximum water depth

**APPENDIX B.**

**Drainage Report**

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**DRAINAGE REPORT-**  
**IAO SURFACE WATER TREATMENT**  
**PLANT UPGRADES PROJECT**  
WAILUKU, MAUI, HAWAI'I  
TMK: (2) 3-5-001: 067 (POR.) & 091 (POR.)

November 2014

Prepared for:

County of Maui Dept. of Water Supply  
200 South High St, 5<sup>th</sup> Floor  
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**DRAINAGE REPORT-  
IAO SURFACE WATER TREATMENT PLANT  
UPGRADES PROJECT**

Wailuku, Maui, Hawai'i

TMK: (2) 3-5-001: 067 (POR.) & 091 (POR.)

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November 2014

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# **DRAINAGE REPORT FOR THE IAO SURFACE WATER TREATMENT PLANT UPGRADES PROJECT**

## **I. INTRODUCTION**

The purpose of this report is to present the proposed drainage design for the Iao Surface Water Treatment Plant Upgrades project and to assess if the design meets County of Maui storm drainage regulations.

## **II. PROPOSED PROJECT**

### **A. LOCATION**

The Iao Surface Water Treatment Plant Upgrades project is located in Wailuku, Maui, Hawaii on West Alu Road near the intersection of Iao Valley Road. The proposed project work will primarily take place on a parcel identified as Tax Map Key (TMK): (2) 3-5-001: 067 (por.). Refer to Exhibit 1 for the Location and Vicinity Map.

The existing Iao Water Treatment Plant (WTP) is located east and makai of the project site. Undeveloped Kehalani Mauka lots lie to the south while West Alu Road borders the north and west sides of the site. On the opposite side of West Alu Road, the land consists of steep mountainous hillsides that are forested and undeveloped.

The project site is within the Kehalani Mauka development. Parcel 67 is owned by RCFC Kehalani LLC, Kehalani Mauka LLC, and Wailuku Water Company LLC. The Department of Water Supply (DWS) is in the process of acquiring the land for the Iao Surface WTP Upgrades project. Access to the site will be provided by a driveway off of West Alu Road through the adjacent Parcel 91. DWS will acquire an easement for the driveway and utilities within Parcel 91.

## **B. PROJECT DESCRIPTION**

The existing Iao Surface Water Treatment Plant is located at the site of DWS's Iao 3.0 million gallon (MG) Tank just makai of the proposed project site. The existing WTP was meant to be temporary and was initially sheltered within a large tent that has since been removed, leaving the treatment units exposed to the elements for a number of years. DWS has been looking for a permanent WTP option to replace the temporary plant.

The proposed project involves installing a new treatment plant building, along with an access road, parking area, chlorine contact tank and sludge lagoons; as well as water, sewer and drainage utilities to serve the new project site. This report focuses on the proposed drainage system.

## **III. EXISTING CONDITIONS**

### **A. TOPOGRAPHY AND SOIL CONDITIONS**

The project site is currently undeveloped and is covered with dense high grass. There is a pull-off on West Alu Road, but no roads actually enter the site.

The land slopes in an easterly direction with an average slope of approximately nine (9) percent. Elevations range from 508 to 560 feet mean sea level (msl). West Alu Road runs along the north and west borders of the site and is situated slightly higher.

The Natural Resource Conservation Service (NRCS) soil type found in the proposed project area is Wailuku silty clay (WvB). According to the NRCS, a representative soil profile consists of at least 60 inches of silty clay with no bedrock or groundwater. Wailuku soils are well drained and permeability is moderate. The Hydrologic Soil Group (HSG) for runoff is Group C.

A geotechnical investigation was completed on the project site by Hirata & Associates. Soil borings from April of 2014 showed that the soil on the site generally consists of about eight to twelve feet of reddish brown clayey silt over a layer of completely weathered rock that has degraded into a similar clayey silt soil. One soil boring found weathered rock that was highly to completely weathered at a depth of 21 feet. No groundwater or seepage was encountered during the soil borings.

**B. CLIMATE AND RAINFALL**

The climate in the vicinity of Wailuku is relatively sunny and warm, with average temperatures varying from a low of 63 degrees Fahrenheit in the winter to a high of 88 degrees in the summer. The annual rainfall is around 37 inches, making the climate semi-arid. The rainfall is also highly seasonal, with 90 percent of the annual rainfall coming between October and May. The 10 and 50-year, 1-hour rainfall is 2.5 and 3.6 inches respectively.

The project site is exposed to prevailing tradewinds coming from the northeast approximately 80 to 85 percent of the time. These tradewinds average 10 to 15 miles per hour during the afternoons with lighter winds during the mornings and nights. Between October and April, southerly winds of Kona storms may be experienced.

**C. DRAINAGE**

As mentioned previously, the site is currently undeveloped and contains no impervious surfaces. Site runoff drains overland to the east through the vacant open land. It drains as sheet flow and there are no drainage ways or areas of concentrated flow. Normally most runoff is infiltrated into the open field land but in intense storm events runoff may reach and enter the Waihee Ditch, which is located approximately 600 feet makai of the site. The Waihee Ditch flows to Waiale Reservoir via the Hopoi Chute and also to irrigated agricultural fields.

The mountainous offsite land above West Alu Road also contributes runoff to the project site. Offsite area O-1 drains off the steep hillsides and is intercepted by a roadside ditch on the mauka side of West Alu Road. The ditch runoff is eventually collected by a 36-inch culvert, which conveys the runoff under the roadway and into the project site. This runoff currently disperses into the open field land. Offsite Area O-2 is located to the northwest and sheet flows off West Alu Road and into the site. Offsite Area O-3 is an offsite area on the existing WTP site where the new WTP driveway is to be installed.

The County of Maui stormwater rules state that drainage areas under 100 acres are to be designed and analyzed for the 10 or 50-year storm. Since the project drainage areas are less than 100 acres, the 10-year storm was used for design of drainage systems and for comparison of existing and proposed site runoff. The 10-year design storm can be used to design the storm drain systems, however 50-year design must be used for sumps or low points.

The results of the hydrologic analysis are summarized in Table 1 below:

**Table 1: Existing Conditions, 10-Year Runoff**

Drainage Area	Contributing Area (ac)	Existing Q 10 (cfs)	Flows To
Drainage Area 1	2.251	4.15	Waihee Ditch
Drainage Area O-1	16.6	27.80	Waihee Ditch
Drainage Area O-2	2.3	4.98	Waihee Ditch
Drainage Area O-3	0.118	0.37	Waihee Ditch
<b>TOTAL TO</b>			
<b>WAIHEE DITCH</b>	<b>21.269</b>	<b>37.30</b>	

See Exhibit 2 for the Existing Conditions Drainage Area Map and Exhibit 4 for the Offsite Drainage Area Map. Hydrology Calculations can be found in Appendix A.

**D. FLOOD ZONE**

The project site is not within any Federal Emergency Management Agency (FEMA) flood zone area. The entire area lies within Zone X, which are areas determined to be outside the 0.2 percent annual chance (500-year) floodplain.

Flood zone classifications are based on FEMA Flood Insurance Rate Map (FIRM) number 1500030391E, revised September 19, 2012. Refer to Appendix D for a Flood Hazard Assessment Report (FHAT).

#### **IV. PROPOSED IMPROVEMENTS**

##### **A. GRADING**

The site grading will feature excavation on the mauka end and embankment on the makai end so that a relatively level pad area can be provided for the development of the new water treatment plant. Embankment slopes will be limited to two feet horizontal to one foot vertical. No retaining walls will be used. The excavation and embankment volumes will be 10,601 and 1,447 cubic yards (cy) respectively for a net volume of 9,154 cy of excess material. The maximum cut will be about 16 feet and the maximum embankment will be about 8 feet.

##### **B. DRAINAGE**

As mentioned previously, the Iao Surface Water Treatment Plant Project is within the Kehalani Mauka Development. The Kehalani Mauka Development has an approved drainage master plan by Warren S. Unemori Engineering (see attached Exhibit 5 from Unemori's drainage master plan). The master plan report is titled "*Drainage Report, Kehalani Offsite Drainage System- Phase 1, Wailuku, Maui, Hawaii*", and was last revised in January 2004. The report designed the current back-bone drainage system that collects and conveys Kehalani Mauka Development runoff to a downstream stormwater management system. The report also designed the downstream stormwater management system, which includes the 490 acre-foot Waikapu Retention Basin located adjacent to Waiale Road.

The runoff from the proposed project site and its offsite contributing areas will be collected by a new onsite storm drain system. A 36-inch inlet headwall will collect runoff coming into the site from the existing 36-inch West Alu Road culvert. Eight grated drain inlets will collect runoff from the project site plus offsite areas O-2 and O-3. The proposed storm drain system will then convey

runoff approximately 1500 feet to Kehalani Parkway where it will connect into the 54-inch storm drain located within the roadway. The storm drain flow is then conveyed to the Waikapu Retention Basin located near Waiale Road.

Management of peak runoff is provided by the Waikapu Retention Basin, which is designed to fully retain the 100-year, 24-hour runoff from the full build-out of all phases of the Kehalani Mauka Development plus its mauka offsite contributing areas. The runoff from this project will be retained in the basin.

The proposed project design conforms to what was assumed in the drainage master plan report. The drainage master plan assumed a runoff curve number of 85 for all of the fully developed Kehalani Mauka Development, which equates to 45 percent impervious coverage over hydrologic soil group C soils. The proposed project site will have 47 percent impervious, which is roughly in line with the assumed average.

Since this project conforms to the drainage design set forth in the approved Kehalani Mauka Development drainage master plan, it therefore also meets the requirements listed in the County of Maui Storm Drainage Manual.

The proposed conditions runoff is summarized in Table 2 on the following page. Note that the proposed storm drain system runoff will be completely retained such that there will be zero discharge to any downstream drainage system.

**Table 2: Prop. Conditions, 10-Year Runoff**

Drainage Area	Contributing Area (ac)	Prop. Q 10 (cfs)	Flows To
Drainage Area 1	0.115	0.84	DI D-1
Drainage Area 2	0.260	2.05	DI C-1
Drainage Area 3	0.081	0.32	DI B-3
Drainage Area 4	0.134	1.10	DI B-2
Drainage Area 5	0.294	1.06	DI E-2
Drainage Area 6	0.419	2.86	DI E-1
Drainage Area 7	0.456	1.53	Headwall A
Drainage Area 8	0.151	0	Lagoons
Drainage Area 9	0.341	1.21	Waihee Ditch
Drainage Area O-1	16.6	27.80	Headwall A
Drainage Area O-2	2.3	4.98	DI E-2
Drainage Area O-3	0.118	0.58	DI B-2
<b>TOTAL TO WAIHEE DITCH</b>	<b>0.341</b>	<b>1.21</b>	<b>(36 cfs Decrease)</b>
<b>TOTAL TO PROP. STORM DRAIN SYSTEM</b>	<b>20.928</b>	<b>43.12</b>	<b>(43 cfs Increase)</b>

- Note:
1. The sludge lagoon has an open top and retains what rainfall lands on it.
  2. The Proposed Storm Drain System runoff will be fully retained in the existing Offsite Waikapu Retention Basin such that there will be zero discharge to any downstream drainage system.

A hydraulic analysis was also completed on the proposed storm drain system. Calculations show that the pipes are adequately sized for the 10-year storm. Additionally the two sump drain inlets (DI B-2 and DI B-3) and the inlet headwall (Headwall A) have adequate intake capacity for the 50-year storm.

See Exhibit 3 for the Proposed Conditions Drainage Area Map. Refer to Appendix A for Hydrology Calculations and Appendix B for Hydraulic Calculations.

**C. RUNOFF WATER QUALITY**

Water quality treatment is also provided and will comply with the County's recently adopted "Rules for the Design of Storm Water Treatment Best Management Practices". Since the existing Waikapu Retention Basin has capacity to completely retain the 100-year, 24-hour storm, it is inferred that the one-inch water quality storm runoff is also fully retained. All suspended solids and potential pollutants will be captured in the basin and will not contribute to any downstream drainage-ways. Refer to Appendix C for water quality calculations.

A maintenance plan will be developed for managing the BMPs on the future site. The plan will include requirements for removing accumulated sediments and debris, maintaining vegetation, and performing regular inspections so that the BMPs operate effectively into the future.

**D. EROSION CONTROL**

Temporary erosion control measures will be incorporated during construction to minimize soil loss and erosion hazards. Best Management Practices may include temporary sediment basins, temporary diversion berms and swales to intercept runoff, silt fences, dust fences, slope protection, stabilized construction entrances and truck wash-down areas. Periodic water spraying of loose soils will be employed to minimize air-borne dirt particles. The project will also need to apply for and meet the requirements of a National Pollution Discharge Elimination System (NPDES) permit.

## **V. CONCLUSION**

The proposed improvements for this project will be designed in accordance with the Department of Public Works (DPW) Storm Drainage Rules. The proposed storm drain system will have adequate capacity and the post-development runoff will be retained. Erosion control and water quality measures will be provided to minimize pollution during and after construction. The project will also comply with the County's recently adopted "Rules for the Design of Storm Water Treatment Best Management Practices".

Based on the information presented in this report, the drainage design for this project will have no adverse effects on the existing facilities or on the surrounding environment.

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9. Warren S. Unemori Engineering, Inc. (January 2004). *Kehalani Offsite Drainage System- Phase 1, Wailuku, Maui, Hawaii*.
10. Warren S. Unemori Engineering, Inc. (May 28, 2013). *Project Plans: Kehalani Parkway - Mauka Loop*.
11. Hirata and Associates, Inc. (June 18, 2014). *Foundation Investigation, Iao Surface Water Treatment Plant Upgrades, Wailuku, Maui, Hawaii, DWS Job No. 12-03*.
12. Munekiyo & Hiraga, Inc. (October 25, 2013). *Letter: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.)*.



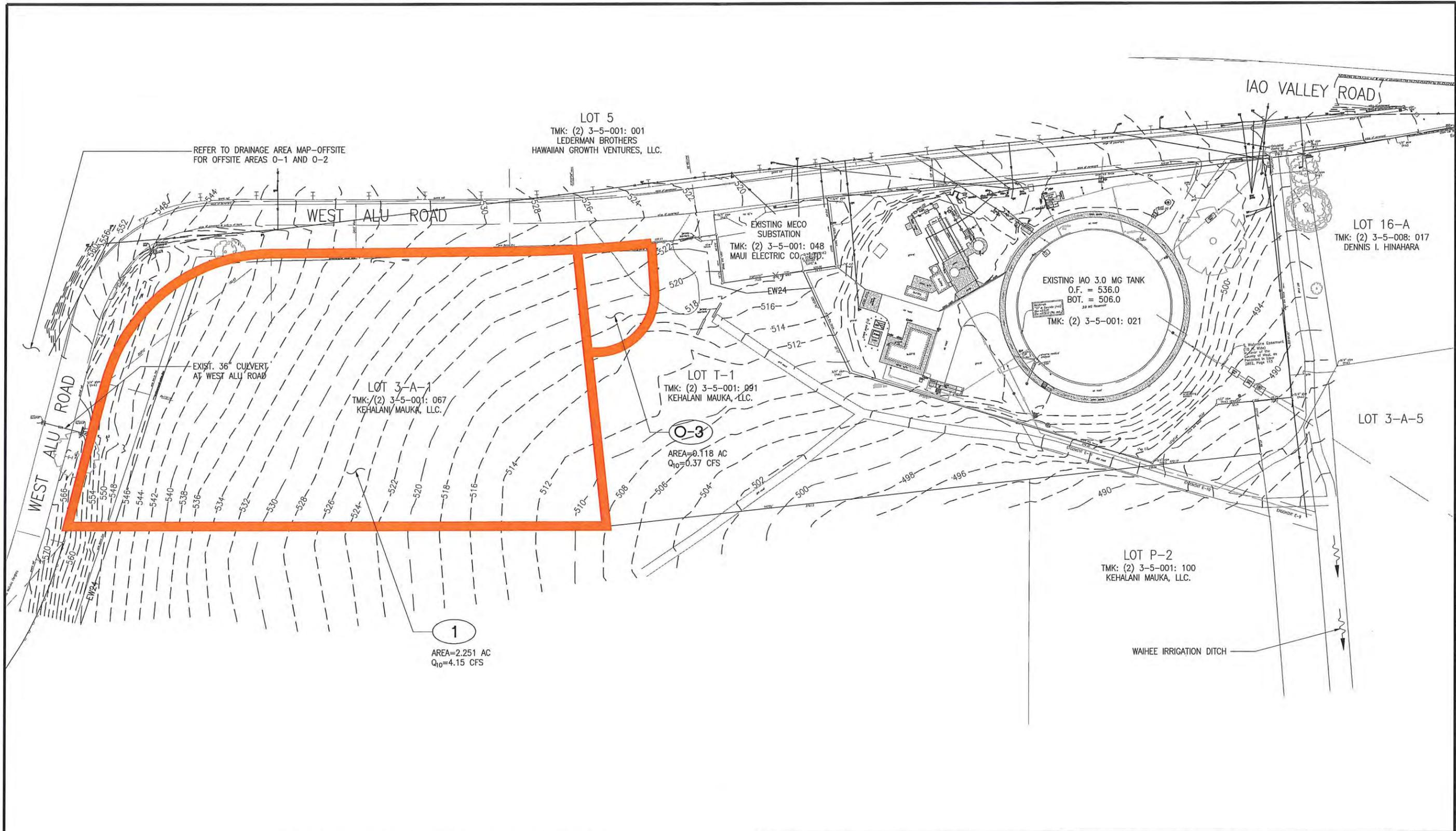
AUSTIN, TSUTSUMI & ASSOCIATES, INC.  
CIVIL ENGINEERS • SURVEYORS

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# EXHIBITS

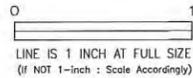
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**DRAINAGE AREA MAP-EXISTING CONDITIONS**

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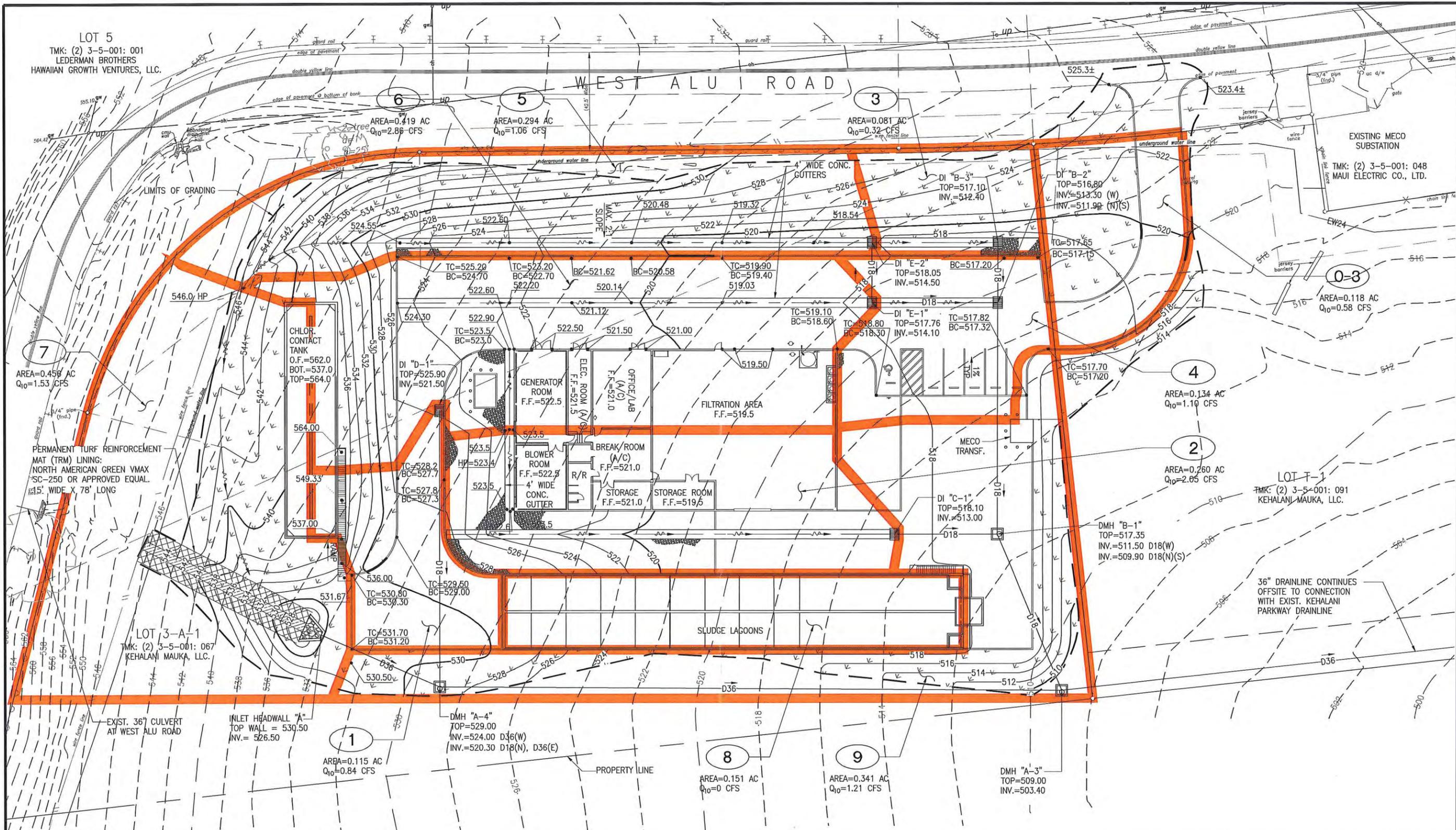


DRAINAGE REPORT  
 IAO SURFACE WATER  
 TREATMENT PLANT UPGRADES  
 WAILUKU, MAUI, HAWAII

**ATA** AUSTIN, TSUTSUMI & ASSOCIATES, INC.  
 ENGINEERS, SURVEYORS • HONOLULU, WAILUKU, HILO, HAWAII

DRAINAGE AREA MAP-EXISTING  
 CONDITIONS

EXHIBIT  
**2**

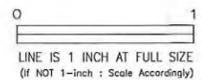


LOT 5  
 TMK: (2) 3-5-001: 001  
 LEDERMAN BROTHERS  
 HAWAIIAN GROWTH VENTURES, LLC.

EXISTING MECO  
 SUBSTATION  
 TMK: (2) 3-5-001: 048  
 MAUI ELECTRIC CO., LTD.

LOT F-1  
 TMK: (2) 3-5-001: 091  
 KEHALANI MAUKA, LLC.

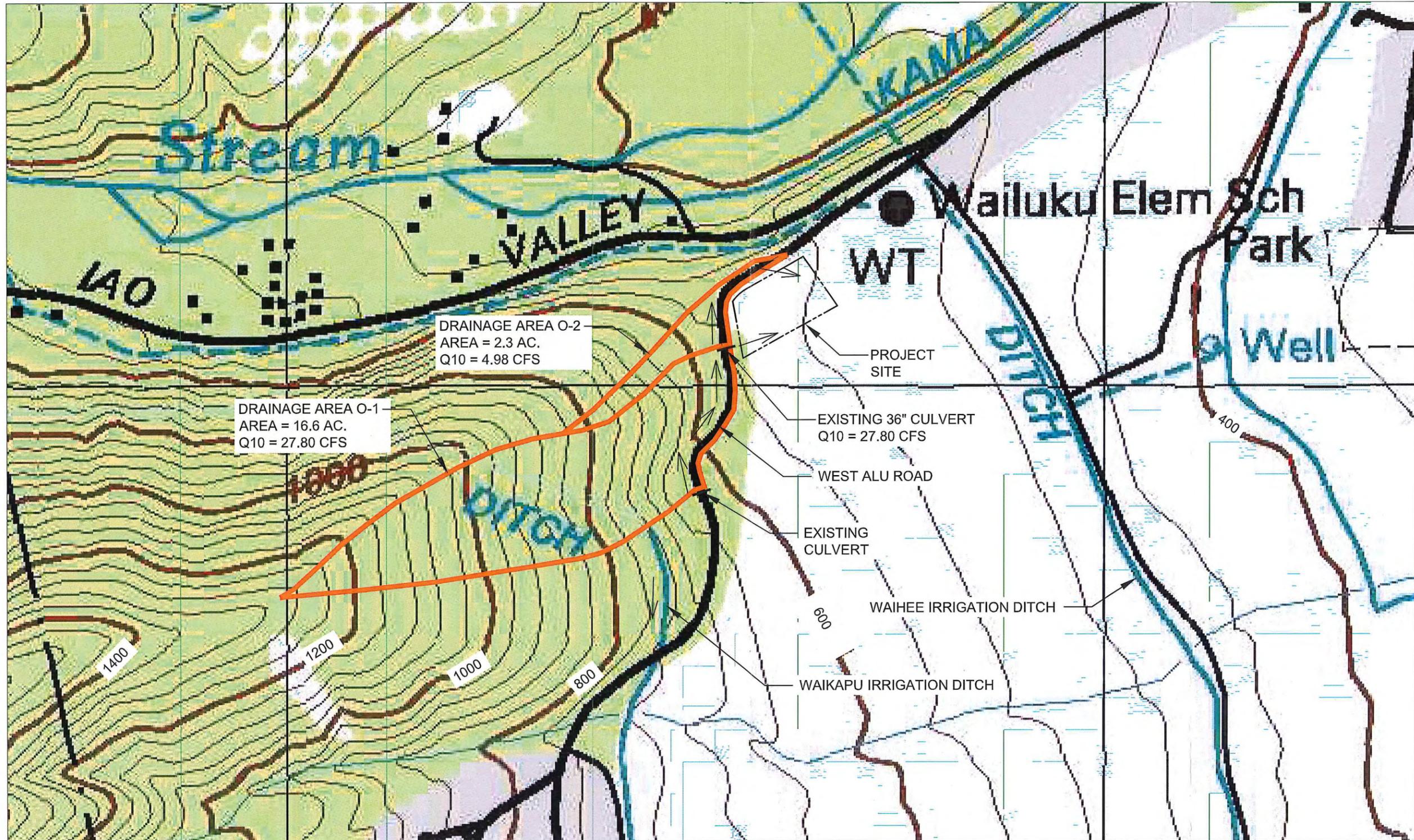
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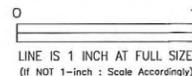
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 DRAINAGE AREA MAP-PROPOSED  
 CONDITIONS

EXHIBIT  
**3**



MAP SCALE 1" = 400'



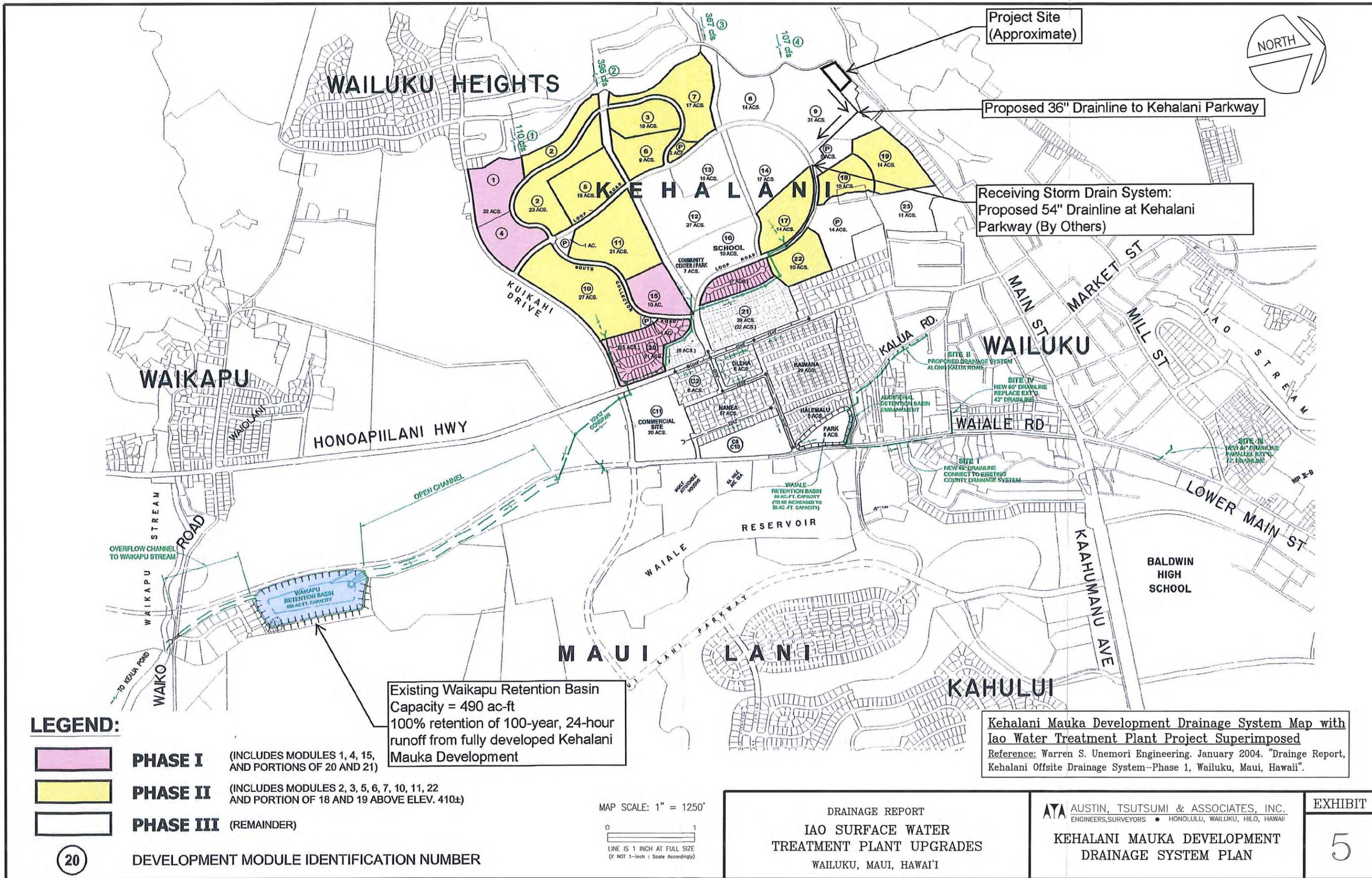
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DRAINAGE AREA MAP—  
OFFSITE

EXHIBIT

4





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# APPENDIX A

## Hydrology Calculations

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## APPENDIX A

### DRAINAGE AREA CALCULATIONS EXISTING CONDITIONS

Drainage Area Label	Drainage Area Description	Area (acres)	Runoff Coeff.	Tc (min)	10-Yr Design Intensity (in/hr)	10-Yr, 1-Hr Runoff	
						Flow (cfs)	Volume (cf)
1	Onsite Area	2.251	0.35	16.5	5.27	4.15	7,470
O-1	Offsite to Ex. 36" Culv. & Site	16.6	0.41	27.7	4.07	27.80	50,040
O-2	Offsite to Site from W. Alu Rd	2.3	0.46	22.2	4.66	4.98	8,964
O-3	Offsite Area at Prop. Entrance	0.118	0.45	9.0	6.94	0.37	666
<b>Total to Waihee Ditch</b>		<b>21.269</b>				<b>37.30</b>	<b>67,140</b>

- Notes:
1. All drainage areas are less than 100 acres. The Rational Method ( $Q = CIA$ ) is used to determine runoff.
  2. 10-year design is used for most drainage areas. 50-year design is used for runoff to proposed DI B-2 and B-3 which are located in a sump low point.
  3. Refer to Runoff Coefficient Calculations for determination of "C" value.
  4. Refer to Time of Concentration Calculations for determination of "Tc" value.
  5. Rainfall Intensity obtained from the NOAA Precipitation Frequency Data Server, accessed online at: <http://hdsc.nws.noaa.gov/hdsc/pfds>
  6. Runoff volume determined using triangular Rational Method hydrograph ending at 1-hour. Hydrograph Volume =  $(Q \text{ ft}^3/\text{sec}) \times (60 \text{ sec}/\text{min}) \times (60 \text{ min}/\text{hr}) \times (1/2)$

## APPENDIX A

### DRAINAGE AREA CALCULATIONS PROPOSED CONDITIONS

Drainage Area Label	Flows To	Area (acres)	Runoff Coeff.	Tc (min)	10-Yr Design Intensity (in/hr)	10-Yr, 1-Hr Runoff		50-Yr Design Intensity (in/hr)	50-Yr, 1-Hr Runoff	
						Flow (cfs)	Volume (cf)		Flow (cfs)	Volume (ac-ft)
1	DI D-1	0.115	0.84	5.0	8.75	0.84	1,512	-	-	-
2	DI C-1	0.260	0.90	5.0	8.75	2.05	3,690	-	-	-
3	DI B-3	0.081	0.48	5.7	8.43	0.32	576	12.05	0.46	828
4	DI B-2	0.134	0.93	5.0	8.75	1.10	1,980	12.50	1.57	2,826
5	DI E-2	0.294	0.46	7.0	7.85	1.06	1,908	-	-	-
6	DI E-1	0.419	0.87	6.9	7.89	2.86	5,148	-	-	-
7	Headwall A	0.456	0.43	7.2	7.76	1.53	2,754	-	-	-
8	Lagoon	0.151	0.00	5.0	8.75	0.00	0	← See Note 7 Below		
9	Waihee	0.341	0.59	12.2	6.02	1.21	2,178	-	-	-
O-1	Headwall A	16.6	0.41	27.7	4.07	27.80	50,040	-	-	-
O-2	DI E-2	2.3	0.46	22.2	4.66	4.98	8,964	-	-	-
O-3	DI B-2	0.118	0.66	7.9	7.44	0.58	1,044	10.62	0.82	1,476
<b>Total to Waihee Ditch</b>		<b>0.341</b>				<b>1.21</b>	<b>2,178</b>	<b>(36 cfs Decrease)</b>		
<b>Total to Prop. Storm Drain Sys.</b>		<b>20.928</b>				<b>43.12</b>	<b>77,616</b>	<b>(43 cfs Increase. See Note 8)</b>		

- Notes:
1. All drainage areas are less than 100 acres. The Rational Method ( $Q = CIA$ ) is used to determine runoff.
  2. 10-year design is used for most drainage areas. 50-year design is used for DI B-2 and B-3 due to their location in a sump low point.
  3. Refer to Runoff Coefficient Calculations for determination of "C" value.
  4. Refer to Time of Concentration Calculations for determination of "Tc" value.
  5. Rainfall Intensity obtained from the NOAA Precipitation Frequency Data Server, accessed online at: <http://hdsc.nws.noaa.gov/hdsc/pfds>
  6. Runoff volume determined using triangular Rational Method hydrograph ending at 1-hour. Hydrograph Volume =  $(Q \text{ ft}^3/\text{sec}) \times (60 \text{ sec}/\text{min}) \times (60 \text{ min}/\text{hr}) \times (1/2)$
  7. Lagoon has open top and captures all rainfall that falls directly on it.
  8. The prop. storm drain system runoff will be fully retained in the existing offsite Waikapu Retention Basin such that there will be zero discharge to any downstream drainage system.

## APPENDIX A

### RUNOFF COEFFICIENT CALCULATIONS

Drainage Area Label	C <sub>10</sub> = 0.35		C <sub>10</sub> = 0.40		C <sub>10</sub> = 0.40		C <sub>10</sub> = 0.85		C <sub>10</sub> = 0.95		Weighted Avg. Coeff.	
	Ex. Tall Grass/ Brush		Ex. Woods Brush		Grass Cover (Graded Area)		Dirt/ Bare Soil		Impervious Surfaces		TOTAL	
	Area (sf)	Area (%)	Area (sf)	Area (%)	Area (sf)	Area (%)	Area (sf)	Area (%)	Area (sf)	Area (%)	Area (sf)	Runoff Coeff.
<b>Existing Conditions</b>												
1	98,069	100.0	0	0.0	0	0.0	0	0.0	0	0.0	98,069	0.35
O-1	0	0.0	707,587	97.9	0	0.0	0	0.0	15,072	2.1	722,659	0.41
O-2	0	0.0	86,821	88.3	0	0.0	0	0.0	11,520	11.7	98,341	0.46
O-3	4,105	79.7	0	0.0	0	0.0	1,044	20.3	0	0.0	5,149	0.45
<b>Proposed Conditions</b>												
1	0	0.0	0	0.0	1,040	20.7	0	0.0	3,993	79.3	5,033	0.84
2	0	0.0	0	0.0	0	0.0	5,662	50.0	5,670	50.0	11,332	0.90
3	0	0.0	0	0.0	2,996	84.8	308	8.7	230	6.5	3,534	0.48
4	0	0.0	0	0.0	40	0.7	686	11.8	5,098	87.5	5,824	0.93
5	0	0.0	0	0.0	11,240	87.8	723	5.7	832	6.5	12,795	0.46
6	0	0.0	0	0.0	2,599	14.2	1,048	5.7	14,608	80.0	18,255	0.87
7	0	0.0	0	0.0	18,662	94.0	0	0.0	1,189	6.0	19,841	0.43
8	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	6,600	0.00
9	0	0.0	0	0.0	8,674	58.4	5,734	38.6	444	3.0	14,852	0.59
O-1	(No Change, See Existing Conditions)											
O-2	(No Change, See Existing Conditions)											
O-3	0	0.0	0	0.0	2,748	53.4	0	0.0	2,400	46.6	5,148	0.66

**Surface Type Detailed Descriptions:**

- Ex. Tall Grass/ Brush, Good Cover, Steep Slopes, HSG C
- Ex. Woods, Good Cover, V. Steep Slopes, HSG C
- Grass Cover (Graded Area), V. Slopes, HSG C
- Dirt Roadways or Bare Soil HSG C
- Impervious Surfaces (Pavement, Buildings, Pads, etc)

Note: 1. Lagoon has open top and captures all rainfall that falls directly on it.

APPENDIX A

TIME OF CONCENTRATION CALCULATIONS

Drain Area Label	Flow Segment 1			Flow Segment 2			Flow Segment 3			Flow Segment 4			TOTAL Time (min)				
	Overland Flow			Overland Flow			Concentrated Flow			Concentrated Flow							
	Surf. Type	Length (ft)	Slope (%)	Time (min)	Surf. Type	Length (ft)	Slope (%)	Time (min)	Surf. Type	Length (ft)	Slope (%)	Time (min)	Surf. Type	Length (ft)	Slope (%)	Time (min)	
<b>Existing Conditions</b>																	
1	Grass	440	9.3	16.5	-	-	-	0	-	-	-	0	-	-	-	0	16.5
O-1	Woods	1,730	39.3	27.0	-	-	-	0	Paved	590	8.5	0.7	-	-	-	0	27.7
O-2	Woods	830	34.9	21.7	-	-	-	0	Paved	350	7.1	0.5	-	-	-	0	22.2
O-3	Grass	90	9.4	9.0	-	-	-	0	-	-	-	0	-	-	-	0	9.0
<b>Proposed Conditions</b>																	
1	Grass	25	30.1	3.0	Pave	45	5.6	0.5	-	-	-	0	-	-	-	0	3.5*
2	Gravel	25	11.6	1.0	-	-	-	0	Pave	200	3.0	0.7	-	-	-	0	1.7*
3	Grass	40	23.6	5.5	-	-	-	0	Pave	65	3.9	0.2	-	-	-	0	5.7
4	Gravel	25	2.0	1.8	Pave	30	2.8	0.6	Pave	45	2.0	0.2	-	-	-	0	2.6*
5	Grass	35	12.3	6.0	-	-	-	0	Grass	75	28.5	0.3	Pave	195	3.5	0.7	7.0
6	Grass	65	31.4	6.2	-	-	-	0	Pave	195	3.3	0.7	-	-	-	0	6.9
7	Grass	70	20.4	7.0	-	-	-	0	Grass	65	19.3	0.2	-	-	-	0	7.2
8	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	0	0.0*
9	Grass	175	7.4	12.2	-	-	-	0	-	-	-	0	-	-	-	0	12.2
O-1	(No Change, See Existing Conditions)																
O-2	(No Change, See Existing Conditions)																
O-3	Grass	70	10.4	7.8	-	-	-	0	Pave	20	2.0	0.1	-	-	-	0	7.9

- Notes:
1. County of Maui Storm Drain Manual Plate 1 used for the determination of overland flow time.
  2. County of Maui Storm Drain Manual Table 4 used for the determination of concentrated flow time.
  3. A pipe flow rate of 5 fps was assumed.
  4. Time of concentrations marked with asterisk (\*) are rounded up to 5 minutes minimum for runoff calculations.

## APPENDIX A

### SUMMARY OF PROCESS DISCHARGES

Process Flow	Description	Approx. Frequency	Estimated Flow Rate	Flow Rate (cfs)	Flows To
1	Backwash from the strainers	Hourly	150 gpm	0.33 cfs	Waihee Ditch
2	Bypass flow of raw water supply (if raw water is too dirty)	Monthly	4.8 MGD	7.43 cfs	Waihee Ditch
3	Washout water from the Chlorine Contact Tank (CCT)	Rare	300 gpm	0.67 cfs	DI D-1
4	Overflow from the CCT	Rare	4.8 MGD	7.43 cfs	DI D-1

- Notes:
1. Process Flows 1 and 2 first go to the sludge lagoons. The decant from the sludge lagoons then goes to the existing storm drain system at the existing Iao Water Treatment Plant, which discharges to the Waihee Irrigation Ditch.
  2. Process Flows 3 and 4 are rare and it would be extremely unlikely that they would occur at the same time as the 10-year storm. For this reason, Process Flows 3 and 4 are not added to the 10-year storm flows in the storm drain HGL analysis.



**NOAA Atlas 14, Volume 4, Version 3**  
**Location name: Wailuku, Hawaii, US\***  
**Coordinates: 20.8835, -156.5125**  
**Elevation: 493 ft\***  
 \* source: Google Maps



**POINT PRECIPITATION FREQUENCY ESTIMATES**

S. Perica, D. Martin, B. Lin, T. Parzybok, D. Riley, M. Yekta, L. Hiner, L.-C. Chen, D. Brewer, F. Yan, K. Maitaria, C. Trypaluk, G. M. Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aeriels](#)

**PF tabular**

Precipitation data is specific to project location.

**PRECIPITATION DATA**  
(in inches per hour)

Interpolate to find 10-year Rainfall Intensity for the storm duration equal to the Tc.

<b>PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)<sup>1</sup></b>										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	<b>4.10</b> (3.44-4.66)	<b>5.41</b> (4.60-6.36)	<b>7.25</b> (6.10-8.60)	<b>8.75</b> (7.25-10.4)	<b>10.8</b> (8.77-13.0)	<b>12.5</b> (9.98-15.2)	<b>14.2</b> (11.1-17.6)	<b>16.1</b> (12.3-20.2)	<b>18.7</b> (13.7-24.0)	<b>20.9</b> (14.8-27.2)
10-min	<b>3.04</b> (2.56-3.45)	<b>4.01</b> (3.41-4.72)	<b>5.38</b> (4.52-6.38)	<b>6.49</b> (5.37-7.74)	<b>8.02</b> (6.50-9.66)	<b>9.25</b> (7.40-11.3)	<b>10.6</b> (8.26-13.0)	<b>11.9</b> (9.11-15.0)	<b>13.9</b> (10.2-17.8)	<b>15.5</b> (11.0-20.2)
15-min	<b>2.55</b> (2.14-2.89)	<b>3.36</b> (2.85-3.95)	<b>4.50</b> (3.79-5.34)	<b>5.43</b> (4.50-6.48)	<b>6.71</b> (5.45-8.09)	<b>7.74</b> (6.20-9.44)	<b>8.84</b> (6.91-10.9)	<b>9.99</b> (7.62-12.5)	<b>11.6</b> (8.52-14.9)	<b>13.0</b> (9.19-16.9)
30-min	<b>1.79</b> (1.50-2.03)	<b>2.36</b> (2.01-2.78)	<b>3.17</b> (2.66-3.76)	<b>3.82</b> (3.16-4.56)	<b>4.72</b> (3.83-5.69)	<b>5.45</b> (4.36-6.64)	<b>6.22</b> (4.86-7.67)	<b>7.03</b> (5.37-8.81)	<b>8.18</b> (6.00-10.5)	<b>9.12</b> (6.46-11.9)
60-min	<b>1.18</b> (0.990-1.34)	<b>1.55</b> (1.32-1.83)	<b>2.08</b> (1.75-2.47)	<b>2.51</b> (2.08-3.00)	<b>3.11</b> (2.52-3.74)	<b>3.58</b> (2.87-4.37)	<b>4.09</b> (3.20-5.05)	<b>4.62</b> (3.53-5.80)	<b>5.38</b> (3.95-6.89)	<b>6.00</b> (4.25-7.82)
2-hr	<b>0.804</b> (0.696-0.934)	<b>1.08</b> (0.920-1.27)	<b>1.44</b> (1.22-1.72)	<b>1.73</b> (1.44-2.07)	<b>2.13</b> (1.74-2.58)	<b>2.45</b> (1.96-3.00)	<b>2.77</b> (2.17-3.43)	<b>3.11</b> (2.38-3.91)	<b>3.58</b> (2.63-4.60)	<b>3.97</b> (2.81-5.19)
3-hr	<b>0.603</b> (0.522-0.699)	<b>0.816</b> (0.696-0.959)	<b>1.09</b> (0.920-1.30)	<b>1.31</b> (1.09-1.57)	<b>1.62</b> (1.32-1.95)	<b>1.86</b> (1.49-2.27)	<b>2.10</b> (1.65-2.60)	<b>2.36</b> (1.81-2.96)	<b>2.72</b> (2.00-3.48)	<b>3.01</b> (2.13-3.93)
6-hr	<b>0.383</b> (0.328-0.447)	<b>0.514</b> (0.438-0.606)	<b>0.696</b> (0.585-0.827)	<b>0.840</b> (0.698-1.01)	<b>1.04</b> (0.847-1.26)	<b>1.19</b> (0.958-1.46)	<b>1.36</b> (1.06-1.68)	<b>1.52</b> (1.17-1.92)	<b>1.76</b> (1.29-2.26)	<b>1.94</b> (1.38-2.55)
12-hr	<b>0.237</b> (0.204-0.276)	<b>0.320</b> (0.272-0.376)	<b>0.437</b> (0.367-0.518)	<b>0.531</b> (0.441-0.634)	<b>0.664</b> (0.541-0.801)	<b>0.771</b> (0.617-0.941)	<b>0.883</b> (0.692-1.09)	<b>1.00</b> (0.765-1.26)	<b>1.17</b> (0.857-1.50)	<b>1.30</b> (0.924-1.70)
24-hr	<b>0.146</b> (0.125-0.171)	<b>0.200</b> (0.171-0.234)	<b>0.276</b> (0.236-0.324)	<b>0.339</b> (0.288-0.399)	<b>0.429</b> (0.360-0.507)	<b>0.503</b> (0.418-0.598)	<b>0.582</b> (0.478-0.696)	<b>0.668</b> (0.541-0.804)	<b>0.792</b> (0.626-0.963)	<b>0.893</b> (0.692-1.10)
2-day	<b>0.092</b> (0.081-0.105)	<b>0.125</b> (0.110-0.143)	<b>0.172</b> (0.151-0.197)	<b>0.211</b> (0.183-0.243)	<b>0.266</b> (0.229-0.308)	<b>0.311</b> (0.265-0.362)	<b>0.359</b> (0.301-0.421)	<b>0.411</b> (0.339-0.485)	<b>0.485</b> (0.390-0.580)	<b>0.545</b> (0.429-0.660)
3-day	<b>0.066</b> (0.058-0.075)	<b>0.090</b> (0.079-0.102)	<b>0.124</b> (0.109-0.141)	<b>0.152</b> (0.133-0.174)	<b>0.193</b> (0.167-0.222)	<b>0.227</b> (0.194-0.263)	<b>0.263</b> (0.222-0.307)	<b>0.303</b> (0.252-0.356)	<b>0.360</b> (0.292-0.428)	<b>0.408</b> (0.323-0.490)
4-day	<b>0.053</b> (0.047-0.060)	<b>0.072</b> (0.064-0.082)	<b>0.100</b> (0.088-0.113)	<b>0.123</b> (0.108-0.140)	<b>0.157</b> (0.136-0.179)	<b>0.185</b> (0.159-0.213)	<b>0.215</b> (0.183-0.250)	<b>0.249</b> (0.208-0.291)	<b>0.298</b> (0.242-0.353)	<b>0.339</b> (0.269-0.406)
7-day	<b>0.034</b> (0.030-0.038)	<b>0.046</b> (0.041-0.052)	<b>0.064</b> (0.056-0.072)	<b>0.078</b> (0.069-0.089)	<b>0.100</b> (0.087-0.115)	<b>0.118</b> (0.102-0.136)	<b>0.138</b> (0.117-0.160)	<b>0.160</b> (0.133-0.187)	<b>0.192</b> (0.156-0.227)	<b>0.219</b> (0.174-0.262)
10-day	<b>0.026</b> (0.023-0.030)	<b>0.035</b> (0.031-0.040)	<b>0.049</b> (0.043-0.055)	<b>0.060</b> (0.052-0.068)	<b>0.076</b> (0.066-0.087)	<b>0.089</b> (0.077-0.103)	<b>0.104</b> (0.088-0.120)	<b>0.120</b> (0.100-0.140)	<b>0.144</b> (0.117-0.170)	<b>0.163</b> (0.130-0.195)
20-day	<b>0.016</b> (0.015-0.019)	<b>0.022</b> (0.019-0.025)	<b>0.030</b> (0.026-0.034)	<b>0.036</b> (0.032-0.041)	<b>0.045</b> (0.039-0.052)	<b>0.053</b> (0.045-0.061)	<b>0.061</b> (0.051-0.070)	<b>0.069</b> (0.058-0.081)	<b>0.082</b> (0.067-0.097)	<b>0.092</b> (0.073-0.110)
30-day	<b>0.013</b> (0.011-0.015)	<b>0.017</b> (0.015-0.019)	<b>0.023</b> (0.020-0.026)	<b>0.028</b> (0.025-0.032)	<b>0.035</b> (0.030-0.040)	<b>0.040</b> (0.035-0.046)	<b>0.046</b> (0.039-0.053)	<b>0.052</b> (0.044-0.061)	<b>0.061</b> (0.050-0.072)	<b>0.068</b> (0.054-0.082)
45-day	<b>0.010</b> (0.009-0.012)	<b>0.014</b> (0.012-0.016)	<b>0.018</b> (0.016-0.021)	<b>0.022</b> (0.020-0.025)	<b>0.027</b> (0.024-0.031)	<b>0.031</b> (0.027-0.036)	<b>0.035</b> (0.030-0.041)	<b>0.040</b> (0.033-0.046)	<b>0.046</b> (0.037-0.054)	<b>0.050</b> (0.040-0.060)
60-day	<b>0.009</b> (0.008-0.010)	<b>0.012</b> (0.011-0.014)	<b>0.016</b> (0.014-0.018)	<b>0.019</b> (0.017-0.021)	<b>0.023</b> (0.020-0.026)	<b>0.026</b> (0.022-0.030)	<b>0.029</b> (0.025-0.034)	<b>0.032</b> (0.027-0.038)	<b>0.037</b> (0.030-0.043)	<b>0.040</b> (0.032-0.048)

<sup>1</sup> Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at low er and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the low er bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

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**PF graphical**





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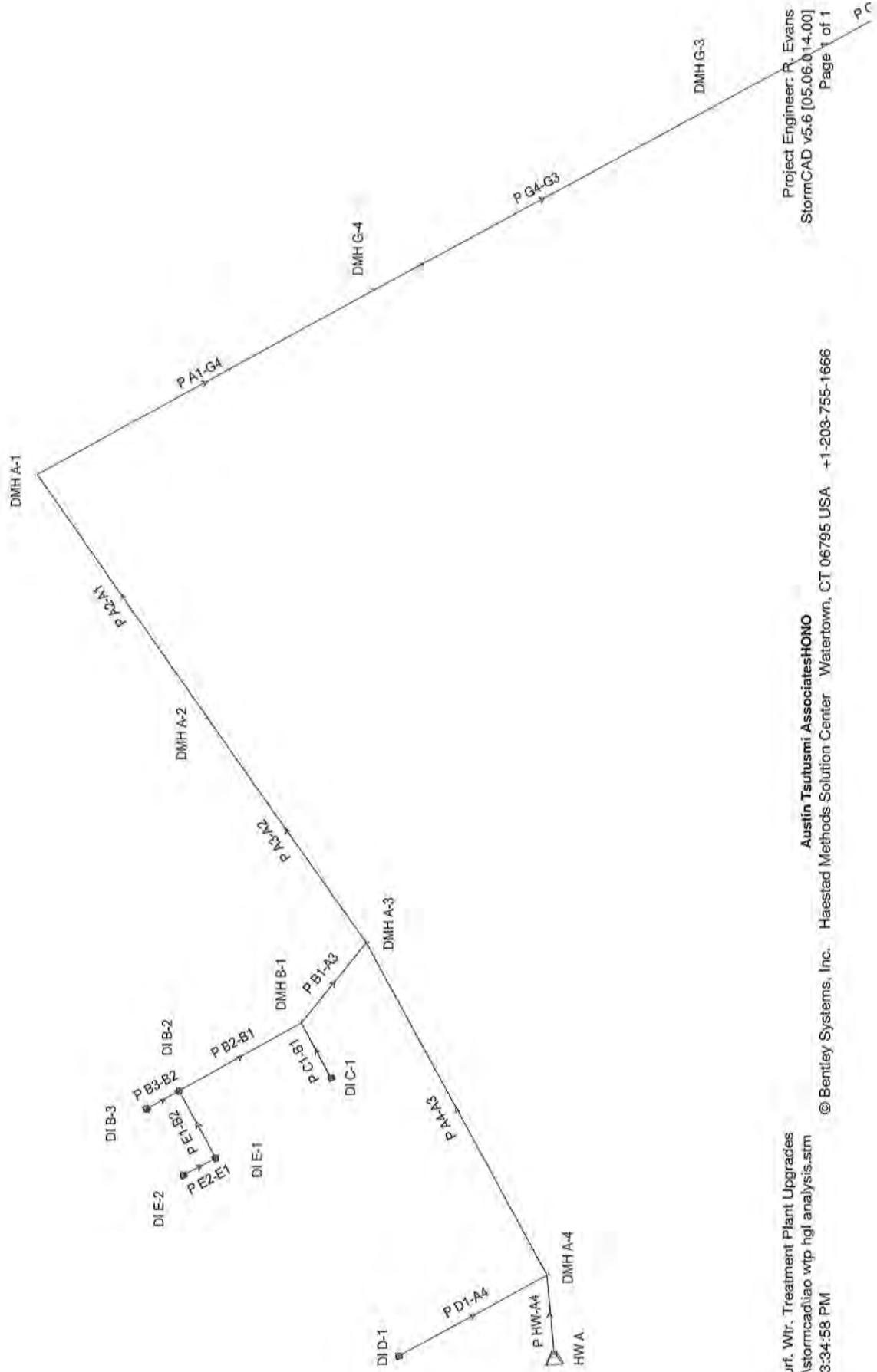
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# APPENDIX B

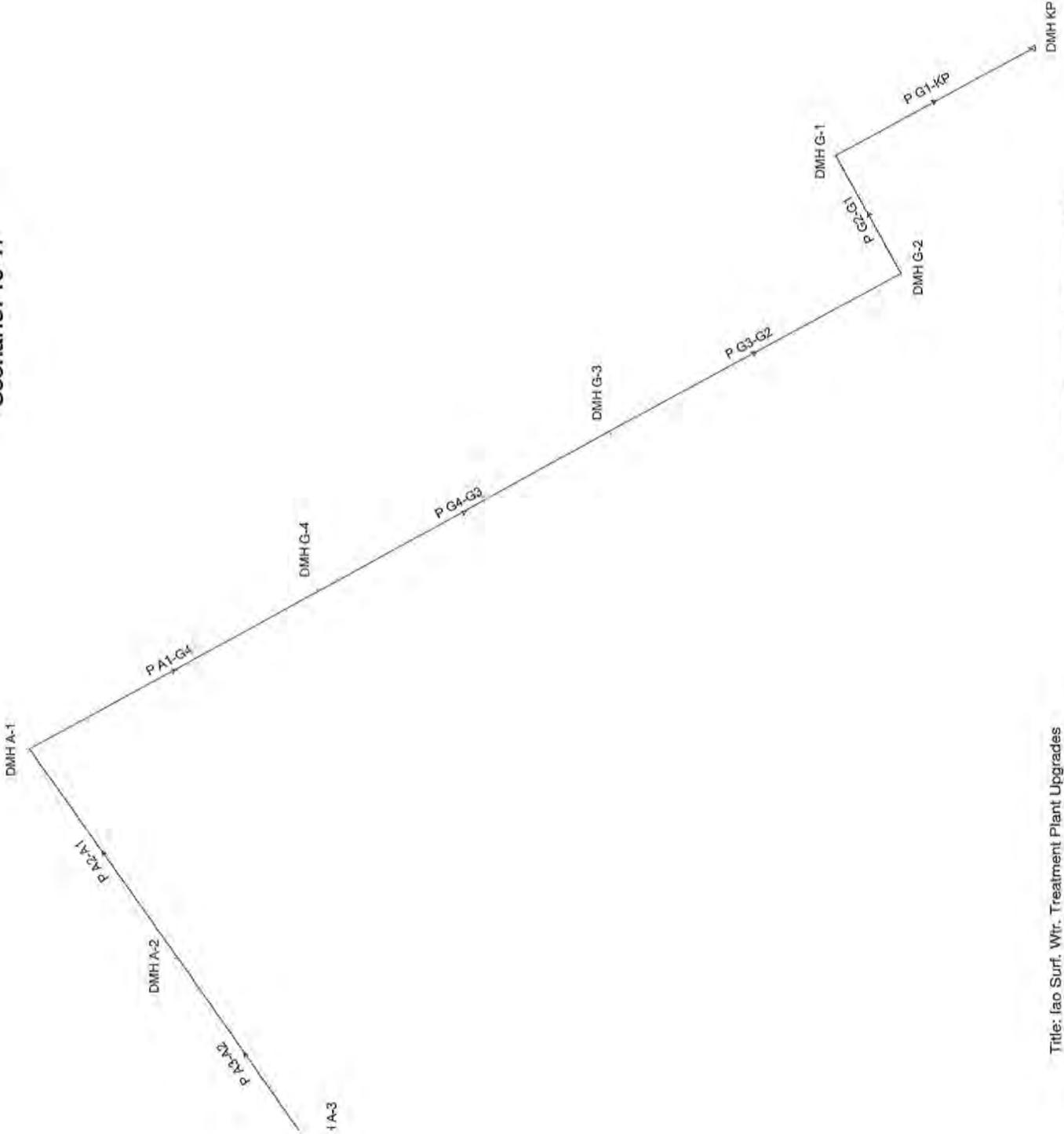
## Hydraulic Calculations

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# Scenario: 10-Yr



Scenario: 10-Yr



Scenario: 10-Yr

HGL Report- Iao WTP

Line	Label	Number of Sections	Section Size	Material Description	Manning's n	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft)	Pipe Slope (ft/ft)	Hydraulic Slope (ft/ft)	Total System Flow (cfs)	Full Flow Capacity (cfs)	Avg. Velocity (ft/s)	Normal Depth / Diameter (d/D) (%)	Hydraulic Grade Line Out (ft)	Element Headloss (ft)	Hydraulic Grade Line In (ft)	Ground Elevation (ft)
1	DMH KP										43.12				460.00	0.00	460.00	472.00
2	P G1-KP	1	36 inch	Corrugated HDPE (Smooth)	0.012	463.50	465.35	185.00	0.0100	0.0125	43.12	72.25	10.67	55.6	465.18	2.31	467.49	473.00
3	DMH G-1										43.12				467.49	1.49	468.98	473.00
4	P G2-G1	1	36 inch	Corrugated HDPE (Smooth)	0.012	465.35	469.50	111.00	0.0374	0.0240	43.12	139.71	17.41	38.1	468.98	2.66	471.64	483.00
5	DMH G-2										43.12				471.64	1.49	473.13	483.00
6	P G3-G2	1	36 inch	Corrugated HDPE (Smooth)	0.012	469.50	472.25	275.00	0.0100	0.0046	43.12	72.25	10.67	55.6	473.13	1.26	474.39	484.00
7	DMH G-3										43.12				474.39	0.50	474.89	484.00
8	P G4-G3	1	36 inch	Corrugated HDPE (Smooth)	0.012	472.25	475.00	275.00	0.0100	0.0082	43.12	72.25	10.67	55.6	474.89	2.25	477.14	480.00
9	DMH G-4										43.12				477.14	0.50	477.64	480.00
10	P A1-G4	1	36 inch	Corrugated HDPE (Smooth)	0.012	475.00	481.50	272.00	0.0239	0.0221	43.12	111.69	14.78	43.1	477.64	6.00	483.64	494.75
11	DMH A-1										43.12				483.64	1.49	485.13	494.75
12	P A2-A1	1	36 inch	Corrugated HDPE (Smooth)	0.012	485.60	492.00	212.00	0.0302	0.0345	43.12	125.54	16.11	40.4	486.82	7.32	494.14	499.00
13	DMH A-2										43.12				494.14	0.50	494.64	499.00
14	P A3-A2	1	36 inch	Corrugated HDPE (Smooth)	0.012	492.00	503.40	197.00	0.0579	0.0553	43.12	173.81	20.40	33.9	494.64	10.90	505.54	509.00
15	DMH A-3										43.12				505.54	0.70	506.23	509.00
16	P A4-A3	1	36 inch	Corrugated HDPE (Smooth)	0.012	503.40	520.30	270.00	0.0626	0.0587	30.17	180.77	18.97	27.6	506.23	15.85	522.08	529.00
17	DMH A-4										30.17				522.08	1.11	523.19	529.00
18	P HW-A4	1	36 inch	Corrugated HDPE (Smooth)	0.012	524.00	526.50	56.00	0.0446	0.0578	29.33	152.66	16.67	29.7	525.02	3.24	528.25	530.50
19	HW A										29.33				528.25	0.00	528.25	530.50
20	P B1-A3	1	18 inch	Corrugated HDPE (Smooth)	0.012	503.40	509.90	73.00	0.0890	0.0687	12.95	33.95	17.92	42.8	506.23	5.01	511.25	517.35
21	DMH B-1										12.95				511.25	0.65	511.90	517.35
22	P B2-B1	1	18 inch	Corrugated HDPE (Smooth)	0.012	509.90	511.90	100.00	0.0200	0.0127	10.90	16.09	9.78	60.3	511.90	1.27	513.17	516.80
23	DI B-2										10.90				513.17	1.09	514.26	516.80
24	P B3-B2	1	18 inch	Corrugated HDPE (Smooth)	0.012	511.90	512.40	26.00	0.0192	0.0000	0.32	15.78	0.18	9.9	514.26	0.00	514.26	517.10
25	DI B-3										0.32				514.26	0.00	514.26	517.10
26	P E1-B2	1	18 inch	Corrugated HDPE (Smooth)	0.012	513.30	514.10	55.00	0.0145	0.0191	8.90	13.72	8.26	58.6	514.20	1.05	515.25	517.76
27	DI E-1										8.90				515.25	0.87	516.12	517.76
28	P E2-E1	1	18 inch	Corrugated HDPE (Smooth)	0.012	514.10	514.50	26.00	0.0154	0.0028	6.04	14.11	3.42	45.7	516.12	0.07	516.19	518.05
29	DI E-2										6.04				516.19	0.00	516.19	518.05
30	P C1-B1	1	18 inch	Corrugated HDPE (Smooth)	0.012	511.50	513.00	45.00	0.0333	0.0383	2.05	20.78	7.49	21.2	511.82	1.72	513.54	518.10
31	DI C-1										2.05				513.54	0.00	513.54	518.10
32	P D1-A4	1	18 inch	Corrugated HDPE (Smooth)	0.012	520.30	521.50	119.00	0.0101	0.0001	0.84	11.43	0.48	18.3	523.19	0.01	523.20	525.90
33	DI D-1										0.84				523.20	0.00	523.20	525.90

## Culvert Calculator Report

### Existing 36" W. Alu Rd. Culvert

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	562.00 ft	Headwater Depth/Height	0.92
Computed Headwater Elev.	560.36 ft	Discharge	27.80 cfs
Inlet Control HW Elev.	560.12 ft	Tailwater Elevation	0.00 ft
Outlet Control HW Elev.	560.36 ft	Control Type	Entrance Control

Grades			
Upstream Invert	557.61 ft	Downstream Invert	556.67 ft
Length	35.00 ft	Constructed Slope	0.026857 ft/ft

Hydraulic Profile			
Profile	S2	Depth, Downstream	1.19 ft
Slope Type	Steep	Normal Depth	1.03 ft
Flow Regime	Supercritical	Critical Depth	1.71 ft
Velocity Downstream	10.62 ft/s	Critical Slope	0.004558 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.013
Section Material	Concrete	Span	3.00 ft
Section Size	36 inch	Rise	3.00 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev.	560.36 ft	Upstream Velocity Head	0.70 ft
Ke	0.50	Entrance Loss	0.35 ft

Inlet Control Properties			
Inlet Control HW Elev.	560.12 ft	Flow Control	Unsubmerged
Inlet Type	Square edge w/headwall	Area Full	7.1 ft <sup>2</sup>
K	0.00980	HDS 5 Chart	1
M	2.00000	HDS 5 Scale	1
C	0.03980	Equation Form	1
Y	0.67000		

## Culvert Calculator Report Proposed 36" Onsite Headwall

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	529.50 ft	Headwater Depth/Height	0.95
Computed Headwater Elev.	529.34 ft	Discharge	29.33 cfs
Inlet Control HW Elev.	529.09 ft	Tailwater Elevation	0.00 ft
Outlet Control HW Elev.	529.34 ft	Control Type	Entrance Control

Grades			
Upstream Invert	526.50 ft	Downstream Invert	524.25 ft
Length	60.00 ft	Constructed Slope	0.037500 ft/ft

Hydraulic Profile			
Profile	S2	Depth, Downstream	1.07 ft
Slope Type	Steep	Normal Depth	0.97 ft
Flow Regime	Supercritical	Critical Depth	1.75 ft
Velocity Downstream	12.94 ft/s	Critical Slope	0.004642 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.013
Section Material	Concrete	Span	3.00 ft
Section Size	36 inch	Rise	3.00 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev.	529.34 ft	Upstream Velocity Head	0.73 ft
Ke	0.50	Entrance Loss	0.36 ft

Inlet Control Properties			
Inlet Control HW Elev.	529.09 ft	Flow Control	Unsubmerged
Inlet Type	Square edge w/headwall	Area Full	7.1 ft <sup>2</sup>
K	0.00980	HDS 5 Chart	1
M	2.00000	HDS 5 Scale	1
C	0.03980	Equation Form	1
Y	0.67000		







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# APPENDIX C

## Water Quality Calculations

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## APPENDIX C

### WATER QUALITY CALCULATIONS

Page 1

#### A. Description:

The project is located within the Kehalani Mauka master planned area. As part of the Drainage Master Plan for Kehalani Mauka, a large offsite retention basin was constructed roughly 2 miles southeast of the project site, along Waiale Road. The basin, known as Waikapu Retention Basin, is designed to completely retain the 100-year, 24-hour runoff from the fully developed Kehalani Mauka development area.

Waikapu Retention Basin has a storage volume of 490 ac-ft without any low-flow outlet. Stormwater will be completely retained, thereby capturing all suspended solids and allowing them to settle out. The captured stormwater will then infiltrate into the soils and recharge groundwater. The practice of extended detention is recognized by the County of Maui as an acceptable Water Quality BMP.

Reference: Department of Public Works & Waste Management, County of Maui, *Rules for the Design of Storm Water Treatment Best Management Practices*, Title MC-15, Subtitle 01, Chapter 111.

#### B. Determine Water Quality Design Volume (WQDV):

$$WQDV = C \times P \times A \times 3630$$

WQDV = Water Quality Design Volume (cf)

C = Runoff Coefficient

P = Design Storm for Water Quality

A = Drainage Area (acres)

3630 = Conversion Factor = (43,560 ft<sup>2</sup>/ac) (1ft/12in)

Next Determine runoff coefficient, C:

$$C = 0.05 + (0.009 \times IMP)$$

IMP = Percent Impervious Area Within Drainage Area

Impervious Area on Site = 1.061 ac

Total Site Area = 2.251 ac

$$IMP = (1.061 \text{ ac} / 2.251 \text{ ac}) = 47.1\%$$

$$C = 0.05 + (0.009 \times 47.1)$$

$$C = 0.47$$

Next calculated required WQDV for site:

$$WQDV = (0.47) (1.00 \text{ in}) (2.251 \text{ ac}) (3630)$$

$$WQDV = 3,840 \text{ cf}$$

#### Summary of Required Water Quality Volume:

Drainage Area	IMP (ac)	IMP %	C	P (in)	A (ac)	Factor	WQDV (cf)	WQDV (ac-ft)
Onsite	1.061	47.1	0.47	1.00	2.251	3630	3,840	0.088
Offsite	0.634	3.3	0.08	1.00	18.966	3630	5,508	0.126
<b>Total</b>								<b>0.215</b>

Notes: Gravel/ Bare soil counted as impervious surface.

C. Design System:

1. Check Water Quality Volume at Basin

Total WQDV Required = 0.215 ac-ft

Total WQDV Provided at Waikapu Basin = 490.00 ac-ft

**Adequate treatment volume is provided.**

Since the existing Waikapu Retention Basin has capacity to retain the 100-year 24-hour storm runoff, it therefore has capacity to store the lesser 1-inch water quality storm.

**Additional Information:** The Dam Safety Division of the DLNR is requiring the owner to install submersible outflow pumps at the basin as a safety measure. As of November 2014, the plan for the pumps is being reviewed by DLNR and the pumps have not been installed yet. However, even after the future pumps are installed, the basin will still provide sufficient storage for the water quality volume.

The retention basin bottom invert is 270 ft. The first pump will not turn on until the water surface reaches an elevation of 280 ft. At elevation 280 ft the basin has a cumulative storage capacity of 89.488 acre-feet, which is still sufficient for 100% retention of the water quality storm runoff from the entire Kehalani Mauka Development and its contributing offsite areas.

**FORM B**



**COUNTY OF MAUI**  
**DEPARTMENT OF PUBLIC WORKS**  
**DEVELOPMENT SERVICES ADMINISTRATION**  
**250 SOUTH HIGH STREET**  
**WAILUKU, HAWAII 96793**  
**Ph: (808)270-7242 Fax: (808)270-7972 Inspector: (808)270-7366**

**STORMWATER RUNOFF  
CONTROL PRACTICES AND  
MAINTENANCE PLAN**

<b>INTRODUCTION</b>		
Increases in impervious surfaces associated with development can increase runoff, degrade water quality, and negatively impact streams, coastal waters, and other water bodies. The best way to mitigate these impacts is to treat, infiltrate, or store runoff onsite before it can impact water bodies downstream.		
This General Permit allows the permit holder to construct the proposed project, subject to special conditions and requirements to mitigate stormwater impacts due to development.		
<b>OWNER/PERMITTEE INFORMATION</b>		
Project Name:	Iao Surface Water Treatment Plant Upgrades	
Address:	No assigned address	
Tax Map Key:	(2) 3-5-001: 067 (POR.), (2) 3-5-001: 091 (POR.)	
Permit No.:		
Facility Contact Name:	County of Maui Department of Water Supply	
Phone Number:	(808) 270-7730	
E-Mail:	Water.Supply@co.maui.hi.us	
<b>REQUIRED BEST MANAGEMENT PRACTICES</b>		
To the maximum extent feasible, runoff from paved areas and other impervious surfaces, roof drains, and other onsite drainage systems shall not be allowed to directly drain into the street, gutter, storm drain, or drainage ditch, or any stream, creek, or other body of water. Rather runoff shall be directed to vegetated areas, gravel or sand pits, retention ponds, vegetated swale, tree wells, planter areas, porous pavements, or other treatment devices.		
<b>TREATMENT CONTROL MEASURES</b>		
<input checked="" type="checkbox"/> Detention Basin	<input type="checkbox"/> Bioretention	<input type="checkbox"/> Pre-fabricated Treatment Device
<input type="checkbox"/> Infiltration Basin/Trench	<input type="checkbox"/> Vegetated Swale	<input type="checkbox"/> Porous Pavement
<input type="checkbox"/> Sand Filter	<input type="checkbox"/> Vegetated Filter Strip	<input type="checkbox"/> Subsurface Drainage System
<input type="checkbox"/> Other		
<p>Note: The Existing Waikapu Retention Basin adjacent to Waiale Road provides treatment and storage for a large portion of the Kehalani Development Master Plan area, which this project is a part of. The WQDV and the 100-year storm are completely retained in the basin.</p> <ul style="list-style-type: none"> <li>• Attach appropriate checksheet.</li> <li>• 8-1/2x11 exhibit showing location and size of the treatment control measure shall be provided.</li> </ul>		
<b>MAINTENANCE REQUIREMENT</b>		
<ul style="list-style-type: none"> <li>• Property owner shall provide adequate long term maintenance to ensure that all storm water control facilities remain in proper working condition.</li> <li>• County representatives are authorized to enter the property at reasonable times and in a reasonable manner for the purpose of inspecting the facilities.</li> <li>• Appropriate maintenance checklists are attached.</li> </ul>		
<b>OWNER'S CERTIFICATION</b>		
<ul style="list-style-type: none"> <li>• The site shall be developed and maintained in accordance with all provisions of this plan.</li> <li>• Compliance with the provisions of this plan shall remain as a condition of the associated building permit or subdivision approval in perpetuity and shall run with the land unless otherwise released in writing by the County of Maui.</li> </ul>		
Name	Signature	Date

**STORMWATER POST-DEVELOPMENT  
CONTROL MEASURE MAINTENANCE  
CHECK LIST FOR:**



**COUNTY OF MAUI**

**DETENTION BASIN**

**MAINTENANCE REQUIREMENTS**

Maintenance Activity	Schedule
Reconstruct or replace facility when it no longer functions properly.	As needed
Ensure that appropriate site runoff continues to flow to facility.	Annual
Assess overall operation of facility and make necessary repairs.	Annual
Inspect, clean, and repair all pretreatment areas.	Annual, After major storms
Maintain establishment of vegetation and replant bare areas.	Annual
Remove unwanted trees, brush, and weeds.	Annual
Repair inlet and outlet structures, overflow, low flow channels, and any other structures.	Annual, After major storms
Remove trash and debris.	Annual, After major storms
Repair erosion and other damage.	Annual, After major storms
Remove sediment from main basin	When 50% of original volume has been lost
Other:	





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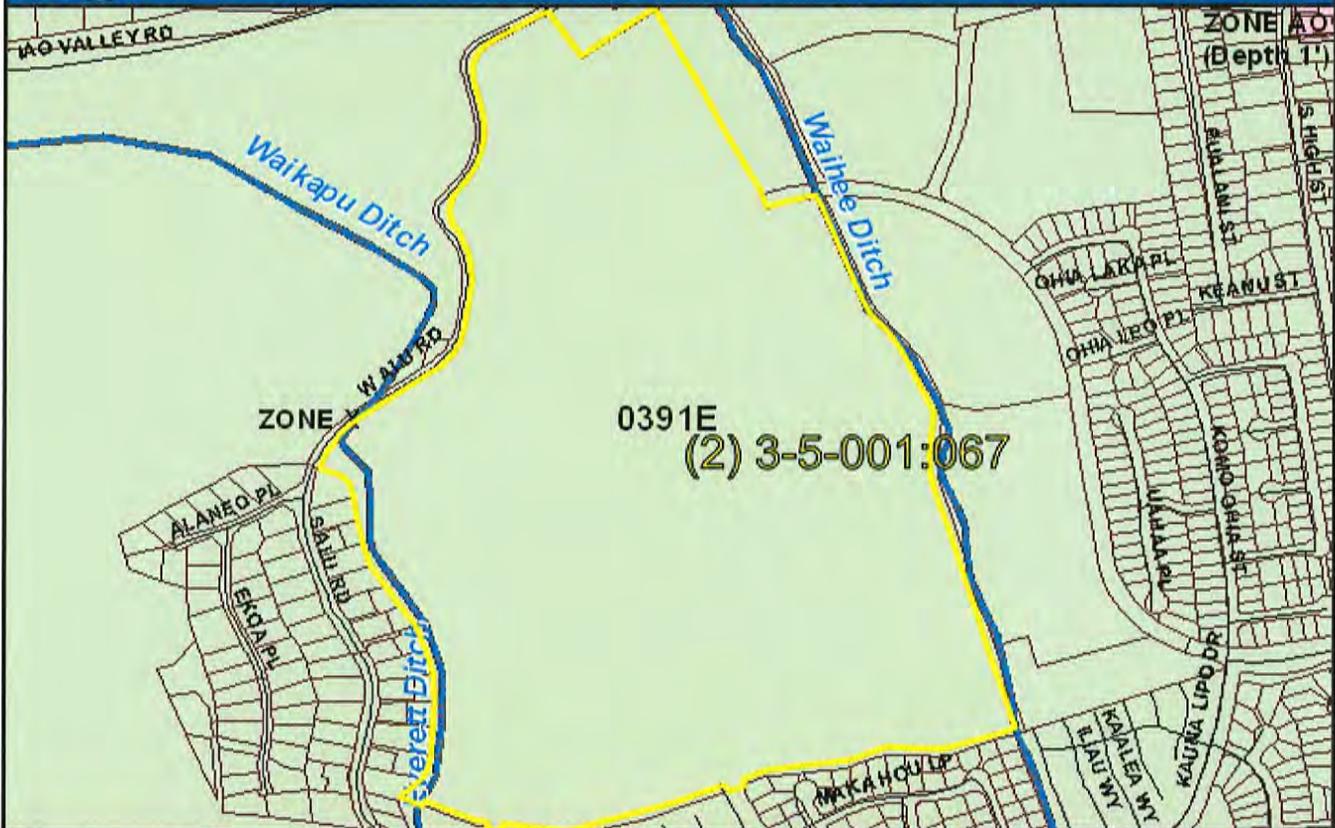
# APPENDIX D

## Flood Hazard Assessment Report

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# State of Hawaii FLOOD HAZARD ASSESSMENT REPORT



## NATIONAL FLOOD INSURANCE PROGRAM

### FLOOD ZONE DEFINITIONS

**SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD** – The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zone A, AE, AH, AO, V, and VE. The Base Flood Elevation (BFE) is the water-surface elevation of the 1% annual chance flood. Mandatory flood insurance purchase applies in these zones:

- Zone A:** No BFE determined.
- Zone AE:** BFE determined.
- Zone AH:** Flood depths of 1 to 3 feet (usually areas of ponding); BFE determined.
- Zone AO:** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined.
- Zone V:** Coastal flood zone with velocity hazard (wave action); no BFE determined.
- Zone VE:** Coastal flood zone with velocity hazard (wave action); BFE determined.
- Zone AEF:** Floodway areas in Zone AE. The floodway is the channel of stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without increasing the BFE.

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

- Zone XS (X shaded):** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
- Zone X:** Areas determined to be outside the 0.2% annual chance floodplain.

### OTHER FLOOD AREAS

- Zone D:** Unstudied areas where flood hazards are undetermined, but flooding is possible. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

### PROPERTY INFORMATION

<b>COUNTY:</b>	MAUI
<b>TMK NO:</b>	(2) 3-5-001-067
<b>PARCEL ADDRESS:</b>	S ALU RD WAILUKU, HI 96793
<b>FIRM INDEX DATE:</b>	SEPTEMBER 19, 2012
<b>LETTER OF MAP CHANGE(S):</b>	NONE
<b>FEMA FIRM PANEL(S):</b>	1500030391E
<b>PANEL EFFECTIVE DATE:</b>	SEPTEMBER 25, 2009

<b>PARCEL DATA FROM:</b>	JULY 2013
<b>IMAGERY DATA FROM:</b>	MAY 2005

### IMPORTANT PHONE NUMBERS

<u>County NFIP Coordinator</u>	
County of Maui	
Carolyn Cortez	(808) 270-7253
<u>State NFIP Coordinator</u>	
Carol Tyau-Beam, P.E., CFM	(808) 587-0267

*Disclaimer: The Department of Land and Natural Resources (DLNR) assumes no responsibility arising from the use of the information contained in this report. Viewers/Users are responsible for verifying the accuracy of the information and agree to indemnify the DLNR from any liability, which may arise from its use.*

*If this map has been identified as 'PRELIMINARY' or 'UNOFFICIAL', please note that it is being provided for informational purposes and is not to be used for official/legal decisions, regulatory compliance, or flood insurance rating. Contact your county NFIP coordinator for flood zone determinations to be used for compliance with local floodplain management regulations.*

# **APPENDIX C.**

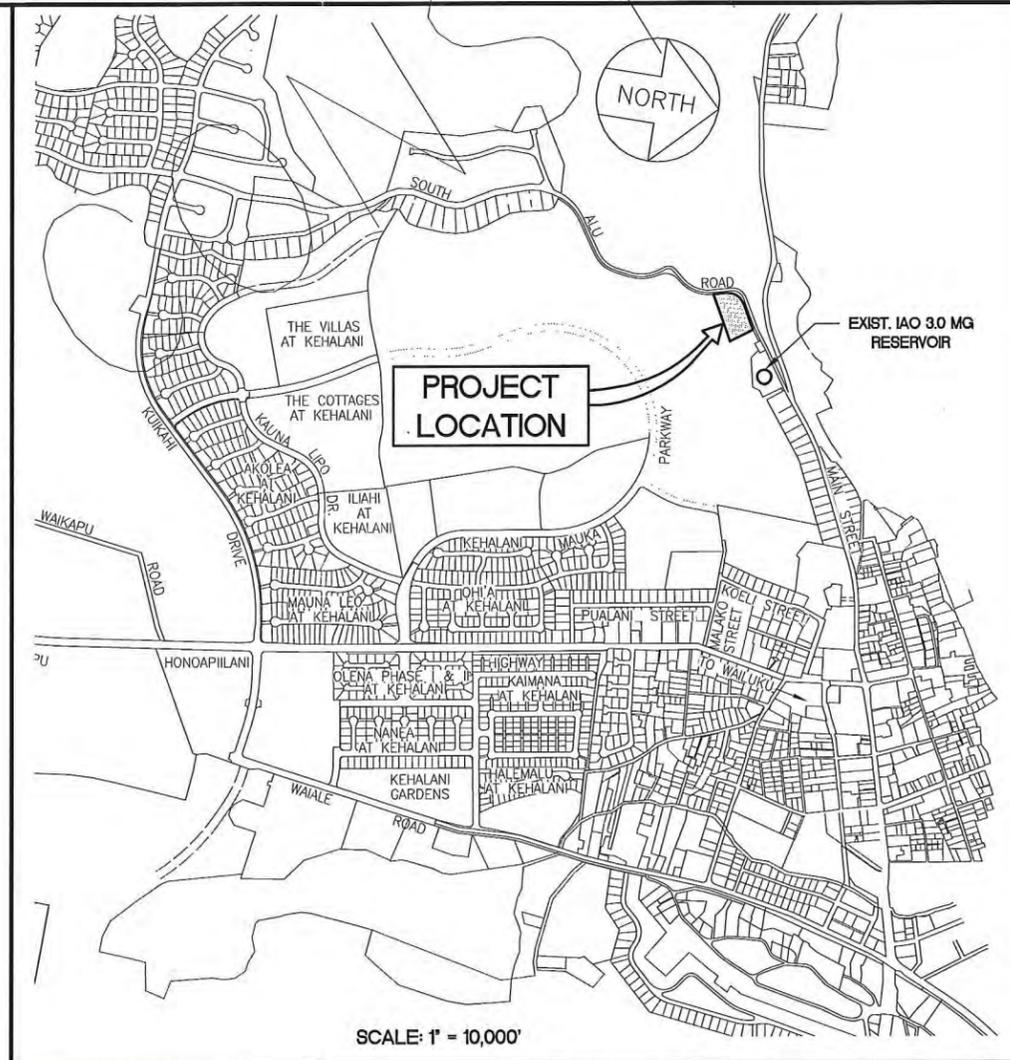
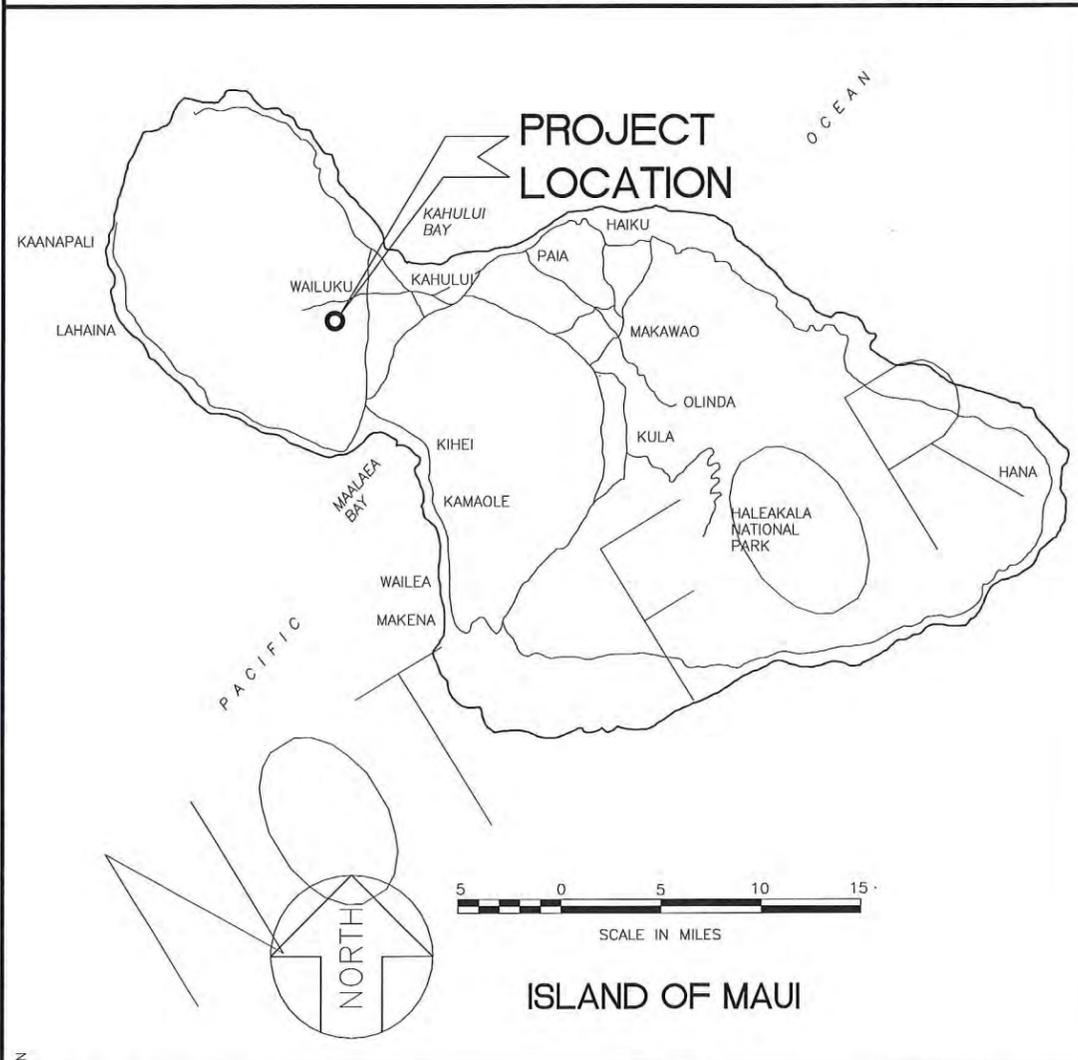
## **Preliminary Plans**

DEPARTMENT OF WATER SUPPLY  
 COUNTY OF MAUI  
 WAILUKU, MAUI, HAWAII  
**IAO SURFACE WATER TREATMENT PLANT UPGRADES**  
 DWS JOB NO. 12-03  
 IAO, MAUI, HAWAII  
 TAX MAP KEY: (2) 3-5-001:067 (PORTION) AND 091 (PORTION)

FOR PRODUCTION

PROJECT LOCATION MAP

APPROVED



\_\_\_\_\_  
 CHIEF, ENVIRONMENTAL MANAGEMENT DIVISION  
 DEPARTMENT OF HEALTH, STATE OF HAWAII

DATE

\_\_\_\_\_  
 DIRECTOR, DEPARTMENT OF WATER SUPPLY  
 COUNTY OF MAUI

DATE

\_\_\_\_\_  
 COUNTY ENGINEER, DEPARTMENT OF PUBLIC WORKS  
 COUNTY OF MAUI

DATE

Y:\2013\13-002\DESIGN\DRAWINGS\T-1 - TITLE SHEET.DWG Feb 03, 2015 - 2:54 PM

FILE	POCKET	FOLDER	NO.
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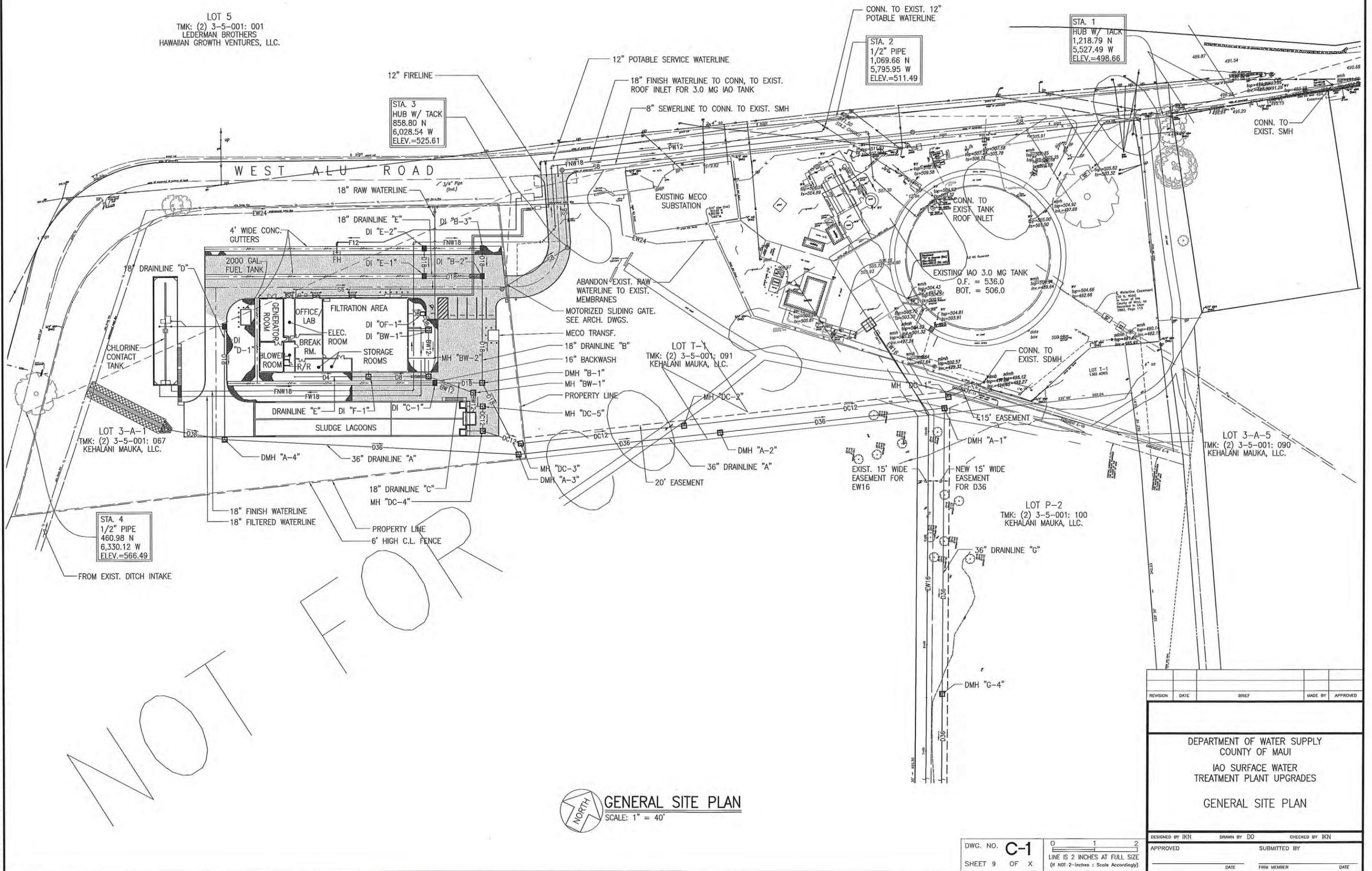
LOT 5  
 TMK: (2) 3-5-001: 001  
 LEDERMAN BROTHERS  
 HAWAIIAN GROWTH VENTURES, LLC.

STA. 3  
 HUB W/ TACK  
 858.80 N  
 6,028.54 W  
 ELEV.=525.61

STA. 2  
 1/2" PIPE  
 1,069.66 N  
 5,795.95 W  
 ELEV.=511.49

STA. 1  
 HUB W/ TACK  
 1,218.79 N  
 5,527.49 W  
 ELEV.=498.66

STA. 4  
 1/2" PIPE  
 460.98 N  
 6,330.12 W  
 ELEV.=566.49



FN:\2013\13-002\DESIGN\DRAWINGS\C-1 - GENERAL SITE PLAN.DWG Feb 03, 2015-3:00 PM

NOT FOR

**GENERAL SITE PLAN**  
 SCALE: 1" = 40'

REVISION	DATE	BREF	MADE BY	APPROVED

DEPARTMENT OF WATER SUPPLY  
 COUNTY OF MAUI  
 IAO SURFACE WATER  
 TREATMENT PLANT UPGRADES  
 GENERAL SITE PLAN

DESIGNED BY IKN	DRAWN BY DO	CHECKED BY IKN
APPROVED	SUBMITTED BY	

DWG. NO. **C-1**  
 SHEET 9 OF X  
 LINE IS 2 INCHES AT FULL SIZE  
 (IF NOT 2-INCHES : Scale Accordingly)

LOT 5  
 TMK: (2) 3-5-001: 001  
 LEDERMAN BROTHERS  
 HAWAIIAN GROWTH VENTURES, LLC.

STA. 3  
 HUB W/ TACK  
 858.80 N  
 6,028.54 W  
 ELEV.=525.61

WEST ALU ROAD

LOT 3-A-1  
 TMK: (2) 3-5-001: 067  
 KEHALANI MAUKA, LLC.

LOT T-1  
 TMK: (2) 3-5-001: 091  
 KEHALANI MAUKA, LLC.

Curve #	Δ	Δ/2	R	T	Ch	Lc
①	93°58'39"	46°59'20"	40.00'	42.88	58.50'	65.61'

**WTP SITE PLAN**  
 SCALE: 1" = 20'

DWG. NO. **C-2**  
 SHEET 10 OF X  
 LINE IS 2 INCHES AT FULL SIZE  
 (IF NOT 2-INCHES : SCALE ACCORDINGLY)

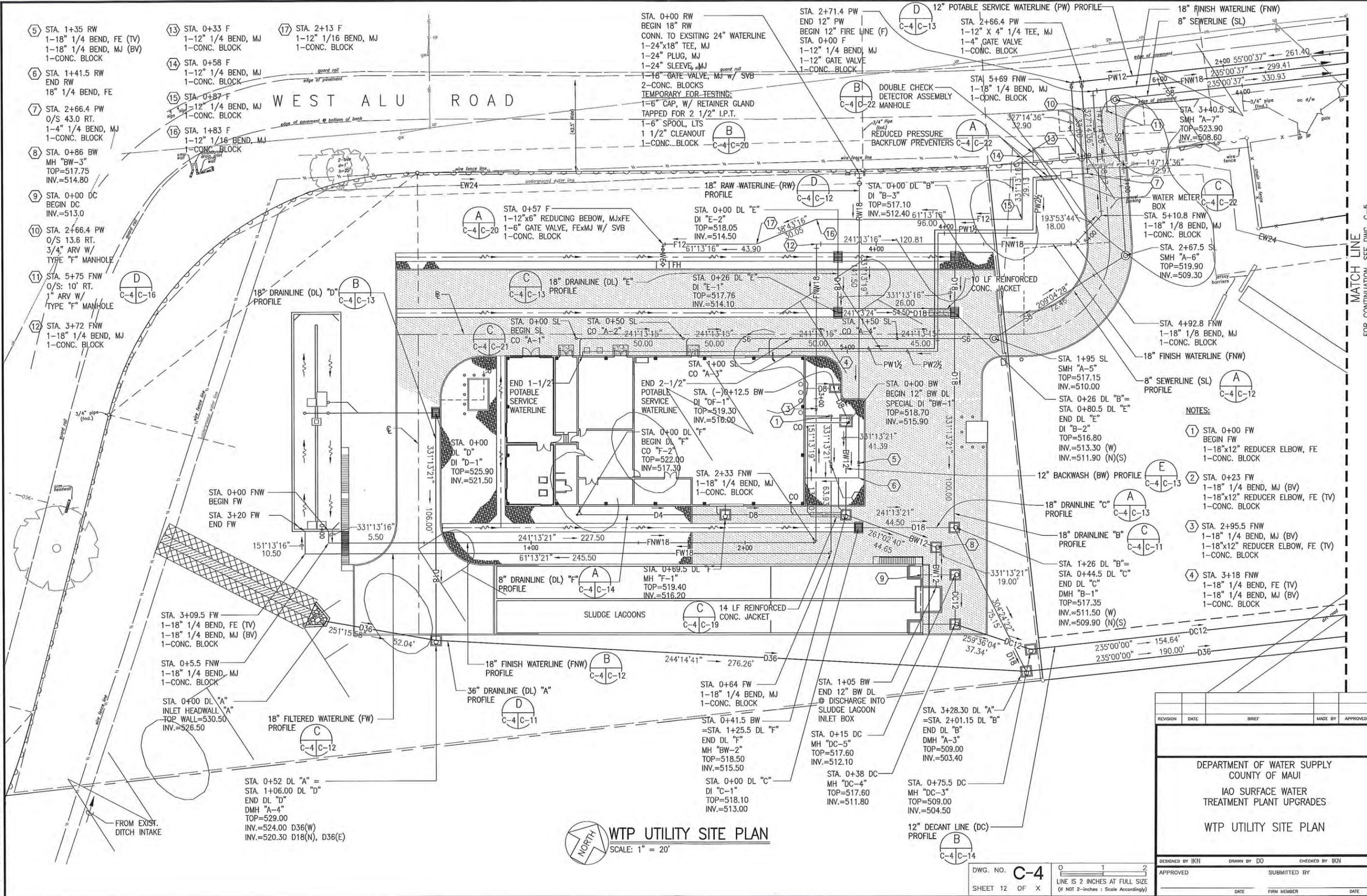
REVISION	DATE	BREF	MADE BY	APPROVED	
DEPARTMENT OF WATER SUPPLY COUNTY OF MAUI IAO SURFACE WATER TREATMENT PLANT UPGRADES WTP SITE PLAN					
DESIGNED BY	IKN	DRAWN BY	DO	CHECKED BY	IKN
APPROVED		SUBMITTED BY			
	DATE	FIRM MEMBER		DATE	

F:\Y:\2013\13-002\DESIGN\DRAWINGS\C-2 - WTP SITE PLANDWG Feb 03, 2015-1:53 PM

MATCH LINE  
 FOR CONTINUATION, SEE DWG. C-3



FN:\2013\13-002\DESIGN\DRAWINGS\C-4 - WTP UTILITY SITE PLAN.DWG Feb 03, 2015 11:57 PM



FOR CONTINUATION, SEE DWG. C-5

REVISION	DATE	BRIEF	MADE BY	APPROVED

DEPARTMENT OF WATER SUPPLY  
COUNTY OF MAUI  
IAO SURFACE WATER  
TREATMENT PLANT UPGRADES  
WTP UTILITY SITE PLAN

DESIGNED BY IKN	DRAWN BY DO	CHECKED BY IKN
APPROVED	SUBMITTED BY	

DWG. NO. **C-4**  
SHEET 12 OF X  
LINE IS 2 INCHES AT FULL SIZE  
(IF NOT 2-INCHES : SCALE ACCORDINGLY)

FN:\2013\13-002\DESIGN\DRAWINGS\C-5 - UTILITY OFF-SITE PLAN.DWG Feb 03, 2015-2:00 PM

MATCH LINE  
FOR CONTINUATION SEE DWG. C-4

STA. 0+00 PW12  
BEGIN 12" PW  
CONN. TO EXISTING 12" WATERLINE  
1-12"x12" TEE, MJ  
2-12" SPOOLS, PE, 12" LONG  
2-12" SLEEVE, MJ  
1-12" GATE VALVE, MJ, W/SVB  
1-CONC. BLOCK  
TEMPORARY FOR TESTING:  
1-12" CAP, W/ RETAINER GLAND  
TAPPED FOR 4" I.P.T.  
1-12" SPOOL, LTS  
4" CLEANOUT  
1-CONC. BLOCK

TMK (2) 3-5-001:001  
LEDERMAN BROTHERS  
HAWAIIAN GROWTH VENTURES, LLC.

STA. 8+68.4 FNW  
1-18" 1/4 BEND, MJ  
1-CONC. BLOCK

STA. 6+71.5 SL  
SMH "A-8"  
TOP=509.20±  
INV.=502.00

STA. 9+21.5 SL  
SMH "A-9"  
TOP=498.10±  
INV.=493.00

STA. 10+68± SL  
END SL  
CONNECT TO EXIST. SMH  
TOP=491.66±  
INV.=488.0

LOT 16-A  
TMK (2) 3-5-008:017  
DENNIS I. HINAHARA

LOT WD-3  
TMK (2) 3-5-001:096  
KEHALANI MAUKA, LLC.

LOT 3-A-5

STA. 5+16± DC12  
CONN. TO EXIST. SDMH  
TOP=497.58±  
INV.=494.50

STA. 4+80 DC12  
MH "DC-1"  
TOP=498.00  
INV.=494.85

STA. 2+30 DC12  
MH "DC-2"  
TOP=501.50  
INV.=497.35

STA. 5+19.30 DL "A"  
DMH "A-2"  
TOP=499.00  
INV.=492.00

STA. 0+00 DL "G"  
=STA. 7+31.30 DL "A"  
END DL "A"  
BEGIN DL "G"  
DMH "A-1"  
TOP=494.50  
INV.=483.80 (IN)  
INV.=481.50 (OUT)

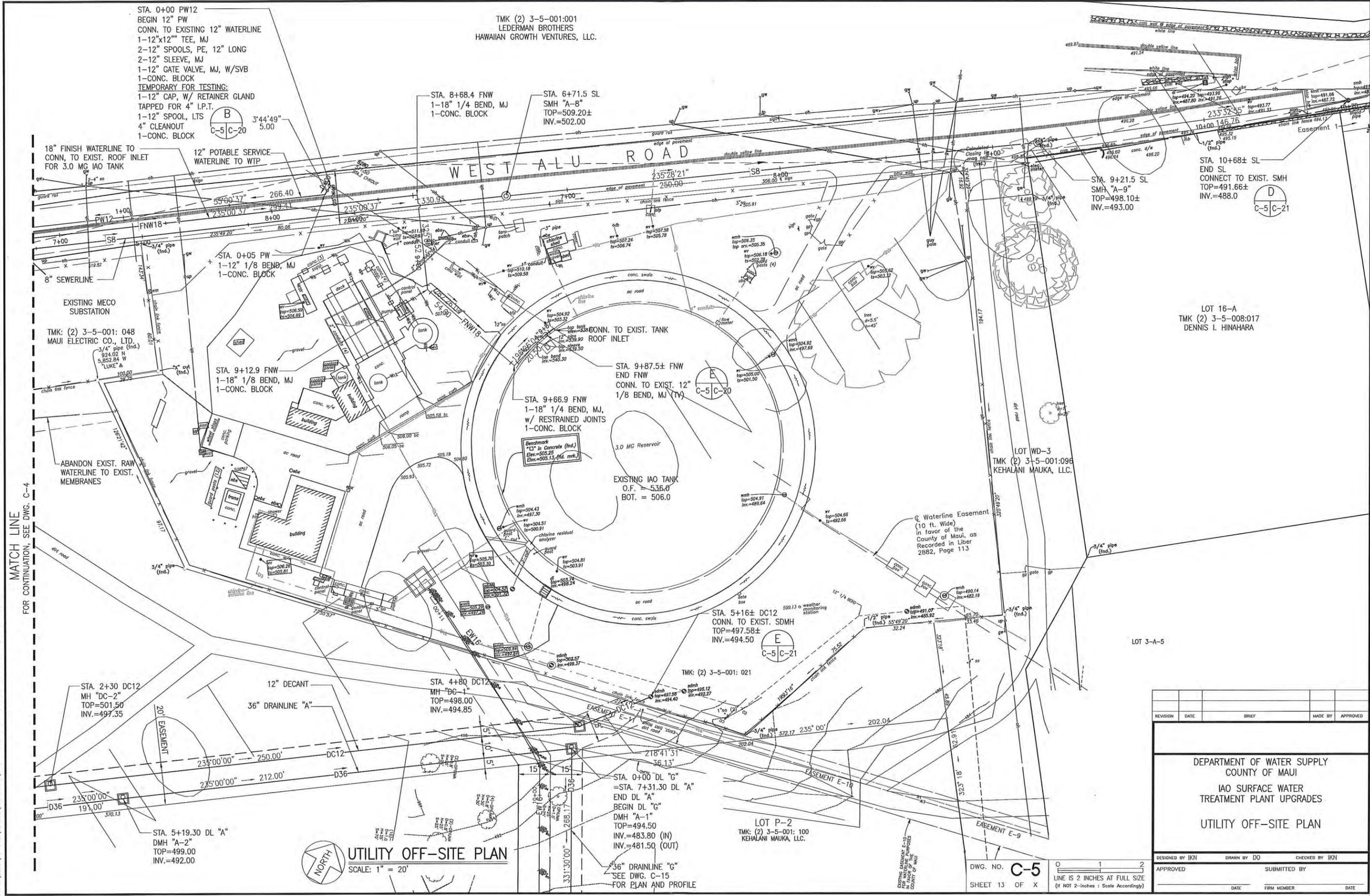
36" DRAINLINE "C"  
SEE DWG. C-15  
FOR PLAN AND PROFILE

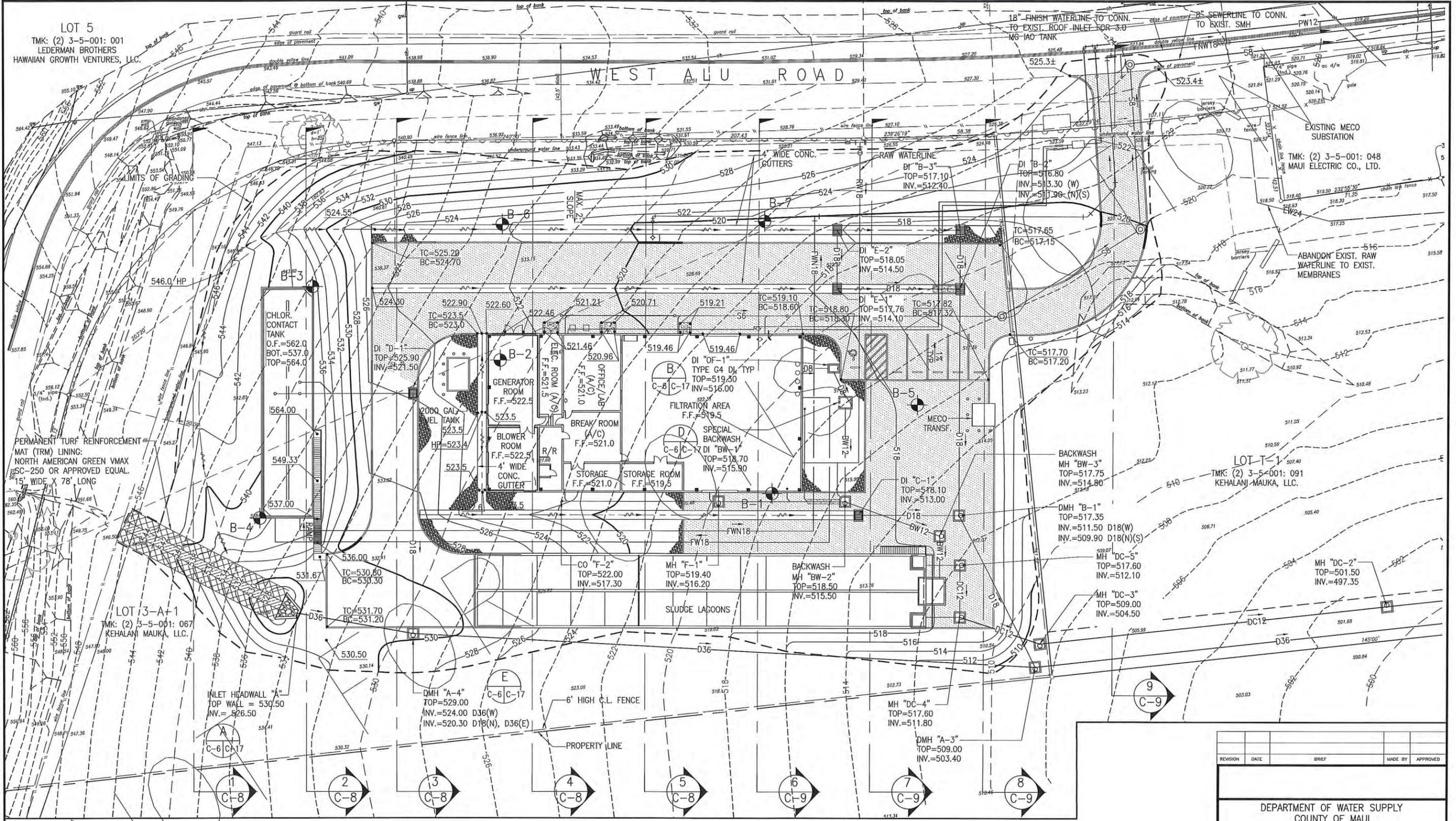
**UTILITY OFF-SITE PLAN**  
SCALE: 1" = 20'



DWG. NO. **C-5**  
SHEET 13 OF X  
LINE IS 2 INCHES AT FULL SIZE  
(IF NOT 2-INCHES : Scale Accordingly)

REVISION	DATE	BRIEF	MADE BY	APPROVED	
DEPARTMENT OF WATER SUPPLY COUNTY OF MAUI IAO SURFACE WATER TREATMENT PLANT UPGRADES UTILITY OFF-SITE PLAN					
DESIGNED BY	IKN	DRAWN BY	DO	CHECKED BY	IKN
APPROVED		SUBMITTED BY			





LOT 5  
 TMK: (2) 3-5-001: 001  
 LEDERMAN BROTHERS  
 HAWAIIAN GROWTH VENTURES, LLC.

EXISTING MECO  
 SUBSTATION  
 TMK: (2) 3-5-001: 048  
 MAUI ELECTRIC CO., LTD.

LOT T-1  
 TMK: (2) 3-5-001: 091  
 KEHALANI MAUKA, LLC.

LOT 3-A-1  
 TMK: (2) 3-5-001: 067  
 KEHALANI MAUKA, LLC.

**EARTHWORK SUMMARY:**

AREA OF CLEARING, GRUBBING,  
 AND GRADING = 2.04 ACRES

TOTAL EXCAVATION = 10,600 C.Y.

TOTAL EMBANKMENT = 1,450 C.Y.

**LEGEND:**

B-1 APPROXIMATE LOCATION OF BORING AND NUMBER  
 (SEE DWG. C-23 FOR BORING LOGS)



**WTP GRADING PLAN**

SCALE: 1" = 20'

REVISION	DATE	BRIEF	MADE BY	APPROVED

DEPARTMENT OF WATER SUPPLY  
 COUNTY OF MAUI  
 IAO SURFACE WATER  
 TREATMENT PLANT UPGRADES

**WTP GRADING PLAN**

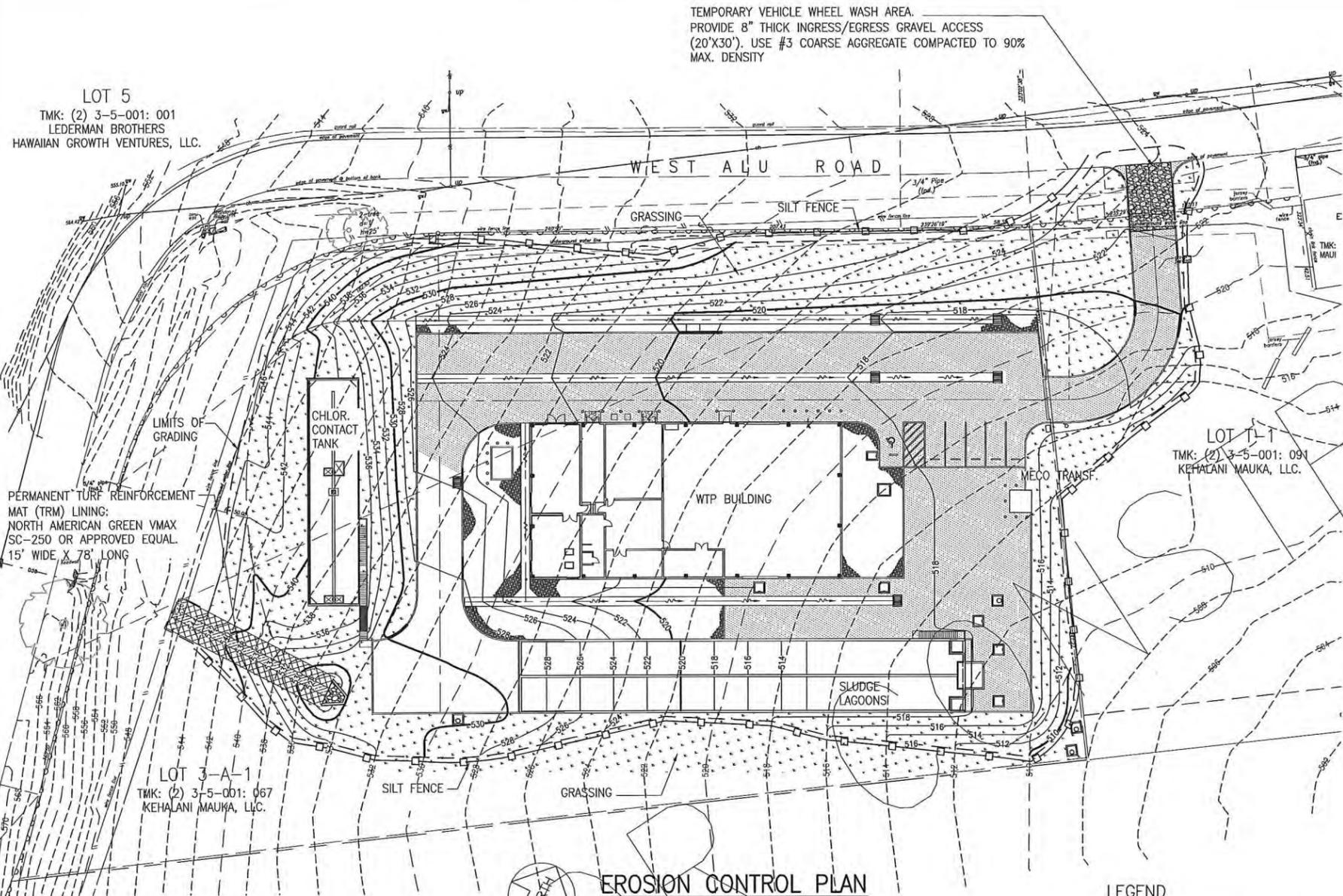
DESIGNED BY IKN    DRAWN BY DO    CHECKED BY IKN  
 APPROVED    SUBMITTED BY

DATE    FIRM MEMBER    DATE

DWG. NO. **C-6**  
 SHEET 14 OF X

0 1 2  
 LINE IS 2 INCHES AT FULL SIZE  
 (IF NOT 2-INCHES : Scale Accordingly)

FN:\Y:\2013\13-002\DESIGN\DRAWINGS\C-6 - WTP GRADING PLAN.DWG Feb 03, 2015-2:01 PM



TEMPORARY VEHICLE WHEEL WASH AREA.  
 PROVIDE 8" THICK INGRESS/EGRESS GRAVEL ACCESS  
 (20'X30'). USE #3 COARSE AGGREGATE COMPACTED TO 90%  
 MAX. DENSITY

LOT 5  
 TMK: (2) 3-5-001: 001  
 LEDERMAN BROTHERS  
 HAWAIIAN GROWTH VENTURES, LLC.

LOT 1-1  
 TMK: (2) 3-5-001: 091  
 KEHALANI MAUKA, LLC.

PERMANENT TURF REINFORCEMENT  
 MAT (TRM) LINING:  
 NORTH AMERICAN GREEN VMAX  
 SC-250 OR APPROVED EQUAL.  
 15' WIDE X 78' LONG

LOT 3-A-1  
 TMK: (2) 3-5-001: 067  
 KEHALANI MAUKA, LLC.

**MINIMUM BEST MANAGEMENT PRACTICES**

**DRAINAGE.** HANDLE TO CONTROL EROSION, PREVENT DAMAGE TO DOWNSTREAM PROPERTIES AND RETURN TO THE NATURAL DRAINAGE COURSE IN A MANNER WHICH MINIMIZES SEDIMENTATION OR OTHER POLLUTION TO THE MAXIMUM EXTENT PRACTICABLE.

**DUST CONTROL.** CONTROL DUST EMISSIONS TO THE MAXIMUM EXTENT PRACTICABLE THROUGH BMP'S SUCH AS WATER SPRINKLING, DUST FENCES, LIMITING AREA OF DISTURBANCE AND TIMELY GRASSING OF FINISHED AREAS.

**VEGETATION.** RETAIN NATURAL VEGETATION, SPECIALLY GRASSES, WHEREVER FEASIBLE. AVOID STORAGE OR GRUBBED MATERIAL NEAR WATERCOURSES.

**EROSION CONTROL.** STABILIZE ALL DISTURBED AREAS WITH EROSION CONTROL MEASURES SUCH AS VEGETATION, RUNOFF DIVERSION, CHECK DAMS, MULCHING, BLANKETS, BONDED FIBER MATRICES, AND VEHICLE WHEEL WASH FACILITIES.

**SEDIMENT CONTROL.** CAPTURE SEDIMENT TRANSPORTED IN RUNOFF TO MINIMIZE THE SEDIMENT FROM LEAVING THE SITE WITH METHODS SUCH AS SEDIMENT BASIN, SEDIMENT TRAPS, SILT FENCES, SAND BAGS, AND VEGETATED FILTER STRIPS.

**MATERIAL AND WASTE MANAGEMENT.** PROPERLY STORE TOXIC MATERIAL AND PREVENT THE DISCHARGE OF POLLUTANTS ASSOCIATED WITH CONSTRUCTION MATERIALS.

**TIMING OF CONTROL MEASURE IMPLEMENTATION.** TIMING OF CONTROL MEASURES SHALL BE IN ACCORDANCE WITH THE APPROVED EROSION CONTROL PLAN. DISTURBED AREAS OF CONSTRUCTION SITES THAT WILL NOT BE REDISTURBED FOR TWENTY-ONE DAYS OR MORE WILL BE STABILIZED (GRASSED OR GRAVELED) BY NO LATER THAN THE FOURTEENTH DAY AFTER THE LAST DISTURBANCE.

**MATting.** INSTALL EROSION CONTROL MATting FOR ALL SLOPES GREATER THAN 3H:1V.

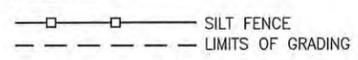
**ADDITIONAL BEST MANAGEMENT PRACTICES (BMP'S):**

1. GRAVEL CONSTRUCTION ENTRANCE FOR EACH INGRESS AND EGRESS.
2. PERIMETER RUNOFF CONTROL.
3. MEASURES TO CONTROL EROSION AND OTHER POLLUTANTS SHALL BE IN PLACE BEFORE ANY EARTH MOVING PHASE OF THE GRADING IS INITIATED.
4. CONTRACTOR SHALL CONSTRUCT PROCESS WATER BASIN TO HAVE PROCESS WATER SUCH AS CHLORINATED WATER, HYDROSTATIC TESTING WATER, WASHWATER AFTER CLEANING CONCRETE TRUCKS, ETC. BE CONTAINED WITHIN THE BASIN AND PERCOLATE INTO THE SOIL.
5. CONTRACTOR AND/OR OWNER SHALL COMPLY WITH CHAPTER 11-55, WATER POLLUTION CONTROL, HAWAII ADMINISTRATION RULES, DEPT. OF HEALTH WHICH REQUIRES AN NPDES PERMIT FOR CERTAIN CONSTRUCTION ACTIVITY.
6. CONTRACTOR SHALL OBTAIN APPROVAL OF A GRADING PHASING PLAN BY THE DEPARTMENT OF PUBLIC WORKS & ENVIRONMENTAL MANAGEMENT PRIOR TO CONSTRUCTION.

**EROSION CONTROL PLAN**

SCALE: 1" = 30'

**LEGEND**

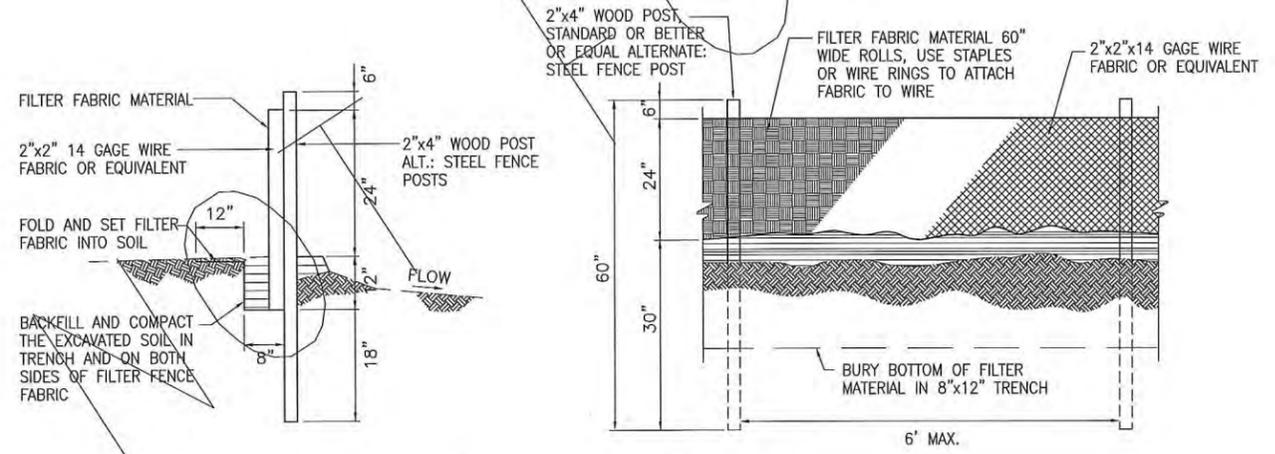


**TEMPORARY EROSION CONTROL MEASURES**

1. TEMPORARY GROUND COVER SHALL BE APPLIED WITHIN A PERIOD OF 30 CALENDAR DAYS AFTER THE SITE HAS BEEN GRADED, OR BARED OF VEGETATION, OR IF FINAL GRADING OF THE SITE WILL BE SUSPENDED FOR MORE THAN 30 CALENDAR DAYS. ALL COST FOR MAINTAINING IRRIGATING AND REMOVING TEMPORARY EROSION CONTROL MEASURES WILL BE BORNE BY THE CONTRACTOR.
2. THE CONTRACTOR MAY USE HYDRO-MULCH TO APPLY THE TEMPORARY GROUND COVER.
3. TEMPORARY GROUND COVER SHALL CONSIST OF 2,000 LBS. PER ACRE WOOD CELLULOSE FIBER MULCH AND 65 LBS. PER ACRE TACKIFIER.

**TEMPORARY DUST CONTROL MEASURES**

1. EXCAVATION, EMBANKMENT AND IMPORTED MATERIALS SHALL BE KEPT DAMPENED WITH WATER DURING THE GRADING OPERATIONS.
2. THE CONTRACTOR SHALL MAINTAIN A SUITABLE WATER SYSTEM AND DAMPEN THE GRADED OR GRUBBED SITE WITH WATER.
3. AT THE END OF EACH DAY, SEVEN (7) DAYS A WEEK, THE PROJECT SITE SHALL BE KEPT DAMP WITH WATER. THE SITE SHALL BE SUFFICIENTLY DAMPENED SO THAT THE SITE WILL REMAIN MOISTENED DURING THE NIGHT.



**SILT FENCE DETAIL A**  
 NOT TO SCALE

REVISION	DATE	BRIEF	MADE BY	APPROVED

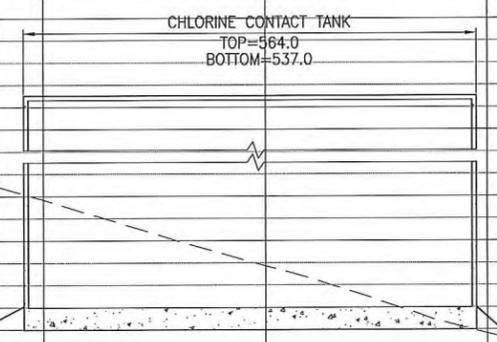
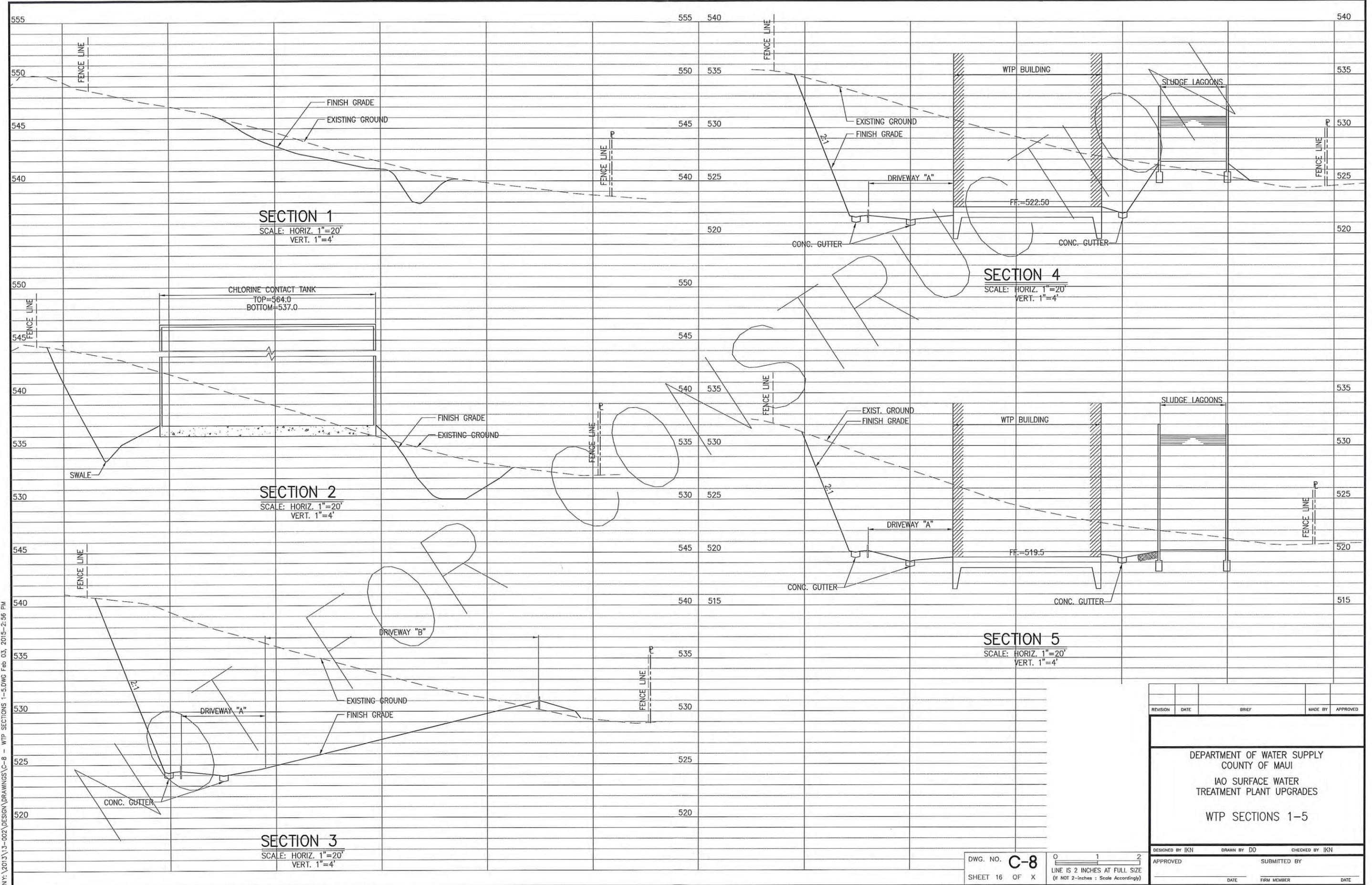
DEPARTMENT OF WATER SUPPLY  
 COUNTY OF MAUI  
 IAO SURFACE WATER  
 TREATMENT PLANT UPGRADES  
**EROSION CONTROL PLAN AND DETAILS**

DESIGNED BY IKN	DRAWN BY DO	CHECKED BY IKN
APPROVED	SUBMITTED BY	

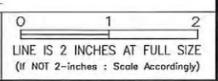
DWG. NO. **C-7**  
 SHEET 15 OF X  
 LINE IS 2 INCHES AT FULL SIZE  
 (IF NOT 2-INCHES : SCALE ACCORDINGLY)

F:\NY\_2013\13-002\DESIGN\DRAWINGS\C-7 - EROSION CONTROL PLAN.DWG Feb 03, 2015-2:03 PM

F:\Y:\2013\13-002\DESIGN\DRAWINGS\C-8 - WTP SECTIONS 1-5.DWG Feb 03, 2015-2:56 PM



DWG. NO. **C-8**  
 SHEET 16 OF X

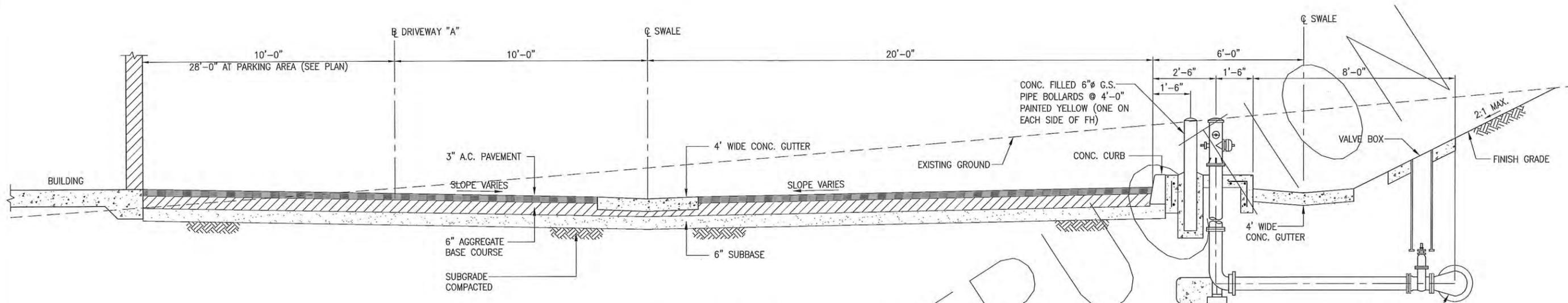


REVISION	DATE	BRIEF	MADE BY	APPROVED

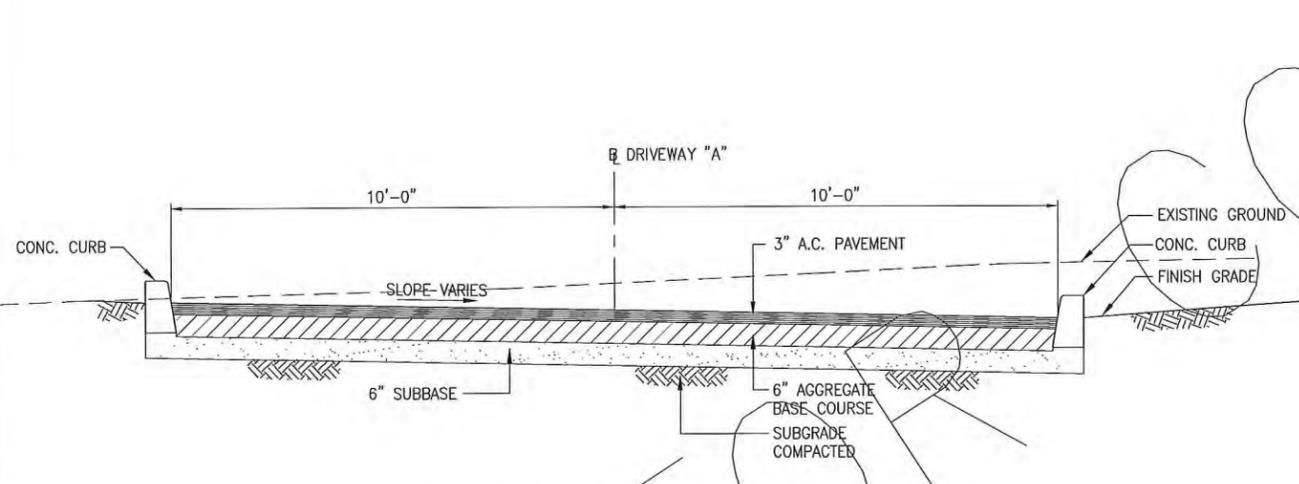
DEPARTMENT OF WATER SUPPLY  
 COUNTY OF MAUI  
 IAO SURFACE WATER  
 TREATMENT PLANT UPGRADES  
 WTP SECTIONS 1-5

DESIGNED BY IKN	DRAWN BY DO	CHECKED BY IKN
APPROVED	SUBMITTED BY	
	DATE	FIRM MEMBER
		DATE

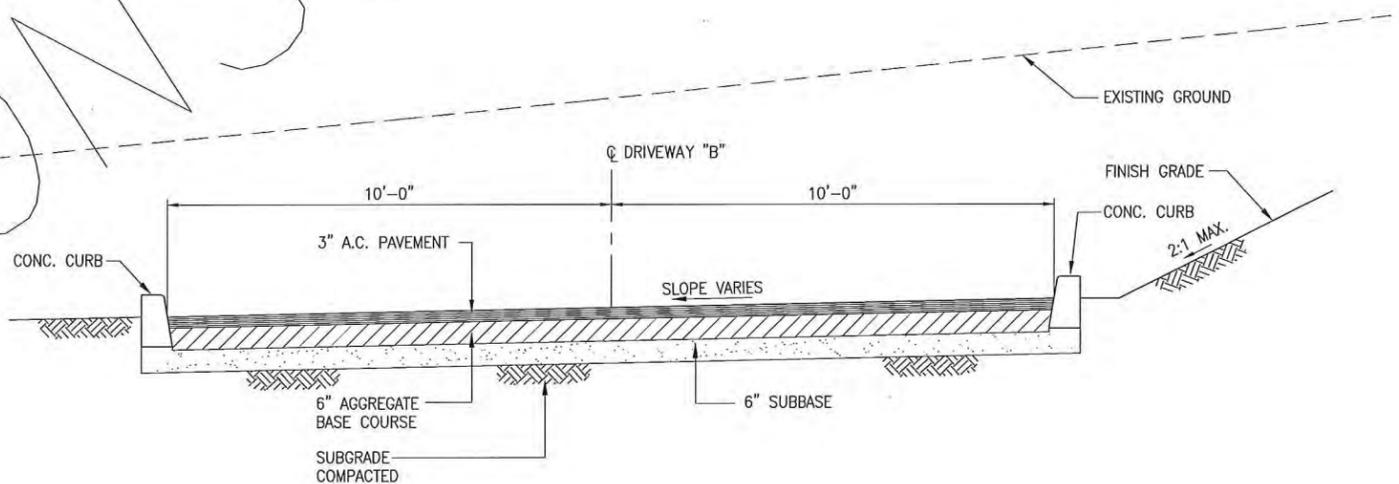




**DRIVEWAY "A" TYPICAL SECTION FROM CHAIN LINK GATE TO END** (A)  
 SCALE: 1/2"=1'-0"  
 C-10



**DRIVEWAY "A" TYPICAL SECTION STA. 0+00 TO CHAIN LINK GATE** (B)  
 SCALE: 1/2"=1'-0"  
 C-10



**DRIVEWAY "B" TYPICAL SECTION** (C)  
 SCALE: 1/2"=1'-0"  
 C-10

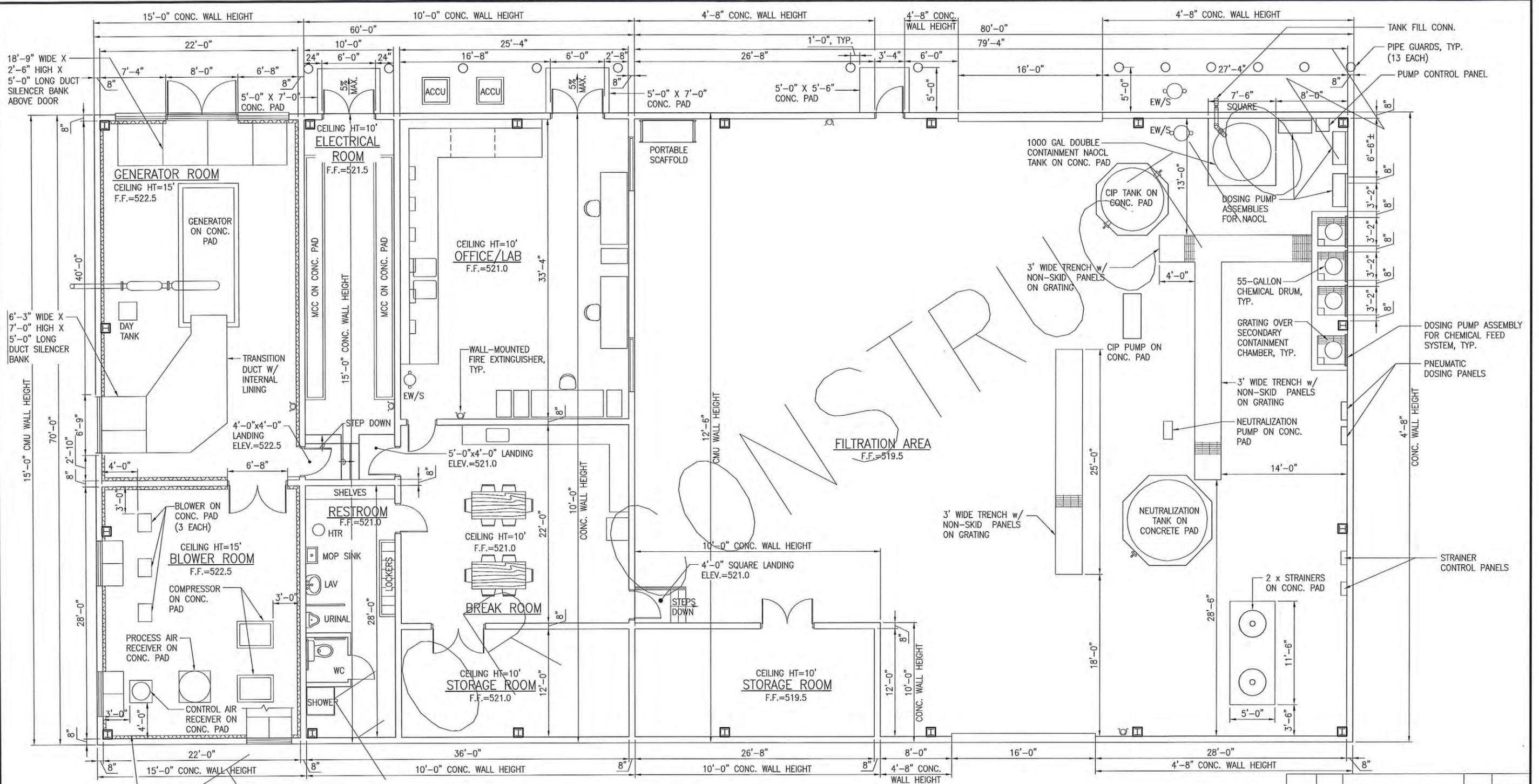
F:\Y:\2013\13-002\DESIGN\DRAWINGS\C-10 - ROAD A AND B TYPICAL SECTIONS.DWG Feb 03, 2015-2:03 PM

NO

REVISION	DATE	BRIEF	MADE BY	APPROVED
DEPARTMENT OF WATER SUPPLY COUNTY OF MAUI IAO SURFACE WATER TREATMENT PLANT UPGRADES  DRIVEWAY "A" AND DRIVEWAY "B" TYPICAL SECTIONS				
DESIGNED BY IKN		DRAWN BY DO		CHECKED BY IKN
APPROVED		SUBMITTED BY		

DWG. NO. **C-10**  
 SHEET X OF X  
 LINE IS 2 INCHES AT FULL SIZE  
 (IF NOT 2-INCHES : SCALE ACCORDINGLY)

F:\NY\_2013\13-002\DESIGN\DRAWINGS\A-1 - PRELIMINARY FLOOR PLAN.DWG Feb 03, 2015-2:08 PM



**NOTE:**  
CONCRETE PAD DIMENSIONS ARE APPROXIMATE AND SUBJECT TO REVISION BASED ON REQUIREMENTS OF EQUIPMENT TO BE FURNISHED



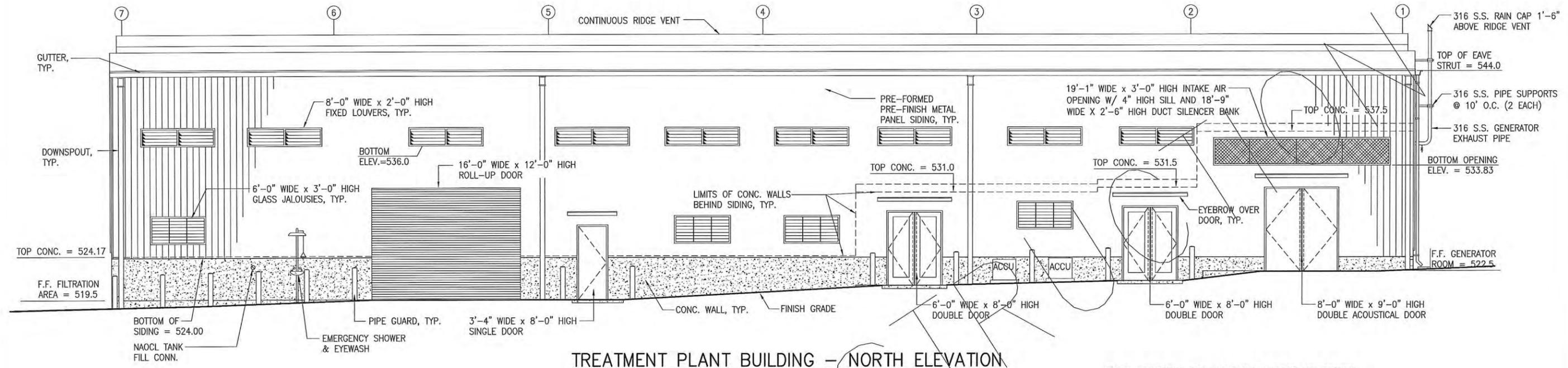
**TREATMENT PLANT BUILDING - PRELIMINARY FLOOR PLAN**  
SCALE: 3/16"=1'-0"

REVISION	DATE	BRIEF	MADE BY	APPROVED

DEPARTMENT OF WATER SUPPLY  
COUNTY OF MAUI  
IAO SURFACE WATER  
TREATMENT PLANT UPGRADES  
TREATMENT PLANT BUILDING  
PRELIMINARY FLOOR PLAN

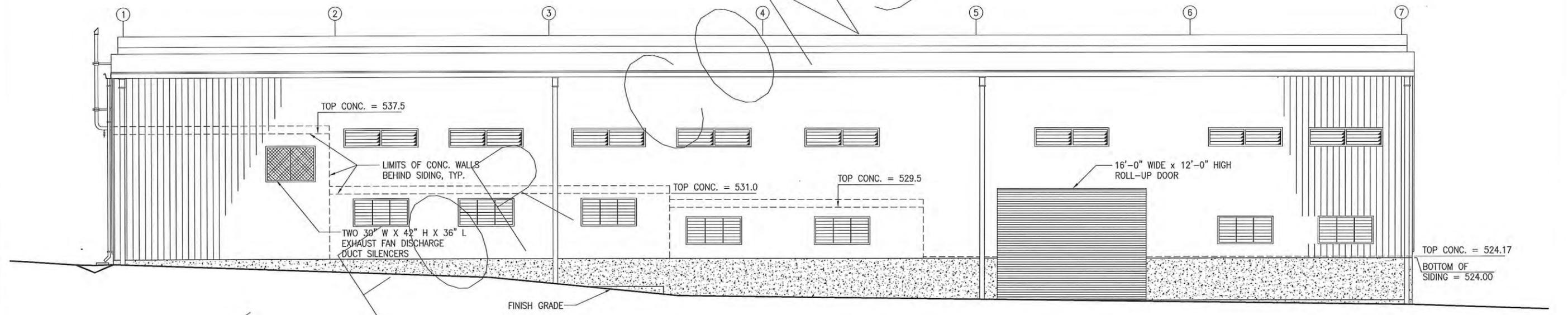
DWG. NO. **A-1**  
SHEET X OF X  
LINE IS 2 INCHES AT FULL SIZE  
(If NOT 2-inches : Scale Accordingly)

DESIGNED BY IKN    DRAWN BY DO    CHECKED BY IKN  
APPROVED \_\_\_\_\_    SUBMITTED BY \_\_\_\_\_  
DATE \_\_\_\_\_    FIRM MEMBER \_\_\_\_\_    DATE \_\_\_\_\_



**TREATMENT PLANT BUILDING – NORTH ELEVATION**  
SCALE: 3/16"=1'-0"

NOTE: DIMENSIONS FOR DOORS AND LOUVERS ARE OPENING SIZES IN CMU WALL/METAL PANEL SIDING.



**TREATMENT PLANT BUILDING – SOUTH ELEVATION**  
SCALE: 3/16"=1'-0"

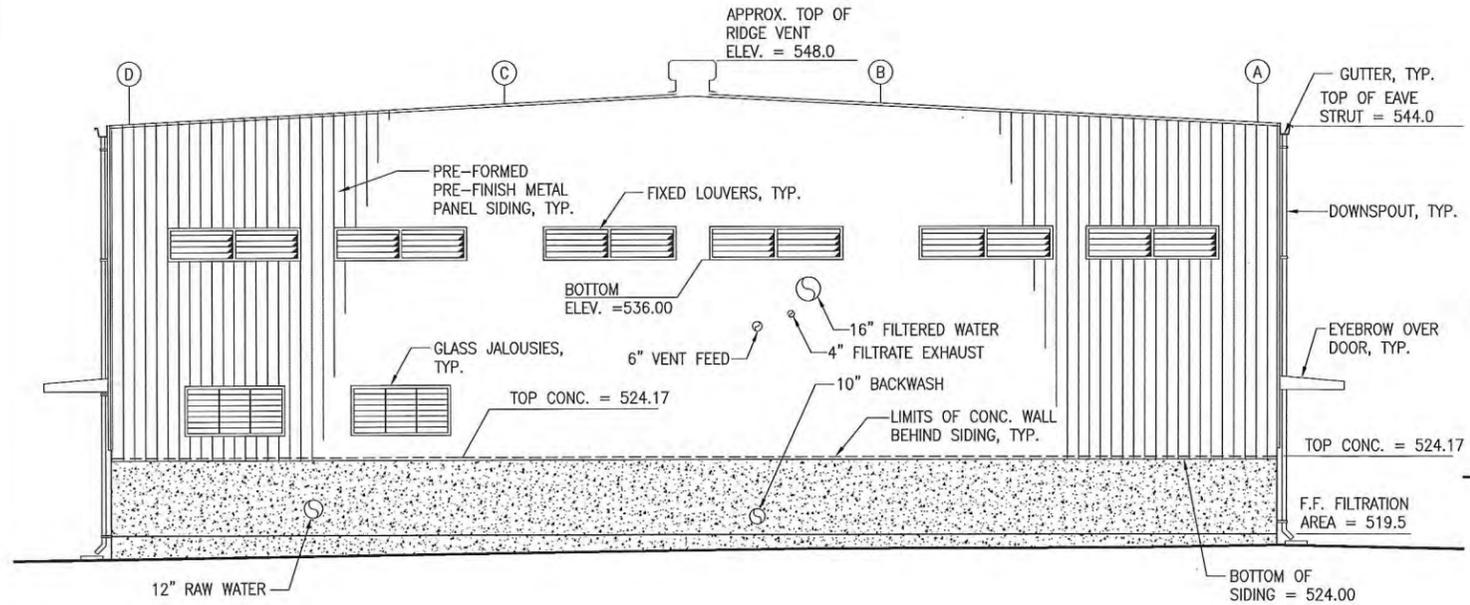
F:\Y:\2013\13-002\DESIGN\DRAWINGS\A-2 - ELEVATIONS.DWG Feb 03, 2015 - 2:38 PM

NOT

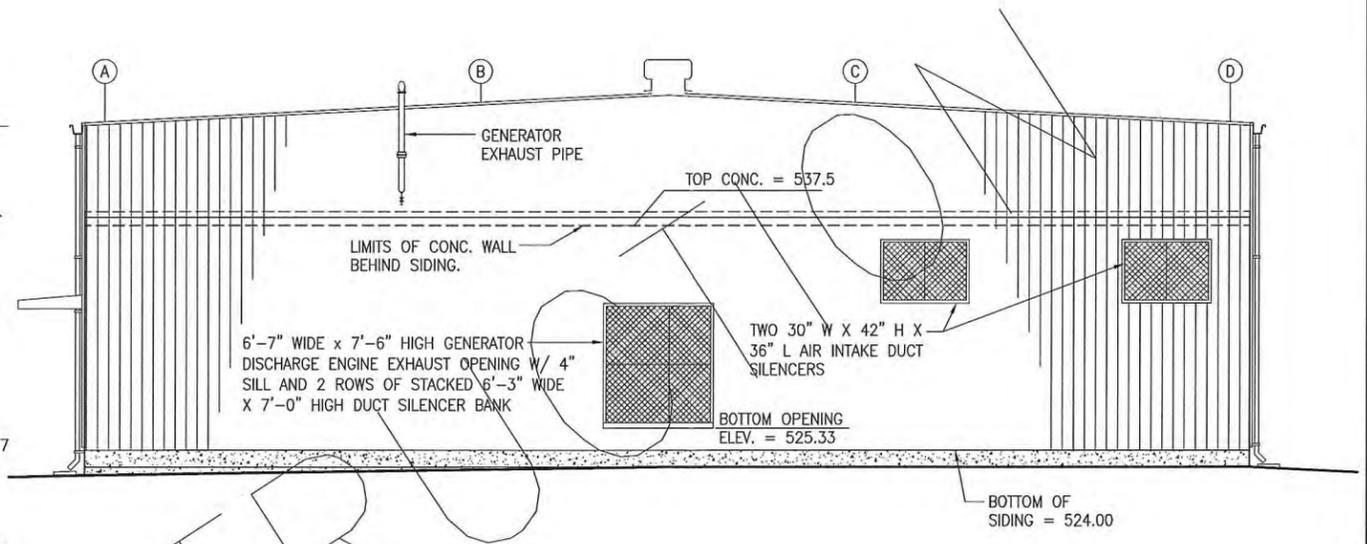
REVISION	DATE	BRIEF	MADE BY	APPROVED	
DEPARTMENT OF WATER SUPPLY COUNTY OF MAUI IAO SURFACE WATER TREATMENT PLANT UPGRADES  TREATMENT PLANT BUILDING ELEVATIONS – NORTH AND SOUTH					
DESIGNED BY	IKN	DRAWN BY	DO	CHECKED BY	IKN
APPROVED		SUBMITTED BY			

DWG. NO. **A-2**  
SHEET X OF X

0 1 2  
LINE IS 2 INCHES AT FULL SIZE  
(IF NOT 2-INCHES : Scale Accordingly)



**TREATMENT PLANT BUILDING – EAST ELEVATION**  
SCALE: 3/16"=1'-0"



**TREATMENT PLANT BUILDING – WEST ELEVATION**  
SCALE: 3/16"=1'-0"

CONSULTING

NOT FOR

F:\1\2013\13-002\DESIGN\DRAWINGS\A-3 - ELEVATIONS-2.DWG Feb 03, 2015-2:40 PM

REVISION	DATE	BREF	MADE BY	APPROVED

DEPARTMENT OF WATER SUPPLY  
COUNTY OF MAUI  
IAO SURFACE WATER  
TREATMENT PLANT UPGRADES  
  
TREATMENT PLANT BUILDING  
ELEVATIONS – EAST AND WEST

DESIGNED BY IKN	DRAWN BY DO	CHECKED BY IKN
APPROVED	SUBMITTED BY	
	DATE	FIRM MEMBER

DWG. NO. **A-3**  
SHEET X OF X

0 1 2  
LINE IS 2 INCHES AT FULL SIZE  
(IF NOT 2-INCHES : Scale Accordingly)

FW:\2013\13-002\DESIGN\DRAWINGS\A-4 - SITE ELEVATIONS.DWG Feb 03, 2015- 2:45 PM

SLUDGE LAGOON RAILING (BEYOND)

INLET BOX

SLUDGE LAGOONS (BEYOND)

TREATMENT PLANT BUILDING

TOP = 548.0

ACCESS ROAD BEYOND

TOP = 564.0

CHLORINE CONTACT TANK

FINISH GRADE

ACCESS ROAD

FINISH GRADE

### TREATMENT PLANT SITE - NORTH ELEVATION

SCALE: 3/32"=1'-0"

CHLORINE CONTACT TANK

ACCESS ROAD

TREATMENT PLANT BUILDING (BEYOND)

SLUDGE LAGOON RAILING

FINISH GRADE

SLUDGE LAGOONS

INLET BOX

### TREATMENT PLANT SITE - SOUTH ELEVATION

SCALE: 3/32"=1'-0"

NOT FOR CONSTRUCTION

REVISION	DATE	BRIEF	MADE BY	APPROVED

DEPARTMENT OF WATER SUPPLY  
 COUNTY OF MAUI  
 IAO SURFACE WATER  
 TREATMENT PLANT UPGRADES  
 TREATMENT PLANT SITE ELEVATIONS

DESIGNED BY IKN	DRAWN BY DO	CHECKED BY IKN
APPROVED	SUBMITTED BY	

DWG. NO. **A-4**  
 SHEET X OF X

0 1 2  
 LINE IS 2 INCHES AT FULL SIZE  
 (IF NOT 2-INCHES : SCALE ACCORDINGLY)

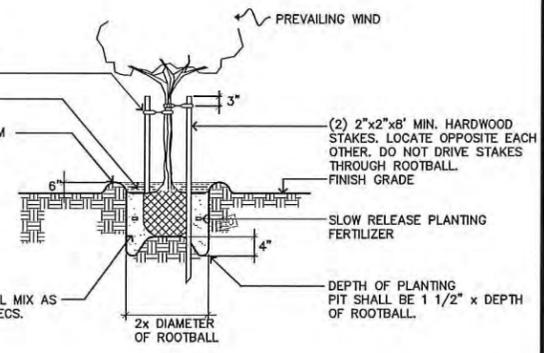
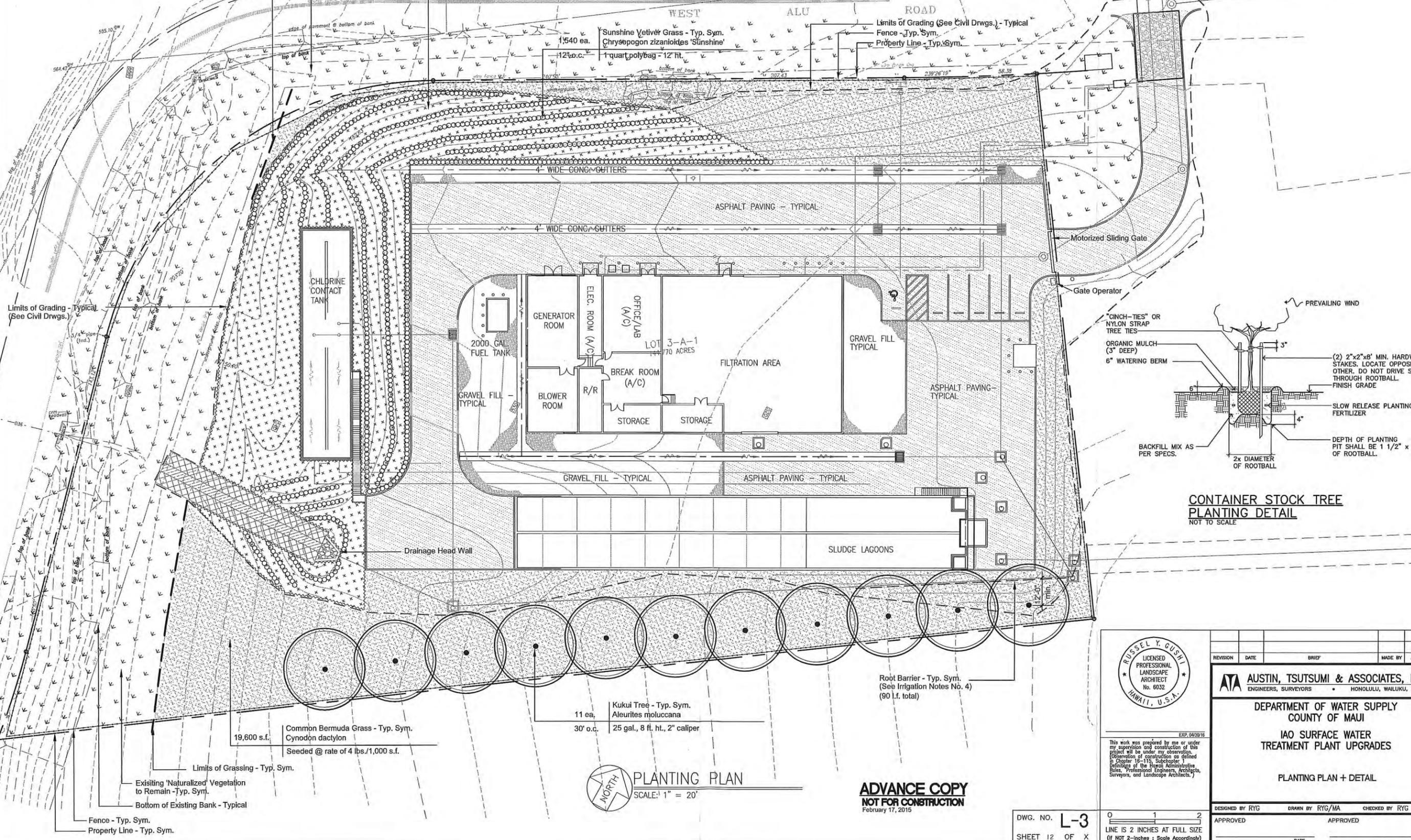
Existing 'Naturalized' Vegetation to Remain  
Typ. Sym.

Limits of Grassing - Typ. Sym.

15,200 s.f.  
Common Bermuda Grass/Annual Rye Grass Mixture - Typ. Sym.  
Cynodon dactylon/Lolium multiflorum, Respectively  
4 Parts Common Bermuda Grass to 1 Part Annual Rye Grass  
Seeded @ Rate of 5 lbs./1,000 s.f.

1,540 ea.  
Sunshine Velvet Grass - Typ. Sym.  
Chrysopogon zizanioides 'Sunshine'  
12' o.c.  
1 quart polybag - 12" ht.

Limits of Grading (See Civil Drwgs.) - Typical  
Fence - Typ. Sym.  
Property Line - Typ. Sym.



11 ea.  
Kukui Tree - Typ. Sym.  
Aleurites moluccana  
30' o.c.  
25 gal., 8 ft. ht., 2\"/>

**PLANTING PLAN**  
SCALE: 1" = 20'

**ADVANCE COPY**  
**NOT FOR CONSTRUCTION**  
February 17, 2015



EXP. 04/30/16  
This work was prepared by me or under my supervision and construction of this project will be under my observation. (Observation of construction as defined in Chapter 19-115, Subchapter 1, Definitions of the Hawaii Administrative Rules, Professional Engineers, Architects, Surveyors, and Landscape Architects.)

REVISION	DATE	BRIEF	MADE BY	APPROVED
<p><b>ATA AUSTIN, TSUTSUMI &amp; ASSOCIATES, INC.</b> ENGINEERS, SURVEYORS • HONOLULU, WAILUKU, HAWAII</p> <p><b>DEPARTMENT OF WATER SUPPLY COUNTY OF MAUI</b></p> <p><b>IAO SURFACE WATER TREATMENT PLANT UPGRADES</b></p> <p><b>PLANTING PLAN + DETAIL</b></p>				
DESIGNED BY RYG	DRAWN BY RYG/MA	CHECKED BY RYG		
APPROVED	APPROVED	DATE	DATE	
FILE	POCKET	FOLDER	NO.	

DWG. NO. **L-3**  
SHEET 12 OF X  
0 1 2  
LINE IS 2 INCHES AT FULL SIZE  
(IF NOT 2-INCHES = SCALE ACCORDINGLY)

## **APPENDIX D.**

# **Biological Resources Survey**

**BIOLOGICAL RESOURCES SURVEY  
IAO WATER TREATMENT FACILITY PROJECT  
WAILUKU, MAUI, HAWAII**

by

**ROBERT W. HOB DY  
ENVIRONMENTAL CONSULTANT  
Kokomo, Maui  
August 2013**

**Prepared for:  
Department of Water Supply  
County of Maui**

**BIOLOGICAL RESOURCES SURVEY  
IAO WATER TREATMENT FACILITY PROJECT  
Wailuku, Maui, Hawaii**

**INTRODUCTION**

The Iao Water Treatment Facility Project is situated on the upper west edge of Wailuku Town adjacent to West Alu Road (see Figures 1 & 2). The project area is approximately 2.3 acres in size (TMK (2) 3-5-01:067). It lies adjacent to and just above the existing Iao Water Tank site and a Maui Electric Company substation on undeveloped land. This study was initiated in fulfillment of environmental requirements of the planning process.

**SITE DESCRIPTION**

The project area lies on former agricultural land, now fallow, that slopes gently down to the east from the West Maui Mountains at elevations ranging from 575 feet down to 515 feet above sea level. The vegetation consists of a dense growth of tall grasses with a few trees and shrubs. The soil is categorized as Wailuku Silty Clay, 3 to 7% slopes (WvB) which is a deep, well-drained, dark reddish-brown soil developed from alluvium from Iao Valley (Foote et al, 1972). Rainfall averages about 30 inches per year with the bulk falling during a few winter storms.

**BIOLOGICAL HISTORY**

The original vegetation in this area consisted of a dense low statured native forest and shrubland with such components as 'ōhi'a (*Metrosideros polymorpha*), 'a'ali'i (*Dodonaea viscosa*), olopua (*Nestegis sandwicensis*), lama (*Diospyros sandwicensis*), halapepe (*Pleomele auwahiensis*), and a variety of ferns, vines and herbaceous plants.

Hawaiians lived in the area for several centuries, farming in the valley bottoms and lowlands and utilizing forest plants for food, construction materials, weapons, fiber and medicines. They altered the landscape somewhat through cultivation and burning.

During the mid 1800s this area was cleared for sugar cane agriculture and the area was cleared, plowed, planted, burned and harvested in continuous cycles for over 100 years. Native ecosystems were replaced by sugar cane and increasing numbers of agricultural weeds.

When sugar production ended in the 1990s this area was converted to cattle grazing. All of these practices, along with recent fires that have swept through the grass lands, have resulted in an environment that is now nearly totally lacking in native plants and animal species.

## **SURVEY OBJECTIVES**

This report summarizes the findings of a flora and fauna survey of the proposed Iao Water Treatment Facility Project which was conducted in August 2013. The objectives of the survey were to:

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

## **BOTANICAL SURVEY REPORT**

### **SURVEY METHODS**

A walk-through botanical survey method was used for covering the entire project area. An inventory was made on plant species, distribution and abundance and notes were made on terrain and substrate.

### **DESCRIPTION OF THE VEGETATION**

The vegetation within the project area was dominated by one large and densely growing grass, Guinea grass (*Megathyrsus maximus*) which covers the whole area. Two common shrub species included koa haole (*Leucaena leucocephala*) and opiuma (*Pithecellobium dulce*). Four uncommon species of note included swollen fingergrass (*Chloris barbata*), Natal redtop (*Melinis repens*), gycine (*Neonotonia wightii*) and common guava (*Psidium guajava*).

A total of 40 plant species were recorded during the survey. Just one of these was a common dry land native plant, the 'uhaloa (*Waltheria indica*), which is widespread in Hawaii and on many other Pacific islands. The remaining 39 species were pasture plants or agricultural weeds. Many of the smaller species grew along the margins of the project area or in small clearings.

### **DISCUSSION AND RECOMMENDATIONS**

The vegetation throughout the project area is dominated by non-native species that are of no particular environmental interest or concern. Just one common indigenous plant, 'uhaloa, was found growing in a recently disturbed area. No federally listed Endangered or Threatened plant species (USFWS, 2013) were found, nor do any plants that are candidates for such status occur on the project area. No special plant habitats occur on or near the project and no potential wetlands occur in this dry upland site.

This project is not expected to have any significant negative impacts on the botanical resources in this part of West Maui. No recommendations regarding botanical resources are deemed necessary or appropriate.

## PLANT SPECIES LIST

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

For each species, the following information is provided:

1. Scientific name with author citation
2. Common English or Hawaiian name.
3. Bio-geographical status. The following symbols are used:

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

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

Polynesian = all those plants brought to Hawaii during the course of Polynesian migrations.

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

4. Abundance of each species within the project area:

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

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

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

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

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
<b>MONOCOTS</b>			
ASPARAGACEAE (Asparagus Family)			
<i>Asparagus plumosus</i> J.G. Baker	climbing asparagus fern	non-native	rare
POACEAE (Grass Family)			
<i>Chloris barbata</i> (L.) Sw.	swollen fingergrass	non-native	uncommon
<i>Cynodon dactylon</i> (L.) Pers.	Bermuda grass	non-native	rare
<i>Digitaria violascens</i> Link	smooth crabgrass	non-native	rare
<i>Eleusine indica</i> (L.) Gaertn.	wiregrass	non-native	rare
<i>Eragrostis pectinacea</i> (Michx.) Nees	Carolina lovegrass	non-native	rare
<i>Megathyrsus maximus</i> (Jacq.) Simon & Jacobs	Guinea grass	non-native	abundant
<i>Melinis repens</i> (Willd.) Zizka	Natal redtop	non-native	uncommon
<i>Urochloa subquadrifera</i> (Trin.) Webster	-----	non-native	rare
<b>DICOTS</b>			
ACANTHACEAE (Acanthus Family)			
<i>Asystasia gangetica</i> (L.) T. Anderson	Chinese violet	non-native	rare
<i>Thunbergia fragrans</i> Roxb.	white thunbergia	non-native	rare
AMARANTHACEAE (Amaranth Family)			
<i>Alternanthera pungens</i> Kunth	khaki weed	non-native	rare
<i>Amaranthus spinosus</i> L.	spiny amaranth	non-native	rare
ANACARDIACEAE (Mango Family)			
<i>Schinus terebinthifolius</i> Raddi	Christmas berry	non-native	rare
ASTERACEAE (Sunflower Family)			
<i>Calyptocarpus vialis</i> Less.	straggler daisy	non-native	rare
<i>Emilia fosbergii</i> Nicolson	red pualele	non-native	rare
<i>Tridax procumbens</i> L.	coat buttons	non-native	rare
<i>Verbesina encelioides</i> (Cav.) Benth. & Hook.	golden crown-beard	non-native	rare
BIGNONIACEAE (Bignonia Family)			
<i>Spathodea campanulata</i> P. Beauv.	African tulip tree	non-native	uncommon
BORAGINACEAE (Borage Family)			
<i>Heliotropium amplexicaule</i> Vahl	summer heliotrope	non-native	uncommon
<i>Heliotropium procumbens</i> Mill.	four-spike heliotrope	non-native	rare
CASUARINACEAE (She-oak Family)			
<i>Casuarina equisetifolia</i> L.	common ironwood	non-native	rare
EUPHORBIACEAE (Spurge Family)			
<i>Euphorbia hirta</i> L.	hairy spurge	non-native	rare
<i>Ricinus communis</i> L.	Castor bean	non-native	rare
FABACEAE (Pea Family)			
<i>Chamaecrista nictitans</i> (L.) Moench	partridge pea	non-native	uncommon
<i>Crotalaria retusa</i> L.	rattlepod	non-native	rare
<i>Desmodium tortuosum</i> (Sw.) DC.	Florida beggarweed	non-native	rare
<i>Indigofera hendecaphylla</i> Jacq.	creeping indigo	non-native	rare
<i>Leucaena leucocephala</i> (Lam.) de Wit	koa haole	non-native	common
<i>Neonotonia wightii</i> (Wight & Arnott) Lackey	glycine	non-native	uncommon

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
<i>Pithecellobium dulce</i> (Roxb.) Benth.	'ōpiuma	non-native	common
MALVACEAE (Mallow Family)			
<i>Malvastrum coromandelianum</i> (L.) Garcke	false mallow	non-native	rare
<i>Waltheria indica</i> L.	'uhaloa	indigenous	rare
MYRTACEAE (Myrtle Family)			
<i>Eucalyptus robusta</i> Sm.	swamp mahogany	non-native	rare
<i>Psidium guajava</i> L.	common guava	non-native	uncommon
<i>Syzygium cumini</i> (L.) Skeels	Java plum	non-native	rare
NYCTAGINACEAE (Four-o'clock Family)			
<i>Boerhavia coccinea</i> Mill.	scarlet spiderling	non-native	rare
PASSIFLORACEAE (Passion Flower Family)			
<i>Passiflora suberosa</i> L.	cork-bark passion flower	non-native	rare
PROTEACEAE (Protea Family)			
<i>Grevillea robusta</i> A. Cunn. ex R.Br.	silk oak	non-native	rare
SOLANACEAE (Nightshade Family)			
<i>Solanum torvum</i> Sw.	pea aubergine	non-native	rare

## FAUNA SURVEY REPORT

### SURVEY METHODS

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

### RESULTS

#### MAMMALS

Just one non-native mammal, the mongoose (*Herpestes auropunctatus*) was observed during two site visits to the project area. Taxonomy and nomenclature follow Tomich (1986). Deep dense grass made it difficult to see small terrestrial mammals but one would expect there to also be mice (*Mus domesticus*), rats (*Rattus* spp.) and perhaps feral cats (*Felis catus*) in the project area.

A special effort was made to look for the native Hawaiian hoary bat by making an evening survey of the area. When present in an area these bats can be easily identified as they forage for insects, their distinctive flight patterns clearly visible in the glow of twilight. No evidence of such activity was observed though visibility was excellent. In addition a bat detecting device (Batbox IID) was used, set to the frequency of 27,000 to 28,000 hertz which is the typical range within which these bats are known to echolocate. No activity was detected using this device.

#### BIRDS

Birdlife was rather sparse in and around the project area due to the lack of habitat diversity and food resources. Just six species of non-native birds were recorded during two site visits. Taxonomy and nomenclature follow American Ornithologists' Union (2011). Uncommon were zebra dove (*Geopelia striata*), spotted dove (*Streptopelia chinensis*), common myna (*Acridotheres tristis*) and house finch (*Carpodacus mexicanus*), while Japanese white-eye (*Zosterops japonicus*) and gray francolin (*Francolinus pondicerianus*) were rare. A number of other bird species might be expected to frequent this area including, the nutmeg mannikin (*Lonchura punctulata*), chestnut mannikin (*Lonchura malacca*), house sparrow (*Passer domesticus*) and northern cardinal (*Cardinalis cardinalis*). This habitat is not suitable for Hawaii's native forest birds that occur only at higher elevations beyond the range of mosquitoes and the avian diseases they carry and transmit.

#### REPTILES

One reptile, the mourning gecko (*Lepidodactylus lugubris*) was heard calling at dusk during the evening survey.

## INSECTS

A few insect species were seen in the project area during two site visits. Eight species were recorded, representing five insect Orders. Taxonomy and nomenclature follow Nishida et al (1992). Most common were the honey bee (*Apis mellifera*) and the dung fly (*Musca sorbens*). Less common were the Sonoran carpenter bee (*Xylocopa sonorina*), passion flower butterfly (*Agraulis vanillae*) and the large orange sulphur butterfly (*Phoebis agarithe*). One native insect was seen, the green darner dragonfly (*Anax junius*). This indigenous dragonfly is widespread throughout Hawaii and is also found throughout much of North America.

Looked for but not seen was the Endangered Blackburn's sphinx moth (*Manduca blackburni*). None of this moth's specific host plants occur within the project area and no moth's or their larvae were seen.

## DISCUSSION AND RECOMMENDATIONS

The wildlife within and around this project area is composed almost entirely of non-native species. Of a total of 1 mammal, 6 birds, 1 reptile, 8 insects, only one indigenous dragonfly, the green darner (*Anax junius*) was recorded. This dragonfly which is widespread in Hawaii also occurs on the American mainland.

No Endangered or Threatened native animals were found during the survey, nor were any found that are candidates for such status. No special wildlife habitats were found either.

As a result of these findings, it is determined that there is little of environmental concern with regard to animal life within the proposed project. The development of this proposed project is not expected to have a significant negative impact on the native wildlife resources in this part of West Maui.

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

## ANIMAL SPECIES LIST

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

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

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

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

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

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

4. Abundance of each species within the project area:

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

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

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

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

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
<b>MAMMALS</b>			
<i>Herpestes auropunctatus</i> Hodgson	mongoose	non-native	rare
<b>BIRDS</b>			
<i>Geopelia striata</i> L.	zebra dove	non-native	uncommon
<i>Streptopelia chinensis</i> Scopoli	spotted dove	non-native	uncommon
<i>Acridotheres tristis</i> L.	common myna	non-native	uncommon
<i>Carpodacus mexicanus</i> Muller	house finch	non-native	uncommon
<i>Zosterops japonicus</i> Temmink & Schlegel	Japanese white-eye	non-native	rare
<i>Francolinus pondicerianus</i> Gmelin	gray francolin	non-native	rare
<b>REPTILES</b>			
<i>Lepidodactylus lugubris</i> Dumeril & Bibron	mourning gecko	non-native	rare
<b>INSECTS</b>			
Order DIPTERA - flies			
MUSCIDAE (House Fly Family)			
<i>Musca sorbens</i> Wiedemann	dung fly	non-native	common
Order HETEROPTERA - true bugs			
PSYLLIDAE (Psyllid Family)			
<i>Heteropsylla cubana</i> Crawford	koa haole psyllid	non-native	rare
Order HYMENOPTERA - bees, wasps, ants			
APIDAE (Honey Bee Family)			
<i>Apis mellifera</i> L.	honey bee	non-native	common
<i>Xylocopa sonorina</i> Smith	Sonoran carpenter bee	non-native	uncommon
Order LEPIDOPTERA - butterflies, moths			
LYCAENIDAE (Gossamer-winged Butterfly Family)			
<i>Lampides boeticus</i> L.	long tail blue butterfly	non-native	rare
NYMPHALIDAE (Brush-footed Butterfly Family)			
<i>Agraulis vanillae</i> L.	passion flower butterfly	non-native	uncommon
PIERIDAE (White and Sulphur Butterfly Family)			
<i>Phoebis agarithe</i> Boisduval	large orange sulphur butterfly	non-native	uncommon
Order ODONATA - dragonflies, damselflies			
AESHNIDAE (Darner Dragonfly Family)			
<i>Anax junius</i> Drury	green darner	indigenous	rare



Figure 1. Project location Wailuku, Maui (outlined in black)





Figure 3. View downslope toward project area. A dense growth of Guinea grass with a few koa haole shrubs scattered throughout.



Figure 4. View downslope across project area showing some larger trees.

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# **APPENDIX E.**

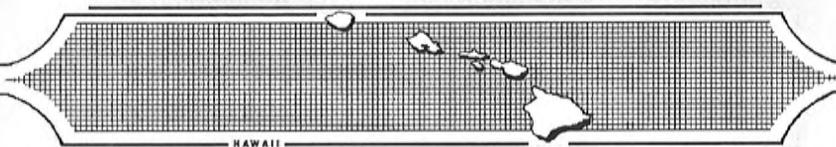
## **Archaeological Assessment**

**AN ARCHAEOLOGICAL ASSESSMENT  
ON A 2.5-ACRE PARCEL FOR THE IAO WATER TREATMENT  
FACILITY PROJECT IN 'ĪAO, WAILUKU AHUPUA`A, WAILUKU  
DISTRICT, ISLAND OF MĀUI, HAWAII  
[TMK: (2) 3-05-001:067]**

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## INTRODUCTION

At the request of Munekiyo and Hiraga, Inc., Scientific Consultant Services, Inc. (SCS) conducted Archaeological Inventory Survey on approximately 2.5-acres of land for the proposed Iao Water Treatment Facility Project in Wailuku, Wailuku Ahupua`a, Wailuku District, Island of Maui, Hawai`i [TMK (2) 3-05-001:067] (Figures 1 and 2). While Inventory-Survey-level investigations were completed, this report is being written as an Archaeological Assessment as a determination of “no findings” was made during fieldwork.

Based on limited archival research, settlement pattern analysis of the project area, and knowledge of previous Inventory Survey on several parcels directly surrounding this larger parcel (Dega 2003), there were restricted expectations prior to fieldwork for documenting significant traditional-period archaeological sites in the project area. Previous archaeological research in adjacent intermediate areas has not yielded many positive results, this perhaps due to historic land use, which led to massive landscape modifications. No historic-period sites were identified on the parcel, however.

The overall purpose of the project was to determine the presence or absence of architecture, midden deposits, and/or artifact deposits on the surface of the project area, as well as assess the potential for the presence of subsurface cultural deposits. If sites/historic properties were identified, they were to be evaluated in terms of significance criteria. In sum, no sites were identified on the surface of the parcel and no areas were readily amenable to testing which would have likely yielded significant results. Extensive alteration by historic and modern grading and grubbing, as explained more below, has significantly altered the natural topography and vegetation of the parcel.

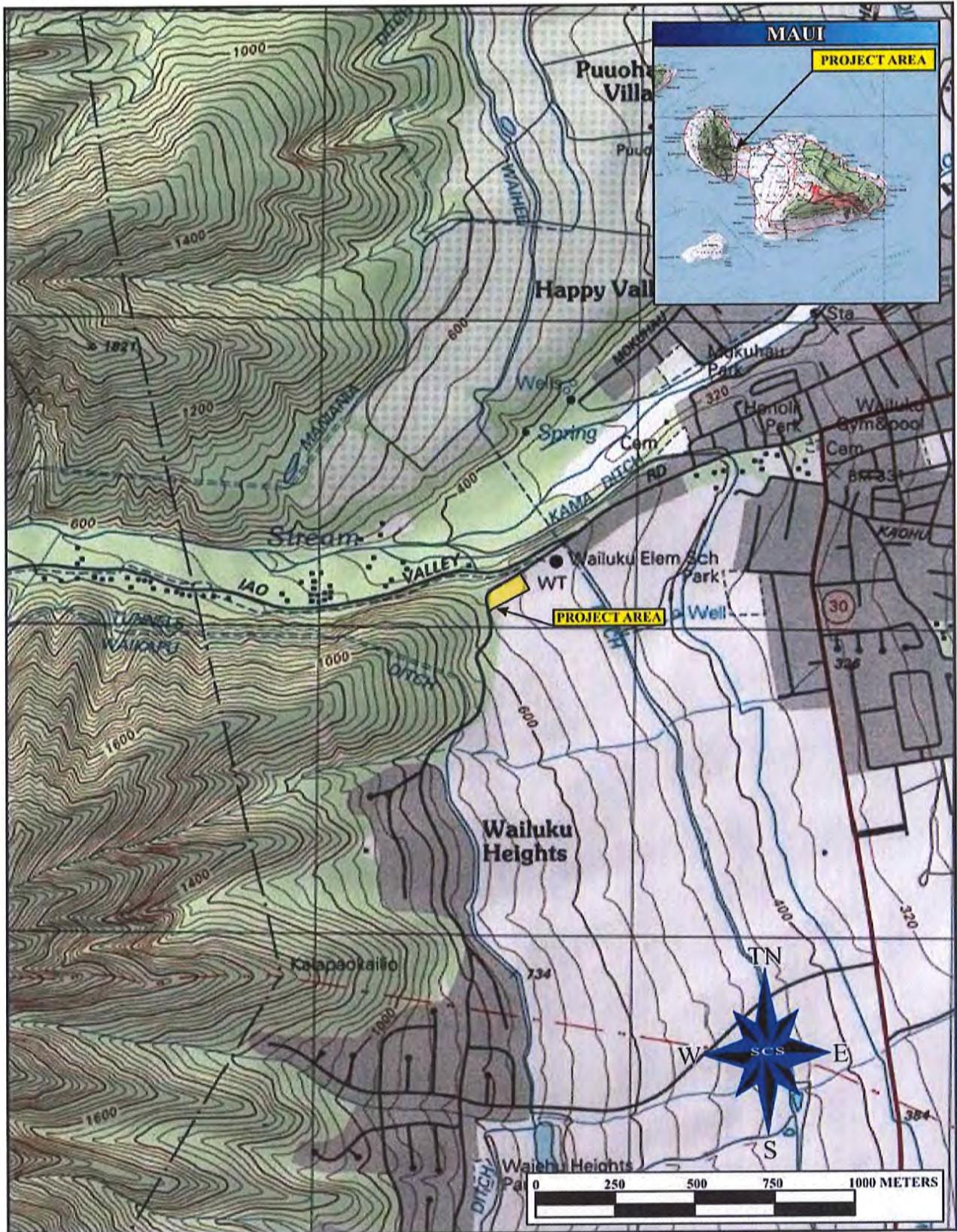


Figure 1: Portion of USGS Topographic Map Showing the Location of the Project Area



## ENVIRONMENTAL SETTING

### **PROJECT AREA LOCATION**

The project area consists of an approximate 2.5-acre of land adjacent to an existing 3.0 million gallon (MG) water tank. The parcel is bounded to the west and south by former agricultural land, to the east by an existing water tank and baseyard, and to the north by Alu Road. The parcel is situated on very slightly sloping to flat land at an elevation of c. 500 ft above mean sea level (amsl) at a distance of 3.9 km (2.4 mi) from the nearest coastline near Kahului Harbor.

### **SOILS**

Soils in the project area consist of Wailuku silty clay (WvB) and Rough Broken Land (rRR) Foote *et al.* 1972:99). The Waikuku Series occurs on 3%-7% slopes and is commonly associated with sugar cane, pasture, and homesites. These are well-drained soils occurring on alluvial fans that have developed from igneous rock. The series profile is composed of reddish-brown silty clay that lies over bedrock. The second series, Rough Broken Land, is characterized by very steep land broken by intermittent drainage channels and occurs on c. 40%-70% slopes. Runoff is rapid and erosion is common. Soil lies over weathered rock, with outcrops, stones, and soil slip common in these areas. The series is associated with watershed and wildlife habitat.

The parcel has clearly been remodeled by earthmoving activities associated with construction of the adjacent water tank facility and previously, by agricultural and road building activities. Impacts on the parcel's ground have been massive.

### **VEGETATION**

Vegetation on the parcel is dominated by *haole koa*, lowland shrubs, grasses, and small (unidentified) weedy plants. The weeds were ubiquitous, making surface visibility only fair.

### **CLIMATE**

Rainfall in this intermediate, leeward-type environment is very modest. The project area receives an average annual rainfall of only 33 to 44 centimeters (Price 1983:63), with much of this rainfall occurring during the winter months (November–April). Seasonal variation in rainfall amount follows normal orographic patterns for leeward-type areas of Maui. The project area occurs just to the south of what may be considered the leeward-windward boundary. At higher elevations within Wailuku Ahupua`a, the amount of rainfall doubles and triples that of the project area. To the north, from `Īao Stream Valley area toward Waihee Valley, rainfall is much more intensive, with combined rainfall and geographic patterns being more conducive to

traditional types of agricultural cultivation (*i.e.*, *lo`i*, sweet potato). The rainfall in this gently sloping project area drains downhill to the east and provides an additional water source for traditional Hawaiian agriculture in the lowland flats to the east of the project area (see Handy and Handy 1972).

### **TRADITIONAL AND HISTORIC SETTING**

Wailuku District inhabits the eastern side of the West Maui Mountains (Mauna Kahalawai) and occupies the isthmus through the center of the island to coastal reaches in Kahukui and Mā`alaea. Wailuku, together with Waikapu, Waihee, and Waiehu, is one of the *Na Wai`Eha*, or "the four waters," known for the occupancy of chiefly individuals (Kame`eleihiwa 1992; Pukui and Elbert 1992; and Creed 1993). Wailuku District and Wailuku Ahupua`a are frequently mentioned in historical texts and oral traditional accounts as being politically, ceremonially, and geographically important areas during traditional times (Cordy 1981, 1996; Kirch 1985). Wailuku was considered a "chiefly center" (Sterling 1998:90) with many of the chiefs and much of the area's population residing near or within portions of `fao Valley and lower Wailuku. The many *heiau* constructed in the Wailuku area point to its ceremonial and religious importance during pre-Contact times. During historic times, after numerous battles in the area, the large concentration of Land Commission Awards granted in Wailuku, particularly in lower `Iao Valley, also attest to a sizeable population base and the importance of the lands for cultivation through time. More recent land use in the area included sugar cane cultivation and use of the land for pasture.

### **THE TRADITIONAL SETTING OF WAILUKU**

Archaeological settlement data indicates that initial colonization and occupation of the Hawaiian Islands first occurred on the windward sides of the main islands, with populations eventually settling into drier leeward areas at later periods (Kirch 1985). Archaeological dates for initial occupation of the Hawaiian Islands far pre-dates accepted ranges gleaned from palynological data. A more secure estimate for initial occupation of the islands is the A.D. 9<sup>th</sup> century (Athens 1997), if one is to lay more credibility with the pollen record than the archaeological record. In the Waihe`e and Waiehu areas of Wailuku, Kirch (1985:87) notes that "a number of coastal dune midden sites have been reported, and at least one of these contained pearl-shell fishhooks similar to those from the Bellows Site, eroding from the wave-cut midden." (The Bellows site, located on the windward coast of O`ahu, has yielded dates of occupation, albeit controversial, from A.D. 300 to 600 [Pearson *et al.* 1971], one of the earliest dated sites in the Hawaiian Islands. For the most part, these dates have now been diagnosed as very

problematical and are no longer valid.) More recent research within Wailuku Ahupua`a indicates that the area was likely settled between c. A.D. 1100 (Kirch 1985:142) and A.D. 1200 (Fredericksen and Fredericksen 1996).

To the north of the current project area lies `Īao Valley, one of the most important locations in the area for prehistoric activity. Connolly (1974:5) states that the pre-Contact valley [ `Īao] had a large population base with "most people residing in a settlement near `Īao Needle," just northwest of the project area. Supposedly, the subsistence base of this population consisted of fish and taro, with Kahului Harbor and the coast close by and *lo`i* systems lining `Īao Valley's stream banks. Prehistoric ditches or *`auwai* were utilized in taro cultivation (Connolly 1974:5). Sterling (1998:86) adds that two *`auwai* within the valley:

have existed immemorially and were evidently constructed for the purpose of irrigating *kalo* on the plains which stretch away to the northward and southward of the [ `Īao] river. Several minor *`auwai* have, since ancient times, tapped the river at different points lower down and spread the water through the lands in the gulch on either side of the river bed.

Handy in Sterling (1998:63) further notes that "From Waihee and Wailuku Valley, in ancient times, was the largest continuous area of wet taro cultivation in the islands." Cheever (1851:124) writes: "the whole valley of Wailuku, cultivated terrace after terrace, gleaming with running waters and standing pools, is a spectacle of uncommon beauty to one that has a position a little above it."

Recent archaeological research (Fredericksen and Fredericksen 1996:52) has revealed that habitation sites along what is now Lower Main Street in Wailuku, "are associated with the rich taro producing lands in the Lower `Īao River flood plain, and the extensive cultivation systems present in `Īao Valley." These habitation sites have been dated to the A.D. 15<sup>th</sup> through 17<sup>th</sup> centuries. The `Īao Valley area was not only renowned for its agricultural base during prehistoric times but its ceremonial and political base as well (see also Cordy 1996; Donham 1996).

No discussion of Wailuku is complete without mentioning the important *heiau* complex above `Īao Valley near its seaward terminus. During the mid to late 18<sup>th</sup> century, the Haleki`i-Pihana *heiau* complex was supposedly designed by a Hawaiian named Kiha (Sterling 1998:89). These monuments, designated as State Site Number 50-50-04-522 are described as very

important *heiau* within Hawaiian history. Yent (1983:7) notes the life cycle of the *ali`i* was represented here. It was the place where Kamehameha I's wife was born, Kahekili lived, and Kekaulike died. Thrum (1909:46) reported that Kamehameha I evoked his war god at Pihana Heiau after his warriors defeated Kalanikupuli's forces during the Battle of `Īao in 1790. The two *heiau* are primarily associated with Kahekili, who is connected with the Haleki`i-Pihana complex between c. A.D. 1765 and 1790, and Kamehameha, during his conquering of Maui in 1792 (Yent 1983:18). Haleki`i and Pihana Heiau are the only remaining pre-Contact Hawaiian structures of religious and historical importance in the Wailuku-Kahului area that are easily accessible to the public (Estioko-Griffin and Yent 1986:3).

The Fredericksens' (1996:52) report states that politically, Wailuku [village] was known as a central settlement for high ranking chiefs and their retinue. The Wailuku area was also witness to many battles, from the Battles of `Īao and Sand Hills to the Battles of Kepaniwai and Kakanilua. The most famous battle was that of Kepaniwai where Kamehameha I, in July 1790, finally wrested control of Maui Island. Kamehameha I and his warriors landed at the Kawela portion of Kahului Bay and proceeded up `Īao and other valleys to score a decisive victory. Wailuku, meaning water of destruction, succinctly describes the area in which many of these major battles occurred. Of additional note is that in the Kauahea area of `Īao Valley warriors apparently dwelt and were "trained in war skills and there was a boxing site in the time of Kahekili" (Sterling 1998:89).

### **TRADITIONAL SETTING OF THE PROJECT AREA AND ENVIRONS**

Creed (1993) has written extensively on the traditional background of the Waikapu-Wailuku area, much of which directly applies to the open landscape of the current project area just to the north of Waikapu. Many classes of sites are found or may have existed in the Waikapu-Wailuku area during traditional times. Creed (1993:19–21) provides an extensive list, including some site types that would not apply to the current parcel due to its distance from major drainages, the coastline, and its open land classification. Traditional sites that would apply include agricultural sites (*kula* lands, *wauke* patches, *hala* trees, pigs, and potato patches), boundary walls, burials (sometimes located in habitation terraces), feather gathering areas (particularly in the mountains to the west), habitation loci, and *pohaku* (an adze stone marks the border between Wailuku and Waikapu). While populations were predominantly centered in `Īao Valley and Waikapu Valley, there was agricultural and habitation activity in the open grasslands of the current project area above the coastal flats. Much evidence for such activities has not yet been found through archaeological means, a situation that places much culpability on historic

land use that may have erased or scattered this evidence. As such, there is much more evidence for historic activities occurring in the area.

### **HISTORICAL TIMES**

Current project area lands were first assigned to the district formerly known as Kula. Taken literally, *Kula* refers to open land or plains (Pukui and Elbert 1992:70). Kula District is known for its dry, arid lands being vacant of perennial streams. Kula was always an arid region, throughout its long, low seashore, vast stony *kula* lands, and broad uplands. There are exceptions in Wailuku as one proceeds along Īao Stream Valley and further to the west/northwest past Waihee and Waiehu. However, even the vast stony *kula* lands were utilized during traditional and historic times. Most evidence for such land utilization has come from historic records.

In 1848, during the late historic period, commissioners of the Great *Mahele* instigated an extreme modification to traditional land tenure on all islands that resulted in a division of lands and a system of private ownership. The *Māhele* was based upon the principles of western law. While a complex issue, many scholars believe that in order to protect Hawaiian sovereignty from foreign powers, Kamehameha III was forced to establish laws changing the traditional Hawaiian society to that of a market economy (Kuykendall Vol. I 1938:145 footnote 47 *et passim*; Daws 1968:111; Kame`eleihiwa 1992:169–170, 176). The dramatic shift from a redistributive economy to a market economy resulted in drastic changes to land tenure, among other things. Case in point, foreigners demanded private ownership of land to ensure their investments (Kuykendall Vol. I 1938: 145 *et passim*; Kame`eleihiwa 1992:178; Kelly 1998:4).

Once lands were made available and private ownership was instituted, native Hawaiians, including the *maka`āinana* (commoners), were able to claim land plots upon which they had been cultivating and living. Oftentimes, foreigners were simply just given lands by the *ali`i*. However, in the case of commoners, they would only make claims only if they had first been made aware of the foreign procedures (*kuleana* lands, land commission awards). These claims could not include any previously cultivated or currently fallow land, *okipu*, stream fisheries, or many other natural resources necessary for traditional survival (Kame`eleihiwa 1992:295; Kirch and Sahlins 1992). Awarded parcels were labeled as Land Commission Awards (LCAs). If occupation could be established through the testimony of witnesses, the petitioners were issued a Royal Patent number and could then take possession of the property. (Chinen 1961:16).

During the *Māhele*, Wailuku District was declared Crown Land and numerous Land Commission Awards, approximately 180, were awarded within Wailuku Ahupua`a while approximately 100 were awarded for Waikapu Ahupua`a (Creed 1993). A handful of foreigners (*i.e.*, Anthony Catalena, James Louzada, E. Bailey) gained control of large parcels of lands that would later be used for mass cultivation of sugar. Significantly, the majority of LCAs were awarded to Hawaiians, a gauge that can be used to measure pre-Contact settlement, since there was little overall change in traditional land use among Hawaiians prior to 1853 (Creed 1993:38).

Land use in Wailuku and Waikapu Ahupua`a in the mid 19<sup>th</sup> and early 20<sup>th</sup> century was largely devoted to the sugar industry. During the 1860s, the sugar business was growing, with plantations and mills at Wailuku, Waihe`e, Waikapu, and Haiku. Many of the plantation camps associated with these mills were centered in the Pu`unene, Kahului, and Wailuku area (see Denham *et al.* 1992:16). Hopoi Camp supposedly occurred near the project area by Hopoi Reservoir but was not relocated during the present investigation. Hopoi Reservoir was constructed by at least by 1922, when references to Hopoi Camp occurred on an area map (M. Kirkendall, personal communication 10.September.2003) Historic utilization of the Waikapu-Wailuku landscape within and near the project area focused on industrial-levels of cultivating sugar cane and pineapple. Water was channeled from traditional sources (*e.g.*, Waikapu Stream, western aquifers or springs) through plantation lands. Both local and imported workers operated on these plantation lands and the area maintained fair population density. Evidence for expansive landscape modifications to accommodate the industrial-level of production is very evident across and near the current subject parcel in the form of the north-south oriented Kama Ditch, Hopoi Reservoir, and several excavated/bunded areas. The significant amount of plastic and rubber tubing found across the surface of the project area attests to even more recent utilization of the open landscape for cultivation. These former sugar cane and pineapple lands are now being reclaimed through residential developments.

### **PREVIOUS ARCHAEOLOGY**

Of interest for the present study are the results from two projects recently conducted just to the south of the current project area, in a similar environment. First, Archaeological Inventory Survey was conducted on approximately 100 acres of land that included five separate lots and a proposed road corridor in the Kehalani Mauka Subdivision (Dega 2003). Three historic sites were documented during this Inventory Survey. State Site Number 50-50-04-5473 has been assigned to Hopoi Reservoir. This reservoir predates Hopoi Camp and was present at least by 1922 (see Dega 2003). Occurring to the immediate east of the reservoir and running north-south to Waikapu is Kama Ditch (State Site No. 50-50-04-5474), a water conduit carrying the precious

commodity to dry southern lands. A single basalt adze (Site 50-50-04-5478) was recovered from the northern flank of Lot 21 along the eastern flank of the parcel. Extensive survey and testing in the area of the isolated find failed to produce additional artifacts or cultural deposits. Representative subsurface testing (18 trenches) on the lots only revealed highly homogenous soil matrices across the open, barren intermediate area.

Archaeological Inventory Survey was also conducted on Kehalani lands just to the east of Honoapiʻilani Highway (Monahan 2003). This survey failed to produce any structures or artifact scatters. Trench excavation demonstrated a fairly consistent subsurface stratigraphy with a thick layer of dark brown silt (Layer II) inclusive of historical garbage (*i.e.*, black plastic and rubber tubing, white plastic irrigation pipes, and black plastic sheeting) over an undisturbed very dark grayish-brown silty clay subsurface (Layer III). A dark brown, silty root mat-layer (Layer I) was present in some units. No undisturbed sandy deposits were encountered, although a few trenches close to the eastern boundary of the project area did contain thin lenses of yellowish-brown sand. These sand lenses were clearly introduced as recent fill. In total, pedestrian survey and subsurface testing demonstrated that both parcels had been extensively altered through grading and other earthmoving activities associated with historic construction (of water features) and cultivation.

In terms of general projects in the Wailuku-Waikapu environs, the earliest archaeological endeavors on Maui were undertaken by Thrum (1909), Stokes (1918), Emory (1921), and Walker (1931). None of their archaeological finds directly pertain to the current project area; however, their data allows for a deeper understanding of the traditional use of the Wailuku-Waikapu area. More recent archaeological work just to the south of the current project area has been limited to two field inspections (Donham 1991, 1995) and on the eastern boundary line of the current project location, two archaeological Inventory Survey-level investigations (Kennedy 1988, 1989; Buffum and Dega 2001). The conclusions offered by these few projects conducted just to the south of the currently-investigated land area primarily indicate that any surface and/or subsurface features of cultural value that were once present within the area have most likely since been destroyed by intensive agricultural use of the land (*i.e.*, sugar cane and/or pineapple cultivation); this pattern was also confirmed by subsurface examination.

Work within Iao Valley environs to the north was also initiated by Thrum (1909) who first identified the much investigated Halekii and Pihana Heiau. In addition to Thrum's work at the monumental structures, Stokes mapped the site in 1916. Walker also recorded the site in 1931, during his island-wide survey of Maui in which he identified many *heiau* within Wailuku

Ahupua`a (Walker 1931). Emory was the next archaeologist working at this important site and during his 1959 campaign, reconstructed portions of Halekii and rendered another map of the Heiau. The most recent work at the site was accomplished by Yent (1983, 1984, 1995) who conducted systematic survey, mapping, and excavations as part of a restoration plan. Yent's (1995) work yielded explicit planviews of the site, detailed profiles of the *heiau*, and revealed construction techniques utilized to build the features.

Prior to the modern era, the only large-scale survey of Wailuku Ahupua`a and environs, albeit biased towards coastal structures, was conducted by Walker (1931). Recently, many other archaeological projects have been conducted in the area and have yielded much data regarding settlement pattern and land utilization within the *ahupua`a*. Kirch (1985:144) notes, however, that "more intensive study of these important regions will help to unravel the sequence of economic, social, and political change that led to the development of the powerful Maui chiefdoms witnessed by Cook and others".

Connolly (1974), as part of the initial `Iao Valley Flood Control Project (Phase I), conducted archaeological survey on a parcel located north and upvalley from the present project area. Connolly's survey augmented a preliminary reconnaissance of the study area by K. Moore of Bishop Museum in April, 1974, the latter noting the presence of stone structural remains thought to be taro or *lo`i* terraces. During survey, Connolly recorded two historic complexes composed of a substantial amount of terraces, free-standing walls, ditches, historic house foundations, and several stone mounds.

Identified by Connolly (1974) and distinguished as State Site No. 50-50-04-2978 (Wallace System Complex) and 50-50-04-2979 (North Terrace System Complex), the former site, located on the south stream bank of `Iao Valley, contained a site composed of twenty terraces, two irrigation ditches, one free-standing, diversionary wall, and two house foundations. The North Terrace System Complex consisted of a wet-land taro system represented by six taro terraces, two free-standing walls, and two stone mounds of unknown function. Connolly believed both sites (and all features) to have been constructed during historic times, the sites presumably constructed by Portugese workers living in a camp within the valley. Several interesting artifacts were also recovered during the survey and represent traditional taro processing: one, fractured basalt *poi* pounder and one, unfinished basalt *poi* pounder.

Cordy (1996) and Donham (1996) provide overview studies of prior archaeological work having been conducted in the area. Cordy (1996) discussed an overview of Mahele documents

on land patterns in the `Iao Valley area that clearly showed that lower valley region contained irrigated taro fields throughout the flood plain and houses and associated grave sites at the base of the sand dunes bordering the sides of the flood plain. Donham (1996) also summarized that house sites occur along the base of the sand dunes, with population movement occurring up valley through time.

Finally, SCS/CRMS, Inc (Spear and Burgett 2003) was contracted by the U.S. Army Corps of Engineers to provide archaeological reconnaissance survey and limited subsurface testing for the alternative channel alignment, `Iao Stream Flood Control Project within `Iao Valley. A 100% reconnaissance survey of the project area revealed only one site (State Site Number 50-50-04-4755; TMK 3-4-32:1). The site is composed of three features. The three features (designated as Features A, B, and C) consist of a concrete foundation with concrete troughs, a soil-filled terrace and retaining wall, and wall remnant, respectively. These features form a small, presumably historic habitation complex-activity area. Overall, the project area was relatively void of visible architectural and/or surface remains, this being the effect of heavy landscape modifications, both cultural and natural processes, to the project area within the last 100 years. However, floodplain agriculture has likely been practiced in the area for hundreds of years with archaeological signatures to these activities being buried in the present floodplain.

### **SETTLEMENT PATTERN**

Archival research and analyses of the generalized settlement pattern for Wailuku District have been the foremost sources for discerning an established settlement pattern for the current project area.

Archaeological evidence suggests that early settlement in the Hawaiian Islands occurred along windward shoreline areas between the A.D. 4<sup>th</sup> and 11<sup>th</sup> centuries. Pollen evidence suggests a settlement date of the A.D. 9<sup>th</sup> century (see Athens 1997). For the most part, these populations used local resources and seldom ventured into upland valleys. Cordy (in Creed 1993) suggests, however, that upper valley areas on windward coasts were likely populated before the A.D. 1100s. Coastal settlement was still dominant, but populations began exploiting and living in more upland *kula* zones. Greater population expansion to inland areas did not occur until the *c.* A.D. 12<sup>th</sup> century but continued through the 16<sup>th</sup> century. Large scale or intensive agricultural endeavors were implemented in association with habitation. Coastal lands were used for settlement and taro was cultivated in near-coastal reaches and in the uplands. Upland areas of Maui such as the Waiohuli-Kula area contained large garden enclosures, ceremonial structures, and permanent habitation sites by *c.* A.D. 1600.

Nearer the coast in intermediate lands (*c.* 60–85 meters amsl), taro was cultivated along stream courses, dryland taro was grown on *kula* lands such as the project area, and populations were settled. It is possible that the *kalo* patches described in the aforementioned LCA accounts originated during the “Expansion Period” of A.D. 1400 to 1600, perpetuating through historic times (Kirch 1985). However, almost no traditional cultivation occurred in the area during the 1850s as pasture land and sugar cane cultivation were already dominating the use of the land (Creed 1993:74). Primary settlement and resource zones lay outside the current medial environmental zone in Wailuku proper, near perennial water sources (ʻĪao Valley, Waihee, Waichu). The only substantial settlement along this medial isthmus zone between 300 and 600 feet amsl was at Waikapu, to the south of the current project area, near the base of Waikapu Stream Valley (see Creed 1993). As the current project area does not contain a perennial water source and is primarily open grassland, the area is considered to lie at the periphery of the more resource-rich zones in Wailuku.

Historic utilization of the Wailuku-Waikapu landscape was dominated by the cash cropping of sugar cane and pineapple, made possible by water channeled from traditional sources (*e.g.*, Waikapu Stream) through plantation lands. Historic features associated with this period are represented as water features in the form of reservoirs (Hopoi Reservoir) and water channels (Kama Ditch, Waihee Ditch). This area was also an important transportation corridor linking both the south and north flanks of the Maui isthmus, with Honoapiʻilani Highway having been demarcated as a Government Road on area maps by 1882 (Creed 1993:20).

Cultivation of sugarcane began to the north in ʻĪao Valley area during the 1850s. Sugarcane became the dominant crop cultivated in the area and provided occupational opportunities for both local and non-local residents. With sugarcane cultivation came irrigation and processing structures across the landscape, these being irrigation ditches, mills, and other infrastructures supporting the cash crop production. During the 20<sup>th</sup> century, sugarcane cultivation continued on an intensive scale. A Portugese worker camp was located within ʻĪao Valley, the camp providing residence to plantation workers. The 1916 flood erased this camp and a rock crusher installed several years previously. After the flood, the sugarcane plantations rebuilt many of the irrigation ditches and mill stations destroyed during the flood. Sugarcane continued to be the dominant activity in the ʻĪao Valley area, only small taro plots still being cultivated. To the south/southwest of the current project area, land was utilized during World War II as a military training area. In addition, ranching became a viable activity in the ʻĪao Valley area, particularly in *mauka* areas below the precipitous cliffs of the West Maui mountain range. Lower reaches of ʻĪao Valley currently have many residences, which lead downslope into the well developed Wailuku Town.

## **METHODS**

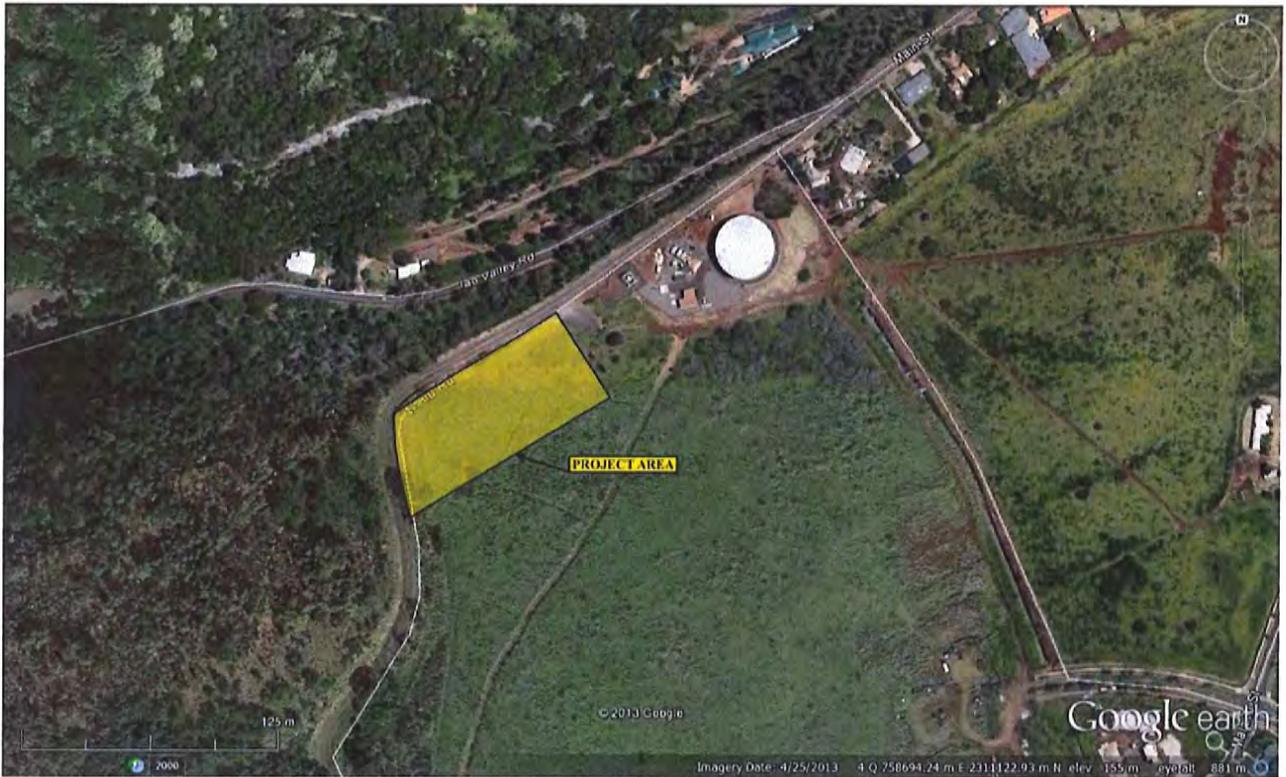
Fieldwork was conducted on August 30, 2013 by SCS personnel Ian Bassford, B.S. under the overall direction of Michael Dega, Ph.D (Principal Investigator). The inventory survey included a 100% pedestrian survey of the project area in <5 m transects. Numerous photographs were taken of the well location and overall project area in addition to written notes and descriptions of the topography and natural environment.

Archival research entailed investigating the historic and archaeological background of the general project area. This examination included a documentary search of previous archaeological research conducted in this region of Maui as well as a review of archival literature relating to Land Commission Awards and local mythology. The review of historical documents was accomplished in order to understand the impact of post-Contact events on the cultural and archaeological landscape of the region.

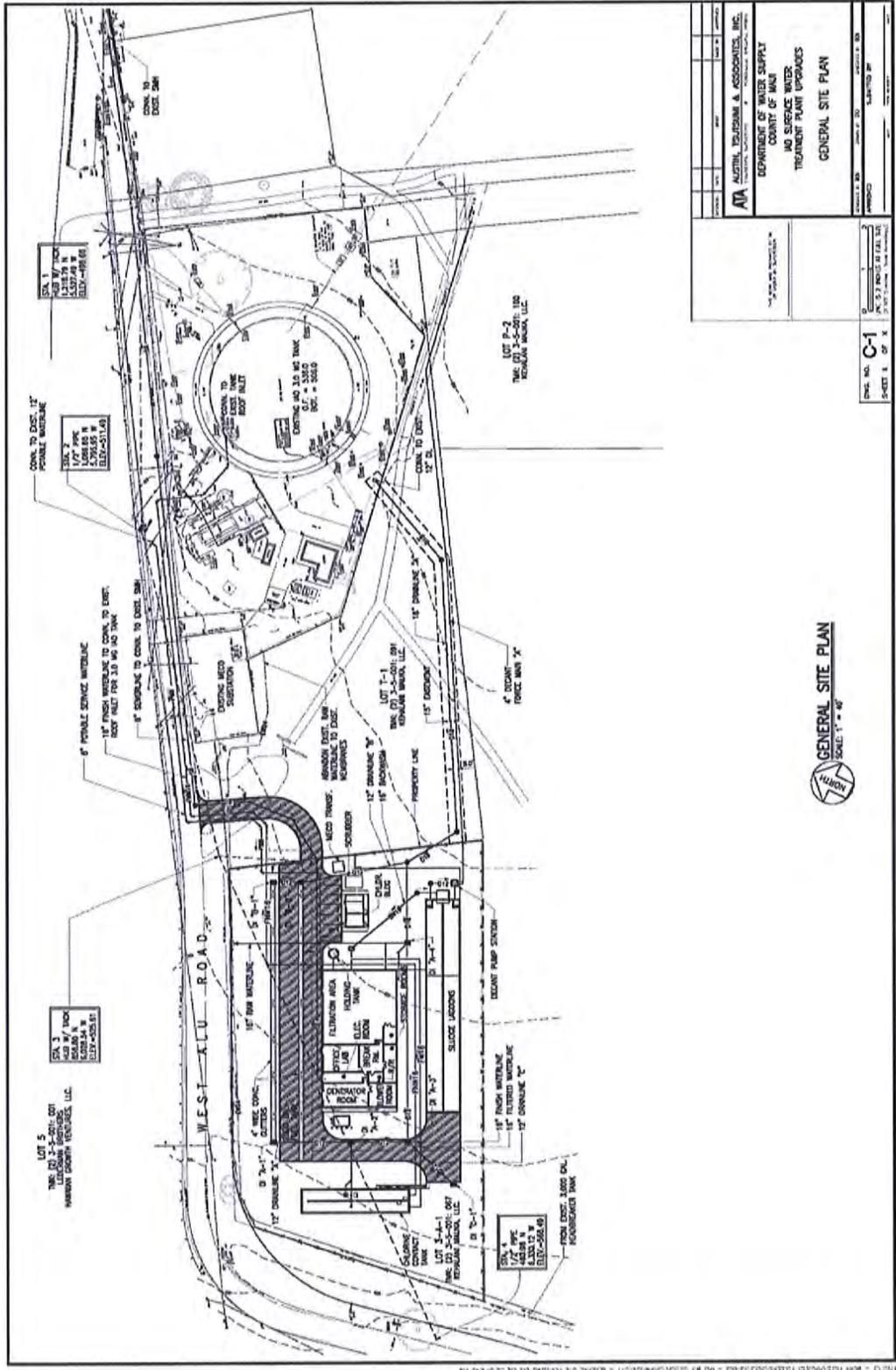
## **RESULTS OF FIELDWORK**

The project area consists of an approximate 1.5-acre parcel located along Alu Road and adjacent to an existing 3.0 MG water tank (Figures 3-6). The ground surface and subterranean reaches of the parcel have been heavily modified through time, given intensive industrial sugar cane plantation cultivation in the area, as well as mechanical grading activities for the existing tank. The survey was negative for both surface materials and areas thought to potentially contain subsurface cultural materials.

The archaeological assessment included a pedestrian inspection of the project area with photographic and written documentation of the proposed well site. No new sites, surface features or midden scatters were identified during the pedestrian survey. Historic and modern agricultural and water tank construction activities adjacent to the current project area has clearly impacted the project areas ground surface and likely destroyed any surface deposits and possibly any near surface cultural deposits or artifacts.



**Figure 3: Aerial Photograph Showing Location of Project Area (Google Earth 2013).**



<b>AA</b> AZUSTAL, TAJIYOHAMI & ASSOCIATES, INC. ENGINEERS, ARCHITECTS, PLANNERS 1400 S. RICHMOND AVE., SUITE 100 DENVER, CO 80202	
DEPARTMENT OF WATER SUPPLY COUNTY OF MONTROSE TREATMENT PLANT UPGRADES <b>GENERAL SITE PLAN</b>	
PROJECT NO. 01-2-001-100 SHEET 1 OF 4	DATE: 07-20-01 DRAWN BY: [Name] CHECKED BY: [Name]

**GENERAL SITE PLAN**  
 SCALE: 1" = 40'

Figure 4: Plan View of Proposed Work Site (Courtesy of Muneikiyo and Hiraga, Inc.).



**Figure 5: View Northeast Showing Proposed Location for Proposed Work Site.**



**Figure 6: View North of Proposed Work Site.**

## **SUMMARY AND CONCLUSIONS**

The current Archaeological Assessment, consisting of 100% pedestrian survey of the project area, did not lead to the identification of any surface cultural remains. Historic and modern era agricultural and water storage construction activities in the parcel have likely disturbed any previously existing sites or surface deposits. It is our estimation, based on this Archaeological Assessment, that the proposed undertaking would not have an adverse impact on any archaeological sites or features.

### **ARCHAEOLOGICAL MONITORING**

Archaeological Monitoring is not recommended during the construction activities for the proposed water tank work. However, should the inadvertent discovery of significant cultural materials and/or burials occur during construction, all work in the immediate area of the find must cease and the SHPD be notified to discuss mitigation.

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## **APPENDIX F.**

# **Cultural Impact Assessments**

## **IAO WATER TREATMENT PLANT UPGRADES Cultural Impact Assessment Interview**

Interviewed With: Carl Izumi  
Interview Date: 10/19/2013  
Interviewed By: Bryan Esmeralda, Analyst

The interview with Carl Izumi took place on October 19, 2013 at the Munekiyo & Hiraga, Inc. office in Wailuku, Maui.

Carl Izumi was born and raised on Maui, attended the University of Louisville in Kentucky after graduating from Baldwin High School, and until a few years ago, co-owned a veterinary supply company in Honolulu where he currently resides. Although he now resides in Honolulu, Carl is a Maui boy at heart. Born into a family of all male siblings, Carl, his twin brother, and their older brother lived with their parents on Vineyard Street in Wailuku where their father's medical practice was located until the twins were 5 years old. It was at this time that the family relocated, and moved up the street into the house on Alu Road directly below the site of the Iao Water Tank. The proposed Iao Water Treatment Plant is located adjacent to the Iao Water Tank.

Carl recalls that when the family moved into the house, the water tank already existed in its current location. The tank site, and its location set back from the roadway and within undeveloped open land, provided a recreational area for Carl and his brothers. Here they would play in the shadow of the tank and in the open fields that surrounded it.

In the years that he lived in the house, and through the years in which his family owned it after his leaving the island (over 40 years), Carl does not recall any cultural practices taking place in the vicinity of the Iao Water Tank. The tank is located on the slopes of the West Maui Mountains, and near the entrance to Iao Valley, both culturally significant areas to Native Hawaiians, but the land underlying the tank itself did not play host to any cultural practices.

Currently, the lands are undeveloped or slated for development by the nearby Kehalani Master Planned Community. Prior to this development, the lands were utilized for agricultural purposes for many years. Historically, the area was used for sugar cane cultivation, followed by cattle grazing, which ceased in the late 1990's.

The Izumi family did not experience any problems or hardships as a result of their close proximity to the tank. Noise or air pollution as a result of any maintenance activities did not present a burden on the family, nor did the normal day-to-day operations cause adverse impacts on the living conditions for Carl and his family.

Although the tank site is located near Iao Valley, one of the most culturally significant areas on the island, the site itself holds no significant cultural value today.

**IAO WATER TREATMENT PLANT UPGRADES**  
**Cultural Impact Assessment Interview**

Interviewed with: Tomiko "Helen" (Fukushima) Yamagata  
Interview date: November 19, 2014  
Interviewed by: Charlene Shibuya, Senior Associate, Munekiyo & Hiraga, Inc.

Mrs. Yamagata was interviewed at her residence located at 2317 Vineyard Street in Wailuku town for her recollections of the vacant lands above the Iao water tank off West Alu Road.

She was born in Paia in 1919 and later attended Keahua Elementary school in an old plantation camp that is no longer in existence today. During her childhood, she grew up in Camp 13 of the former Puunene plantation village until she moved back to Paia when she was eighteen (18) years old and became a dress maker at Ikeda Store in Lower Paia.

Helen was not able to attend high school but took up English at Maui Community College and some art classes from Hajime Fujimoto, Art Teacher from Baldwin High School. She returned to live on Kahookele Street in Wailuku at about age 27 to continue as a seamstress and worked for Alice Ideta, Professional Designer whose business was located on Main Street above the former Kress Store building. After the war, business got slow but she continued as a self-employed seamstress.

She married in 1947 and eventually moved to her current address on Vineyard Street and has lived in Wailuku town at that home for about the past 67 years. Her occupation continued as a seamstress working from home while raising her two daughters. This residence is located only about 0.57 miles from the project site and she is very familiar with the project surrounding. After her daughters grew up, she was an avid runner and later walker her covered many routes and long distances in the Wailuku area daily. Her past recollections of the project site is that the existing water tank existed before the initial increment of the Wailuku Heights residential subdivision was built. The surrounding area was all cane field cultivation and throughout the decades, she has not seen any cultural or gathering practices on the project site and surrounding area.

## **APPENDIX G.**

# **Zoning and Flood Confirmation Forms**

14/29/14

COUNTY OF MAUI  
DEPARTMENT OF PLANNING  
One Main Plaza Building  
2200 Main Street, Suite 335  
Wailuku, Hawaii 96793



Zoning Administration and  
Enforcement Division (ZAED)  
Telephone: (808) 270-7253  
Facsimile: (808) 270-7634  
E-mail: [planning@mauicounty.gov](mailto:planning@mauicounty.gov)

### ZONING AND FLOOD CONFIRMATION FORM

(This section to be completed by the Applicant)

APPLICANT NAME Munekiyo & Hiraga, Inc. TELEPHONE 244-2015  
PROJECT NAME Proposed Iao Water Treatment Plant Upgrades E-MAIL planning@mhplanning.com  
PROPERTY ADDRESS S. Alu Road near Inters.w/ Iao Valley Road TAX MAP KEY (2) 3-5-001:067(por.)

Yes  No Will this Zoning & Flood Confirmation Form be used with a Subdivision Application?  
IF YES, answer questions A and B below and comply with instructions 2 & 3 below:

A)  Yes  No Will it be processed under a consistency exemption from Section 18.04.030(B), MCC?  
IF YES, which exemption? (No. 1, 2, 3, 4 or 5) \_\_\_\_\_

B) State the purpose of subdivision and the proposed land uses (ie 1-lot into 2-lots for all land uses allowed by law):  
\_\_\_\_\_

- INSTRUCTIONS:**
- 1) Please use a separate Zoning & Flood Confirmation Form for each Tax Map Key (TMK) number.
  - 2) If this will be used with a subdivision application AND the subject property contains multiple districts/designations of (1) State Land Use Districts, (2) Maui Island Plan Growth Boundaries, (3) Community Plan Designations, or (4) County Zoning Districts; submit a signed and dated Land Use Designations Map, prepared by a licensed surveyor, showing the metes & bounds of the subject parcel and of each district/designation including any subdistricts.
  - 3) If this will be used with a subdivision application AND the subject property contains multiple State Land Use Districts; submit an approved District Boundary Interpretation from the State Land Use Commission.

(This section to be completed by ZAED)

**LAND USE DISTRICTS/DESIGNATIONS (LUD) AND OTHER INFORMATION: 1**

STATE DISTRICT:  Urban  Rural  Agriculture  Conservation  (SMA) Special Management Area

MAUI ISLAND Growth Boundary:  Urban  Small Town  Rural  Planned Growth Area  Outside Growth Boundaries

PLAN Protected Area:  Preservation  Park  Greenbelt  Greenway  Sensitive Land  Outside Protected Areas

COMMUNITY PLAN: PD-3 - project District 3 - Kehalani

COUNTY ZONING: PD-3-WK/05 - PD3 (Wailuku) Open space

OTHER/COMMENTS: (zoning based on portion provided on attached map)

**FEMA FLOOD INFORMATION:**

FLOOD HAZARD AREA ZONES <sup>3</sup> X  
& BASE FLOOD ELEVATIONS:

FEMA DESIGNATED FLOODWAY For Flood Zone AO, FLOOD DEPTH:  
 FLOOD DEVELOPMENT PERMIT REQUIRED (Zones V, VE, A, AO, AE, AH, D, & Floodways) Attached LUD Map

(PD) Planned Development  
 (PH) Project District  
 See Additional Comments (Pg.2)  
 See Attached LUD Map

**SUBDIVISION LAND USE CONSISTENCY:**  Not Consistent, (LUDs appear to have NO permitted uses in common).  
 Not Applicable, (Due to processing under consistency exemption No. 1, 2, 3, 4, 5).  
 Interim Zoning, (The parcel or portion of the parcel that is zoned interim shall not be subdivided).  
 <sup>4</sup> Consistent, (LUDs appear to have ALL permitted uses in common).  
 <sup>4</sup> Consistent, upon obtaining an SMA, PD, or PH subdivision approval from Planning.  
 <sup>4</sup> Consistent, upon recording a permissible uses unilateral agreement processed by Public Works (See Pg.2).

- NOTES:**
- 1 The conditions and/or representations made in the approval of a State District Boundary Amendment, Community Plan Amendment, County Change In Zoning, SMA Permit, Planned Development, Project District and/or a previous subdivision, may affect building permits, subdivisions, and uses on the land.
  - 2 Please review the Maui Island Plan and the Community Plan document for any goals, objectives, policies or actions that may affect this parcel.
  - 3 Flood development permits might be required in zones X and XS for any work done in streams, gulches, low-lying areas, or any type of drainageway; Flood development permits are required for work in all other zones. Subdivisions that include/adjoin streams, gulches, low-lying areas, or any type of drainageway might require the following designations to be shown on the subdivision map: 100-year flood inundation limits; base flood elevations; drainage reserves.
  - 4 Subdivisions will be further reviewed during the subdivision application process to verify consistency, unilateral agreement requirements, and the conditions associated with a unilateral agreement [Section 18.04.030.D, Maui County Code].

**REVIEWED & CONFIRMED BY:**  
 \_\_\_\_\_ (Signature) \_\_\_\_\_ (Date)  
 For: John S. Rapacz, Planning Program Administrator, Zoning Administration and Enforcement Division

14-29016-6

JUL 19 2014

COUNTY OF MAUI  
DEPARTMENT OF PLANNING  
One Main Plaza Building  
2200 Main Street, Suite 335  
Wailuku, Hawaii 96793



Zoning Administration and  
Enforcement Division (ZAED)  
Telephone: (808) 270-7253  
Facsimile: (808) 270-7634  
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(This section to be completed by the Applicant)

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PROPERTY ADDRESS S. Alu Road near Inters.w/ Iao Valley Road TAX MAP KEY (2) 3-5-001:091(por.)

Yes  No Will this Zoning & Flood Confirmation Form be used with a Subdivision Application?  
IF YES, answer questions A and B below and comply with instructions 2 & 3 below:

A)  Yes  No Will it be processed under a consistency exemption from Section 18.04.030(B), MCC?  
IF YES, which exemption? (No. 1, 2, 3, 4 or 5) \_\_\_\_\_

B) State the purpose of subdivision and the proposed land uses (ie 1-lot into 2-lots for all land uses allowed by law):  
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(This section to be completed by ZAED)

**LAND USE DISTRICTS/DESIGNATIONS (LUD) AND OTHER INFORMATION:** <sup>1</sup>

STATE DISTRICT:  Urban  Rural  Agriculture  Conservation  (SMA) Special Management Area

MAUI ISLAND Growth Boundary:  Urban  Small Town  Rural  Planned Growth Area  Outside Growth Boundaries

PLAN Protected Area:  Preservation  Park  Greenbelt  Greenway  Sensitive Land  Outside Protected Areas

COMMUNITY PLAN: <sup>2</sup> PD-3 Project District 3 - Kula

COUNTY ZONING: PD-3-WK 3/05 - PD3 (Wailuku) open space

OTHER/COMMENTS: Zoning based solely on portion provided on attached map.

**FEMA FLOOD INFORMATION:**

FLOOD HAZARD AREA ZONES <sup>3</sup> X

& BASE FLOOD ELEVATIONS:

FEMA DESIGNATED FLOODWAY For Flood Zone AO, FLOOD DEPTH: \_\_\_\_\_

FLOOD DEVELOPMENT PERMIT REQUIRED (Zones V, VE, A, AO, AE, AH, D, & Floodways) Attached LUD Map

(PD) Planned Development  
 (PH) Project District  
 See Additional Comments (Pg.2)  
 See Attached LUD Map

**SUBDIVISION LAND USE CONSISTENCY:**  Not Consistent, (LUDs appear to have NO permitted uses in common).

\_\_\_\_\_  
(Signature)  Not Applicable, (Due to processing under consistency exemption No. 1, 2, 3, 4, 5).

Interim Zoning, (The parcel or portion of the parcel that is zoned interim shall not be subdivided).

<sup>4</sup> Consistent, (LUDs appear to have ALL permitted uses in common).

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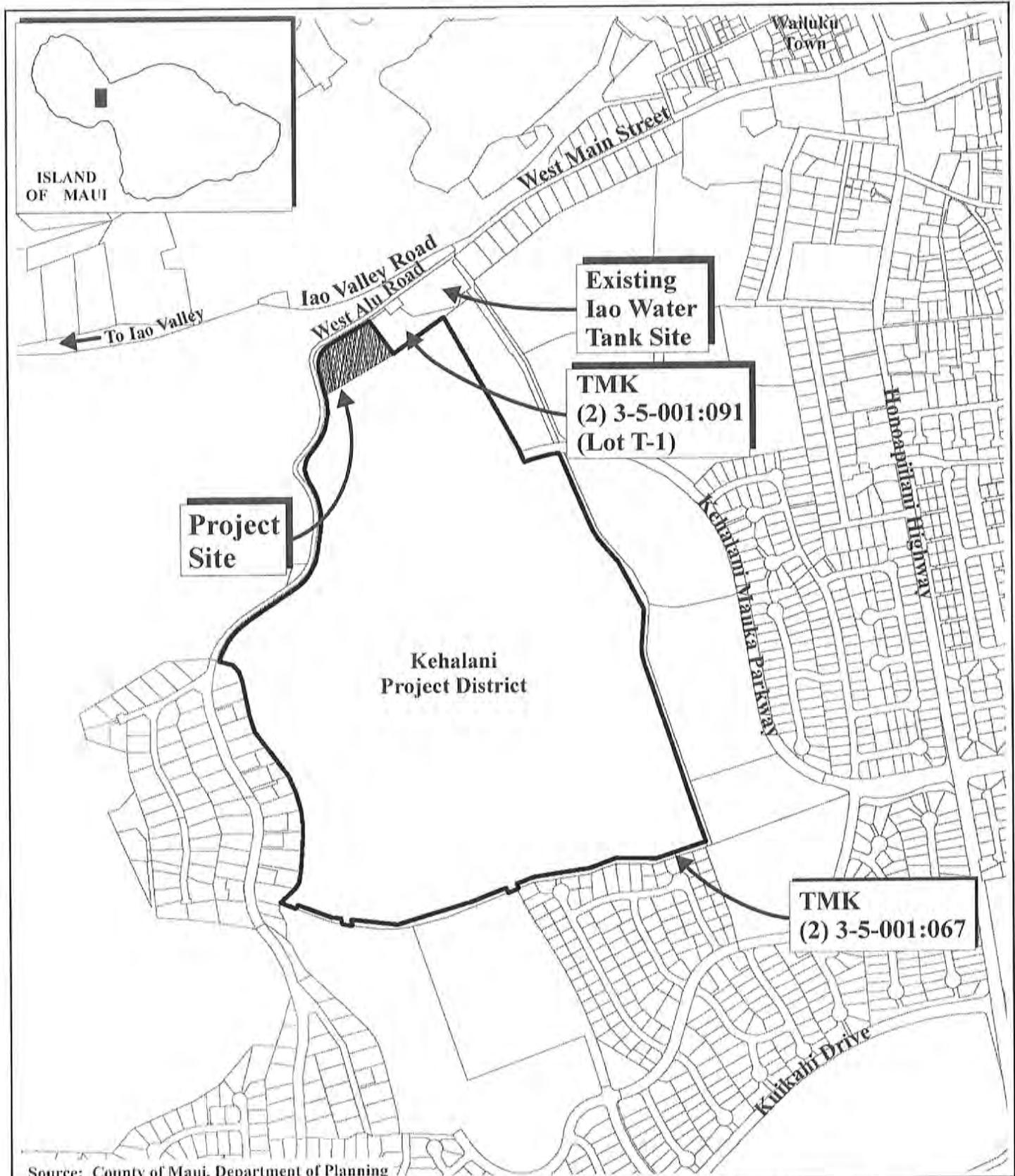
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  - 2 Please review the Maui Island Plan and the Community Plan document for any goals, objectives, policies or actions that may affect this parcel.
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  - 4 Subdivisions will be further reviewed during the subdivision application process to verify consistency, unilateral agreement requirements, and the conditions associated with a unilateral agreement [Section 18.04.030.D, Maui County Code].

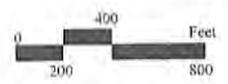
**REVIEWED & CONFIRMED BY:**

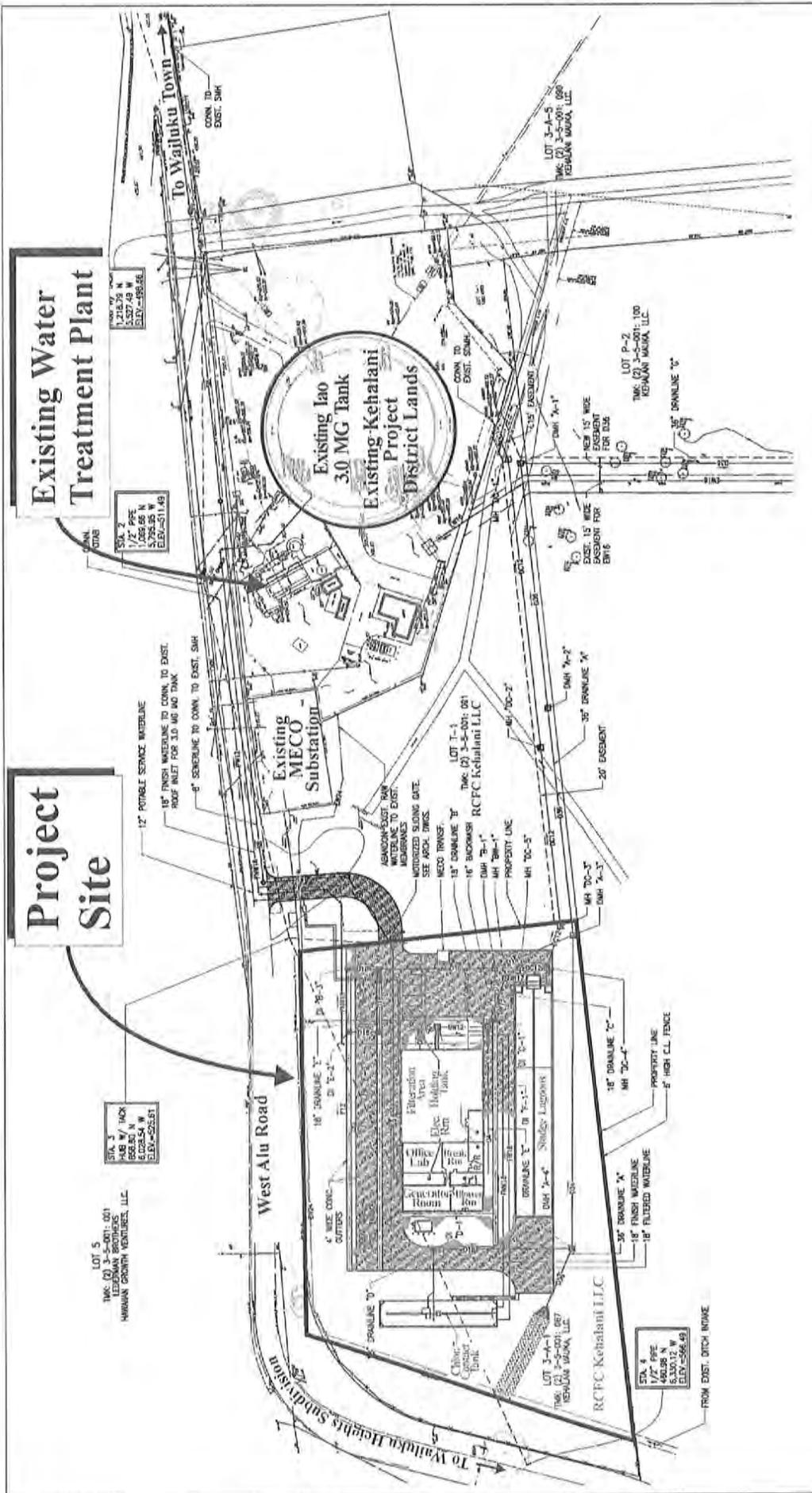
\_\_\_\_\_  
(Signature) John S. Rapacz 6/12/14  
\_\_\_\_\_  
(Date)

For: John S. Rapacz, Planning Program Administrator, Zoning Administration and Enforcement Division



**Figure 1** Proposed Iao Water Treatment Plant Upgrades Regional Location Map





**Existing Water Treatment Plant**

**Project Site**

Source: Austin, Tsutsumi & Associates, Inc.

**Figure 2 Proposed Iao Water Treatment Plant Upgrades Site Plan** NOT TO SCALE



Prepared for: County of Maui, Department of Water Supply

MUNEKIYO & HIRAGA, INC.

ATA/Iao WTF Upgrades/Site Plan

# **Draft Environmental Assessment**

## **PROPOSED IAO WATER TREATMENT PLANT UPGRADES (TMK (2)3-5-001:067 (por.) and 091 (por.))**

**Prepared for the Approving Agency:  
County of Maui,  
Department of Water Supply**

**March 2015**

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by Munekiyo & Hiraga, Inc.**



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## LIST OF ACRONYMS

2010 D&O	June 10, 2010 Commission on Water Resource Management Findings of Fact, Conclusions of Law and Decision and Order
AFONSI	Anticipated Finding of No Significant Impact
ALISH	Agricultural Lands of Importance to the State of Hawaii
BMP	Best Management Practice
CCT	Chlorine Contact Tank
CFS	Cubic Feet Per Second
CWRM	Commission on Water Resource Management
CZM	Coastal Zone Management
DLIR	Department of Labor and Industrial Relations
DOE	Department of Education
DWS	Department of Water Supply
DWSRF	Drinking Water State Revolving Fund
EA	Environmental Assessment
FEMA	Federal Emergency Management Agency
HAR	Hawaii Administrative Rules
HC&S	Hawaiian Commercial & Sugar Company
HRS	Hawaii Revised Statutes
Hui/MTF	Hui O Na Wai Eha and Maui Tomorrow Foundation, Inc.
IIFS	Interim Instream Flow Standards
KMD	Kehalani Mauka Development
LSB	Land Study Bureau
MECO	Maui Electric Company, Ltd.
MG	Million Gallons
MGD	Million Gallons per Day
MIP	Maui Island Plan
MSL	Mean Sea Level
NRCS	Natural Resources Conservation Service
OHA	Office of Hawaiian Affairs
PDR	Preliminary Drainage Report
PER	Preliminary Engineering Report
RGB	Rural Growth Boundary
rRR	Rough Broken Land
SCS	Scientific Consulting Services
SHPD	State Historic Preservation Division
SMA	Special Management Area
SRB	Small Town Boundary
SWUPA	Surface Water Use Permit Applications
SWUPA-E	Surface Water Use Permit Application Existing Use
SWUPA-N	Surface Water Use Permit Application New Use
TPB	Treatment Plant Building
TMK	Tax Map Key
UGB	Urban Growth Boundary

USDA	U. S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WUDP	Water Use and Development Plan
WTP	Water Treatment Plant
WUP	Water Use Permit
WvB	Wailuku Silty Clay, 3-7 percent slopes (soil type)
WWC	Wailuku Water Company
WWRD	Wastewater Reclamation Division
WWRF	Wastewater Reclamation Facility
WWTP	Wastewater Treatment Plant

## Executive Summary

**Project Name:** Proposed Iao Water Treatment Plant Upgrades

**Type of Document:** Draft Environmental Assessment

**Legal Authority:** Chapter 343, Hawaii Revised Statutes

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

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

**Location:** Island of Maui  
Wailuku  
TMK No.: (2)3-5-001:067 (por.) and 091 (por.)

**Applicant:** County of Maui  
Department of Water Supply  
200 South High Street, 5<sup>th</sup> Floor  
Wailuku, Hawaii 96793  
Contact: Thomas Ochwat  
Phone: (808) 270-7816

**Approving Agency:** County of Maui  
Department of Water Supply  
200 South High Street, 5<sup>th</sup> Floor  
Wailuku, Hawaii 96793  
Contact: David Taylor, Director  
Phone: (808) 270-7816

**Consultant:** Munekiyo & Hiraga, Inc.  
305 High Street, Suite 104  
Wailuku, Hawaii 96793  
Contact: Tessa Ng, AICP, Vice President  
Phone: (808) 983-1233

## **Project Summary:**

The County of Maui, Department of Water Supply (DWS) proposes to replace the existing Iao Water Treatment Plant (WTP) with a new WTP. The Iao WTP is located on West Alu Road near its intersection with Iao Valley Road and West Main Street on a portion of a parcel identified as Tax Map Key (TMK) (2)3-5-001:067. Access to the site will be provided by a driveway off of West Alu Road through the adjacent parcel, TMK (2)3-5-001:091. The existing WTP, which is located at the site of DWS' 3.0 million gallon Iao Tank, consists of three (3) pressure membrane units that produce approximately 1.7 million gallons per day (mgd) of treated water. The existing membrane filtration units were meant to be temporary, and were initially sheltered within a large tent that has since been removed, leaving the units exposed to the elements for a number of years. Therefore, replacement of the units and a permanent structure were deemed necessary by DWS.

The proposed project involves installing new membrane filtration units within a building to produce an average of up to 3.2 mgd of treated water on approximately 2.6 acres of Parcel 67. The treated water flow from the WTP of 3.2 mgd is in accordance with an agreement between DWS and Wailuku Water Company, LLC (WWC), which allows for DWS to withdraw up to 3.2 mgd of water over a 24-hour period from the Iao-Waikapu Ditch. This amount is exclusive of the backwash water from the treatment plant process, as long as the backwash water is placed back into WWC's water system. The new WTP will treat approximately 3.4 mgd of raw water from the ditch to produce 3.2 mgd of treated water. The difference of approximately 140,000 gallons per day is the treated water being used for backwashing and cleaning of the membranes, which will be placed back into WWC's water system by ultimately being discharged into WWC's Waihee Ditch. The proposed WTP will include a Treatment Plant Building, Chlorine Contact Tank, Sludge Lagoon, and other accessory equipment and facilities.

The project site is part of a large parcel (Parcel 67) owned by RCFC Kehalani LLC. DWS is in the process of acquiring the land for the Iao WTP. Access to the site will be provided by a driveway off of West Alu Road through the adjacent parcel, TMK (2)3-5-001:091. DWS intends to purchase this adjacent Parcel 091 (Lot T-1) from owner RCFC Kehalani LLC.

The Iao WTP project will be funded by the State of Hawaii and County of Maui. The use of public funds and lands is a trigger for the preparation of an Environmental Assessment (EA) pursuant to Chapter 343, Hawaii Revised Statutes (HRS) and Section 11-200, Hawaii Administrative Rules (HAR).

# **I. PROJECT OVERVIEW**

# I. PROJECT OVERVIEW

## A. PROPERTY LOCATION, EXISTING USE, AND LAND OWNERSHIP

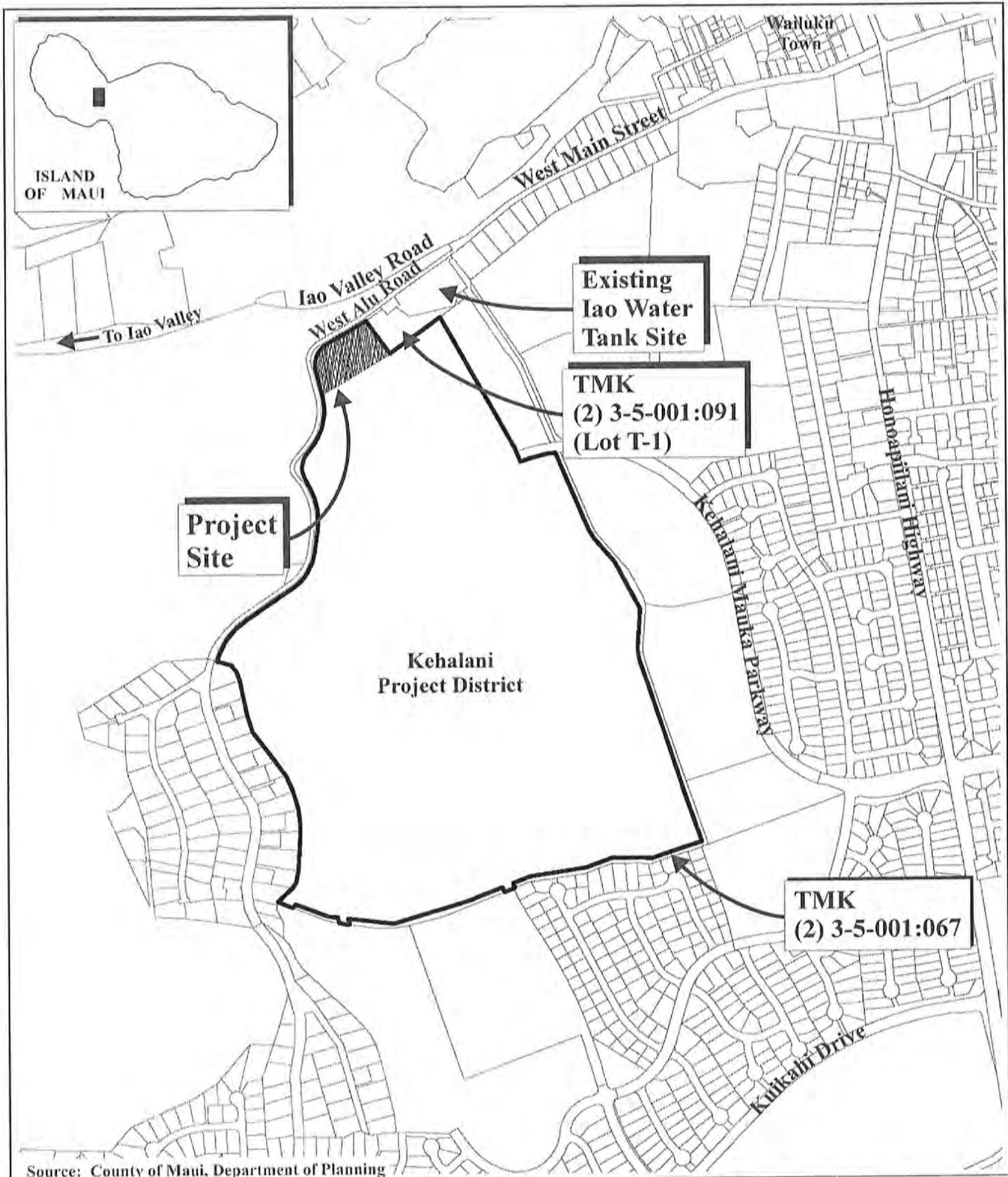
The Maui County, Department of Water Supply (DWS) proposes to replace/relocate the existing Iao Water Treatment Plant (WTP) with a new WTP. The Iao WTP will be located on West Alu Road near its intersection with Iao Valley Road and West Main Street on a portion of a parcel identified as Tax Map Key (TMK) (2)3-5-001:067 (Parcel 67). See **Figure 1**. Access to the site will be provided by a driveway off of West Alu Road through the adjacent parcel, TMK (2)3-5-001:091 (Parcel 91).

The project site is currently vacant and undeveloped. It lies west of and adjacent to an existing Maui Electric Company, Ltd. (MECO) substation and the existing WTP site. The existing WTP, which is located at the site of DWS's 3.0 million gallon Iao Tank, produces approximately 1.7 million gallons per day (mgd) of treated water. See **Figure 2**.

The project site is part of a large parcel (Parcel 67) owned by RCFC Kehalani LLC. Approximately 2.6 acres will be utilized from Parcel 67 for the proposed project. DWS is in the process of acquiring the land for the Iao WTP. The adjacent parcel, TMK (2)3-5-001:091, through which access will be provided, is also owned by RCFC Kehalani LLC. DWS intends to purchase this parcel as well. If construction of the proposed WTP occurs prior to the purchase, DWS will acquire a temporary construction easement for the driveway and waterlines through Parcel 091.

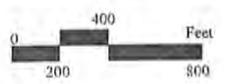
## B. PROJECT NEED

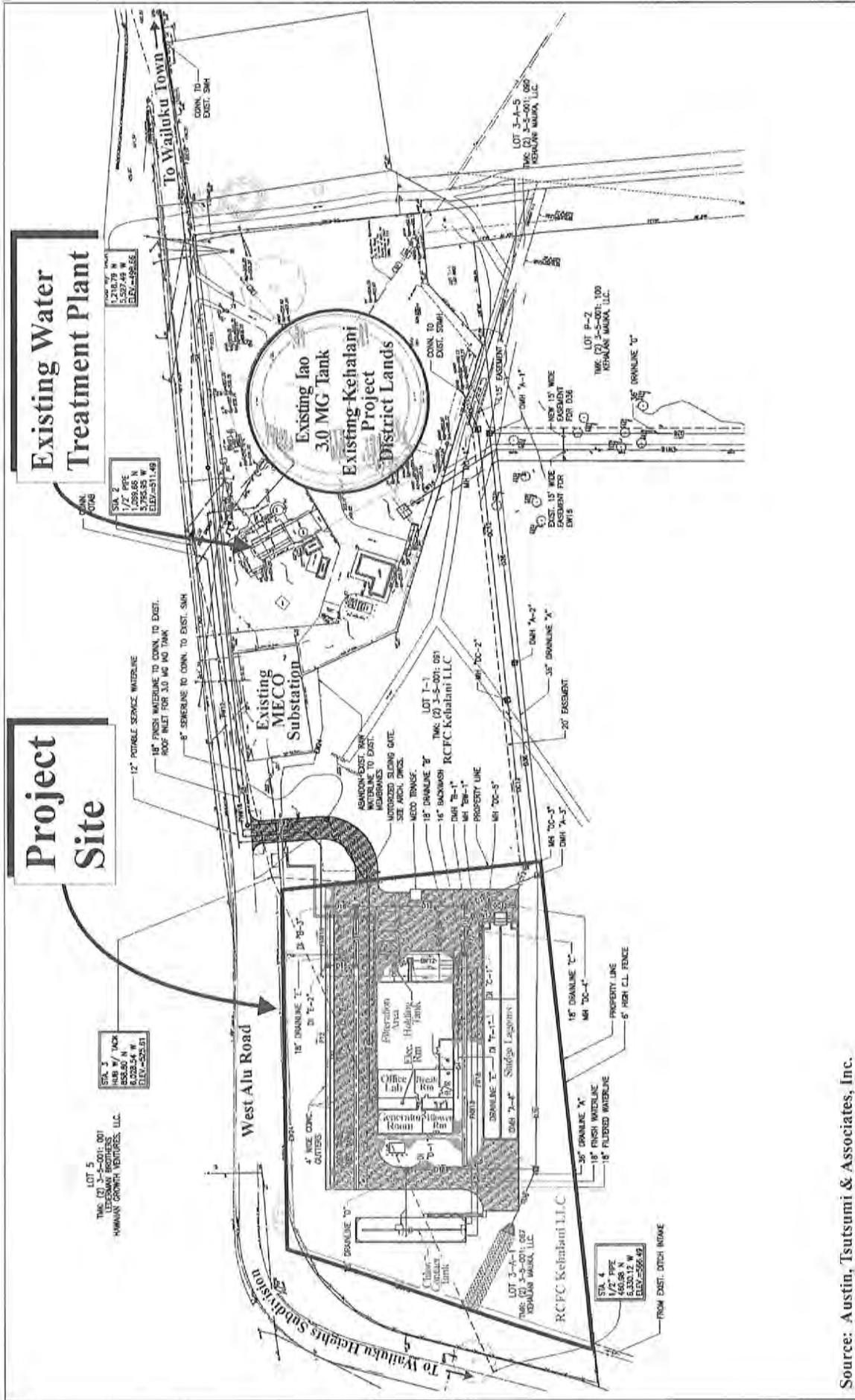
The existing WTP consists of three (3) pressure membrane units that produce approximately 1.7 million gallons per day (mgd) of treated water. The existing membrane filtration units were meant to be temporary, and were initially sheltered within a large tent that has since been removed, leaving the units exposed to the elements for a number of years. Therefore, replacement of the units and a permanent structure were deemed necessary by DWS. The proposed Iao WTP will be built to produce approximately 3.2 mgd of treated water to meet future projected population demands. See **Appendix "A"**, Preliminary Engineering Report (PER).



Source: County of Maui, Department of Planning

**Figure 1 Proposed Iao Water Treatment Plant Upgrades Regional Location Map**





Source: Austin, Tsutsumi & Associates, Inc.

Figure 2 Proposed Iao Water Treatment Plant Upgrades NOT TO SCALE  
Site Plan



Prepared for: County of Maui, Department of Water Supply



ATAI Iao WTF Upgrades Site Plan

### **C. PROPOSED ACTION**

DWS proposes to replace the existing Iao WTP with a new WTP. This project will involve installing new membrane filtration units within a building to produce an average of up to 3.2 mgd, which is based on a maximum average raw water flow to the WTP of approximately 3.4 mgd, in accordance with an agreement between DWS and Wailuku Water Company, LLC.

The major components for the project will be as follows:

- The Treatment Plant Building (TPB) which will include a “Filtration Area” as well as separate rooms for office/laboratory, break room with restroom, storage rooms, electrical room, and generator room. The Filtration Area will house four (4) membrane filtration units. Other equipment will also be housed in the Filtration Area.
- An aboveground 2,000 gallon diesel fuel tank as part of the generator system.
- A dual-compartment Sludge Lagoon constructed of concrete to contain the backwash water and other discharge waters from the membrane treatment process.
- A Chlorine Contact Tank (CCT) that allows for disinfection of the filtered water with sodium hypochlorite to produce the finish water.
- A finish water line from the CCT to a connection point with an existing pipe that discharges into the Iao Tank through a roof inlet. A portion of this water line would be within West Alu Road.
- A gravity wastewater line from the restroom within the TPB to the uppermost existing sewer manhole on South Alu Road.
- A drainage system that would convey on-site runoff and off-site runoff that currently discharges on to the project site to a connection point with the Kehalani Parkway storm drain system.

Refer to **Figure 2** and see **Appendix “C”**, Preliminary Plans.

Upon completion of the new WTP facility, the existing Iao WTP will be decommissioned.

### **D. PROJECT COSTS AND IMPLEMENTATION**

The cost of the proposed project is estimated to be \$12 to \$15 million. Construction of the Iao WTP is anticipated to begin in the summer of 2016 and take approximately two (2) years to complete.

**E. CHAPTER 343, HAWAII REVISED STATUTES (HRS)  
REQUIREMENTS**

The Iao WTP project will be funded by the County of Maui and State of Hawaii. The use of public funds and lands triggers compliance with the Hawaii Revised Statutes (HRS), Chapter 343 requirements. Therefore, this Environmental Assessment (EA) is being prepared pursuant to Title 11, Chapter 200, Hawaii Administrative Rules (HAR), Environmental Impact Statement Rules to evaluate the proposed project's technical characteristics, environmental and socio-economic impacts, and alternatives, as well as to advance findings relative to the significance of the project's potential impacts and proposed mitigation measures. The Approving Agency for the EA is the DWS.

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

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

### **A. PHYSICAL SETTING**

#### **1. Surrounding Land Uses**

##### **a. Existing Conditions**

The existing Iao Water Treatment Plant is located west of Old Wailuku Town and west of the intersection of Iao Valley Road and West Alu Road at the entrance to Iao Valley. The proposed project site is currently vacant and undeveloped. The site is west of and adjacent to a MECO substation and the existing Iao WTP site. The surrounding area to the south of the project site is currently vacant and undeveloped. Land to the south is proposed to be developed as part of the Kehalani Project District.

Wailuku Town is located further north and east of the project site, beyond the Kehalani Mauka development. Wailuku serves as the County seat and the primary location of many State and Federal offices. Wailuku Town is also characterized by a mix of commercial uses, including offices, shops, and restaurants. The existing residential developments of Wailuku Heights and Kehalani are located further west and south, respectively, to the project site. Additionally, there are existing single-family residences located further east of the project site.

##### **b. Potential Impacts and Mitigation Measures**

The proposed project involves replacement of the existing Iao WTP. The project site is on lands that are undeveloped. As such, its specific siting provides a buffer from nearby residential homes of which the closest home is approximately 600 feet away. Furthermore, the construction of the proposed improvements to the Iao Water Treatment Plant facilities represents an augmentation of the existing system to increase productivity.

Due to the nature of the proposed project, the proposed action is not anticipated to have adverse impacts to existing land uses in the vicinity.

DWS is coordinating with RCFC Kehalani LLC on future development of Kehalani Project District adjacent to the project site.

2. **Climate**

a. **Existing Conditions**

Like most areas of Hawaii, the climate in Wailuku is relatively uniform year-round. Characteristic of Maui's climate, the project site experiences mild and uniform temperatures, moderate humidity and relatively consistent northeasterly tradewinds. This stability is attributed to Maui's tropical latitude, relative to the Pacific anticyclone and storm tracts, and the surrounding ocean currents. Variations in climate among the different regions in Maui are largely due to local terrain.

Historically, in the region, daily temperatures range from an average low of 67 degrees Fahrenheit (measured at Kahului Airport) to an average high of 84 degrees Fahrenheit. The warmest month is August while the coolest month is February (County of Maui, Office of Economic Development, 2011).

Rainfall in the region is seasonal, with most precipitation occurring between October and March. Annual rainfall data for Central Maui shows an average of 18.49 inches (County of Maui, Office of Economic Development, 2011).

b. **Potential Impacts and Mitigation Measures**

The proposed project is limited to the replacement of the existing water treatment facilities. As such, significant adverse impacts to climatic conditions are not anticipated as a result of the proposed project.

3. **Agricultural Lands**

a. **Existing Conditions**

In 1977, the State of Hawaii, Department of Agriculture developed a classification system to identify Agricultural Lands of Importance to the State of Hawaii (ALISH), based primarily, though not exclusively, on soil characteristics of the underlying land. The three (3) classes of ALISH lands are "Prime", "Unique", and "Other Important" agricultural land, with the remaining non-classified lands termed "Unclassified". When

utilized with modern farming methods, “Prime” agricultural lands have soil quality, growing season, and moisture supply needed to produce sustained crop yields economically; while “Unique” agricultural lands contain a combination of soil quality, growing season, and moisture supply to produce sustained yields of a specific crop. “Other Important” agricultural lands include those important agricultural lands that have not been rated as “Prime” or “Unique”.

The project site is located on lands that are designated as “Prime” by the ALISH map. See **Figure 3**.

Additionally, the University of Hawaii, Land Study Bureau (LSB) developed the Overall Productivity Rating, which classified soils according to five (5) levels, with “A” representing the class of highest productivity soils and “E” representing the lowest. The LSB does not classify the lands underlying the proposed project site. See **Figure 4**.

The project site and surrounding areas were cultivated with sugar cane from the mid-1800s through the 1990s. When sugar production ended in the 1990s, the area was converted to cattle grazing. Grazing activity ended approximately nine (9) years ago. The site is currently zoned within the County’s “Project District 3, Wailuku”. Currently, the project site and surrounding areas to the south and west, are vacant with no active agricultural activities.

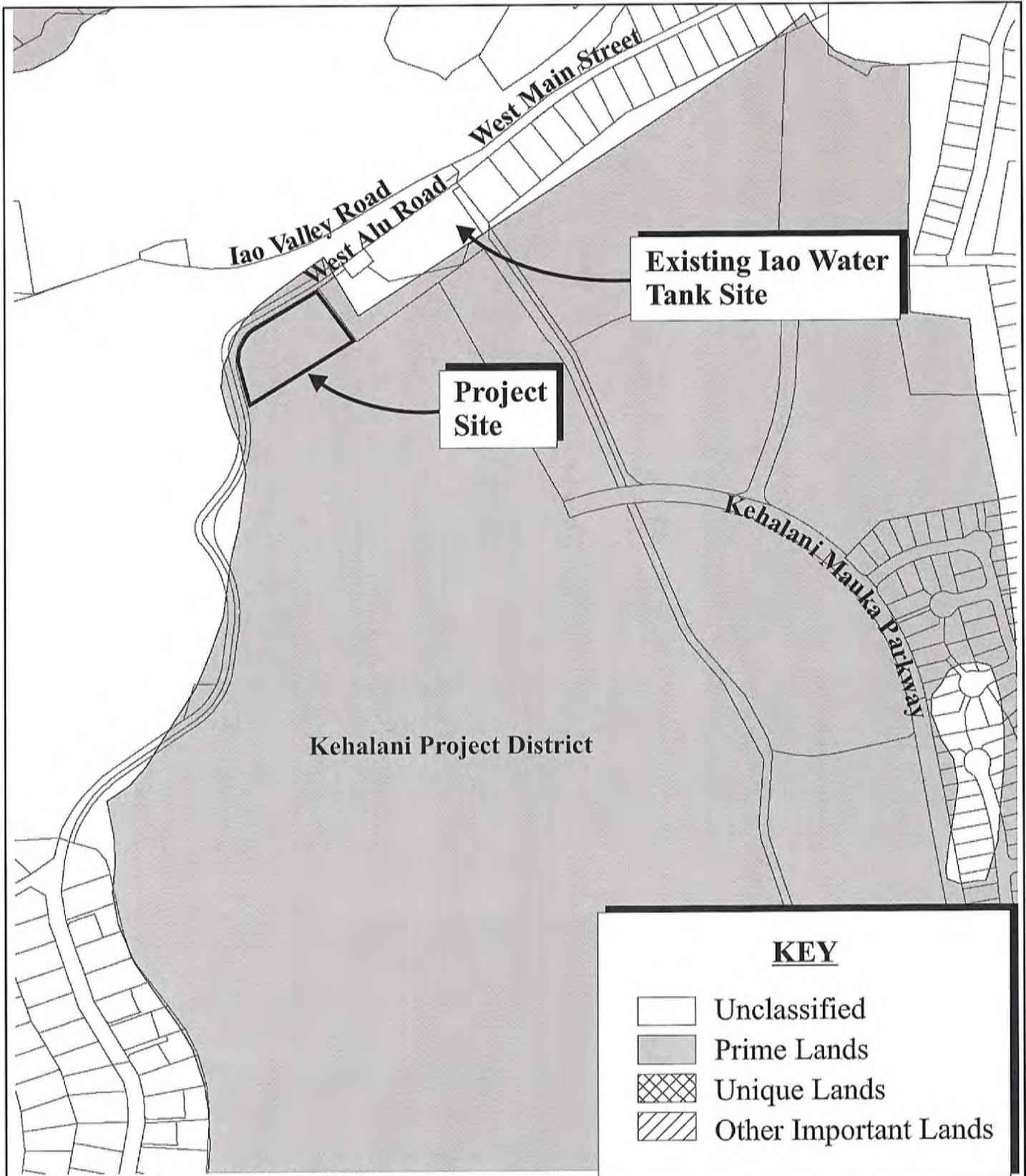
**b. Potential Impacts and Mitigation Measures**

The site is designated within the “Project District 3, Wailuku” area and has not been in active agricultural production since 1992. Given the discontinued agricultural use at the site and the land’s designation for urban use, adverse impacts to agricultural productivity are not anticipated as a result of the proposed project.

**4. Topography and Soils Characteristics**

**a. Existing Conditions**

The project site slopes in the west to east (mauka to makai) direction, with approximate ground mean sea level (msl) elevations being 560 feet at the upper end to 508 feet at the lower end. Refer to **Appendix “A”**.



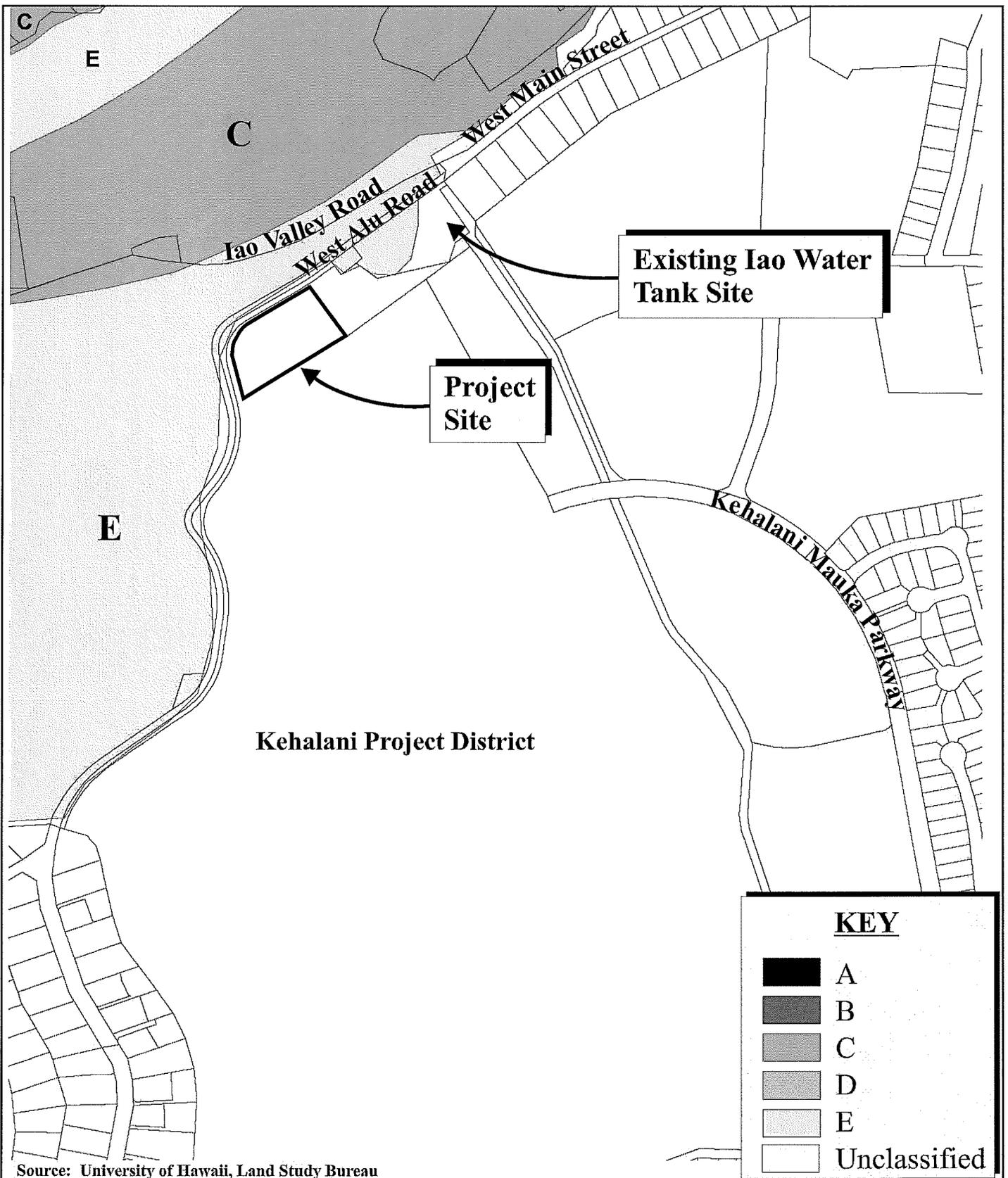
Source: State of Hawaii, Department of Agriculture

**Figure 3** Proposed Iao Water Treatment Plant Upgrades  
 Agricultural Lands of Importance to the State of Hawaii



Prepared for: County of Maui, Department of Water Supply





**Figure 4 Proposed Iao Water Treatment Plant Upgrades**

Land Study Bureau Soil Productivity Rating



The project site consists of soils within the Waiakoa-Keahua-Molokai association, which is found on low uplands and is characterized by moderately deep and deep, nearly level to moderately steep, well-drained soils that have a moderately fine textured subsoil (USDA, 1972). See **Figure 5**. Underlying the project site is Wailuku Silty Clay, 3 to 7 percent slopes (WvB) and Rough Broken Land (rRR). See **Figure 6**.

Wailuku Silty Clay, 3 to 7 percent slopes (WvB) is a dark reddish-brown silty clay that is about 12 inches thick. Permeability is moderate, runoff is slow and the erosion hazard is slight (USDA, 1972). Rough Broken Land (rRR) is very steep land broken by numerous intermittent drainage channels and contains variable soils 20 to more than 60 inches deep over soft weathered rock.

**b. Potential Impacts and Mitigation Measures**

Based on a foundation investigation of the proposed project site, it was determined that conventional shallow foundations may be used to support proposed structures for the WTP. The project site will be graded to allow for construction of and access to the new structures. However, adverse impacts to underlying soil conditions and topography are not anticipated to result from the proposed project. Refer to **Appendix “A”**.

**5. Flood and Tsunami Hazards**

**a. Existing Conditions**

The project site is located near the eastern base of the West Maui Mountains. As indicated by the Flood Insurance Rate Map for the County of Maui, the project site is located within Zone X. Zone X is the flood insurance rate zone that corresponds to areas of minimal flooding or areas determined to be outside the 0.2 percent annual chance flood plain. See **Figure 7**.

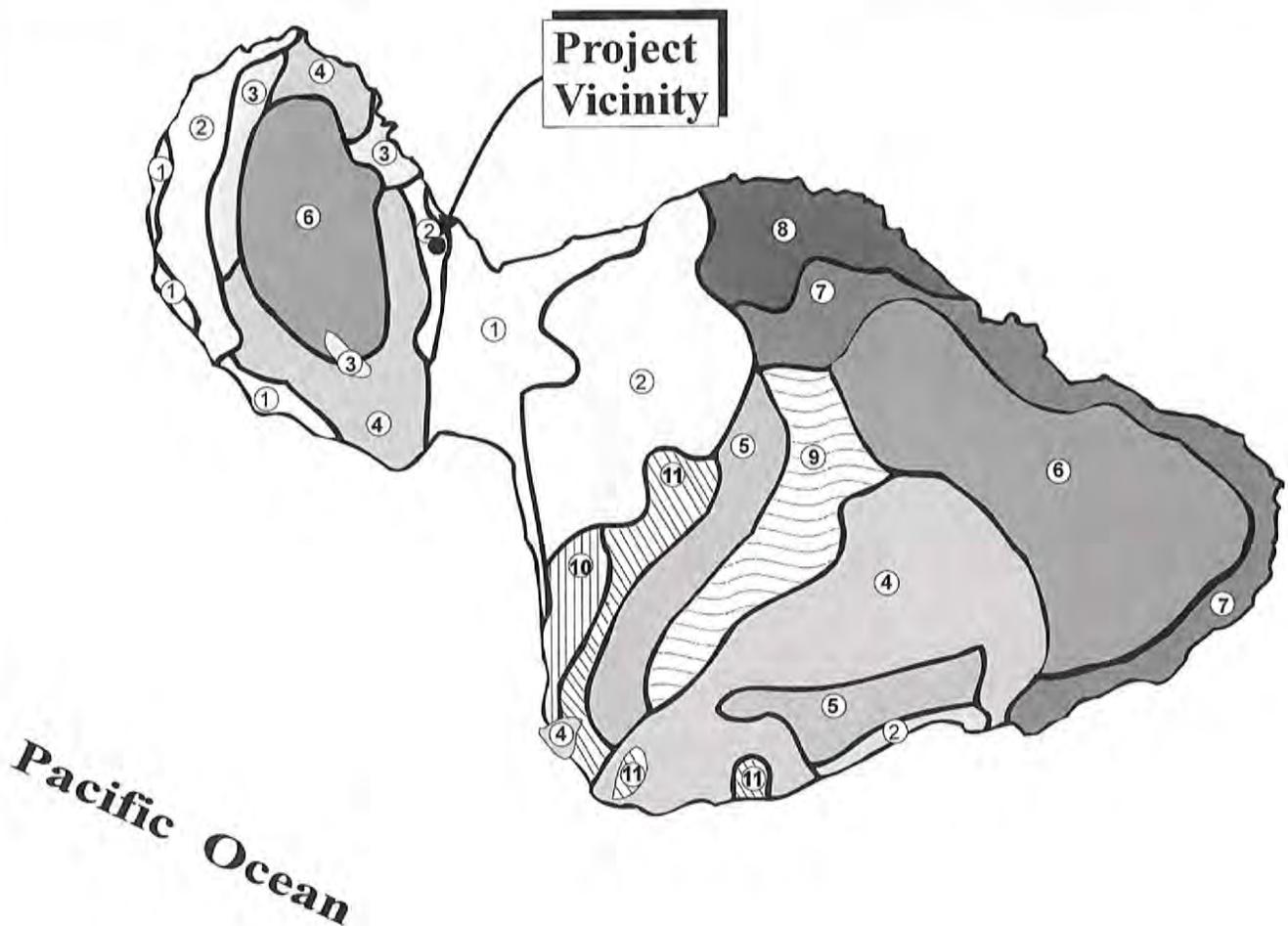
The project site is located inland and outside the tsunami inundation zone.

**b. Potential Impacts and Mitigation Measures**

Given the location of the project site within Flood Zone X and outside of the tsunami inundation zone, there are no anticipated adverse effects to the proposed project from flooding or tsunami related events.

# LEGEND

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



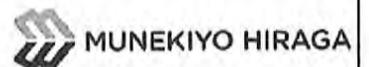
Map Source: USDA Soil Conservation Service

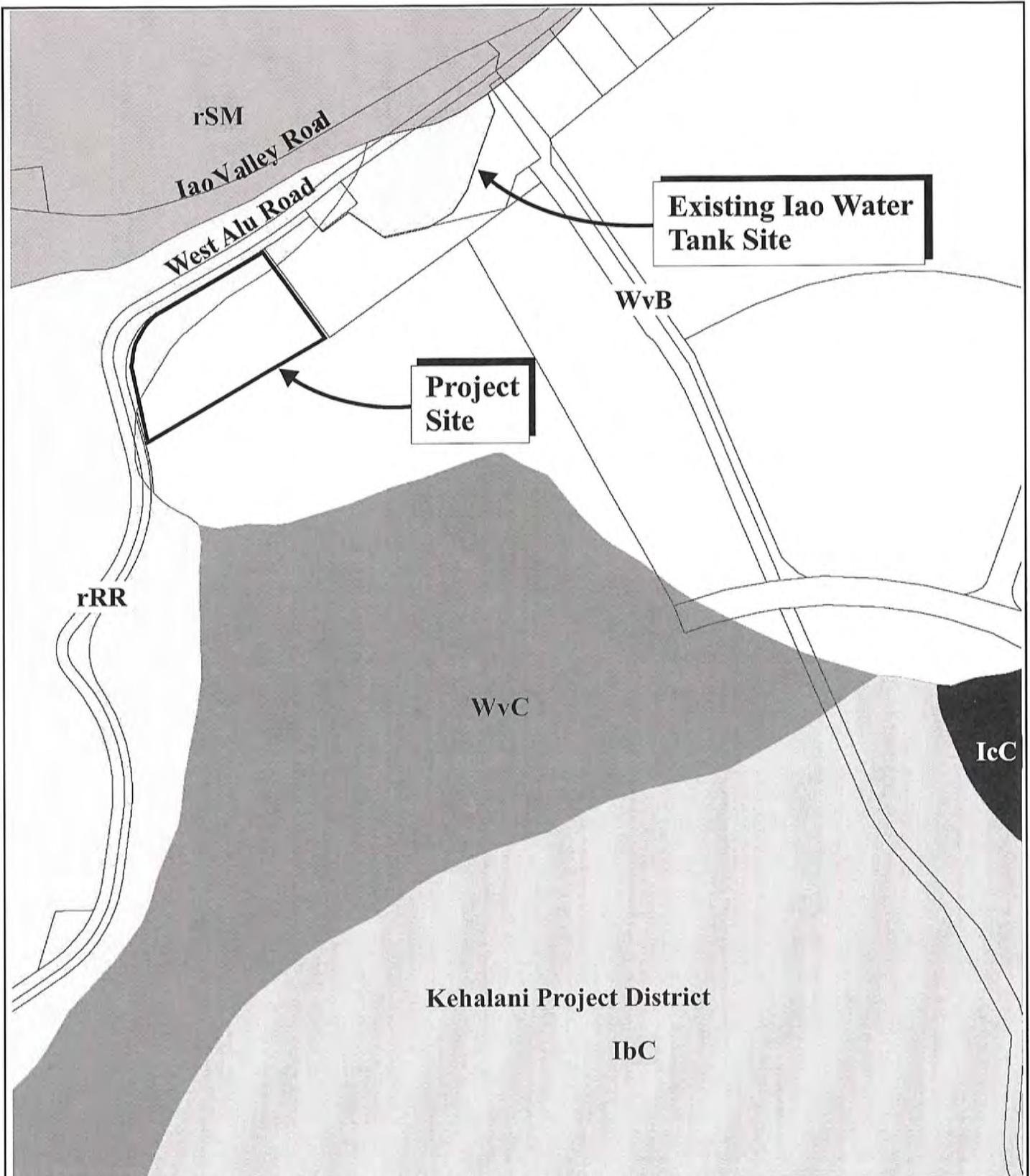
**Figure 5** Proposed Iao Water Treatment Plant Upgrades  
Soil Association Map

NOT TO SCALE



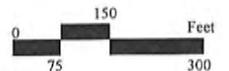
Prepared for: County of Maui, Department of Water Supply

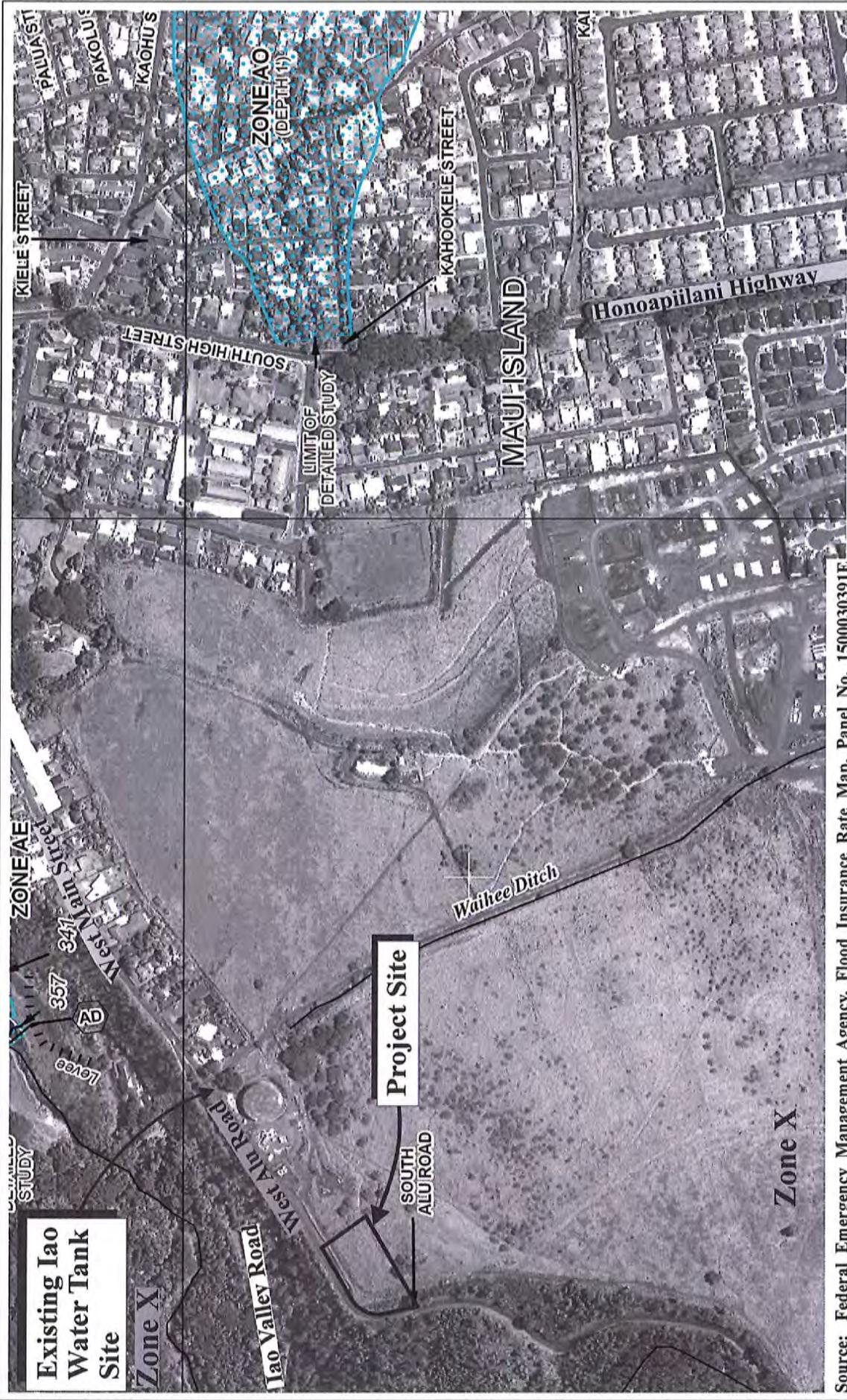




Source: USDA Natural Resources Conservation Service, Soil Survey Geographic Database, 2006

**Figure 6** Proposed Iao Water Treatment Plant Upgrades  
Soil Classification Map





Source: Federal Emergency Management Agency, Flood Insurance Rate Map, Panel No. 1500030391E

**Figure 7 Proposed Iao Water Treatment Plant Upgrades**  
**Flood Insurance Rate Map**



Prepared for: County of Maui, Department of Water Supply



ATA\Iao WTF Upgrades\FIRM

**6. Streams and Wetlands**

**a. Existing Conditions**

There are no streams or wetlands within the project site. Iao Stream is located approximately 500 feet north of the project site. The stream is north of Iao Valley Road and generally runs west to east. This stream is listed by the State of Hawaii, Department of Health as an impaired water, indicating that the water quality within the stream may not meet State of Hawaii water quality criteria for streams. Iao Stream is one (1) of the four (4) streams in the Wailuku District that comprises Na Wai Eha. The three (3) other streams are Waihee River, Waiehu Stream, and Waikapu Stream.

On June 25, 2004, Earthjustice, on behalf of Hui O Na Wai Eha and Maui Tomorrow Foundation, Inc. (Hui/MTF), filed a Petition to Amend the Interim Instream Flow Standards (IIFS) for the Waihee River and the Waiehu, Iao, and Waikapu Streams. The State of Hawaii Commission on Water Resource Management (CWRM) held 23 days of hearings between December 3, 2007 and March 4, 2008. On June 10, 2010, CWRM released its final Findings of Fact, Conclusions of Law, Decision and Order.

On August 15, 2012, following an appeal by Petitioners Hui/MTF and the Office of Hawaiian Affairs (OHA), the Hawaii Supreme Court issued a decision vacating CWRM's Findings of Fact, Conclusions of Law, and Decision and Order issued on June 10, 2010 (the 2010 D&O) and remanded the matter to CWRM for further proceedings consistent with the court's decision.

In April 2014, the parties in the case (Hui/MTF, OHA, Hawaiian Commercial and Sugar Company, Wailuku Water Company (WWC), and the County of Maui Department of Water Supply (DWS)) reached an agreement with respect to the IIFS for the Waihee River and the Waiehu, Iao, and Waikapu Streams. The agreement was approved by CWRM on April 17, 2014.

Regarding Iao Stream and DWS specifically, CWRM reaffirmed its prior conclusion (from the 2010 D&O) that the 3.2 mgd of water for DWS's Iao Water Treatment Facility is a reasonable current and future use of water

diverted from Iao Stream for purposes of the restoration of stream flows under an amended IIFS.

Further, the amended IIFS for Iao Stream is as follows:

The IIFS just below the diversion operated by WWC on Iao Stream above the Iao-Waikapu and the Iao-Maniania Ditches shall be 10 mgd; provided, however, that when the average daily flow measured at USGS stream-gauge station 16604500 on Iao Stream is between 15 mgd and 10 mgd and has continued in that range for three (3) consecutive days, the greater of one-third (1/3) of the stream flow or 3.9 mgd may be diverted for noninstream use until the flow returns to 15 mgd or above.

Further, when the average flow for any day falls below 10 mgd, commencing the next day and continuing until the average daily flow returns to at least 10 mgd, 3.4 mgd may be diverted for noninstream use.

The intent is to provide adequate water to accommodate DWS's 3.2 mgd for its water treatment plant and the estimated 0.2 mgd used by kuleana users served exclusively by the Iao-Waikapu Ditch.

However, this decision nonetheless is without prejudice to the rights of any party and of CWRM to revisit this issue in the context of any proceeding involving a water use permit application by DWS, in which proceeding DWS will have the burden of justifying its water use.

On March 31, 2009, DWS submitted Surface Water Use Permit Applications (SWUPAs) to CWRM: SWUPA-E for its existing use of 1.784 mgd and SWUPA-N for a new use of 1.416 mgd from the Iao-Waikapu Ditch, for a total of 3.2 mgd. However, the water use permit application proceedings have yet to begin. CWRM has continued the hearings on all existing use SWUPAs and has not yet taken up the matters of the new use SWUPAs.

Hawaii Revised Statutes (HRS) Section 174C-49 sets forth the criteria that must be met for water use permits. Under HRS Section 174C-49, an applicant for a water use permit must establish that the proposed use of water (1) can be accommodated with the available water source, (2) is a reasonable-beneficial use as defined in HRS Section 174C-3, (3) will not interfere with any existing legal use of water, (4) is consistent with the public interest, (5) is consistent with state and county general plans and

land use designations, (6) is consistent with county land use plans and policies, and (7) will not interfere with the rights of the Department of Hawaiian Home Lands. Each of DWS's SWUPAs demonstrate that the proposed use of water can meet each of these criteria.

The closest wetland is the Kanaha Pond Wildlife Sanctuary located approximately 3.5 miles northwest of the project site.

Waihee Ditch, an irrigation canal built in the early 1900s, is located approximately 600 feet east of the project site. The irrigation canal flows in a southerly direction and ends at a reservoir in Maalaea. If the reservoir at Maalaea overflows, it discharges into Pohakea Gulch, which terminates in Kealia Pond, a wetland between Kihei and Maalaea.

**b. Potential Impacts and Mitigation Measures**

The source water for the Iao WTP is the watershed area draining into the upper reaches of Iao Stream. There is a ditch intake in Iao Stream, near Iao Valley State Park, that diverts stream water into Iao Ditch. Shortly downstream of the Iao Ditch intake, the ditch divides into two (2) ditches. The Iao-Maniania Ditch flows north towards Waiehu, and the Iao-Waikapu Ditch flows south towards Maalaea. Where the Iao-Waikapu Ditch crosses Alu Road, an intake diverts water from the ditch into the raw water transmission line that conveys the water to the existing Iao WTP. Refer to **Appendix "A"**.

According to the agreement approved by CWRM, the proposed 3.2 mgd water for the Iao WTP is a reasonable amount and future use of water from Iao Stream for purposes of the restoration of stream flows under an amended IIFS. Based on the provisions of the agreement for the IIFS, there are no anticipated impacts to the Iao Stream.

Under existing conditions, stormwater runoff sheetflows east of the project site. Runoff normally infiltrates into the open field lands, but in intense storm events, runoff may reach and enter the Waihee Ditch, which is approximately 600 feet from the project site. The proposed project involves the development of a storm drain system which will reduce the runoff flowing into the Waihee Ditch. More detailed discussion on the drainage system is provided later in this chapter.

The proposed project also involves the construction of a dual-compartment concrete sludge lagoon for gravity solids-liquid separation of backwash water from the filtration membrane units. The decanted treated water will be conveyed by a 12-inch drainline from the sludge lagoon to a discharge point into Waihee Ditch. An NPDES permit will be required for this discharge.

The water quality of discharges into the Waihee Ditch will meet levels acceptable to State of Hawaii Department of Health – Clean Water Branch (CWB) under their permitting requirements and comply with the State’s Water Quality Standards.

7. **Flora and Fauna**

a. **Existing Conditions**

The project site lies on former agricultural lands that slope gently down to the east from the West Maui Mountains. Original vegetation in the area consisted of a dense low saturated native forest and shrubland. However, the area was cleared for sugar cane cultivation in the mid 1800s and the land was plowed, planted, burned, and harvested in continuous cycles for over 100 years. When sugar production ended in the 1990s, the area was converted to cattle grazing. These agricultural practices, along with recent fires, have resulted in an environment that is nearly lacking native plants and animal species.

A Biological Resources Survey was conducted for the project site by Robert Hobdy in August 2013. See **Appendix “D”**. The vegetation throughout the project area is dominated by non-native species that are of no particular environmental interest or concern. Just one (1) common indigenous plant, uhaloa, was found growing in a recently disturbed area. No federally listed Endangered or Threatened plant species (USFWS, 2013) were found, nor do any plants that are candidates for such status occur on the project area. No special plant habitats occur on or near the project and no potential wetlands occur in this dry upland site.

Just one (1) non-native mammal, the mongoose (*Herpestes auro-punctatus*), was observed during two (2) site visits to the project area. Deep dense grass made it difficult to see small terrestrial mammals but one would expect there to also be mice (*Mus domesticus*), rats (*Rattus* spp.), and

perhaps feral cats (*Felis catus*) in the project area. A special effort was made to look for the native Hawaiian hoary bat by making an evening survey of the area. When present in an area these bats can be easily identified as they forage for insects, their distinctive flight patterns clearly visible in the glow of twilight. No evidence of such activity was observed though visibility was excellent. Birdlife was rather sparse in and around the project area due to the lack of habitat diversity and food resources. Just six (6) species of non-native birds were recorded during two (2) site visits.

In summary, the wildlife within and around this project area is composed almost entirely of non-native species. Of a total of one (1) mammal, six (6) birds, one (1) reptile, eight (8) insects, only one (1) indigenous dragonfly, the green darner (*Anax junius*) was recorded. This dragonfly, which is widespread in Hawaii, also occurs on the American mainland. No endangered or threatened native animals were found during the survey, nor were any found that are candidates for such status. No special wildlife habitats were found.

**b. Potential Impacts and Mitigation Measures**

There are no endangered or threatened species of flora or fauna found within the project site. The Biological Resources Study concluded that the proposed project is not expected to have any significant negative impacts on the botanical resources in this part of Maui. No recommendations regarding botanical resources are deemed necessary or appropriate. The development of this proposed project is not expected to have a significant negative impact on the native wildlife resources in this part of the island.

While no protected seabirds were found on the property, the uau or dark rumped petrel (*Pterodroma sandwichensis*) and ao or Newell's shearwater (*Puffinus newelli*) are known to overfly the area at dawn and dusk to their burrows high in the mountains between the months of March and November. In late fall, young birds fledge from their burrows to take their first tentative flights out to sea. These inexperienced birds are easily confused and distracted by bright lights and often crash to the ground where they are particularly vulnerable to being run over by vehicles or killed by predators. It is recommended that any significant outdoor lighting such as street lights or flood lights that are incorporated into the

project design be shielded to direct the light downward so that it is not visible from above. Refer to **Appendix “D”**.

**8. Archaeological Resources**

**a. Existing Conditions**

An Archaeological Assessment of the project area was completed by Scientific Consultant Services, Inc. (SCS) on October 2013. See **Appendix “E”**. The assessment involved conducting an Archaeological Inventory Survey comprised of historic background research and a pedestrian survey. The assessment was done to determine the presence or absence of architecture, midden deposits, and/or artifact deposits on the surface of the project area, and assess the potential for presence of subsurface cultural deposits.

As previously mentioned, the project site is part of a larger agricultural parcel that was previously used for sugar cane cultivation and land for pasture. The parcel has clearly experienced land alteration by earthmoving activities associated with construction of the adjacent water tank facility and previous agricultural and road building activities.

Fieldwork investigation conducted on August 30, 2013 by SCS revealed no surface materials and areas thought to potentially contain subsurface cultural materials. Also, no new sites, surface features or midden scatters were identified during the pedestrian survey. The ground surface and subterranean reaches of the parcel have been heavily modified through time by intensive industrial sugar cane plantation cultivation.

**b. Potential Impacts and Mitigation Measures**

The Archaeological Assessment’s 100 percent pedestrian survey of the project area did not lead to the identification of any surface cultural remains. Historic and modern era agricultural and water storage construction activities have likely disturbed any previously existing sites or surface deposits. The Archaeological Assessment report concluded that the proposed project will not have an adverse impact on any archaeological sites or features. The Archaeological Assessment was filed with SHPD for review and approval.

Archaeological Monitoring is not recommended during construction activities for the project. However, should the inadvertent discovery of significant cultural materials and/or burials occur during construction, all work in the immediate area of the find shall cease and SHPD will be notified to discuss mitigation. Refer to **Appendix “E”**.

9. **Cultural Resources**

a. **Existing Conditions**

Within the Hawaiian cultural context, the project site is located within Wailuku ahupuaa, which translated means “water [of] destruction,” referring to the battle of Ke Pani Wai, between Kamehameha I and Kalanikupule.

The Wailuku area is known for the occupancy of chiefly individuals, with many chiefs and much of the area’s population residing near or within portions of Iao Valley and lower Wailuku. The Wailuku District and Wailuku ahupuaa are frequently mentioned in historical texts and oral-tradition accounts as being politically, ceremonially, and geographically important areas during traditional times. The area was likely settled between c. A.D. 1100 and A.D. 1200. Scattered amongst the agricultural and habitation sites were other places of cultural significance. The Wailuku District was a center of political power often at war with its rival in Hana.

During the Great Mahele of 1848, the Wailuku District was declared Crown Land. Approximately 180 Land Commission Awards (LCA) were granted in Wailuku ahupuaa and 100 were granted in the neighboring Waikapu ahupuaa. While a handful of foreigners gained control of large parcels of land that would later be used for commercial sugar cane production, the majority of LCAs were awarded to Native Hawaiians, suggesting that the area was densely populated in the mid-19<sup>th</sup> century. The project site falls under LCA 387, which was awarded to the American Board of Commissioners for Foreign Missions.

Land use in and around the project area in the mid-19<sup>th</sup> and early 20<sup>th</sup> centuries was largely devoted to commercial sugar cane and pineapple production. Sugar plantations and mills have been located in the Wailuku and Waikapu area since the 1860s. The Hopoi Sugar Camp, which shows

up on maps dated to 1922, was located just south of the project area near the Hopoi Reservoir. Refer to **Appendix “E”**.

A Cultural Impact Assessment interview was conducted on October 19, 2013 with Mr. Carl Izumi who lived in the house located directly below the existing Iao Water Tank site. Prior to moving into the house below the water tank, their family lived a couple miles away at a different location in Wailuku town on Vineyard Street. During the times he lived next to the water tank and through the years his family owned the house after him leaving the island over 40 years ago, he does not recall any cultural practices taking place in the vicinity of the Iao Water Tank. See **Appendix “F”**.

Another Cultural Impact Assessment interview was conducted on November 19, 2014 with Mrs. Tomiko “Helen” Yamagata at her residence on Vineyard Street which is about 0.57 miles from the project site. Mrs. Yamagata lived at this location in Wailuku for the past 68 years after being married. Prior to living on Vineyard Street, she lived on Kahookele Street in Wailuku and worked as a seamstress at the Wailuku Hotel next to Kress Store off of Market Street. She later was a self-employed seamstress working from her home while raising her children. She babysat for one (1) of her daughters that lived in Wailuku Heights so she and her husband frequently drove by the project site to and from their residence. She was also an avid runner and later walker that covered many routes and long distances in the Wailuku area daily. Her recollection of the area was that it was all in cane field cultivation and throughout the decades, she has not observed any cultural or gathering practices on the project site and surrounding area. Refer to **Appendix “F”**.

Although the slopes of the West Maui Mountains and the nearby Iao Valley are both culturally significant areas to Native Hawaiians, the land underlying the proposed WTP itself does not appear to host any cultural practices.

**b. Potential Impacts and Mitigation Measures**

From a recent historical perspective, land underlying the proposed project site was primarily used for commercial sugar cane cultivation and pastureland. Also, the Cultural Impact Assessment interviews revealed no

indications of cultural practices, such as gathering, access, or religious traditions, known to be associated with the existing tank and adjacent project site.

With reference to the project site, no adverse impact to cultural resources, practices, and traditions anticipated.

**10. Air Quality**

**a. Existing Conditions**

The project site, in general, does not experience adverse air quality conditions. There are no point sources of airborne emissions within close proximity to the project site. Point sources in the surrounding Central Maui region include the Maalaea Power Plant, Puunene Sugar Mill, and rock quarry at Puunene, all of which are well over two (2) miles from the project site. Non-point sources of pollution in the vicinity of the project site include: vehicular exhaust from High Street, Honoapiilani Highway and other nearby roadways; dust generated by construction activities in the Kehalani Mauka development; and/or burning activities from sugar cane harvesting and cultivation operations conducted in the central valley area. Emissions from these sources, however, are quickly dispersed by prevailing tradewinds.

**b. Potential Impacts and Mitigation Measures**

During construction, airborne particulates as a result of construction-related activities may temporarily affect the ambient air quality within the immediate vicinity of the project site. The project will comply with regulations established in Hawaii Administrative Rules (HAR), Chapter 11.60.1, "Air Pollution Control" and Section 11-60.1-33, "Fugitive Dust". Mitigative measures will include utilization of water wagons and sprinklers to control dust, as well as other appropriate Best Management Practices to ensure that fugitive dust from the project area is minimized. By effectively employing these mitigative measures, construction-related activities are not anticipated to pose a significant impact to the air quality in the surrounding area.

From a long-term perspective, adverse impacts to air quality are not anticipated.

## 11. Noise

### a. Existing Conditions

The predominant source of noise in the vicinity of the project site stems from traffic traveling along Iao Valley Road, South Alu Road, West Alu Road, and other roadways in the area. The lands abutting the site are former agricultural lands that are currently vacant and undeveloped. Single-family homes located to the south, west, and east of the project site are not major noise-generators.

### b. Potential Impacts and Mitigation Measures

Ambient noise conditions may be temporarily affected by construction-related activities. Heavy construction machinery and equipment are anticipated to be the dominant noise-generating sources during the construction period. Mitigation measures for construction-related activities will include using proper equipment and conducting regular vehicle maintenance, both of which are anticipated to reduce noise levels. Equipment mufflers or other noise attenuating equipment may also be employed as required. Noisy construction activities will be restricted to hours between 7:00 a.m. and 3:30 p.m., Monday through Friday, excluding holidays. The project will comply with HAR, Chapter 11-46, "Community Noise Control" and obtain a noise permit, as applicable. By effectively employing these measures, potential noise-related impacts from construction-related activities will be mitigated to an acceptable level. Ambient noise impacts associated with the project will be limited to a 24-month time frame during which the construction of the project will be completed.

Upon completion of the project, equipment such as compressors, blowers, and the standby generator within the TPB will generate noise. These equipment items will be housed within sound attenuated rooms inside the TPB such that applicable State of Hawaii Department of Health day-time and nighttime noise limits at the property lines are met for the compressor and blower. Refer to **Appendix "A"**.

From a long-term perspective, the proposed Iao WTP is not anticipated to result in adverse noise impacts.

## 12. Scenic and Open Space Resources

### a. Existing Conditions

Scenic resources in the vicinity of the project site include the West Maui Mountains to the West and the Central Maui's isthmus and Haleakala to the east. Open space resources in the region include the slopes of the West Maui Mountains. Background views beyond the existing site from ground level are limited due to the terrain and natural vegetation and trees that surround the area. Scenic and open space views looking makai are best seen when travelling downhill along West Alu Road from the Old Wailuku Heights area. Ground views looking mauka up towards the West Maui Mountains are obscured by the terrain and dense tree forest.

### b. Potential Impacts and Mitigation Measures

The proposed project involves constructing a Treatment Plant Building (TPB) and related facilities mauka of the existing Iao water tank. West Alu Road, that perimeters the north and west boundaries of the site, rises from an elevation of 527.2 feet up to 557.85 feet. Contour elevations of the site gently rise up to meet with the road elevations. The higher side of the site will be excavated down to create a level pad for the TPB and Chlorine Contact Tank (CCT) and appurtenant facilities. The maximum heights from the finished grade to the top of the TPB and CCT are about 29 feet and 28 feet, respectively. Views down to the slopes of Haleakala and Central Maui's isthmus will still be visible from West Alu Road's upper elevation approach. Additionally, DWS will install landscaping on the southern boundary of the project site to provide visual mitigation for the facility. Refer to **Appendix "C"**, Preliminary Development Plans, Sheet L-3. As such, the proposed project will not negatively affect scenic resources. Furthermore, the TPB and CCT footprints will occupy only 9,800 square feet and 2,180 square feet, respectively. Therefore, the project is not anticipated to adversely affect open space resources.

## 13. Beach and Mountain Access

### a. Existing Conditions

The project site is located approximately 2.5 miles from the nearest beach and approximately a quarter of a mile from the foot of the West Maui Mountains. Further, cultural interviews conducted for the proposed

project concluded that there are no activities related to gathering, access, or other customary activities occurring at the project site.

**b. Potential Impacts and Mitigation Measures**

There are no traditional access corridors identified by the Cultural Assessment within the project site and due to the distances to the nearest beach and mountain, there are no anticipated adverse impacts to beach and mountain access from the proposed project.

**B. SOCIO-ECONOMIC ENVIRONMENT**

**1. Population**

**a. Existing Conditions**

The population of the County of Maui has exhibited relatively strong growth over the past decade. In 2010, there were 154,834 residents in the County, a 21 percent increase in the resident population since 2000. The Wailuku-Kahului region is the most populous region in the County and has grown at a faster rate than the County as a whole. In 2010, there were approximately 54,400 residents living in the Wailuku-Kahului region, a 31 percent increase over the last decade (U.S. Census Bureau, 2000 and 2010). Population in the County of Maui is projected to grow to 199,550 residents by 2030 while the Wailuku-Kahului region is anticipated to have approximately 71,200 residents (County of Maui, Department of Planning, 2006).

**b. Potential Impacts and Mitigation Measures**

The proposed project involves the replacement of the existing Iao WTP and is not considered a population generator. As such, significant impacts to population are not anticipated to result from project implementation.

**2. Economy**

**a. Existing Conditions**

The Wailuku region is Maui County's center of governmental activity. Along with neighboring Kahului, the region encompasses a broad range of commercial, service, and public sector activities. In addition, the region is surrounded by approximately 32,000 acres of sugar cane. This vast

expanse of agricultural land, managed by Hawaiian Commercial & Sugar Company (HC&S), is a key contributor to the local economy.

Not-seasonally-adjusted unemployment rates for both Maui County and the Island of Maui in December 2014, were 3.8 percent and 3.6 percent, respectively. These rates both decreased from the December 2013 when unemployment rates stood at 4.7 percent and 4.5 percent, respectively (DLIR, January 2015).

**b. Potential Impacts and Mitigation Measures**

In the short term, the proposed project will provide construction-related revenue and employment. Accordingly, the project will have a beneficial impact on the local economy during the construction phase.

In the long term, the facility is not anticipated to significantly impact Maui County's economy. DWS anticipates two (2) to three (3) employees at the Iao WTP during the week once completed. No new positions are expected to be required to staff the replacement facility.

**C. PUBLIC SERVICES**

**1. Police and Fire Protection**

**a. Existing Conditions**

Police protection for the Wailuku and Waikapu region is provided by the Maui County Police Department headquartered on Mahalani Street, approximately 1.5 miles north of the project site. The region is served by the Department's Central Maui station, which is divided in three (3) sectors. Each sector is divided into three (3) beats, each patrolled by a single officer.

Fire prevention, suppression, and protection services for the Waiehu, Waihee, and Wailuku regions are provided by the County Department of Fire and Public Safety's Wailuku station, located on Kinipopo Street in Wailuku Town, approximately 0.9 mile northeast of the project site. The region is also served by the Department's Kahului Station, located on Dairy Road, approximately 3.7 miles east of the project site.

**b. Potential Impacts and Mitigation Measures**

The proposed project will not affect the service area limits or personnel for police and fire protection. The proposed facility is not anticipated to impact calls for service for police and fire personnel.

**2. Medical Services**

**a. Existing Conditions**

The island's major medical facility is Maui Memorial Medical Center, located approximately 3.0 miles north of the project site, midway between Wailuku and Kahului. Acute, general, and emergency care services are provided at the 231-bed facility. Other private medical service providers in the Central Maui region, which have regular hours, include Maui Medical Group and Kaiser Permanente.

**b. Potential Impacts and Mitigation Measures**

As a non-habitable project, the proposed facility will not affect requirements for medical services. As with police and fire protection services, service area limits for medical emergency responders will not be affected by the proposed project.

**3. Solid Waste**

**a. Existing Conditions**

Single-family residential solid waste collection service is provided by the County of Maui. Residential solid waste collected by County crews is disposed at the County's Central Maui Landfill, located four (4) miles southeast of the Kahului Airport. Commercial waste from private collection companies is also disposed at the Central Maui Landfill. A County-operated green waste recycling facility is located at the Central Maui Landfill.

Maui Demolition and Construction Landfill, a privately owned facility, accepts solid waste and concrete from demolition and construction activities. This facility is located at Maalaea, south of the project site, near Honoapiilani Highway's junction with North Kihei Road and Kuihelani Highway.

b. **Potential Impacts and Mitigation Measures**

Construction waste which may be generated from implementation of the project will be recycled or disposed of at the appropriate construction waste disposal location. With these solid waste management measures, the contribution of construction waste to the landfills will be minimized. Thus, the proposed action is not anticipated to adversely affect capacity parameters of the County's solid waste system.

4. **Recreational Resources**

a. **Existing Conditions**

The County's Wailuku Elementary School Park is located less than a quarter of a mile from the site, providing baseball/softball fields, basketball courts, a volleyball court, and a playground.

b. **Potential Impacts and Mitigation Measures**

As the proposed project is not considered to be a population generator, it will not create a need for additional recreational facilities. Therefore, the proposed project is not anticipated to adversely impact existing public recreational facilities.

5. **Schools**

a. **Existing Conditions**

The Wailuku-Kahului region is served by the State Department of Education's (DOE) public school system and by several privately operated schools. Public schools operated by DOE in the Kahului area include Lihikai, Kahului, and Pomaikai Elementary Schools (Grades K-5); Maui Waena Intermediate School (Grades 6-8); and Maui High School (Grades 9-12). Existing DOE public schools in the Wailuku area include Wailuku Elementary School (Grades K-5); Iao Intermediate School (Grades 6-8); and Baldwin High School (Grades 9-12). The University of Hawaii-Maui College, located north of the project site in Kahului, serves as the island's primary higher education institution. A new public elementary school, the Puu Kukui Elementary School (Grades K-5), recently opened within the Kehalani Mauka development.

b. **Potential Impacts and Mitigation Measures**

The proposed facility is a non-residential project and is not anticipated to impact school enrollments or facility requirements.

**D. INFRASTRUCTURE**

1. **Roadways**

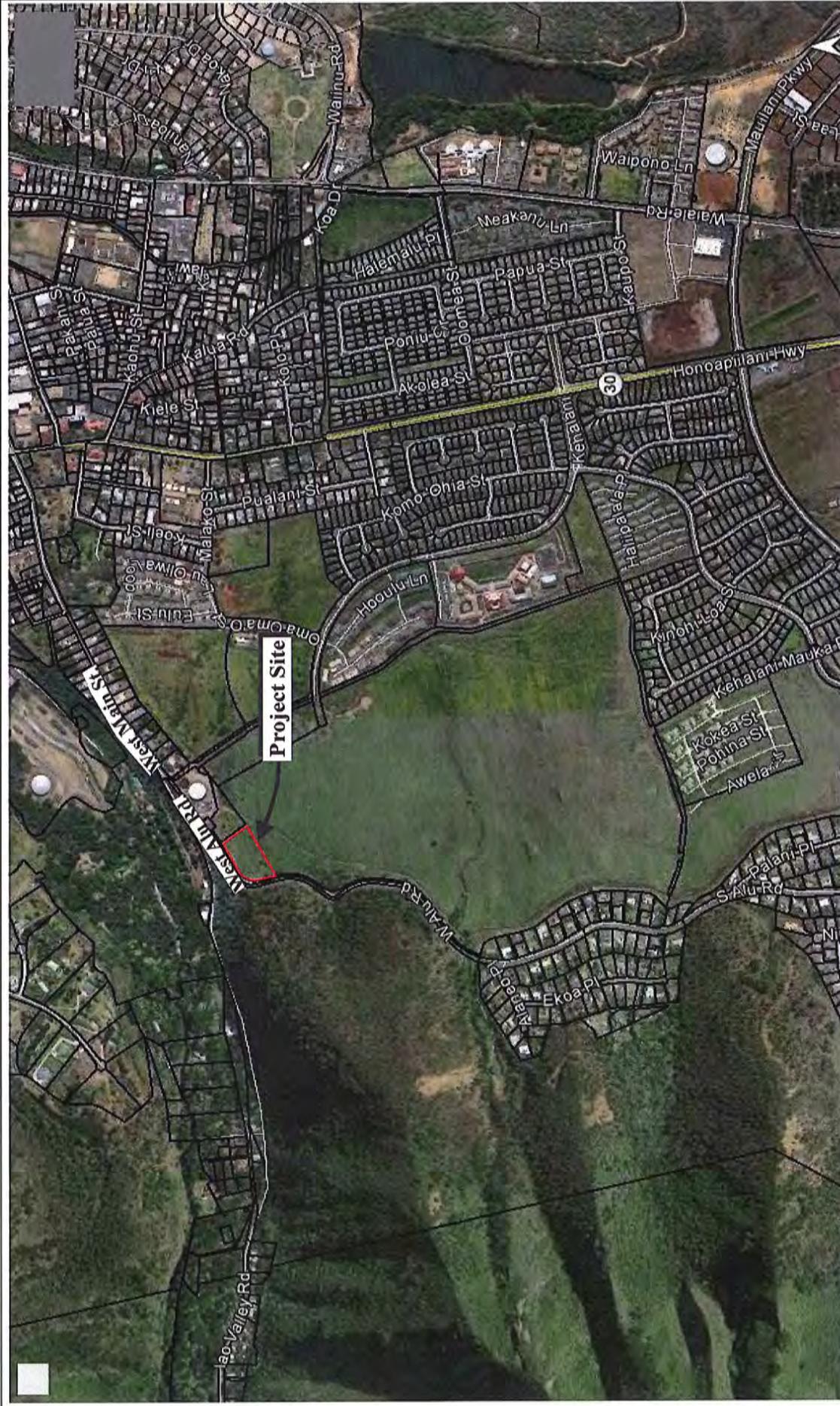
a. **Existing Conditions**

The proposed Iao WTP site will be located on an undeveloped parcel adjacent to West Alu Road. Currently, there is no vehicular access to the proposed project site.

West Alu Road is a two-lane roadway that originates at the junction with Iao Valley Road and West Main Street. West Alu Road provides access through the Wailuku Heights residential neighborhood while Iao Valley Road continues west into Iao Valley. West Main Street is a two-lane east-west roadway that runs through Wailuku Town. See **Figure 8**.

b. **Potential Impacts and Mitigation Measures**

Access to the project site will be by a new driveway off of West Alu Road. No roadway improvements are included in the WTP design other than the proposed driveway entrance. There will be a short-term increase in traffic during construction of the new Iao WTP associated with construction workers and equipment entering and leaving the project site. A maximum of 20 to 25 construction employees are expected to work at the project site. Parking for construction employees will be located on the project site to minimize additional traffic impacts. Limited construction access use will be confined to the two (2) year construction period. Construction of the proposed project is not anticipated to significantly impact pedestrian or vehicular movement and minimal road or lane closures are expected during the course of the project.



Source: Google Earth Pro

**Figure 8** Proposed Iao Water Treatment Plant Upgrades  
Regional Roadway Map



NOT TO SCALE

Prepared for: County of Maui, Department of Water Supply



ATA:Iao WTF Upgrades\RegionalRoadwayMap

Once the facility is in operation, there will be two (2) to three (3) DWS employees working at the WTP, seven days a week. Based on this anticipated level of maintenance and monitoring, significant long-term impacts to traffic conditions in the vicinity of the WTP site are not anticipated.

## 2. Water

### a. Existing Conditions

The source raw water for the Iao WTP for treatment is the watershed area draining into the upper reaches of Iao Stream. There is a ditch intake in Iao Stream, near Iao Valley State Park, that diverts stream water into Iao Ditch. Shortly downstream of the Iao Ditch intake, the ditch divides into two (2) ditches. The Iao-Maniania Ditch flows north towards Waiehu, and the Iao-Waikapu Ditch flows south towards Maalaea. Where the Iao-Waikapu Ditch crosses Alu Road, an intake diverts water from the ditch into the raw water transmission line that conveys the water to the Iao WTP. Refer to **Appendix "A"**.

As previously noted, the amount of water allowed for use at the Iao Water Treatment Plant was arrived at in a recent agreement accepted by all parties (Hui o Na Wai Eha, Maui Tomorrow Foundation, the Office of Hawaiian Affairs, Hawaiian Commercial and Sugar Company, Wailuku Water Company, the County of Maui Department of Water Supply, and the State of Hawaii Commission on Water Resource Management). Impacts to streams were taken into consideration during discussions on the agreement. With anticipated growth in the Central Maui system that encompasses customers from Hookipa to Makena, and the fact that the Iao aquifer is nearing its sustainable yield, surface water is needed to provide water for future growth.

### b. Potential Impacts and Mitigation Measures

The proposed project involves replacing the existing Iao WTP, which has a capacity to produce approximately 1.7 mgd of treated water, with a new WTP. The new WTP is designed to produce an average of up to 3.2 mgd of treated water.

As previously noted, CWRM concluded that the water diverted from Iao Stream for the Iao WTP is a reasonable current and future use for purposes of the restoration of stream flows under an amended IIFS. Further, the IIFS agreement between the parties noted the 3.2 mgd for the DWS' Iao WTP. It is noted that DWS submitted Surface Water Use Permit Applications (SWUPAs) to CWRM: SWUPA-E for its existing use of 1.784 mgd and SWUPA-N for a new use of 1.416 mgd from the Iao-Waikapu Ditch, for a total of 3.2 mgd. However, the water use permit application proceedings are pending as CWRM has continued the hearings on all existing use SWUPAs and has not yet taken up the matters of the new use SWUPAs.

### **3. Wastewater**

#### **a. Existing Conditions**

The site is presently vacant and undeveloped with no wastewater being generated. There is an existing off-site 8-inch sewer gravity line and manhole along West Alu Road approximately 700 feet downhill of the site. The existing 8-inch sewerline is part of the Central Maui Wastewater Collection System which conveys wastewater for treatment to the Kahului Wastewater Reclamation Facility.

#### **b. Potential Impacts and Mitigation Measures**

Wastewater generated from the Restroom and Break Room in the TPB will be conveyed to an on-site 6-inch gravity line with cleanouts. The 6-inch gravity line will transition into an off-site 8-inch gravity line with manholes within West Alu Road. The 8-inch gravity line will then convey the wastewater to a discharge point into an existing sewer manhole along West Alu Road approximately 700 feet downhill of the project site. Refer to **Appendix "A"**.

The wastewater flow from the TPB is estimated to be 60 gallons per day, which is minimal. Therefore, wastewater generated from the TPB is not anticipated to negatively impact the existing sewer collection and treatment plant facilities in the central region.

#### 4. Drainage

##### a. Existing Conditions

The project site is currently undeveloped and covered with dense high grass. The land slopes from west to east averaging approximately nine (9) percent. Elevations range from 508 to 560 feet msl. West Alu Road is situated slightly higher and borders the site's north and west boundaries.

Annual rainfall is around 37 inches, making the climate semi-arid. Rainfall is also highly seasonal with 90 percent of the annual rainfall occurring between October and May. The 10- and 50-year, 1-hour rainfall is 2.5 and 3.6 inches, respectively.

Site runoff drains over land as sheet flow to the east through vacant open land. There are no drainageways or areas of concentrated flow. Runoff normally infiltrates into the open field lands but in intense storm events, runoff may reach and enter Waihee Ditch which is located approximately 600 feet makai of the site. Waihee Ditch flows to Waiale Reservoir via the Hopoi Chute and to irrigated agricultural fields. Refer to **Appendix "B"**.

Existing storm water runoff from the project site under the 10-year storm is 4.15 cubic feet per second (cfs). Mountainous offsite land above West Alu Road contributes an additional 33.15 cfs of runoff. The total runoff flowing through the project site to Waihee Ditch is 37.30 cfs.

The project site is not within any Federal Emergency Management Agency (FEMA) flood zone area. The area lies within Zone X, which are areas determined to be outside the 0.2 percent annual chance (500-year) floodplain. Refer to **Figure 7**.

##### b. Potential Impacts and Mitigation Measures

Proposed site grading will feature excavation on the mauka end and embankment of the makai end to create a relatively level pad area. Embankment slopes will be limited to two (2) feet horizontal to one (1) foot vertical with no retaining walls. Maximum cut will be about 16 feet and the maximum embankment will be 8 feet.

The proposed project is within the Kehalani Mauka Development (KMD) which has an approved drainage master plan by Warren S. Unemori Engineering titled "Drainage Report, Kehalani Offsite Drainage System – Phase 1, Wailuku, Maui, Hawaii, Revised January 2004". The report designed the current back-bone drainage system that collects and conveys KMD runoff to a downstream stormwater management system which includes the 490 acre-foot Waikapu Retention Basin located adjacent to Waiale Road.

The runoff from the proposed project site and its offsite contributing area will be collected and conveyed to the Waikapu Retention Basin. The proposed storm drainage system will consist of a 36-inch inlet headwall to collect offsite runoff entering the site from offsite mountainous areas from the west through the existing 36-inch West Alu Road culvert. Eight (8) grated drain inlets will collect runoff from the project site and other offsite areas. This runoff will be conveyed via adequately sized storm sewer pipes, approximately 1,500 feet to Kehalani Parkway to connect into a 54-inch storm drain pipe located within Kehalani Mauka Parkway and directed to the Waikapu Retention Basin. Management of peak runoff is provided by the Waikapu Retention Basin, which is designed to fully retain the 100-year, 24-hour runoff from full build out of all phase of the Kehalani Mauka Development plus its mauka offsite contributing areas.

The proposed improvements for this project will be designed in accordance with the Department of Public Works (DPW) Storm Drainage Rules and will conform to the drainage design set forth in the approved KMD Drainage Master Plan. With implementation of the proposed storm drain system, the runoff flowing into Waihee Ditch will decrease from 37.30 cfs under existing conditions to 1.21 cfs, a decrease of 36 cfs. Runoff that will be conveyed to the Waikapu Retention Basin will total 43.12 cfs. The runoff from this project will be completely retained in the basin resulting in zero discharge into any downstream drainage system.

During the construction phase of the project, temporary Best Management Practices (BMP) will be implemented to prevent pollution of downstream resources. In the long term, the basin will capture all suspended solids and potential pollutants to not contribute to any downstream drainageways. Furthermore, a Stormwater Runoff Control Practices and Maintenance Plan will be developed to properly manage permanent BMP features on the future site. Refer to **Appendix "B"**.

The proposed drainage design and development of a Stormwater Runoff Control Practices and Maintenance Plan will insure that the project will have no adverse effects on the existing facilities or on the surrounding environment.

## **5. Electricity and Telephone Systems**

### **a. Existing Conditions**

Electricity and telephone service in the project vicinity is provided by an overhead system along West Main Street and West Alu Road.

### **b. Potential Impacts and Mitigation Measures**

The project will require at least one (1) new Maui Electric Company, Ltd. (MECO) pole to cross West Alu Road via overhead conductors. A riser from the last pole will convert to an underground feed to a new MECO pad-mounted transformer. A standby generator installed at the WTP will automatically start-up to provide full back-up power in the event of a utility outage.

The telephone service for the new treatment building will utilize at least one (1) new MECO pole to cross West Alu Road via overhead conductors.

Addition of these utility services is not anticipated to have adverse impacts on the electrical and telephone services in the area.

## **E. CUMULATIVE AND SECONDARY IMPACTS**

Cumulative impacts are defined by Title 11, Chapter 200, HAR, Environmental Impact Statement Rules as:

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

A "secondary impact" or "indirect effect" from the proposed action are defined by Title 11, Chapter 200, HAR as

*"effects which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable."*

In this case, the context for analyzing secondary and cumulative impacts is defined by the time horizon within which “reasonably foreseeable” conditions may occur. From a local planning standpoint, the future context for water use and development is established by the Water Use and Development Plan (WUDP) and the Maui County General Plan. Both documents are inseparable, as the General Plan defines parameters for growth, while the WUDP provides a means for meeting the needs of this planned growth. The updated WUDP for Central Maui was adopted by the County Council in December 2010 while the General Plan was updated in 2012. Both documents plan for the horizon year 2030. Both planning documents utilize the same technical data base for planning consistency purposes. Thus, “reasonably foreseeable” conditions may be considered within this future context.

The Maui County General Plan, as set forth in Chapter 2.80.B of the Maui County Code, provides for the update of the County General Plan. The General Plan is a long-term, comprehensive blueprint for the physical, economic, environmental development and cultural identity of the County through 2030. The components of the General Plan include the following:

- The Countywide Policy Plan provides broad policies and objectives which portrays the desired direction of the County’s future. It includes a countywide vision, statement of core principles, and objectives and policies for population, land use, the environment, the economy, and housing.
- The Maui Island Plan (MIP) provides a land use strategy, water assessment, nearshore ecosystem assessment, an implementation strategy, and milestone measurements. An essential element of the MIP is a Managed and Directed Growth Plan which identifies existing and future land use patterns and determines planned growth.
- The nine (9) Community Plans provide implementing actions based on consistency with the Countywide Policy Plan and MIP’s vision, goals, objectives, and policies.

A discussion of how the proposed project is consistent with specific goals, objectives, and policies of the Countywide Policy Plan, Maui Island Plan, and Wailuku-Kahului Community Plan are presented in Chapter III of this EA document.

Whereas the Countywide Policy Plan covers planning goals and objectives at the broadest levels, and the regional Community Plans consider specific regional needs and opportunities, the MIP and the WUDP may be viewed as parallel plans, in that both address functional elements of the General Plan, and both address islandwide growth parameters which will ultimately dictate water consumption patterns on the island.

The MIP is used by the County Council, Maui Planning Commission, County administration and the community as a policy foundation for day-to-day decision making by doing the following:

- Providing direction for the development of future policies and regulations (for example, zoning and other ordinances, guidelines and area-specific plans that describe what kind of development can occur where);
- Providing policies to help determine the appropriateness of development proposals; and
- Assigning resource for capital investments and programmatic initiatives.

The Directed Growth Plan, which is a key element of the MIP, provides a framework for managing outcomes of growth based on analysis of natural hazards, sensitive lands, cultural resources, scenic corridors, and related environmental and human community parameters. An important component of the Directed Growth Plan is maps that delineate urban and rural growth areas. Referred to as Urban and Rural Growth Boundaries, these maps set the boundaries for the physical limits of development. In so doing, the Directed Growth Plan seeks to manage the use of non-urban and non-rural resources important in sustaining the island to the year 2030.

In light of the foregoing, the assessment of cumulative and secondary impacts is undertaken in the context of planned growth recommended by the General Plan update process, particularly the MIP and its Urban and Rural Growth boundary maps. The proposed urban and rural growth boundaries provide the basis for acknowledging that the proposed Iao WTP will facilitate implementation of the General Plan, as mandated by County Charter. Future housing and commercial development currently envisioned by the General Plan within the Central Maui Water Service Area represents the “reasonably foreseeable” future for considering potential impacts of the proposed project. The spatial order of development of these units is not defined, however, as development timelines are governed by market conditions, discretionary approval processes, and landowners’ financial capacity and preference to build. Notwithstanding, proposed water treatment capacity provided by the proposed project will, over time, support the County-planned growth in the region. It is noted that the Iao WTP is but one infrastructural component which is required to ensure that the MIP is implemented as required by the County Charter. Other infrastructure components include the need for sufficient wastewater collection, treatment and disposal capacity, and sufficient regional and local transportation system networks that will provide for community connectivity and mobility.

In summary, the proposed is being planned in consideration of the long-term infrastructural requirements necessary to support planned future growth in the Central Maui region. The proposed project is not anticipated to have a significant adverse impact on the physical environment. Assessing the project in the context of the future planned growth in the Central Maui region in the foreseeable future, the proposed action is not anticipated to result in significant adverse secondary or cumulative impacts.

### **III. RELATIONSHIP TO LAND USE PLANS, POLICIES, AND CONTROLS**

### **III. RELATIONSHIP TO LAND USE PLANS, POLICIES, AND CONTROLS**

#### **A. STATE LAND USE DISTRICTS**

Pursuant to Chapter 205, Hawaii Revised Statutes (HRS), all lands in the State have been placed into one (1) of four (4) land use districts by the State Land Use Commission. These land use districts have been designated “Urban”, “Rural”, “Agricultural”, and “Conservation”. The Iao WTP site (Parcels 67 and 91) is classified as mainly “Urban” with a small portion of Parcel 91 designated “Agricultural” and is a permitted use within both districts. See **Figure 9**.

#### **B. CHAPTER 226, HRS, HAWAII STATE PLAN**

Chapter 226, HRS, also known as the Hawaii State Plan, is a long-range comprehensive plan which serves as a guide for the future long-range development of the State by identifying goals, objectives, policies, and priorities, as well as implementation mechanisms. The proposed action is consistent with the following goals of the Hawaii State Plan:

*A strong, viable economy, characterized by stability, diversity, and growth, that enables the fulfillment of the needs and expectations of Hawaii's present and future generations.*

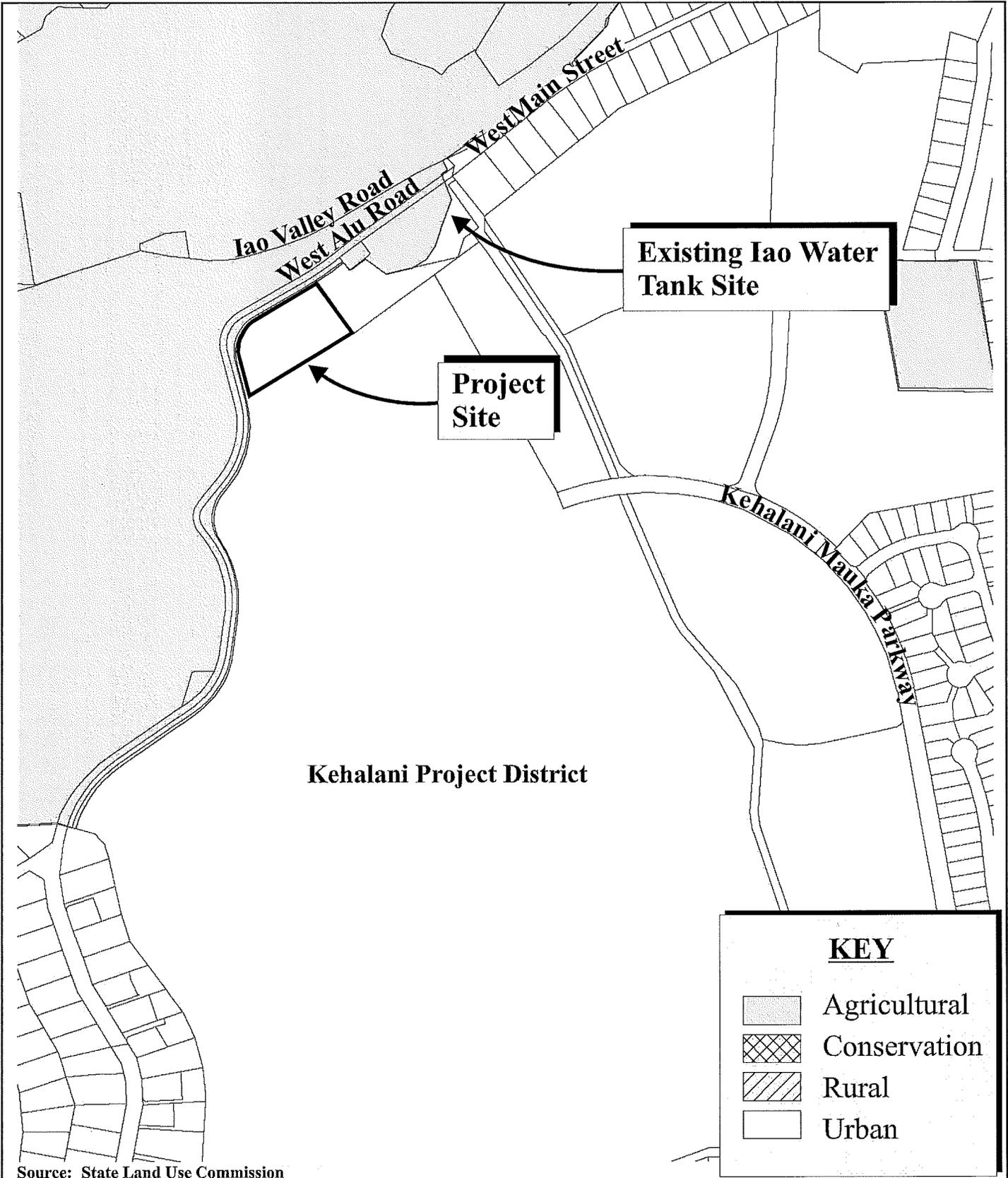
##### **1. Objectives and Policies of the Hawaii State Plan**

The proposed action is consistent with the following objectives and policies of the Hawaii State Plan:

##### **Chapter 226-11, HRS, Objectives and Policies for the Physical Environment - Land-Based, Shoreline, and Marine Resources**

**226-11(b)(3), HRS:** *Take into account the physical attributes of areas when planning and designing activities and facilities.*

**226-11(b)(4), HRS:** *Manage natural resources and environs to encourage their beneficial and multiple use without generating costly or irreparable environmental damage.*



Source: State Land Use Commission

**Figure 9** Proposed Iao Water Treatment Plant Upgrades  
State Land Use District Map



226-11(b)(8), HRS: *Pursue compatible relationships among activities, facilities, and natural resources.*

**Chapter 226-13, HRS, Objectives and Policies for the Physical Environment - Land, Air, and Water Quality**

226-13(b)(2), HRS: *Promote the proper management of Hawaii's land and water resources.*

226-13(b)(3), HRS: *Promote effective measures to achieve desired quality in Hawaii's surface, ground, and coastal waters.*

**Chapter 226-14, HRS, Objectives and Policies for the Facility Systems - In General**

226-14(b)(1), HRS: *Accommodate the needs of Hawaii's people through coordination of facility systems and capital improvement priorities in consonance with state and county plans.*

**Chapter 226-16, HRS, Objectives and Policies for the Facility Systems - Water**

226-16(b)(1), HRS: *Coordinate development of land use activities with existing and potential water supply.*

226-16(b)(4), HRS: *Assist in improving the quality, efficiency, service, and storage capabilities of water systems for domestic and agricultural use.*

**2. Priority Guidelines of the Hawaii State Plan**

The proposed action coincides with the following priority guidelines of the Hawaii State Plan.

**Chapter 226-103, HRS, Economic Priority Guidelines:**

226-103(e)(4), HRS: *Explore alternative funding sources and approaches to support future water development programs and water system improvements.*

## C. GENERAL PLAN OF THE COUNTY OF MAUI

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

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

Chapter 2.80B of the Maui County Code, relating to the General Plan and Community Plans, implements the foregoing Charter provision through enabling legislation which calls for a Countywide Policy Plan. The Countywide Policy Plan was adopted as Ordinance No. 3732 on March 24, 2010.

With regard to the Countywide Policy Plan, Section 2.80B.030 of the Maui County Code states the following.

*The countywide policy plan shall provide broad policies and objectives which portray the desired direction of the County's future. The countywide policy plan shall include:*

- 1. A vision for the County;*
- 2. A statement of core themes or principles for the County; and*
- 3. A list of countywide objectives and policies for population, land use, the environment, the economy, and housing.*

Core principles set forth in the Countywide Policy Plan are listed as follows:

- 1. Excellence in the stewardship of the natural environment and cultural resources;*
- 2. Compassion for and understanding of others;*
- 3. Respect for diversity;*
- 4. Engagement and empowerment of Maui County residents;*
- 5. Honor for all cultural traditions and histories;*

6. *Consideration of the contributions of past generations as well as the needs of future generations,*
7. *Commitment to self-sufficiency;*
8. *Wisdom and balance in decision making;*
9. *Thoughtful, island appropriate innovation; and*
10. *Nurturance of the health and well-being of our families and our communities.*

Congruent with these core principles, the Countywide Policy Plan identifies goals objectives, policies and implementing actions for pertinent functional planning categories, which are identified as follows:

1. *Natural environment*
2. *Local cultures and traditions*
3. *Education*
4. *Social and healthcare services*
5. *Housing opportunities for residents*
6. *Local economy*
7. *Parks and public facilities*
8. *Transportation options*
9. *Physical infrastructure*
10. *Sustainable land use and growth management*
11. *Good governance*

With respect to the proposed Iao WTP improvements, the following goals, objectives, policies and implementing actions are illustrative of the compliance with the Countywide Policy Plan.

## **IMPROVE PHYSICAL INFRASTRUCTURE**

### **Goal:**

*Maui County's physical infrastructure will be maintained in optimum condition and will provide for and effectively serve the needs of the County through clean and sustainable technologies.*

### **Objective:**

*Improve water systems to assure access to sustainable, clean, reliable, and affordable sources of water.*

### **Policies:**

- *Ensure that adequate supplies of water are available prior to approval of subdivision or construction documents.*
- *Develop and fund improved water-delivery systems.*
- *Retain and expand public control and ownership of water resources and delivery systems.*
- *Improve the management of water systems so that surface-water and groundwater resources are not degraded by overuse or pollution.*
- *Seek reliable long-term sources of water to serve developments that achieve consistency with the appropriate Community Plans.*

### **Objective:**

*Improve the planning and management of infrastructure systems.*

### **Policies:**

- *Provide a reliable and sufficient level of funding to enhance and maintain infrastructure system.*
- *Maintain inventories of infrastructure capacity, and project future infrastructure needs.*
- *Ensure that infrastructure is built concurrent with or prior to development.*

In summary, the proposed project is consistent with the above-noted themes and principles of the Countywide Policy Plan.

## **D. MAUI ISLAND PLAN**

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

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

1. *An island-wide land use strategy, including a managed and directed growth plan*
2. *A water element addressing supply, demand and quality parameters*
3. *A nearshore ecosystem element addressing nearshore waters and requirements for preservation and restoration*
4. *An implementation program which addresses the County's 20-year capital improvement requirements, financial program for implementation, and action implementation schedule*
5. *Milestone indicators designed to measure implementation progress of the MIP*

It is noted that Ordinance No. 4004 does not address the component relating to the implementation program. Chapter 2.80B of the Maui County Code, relating to the General Plan, was amended via Ordinance No. 3979, October 5, 2012, to provide that the implementation program component be adopted no later than one (1) year following the effective date of Ordinance No. 4004. The implementation program component of the MIP was adopted by Ordinance No. 4126 on May 29, 2014.

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

1. *Population*
2. *Heritage Resources*
3. *Natural Hazards*
4. *Economic Development*
5. *Housing*
6. *Infrastructure and Public Facilities*
7. *Land Use*

Additionally, an essential element of the MIP is its directed growth plan which provides a management framework for future growth in a manner that is fiscally, environmentally, and culturally prudent. Among the directed growth management tools developed through the MIP process are maps delineating urban growth boundaries (UGB), small town

boundaries (SRB) and rural growth boundaries (RGB). The respective boundaries identify areas appropriate for growth and their corresponding intent with respect to development character.

The proposed Iao WTP improvements project is located within the UGB. In this regard, it is consistent with the directed growth strategy defined via growth maps adopted in the MIP.

In addition, the proposed project has been reviewed with respect to pertinent goals, objectives, policies and implementing actions of the MIP. A summary of these policy statements are provided below:

## **INFRASTRUCTURE AND PUBLIC FACILITIES – WATER**

### **Goal:**

*6.3 Maui will have an environmentally sustainable, reliable, safe, and efficient water system.*

### **Objective:**

*6.3.2 Increase the efficiency and capacity of the water systems in striving to meet the needs and balance the island's water needs.*

### **Policies:**

*6.3.2.a Ensure the efficiency of all water system elements including well and stream intakes, water catchment, transmission lines, reservoirs, and all other system infrastructure.*

*6.3.2.d Work with appropriate State and County agencies to achieve a balance in resolving the needs of water users in keeping with the water allocation priorities of the MIP.*

### **Objective:**

*6.3.3 Improve water quality and the monitoring of public and private water systems.*

### **Policy:**

*6.3.3.a Protect and maintain water delivery systems.*

**E. WAILUKU-KAHULUI COMMUNITY PLAN**

The project site is located within the Wailuku-Kahului Community Plan region, one (1) of nine (9) community plan regions established in the County of Maui. Planning for each region is guided by the respective community plan, which is designed to implement the Maui County General Plan. Each community plan contains recommendations and standards which guide the sequencing, patterns and characteristics of future development in the region.

The Wailuku-Kahului Community Plan was adopted by the County of Maui and took effect in 2002. Land use guidelines are set forth by the Wailuku-Kahului Community Plan Land Use Map. The Iao WTP project is designated "Project District 3" by the Wailuku-Kahului Community Plan Map. See **Figure 10** and **Appendix "G"**. The guidelines for Project District 3 calls for:

*...units of all types, including single family detached, attached and various forms of multi-family units including townhouses and garden apartments. Alternatives to promote affordable housing such as experimental and demonstration housing shall be considered in the residential development.*

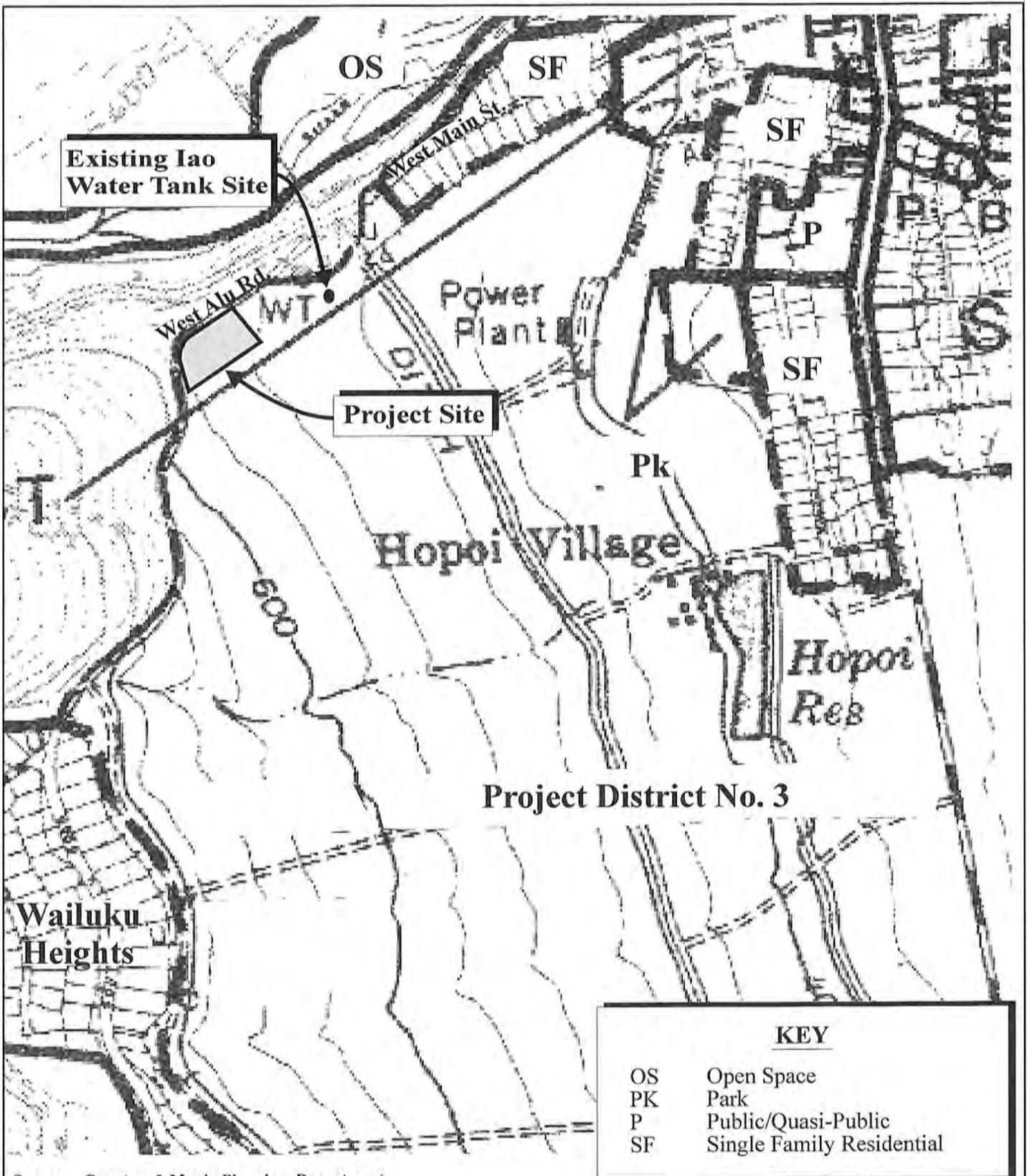
*A neighborhood commercial center of at least 20 acres should be provided with convenient access for residences of the project district and adjacent residential areas. Public amenities should include a continuous system of parks and open space areas which would include pedestrian ways and green-belts with buffer zones along the highway.*

*Public use areas should be reserved within the Project District to accommodate a school, park use and any other public facilities that may be required should the need arise in the future.*

*The immediate construction of the Waiale Road extension, from Honoapiilani Highway to its intersection with the Mahalani Road extension, will facilitate access between Kahului and Wailuku.*

*Recommended guidelines for spatial allocations within the project district are:*

<i>School (elementary)</i>	<i>10 acres</i>
<i>Park</i>	<i>20 acres</i>
<i>Community center</i>	<i>5 acres</i>
<i>Open Space, and drainage</i>	<i>94 Acres</i>



**Figure 10** Proposed Iao Water Treatment Plant Upgrades  
Wailuku-Kahului Community Plan Map

NOT TO SCALE



<i>Neighborhood commercial center</i>	<i>20 acres</i>
<i>Residential use</i>	<i>396 acres</i>
<i>Residential units based on an average density of 5.1 units per acre</i>	<i>2,000 units</i>

The proposed action is consistent with the following goals, objectives, and policies of the Wailuku-Kahului Community Plan.

## **GOVERNMENT**

### **Goal:**

*Government that demonstrates the highest standards of fairness; responsiveness to the needs of the community; fiscal integrity; effectiveness in planning and implementation of programs and projects; a fair and equitable approach to taxation and regulation; and efficient, results-oriented management.*

### **Objectives and Policy:**

- *Ensure that adequate infrastructure is or will be available to accommodate planned development.*

## **INFRASTRUCTURE**

### **Goal:**

*Timely and environmentally sound planning, development and maintenance of infrastructure systems which serve to protect and preserve the safety and health of the region's residents, commuters and visitors through the provision of clean water, effective waste disposal and drainage systems, and efficient transportation systems which meet the needs of the community.*

### **Objectives and Policies:**

- *Coordinate water system improvement plans with growth areas to ensure adequate supply and a program to replace deteriorating portions of the distribution system. Future growth should be phased to be in concert with the service capacity of the water system.*
- *Improve the quality of domestic water.*

- *Protect water resources in the region from contamination, including protecting ground water recharge areas, and wellhead protection areas within a 1.25-mile radius from the wells.*
- *Coordinate the construction of all water and public roadway and utility improvements to minimize construction impacts and inconveniences to the public.*

## **F. COUNTY ZONING**

The Iao WTP site (Parcel 67) and Parcel 091 (Lot T-1), which will provide access to the Iao WTP, are located within the “Wailuku Project District 3 (Kehalani)”, according to Maui County zoning. The purpose of this project district is to “*provide for a flexible and creative approach to development which considers physical, environmental, social, and economic factors in a comprehensive manner*”. And, the intent of this project district is to “*establish a residential community along with an integrated open space and recreation system, future school sites, and community shopping facilities to serve the expanding Wailuku-Kahului population*”. The Iao WTP project site is designated for “single-family residential” use within the Wailuku Project District 3 (Kehalani) for TMK (2) 3-5-001:067(por.). The access driveway portion of the project is proposed within the adjacent TMK (2) 3-5-001:091(por.) that is designated as “Public/Quasi Public”. A Project District Phase II and III application will need to be submitted and approved in order for the proposed project to proceed. Refer to **Appendix “G”**.

Criteria considered in the assessment of a Phase II Project District approval for the proposed project are set forth in MCC Chapter 19.45 and are as follows:

### **1. Infrastructure Service for Project Site**

Infrastructure services to the proposed project site are provided as summarized below.

#### **a. Access**

Access to the project site will be provided by a driveway off of Alu Road through the adjacent parcel, TMK (2)3-5-001:091. DWS will acquire lands for the driveway through Parcel 091 (Lot T-1).

#### **b. Water**

Water service for the project site will be provided by the County DWS. A 12-inch service waterline will tap into DWS’s 12-inch main in West Alu

Road to provide service water to the WTP. The service line will provide source water for the WTP plumbing fixtures, washdown facilities, etc. The service line will also provide for fire protection for the WTF via an on-site fire hydrant.

c. **Wastewater**

Wastewater generated from the restroom, lunchroom and office/laboratory, and water from floor drains throughout the TPB will connect to an on-site 6-inch gravity line with cleanouts that transitions into an off-site 8-inch gravity line with manholes. This 8-inch gravity line will convey the wastewater to a discharge point into an existing sewer manhole along West Alu Road.

d. **Drainage Improvements and Erosion Control**

The proposed improvements for this project will be designed in accordance with the Department of Public Works (DPW) Storm Drainage Rules and will conform to the drainage design set forth in the approved Kehalani Mauka Development drainage master plan. The runoff from the proposed project site and its offsite contributing areas will be collected by a new onsite storm drain system. The proposed storm drain system will have adequate capacity and the post-development runoff will be retained.

Erosion control and water quality measures will be provided to minimize pollution during and after construction. Best Management Practices may include temporary sediment basins, temporary diversion berms and swales to intercept runoff, silt fences, dust fences, slope protection, stabilized construction entrances and truck wash-down areas. Periodic water spraying of loose soils will be employed to minimize air-borne dirt particles. The project will also need to apply for and meet the requirements of a National Pollution Discharge Elimination System (NPDES) permit.

The project will also comply with the County's recently adopted "Rules for the Design of Storm Water Treatment Best Management Practices".

e. **Landscaping**

The proposed project is for a water treatment plant and associated facilities. Landscaping will be included on the south boundary to offset the impacts of the WTP building and sludge lagoons. Refer to **Appendix “C”**, Sheet L-3.

2. **Proposals for Recreation and Community Facilities**

The proposed project involves the construction of a water treatment plant and related facilities. There are no proposals for recreation and community facilities associated with the proposed action.

3. **Proposals for Floor Area Ratios, Lot Coverage, Net Buildable Areas, Open Space**

The project site is approximately 2.6 acres in size. The proposed project includes an approximately 9,800 square foot Treatment Plant Building (TPB) which will house a filtration area, office, break room, generator room, storage, and other related uses. The TPB will cover approximately 9 percent of the lot. A site plan and plans for the TPB are provided in the Preliminary Engineering Report. Refer to **Appendix “A”**.

4. **Statement on Potential Environmental, Socioeconomic, and Aesthetic Impacts**

See Chapter II of the Draft EA.

**G. COASTAL ZONE MANAGEMENT OBJECTIVES AND POLICIES**

Pursuant to Chapter 205-A, Hawaii Revised Statutes, projects should be evaluated with respect to Coastal Zone Management (CZM) objectives, policies and guidelines. The project site is approximately 2.5 miles away from the coastline and will not involve work within the County of Maui’s Special Management Area (SMA). However, the applicability of coastal zone management considerations has been reviewed and assessed.

1. **Recreational Resources**

**Objective:**

*Provide coastal recreational opportunities accessible to the public.*

**Policies:**

- (a) *Improve coordination and funding of coastal recreational planning and management; and*
- (b) *Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:*
  - (i) *Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;*
  - (ii) *Requiring replacement of coastal resources having significant recreational value, including but not limited to surfing sites, fishponds, and sand beaches, when such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the state for recreation when replacement is not feasible or desirable;*
  - (iii) *Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;*
  - (iv) *Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;*
  - (v) *Ensuring public recreational use of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources;*
  - (vi) *Adopting water quality standards and regulating point and non-point sources of pollution to protect, and where feasible, restore the recreational value of coastal waters;*
  - (vii) *Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing; and*
  - (viii) *Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, county planning commissions; and crediting such dedication against the requirements of Section 46-6, HRS.*

**Response:** The project site is located inland, approximately 2.5 miles from the coastline. Based on the location of the project, there are no anticipated impacts on coastal recreational opportunities or existing public access to the shoreline.

## 2. **Historic Resources**

### **Objective:**

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

### **Policies:**

- (a) *Identify and analyze significant archeological resources;*
- (b) *Maximize information retention through preservation of remains and artifacts or salvage operations; and*
- (c) *Support state goals for protection, restoration, interpretation, and display of historic resources.*

**Response:** Cultural interviews were conducted for the project site. As discussed previously, the interviewees did not identify any cultural activities within the project area and concluded that the exercise of native Hawaiian rights, or any ethnic group, related to gathering, access or other customary activities will not be affected by the proposed project. Refer to **Appendix “F”**.

An Archaeological Assessment of the project site also did not identify any surface or subsurface cultural remains, historic surface features, or architecture. As such, the proposed project is not anticipated to have an adverse impact on any significant historic properties. Refer to **Appendix “E”**.

## 3. **Scenic and Open Space Resources**

### **Objective:**

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

### **Policies:**

- (a) *Identify valued scenic resources in the coastal zone management area;*

- (b) *Ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;*
- (c) *Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources; and*
- (d) *Encourage those developments which are not coastal dependent to locate in inland areas.*

**Response:** The project site does not lie within a coastal scenic view corridor nor along the shoreline. The infrastructure development at the Iao WTP facility will primarily entail low-profile improvements. The treatment plant building will be a single-story building. For these reasons, no adverse impacts on scenic or open space resources are anticipated.

#### 4. **Coastal Ecosystems**

**Objective:**

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

**Policies:**

- (a) *Improve the technical basis for natural resource management;*
- (b) *Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;*
- (c) *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*
- (d) *Promote water quantity and quality planning and management practices which reflect the tolerance of fresh water and marine ecosystems and prohibit land and water uses which violate state water quality standards.*

**Response:** As previously noted, due to the project site's location (over two (2) miles) away from the shoreline, there are no anticipated impacts to coastal ecosystems from the proposed project.

**5. Economic Uses**

**Objective:**

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

**Policies:**

- (a) *Concentrate coastal dependent development in appropriate areas;*
- (b) *Ensure that coastal dependent development such as harbors and ports, and coastal related development such as visitor facilities and energy generating facilities, are located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area; and*
- (c) *Direct the location and expansion of coastal dependent developments to areas presently designated and used for such developments and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:*
  - (i) *Use of presently designated locations is not feasible;*
  - (ii) *Adverse environmental effects are minimized; and*
  - (iii) *The development is important to the State's economy.*

**Response:** The proposed project will generate short-term construction-related employment and spending which will benefit the local economy. The proposed action does not contradict the objectives and policies for economic uses. Furthermore, the proposed project is part of the County's efforts to maintain and improve potable water service to businesses and residents in the area.

**6. Coastal Hazards**

**Objective:**

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

**Policies:**

- (a) *Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and nonpoint source*

*pollution hazards;*

- (b) Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint pollution hazards;*
- (c) Ensure that developments comply with requirements of the Federal Flood Insurance Program;*
- (d) Prevent coastal flooding from inland projects; and*
- (e) Develop a coastal point and nonpoint source pollution control program.*

**Response:** The project site falls within Zone X, an area of minimal flooding, as indicated by the Flood Insurance Rate Map for the County of Maui. Refer to **Figure 7**. Best Management Practices (BMPs) will be implemented during the construction phase to mitigate potential erosion and stormwater impacts. BMPs include the installation of drain inlet filters and silt fences along the eastern, down-slope border of the project site. Upon completion of construction, all open areas will be covered with gravel or vegetation to provide adequate slope maintenance on the property.

## **7. Managing Development**

### **Objective:**

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

### **Policies:**

- (a) Use, implement, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development;*
- (b) Facilitate timely processing of applications for development permits and resolve overlapping of conflicting permit requirements; and*
- (c) Communicate the potential short and long-term impacts of proposed significant coastal developments early in their life-cycle and in terms understandable to the public to facilitate public participation in the planning and review process.*

**Response:** The HRS Chapter 343 EA involves review by governmental agencies and provide for public involvement opportunities to comment on the project. Applicable State and County requirements will be adhered to in the design and construction of the project. Further, opportunities for review of the proposed action are offered through the regulatory review process for the Project District permitting for the project.

8. **Public Participation**

**Objective:**

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

**Policies:**

- (a) *Maintain a public advisory body to identify coastal management problems and to provide policy advice and assistance to the coastal zone management program;*
- (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-related issues, developments, and government activities; and*
- (c) *Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.*

**Response:** The project will meet County public awareness, education and participation objectives. Opportunities for agency and public review will be provided as part of the notification review and comment process required for the EA as well as the Project District permitting. On January 20, 2015, the DWS presented the proposed project at a Kehalani Homeowners Association Board meeting to solicit input.

9. **Beach Protection**

**Objective:**

*Protect beaches for public use and recreation.*

**Policies:**

- (a) *Locate new structures inland from the shoreline setback to conserve open space and to 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.*

**Response:** The proposed project is located inland, approximately 2.5 miles from the shoreline. As a result, there are no anticipated adverse impacts on beach resources.

**10. Marine Resources**

**Objective:**

*Implement the State's ocean resources management plan.*

**Policies:**

- (a) *Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;*
- (b) *Assure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;*
- (c) *Coordinate the management of marine and coastal resources and activities management to improve effectiveness and efficiency;*
- (d) *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;*
- (e) *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*

- (f) *Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.*

**Response:** As previously stated, the project site is located inland, 2.5 miles away from the ocean and is therefore, not anticipated to have any adverse impact on marine or coastal resources.

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

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

- (1) *Directly illuminates the shoreline and ocean waters; or*
  - (2) *Is directed to travel across property boundaries toward the shoreline and ocean waters.*
- (b) *Subsection (a) shall not apply to special management area use permits for structures with:*

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

**Response:** The proposed project is not located on or near the shoreline. Nevertheless, project lighting will be shielded to direct light downward.

## **H. HAWAII DRINKING WATER STATE REVOLVING FUND ENVIRONMENTAL CROSSCUTTERS**

The proposed project will be funded in part by the Hawaii Drinking Water State Revolving Fund (DWSRF). As such, the project must comply with the Environmental Cross-Cutters and Federal Requirements for DWSRF projects. **Table 2** below provides a listing of the environmental cross-cutters as well as the documentation received for the proposed Iao WTP project in addressing the requirement criteria.

**Table 2. Environmental Cross-Cutters and Project Documentation**

Environmental Authority	Procedure	Responsible Agency	Response	Project Documentation
Archaeological and Historical Preservation Act of 1974	Obtain review for all projects	State Historic Preservation Division (SHPD)	An Archaeological Field Inspection was prepared in October 2013. The Draft EA will be provided to SHPD for review and comment. The Archaeological Assessment was submitted to SHPD for approval.	Refer to Archaeological Assessment in Appendix "E".
Clean Air Act	Coordinate to assure project conforms with State Implementation Plan (SIP)	State Department of Health, Clean Air Branch	The Draft EA will be provided to the Department of Health for review and comment.	See Chapter II (Section A-10) of Draft EA for discussion of potential air quality impacts and mitigation measures.
Coastal Barrier Resources Act	Obtain review if project is located on a coastal barrier island	State Coastal Zone Management Agency	Not applicable. Project site is not located on a coastal barrier island.	Not applicable.
Coastal Zone Management Act	Obtain review if project is located in coastal zone	State Coastal Zone Management Agency	Pursuant to Chapter 205A-1, the project site is within the Coastal Zone Management Area. The project site is, however, outside of the Special Management Area (SMA). A SMA permit is not required.	See Chapter III (Section G) of this EA document for discussion of the Coastal Zone Management Program review criteria.

Environmental Authority	Procedure	Responsible Agency	Response	Project Documentation
Endangered Species Act	Obtain review by U.S. Fish and Wildlife Service for all projects	U.S. Fish and Wildlife Service (USFWS)	A biological survey for the proposed project found no federally listed endangered or threatened species of flora or fauna and did not identify any critical habitats. The USFWS was consulted during the early consultation process for the Draft EA.	Refer to Appendix "D" for the biological survey. See Chapter VIII of this EA document for a copy of the USFWS early consultation comment letter.
Environmental Justice	Are low income and minority groups affected?	U.S. Environmental Protection Agency	No low-income or minority groups will be adversely affected as a result of the proposed project. The Draft EA will be provided to the U.S. Environmental Protection Agency for review and comment.	Refer to Chapter II (Section B) of this EA document for a discussion of socioeconomic and demographic parameters.
Floodplain Management	Obtain review if project is located in or affects 100-year flood plain	Federal Emergency Management Agency	Not applicable. Project site is located in Flood Zone X and is not located in nor will it affect a 100-year flood plain.	Refer to Chapter II (Section A-5) of this EA document
Protection of Wetlands	Obtain review if project area contains wetlands	U.S. Army Corps of Engineers (COE)	Not applicable. The project site does not contain any wetlands. The U.S. Army Corps of Engineers was consulted during the early consultation process for the Draft EA.	See comment letter from U.S. Army Corps of Engineers in Chapter VIII of this EA document.

Environmental Authority	Procedure	Responsible Agency	Response	Project Documentation
Farmland Protection Policy Act	Obtain review if project area contains prime farmland	Natural Resources Conservation Service (NRCS)	The site contains lands designated as "Prime" agricultural lands by the Agricultural Lands of Importance to the State of Hawaii (ALISH) map. The WTP site and surrounding areas were cultivated with sugar cane from the mid-1800s to the 1990s. However, this area is currently vacant and undeveloped and is slated for residential development.	Refer to Chapter II (Section A-3) of this EA document for a discussion of agricultural resources.
Fish and Wildlife Coordination Act	Obtain review for all projects	USFWS	Comments from USFWS were received in the early consultation process during the preparation of the Draft EA.	Refer to Chapter VIII of this EA document for the early consultation comments from USFWS.
National Historic Preservation Act	Obtain review for all projects	SHPD	An Archaeological Assessment was prepared in October 2013. The Draft EA will be provided to SHPD for review and comment. The Archaeological Field Inspection was submitted to SHPD for approval.	Refer to the Archaeological Assessment in Appendix "E".
Safe Drinking Water Act	Obtain review if project could affect sole source aquifer	State Department of Health, Safe Drinking Water Branch (SDWB)	The proposed project will not affect a sole source aquifer. The Draft EA will be provided to the Department of Health for review and comment.	Refer to Chapter II (Section A-6 and Section D-2) of this EA document for a discussion of water quality mitigation measures.

Environmental Authority	Procedure	Responsible Agency	Response	Project Documentation
Wild and Scenic Rivers Act	Obtain review if project is located in area with Wild and Scenic Rivers	National Park Service	The project site is not located in an area with Wild or Scenic Rivers. There are no Wild or Scenic Rivers in the State of Hawaii.	Not applicable.
Consultation Process Under the Magnuson-Stevens Fishery Conservation and Management Act	Obtain review if it will affect essential fish habitat	National Marine Fisheries Service	Not applicable. The project site is located approximately 2.5 miles inland of the nearest coastline. The proposed project will not affect essential fish habitats.	Not applicable.

**IV. UNAVOIDABLE ADVERSE  
ENVIRONMENTAL EFFECTS  
AND IRREVERSIBLE AND  
IRRIETRIEVABLE  
COMMITMENTS OF  
RESOURCES**

#### **IV. UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS AND IRREVERSIBLE AND IRRIETRIEVABLE COMMITMENTS OF RESOURCES**

In the short term, the proposed Iao WTP project will result in unavoidable construction-related impacts, including noise impacts generated by construction equipment and activities. In addition, there may be temporary air quality impacts associated with dust generated from site work and exhaust emissions from construction equipment and vehicles. These noise and air quality impacts will be temporary in nature, occurring only during the 24-month construction period, and will be mitigated to the extent practicable through implementation of Best Management Practices (BMPs).

The proposed project commits a small area of land, about 2.6 acres, for the construction of the Iao WTP. Other resources which will be committed in the implementation of the proposed action include material and fuel resources. The project will result in short-term beneficial impacts related to temporary construction employment and spending.

## **V. ALTERNATIVES TO THE PROPOSED ACTION**

## V. ALTERNATIVES TO THE PROPOSED ACTION

Alternatives to the preferred alternative, which is the proposed action, include the “no action”, “deferred action,” and “alternative site location”. These alternatives are addressed below.

### A. NO ACTION ALTERNATIVE

The existing Iao Water Treatment Plant (WTP) consists of three (3) pressure membrane units that were meant to be temporary and were initially sheltered within a large tent. The tent has since been removed, leaving the units exposed to the elements for a number of years. As a result, DWS deemed the replacement of the pressure membrane units to be necessary. The proposed Iao WTP project involves the construction of a filtration building that will house three (3) new pressure membrane units and providing shelter and protection for the equipment. The proposed project will also have a larger capacity with the ability to produce an average of up to 3.2 mgd of treated water. The “no action” alternative involves the continued reliance on a WTP that was intended for temporary use only and has been left unprotected for a number of years. In addition, the “no action” alternative does not provide for additional water treatment capacity that will be required for the long-term use of the facility. Based on the foregoing factors, the “no action” alternative was not pursued.

### B. DEFERRED ACTION ALTERNATIVE

Similar to the no action alternative, the deferred action alternative involves the continued use of the existing, temporary Iao WTP facilities. In addition, the deferred action alternative would likely result in higher implementation costs as the cost of construction and equipment rise in the future. For these reasons, the deferred action alternative was not selected by DWS.

### C. ALTERNATIVE SITE LOCATION ALTERNATIVE

This alternative would involve site selection and property acquisition to develop a replacement water treatment facility at a new location. This alternative was not pursued because the site identified in the preferred alternative is adjacent to the existing Iao WTP, the raw water source, and pertinent infrastructure, making it ideally suited for a replacement facility. An alternative site would be a greater distance from the existing facility that the project is replacing and, therefore, was not selected by DWS.

# **VI. SIGNIFICANCE CRITERIA ASSESSMENT**

## VI. SIGNIFICANCE CRITERIA ASSESSMENT

The proposed project involves the construction of the Iao WTP improvements in Wailuku. The Iao WTP improvements will consist of a number of improvements including the construction of a Treatment Plant Building (TPB), Chlorine Contact Tank and Sludge Lagoon.

Since the proposed action will involve the use of State and County funds and lands, compliance with Chapter 343, Hawaii Revised Statutes (HRS), and Chapter 200 (Title 11), Hawaii Administrative Rules, Environmental Impact Statement Rules is necessary. Every aspect of the proposed action, expected primary and secondary consequences, and the cumulative as well as the short-term and long-term effects of the action have been evaluated in accordance with the Significance Criteria of Section 11-200-12 of the Administrative Rules. Discussion of project conformance to the Significance Criteria is as follows:

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

The historic agricultural practices at the project site and in the surrounding areas, have resulted in an environment that is nearly totally lacking in native plants and animal species. There are no endangered or threatened flora or fauna on the site, nor are there any archaeological, historic or cultural resources that may be affected by the proposed project. No impacts to streams or wetlands are anticipated to result from the proposed action.

Based on the discussion provided above, the proposed project is not anticipated to involve an irrevocable commitment to loss or destruction of any natural or cultural resource.

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

There are no adverse impacts to climate, topography, or soils anticipated to result from the proposed project. There are also no known rare, threatened, or endangered species of flora, fauna, or avifauna located within the project site.

The proposed Iao WTP involves lands designated for urban uses. While the project site was historically used for sugar cane cultivation, active cultivation ended in the 1990s. Furthermore, the project commits a small area of land that is

in close proximity to existing DWS infrastructure. Based on the foregoing facts, the proposed project will not curtail the beneficial use of the site.

3. **Conflicts with the state's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders.**

The proposed project does not conflict with the State's Environmental Policy and Guidelines as set forth in Chapter 344, Hawaii Revised Statutes (HRS).

4. **Substantially affects the economic welfare, social welfare, and cultural practices of the community or State.**

The proposed project will directly benefit the local economy by providing construction and construction-related employment. Therefore, the proposed project will have a positive short-term effect on economic and social welfare. From a long-term perspective, the Iao WTP project will ensure that safe and clean drinking water is provided to residents and businesses within the Central Maui service area. The cultural impact assessment did not identify any ongoing cultural practices occurring within the project site. As such, adverse impacts to cultural practices are not anticipated.

5. **Substantially affects public health.**

During the 24-month construction period, appropriate Best Management Practices will be implemented to mitigate potential air quality and noise impacts. Following construction, long-term adverse public health impacts resulting from the proposed project are not anticipated. The proposed Iao WTP project will ensure that safe and clean drinking water continues to be provided to residents and businesses in Central Maui.

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

The proposed project is not anticipated to result in significant adverse secondary impacts. No significant population changes are anticipated as a result of the proposed replacement and upgrade to the existing Iao WTP. There are no anticipated adverse effects on public services, such as police, fire, medical,

educational, or solid waste collection, as service limits or service capacities will not be affected.

7. **Involves a substantial degradation of environmental quality.**

Construction activities will create temporary short-term nuisances related to noise and dust. Appropriate dust control and noise mitigation measures will be implemented by the contractor to ensure that fugitive dust and noise generated in connection with construction is minimized.

As previously discussed in Chapter II of this EA document, adverse impacts to natural resources, cultural resources, and the natural environment are not anticipated.

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

The proposed improvements to the Iao WTP are not anticipated to cumulatively have a negative impact on the physical environment. The project does not involve a commitment to larger actions.

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

Rare, threatened or endangered species of flora, fauna, avifauna or their habitats are not expected to be affected by the proposed project, due to the fact that there are no rare, threatened, or endangered species or their habitats found on or in the vicinity of the project site.

10. **Detrimentially affects air or water quality or ambient noise levels.**

Construction activities will result in short-term air quality and noise impacts. Best Management Practices (BMPs) for dust control measures, such as regular watering and sprinkling, and erection of dust screens will be implemented to minimize construction-related air quality impacts. Short-term noise impacts will occur primarily from construction equipment. Equipment mufflers or other noise attenuating equipment, as well as proper equipment and vehicle maintenance and other BMPs are anticipated to mitigate noise from construction activities. Erosion control measures, including the installation of a grated drain inlet filter and silt

fences, will reduce the amount of silt and stormwater runoff flowing into downstream properties.

Upon completion of the project, equipment such as compressors, blowers and the standby generator within the TPB will generate noise. These equipment items will be housed within sound attenuated rooms inside the TPB such that applicable State Department of Health day-time and nighttime noise limits at the property lines are met for the compressor and blower. Refer to **Appendix "A"**.

Based on the discussion provided above, the proposed project is not anticipated to detrimentally affect air or water quality or ambient noise levels.

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

The proposed project is not located within an environmentally sensitive area and, as such, there are no anticipated adverse effects as a result of the proposed project.

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

The proposed project is not anticipated to adversely affect scenic view corridors. The infrastructure development at the Iao WTP will primarily entail low-profile improvements. The structures proposed for the project site will have heights and footprints which are not anticipated to significantly impact scenic vistas and view planes.

13. **Requires substantial energy consumption.**

The proposed project is a replacement for the existing Iao WTP facility, substantial new energy requirements are not anticipated for the proposed project. Following County of Maui initiative, along with other DWS WTP facilities, solar panels may be installed on the roof in the future.

Based on the aforementioned findings, the proposed project is anticipated to result in a Findings of No Significant Impact (AFONSI).

## **VII. LIST OF PERMITS AND APPROVALS**

## **VII. LIST OF PERMITS AND APPROVALS**

The following permits and approvals will be required prior to the implementation of the project:

### **State of Hawaii**

1. Hawaii Administrative Rules, Chapter 343 Compliance
2. National Pollutant Elimination System (NPDES) Permit, as applicable
3. Commission on Water Resource Management (CWRM), Water Use Permit (WUP), as applicable
4. CWRM Pump Installation Permit
5. Department of Health Wellhead Protection Protocols
6. Community Noise Permit, as applicable
7. Oversize/Overweight Vehicle Transport over State Highways Permit, as applicable

### **County of Maui**

1. Construction Permits (i.e., grading permit)
2. Project District Phase II and III Approval

**VIII. PARTIES CONSULTED  
DURING THE PREPARATION  
OF THE DRAFT  
ENVIRONMENTAL  
ASSESSMENT; LETTERS  
RECEIVED AND RESPONSES  
TO SUBSTANTIVE  
COMMENTS**

# VIII. PARTIES CONSULTED DURING THE PREPARATION OF THE DRAFT ENVIRONMENTAL ASSESSMENT; LETTERS RECEIVED AND RESPONSES TO SUBSTANTIVE COMMENTS

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

## FEDERAL AGENCIES

1. Larry Yamamoto, State Conservationist  
U.S. Department of Agriculture  
Natural Resources Conservation Service  
P.O. Box 50004  
Honolulu, Hawaii 96850-0001
2. George Young, Chief, Regulatory Branch  
U.S. Department of the Army  
U.S. Army Engineer District,  
Honolulu  
Regulatory Branch, Building 230  
Fort Shafter, Hawaii 96858-5440
3. Wayne Nastri, Regional Administrator  
U.S. Environmental Protection Agency  
Region 9  
75 Hawthorne Street  
San Francisco, California 94105
4. Dave Wesley, Deputy Regional Director  
U. S. Fish and Wildlife Service  
Pacific Region  
911 NE 11th Avenue  
Portland, Oregon 97232
5. Loyal A. Mehrhoff, Field Supervisor  
U. S. Fish and Wildlife Service  
300 Ala Moana Blvd., Rm. 3-122  
Box 50088  
Honolulu, Hawaii 96813

## STATE AGENCIES

6. Dean H. Seki, Comptroller  
Department of Accounting and General Services  
1151 Punchbowl Street, #426  
Honolulu, Hawaii 96813
7. Russell Kokubun, Chair  
Department of Agriculture  
1428 South King Street  
Honolulu, Hawaii 96814-2512
8. Richard C. Lim, Director  
State of Hawaii  
Department of Business, Economic Development & Tourism  
P.O. Box 2359  
Honolulu, Hawaii 96804
9. Jobie Masagatani, Chairperson  
Hawaiian Home Lands Commission  
P.O. Box 1879  
Honolulu, Hawaii 96805
10. Loretta J. Fuddy, Director  
State of Hawaii  
Department of Health  
919 Ala Moana Blvd., Room 300  
Honolulu, Hawaii 96814
11. Alec Wong, P.E., Chief  
Clean Water Branch  
State of Hawaii  
Department of Health  
919 Ala Moana Blvd., Room 300  
Honolulu, Hawaii 96814

12. Patti Kitkowski, District Environmental Health Program Chief  
State of Hawaii  
Department of Health  
Maui Sanitation Branch  
54 South High Street, Room 300  
Wailuku, Hawaii 96793
13. Laura McIntyre, AICP, Office Manager  
Environmental Planning Office  
Department of Health  
919 Ala Moana Blvd., Suite 312  
Honolulu, Hawaii 96814
14. Lene Ichinotsubo  
Environmental Management Division  
State of Hawaii  
Department of Health  
919 Ala Moana Blvd., Room 212  
Honolulu, Hawaii 96814
15. William J. Aila, Jr., Chairperson  
State of Hawaii  
Department of Land and Natural Resources  
P. O. Box 621  
Honolulu, Hawaii 96809
16. Nicki Thompson, Interim Administrator  
State of Hawaii  
Department of Land and Natural Resources  
State Historic Preservation Division  
601 Kamokila Blvd., Room 555  
Kapolei, Hawaii 96707
17. Jenny Pickett, Maui Archaeologist  
State of Hawaii  
Department of Land and Natural Resources  
State Historic Preservation Division  
130 Mahalani Street  
Wailuku, Hawaii 96793
18. Glenn Okimoto, Director  
State of Hawaii  
Department of Transportation  
869 Punchbowl Street  
Honolulu, Hawaii 96813
19. Major General Darryll Wong, Director  
Hawaii State Civil Defense  
3949 Diamond Head Road  
Honolulu, Hawaii 96813-4495
20. Genevieve Salmonson, Acting Director  
Office of Environmental Quality Control  
235 S. Beretania Street, Suite 702  
Honolulu, Hawaii 96813
21. Dr. Kamana`opono Crabbe, Chief Executive Officer  
Office of Hawaiian Affairs  
711 Kapiolani Boulevard, Suite 500  
Honolulu, Hawaii 96813
22. Jesse Souki, Director  
State of Hawaii  
Office of Planning  
P. O. Box 2359  
Honolulu, Hawaii 96804
23. Gil Keith-Agaran, Senator  
Hawaii State Senate  
Hawaii State Capitol, Room 203  
415 S. Beretania Street  
Honolulu, Hawaii 96813
24. Joseph Souki, Representative  
House of Representatives  
Hawaii State Capitol, Room 431  
415 S. Beretania Street  
Honolulu, Hawaii 96813
- COUNTY AGENCIES**
25. Alan Arakawa, Mayor  
County of Maui  
200 South High Street  
Wailuku, Hawaii 96793
26. Teena Rasmussen, Coordinator  
County of Maui  
Office of Economic Development  
2200 Main Street, Suite 305  
Wailuku, Hawaii 96793
27. Anna Foust, Management Officer  
Maui Civil Defense Agency  
200 South High Street  
Wailuku, Hawaii 96793
28. Jeffrey A. Murray, Fire Chief  
County of Maui  
Department of Fire and Public Safety  
200 Dairy Road  
Kahului, Hawaii 96732

29. Jo-Ann Ridao, Director  
County of Maui  
Department of Housing and Human Concerns  
One Main Plaza  
2200 Main Street, Suite 546  
Wailuku, Hawaii 96793
30. Glenn Correa, Director  
County of Maui  
Department of Parks and Recreation  
700 Halia Nakoia Street, Unit 2  
Wailuku, Hawaii 96793
31. William Spence, Director  
County of Maui  
Department of Planning  
2200 Main Street, Suite 315  
Wailuku, Hawaii 96793
32. Gary Yabuta, Chief  
County of Maui  
Police Department  
55 Mahalani Street  
Wailuku, Hawaii 96793
33. David Goode, Director  
County of Maui  
Department of Public Works  
200 South High Street  
Wailuku, Hawaii 96793
34. Kyle Ginoza, Director  
County of Maui  
Department of Environmental Management  
One Main Plaza  
2200 Main Street, Suite 100  
Wailuku, Hawaii 96793
35. Jo Anne Johnson Winer, Director  
County of Maui  
Department of Transportation  
200 South High Street  
Wailuku, Hawaii 96793
36. Council Chair Gladys Baisa  
Maui County Council  
200 South High Street  
Wailuku, Hawaii 96793
37. Councilmember Mike Victorino  
Maui County Council  
200 South High Street  
Wailuku, Hawaii 96793

#### UTILITIES

38. Dan Takahata, Manager – Engineering  
Maui Electric Company, Ltd.  
P.O. Box 398  
Kahului, Hawaii 96733
39. Hawaiian Telcom  
60 South Church Street  
Wailuku, Hawaii 96793

#### COMMUNITY ORGANIZATIONS

40. Wailuku Community Association  
40 Hoauna Street  
Wailuku, Hawaii 96793
41. Rick Papa, President  
Attention: Tiana Raymondo  
Kehalani Association  
P.O. Box 1530  
Wailuku, Hawaii 96793
42. RCFC Kehalani LLC  
c/o Brian Ige  
2005 East Main Street  
Wailuku, Hawaii 96793
43. Wailuku Water Company LLC  
P.O. Box 2790  
Wailuku, Hawaii 96793-7790

APR 21 2014



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

April 16, 2014

Regulatory Office

File No. POH-2013-0209

Tessa Munekiyo Ng  
Munekiyo & Hiraga, Inc.  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Dear Ms. Munekiyo Ng:

The U.S. Army Corps of Engineers (Corps) has evaluated the early consultation information submitted on October 25, 2013, for the replacement of the existing Iao Surface Water Treatment Plant on South Alu Road. The project site is located within TMK #235001067; Latitude 20.883110° N., Longitude 156.512693° W.; city of Wailuku, Island of Maui, Hawaii. Your project has been assigned number POA-2013-0209, which should be referred to in all correspondence with us.

Based on our review of the information you provided we are not able to determine if the subject project area contains waters of the U.S., and/or wetlands, under the Corps' regulatory jurisdiction. We encourage you to provide the Corps with a wetland delineation based on the guidelines presented in the Corps of Engineers Wetlands Delineation Manual dated January 1987 and the Regional Supplement for Hawaii and Pacific Island Regions dated February 2012.

The Corps' regulatory authorities are based on two laws: Section 10 of the Rivers and Harbors Act (RHA) of 1899 (33 USC 403), which prohibits the obstruction or alteration of navigable waters of the U.S. without a permit from the Corps; and Section 404 of the Clean Water Act (CWA), which prohibits the discharge of dredged or fill material into waters of the U.S., including wetlands, without a Corps' permit. Wetlands are defined as areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands include "muskegs", swamps, marshes, bogs, and similar areas.

You may contact Linda Speerstra via email at [linda.speerstra@usace.army.mil](mailto:linda.speerstra@usace.army.mil), by mail at the address above, or by phone at (808) 835-4300 if you have questions. We are interested in your experience with our Regulatory Program and encourage you to complete a customer service survey form. This form is available at [http://corpsmapu.usace.army.mil/cm\\_apex/f?p=regulatory\\_survey](http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey).

Sincerely,

A handwritten signature in black ink, appearing to read "George P. Young".

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



MICHAEL Y. MUNEKIYO  
PRESIDENT

KARLYNN FUKUDA  
EXECUTIVE VICE PRESIDENT

MARK ALEXANDER ROY  
VICE PRESIDENT

TESSA MUNEKIYO NG  
VICE PRESIDENT

BWEN DASHI HIRAGA  
SENIOR ADVISOR

MITSURU "MICKY" HIRANO  
SENIOR ADVISOR

January 29, 2015

George P. Young, P.E.  
Chief, Regulatory Office  
Department of the Army  
U.S. Army Corps of Engineers, Honolulu District  
Fort Shafter, Hawaii 96858-5440

**SUBJECT:** Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.) File No. POH-2013-0209

Dear Mr. Young:

Thank you for your correspondence dated April 16, 2014, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. On behalf of the County of Maui, Department of Water Supply (DWS) we offer the following information in response to the comments noted in your letter.

There are no streams or wetlands within the project site. Iao Stream is located approximately 500 feet north of the project site. The stream is north of Iao Valley Road and generally runs west to east lying at a much lower elevation than the project site. The project site falls within Zone X, an area of minimal flooding, as indicated by the Flood Insurance Rate Map for the County of Maui. Thus the area does not experience inundation or saturation by surface or groundwater at a frequency and duration sufficient to support vegetation typically adapted for life in saturated soil conditions, normally found in wetland area. The Draft Environmental Assessment will include a discussion of streams and wetlands.

MAUI  
305 High St., Suite 104 Wailuku, Hawaii 96793  
ph: (808)244-2015 fax: (808)244-8729  
OAHU  
735 Bishop St., Suite 238 Honolulu, Hawaii 96813 | ph: (808)983-1233

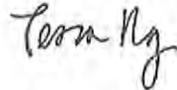
WWW.MUNEKIYOHIRAGA.COM

excellence in  
process  
management

George P. Young, P.E.  
January 29, 2015  
Page 2

We appreciate your input and will include a copy of your comment letter in the Draft Environmental Assessment. Should you have any questions or require further information regarding the proposed action, please contact me at (808) 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Manager

TMN:lh

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakatsuka, Austin Tsutsumi & Associates, Inc.

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**From:** Ian Bordenave <ian.bordenave@fws.gov>

**Sent:** November 27, 2013 at 5:15:40 PM CST

**To:** <planning@mhplanning.com>

**Subject:** c/o Tessa Munekiyo Ng: 2014-TA-0037 Iao Water Treatment Plant Upgrades Project, Maui

In Reply Refer To:  
2013-TA-0037

Ms. Tessa Munekiyo Ng  
Senior Associate  
Munekiyo and Hiraga, Inc.  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Subject: Technical Assistance for the Proposed Iao Water Treatment Plant Upgrades Project, Maui

Dear Ms. Ng:

The U.S. Fish and Wildlife Service (Service) received your letter on October 28, 2013, requesting comment on proposed upgrades to the Iao Surface Water Treatment Plant located on South Alu Road in Wailuku [TMK (2) 3-5-001:067]. The proposed project site is to be located west of the existing Maui County, Department Water Supply facility.

#### *Project Description*

The County of Maui, Department of Water Supply, proposes to replace the existing Iao Water Treatment Plant with a permanent facility with greater production capacity. The existing treatment plant filtration units, located near the three million gallon Iao Water Tank, were initially sheltered within a large tent that has since been removed. Exposure to the elements has degraded the filtration equipment, which has made their replacement necessary. Filtration capacity of the existing plant is approximately 1.7 million gallons per day (gpd). The proposed plant, in addition to being housed in a permanent structure, will increase production capacity to 2.4 million gpd. Additional provisions may allow future expansion of production to increase to 3.0 million gpd.

#### *Species Affected*

Based on information you provided and pertinent information in our files, including data compiled by the Hawaii Biodiversity and Mapping Program, three species protected by the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*), are known to occur within the proposed action area and could be impacted by the proposed action: the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*), Hawaiian petrel (*Pterodroma sandwichensis*), and the threatened Newell's shearwater (*Puffinus auricularis newelli*). The Service offers the following recommendations to minimize and avoid impacts to listed species either on or in the vicinity of the proposed project:

- The Hawaiian hoary bat is known to occur throughout the island of Maui. This bat roosts in both exotic and native woody vegetation and, while foraging, leaves young unattended in "nursery" trees and shrubs. If trees or shrubs suitable for bat roosting are cleared during the hoary bat breeding season (June 1 to September 15), there is a risk that young bats could inadvertently be harmed or killed. As a result, the Service recommends that woody plants greater than 15 feet tall should not be removed or trimmed during the Hawaiian hoary bat breeding season. Additionally, Hawaiian hoary bats forage for insects from as low as three feet to higher than 500 feet above the ground. When barbed wire is used in fencing, Hawaiian hoary bats can become entangled. The Service therefore recommends that barbed wire not be used for fencing as part of this proposed action.

- The Hawaiian petrel and Newell's shearwater, collectively referred to as seabirds, may transit through the proposed action area while flying between the ocean and nesting sites in the mountains during their breeding season (March through December). Seabird fatalities resulting from collisions with artificial structures that extend above the surrounding vegetation have been documented in Hawaii where high densities of transiting seabirds occur. Additionally, artificial lighting, such as flood lighting for construction work and site security, can adversely impact seabirds by causing disorientation which may result in collision with utility lines, buildings, fences, and vehicles. Fledging seabirds are especially affected by artificial lighting and have a tendency to exhaust themselves while circling the light sources and become grounded. Too weak to fly, these birds become vulnerable to depredation by feral predators such as dogs, cats, and mongoose. Therefore, the Service recommends that no outdoor flood lighting be installed as part of the proposed action. Project-related lighting should be minimized. All project-related lights should be shielded so the bulb is not visible at or above bulb-height. Motion sensors and timers should be installed on any necessary project-related lighting to minimize periods of illumination.

#### *Impacts to Aquatic Resources*

Under the statutes of the Fish and Wildlife Coordination Act (FWCA) of 1958, as amended (16 U.s.c. 661 *et seq.*; 48 Stat. 401), any private or public entities operating under Federal permit or license are required to ensure that fish and wildlife conservation receives equal consideration with other proposed project objectives. A significant increase in water supply production capacity resulting from the implementation of the proposed project may have impacts on aquatic habitat functions necessary to support native stream fauna. The Service recommends that the applicant and action agencies involved in the proposed project coordinate with us to address the potential impacts that an additional 700,000 1,000,000+ gpd withdrawal from the Iao Stream watershed may incur on native stream fauna and concomitant aquatic resources.

If you have any questions regarding the recommendations or comments provided in this e-mail, please feel free to contact me during regular business hours using the information provided below.

Regards,

Ian Bordenave  
Biologist  
U.S. Fish and Wildlife Service  
Maui Nui Field Station  
Milepost 6 Mokulele Highway  
Kihei, HI. 96793  
Phone: (808) 270-1439  
E-Mail: [ian\\_\\_bordenave@fws.gov](mailto:ian__bordenave@fws.gov)

January 29, 2015

Ian Bordenave, Biologist  
Director of Transportation  
U.S. Fish and Wildlife Service  
Maui Nui Field Station  
Milepost 6 Mokulele Hwy  
Kihei, Hawaii 96793

**SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.); 2013-TA-0037**

Dear Mr. Bordenave:

Thank you for your correspondence dated November 27, 2013, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. The County of Maui, Department of Water Supply (DWS) offers the following information in response to the comments noted in your letter.

A biological resources survey for the proposed project was conducted by Robert W. Hobdy (Environmental Consultant) in August 2013. The report concludes that the project is not expected to have any significant negative impacts on the botanical resources in this part of Maui. No recommendations regarding botanical resources were deemed necessary or appropriate.

Despite the negative findings of the biological resources survey, DWS will address each of the concerns outlined in your letter as follows:

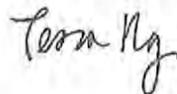
- **Hawaiian Hoary Bat:**  
The biological resources survey made a special effort to look for the Hawaiian hoary bat, but no evidence of bat activity was detected. DWS will restrict clearing

and grubbing activities during the hoary bat breeding season from June 1 to September 15. Due to public health concerns and the need to secure the water treatment facility, barbed wire fencing must be used.

- **Hawaiian Petrel and Newell's Shearwater:**  
The site design will minimize outdoor lighting and implement other mitigating actions such as bulb shielding and installing motion sensors and timers. No night work is expected unless under an emergency situation.
- **Potential Impacts on Native Stream Fauna and Concomitant Aquatic Resources:**  
The amount of water allowed for use at the Iao Water Treatment Plant was arrived at in a recent agreement accepted by all parties (Hui o Na Wai Eha, Maui Tomorrow Foundation, the Office of Hawaiian Affairs, Hawaiian Commercial and Sugar Company, Wailuku Water Company, the Maui County Department of Water Supply, and the State Commission on Water Resource Management). Impacts to streams were taken into consideration during discussions on the agreement. With anticipated growth in the Central Maui system that encompasses customers from Hookipa to Makena, and the fact that the Iao aquifer is designated, surface water is needed to provide water for future growth.

We appreciate your input and will include a copy of your comment letter in the Draft Environmental Assessment. Should you have any questions or require further information regarding the proposed action, please contact me at (808) 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Vice President

TMN:mge

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakastuka, Austin, Tsutsumi & Associates, Inc.

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NEIL ABERGROMBIE  
GOVERNOR



Dean H. Seki  
Comptroller  
Maria E. Ziellinski  
Deputy Comptroller

STATE OF HAWAII  
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES

P.O. BOX 119, HONOLULU, HAWAII 96810-0119

(P)1253.3

NOV 1 2013

Ms. Tessa Munekiyo Ng  
Munekiyo & Hiraga, Inc.  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Dear Ms. Munekiyo Ng:

Subject: Early Consultation Request for Proposed Iao Water Treatment Plant  
Upgrades, Wailuku, Maui, Hawaii: DWS Job No. 12-03  
TMK: (2) 3-5-001:067 (por) and 091 (por).

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

If you have any questions, please call me at 586-0400 or have your staff call Mr. Alva Nakamura of the Public Works Division at 586-0488.

Sincerely,

A handwritten signature in black ink, appearing to be "D. Seki", written over a horizontal line.

DEAN H. SEKI  
Comptroller

c: Mr. Tom Ochwat, County of Maui, Dept. of Water Supply  
Mr. Ivan Nakatsuka, Austin, Tsutsumi & Associates, Inc.

January 29, 2015

Dean H. Seki, Comptroller  
Department of Accounting and General Services  
State of Hawaii  
P.O. Box 119  
Honolulu, Hawaii 96810-0119

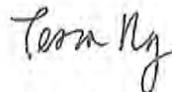
SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.)

Dear Mr. Seki:

Thank you for your letter, dated November 1, 2013, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. The County of Maui, Department of Water Supply (DWS) acknowledges your Department has no comments to offer on the proposed project at this time.

We appreciate your input and will include a copy of your response letter in the Draft Environmental Assessment. Should you have any questions or require further information regarding the proposed action, please contact me at 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Vice President

TMN:mge

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakastuka, Austin, Tsutsumi & Associates, Inc.

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305 High St., Suite 104 Wailuku, Hawaii 96793

ph: (808)244-2015 fax: (808)244-8729

DWAG

735 Bishop St., Suite 238 Honolulu, Hawaii 96813 | ph: (808)983-1233

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

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

In reply, please refer to:  
EMD/CWB

10104PCM.13

October 31, 2013

Ms. Tessa Munekiyo Ng, AICP  
Senior Associate  
Munekiyo & Hiraga, Inc.  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Dear Ms. Munekiyo Ng:

**SUBJECT: Early Consultation Request for the  
Proposed Iao Water Treatment Plant Upgrades  
Wailuku, Island of Maui, Hawaii**

The Department of Health (DOH), Clean Water Branch (CWB), acknowledges receipt of your letter, dated October 25, 2013, requesting comments on your project. The DOH-CWB has reviewed the subject document and offers these comments. Please note that our review is based solely on the information provided in the subject document and its compliance with the Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55. You may be responsible for fulfilling additional requirements related to our program. We recommend that you also read our standard comments on our website at: <http://health.hawaii.gov/epo/files/2013/05/CWB-standardcomment.pdf>.

1. Any project and its potential impacts to State waters must meet the following criteria:
  - a. Antidegradation policy (HAR, Section 11-54-1.1), which requires that the existing uses and the level of water quality necessary to protect the existing uses of the receiving State water be maintained and protected.
  - b. Designated uses (HAR, Section 11-54-3), as determined by the classification of the receiving State waters.
  - c. Water quality criteria (HAR, Sections 11-54-4 through 11-54-8).
2. You may be required to obtain a National Pollutant Discharge Elimination System (NPDES) permit for discharges of wastewater, including storm water runoff, into State surface waters (HAR, Chapter 11-55). An application for an NPDES individual permit must be submitted at least 180 calendar days before the commencement of the discharge. To request NPDES permit coverage, you must submit the CWB Individual NPDES Form through the e-Permitting Portal and the hard copy certification statement with \$1,000 filing fee. Please open the [e-Permitting Portal](#)

Ms. Tessa Munekiyo Ng, AICP  
October 31, 2013  
Page 2

10104PCM.13

website at: <https://eha-cloud.doh.hawaii.gov/epermit/View/home.aspx>. You will be asked to do a one-time registration to obtain your login and password. After you register, click on the Application Finder tool and locate the "CWB Individual NPDES Form." Follow the instructions to complete and submit this form.

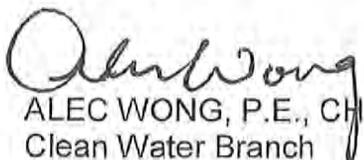
3. If your project involves work in, over, or under waters of the United States, it is highly recommend that you contact the Army Corp of Engineers, Regulatory Branch (Tel: 438-9258) regarding their permitting requirements.

Pursuant to Federal Water Pollution Control Act [commonly known as the "Clean Water Act" (CWA)], Paragraph 401(a)(1), a Section 401 Water Quality Certification (WQC) is required for "[a]ny applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may **result** in any discharge into the navigable waters..." (emphasis added). The term "discharge" is defined in CWA, Subsections 502(16), 502(12), and 502(6); Title 40 of the Code of Federal Regulations, Section 122.2; and Hawaii Administrative Rules (HAR), Chapter 11-54.

4. Please note that all discharges related to the project construction or operation activities, whether or not NPDES permit coverage and/or Section 401 WQC are required, must comply with the State's Water Quality Standards. Noncompliance with water quality requirements contained in HAR, Chapter 11-54, and/or permitting requirements, specified in HAR, Chapter 11-55, may be subject to penalties of \$25,000 per day per violation.

If you have any questions, please visit our website at:  
<http://health.hawaii.gov/cwb>, or contact the Engineering Section, CWB, at (808) 586-4309.

Sincerely,

  
ALEC WONG, P.E., CHIEF  
Clean Water Branch

CM:rh

January 29, 2015

Alec Wong, P.E., Chief  
Clean Water Branch  
State of Hawaii  
Department of Health  
P.O. Box 3378  
Honolulu, Hawaii 96801-3378

**SUBJECT:** Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.); EMD/CWB 10 104 PCM.13

Dear Mr. Wong:

Thank you for your letter, dated October 13, 2013, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. The County of Maui, Department of Water Supply (DWS) offers the following information in response to the comments noted in your letter.

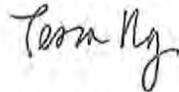
The County of Maui DWS will fully comply with Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55 and any additional requirements related to Department of Health – Clean Water Branch programs. More specifically, the following actions will be taken to address comments detailed in your letter as follows:

1. DWS will assess project impacts to State waters and meet criteria on antidegradation policy (FAR, Section 11-54-1.1), designated uses (HAR, Section 11-54-3), and water quality criteria (HAR, Sections 11-54-4 through 11-54-8).
2. If required per HAR, Chapter 11-55, an NPDES permit will be obtained.

3. The U.S. Army Corps of Engineers, Regulatory Branch has been consulted regarding the proposed project. A request for early consultation was submitted to the Corps and they will be provided with a copy of the Draft Environmental Assessment (EA).
4. Whether or not an NPDES permit applies, DWS will include all contractual requirements in the project's bid documents to insure Best Management Practices are implemented.

We appreciate your input and will include a copy of your comment letter in the Draft EA. Should you have any questions or require further information regarding the proposed action, please contact me at 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Vice President

TMN:mge

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakastuka, Austin, Tsutsumi & Associates, Inc.

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OCT 31 2013

NEIL ABERCROMBIE  
GOVERNOR OF HAWAII



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

LORRIN W. PANG, M.D., M.P.H.  
DISTRICT HEALTH OFFICER

**STATE OF HAWAII**  
**DEPARTMENT OF HEALTH**  
**MAUI DISTRICT HEALTH OFFICE**  
54 HIGH STREET  
WAILUKU, HAWAII 96793

October 30, 2013

Ms. Tessa Munekiyo Ng, AICP  
Senior Associate  
Munekiyo & Hiraga, Inc.  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Dear Ms. Munekiyo Ng:

**Subject: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Maui, Hawaii; DWS Job No. 12-03**  
**TMK: (2) 3-5-001:067 (por.) and 091 (por.)**

Thank you for the opportunity to review this project. We have the following comments to offer:

1. National Pollutant Discharge Elimination System (NPDES) permit coverage maybe required for this project. The Clean Water Branch should be contacted at 808 586-4309
2. The noise created during the construction phase of the project may exceed the maximum allowable levels as set forth in Hawaii Administrative Rules (HAR), Chapter 11-46, "Community Noise Control." A noise permit may be required and should be obtained before the commencement of work. The Indoor & Radiological Health Branch should be contacted at 808 586-4700.

It is strongly recommended that the Standard Comments found at the Department's website: <http://health.hawaii.gov/epo/home/landuse-planning-review-program/> be reviewed, and any comments specifically applicable to this project should be adhered to.

Ms. Tessa Munekiyo Ng  
October 30, 2013  
Page 2

Should you have any questions, please call me at 808 984-8230 or E-mail me at [patricia.kitkowski@doh.hawaii.gov](mailto:patricia.kitkowski@doh.hawaii.gov).

Sincerely,

A handwritten signature in black ink that reads "Patti Kitkowski". The signature is written in a cursive, flowing style.

Patti Kitkowski  
District Environmental Health Program Chief

c EPO

January 29, 2015

Patti Kitkowski  
Maui District Environmental Health Program Chief  
Department of Health  
State of Hawaii  
54 High Street  
Wailuku, Hawaii 96793

**SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.)**

Dear Ms. Kitkowski:

Thank you for your letter, dated October 30, 2013, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. The County of Maui, Department of Water Supply (DWS) offers the following information in response to the comments noted in your letter.

The County of Maui DWS has received comments from the Department of Health (DOH), Clean Water Branch (CWB) on NPDES permit requirements and other regulatory requirements of that branch. DWS will comply as applicable.

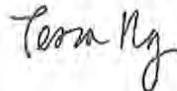
Should noise levels associated with project construction exceed the maximum allowable levels set forth in Hawaii Administrative Rules, HAR Chapter 11-46 "Community Noise Control", a noise permit will be obtained prior to initiation of construction.

It is also noted that the Standard Comments available on the Department's website will be reviewed and comments applicable to the project will be adhered to.

Patti Kitkowski, Program Chief  
January 29, 2015  
Page 2

We appreciate your input and will include a copy of your comment letter in the Draft Environmental Assessment. Should you have any questions or require further information regarding the proposed action, please contact me at (808) 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Vice President

TMN:mge

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakastuka, Austin, Tsutsumi & Associates, Inc.

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NOV 06 2013

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

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

In reply, please refer to:  
File:  
13-208  
Iao WTP Upgrades  
DWS Job No. 12-03

October 30, 2013

Munekiyo & Hiraga, Inc.  
Attention: Tessa Munekiyo Ng, AICP, Senior Associate  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Dear Ms. Ng:

**SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades,  
DWS Job No. 12-03  
Wailuku, Maui, Hawaii; TMK: (2) 3-5-01: 067 (por.) and 091 (por.)**

The Department of Health (DOH), Environmental Planning Office (EPO), acknowledges receipt of your letter dated October 25, 2013. Thank you for allowing us to review and comment on the subject document. The document was routed to the relevant Environmental Health divisions and offices. They will provide specific comments to you if necessary. EPO recommends that you review the standard comments at: <http://health.hawaii.gov/epo/home/landuse-planning-review-program/>. You are required to adhere to all standard comments specifically applicable to this application.

EPO suggests that you examine the many sources available on strategies to support the sustainable design of communities, including the:

State of Hawaii, Office of Planning: [www.planning.hawaii.gov](http://www.planning.hawaii.gov) and the new 2013 ORMP;  
U.H., School of Ocean and Earth Science and Technology: [www.soest.hawaii.edu](http://www.soest.hawaii.edu);  
U.S. Environmental Protection Agency's sustainability programs: [www.epa.gov/sustainability](http://www.epa.gov/sustainability); and  
U.S. Green Building Council's LEED program: [www.usgbc.org/leed](http://www.usgbc.org/leed).

The DOH encourages everyone to apply these sustainability strategies and principles early in the planning and review of projects. We also request that for future projects you consider conducting a Health Impact Assessment (HIA). More information is available at: [www.cdc.gov/healthyplaces/hia.htm](http://www.cdc.gov/healthyplaces/hia.htm). We request you share all of this information with others to increase community awareness on sustainable, innovative, inspirational, and healthy community design.

We require a written response confirming receipt of this letter and any other letters you receive from DOH in regards to this submission. You may mail your response to 919 Ala Moana Blvd., Ste. 312, Honolulu, Hawaii 96814. However, we would prefer an email submission to: [epo@doh.hawaii.gov](mailto:epo@doh.hawaii.gov). We anticipate that our letter(s) and your response(s) will be included in the final document. If you have any questions, please contact me at (808) 586-4337.

Mahalo,

  
Laura Leialoha Phillips McIntyre, AICP  
Manager, Environmental Planning Office

January 29, 2015

Laura Leialoha Phillips McIntyre, AICP  
Manager, Environmental Planning Office  
State of Hawaii  
Department of Health  
919 Ala Moana Blvd., Ste.312  
Honolulu, Hawaii 96814

SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.); 13-208 Iao WTP Upgrades DWS Job No. 12-03

Dear Ms. McIntyre:

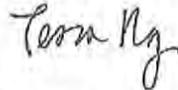
Thank you for your letter, dated October 30, 2013, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. The County of Maui, Department of Water Supply (DWS) offers the following information in response to the comments noted in your letter.

The County of Maui, DWS will review Department of Health, Environmental Planning Office's standard comments detailed in the website noted in your letter, and adhere to comments specifically applicable to the proposed project. Also, sustainable design strategies will be considered on the proposed project.

Laura Leialoha Phillips McIntyre, AICP  
January 29, 2015  
Page 2

We appreciate your input and will include a copy of your comment letter in the Draft Environmental Assessment. Should you have any questions or require further information regarding the proposed action, please contact me at 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Vice President

TMN:mge

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakastuka, Austin, Tsutsumi & Associates, Inc.

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NOV 18 2013

NEIL ABERCROMBIE  
GOVERNOR OF HAWAII



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

STATE OF HAWAII  
DEPARTMENT OF HEALTH  
SAFE DRINKING WATER BRANCH

919 ALA MOANA BLVD., ROOM 308  
HONOLULU, HI 96814-4920

In reply, please refer to:  
File: SDWB

laoWTP01.docx

November 13, 2013

Ms. Tessa Munekiyo Ng  
Senior Associate  
Munekiyo & Hiraga, Inc.  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Dear Ms. Munekiyo Ng:

SUBJECT: EARLY CONSULTATION REQUEST FOR PROPOSED  
IAO WATER TREATMENT PLANT UPGRADES  
WAILUKU, ISLAND OF MAUI, HAWAII

The Safe Drinking Water Branch (SDWB) acknowledges receipt of the letter dated October 25, 2013, from your office requesting our comments regarding the subject project.

The following are our comments regarding the subject application:

This project to replace the Iao water treatment plant appears to be a substantial modification to the County of Maui's Wailuku water system.

Projects proposing to develop new public water systems or proposing substantial modifications to existing public water systems must receive approval by the Director of Health prior to construction of the proposed system or modification in accordance with Hawaii Administrative Rule, Section 11-20-30, "New and modified public water systems." These projects include treatment, storage and distribution systems of public water systems. This requirement is not waived for county owned systems using a surface water source.

The requirement includes submission of plans, specifications, supporting information, and documents detailing the design of the proposed substantial modifications to the SDWB for approval.

If there are any questions, please call Mr. Craig Watanabe of the SDWB Engineering Section, at (808) 586-4258.

Sincerely,

A handwritten signature in cursive script that reads "Joanna L. Seto".

JOANNA L. SETO, P.E., CHIEF  
Safe Drinking Water Branch

CW:slm

c: EPO #13-208 [via email only]

January 29, 2015

Joanna L. Seto, P.E., Chief  
Safe Drinking Water Branch  
Department of Health  
State of Hawaii  
P.O. Box 3378  
Honolulu, Hawaii 96801-3378

SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.); SDWB Iao WTP 01.docx

Dear Ms. Seto:

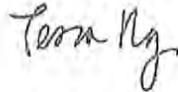
Thank you for your letter, dated November 13, 2013, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. The County of Maui, Department of Water Supply (DWS) offers the following information in response to the comments noted in your letter.

As advised, the County of Maui DWS will fully comply with Hawaii Administrative Rules (HAR), Chapters 11-20-301-55 "New and modified public water systems". Once the plans, specifications, supporting information, and documents detailing the project's design is developed, a package will be submitted to your branch for review and approval by the Director of Health.

Joanna L. Seto, P.E., Chief  
January 29, 2015  
Page 2

We appreciate your input and will include a copy of your response letter in the Draft Environmental Assessment. Should you have any questions or require further information regarding the proposed action, please contact me at 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Vice President

TMN:mge

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakastuka, Austin, Tsutsumi & Associates, Inc.

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NOV 19 2013

NEIL ABERCROMBIE  
GOVERNOR OF HAWAII



WILLIAM J. AILA, JR.  
CHAIRPERSON  
WILLIAM D. BALFOUR, JR.  
KAMANA BEAMER  
LORETTA J. FUDDY, A.C.S.W., M.P.H.  
MILTON D. PAVAO  
JONATHAN STARR  
TED YAMAMURA  
WILLIAM M. TAM  
DEPUTY DIRECTOR

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

November 15, 2013

REF: RFD.3862.6

Munekiyo & Hiraga, Inc.  
Attention: Tessa Munekiyo Ng, AICP, Senior Associate  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Dear Ms. Ng:

SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Maui, Hawaii

DWS Job No.: 12-03  
TMK NO.: (2) 3-5-001:067 (por.) and 091 (por.)

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://www.hawaii.gov/dlnr/cwrn>.

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 EPA 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://hawaii.gov/dbedt/czm/initiative/lid.php>.
- 6. We recommend the use of alternative water sources, wherever practicable.
- 7. 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.

Permits required by CWRM:

Additional information and forms are available at [http://hawaii.gov/dlnr/cwrw/info\\_permits.htm](http://hawaii.gov/dlnr/cwrw/info_permits.htm).

8. 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.
9. A Well Construction Permit(s) is (are) required before the commencement of any well construction work.
10. A Pump Installation Permit(s) is (are) required before ground water is developed as a source of supply for the project.
11. 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.
12. Ground-water withdrawals from this project may affect streamflows, which may require an instream flow standard amendment.
13. A Stream Channel Alteration Permit(s) is (are) required before any alteration can be made to the bed and/or banks of a stream channel.
14. A Stream Diversion Works Permit(s) is (are) required before any stream diversion works is constructed or altered.
15. A Petition to Amend the Interim Instream Flow Standard is required for any new or expanded diversion(s) of surface water.
16. 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:  
On March 31, 2009, the County of Maui Department of Water Supply (Maui DWS) submitted a Surface Water Use Permit Application for Existing Use in the Na Wai Eha, Maui, Surface Water Management Areas, requesting an amount of 1.784 million gallons per day (mgd). An accompanying Surface Water Use Permit Application for Proposed New Use was also submitted, requesting an additional amount of 1.416 mgd. At this time, the Commission on Water Resource Management is still in the process of determining instream flow standards for the Na Wai Eha Surface Water Management Areas, and no decisions have been made on the allocated use of surface water for Maui DWS. Please be aware that any expanded use of water by the Iao Water Treatment Plant will be subject to surface water use permit allocations once they are decided.

If there are any questions, please contact Dean Uyeno at (808) 587-0249.

Sincerely,



WILLIAM M. TAM  
Deputy Director

January 29, 2015

Mr. William M. Tam, Deputy Director  
Department of Land and Natural Resources  
Commission on Water Resource Management  
State of Hawaii  
P.O. Box 621  
Honolulu, Hawaii 96809

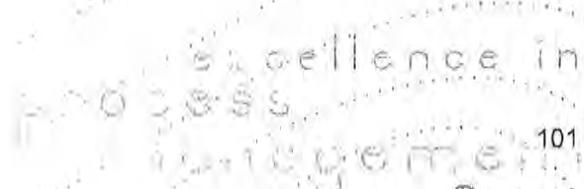
SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.); REF: RFD.3862.6

Dear Mr. Tam:

Thank you for your letter, dated November 15, 2013, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. The County of Maui, Department of Water Supply (DWS) offers the following information in response to the comments noted in your letter.

The County of Maui DWS acknowledges your comments noting that the proposed project will require a Commission on Water Resource Management (CWRM) Water Use Permit and that the Surface Water Use Permit Application (submitted March 31, 2009) for Existing Use in the Na Wai Eha, Maui surface Water Management Areas will be subject to the April 2014 Settlement Agreement in the Na Wai Eha contested case.

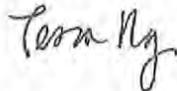
As the project moves further along to better define the project details, DWS will apply for a Water Use Permit with the CWRM and secure any other applicable approvals.



William M. Tam, Deputy Director  
January 29, 2015  
Page 2

We appreciate your input and will include a copy of your comment letter in the Draft Environmental Assessment. Should you have any questions or require further information regarding the proposed action, please contact me at 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Vice President

TMN:mge

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakastuka, Austin, Tsutsumi & Associates, Inc.

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NOV 21 2013

NEIL ABERCROMBIE  
GOVERNOR



STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
869 PUNCHBOWL STREET  
HONOLULU, HAWAII 96813-5097

GLENN M. OKIMOTO  
DIRECTOR

Deputy Directors  
JADE T. BUTAY  
FORD N. FUCHIGAMI  
RANDY GRUNE  
JADINE URASAKI

IN REPLY REFER TO:  
STP 8.1367

November 15, 2013

Ms. Tessa Munekiyo Ng, AICP  
Senior Associate  
Munekiyo and Hiraga, Inc.  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Dear Ms. Ng:

Subject: Iao Water Treatment Plant (WTP) Upgrades  
Early Consultation for Draft Environmental Assessment (DEA)  
TMK: (2) 3-5-001:067 (por.) and 091(por.)

Thank you for requesting the State Department of Transportation's (DOT) review of the subject project. DOT understands the Maui County Department of Water Supply (DWS) proposes to replace the existing WTP with a new WTP.

Given the project location and the nature of the project it is not expected to significantly impact the State highway facility. However, the DWS is required to obtain a permit from DOT Highways Division, Maui District Office, for the transport of oversized and/or overweight materials and equipment on State highway facilities.

DOT appreciates the opportunity to provide comments. If there are any questions, please contact Mr. Norren Kato of the DOT Statewide Transportation Planning Office at telephone number (808) 831-7977.

Very truly yours,

A handwritten signature in black ink, appearing to read "Glenn M. Okimoto", written over a light blue horizontal line.

GLENN M. OKIMOTO, Ph.D.  
Director of Transportation

January 29, 2015

Ford Fuchigami, Interim Director  
Department of Transportation  
State of Hawaii  
869 Punchbowl Street  
Honolulu, Hawaii 96813-5097

SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant  
Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03;  
TMK (2) 3-5-001:067 (por.) and 091 (por.); STP 8.1367

Dear Mr. Fuchigami:

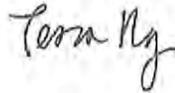
Thank you for your department's letter, dated November 15, 2013, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. The County of Maui, Department of Water Supply (DWS) offers the following information in response to the comments noted in your department's letter.

The County of Maui, DWS acknowledges that the project is not expected to significantly impact State highway facilities. Construction of the project will comply with State highway oversize and/or overweight vehicle regulations. DWS recognizes that the project site needs to be accessed via State highway facilities and will include language in the construction bid documents directing the contractor and its subcontractors and material suppliers to comply with obtaining the necessary permits from your Maui District office.

Ford Fuchigami, Director  
January 29, 2015  
Page 2

We appreciate your input and will include a copy of your department's comment letter in the Draft EA. Should you have any questions or require further information regarding the proposed action, please contact me at 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Vice President

TMN:mge

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakastuka, Austin, Tsutsumi & Associates, Inc.

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NOV 21 2013

NEIL ABERCROMBIE  
GOVERNOR



DARRYLL D. M. WONG  
MAJOR GENERAL  
ADJUTANT GENERAL

JOSEPH K. KIM  
BRIGADIER GENERAL  
DEPUTY ADJUTANT GENERAL

STATE OF HAWAII  
**DEPARTMENT OF DEFENSE**  
OFFICE OF THE ADJUTANT GENERAL  
3949 DIAMOND HEAD ROAD  
HONOLULU, HAWAII 96816-4495

NOV 19 2013

Ms. Tessa Munekiyo Ng, AICP  
Senior Associate  
Munekiyo & Hiraga, Inc.  
305 High Street, Suite 104  
Wailuku, Hawai'i 96793

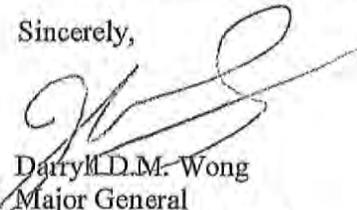
Subject: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Maui, Hawaii, DWS Job No. 12-03; TMK (2) 3-5-001: 67 (por.) and 091 (por.)

Dear Ms. Munekiyo Ng:

Thank you for the opportunity to comment on the above project. The State of Hawaii Department of Defense has no early consultation comments to offer relative to the project at this time, and defers to the appropriate State and federal agencies as to the protection of any cultural, historical, and environmental considerations for the proposed project.

Please contact this office upon completion of the Draft Environment Assessment. Should you have any questions or concerns, please have your staff contact Mr. Lloyd Maki, our Acting Chief Engineering Officer, on Oahu at (808) 733-4250.

Sincerely,

  
Darryll D.M. Wong  
Major General  
Hawaii National Guard  
Adjutant General

c: Mr. Ian Duncan, State Civil Defense

January 29, 2015

Major General Darryll D.M. Wong  
Hawaii National Guard  
Adjutant General  
Department of Defense  
3949 Diamond Head Road  
Honolulu, Hawaii 96816-4495

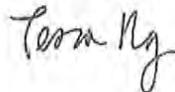
**SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.)**

Dear Major General Wong:

Thank you for your letter, dated November 19, 2013, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. The County of Maui, Department of Water Supply (DWS) acknowledges that the State of Hawaii Department of Defense has no comments to offer at this time.

We appreciate your input and will include a copy of your comment letter in the Draft Environmental Assessment. Should you have any questions or require further information regarding the proposed action, please contact me at 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Vice President

TMN:mge

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakastuka, Austin, Tsutsumi & Associates, Inc.

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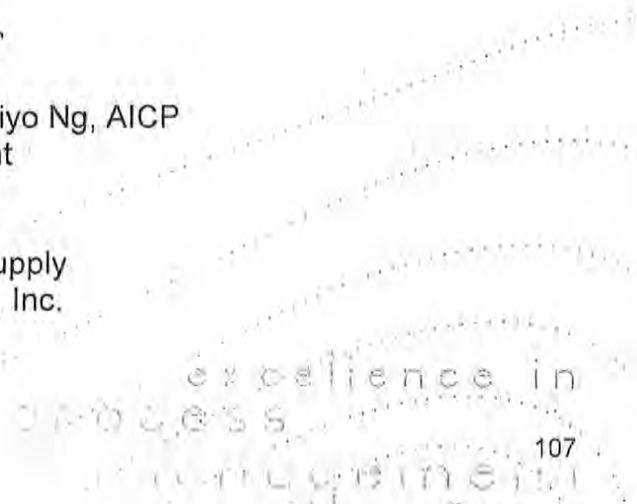
305 High St., Suite 104 Wailuku, Hawaii 96793

ph: (808)244-2015 fax: (808)244-8729

5010M

735 Bishop St., Suite 238 Honolulu, Hawaii 96813 | ph: (808)983-1233

WWW.MUNEKIYOANDHIRAGA.COM



NOV 18 2013



OFFICE OF PLANNING  
STATE OF HAWAII

NEIL ABERCROMBIE  
GOVERNOR

JESSE K. SOUKI  
DIRECTOR  
OFFICE OF PLANNING

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

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

Ref. No. P-14173

November 14, 2013

Ms. Tessa Munekiyo Ng, AICP  
Senior Associate  
Munekiyo & Hiraga, Inc.  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Dear Ms. Munekiyo Ng:

Subject: Early Consultation Request for the Proposed Iao Water Treatment Plant Upgrades; Wailuku, Maui; TMK: (2) 3-5-001:067 (por.) and 091 (por.)

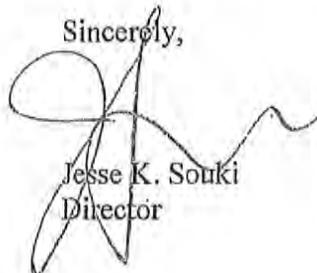
Thank you for the opportunity to provide comments on the Iao Water Treatment Plant Upgrades project.

We have reviewed the documents you submitted to us by letter dated October 25, 2013, and have the following comments to offer.

1. The entire state is defined to be within the Coastal Zone Management Area, see HRS §205A-1 (definition of "coastal zone management area"). The Draft Environmental Assessment (Draft EA) should include a discussion of the proposed project's ability to meet the objectives and policies set forth in HRS §205A-2.
2. The construction project may have nonpoint pollution impacts on coastal waters. Please review the Hawaii Watershed Guidance, which provides a summary and links to management measures that may be implemented to minimize coastal nonpoint pollution impact. Specifically, please examine the sections on: "Hawaii's Management Measures, Urban Areas," on page 109. The *Watershed Guidance* can be viewed or downloaded from the Office of Planning website at <http://files.hawaii.gov/dbedt/op/czm/initiative/nonpoint/HiWatershedGuidanceFinal.pdf>.
3. The Draft EA should include the Coastal Zone Management Act, HRS Chapter 205A, in the list of "Relationship to Land Use Plans, Policies, and Controls."

If you have any questions regarding this comment letter, please contact Josh Hekēkiā of our Hawaii CZM Program at (808) 587-2845.

Sincerely,



Jesse K. Souki  
Director

January 29, 2015

Leo R. Asuncion, Jr., AICP, Acting Director  
Office of Planning  
State of Hawaii  
P.O. Box 2359  
Honolulu, Hawaii 96804

SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.); Ref. No. P-14173

Dear Mr. Asuncion:

Thank you for your department's letter, dated November 14, 2013, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. The County of Maui, Department of Water Supply (DWS) offers the following information in response to the comments noted in your department's letter.

The County of Maui DWS acknowledges that Coastal Zone Management Area rules as prescribed in HRS 205A-1 applies to the proposed project. Accordingly, the Draft Environmental Assessment (Draft EA) will be prepared to include discussions on the proposed project's ability to meet the objectives and policies set forth.

Regarding the concern of construction activities having nonpoint source (NPS) pollution impacts on coastal waters, we note that strict erosion control measures and best management practices will be implemented during the construction phase. In the Hawai'i Watershed Guidance document, one of the 12 management measures that apply to urban areas is Site Development Management Measures. The DWS will coordinate with Department of Health, Clean Water Branch and comply with applicable National Pollutant Discharge Elimination System (NPDES) permit requirements. These

excellence in  
process  
management

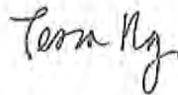
Leo R. Asuncion, Jr.  
January 29, 2015  
Page 2

pollution abatement measures will protect watersheds located downstream of the project site that contain wetlands and riparian areas.

Finally, the Draft EA will be prepared to include the Coastal Zone Management Act, HRS, Chapter 205A in the list of "Relationship to Land Use Plans, Policies, and Controls."

We appreciate your input and will include a copy of your department's comment letter in the Draft EA. Should you have any questions or require further information regarding the proposed action, please contact me at 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Vice President

TMN:mge

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakastuka, Austin, Tsutsumi & Associates, Inc.

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NOV 18 2013

ALAN M. ARAKAWA  
MAYOR



JEFFREY A. MURRAY  
CHIEF

ROBERT M. SHIMADA  
DEPUTY CHIEF

**COUNTY OF MAUI**  
DEPARTMENT OF FIRE AND PUBLIC SAFETY  
FIRE PREVENTION BUREAU

313 MANEA PLACE . WAILUKU, HAWAII 96793  
(808) 244-9161 . FAX (808) 244-1363

November 14, 2013

Munekiyo & Hiraga, Inc  
Attention: Tessa Munekiyo Ng, AICP, Senior Associate  
305 High St. Suite 104  
Wailuku, HI 96793

**Re: Proposed Iao Water Treatment Plant Upgrades**  
**Wailuku, Maui, Hawaii**  
**(2) 3-5-001: 067 (por.) & 091 (por.)**  
**DWS Job No. 12-03**

Dear Tessa:

Thank you for allowing our office the opportunity to comment on this subject. At this time, our office provides the following comments:

- Our office reserves the right to comment on the construction of any buildings during the building permit process when water supply for fire protection, fire apparatus access, and fire protection and life safety system requirements will be addressed.
- Permits for flammable & combustible liquid storage tanks are processed and approved at the Fire Prevention Bureau. A site plan indicating the tank location and distances to property lines and buildings will be required.

If there are any questions or comments, please feel free to contact me at 244-9161 ext. 23.

Sincerely,

A handwritten signature in black ink, appearing to read "Paul Haake", written over a horizontal line.

Paul Haake  
Captain, Fire Prevention Bureau

January 29, 2015

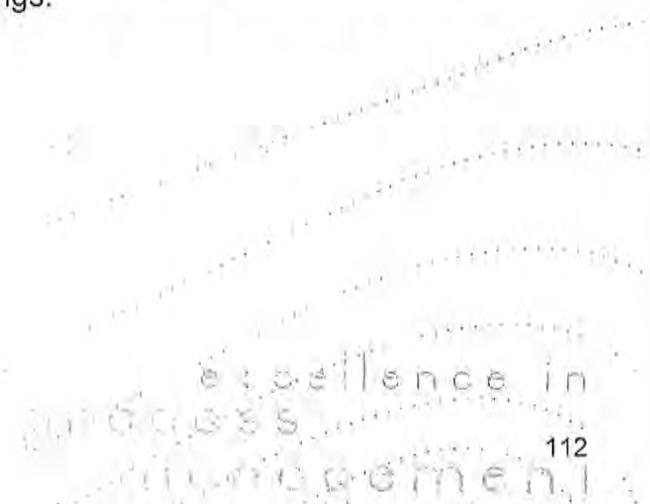
Paul Haake, Captain  
Department of Fire and Public Safety  
County of Maui  
313 Manea Place  
Wailuku, Hawaii 96793

SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.)

Dear Captain Haake:

Thank you for your letter dated November 14, 2013 providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. The County of Maui, Department of Water Supply (DWS) offers the following information in response to the comments noted in your letter.

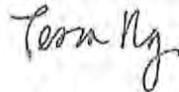
1. We acknowledge that your office reserves the right to comment on the project during the building permit process.
2. Any permits for flammable and combustible liquid storage tanks will be appropriately processed with your office and include a site plan indicating tank location, distances to property lines and buildings.



Paul Haake, Captain  
January 29, 2015  
Page 2

We appreciate your input and we will include a copy of your comment letter in the Draft Environmental Assessment. Should you have any questions or require further information regarding the proposed action, please contact me at (808) 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Vice President

TMN:mge

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakastuka, Austin, Tsutsumi & Associates, Inc.

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DEPARTMENT OF  
HOUSING AND HUMAN CONCERNS  
HOUSING DIVISION  
COUNTY OF MAUI

NOV 14 2013  
ALAN M. ARAKAWA  
Mayor  
JO-ANN T. RIDAO  
Director  
JAN SHISHIDO  
Deputy Director

35 LUNALILO STREET, SUITE 102 • WAILUKU, HAWAII 96793 • PHONE (808) 270-7351 • FAX (808) 270-6284

November 12, 2013

Ms. Tessa Munekiyo Ng, AICP  
Senior Associate  
Munekiyo & Hiraga  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Dear Ms. Ng:

**Subject: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.)**

The Department has reviewed the request for Early Consultation for the above subject project. Based on our review, we have determined that the subject project is not subject to Chapter 2.96, Maui County Code. At the present time, the Department has no additional comments to offer.

Please call Mr. Veranio Tongson Jr. of our Housing Division at (808) 270-1741 if you have any questions.

Sincerely,

WAYDE T. OSHIRO  
Housing Administrator

cc: Director of Housing and Human Concerns



MUNEKIYO, PRESIDENT

KARLYNN FUKUDA  
EXECUTIVE VICE PRESIDENT

MARK ALEXANDER ROY  
VICE PRESIDENT

TESSA MUNEKIYO MD  
VICE PRESIDENT

SHEN CHASHI HIRAGA  
SENIOR ADVISOR

WALTER HIRAGA  
SENIOR ADVISOR

January 29, 2015

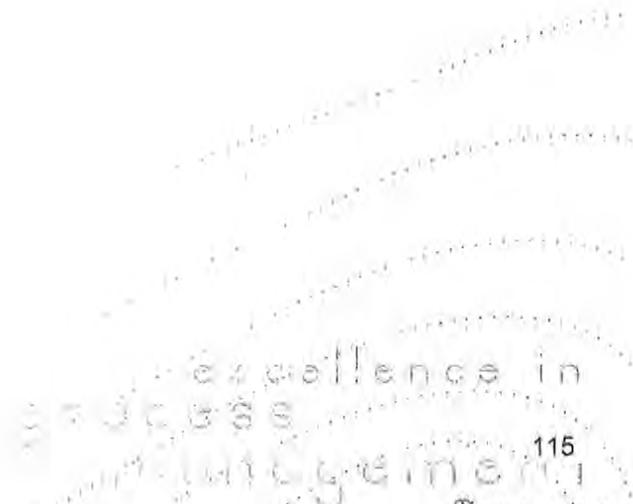
Wayde T. Oshiro, Administrator  
Department of Housing and Human Concerns  
County of Maui  
35 Lunalilo Street, Suite 102  
Wailuku, Hawaii 96793

**SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.)**

Dear Mr. Oshiro:

Thank you for your letter, dated November 1, 2013, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. The County of Maui, Department of Water Supply (DWS) offers the following information in response to the comments noted in your letter.

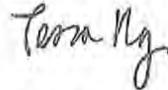
The County of Maui DWS acknowledges that the project is not subject to Chapter 2.96, Maui County Code relating to the County's residential work force housing policy.



Wayde T. Oshiro, Administrator  
January 29, 2015  
Page 2

We appreciate your input and will include a copy of your comment letter in the Draft Environmental Assessment. Should you have any questions or require further information regarding the proposed action, please contact me at (808) 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Manager

TMN:mge

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakastuka, Austin, Tsutsumi & Associates, Inc.

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ALAN M. ARAKAWA  
Mayor



NOV 06 2013 GLENN T. CORREA  
Director

BRIANNE SAVAGE  
Deputy Director

(808) 270-7230  
FAX (808) 270-7934

**DEPARTMENT OF PARKS & RECREATION**  
700 Hali'a Nakoa Street, Unit 2, Wailuku, Hawaii 96793

November 1, 2013

Tessa Munekiyo Ng, AICP, Senior Associate  
Munekiyo & Hiraga, Inc.  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

**SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Maui, Hawaii; DWS Job No. 12-03; TMK: (2) 3-5-001:067 (por.) and 091 (por.)**

Dear Ms. Ng:

We are in receipt of your October 25, 2013 request for early review and comment on the proposed project and have no comment at this time. Please keep our Department informed as the project progresses.

Should you have any questions or need of additional information, please contact me or Robert Halvorson at 808.870.5942 or [robert.halvorson@co.maui.hi.us](mailto:robert.halvorson@co.maui.hi.us)

Sincerely,

  
GLENN T. CORREA  
Director

c: Robert Halvorson, Planning & Development

GTC:RH:do

January 29, 2015

Brianne Savage, Interim Director  
County of Maui  
Department of Parks & Recreation  
700 Hali'a Nako'a Street, Unit 2  
Wailuku, Hawaii 96793

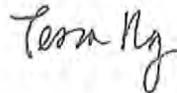
**SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.)**

Dear Ms. Savage:

Thank you for your letter, dated November 1, 2013, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. The County of Maui, Department of Water Supply (DWS) acknowledges your Department has no comments to offer on the proposed project at this time.

We appreciate your input and will include a copy of your department's response letter in the Draft Environmental Assessment. Should you have any questions or require further information regarding the proposed action, please contact me at (808) 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Vice President

TMN::mge

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakastuka, Austin, Tsutsumi & Associates, Inc.

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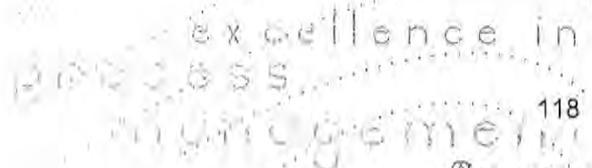
305 High St., Suite 104 Wailuku, Hawaii 96793

ph: (808)244-2015 fax: (808)244-8729

5/1/10

735 Bishop St., Suite 238 Honolulu, Hawaii 96813 | ph: (808)983-1233

WWW.MPLANNING.COM



ALAN M. ARAKAWA  
Mayor

WILLIAM R. SPENCE  
Director

MICHELE CHOUTEAU McLEAN  
Deputy Director



NOV 12 2013

COUNTY OF MAUI  
**DEPARTMENT OF PLANNING**

November 12, 2013

Ms. Tessa Munekiyo Ng  
Munekiyo & Hiraga, Inc.  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Dear Ms. Ng:

**SUBJECT: EARLY CONSULTATION COMMENTS FOR PROPOSED UPGRADES TO THE IAO WATER TREATMENT PLANT, LOCATED ALONG ALU ROAD IN WAILUKU, ISLAND OF MAUI, HAWAII; TMK: (2) 3-5-001: 091 (RFC 2013/0154)**

The Department of Planning (Department) is in receipt of the above-referenced request for early consultation comments on the above-referenced project. The Department understands the proposed action includes the following:

- The Applicant is the County of Maui, Department of Water Supply (DWS);
- The project will involve upgrades to the Iao Water Treatment Plant. Upgrades include, but are not limited to, the installation of new membrane filtration units, various tanks, dual sludge lagoons, holding tanks, waterlines, drainage system, and construction of a Treatment Plant Building;
- The property is currently owned by RCFC Kehalani LLC, Kehalani Mauka LLC, and Wailuku Water Company LLC. The DWS is in the process of acquiring the land for the proposed project; and
- The project triggers compliance with Hawaii Revised Statutes (HRS), Chapter 343;

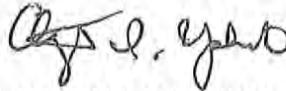
Based on the foregoing, the Department provides the following comments on the Draft Environmental Assessment (EA):

1. Please include a Zoning and Flood confirmation form from the Department's Zoning Administration and Enforcement Division;
2. That the Applicant include information on all permits required in order to complete the project; and
3. Please provide the Department with one (1) hard copy and one (1) electronic copy of the Draft EA.

Ms. Tessa Munekiyo Ng  
November 12, 2013  
Page 2

Thank you for the opportunity to comment. Should you require further clarification, please contact Staff Planner Danny Dias at [danny.dias@mauicounty.gov](mailto:danny.dias@mauicounty.gov) or at (808) 270-7557.

Sincerely,



CLAYTON I. YOSHIDA, AICP  
Planning Program Administrator

for WILLIAM SPENCE  
Planning Director

xc: John S. Rapacz, Planning Program Administrator (PDF)  
Danny A. Dias, Staff Planner (PDF)  
Project File  
General File

WRS:CIY:DD:aj

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January 29, 2015

William Spence, Director  
Department of Planning  
County of Maui  
2200 Main Street, Suite 315  
Wailuku, Hawaii 96793

SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.)

Dear Mr. Spence:

Thank you for your letter, dated November 12, 2013, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. The County of Maui, Department of Water Supply (DWS) offers the following information in response to the comments noted in your letter.

The County of Maui DWS acknowledges your comment advising that certain information be included in the Draft Environmental Assessment (EA).

DWS will include the following information in the Draft EA:

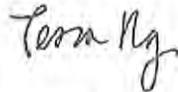
1. Zoning and Flood confirmation from the Planning Department's Zoning Administration and Enforcement Division and;
2. Information on all permits required to complete the proposed project.

Also, DWS will provide the Department with one (1) hard copy and one (1) electronic copy of the Draft EA.

William Spence, Planning Director  
January 29, 2015  
Page 2

We appreciate your input and will include a copy of your comment letter in the Draft Environmental Assessment. Should you have any questions or require further information regarding the proposed action, please contact me at (808) 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Vice President

TMN:mge

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakastuka, Austin, Tsutsumi & Associates, Inc.

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ALAN M. ARAKAWA  
MAYOR

OUR REFERENCE  
YOUR REFERENCE

# POLICE DEPARTMENT

## COUNTY OF MAUI

55 MAHALANI STREET  
WAILUKU, HAWAII 96793  
(808) 244-6400  
FAX (808) 244-6411

November 13, 2013



NOV 18 2013

GARY A. YABUTA  
CHIEF OF POLICE

CLAYTON N.Y.W. TOM  
DEPUTY CHIEF OF POLICE

Ms. Tessa Munekiyo Ng  
AICP, Senior Associate  
Munekiyo & Hiraga, Inc.  
305 High Street, Suite 104  
Wailuku, HI 96793

Dear Ms. Munekiyo Ng:

SUBJECT: Early Consultation Request for the Proposed Iao Water Treatment  
Plant Upgrades, Wailuku, Maui  
DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.)

This is in response your request for comments on the above subject.

We have reviewed the information submitted for this project and have submitted our  
comments and/or recommendations. Thank you for giving us the opportunity to comment  
on this project.

Very truly yours,

Assistant Chief Victor Ramos  
for: Gary A. Yabuta  
Chief of Police

c: William Spence, Planning Department

TO : GARY YABUTA, CHIEF OF POLICE, COUNTY OF MAUI  
VIA : CHANNELS  
FROM : AYLETT WALLWORK, POLICE OFFICER III, COMMUNITY  
POLICING, WAILUKU PATROL DIVISION  
SUBJECT : RESPONSE TO A REQUEST FOR COMMENTS REGARDING  
IAO WATER TREATMENT PLANT UPGRADES

*James J. Aylett*  
11/7/13

This communication is submitted as a response to a request for comments by the Maui County, Department of Water Supply, who is proposing to replace the existing Iao Surface Water Treatment Plant with a new Water Treatment Plant.

PROJECT : PROPOSED IAO WATER TREATMENT  
PLANT UPGRADES  
LOCATION : AREA OF KEHALANI DEVELOPMENT WAILUKU, MAUI,  
HAWAII  
TMK : (2) 3 - 5 - 001:067

**RESPONSE:**

In review of the submitted documents, the concern from the police perspective is the impacts upon vehicular and pedestrian movement as well as the public's safety. Maui County Department of Water Supply is proposing to replace the existing Iao Water Treatment Plant with a new Water Treatment Plant (WTP), west of the existing plant. Construction should not have any impact to vehicular and pedestrian movements or the public's safety. There is adequate on-site parking for workers and their vehicles. The proposed site is not in an area that can be accessed by the roadway, but can be accessed through the existing Iao WTP site. At this time it is undetermined when this project will commence.

There are no objections to the progression of this project. It must be stated that all those involved in this project must remain cognizant in maintaining the safety of the general public.

Respectfully submitted for your review and approval.

*[Signature]* 11764  
Aylett Wallwork #11764  
P.O. III, Community Policing, Wailuku Patrol Division  
11/07/2013 @ 1000 hours

NOTED: Aylett Wallwork 11/8/13

NO CONCERNS AT THIS TIME.  
Sgt. James J. Aylett 11/7/13  
11-7-13 @ 1505

January 29, 2015

Tivoli Faaumu, Chief  
Police Department  
County of Maui  
55 Mahalani Street  
Wailuku, Hawaii 96793

**SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.)**

Dear Chief Faaumu:

Thank you for your Department's letter, dated November 13, 2013, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. The County of Maui, Department of Water Supply (DWS) offers the following information in response to the comments noted in your department's letter.

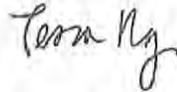
The County of Maui DWS acknowledges your department's comment that the construction phase of the project should not have any impact to vehicular and pedestrian movements or the public's safety and that adequate on-site parking for workers and their vehicles are accommodated. DWS will include provisions in the construction bid documents to ensure the general contractor implements adequate work zone traffic control plans and has adequate on-site construction vehicle parking areas.

We note that access to the proposed site will be via an access driveway off of Alu Road rather than through the existing water treatment plant site.

Tivoli Faaumu, Chief  
January 29, 2015  
Page 2

We appreciate your input and will include a copy of your department's comment letter in the Draft Environmental Assessment. Should you have any questions or require further information regarding the proposed action, please contact me at (808) 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Vice President

TMN:mge

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakastuka, Austin, Tsutsumi & Associates, Inc.

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NOV 13 2013

ALAN M. ARAKAWA  
Mayor

DAVID C. GOODE  
Director

ROWENA M. DAGDAG-ANDAYA  
Deputy Director



GLEN A. UENO, P.E., P.L.S.  
Development Services Administration

CARY YAMASHITA, P.E.  
Engineering Division

BRIAN HASHIRO, P.E.  
Highways Division

COUNTY OF MAUI  
DEPARTMENT OF PUBLIC WORKS

200 SOUTH HIGH STREET, ROOM NO. 434, WAILUKU, MAUI, HAWAII 96793  
Telephone: (808) 270-7845 • Fax: (808) 270-7955

November 7, 2013

Ms. Tessa Munekiyo Ng, AICP  
MUNEKIYO & HIRAGA, INC.  
305 High Street, Suite 104  
Wailuku, Maui, Hawaii 96793

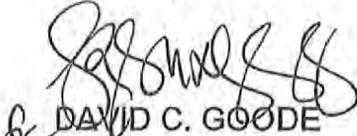
Dear Ms. Munekiyo Ng:

**SUBJECT: EARLY CONSULTATION REQUEST FOR THE  
PROPOSED IAO WATER TREATMENT PLANT  
UPGRADES; DWS JOB NO. 12-03; TMK: (2) 3-5-001:067  
(POR.) and 091 (POR.)**

We have no comments at this time, but wish to reserve our comments until the review of the Draft Environmental Assessment.

Please call Rowena M. Dagdag-Andaya at 270-7845 if you have any questions regarding this letter.

Sincerely,

  
DAVID C. GOODE  
Director of Public Works

DCG:RMDA:ls

xc: Highways Division  
Engineering Division

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January 29, 2015

David C. Goode, Director  
Department of Public Works  
County of Maui  
200 South High Street, Suite 104  
Wailuku, Hawaii 96793

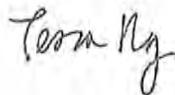
**SUBJECT:** Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.)

Dear Mr. Goode:

Thank you for your letter, dated November 7, 2013, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. The County of Maui, Department of Water Supply (DWS) acknowledges your Department has no comments to offer on the proposed project at this time.

We appreciate your input and we will include a copy of your comment letter in the Draft Environmental Assessment. Should you have any questions or require further information regarding the proposed action, please contact me at (808) 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Vice President

TMN:mge

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakastuka, Austin, Tsutsumi & Associates, Inc.

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HAWAII

305 High St., Suite 104 Wailuku, Hawaii 96793

ph: (808)244-2015 Fax: (808)244-8729

OKAMA

735 Bishop St., Suite 238 Honolulu, Hawaii 96813 | ph: (808)983-1233

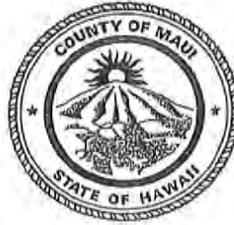
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NOV 18 2013

ALAN M. ARAKAWA  
Mayor  
KYLE K. GINOZA, P.E.  
Director  
MICHAEL M. MIYAMOTO  
Deputy Director

TRACY TAKAMINE, P.E.  
Solid Waste Division  
ERIC NAKAGAWA, P.E.  
Wastewater Reclamation Division



**COUNTY OF MAUI  
DEPARTMENT OF  
ENVIRONMENTAL MANAGEMENT**  
2200 MAIN STREET, SUITE 100  
WAILUKU, MAUI, HAWAII 96793

November 13, 2013

Ms. Tessa Munekiyo Ng  
Munekiyo & Hiraga, Inc.  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Dear Ms. Ng:

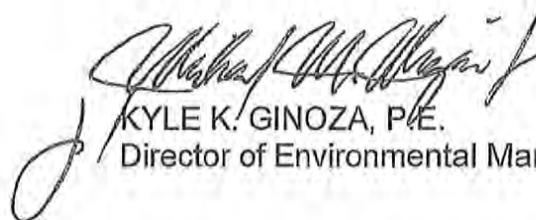
**SUBJECT: IAO WATER TREATMENT PLANT UPGRADES  
EARLY CONSULTATION  
TMK (2) 3-5-001:067 (POR.) AND 091 (POR.), WAILUKU**

We reviewed the subject application and have the following comments:

1. Solid Waste Division comments:
  - a. None.
2. Wastewater Reclamation Division (WWRD) comments:
  - a. None.

If you have any questions regarding this memorandum, please contact Michael Miyamoto at 270-8230.

Sincerely,

  
KYLE K. GINOZA, P.E.  
Director of Environmental Management

January 29, 2015

Kyle K. Ginoza, P.E.  
Department of Environmental Management  
County of Maui  
2200 South High Street, Suite 100  
Wailuku, Hawaii 96793

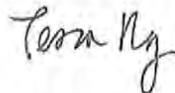
SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.)

Dear Mr. Ginoza:

Thank you for your letter, dated November 13, 2013, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. The County of Maui, Department of Water Supply (DWS) acknowledges your Department has no comments to offer on the proposed project at this time.

We appreciate your input and will include a copy of your response letter in the Draft Environmental Assessment. Should you have any questions or require further information regarding the proposed action, please contact me at (808) 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Vice President

TMN:mge

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakastuka, Austin, Tsutsumi & Associates, Inc.

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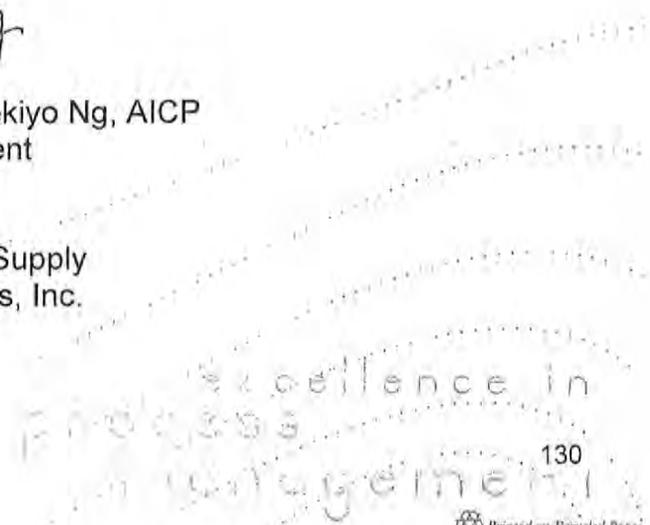
305 High St., Suite 104 Wailuku, Hawaii 96793

ph: (808)244-2015 fax: (808)244-8729

5555

735 Bishop St., Suite 238 Honolulu, Hawaii 96813 | ph: (808)983-1233

WWW.MUNEKIYOHIRAGA.COM



ALAN M. ARAKAWA  
Mayor



NOV 12 2013  
JO ANNE JOHNSON-WINER  
Director  
MARC I. TAKAMORI  
Deputy Director  
Telephone (808) 270-7511

DEPARTMENT OF TRANSPORTATION

COUNTY OF MAUI  
200 South High Street  
Wailuku, Hawaii, USA 96793-2155

October 30, 2013

Ms. Tessa Munekiyo Ng  
Munekiyo & Hiraga Inc.  
305 High Street, Suite 104  
Wailuku, Maui, Hawaii 96793

Subject: Proposed Iao Water Treatment Plant Upgrades

Dear Ms. Ng,

Thank you for the opportunity to comment on this project. We have no comments to make at this time.

Please feel free to contact me if you have any questions.

Sincerely,

  
Jo Anne Johnson-Winer  
Director

January 29, 2015

Jo Anne Johnson Winer, Director  
Department of Transportation  
County of Maui  
200 South High Street  
Wailuku, Hawaii 96793-2155

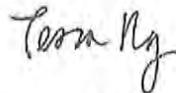
**SUBJECT: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.)**

Dear Ms. Johnson Winer:

Thank you for your letter, dated October 30, 2013, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. The County of Maui, Department of Water Supply (DWS) acknowledges your Department has no comments to offer on the proposed project at this time.

We appreciate your input and will include a copy of your comment letter in the Draft Environmental Assessment. Should you have any questions or require further information regarding the proposed action, please contact me at (808) 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Vice President

TMN:mge

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakastuka, Austin, Tsutsumi & Associates, Inc.

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JUN 16 2014

Maui Electric Company, Ltd. • 210 West Kamehameha Avenue • P. O. Box 398 • Kahului, Maui, HI 96733-0698 • (808) 871-8461



June 11, 2014

Munekiyo & Hiraga, Inc  
Attention: Ms. Tessa Munekiyo Ng, Senior Associate  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Subject: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades  
Tax Map Key: (2) 3-5-001:067 (por.) and 091 (por.)  
Wailuku, Maui, Hawaii

Dear Ms. Munekiyo Ng,

Thank you for allowing us to comment on the Early Consultation Request for the subject project.

In reviewing our records and the information received, Maui Electric Company (MECO) would highly encourage the customer's electrical consultant to submit electrical drawings to us as soon as practical to address and coordinate any possible relocations of our facilities. Since this project's anticipated electrical demand may have a substantial impact to our system, we encourage the customer's electrical consultant to submit the electrical demand requirements and project time schedule as soon as practical so that service can be provided on a timely basis. MECO may need to complete system upgrades to accommodate the anticipated electrical load.

Should you have any questions or concerns, please contact Kelcie Kawamura at 872-3246.

Sincerely,

A handwritten signature in black ink, appearing to read 'R. Okazaki'.

Ray Okazaki  
Supervisor, Engineering

January 29, 2015

Ray Okazaki, Supervisor, Engineering  
Maui Electric Company, Ltd.  
P.O. Box 398  
Kahului, Hawaii 96733-0698

**SUBJECT:** Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Island of Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.)

Dear Mr. Okazaki:

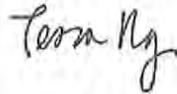
Thank you for your letter dated June 11, 2014, providing early consultation comments on the proposed Iao Water Treatment Plant Upgrades. On behalf of the County of Maui, Department of Water Supply (DWS) we offer the following information in response to the comments noted in your letter.

The County of Maui, DWS and its electrical consultant will submit to MECO, the proposed upgraded facilities electrical demand requirements and project time schedule details as soon as available.

Ray Okazaki, Supervisor, Engineering  
January 29, 2015  
Page 2

We appreciate your input and will include a copy of your comment letter in the Draft Environmental Assessment. Should you have any questions or require further information regarding the proposed action, please contact me at (808) 983-1233.

Very truly yours,



Tessa Munekiyo Ng, AICP  
Manager

TMN:lh

cc: Tom Ochwat, County of Maui, Department of Supply  
Ivan Nakatsuka, Austin Tsutsumi & Associates, Inc.

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## **IX. REFERENCES**

## IX. REFERENCES

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# **APPENDIX A.**

## **Preliminary Engineering Report**

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# PRELIMINARY ENGINEERING REPORT FOR THE IAO SURFACE WATER TREATMENT PLANT UPGRADES PROJECT

WAILUKU, MAUI, HAWAI'I

TMK: (2) 3-5-001: 067 (POR.) & 091 (POR.)

January 28, 2015

Prepared for:

County of Maui Dept. of Water Supply  
200 South High St, 5<sup>th</sup> Floor  
Wailuku, HI 96793

Prepared by:



*Austin, Tsutsumi & Associates, Inc.*

Civil Engineers • Surveyors

1871 Wili Pa Loop, Suite A

Wailuku, Hawai'i 96793

Telephone: (808) 244-8044

Facsimile: (808) 242-9163

E-mail: [atamaui@atahawaii.com](mailto:atamaui@atahawaii.com)

Honolulu • Wailuku • Hilo, Hawai'i

---

---

**PRELIMINARY ENGINEERING REPORT  
FOR THE IAO SURFACE WATER TREATMENT  
PLANT UPGRADES PROJECT**

Wailuku, Maui, Hawai'i

TMK: (2) 3-5-001: 067 (POR.) & 091 (POR.)

Prepared for:

**County of Maui Dept. of Water Supply**

Prepared by:

**Austin, Tsutsumi & Associates, Inc.**

Civil Engineers • Surveyors

Honolulu • Wailuku • Hilo, Hawaii

January 28, 2015

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### PHOTOS

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### APPENDICES

- A. CHLORINE CONTACT TIME CALCULATIONS



TERRANCE S. ARASHIRO, P.E.  
STANLEY T. WATANABE  
IVAN K. NAKATSUKA, P.E.  
ADRIENNE W. L. H. WONG, P.E., LEED AP  
DEANNA HAYASHI, P.E.  
PAUL K. ARITA, P.E.  
ERIK S. KANESHIRO, L.P.L.S., LEED AP

## PRELIMINARY ENGINEERING REPORT FOR

### 3.2 MGD IAO SURFACE WATER TREATMENT PLANT UPGRADES

#### Wailuku, Maui, Hawaii

#### I. INTRODUCTION

The County of Maui Department of Water Supply (DWS) is proposing to replace the existing Iao Surface Water Treatment Plant (WTP) located within the site of the 3.0 MG Iao Tank with a new 3.2 million gallon per day (mgd) WTP to be located west (mauka) of the existing WTP. The site for the new WTP will be on land currently owned by Kehalani Mauka, LLC, Lot T-1 (TMK: (2) 3-5-001:067), adjacent to and mauka of the existing Maui Electric Co., Ltd. Substation. (Refer to Exhibit 1 for Location and Vicinity Map, and Exhibits 2 and 3 for General Site Plans).

Raw water for the WTP will continue to be from the Iao-Waikapu Ditch owned by Wailuku Water Company, LLC (WWC). An agreement between DWS and WWC allows for DWS to withdraw up to 3,200,000 gallons of water over a 24-hour period from the Iao-Waikapu Ditch for a fixed transportation fee of \$0.48 per thousand gallons delivered. This amount of water withdrawn from the ditch is exclusive of backwash water from the treatment process, as long as such backwash water is placed back into WWC's water system. Therefore, the new WTP will treat approximately 3.4 mgd of raw water from the ditch to produce 3.2 mgd of treated water. The difference between the raw water and treated water of approximately 200,000 gpd is the water that will be used for daily multiple backwashing, and to a lesser degree occasional chemical cleaning, of the membranes. This membrane backwashing and cleaning water will be placed back into WWC's water system by ultimately being discharged into WWC's Waihee Ditch, which runs just below the 3.0 MG Iao Tank.



The three high pressure membrane filtration units of the existing WTP were originally housed within a temporary structure that has since been removed. Therefore, these existing units are now in the open and exposed to the elements. The new WTP will consist of four low pressure membrane filtration units housed within a permanent structure.



## **II. CHARACTERISTICS OF PROJECT AREA**

### **A. Climate**

The average annual rainfall in the vicinity of Wailuku is approximately 37 inches per year, with 90% of the annual rainfall occurring between October and May. Prevailing tradewinds are from the northeast approximately 80-85% of the time, averaging 10-15 miles per hour during the afternoons with lighter winds during the mornings and nights. The average annual temperature is approximately 76 degrees Fahrenheit, with the high and low temperatures near 88 degrees and 63 degrees, respectively.

### **B. Topography**

The existing ground at the WTP is sloped in the west to east (mauka to makai) direction, with approximate ground mean sea level (msl) elevations being 560' at the upper end and 508' at the lower end. The project site is undeveloped and overgrown with weeds and grasses, low-lying brush and trees.

### **C. Soils**

A foundation investigation was conducted for the project site, whereby seven borings were drilled, ranging in depth from 15 to 25 feet. Neither seepage nor groundwater was encountered in any of the borings of the foundation investigation.

It was determined that the surface soil consisted of dark reddish brown to brown clayey silt of medium stiff to stiff condition, with only a slight expansion potential. Underlying the surface soil at depths ranging from 8 to 12 feet was mottled brown clayey silt with completely weathered rock fragment of medium stiff to stiff condition. This type of soil extended down to the maximum depths drilled, except for within one of the borings. Underlying this layer in this one boring at a depth of about 21 feet was highly to completely weathered rock of dense to medium hard condition.

Based on this investigation, it was determined that conventional shallow foundations may be used to support the proposed structures for the WTP.



#### **D. Earthquake**

Based on the 1997 Uniform Building Code, the WTP site is located within Seismic Zone 2B. Within Seismic Zone 2B, a seismic factor (Z) equal to 0.2 is recommended for calculation of shear and lateral load imparted on structures during an earthquake

#### **E. Drainage**

Site runoff drains as sheet flow west to east (mauka to makai), as there are no drainage ways or areas of concentrated flow. Normally most runoff is infiltrated into the open field land, but during intense storm events, runoff may reach and enter the Waihee Ditch, located approximately 600 feet makai of the project site.

The mountainous off-site land above West Alu Road also contributes runoff to the project site. This off-site runoff is intercepted by a roadside ditch on the mauka side of West Alu Road. The ditch runoff is eventually collected by a 36-inch culvert, which conveys the runoff under the roadway and into the project site, where it disperses into the open field land. Also, off-site runoff to the northwest sheet flows off West Alu Road and into the site.

#### **F. Noise**

As the site is currently undeveloped, there is no noise being generated by any on-site equipment or vehicles. However, upon completion of the project, there will be noise generated from equipment within the Treatment Plant Building (TPB), particularly from compressors, blowers and the standby generator. These equipment items will be housed within sound attenuated rooms within the TPB such that applicable State Department of Health day-time noise limits at the WTP property lines are met for the generator and night-time noise limits are met for the compressor and blower.



### **III. EXISTING WATER SYSTEM**

#### **A. Source Water and Ditch Intake**

The source water for the WTP is the from the watershed area draining into the upper reaches of lao Stream. There is a ditch intake in lao Stream, near lao Valley State Park, that diverts stream water into lao Ditch. Shortly downstream of the lao Ditch intake, the ditch divides into two ditches. The lao-Maniania Ditch flows north towards Waiehu, and the lao-Waikapu Ditch flows south towards Maalaea. Near where the lao-Waikapu Ditch crosses Alu Road, an intake diverts water from the ditch into the raw water transmission line that conveys the water to the lao WTP.

The intake at the lao-Waikapu Ditch consists of two manually-cleaned screens that are accessible through steel plate hatches. The screened water (raw water) enters a concrete box and exits the box through a 12" pipe with a 12" flow meter, 12" gate valve and air release valve. The elevation at the ditch is approximately 740'. (Refer to Photos 1 and 2.)

#### **B. Raw Water Transmission Line**

The first segment of the transmission line out of the concrete box at the intake is about 800' long. The end of this segment is where the water is discharged into a 3,000± gallon headbreaker tank (HBT) at elevation 617'. The differential elevation between the HBT and existing WTP allows for an inlet pressure at the WTP that is conducive towards operation of the membrane units of the existing WTP. (Refer to Photo 3.)

A little more than half of this first segment of the transmission line is 12" in size, before it increases in size to 24". The transmission line then reduces back down to 12" just before the HBT inlet, which has a 12" gate valve and 12" float control valve. The float valve regulates the discharge of water into the HBT. The differential between the open and close positions of the float is only a few inches.



The HBT outlet is initially 12" in size, with a 12" gate valve, but quickly increases back to 24" in size all the way to the existing WTP. There is no line with valve that connects the HBT inlet to its outlet. Therefore, bypassing of the HBT is not possible.

### **C. Water Treatment Plant**

The major components of the existing treatment plant are three un-sheltered high pressure membrane filtration units with clean-in-place chemical system, a blower and compressor housed within a wooden shelter, an un-sheltered compressed air tank adjacent to this wooden shelter and a wooden building that serves as an office and laboratory. Disinfection is with chlorine gas. (Refer to Photos 4 and 5.)



#### IV. PROPOSED UPGRADES

The existing Iao Surface WTP located within the site of the 3.0 MG Iao Tank will be replaced with a new 3.2 mgd WTP to be located west (mauka) of the existing WTP. The new WTP will consist of four low pressure membrane filtration units housed within a permanent structure. There is no intention of expanding the WTP beyond the currently designed 3.2 mgd average production rate. Therefore, there is no room for expansion of the WTP in the future to increase the plant output capacity. The construction cost for the new WTP is expected to be in the range of \$12-15 million.

Raw water for the WTP will continue to be from the Iao-Waikapu Ditch. A new connection to the existing 24" raw waterline will be made to convey the raw water to the new WTP. The raw water will pass through a strainer to remove debris prior to the water entering the membrane units. After the water leaves the membrane units, the filtered water will be injected with chlorine prior to entering the chlorine contact tank (CCT) for disinfection. The finished water will flow by gravity from the CCT to the existing Iao 3.0 MG Tank.

A sample of the raw water, before it goes through the strainer, will be measured for turbidity. In the event that the turbidity of the raw water is too high to treat, a valve on the raw water line to the membrane units will automatically close, and a valve on a by-pass line will automatically open, allowing the high turbidity water to be conveyed to the new Sludge Lagoons, rather than have the raw water be treated. (Refer to Exhibit 4 for the Process Schematic.) The raw water will continue to be monitored for turbidity, and when the turbidity meets a pre-determined acceptable level, the automatic valve on the by-pass line will close the valve on the line to the membrane units will open, allowing the raw water to be treated.

The basic design criteria for the WTP are shown in Table 1, and the chemical usage design criteria are shown in Table 2.

Table 1. Basic Design Criteria

PARAMETER	VALUE	UNITS
PLANT PRODUCTION		
NUMBER OF MEMBRANE UNITS	4	EACH
AVE. PRODUCTION RATE PER MEMBRANE UNIT	1.2	MGD
MAX. PRODUCTION RATE PER MEMBRANE UNIT	1.6	MGD
AVERAGE PLANT PRODUCTION RATE	3.2	MGD
NUMBER OF MODULES PER UNIT	108	EACH
STRAINERS		
AUTOMATIC SELF CLEANING STRAINER		
NUMBER OF STRAINERS	2	EACH
CAPACITY, EACH	4800	GPM
SIZE	14	INCHES
HORSEPOWER, BACKWASH ARM	1/4	HP
CLEAN-IN-PLACE (CIP) SYSTEM		
CIP TANK		
NUMBER OF TANKS	1	EACH
VOLUME OF TANK	1800	GALLONS
CIP HEATER	60	KW
CIP PUMP		
NUMBER OF PUMPS	1	EACH
CAPACITY	720	GPM
TOTAL DYNAMIC HEAD	40	FT
HORSEPOWER	15	HP
NEUTRALIZATION TANK		
NUMBER OF TANKS	1	EACH
VOLUME OF TANK	5800	GALLONS
NEUTRALIZATION PUMPS		
NUMBER OF PUMPS	1	EACH
CAPACITY, EACH PUMP	120	GPM
TOTAL DYNAMIC HEAD	50	FT
HORSEPOWER, EACH PUMP	3	HP
AIR BLOWERS		
NUMBER OF BLOWERS	3	EACH
AIR FLOW, EACH BLOWER (@ 5 PSIG)	275	SCFM
HORSEPOWER, EACH BLOWER	20	HP
AIR COMPRESSORS		
NUMBER OF COMPRESSORS	2	EACH
AIR FLOW, EACH COMPRESSOR (@ 125 PSIG)	55.3	SCFM
HORSEPOWER, EACH COMPRESSOR	15	HP
AIR RECEIVERS		
CONTROL AIR RECEIVER TANK CAPACITY	120	GAL
TEST AIR RECEIVER TANK CAPACITY	620	GAL
CHLORINE CONTACT TANK		
VOLUME (AT OVERFLOW)	375,000	GALLONS
SLUDGE LAGOONS		
NUMBER OF CELLS	2	EA
VOLUME, EACH CELL	240,000	GAL

Table 2. Chemical Usage Design Criteria

PARAMETER	VALUE	UNITS
<b>SODIUM HYPOCHLORITE (NAOCL) 12.5% SOLUTION</b>		
MEMBRANES MAINTENANCE WASH		
TARGET DOSAGE (12.5% SOLUTION)	100	PPM
USAGE PER CLEAN PER UNIT	1.0	GAL
MAINTENANCE WASH INTERVAL	48	HOURS
CLEAN IN PLACE		
TARGET DOSAGE (12.5% SOLUTION)	500	PPM
USAGE PER CLEAN PER UNIT	5.1	GAL
CIP INTERVAL	30	DAYS
TOTAL USAGE PER YEAR (MEMBRANES)	1000	GAL
DISINFECTION		
TARGET DOSAGE (12.5% SOLUTION)	2.33	PPM
TARGET RESIDUAL	1.30	PPM
TOTAL USAGE PER YEAR (DISINFECTION)	21,800	GAL
OVERALL TOTAL USAGE PER YEAR	22,800	GAL
<b>CITRIC ACID 50% SOLUTION</b>		
CLEAN IN PLACE		
USAGE PER CLEAN PER UNIT	25	GAL
CIP INTERVAL	30	DAYS
TOTAL USAGE PER YEAR	1220	GAL
<b>SULFURIC ACID (H2S04) 50% SOLUTION</b>		
MAINTENACE WASH		
USAGE PER CLEAN PER UNIT	1.3	GAL
MAINTENANCE WASH INTERVAL	48	HOURS
CLEAN IN PLACE		
USAGE PER CLEAN PER UNIT	1.3	GAL
CIP INTERVAL	30	DAYS
TOTAL USAGE PER YEAR	1040	GAL
<b>SODIUM HYDROXIDE (NAOH) 50% SOLUTION FOR NEUTRALIZATION</b>		
MAINTENACE WASH		
USAGE PER CLEAN PER UNIT	1.0	GAL
MAINTENANCE WASH INTERVAL	48	HOURS
CLEAN IN PLACE		
USAGE PER CLEAN PER UNIT	18	GAL
CIP INTERVAL	30	DAYS
TOTAL USAGE PER YEAR	1580	GAL
<b>SODIUM BISULFITE (NAHSO3) 38% SOLUTION FOR NEUTRALIZATION</b>		
MAINTENACE WASH		
USAGE PER CLEAN PER UNIT	0.4	GAL
MAINTENANCE WASH INTERVAL	48	HOURS
CLEAN IN PLACE		
USAGE PER CLEAN PER UNIT	2.1	GAL
CIP INTERVAL	30	DAYS
TOTAL USAGE PER YEAR	410	GAL

NOTE: QUANTITIES BASED ON AVERAGE RAW WATER FLOW OF 3.2 MGD WITH 4 UNITS OPERATING



## A. Major On-site Components

This section describes the major components within the 2.5-acre fenced site of the new surface water treatment plant (WTP). (Refer to Exhibit 5 for WTP Site Plan.)

### 1. Treatment Plant Building

A 140' long x 70' wide x 28' high (at its highest point above finished grade) pre-engineered rigid-frame Treatment Plant Building (TPB) with lower wall portions of concrete masonry unit (CMU) and upper wall portions and roof of aluminum panels. The finish floor elevations of the lower Filtration Area and the multiple rooms of the upper area will vary to conform to the slope of the site. (Refer to Exhibits 6, 7, 8 and 9 for TPB floor plan and elevation views.)

The lower "Filtration Area" of the TPB will house the following major components:

- Two low-differential pressure, automatic backwashing strainers (one acting as a standby), to remove particles from the raw water that may damage the membranes.
- Two pressure reducing valves to reduce the pressure of the raw water that would otherwise damage the membranes. A pressure relief valve will be installed downstream of the pressure reducing valves as a safety feature to protect the membrane units in the event that the pressure reducing valves malfunction.
- Four low pressure membrane filtration units.
- Clean-In-Place (CIP) system used for cleaning the membranes, with CIP and Neutralization Tanks/Pumps, chemical drums and chemical dosing pumps.



- Sodium hypochlorite system with storage tank and peristaltic pumps for injection of sodium hypochlorite into the water for the purpose of disinfection. The sodium hypochlorite stored in the tank will also be used for cleaning of the membrane units, as part of the CIP system.

The upper area of the TPB will have the following separate rooms, with all of the rooms being air conditioned except for the Generator and Blower Rooms:

- Generator Room (sound attenuated) to house the standby generator and diesel fuel day tank
- Blower Room (sound attenuated) to house air blowers, air compressors and air receivers
- Electrical Room to house the motor control center
- Office/Laboratory
- Break Room
- Unisex restroom
- Storage Room

## 2. Fuel Tank

An aboveground, 2,000-gallon, double-containment, fuel tank for storage of diesel fuel to run the standby generator.

## 3. Chlorine Contact Tank

An aboveground concrete Chlorine Contact Tank (CCT) of dimensions 102' long x 24' wide x 28' high (at its highest point above finished grade) with a maximum water depth of 25' feet. The CCT will have



an interior longitudinal wall with an opening at one end. This will allow for serpentine flow from the inlet to the outlet to minimize short circuiting of the flow, thereby maximizing the contact time within the CCT. (Refer to Exhibit 10 for Chlorine Contact Tank Piping Plan and Sections, and Appendix A for Chlorine Contact Time Calculations.)

#### 4. Sludge Lagoon

A dual-compartment concrete Sludge Lagoon of dimensions 200' long x 30' wide with a maximum water depth of 18 feet for gravity solids-liquid separation of backwash water from the membrane units. High turbidity raw water, drain water from the raw water strainers, discharge from the raw water pressure relief valve and overflows from the CIP and Neutralization Tanks will also be conveyed to the Sludge Lagoons. (Refer to Exhibit 11 for Sludge Lagoon Plan and Sections.)

Each of the two compartments of the Sludge Lagoon will have an approximate volume of 240,000 gallons. One compartment will be shut-down at a time to allow for gravity settlement of the sludge.

The decanted liquid will discharge into the Waihee Ditch, for which an NPDES permit will be required, and the sludge would then be allowed to dry via evaporation within the Sludge Lagoons. When the sludge dries to a solids content of approximately 35 percent, the dried sludge will be removed from the compartment, and transported for off-site disposal at the County of Maui landfill.

### **B. Membrane Filtration System**

#### 1. General

The WTP will utilize a low pressure microfiltration system with polyvinylidene fluoride (PVDF) membranes that are resistant to chlorine. This membrane system will be designed to produce water that meets or exceeds all water quality requirements of the State of Hawaii Department of



Health (DOH) and the United States Environmental Protection Agency (EPA).

## 2. Membrane units

Four Memcor CP membrane units will be installed which will allow the WTP to produce an average of 3.2 mgd with three units in operation and one unit on standby.

The membrane units are composed of 108 membrane modules, with the capability of expanding up to 120 modules. However, there is no intention of expanding the WTP in the future beyond the currently designed average production rate of 3.2 mgd.

The Memcor CP filtration unit is a pre-engineered system that is factory assembly and skid mounted. The package comes in two parts; (1) a membrane array with its own frame, and (2) a valve, pipework and instrumentation skid supplied in a supporting frame. The two parts put together measure approximately 19 feet long by 12 feet high by 7 feet wide.

## 3. Membranes

For the lao WTP, Memcor's N Series membranes will be used, which are composed of PVDF and are resistant to chlorine. A pilot study was recently conducted at the existing Kamole Weir WTP which involved testing Memcor's V Series membranes in their L10V modules and their N Series membranes in their L10N modules. The intention is to have the Department of Health approve the N Series membranes for both the L10N and L20N membrane modules based on the results of the pilot study.

The main difference between the L10N and L20N membrane modules is the height of the modules. The L10N modules are 45.5 inches tall, while the L20N modules are 70.9 inches tall. The L20N modules are being proposed for the lao WTP, since L20N modules are used for systems



designed with flow rates greater than 0.5 mgd per membrane unit.. The L10N modules are utilized on small range pre-engineered Memcor skids.

The N Series membranes are stronger and more permeable than previous membranes, including the V Series membranes. The advantages of the N Series membranes are:

- Reduction in fiber repair rates
- Significant improvement in resistance to abrasion
- 20% greater permeability
- 15% higher operating flux rate on average
- Lower fouling rate
- Improved CIP recovery

The expectation for a L20N membrane module life is seven to ten year if properly maintained. The estimated replacement costs for the L20N module would be approximately \$1,200.

#### 4. Flux

Flux is a measure of the rate at which the treated water passes through the membrane per unit of outside surface area of membrane. The design flux rate will be 35-40 gallons per square foot per day (gfd). The maximum flux rate would be 60 gfd, which is expected to be the highest flux rate approved by DOH. The nominal membrane area per L20N module is 375 square feet (sf).

#### 5. Backwash

Over time, particles rejected by the filtering action of the membranes will build up on the outside of each fiber. As a result, the resistance to flow will increase until a backwash is performed. The backwash sequence will remove the build-up of solids and restore the resistance to filtration flow. A



backwash can either be initiated after a pre-set period of time or when the resistance to flow reaches a pre-determined set point.

The backwash is a physical process that uses a low-pressure air scour and air-assisted liquid backwash to remove accumulated particles – no chemicals are used during the backwash. The backwash usually lasts 3 to 4 minutes and occurs at an interval of 15 to 60 minutes, depending on the feed water characteristics. No filtrate backwash pumps are required. The backwash waste from the process discharges into the Sludge Lagoons.

Based on past experience with the existing Iao WTP, the average backwash interval is expected to be 30 minutes. However, during high turbidity events the interval is expected to be less. The estimated backwash waste volume, based on four units operating, is approximately 130,000 gpd. This amount includes backwash that occurs for each maintenance wash and CIP (which are discussed in following sections.)

## 6. Maintenance Wash

The maintenance wash procedure will be used to extend the time between Clean-in-Place (CIP) chemical cleans, as described in the following section. The frequency for a maintenance wash is expected to be 48 hours for chlorine and 48 hours for acid.

The maintenance wash sequence is a short-cycle chemical membrane clean, which uses a chlorine solution and citric acid or sulfuric acid. One wash would use chlorine, and the other wash would most likely use sulfuric acid, which is less expensive and requires fewer chemicals than washing with citric acid. Maintenance washes can occur automatically, or be initiated by an operator.

The maintenance wash sequence involves the following steps:

- CIP Tank Fill – the CIP tank is filled from one of the units in operation or from the common filtrate piping header. This step



is performed in preparation of conducting a maintenance wash and does not require a unit to be removed from operation.

- Backwash - The unit is backwashed to remove excess solids and maximize the chemical cleaning efficiency. The backwash waste is drained to the regular waste outlet.
- Hot Water Fill - The unit is filled with water from the CIP tank.
- Filtrate Recirculation and Chemical Dosing - The CIP transfer/recirculation pump starts to recirculate the water to the unit in a closed loop. The unit is fully isolated from the rest of the system. Acid or chlorine (as sodium hypochlorite) is added in the loop at the beginning of the recirculation sequence until the appropriate quantity of cleaning chemical is added.
- Recirculation – The cleaning solution is recirculated through the membranes.
- Soak - The modules are left to soak for a pre-set time.
- The cleaning solution is drained away from the unit to the neutralization system.
- Chemical Rinses - The unit is refilled with feed water and rinsed to remove residual chemical. All rinse water is directed to the neutralization system.
- Filtration to Waste – The unit is put into filtration but the filtrate with chemical residue is sent to drain or the neutralization system.

The complete maintenance wash sequence usually takes 45 minutes. However, shorter or longer maintenance wash sequences can be enabled if deemed necessary. The estimated waste associated with

maintenance washes, based on four units operating, is approximately 28,000 gpd.

#### 7. Clean-In-Place (CIP)

The CIP sequence will be used to maintain long-term membrane performance. The CIP sequence is usually initiated based on time, but can also be based on transmembrane pressure, resistance or the volume being filtered by the membranes. The time between CIP cleans is expected to be 30 days. The CIP sequence is similar to the maintenance wash, but with longer recirculation and soak sequences, and utilization of filtered water heated to a set temperature. In addition, the CIP sequence includes two sequential chemical cleanings. The first clean would be with citric acid and sulfuric acid together, and the second clean would be with chlorine.

The second cleaning regime uses chlorine typically containing 200 to 500 parts per million of free chlorine. For chlorine cleans, the sequence is similar to that of the maintenance wash, but with a longer duration of approximately 2 hours. The entire CIP cleaning process, using both citric/sulfuric acid and chlorine, takes approximately 8 hours. The estimated waste associated with the CIP cleaning process, based on four units operating, is approximately 1,900 gpd. However, it should be noted that this is based on an average over a 30-day CIP interval, and is not a daily waste flow. The waste per each CIP clean is approximately 14,000 gallons.

#### 8. Chemical Neutralization

Upon completion of a maintenance wash or CIP sequence, the dilute chemical solution from the unit is transferred to the neutralization tank. Neutralization is a fully automated batch process which occurs at the conclusion of either a CIP or maintenance wash.

A level sensor in the neutralization tank signals the start of the neutralization pump which creates a circulation loop. Sodium bisulfite will



be used for chlorine neutralization and sodium hydroxide for acid neutralization. The neutralization pump continues to run, turning over the tank through mixing eductors until a neutral condition is detected. Upon detecting a neutral condition, the tank contents will flow by gravity to the Sludge Lagoons.

9. Pressure Decay Test (PDT)

The PDT will be used to confirm the integrity of the membrane fibers. The test includes filtering to the backwash level (top of the modules), pressurizing the inside of the module fibers and header with air at 15 psig, isolating the cell from the air supply and monitoring the pressure decay over a period of time (typically 2 to 3 minutes.) The test confirms integrity of the membranes based on the rate of pressure decay. Each unit would be tested at regular time intervals, usually every 24 hours, adjustable by the operator.

10. Air Leak Test

If the PDT returns an alarm, the Air Leak Test would be used to assist in determining in which module the integrity loss has occurred. The faulty module can easily be isolated using a specially designed tool and removed from the unit. The isolation does not require the membrane unit to be drained or shutdown. The individual membrane fiber with the leak can then be found and "pinned", which involves inserting a long metal pin into the membrane to plug the membrane. The module with the pinned membrane is then put back into the unit and into operation.

**C. Chemical Systems**

1. Sodium Hypochlorite

Sodium hypochlorite will be used for cleaning the membranes during maintenance washes and during the CIP process. A duplex metering pump assembly (one duty pump, one standby pump) will pump the



sodium hypochlorite to an injection port on the CIP pump discharge line to accomplish these membrane cleaning processes.

Sodium hypochlorite will also be used for disinfection through injection into the filtered water to produce the finish water after achieving sufficient contact time within the Chlorine Contact Tank. A duplex metering pump assembly (one duty pump, one standby pump) will pump the sodium hypochlorite to the primary point of injection into the filtrate water line for disinfection. A third duplex pump assembly will be installed. One of the pumps of this assembly will pump the sodium hypochlorite to an injection port for injection into the raw water prior to the strainers to improve the quality of the raw water prior to filtration, if needed. The second pump will pump the sodium hypochlorite to an injection port into the finish water, if needed to increase its chlorine concentration before leaving the WTP.

As the amount of sodium hypochlorite to achieve these multiple functions is significantly more than the amount of chemicals to be used for just cleaning of the membranes, the sodium hypochlorite will be stored in a 1,000-gallon tank with an integral spill containment feature in the Filtration Area of the Treatment Plant Building (TPB). Filling of this tank will be through an outdoor fill connection just on the other side of the TPB wall from the tank.

## 2. Citric Acid

Citric acid will be used for cleaning the membranes during the CIP process. The solution will be stored in a 55-gallon drum situated over a secondary containment compartment in the Filtration Area of the TPB. A single, panel-mounted, air diaphragm pump will pump the citric acid to an injection port on the CIP pump discharge line.



### 3. Sulfuric Acid

Sulfuric acid will be used for cleaning the membranes during maintenance washes, and will be used with citric acid during the CIP process. The sulfuric acid will be stored in a 55-gallon drum situated over a secondary containment compartment in the Filtration Area of the TPB. A single, panel-mounted, air diaphragm pump will pump the sulfuric acid to an injection port on the CIP pump discharge line.

### 4. Sodium Hydroxide

Sodium hydroxide will be used to neutralize (increase the pH to approximately 7) the citric and sulfuric acids. The sodium hydroxide will be stored in a 55-gallon drum situated over a secondary containment compartment in the Filtration Area of the TPB. A single, panel-mounted, air diaphragm pump will be used to pump the sodium hydroxide to the injection port on the CIP neutralization pipe.

### 5. Sodium Bisulfite

Sodium bisulfite will be used to neutralize (de-chlorinate) the chlorinated water used for cleaning of the membranes. The sodium bisulfite will be stored in a 55-gallon drum situated over a secondary containment compartment in the Filtration Area of the TPB. A single, panel-mounted, air diaphragm pump will be used to pump the sodium bisulfite to the injection port on the CIP neutralization pipe.

### 6. Alternative Chemicals

The chemicals described above are intended to be the chemicals used at the Iao WTP. However, after the new WTP has been in operation for a while, experience may show that different chemicals may work better for cleaning the membranes. In lieu of using citric acid for cleaning, other options would be phosphoric acid or hydrochloric acid.



**D. Wastewater System**

Wastewater generated from the restroom, lunchroom and office/laboratory, and water from floor drains throughout the Filtration Area of the Treatment Plant Building will connect to an on-site 6" gravity line with cleanouts that transitions into an off-site 8" gravity line with manholes. This 8" gravity line will convey the wastewater to a discharge point into an existing sewer manhole along West Alu Road. (Refer to Exhibit 2.)

**E. Service Waterline**

A 12-inch service waterline will tap into DWS's 12-inch main in West Alu Road to provide service water to the WTP. The service line will provide source water for the WTP plumbing fixtures, washdown facilities, etc. The service line will also provide for fire protection for the WTP via an on-site fire hydrant. (Refer to Exhibits 2 and 5.)

**F. Monitoring and Recording Equipment**

All monitoring and recording equipment, with the exception of flow meters, will be installed within the Office/Laboratory within the Treatment Plant Building. Table 3 summarizes the parameters to be measured:



**Table 3. Summary of Measured Parameters**

Parameter	Location	No. of Sampling Points or Instruments
Turbidity	Raw Water (before strainers)	1
	Individual Filtered Water*	4
	Combined Filtered Water (before chlorine injection)	1
	Finish Water (compliance monitoring point)	1
pH	Combined Filtered Water (after chlorine injection)	1
	Finish Water (compliance monitoring point)	1
	CIP Line	1
	CIP Waste Drain	1
	Neutralized Waste	1
Temperature	Finish Water (compliance monitoring point)	1
	CIP Line	1
	CIP Waste Drain	1
Chlorine Residual	Combined Filtered Water (after chlorine injection)	1
	Finish Water (compliance monitoring point)	1
	Neutralized Waste	1
Flow	Raw Water	1
	Individual Filtered Water*	4
	Combined Filtered Water (before chlorine injection)	1
	Finish Water (compliance monitoring point)	1

\*For each membrane filtration unit



## **G. Electrical**

The WTP will require at least one (1) new Maui Electric Co., Ltd. (Meco) pole to cross West Alu Road via overhead conductors. A riser from the last pole will convert to an underground feed to a new Meco pad-mounted transformer. This transformer will provide underground electrical service rated at 480Y/120V, 3-phase, 4-wire to a switchgear contained inside the Electrical Room of the Treatment Plant Building. All electrical loads will be fed from this point throughout the facility. A standby generator will automatically start-up to provide full back-up power in the event of a utility outage.

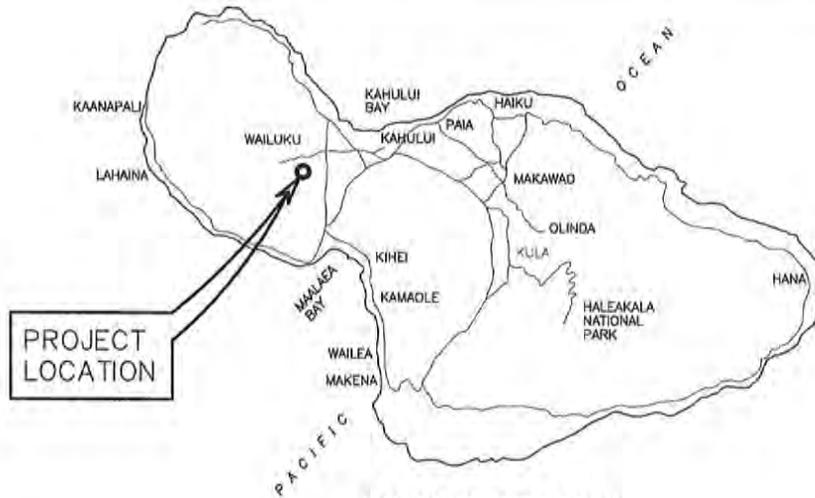
## **H. Telephone**

The telephone service for the new treatment building will utilize at least one (1) new Meco pole to cross West Alu Road via overhead conductors. A riser from the last pole will convert to an underground feed, possibly including a 2'x4' handhole, and terminate at a demarcation point within the Treatment Plant Building. The actual cabling requirement will be determined by the telephone company.

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# EXHIBITS

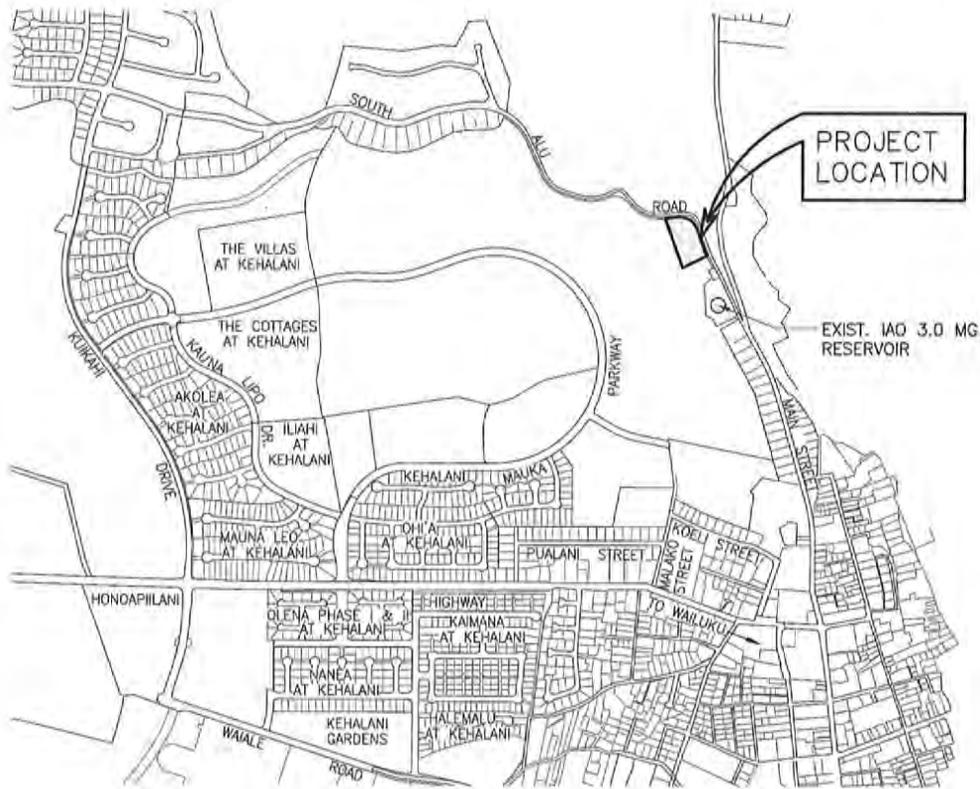
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ISLAND OF MAUI



LOCATION MAP  
NOT TO SCALE



VICINITY MAP  
NOT TO SCALE

FILENAME: C:\2 - WORK FILES\PROJECT FOLDERS\2013\13-002 - IAO WTP\PER\EXHIBITS\EXH. 1 - LOCATION MAP.DWG Nov. 13, 2014-11:44 AM

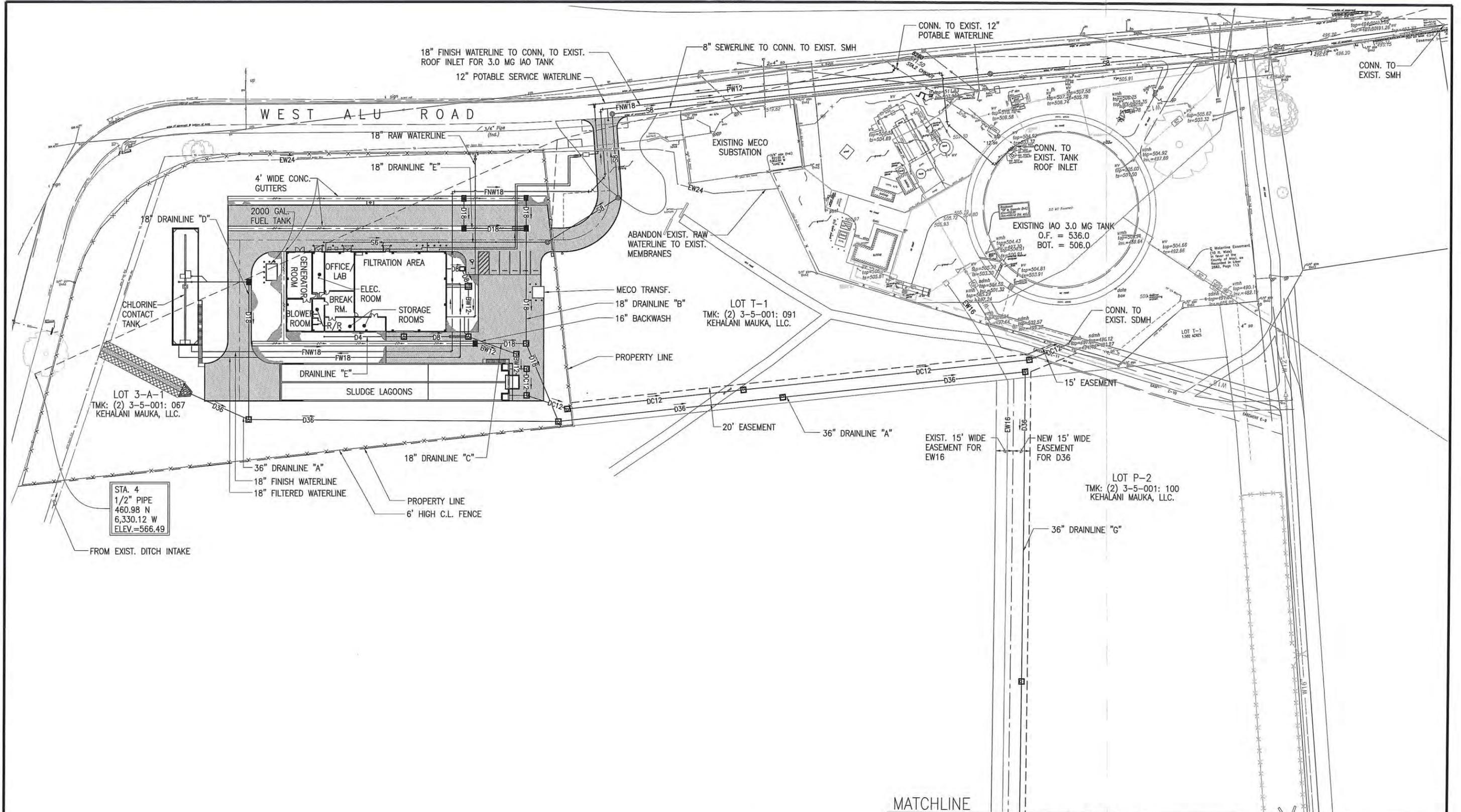
PRELIMINARY ENGINEERING REPORT  
IAO SURFACE WATER  
TREATMENT PLANT UPGRADES  
WAILUKU, MAUI, HAWAII

ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC.  
ENGINEERS, SURVEYORS • HONOLULU, WAILUKU, HILO, HAWAII

LOCATION AND VICINITY MAP

EXHIBIT

1

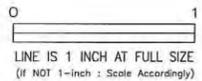


MATCHLINE  
SEE EXHIBIT 3 FOR CONTINUATION



**GENERAL SITE PLAN – NORTH**

SCALE: 1" = 80'



**PRELIMINARY ENGINEERING REPORT**  
**IAO SURFACE WATER**  
**TREATMENT PLANT UPGRADES**  
 WAILUKU, MAUI, HAWAII

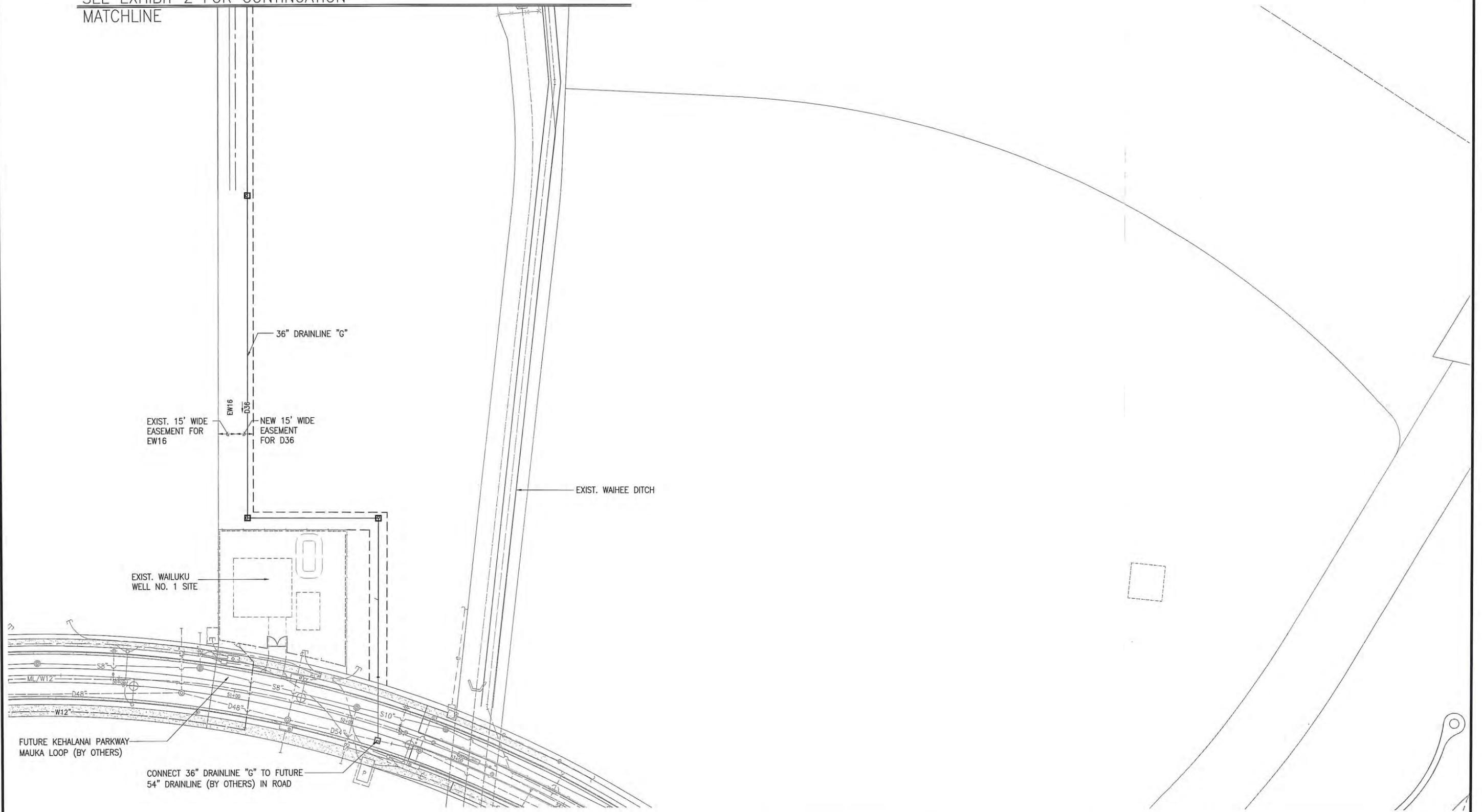
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 ENGINEERS, SURVEYORS • HONOLULU, WAILUKU, HILO, HAWAII

**EXHIBIT**

**GENERAL SITE PLAN – NORTH**

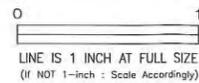
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SEE EXHIBIT 2 FOR CONTINUATION  
MATCHLINE



**GENERAL SITE PLAN - SOUTH**

SCALE: 1" = 80'



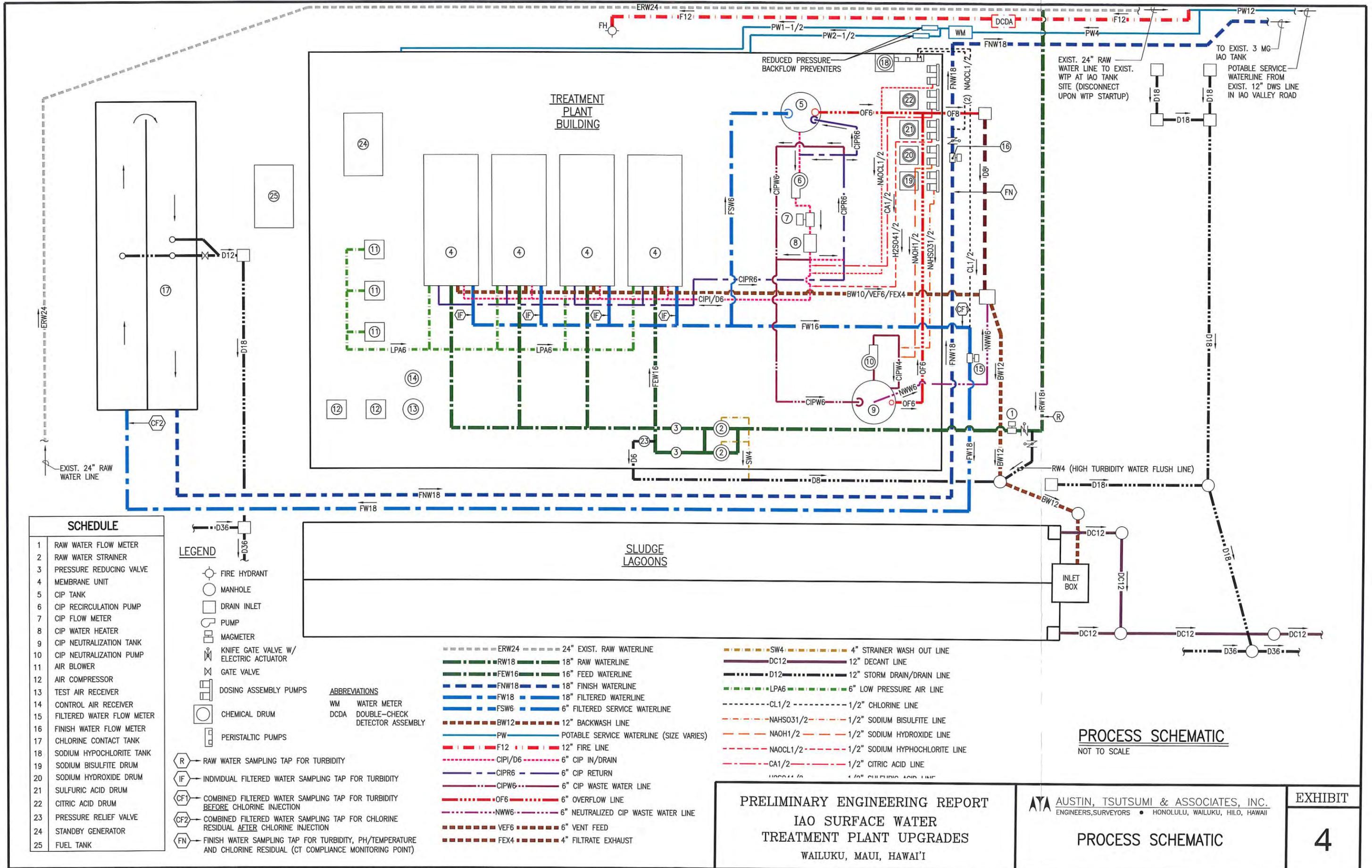
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IAO SURFACE WATER  
TREATMENT PLANT UPGRADES  
WAILUKU, MAUI, HAWAII

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GENERAL SITE PLAN - SOUTH

EXHIBIT

3



SCHEDULE	
1	RAW WATER FLOW METER
2	RAW WATER STRAINER
3	PRESSURE REDUCING VALVE
4	MEMBRANE UNIT
5	CIP TANK
6	CIP RECIRCULATION PUMP
7	CIP FLOW METER
8	CIP WATER HEATER
9	CIP NEUTRALIZATION TANK
10	CIP NEUTRALIZATION PUMP
11	AIR BLOWER
12	AIR COMPRESSOR
13	TEST AIR RECEIVER
14	CONTROL AIR RECEIVER
15	FILTERED WATER FLOW METER
16	FINISH WATER FLOW METER
17	CHLORINE CONTACT TANK
18	SODIUM HYPOCHLORITE TANK
19	SODIUM BISULFITE DRUM
20	SODIUM HYDROXIDE DRUM
21	SULFURIC ACID DRUM
22	CITRIC ACID DRUM
23	PRESSURE RELIEF VALVE
24	STANDBY GENERATOR
25	FUEL TANK

LEGEND	
	FIRE HYDRANT
	MANHOLE
	DRAIN INLET
	PUMP
	MAGMETER
	KNIFE GATE VALVE W/ ELECTRIC ACTUATOR
	GATE VALVE
	DOSING ASSEMBLY PUMPS
	CHEMICAL DRUM
	PERISTALTIC PUMPS
	RAW WATER SAMPLING TAP FOR TURBIDITY
	INDIVIDUAL FILTERED WATER SAMPLING TAP FOR TURBIDITY
	COMBINED FILTERED WATER SAMPLING TAP FOR TURBIDITY BEFORE CHLORINE INJECTION
	COMBINED FILTERED WATER SAMPLING TAP FOR CHLORINE RESIDUAL AFTER CHLORINE INJECTION
	FINISH WATER SAMPLING TAP FOR TURBIDITY, PH/TEMPERATURE AND CHLORINE RESIDUAL (CT COMPLIANCE MONITORING POINT)

ABBREVIATIONS	
WM	WATER METER
DCDA	DOUBLE-CHECK DETECTOR ASSEMBLY

ERW24	24" EXIST. RAW WATERLINE
RW18	18" RAW WATERLINE
FEW16	16" FEED WATERLINE
FNW18	18" FINISH WATERLINE
FW18	18" FILTERED WATERLINE
FSW6	6" FILTERED SERVICE WATERLINE
BW12	12" BACKWASH LINE
PW	POTABLE SERVICE WATERLINE (SIZE VARIES)
F12	12" FIRE LINE
CIP/D6	6" CIP IN/DRAIN
CIPR6	6" CIP RETURN
CIPW6	6" CIP WASTE WATER LINE
OF6	6" OVERFLOW LINE
NWW6	6" NEUTRALIZED CIP WASTE WATER LINE
VEF6	6" VENT FEED
FEX4	4" FILTRATE EXHAUST
SW4	4" STRAINER WASH OUT LINE
DC12	12" DECANT LINE
D12	12" STORM DRAIN/DRAIN LINE
LP6	6" LOW PRESSURE AIR LINE
CL1/2	1/2" CHLORINE LINE
NAHSO3 1/2	1/2" SODIUM BISULFITE LINE
NAOH 1/2	1/2" SODIUM HYDROXIDE LINE
NAOCL1/2	1/2" SODIUM HYPOCHLORITE LINE
CA1/2	1/2" CITRIC ACID LINE

**PROCESS SCHEMATIC**  
NOT TO SCALE

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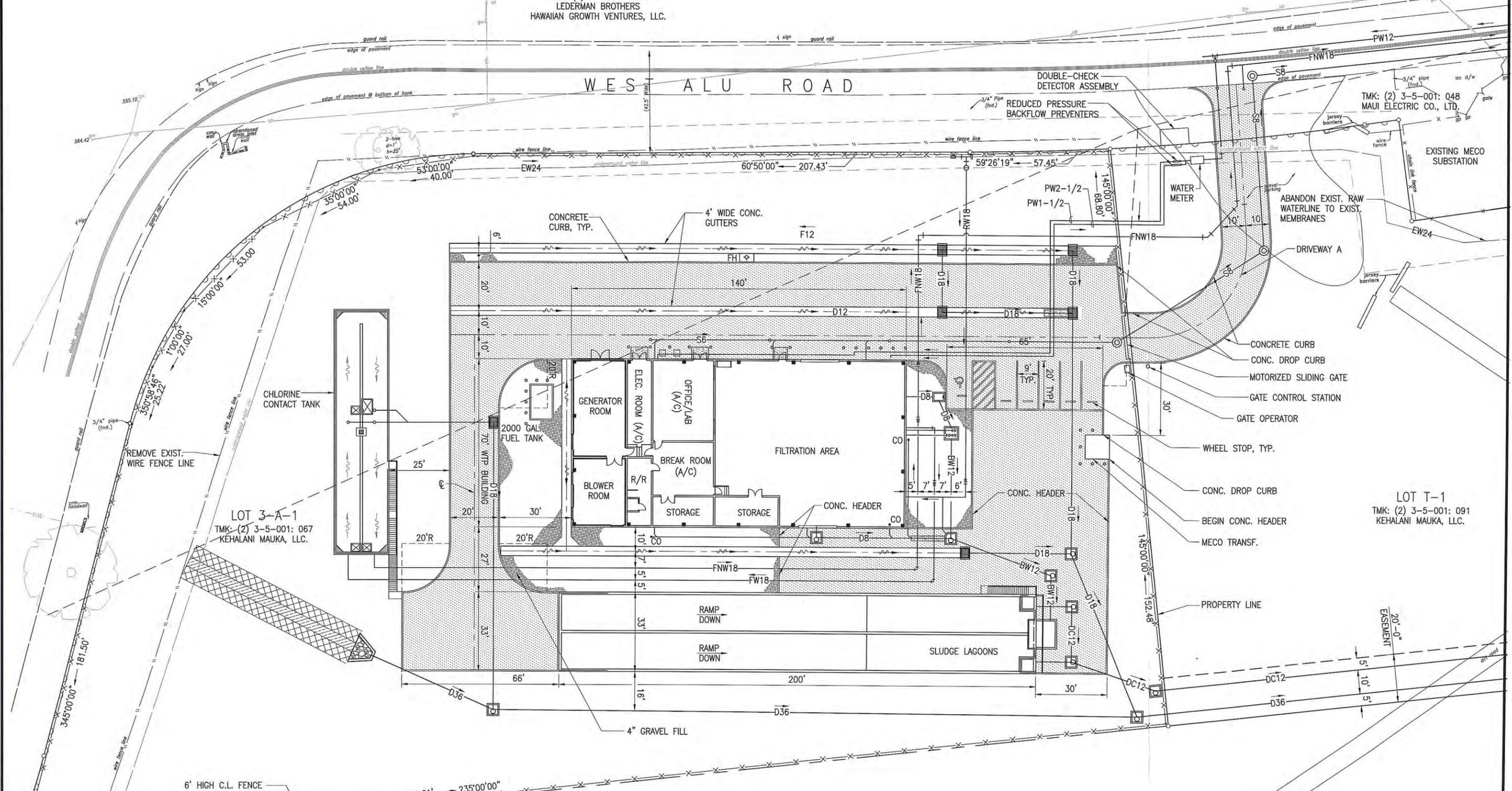
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**PROCESS SCHEMATIC**

EXHIBIT  
**4**

LOT 5  
 TMK: (2) 3-5-001: 001  
 LEDERMAN BROTHERS  
 HAWAIIAN GROWTH VENTURES, LLC.

WEST ALU ROAD



LOT 3-A-1  
 TMK: (2) 3-5-001: 067  
 KEHALANI MAUKA, LLC.

LOT T-1  
 TMK: (2) 3-5-001: 091  
 KEHALANI MAUKA, LLC.

**WTP SITE PLAN**  
 SCALE: 1" = 40'

0 1  
 LINE IS 1 INCH AT FULL SIZE  
 (IF NOT 1-INCH : SCALE ACCORDINGLY)

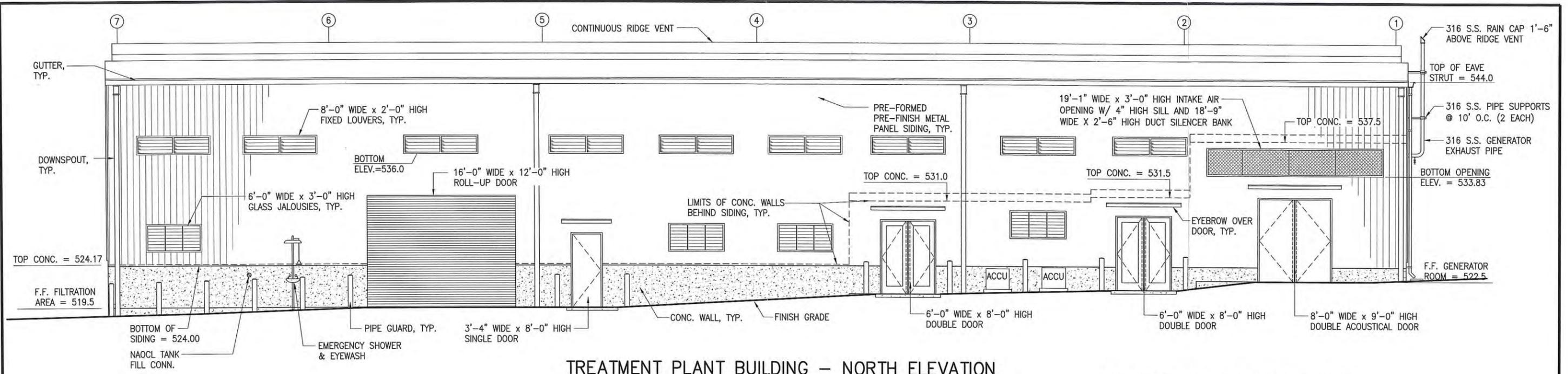
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WTP SITE PLAN

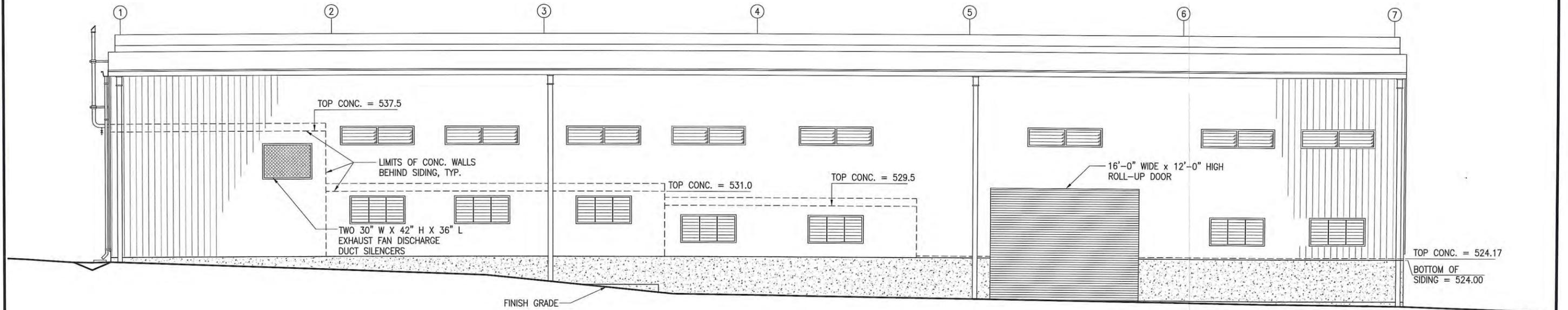
EXHIBIT  
**5**



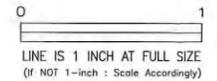


**TREATMENT PLANT BUILDING – NORTH ELEVATION**  
SCALE: 3/32"=1'-0"

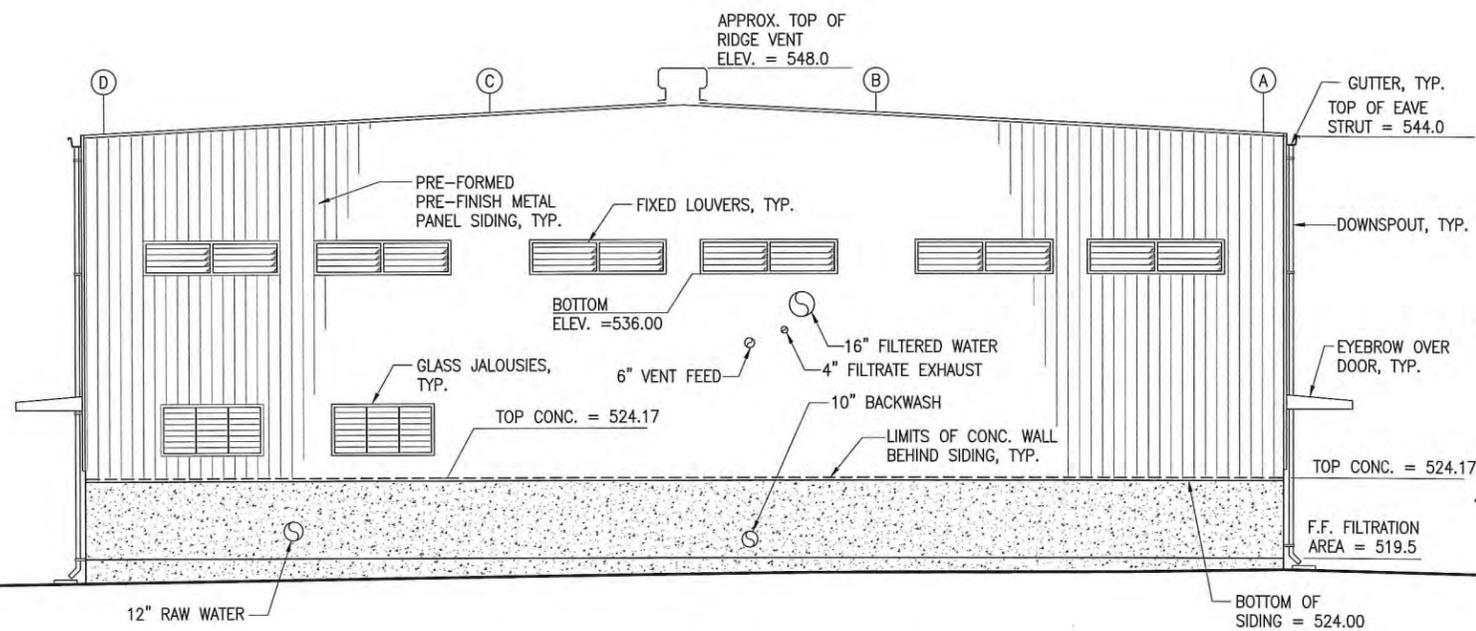
NOTE: DIMENSIONS FOR DOORS AND LOUVERS ARE OPENING SIZES IN CMU WALL/METAL PANEL SIDING.



**TREATMENT PLANT BUILDING – SOUTH ELEVATION**  
SCALE: 3/32"=1'-0"

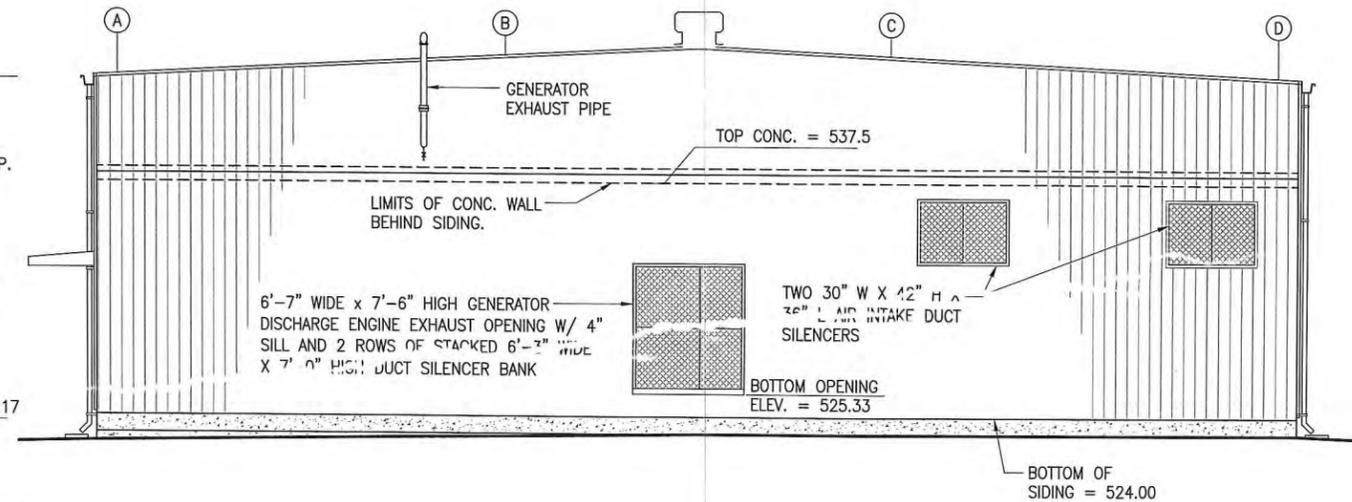


PRELIMINARY ENGINEERING REPORT IAO SURFACE WATER TREATMENT PLANT UPGRADES WAILUKU, MAUI, HAWAII	<b>AUSTIN, TSUTSUMI &amp; ASSOCIATES, INC.</b> ENGINEERS, SURVEYORS • HONOLULU, WAILUKU, HILO, HAWAII	EXHIBIT
		<b>TREATMENT PLANT BUILDING          ELEVATIONS – NORTH AND SOUTH</b>



**TREATMENT PLANT BUILDING – EAST ELEVATION**

SCALE: 3/32"=1'-0"



**TREATMENT PLANT BUILDING – WEST ELEVATION**

SCALE: 3/32"=1'-0"



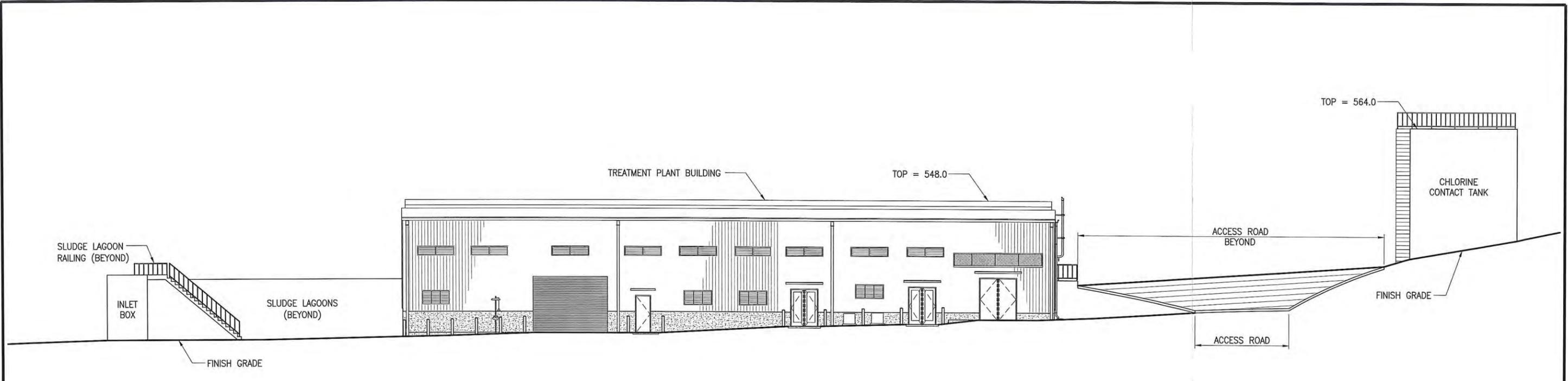
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 WAILUKU, MAUI, HAWAII

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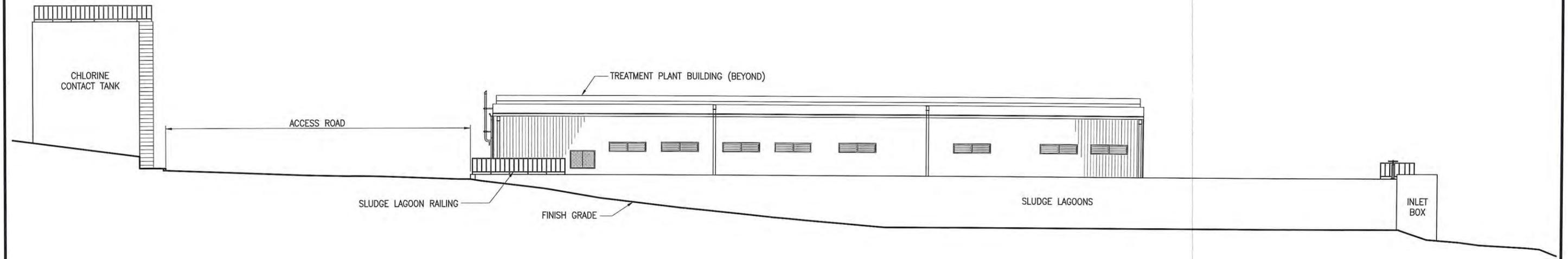
TREATMENT PLANT BUILDING  
 ELEVATIONS – EAST AND WEST

EXHIBIT

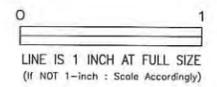
8



**TREATMENT PLANT SITE – NORTH ELEVATION**  
 SCALE: 3/64"=1'-0"



**TREATMENT PLANT SITE – SOUTH ELEVATION**  
 SCALE: 3/64"=1'-0"

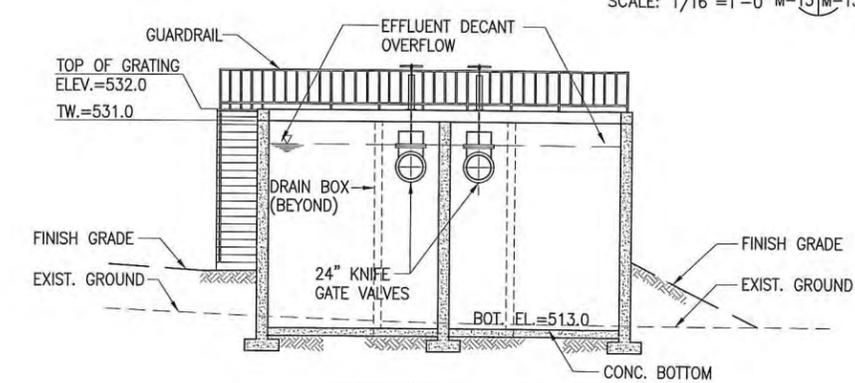
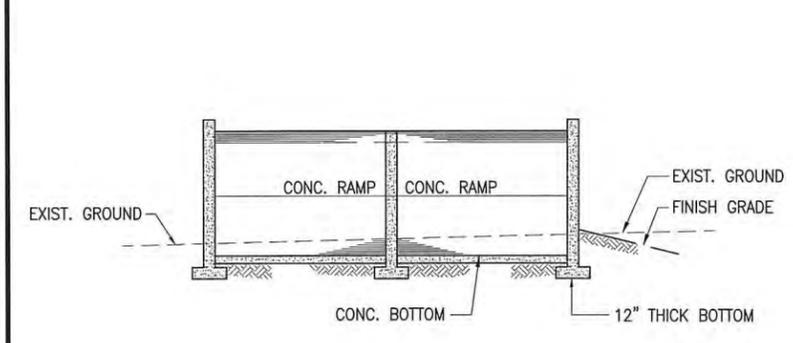
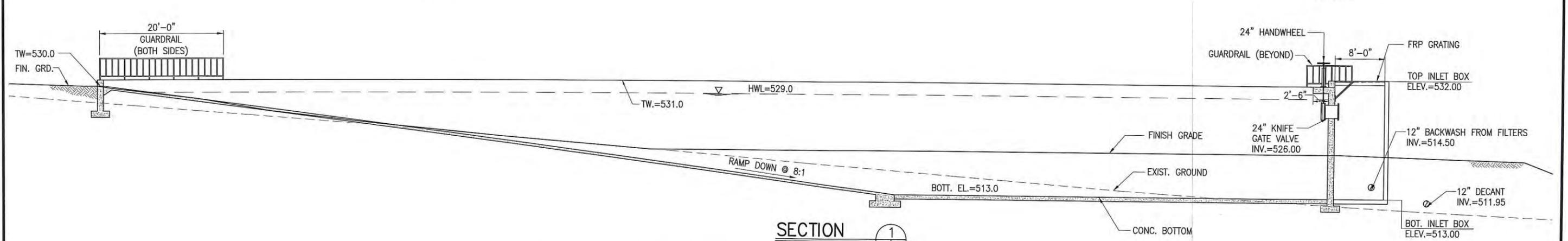
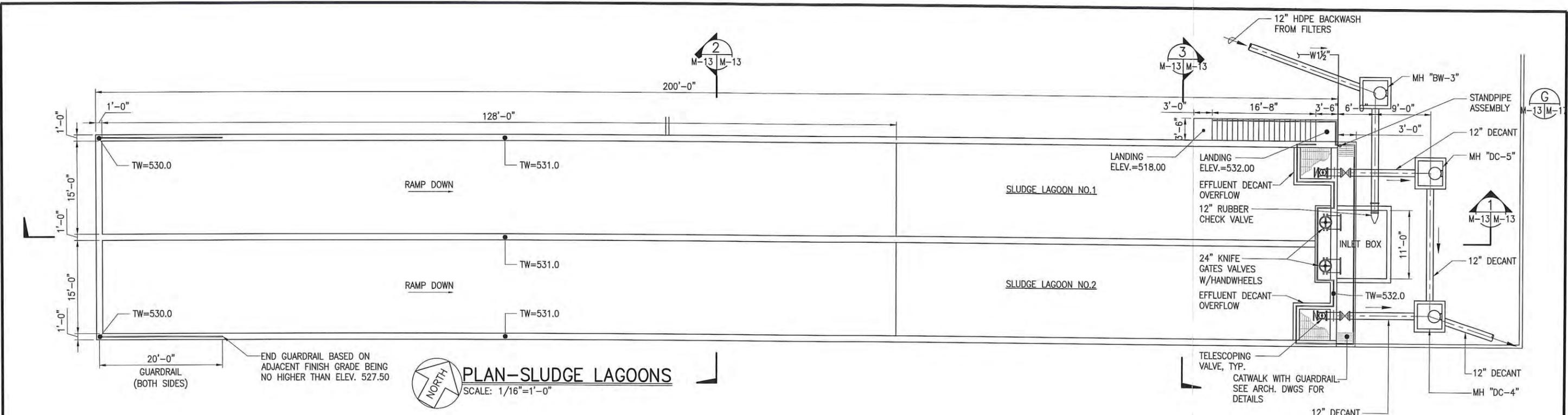


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 TREATMENT PLANT UPGRADES  
 WAILUKU, MAUI, HAWAII

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 TREATMENT PLANT SITE ELEVATIONS

EXHIBIT  
 9





SECTION 2  
SCALE: 1/16"=1'-0" M-13 M-13

SECTION 3  
SCALE: 1/16"=1'-0" M-13 M-13



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IAO SURFACE WATER  
TREATMENT PLANT UPGRADES  
WAILUKU, MAUI, HAWAII

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SLUDGE LAGOON PLAN AND  
SECTIONS

EXHIBIT  
11

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**P H O T O S**

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PHOTO

1

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**RAW WATER INTAKE AT  
 IAO-WAIKAPU DITCH**

**PRELIMINARY ENGINEERING REPORT  
 IAO SURFACE WATER  
 TREATMENT PLANT UPGRADES  
 WAILUKU, MAUI, HAWAII**



IAO-WAIKAPU DITCH

SCREENS (2 EACH)

CONCRETE BOX

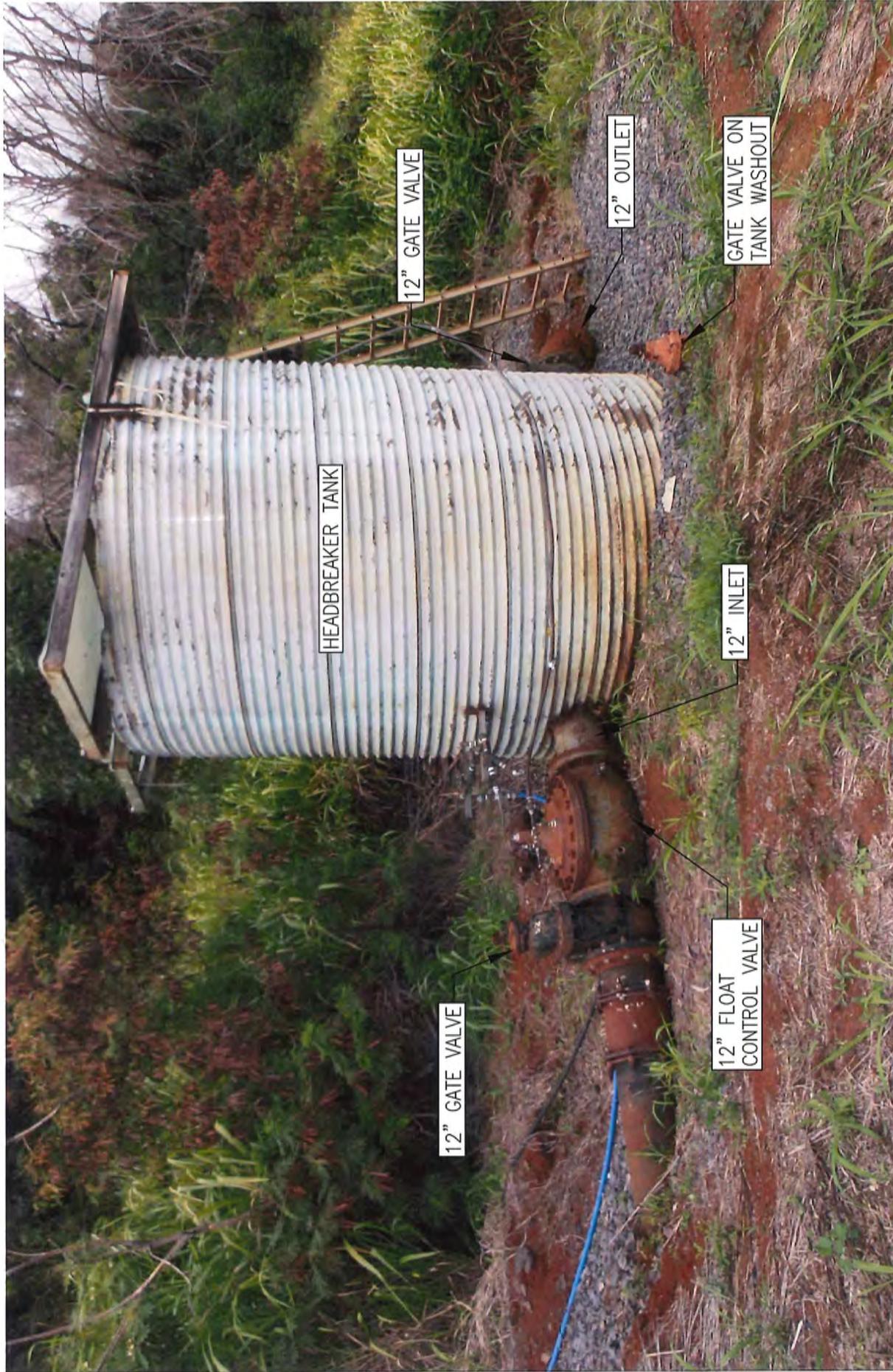
PHOTO

2

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**RAW WATER INTAKE AT  
IAO-WAIKAPU DITCH**

**PRELIMINARY ENGINEERING REPORT  
IAO SURFACE WATER  
TREATMENT PLANT UPGRADES  
WAILUKU, MAUI, HAWAII**



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IAO SURFACE WATER  
TREATMENT PLANT UPGRADES  
WAILUKU, MAUI, HAWAII

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HEADBREAKER TANK

PHOTO

3



WOODEN SHELTER FOR  
BLOWER AND COMPRESSOR

COMPRESSED AIR TANK

BUILDING FOR  
ON-SITE WELL

CLEAN-IN-PLACE  
TANK

MEMBRANE  
FILTRATION UNITS

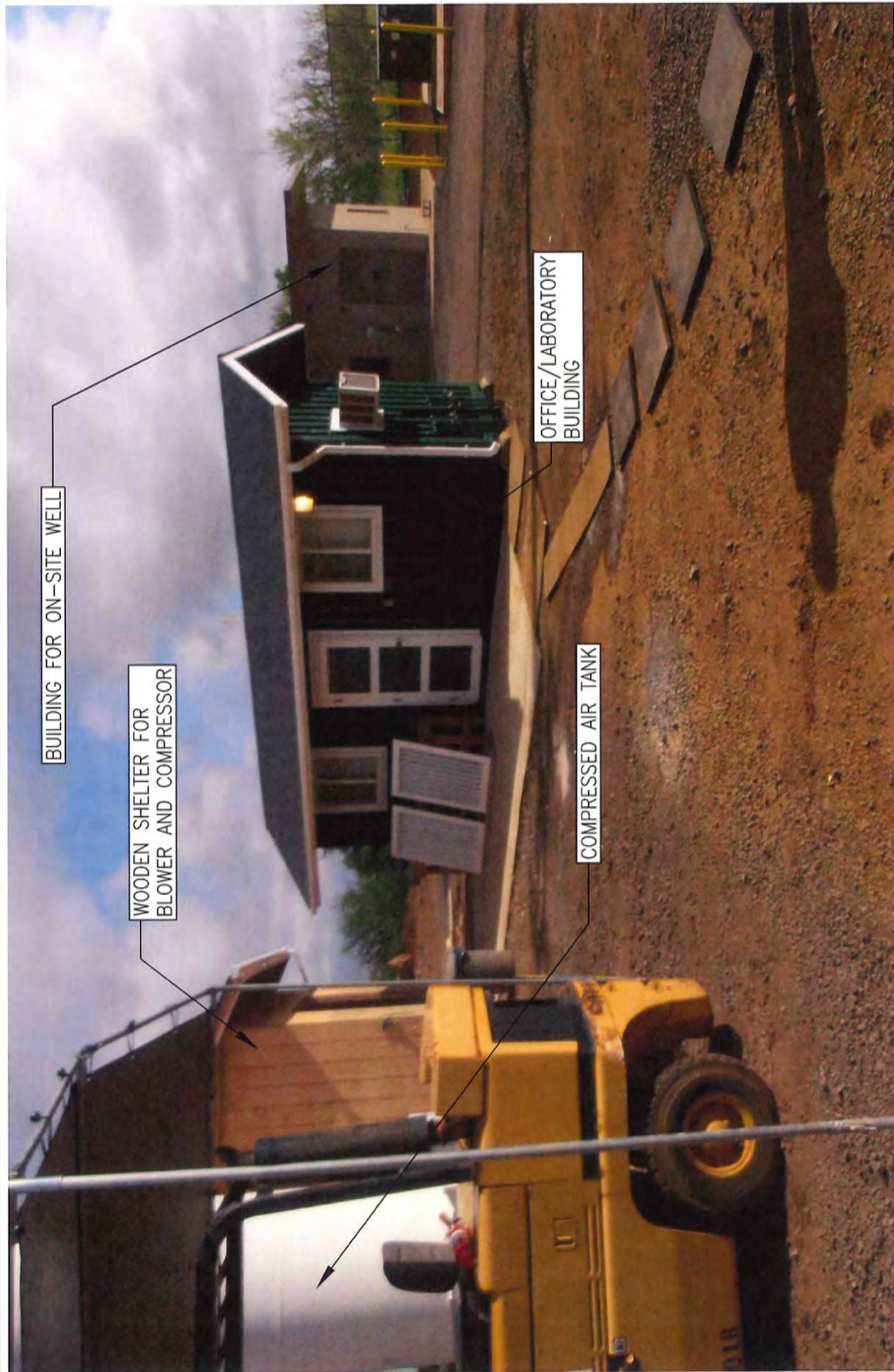
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PHOTO

4

EXISTING IAO WTP



BUILDING FOR ON-SITE WELL

WOODEN SHELTER FOR BLOWER AND COMPRESSOR

OFFICE/LABORATORY BUILDING

COMPRESSED AIR TANK

PRELIMINARY ENGINEERING REPORT  
 IAO SURFACE WATER  
 TREATMENT PLANT UPGRADES  
 WAILUKU, MAUI, HAWAII

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PHOTO

5

EXISTING IAO WTP

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# APPENDICES

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# **APPENDIX A**

## **CHLORINE CONTACT TIME CALCULATIONS**

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## CT VALUE CALCULATION FOR IAO SURFACE WATER TREATMENT PLANT UPGRADES

Disinfection will be by chlorination, since the Maui Department of Water Supply (DWS) has stated that disinfection with ammonia will not be used.

The disinfection procedure would involve injecting chlorine into the combined filtered water line immediately after the filtration units, before it enters the chlorine contact tank. The chlorine dosage would be controlled by a compound loop logic, based on the flow rate of the filtered water, and the chlorine concentration of the filtered water. The chlorine concentration would be measured by a chlorine residual monitor water, from a sampling point right after the filtered water flow meter, before it enters the chlorine contact tank.

Contact time for disinfection would be achieved in the on-site chlorine contact tank. From Table E-5 of the State of Hawaii Department of Health's (DOH's) Surface Water Treatment Rule (SWTR) Administrative Manual, dated July 1, 1994, (see Attachment 'A') the required minimum CT Value is 23, based on the following worst-case scenario:

Temperature = 20° C  
pH = 7.5  
Chlorine Concentration = 1.3 mg/L  
Required Minimum CT = 23

The maximum day production rate will be approximately 4.8 mgd. During high demand periods, the peak production rate could be as high as 6.4 mgd. However, the maximum production rate in a 24 hour period would be limited to 3.2 mgd, based on the current water agreement between DWS and Wailuku Water Company, LLC.

The overall inside dimensions of the chlorine contact tank are 21 feet by 100 feet. There will be a single baffle wall, dividing the tank into two equal 10-foot wide channels. (See Attachment 'B'.) From the American Water Works Association Research Foundation (AWWARF) publication, "Improving Clearwell Design for CT Compliance", the theoretical detention time (T10/T) would be approximately 0.59. (See Attachment 'C'.)

The finished water will flow by gravity from the CCT to the existing IAO 3.0 MG Tank. The water depth in the CCT will vary, based on the hydraulics between the CCT and the 3.0 MG Tank. For example, at a production rate of 4.8 mgd, the water level in the CCT would need to be about 17.6 feet for there to be enough head for the water to flow by gravity to the Tank.

At a production rate of 4.8 mgd, the residence time within the chlorine contact tank at a depth of 17.6 would be as follows:

$$\text{Contact Time} = \frac{(0.59)(264,000 \text{ gallons})(1440 \text{ minutes/day})}{(4,800,000 \text{ gallons per day})} = 46.7 \text{ minutes}$$

The CT Value would be as follows:

CT Value = (1.3 mg/l) (46.7 minutes) = 60.7, which is significantly greater than the required CT Value of 23.

Even at the peak production rate of 6.4 mgd, the CT Value is still significantly greater than 23.

CT Calculations for different production rates are shown in Attachment 'D'. As mentioned previously, the finished water will flow by gravity from the CCT to the existing 3.0 MG Tank. The water depth in the CCT will vary, based on the hydraulics between the CCT and the 3.0 MG Tank. For all flows, the water level in the CCT required to have the finished water flow by gravity is significantly higher than the minimum required depth to meet the CT value.

Attachments:

- 'A' DOH's SWTR Tables E-5
- 'B' Chlorine Contact Tank Drawing
- 'C' AWWARF Publication Excerpts
- 'D' Calculations

Attachment 'A'

TABLE E-5  
CT VALUES FOR INACTIVATION  
OF GIARDIA CYSTS BY FREE CHLORINE  
AT 20°C (68°F)

CHLORINE CONCENTRATION  (mg/L)	pH ≤ 6						pH = 6.5						pH = 7.0					
	Log Inactivations						Log Inactivations						Log Inactivations					
	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0
≤ 0.4	6	12	18	24	30	36	7	15	22	29	37	44	9	17	26	35	43	52
0.6	6	13	19	25	32	38	8	15	23	30	38	45	9	18	27	36	45	54
0.8	7	13	20	26	33	39	8	15	23	31	38	46	9	18	28	37	46	55
1.0	7	13	20	26	33	39	8	16	24	31	39	47	9	19	28	37	47	56
1.2	7	13	20	27	33	40	8	16	24	32	40	48	10	19	29	38	48	57
1.4	7	14	21	27	34	41	8	16	25	33	41	49	10	19	29	39	48	58
1.6	7	14	21	28	35	42	8	17	25	33	42	50	10	20	30	39	49	59
1.8	7	14	22	29	36	43	9	17	26	34	43	51	10	20	31	41	51	61
2.0	7	15	22	29	37	44	9	17	26	35	43	52	10	21	31	41	52	62
2.2	7	15	22	29	37	44	9	18	27	35	44	53	11	21	32	42	53	63
2.4	8	15	23	30	38	45	9	18	27	36	45	54	11	22	33	43	54	65
2.6	8	15	23	31	38	46	9	18	28	37	46	55	11	22	33	44	55	66
2.8	8	16	24	31	39	47	9	19	28	37	47	56	11	22	34	45	56	67
3.0	8	16	24	31	39	47	10	19	29	38	48	57	11	23	34	45	57	68

S-27

TABLE E-5 (CONTINUED)  
CT VALUES FOR INACTIVATION  
OF GIARDIA CYSTS BY FREE CHLORINE  
AT 20°C (68°F)

CHLORINE CONCENTRATION  (mg/L)	pH = 7.5						pH = 8.0						pH = 8.5					
	Log Inactivations						Log Inactivations						Log Inactivations					
	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0
≤ 0.4	10	21	31	41	52	62	12	25	37	49	62	74	15	30	45	59	74	89
0.6	11	21	32	43	53	64	13	26	39	51	64	77	15	31	46	61	77	92
0.8	11	22	33	44	55	66	13	26	40	53	66	79	16	32	48	63	79	95
1.0	11	22	34	45	56	67	14	27	41	54	68	81	16	33	49	65	82	98
1.2	12	23	35	46	58	69	14	28	42	55	69	83	17	33	50	67	83	100
1.4	12	23	35	47	58	70	14	28	43	57	71	85	17	34	52	69	86	103
1.6	12	24	36	48	60	72	15	29	44	58	73	87	18	35	53	70	88	105
1.8	12	25	37	49	62	74	15	30	45	59	74	89	18	36	54	72	90	108
2.0	13	25	38	50	63	75	15	30	46	61	76	91	18	37	55	73	92	110
2.2	13	26	39	51	64	77	16	31	47	62	78	93	19	38	57	75	94	113
2.4	13	26	39	52	65	78	16	32	48	63	79	95	19	38	58	77	96	115
2.6	13	27	40	53	67	80	16	32	49	65	81	97	20	39	59	78	98	117
2.8	14	27	41	54	68	81	17	33	50	66	83	99	20	40	60	79	99	119
3.0	14	28	42	55	69	83	17	34	51	67	84	101	20	41	61	81	102	122

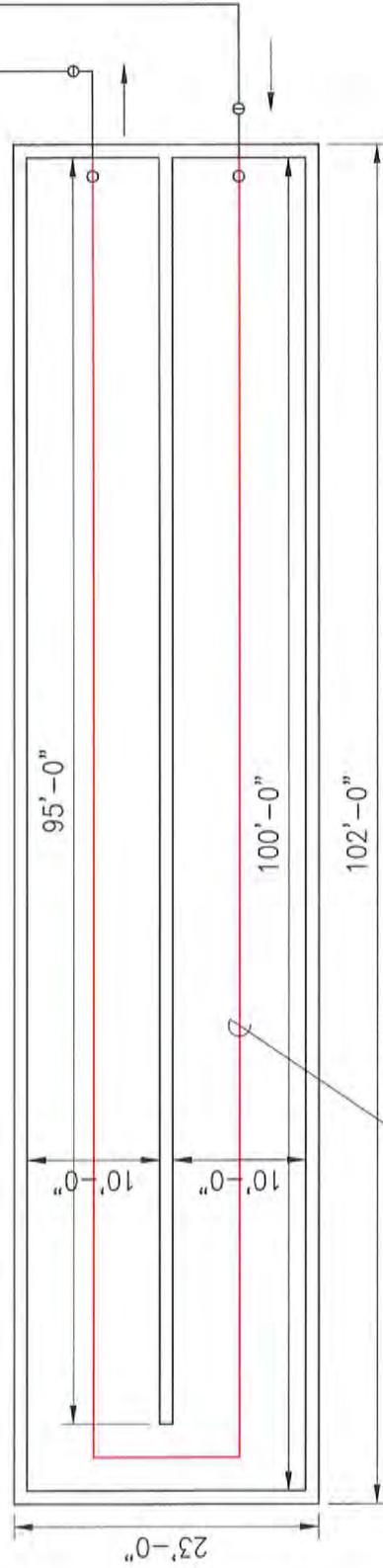
Target residual is 1.3 mg/L



23

ATTACHMENT 'B'

CHLORINE CONTACT TANK  
BOTTOM ELEV.=537.00  
H.W.L. ELEV.=561.00  
O.F. ELEV.=562.00  
TOP OF TANK ELEV.=564.00



LENGTH = 206'  
WIDTH = 10.0'  
L/W = 20.6  
 $T_{10}/T = 0.59$

CHLORINE CONTACT TANK  
NOT TO SCALE

Attachment 'C'

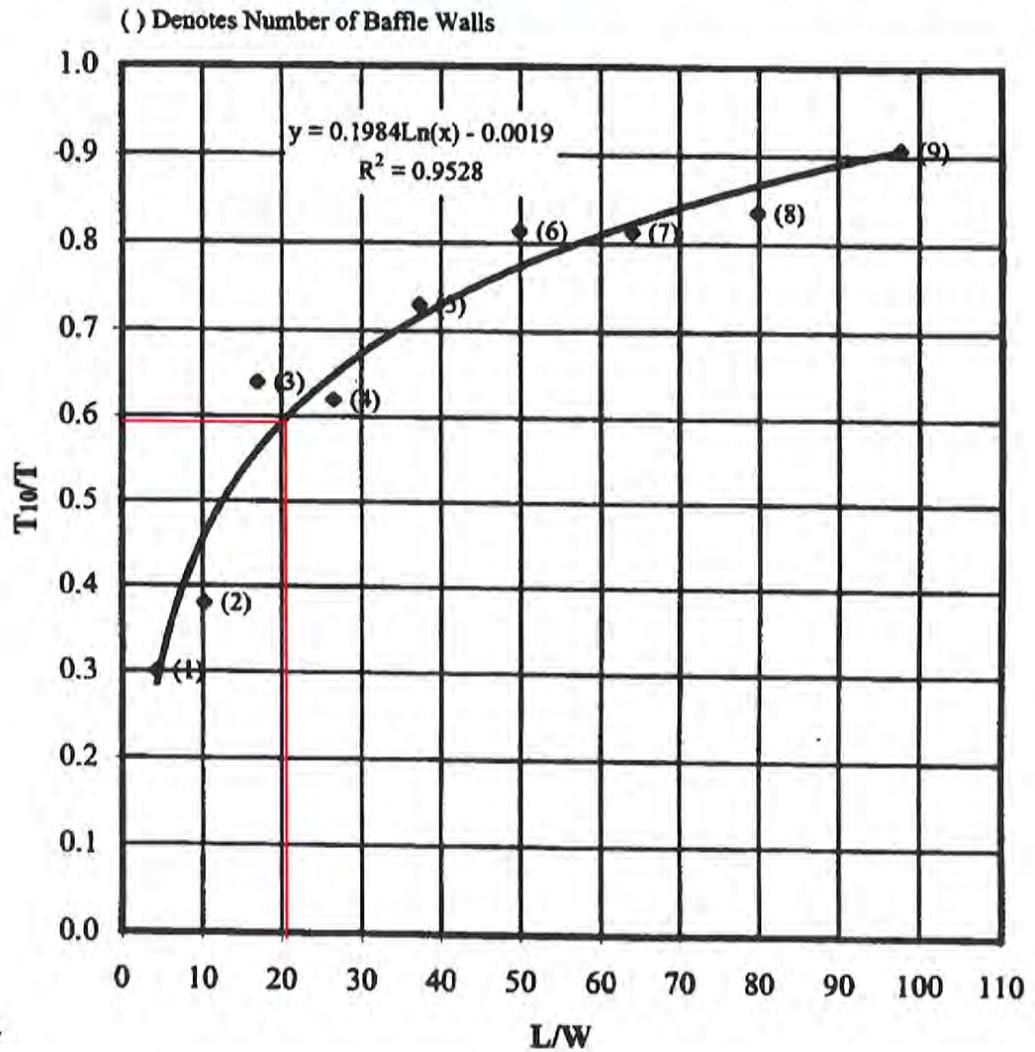


Figure 4.17 Impact of L/W on T<sub>10</sub>/T ratio for rectangular clearwells

**CT VALUE CALCULATION**

**Criteria:**

Temperature: 20 Degrees C

pH: 7.5

Chlorine Concentration: 1.3 mg/l

**Required Minimum CT: 23**

Avg. Day Production Rate = 3.2 mgd = 2,222 gpm  
 Max. Day Production Rate = 4.8 mgd = 3,333 gpm  
 Peak Day Production Rate = 6.4 mgd = 4,444 gpm

**Tank Volume:**

Bottom Elevation = 537 feet

High Water Elevation = 561 feet

Overflow Elevation = 562 feet

Length (inside) = 100 feet

Width (inside) = 21 feet

Inside Wall Length = 95 feet

Inside Wall Width = 1 foot

Area (including wall) = 2,100 sf

Wall Area = 95 sf

Number of Baffle Walls = 1

Working Area (excluding walls) = 2,005 sf

Volume at High Water Elevation = 48,120 cf = 359,986 gallons

Volume at Overflow Water Elevation = 50,125 cf = 374,985 gallons

**T10/T:**

L = Average Flow Path Length = 206 feet

W = Channel Width = 10 feet

L/W = 20.6

T10/T = **0.59** From Figure 4.17 (See Attachment B)

**CT Calculation:**

$CT = T10/T * \text{Min. Volume} / \text{Production Rate}$

Water Depth (ft)	CCT Volume (cf)	CCT Volume (gallons)	Production Rate (mgd)	Production Rate (gpm)	T10/T	Contact Time (min.)	CT Value	Comments
<b>Average Day Production</b>								
4.5	9,023	67,497	3.2	2222	0.59	17.9	23.3	minimum required depth for CT of 23
25.0	50,125	374,985	3.2	2222	0.59	99.6	129.4	maximum water depth
<b>Maximum Day Production</b>								
6.7	13,434	100,496	4.8	3333	0.59	17.8	23.1	minimum required depth for CT of 23
17.6	35,288	263,990	4.8	3333	0.59	46.7	60.7	CT at minimum required depth for flow to lao Tank
25.0	50,125	374,985	4.8	3333	0.59	66.4	86.3	maximum water depth
<b>Peak Day Production</b>								
8.9	17,845	133,495	6.4	4444	0.59	17.7	23.0	minimum required depth for CT of 23
25.0	50,125	374,985	6.4	4444	0.59	49.8	64.7	maximum water depth

**APPENDIX B.**

**Drainage Report**

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**DRAINAGE REPORT-**  
**IAO SURFACE WATER TREATMENT**  
**PLANT UPGRADES PROJECT**  
WAILUKU, MAUI, HAWAI'I  
TMK: (2) 3-5-001: 067 (POR.) & 091 (POR.)

November 2014

Prepared for:

County of Maui Dept. of Water Supply  
200 South High St, 5<sup>th</sup> Floor  
Wailuku, HI 96793

Prepared by:



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**DRAINAGE REPORT-**  
**IAO SURFACE WATER TREATMENT PLANT**  
**UPGRADES PROJECT**

Wailuku, Maui, Hawai'i

TMK: (2) 3-5-001: 067 (POR.) & 091 (POR.)

Prepared for:  
**County of Maui Dept. of Water Supply**

Prepared by:  
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November 2014

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# **DRAINAGE REPORT FOR THE IAO SURFACE WATER TREATMENT PLANT UPGRADES PROJECT**

## **I. INTRODUCTION**

The purpose of this report is to present the proposed drainage design for the Iao Surface Water Treatment Plant Upgrades project and to assess if the design meets County of Maui storm drainage regulations.

## **II. PROPOSED PROJECT**

### **A. LOCATION**

The Iao Surface Water Treatment Plant Upgrades project is located in Wailuku, Maui, Hawaii on West Alu Road near the intersection of Iao Valley Road. The proposed project work will primarily take place on a parcel identified as Tax Map Key (TMK): (2) 3-5-001: 067 (por.). Refer to Exhibit 1 for the Location and Vicinity Map.

The existing Iao Water Treatment Plant (WTP) is located east and makai of the project site. Undeveloped Kehalani Mauka lots lie to the south while West Alu Road borders the north and west sides of the site. On the opposite side of West Alu Road, the land consists of steep mountainous hillsides that are forested and undeveloped.

The project site is within the Kehalani Mauka development. Parcel 67 is owned by RCFC Kehalani LLC, Kehalani Mauka LLC, and Wailuku Water Company LLC. The Department of Water Supply (DWS) is in the process of acquiring the land for the Iao Surface WTP Upgrades project. Access to the site will be provided by a driveway off of West Alu Road through the adjacent Parcel 91. DWS will acquire an easement for the driveway and utilities within Parcel 91.

## **B. PROJECT DESCRIPTION**

The existing Iao Surface Water Treatment Plant is located at the site of DWS's Iao 3.0 million gallon (MG) Tank just makai of the proposed project site. The existing WTP was meant to be temporary and was initially sheltered within a large tent that has since been removed, leaving the treatment units exposed to the elements for a number of years. DWS has been looking for a permanent WTP option to replace the temporary plant.

The proposed project involves installing a new treatment plant building, along with an access road, parking area, chlorine contact tank and sludge lagoons; as well as water, sewer and drainage utilities to serve the new project site. This report focuses on the proposed drainage system.

## **III. EXISTING CONDITIONS**

### **A. TOPOGRAPHY AND SOIL CONDITIONS**

The project site is currently undeveloped and is covered with dense high grass. There is a pull-off on West Alu Road, but no roads actually enter the site.

The land slopes in an easterly direction with an average slope of approximately nine (9) percent. Elevations range from 508 to 560 feet mean sea level (msl). West Alu Road runs along the north and west borders of the site and is situated slightly higher.

The Natural Resource Conservation Service (NRCS) soil type found in the proposed project area is Wailuku silty clay (WvB). According to the NRCS, a representative soil profile consists of at least 60 inches of silty clay with no bedrock or groundwater. Wailuku soils are well drained and permeability is moderate. The Hydrologic Soil Group (HSG) for runoff is Group C.

A geotechnical investigation was completed on the project site by Hirata & Associates. Soil borings from April of 2014 showed that the soil on the site generally consists of about eight to twelve feet of reddish brown clayey silt over a layer of completely weathered rock that has degraded into a similar clayey silt soil. One soil boring found weathered rock that was highly to completely weathered at a depth of 21 feet. No groundwater or seepage was encountered during the soil borings.

**B. CLIMATE AND RAINFALL**

The climate in the vicinity of Wailuku is relatively sunny and warm, with average temperatures varying from a low of 63 degrees Fahrenheit in the winter to a high of 88 degrees in the summer. The annual rainfall is around 37 inches, making the climate semi-arid. The rainfall is also highly seasonal, with 90 percent of the annual rainfall coming between October and May. The 10 and 50-year, 1-hour rainfall is 2.5 and 3.6 inches respectively.

The project site is exposed to prevailing tradewinds coming from the northeast approximately 80 to 85 percent of the time. These tradewinds average 10 to 15 miles per hour during the afternoons with lighter winds during the mornings and nights. Between October and April, southerly winds of Kona storms may be experienced.

**C. DRAINAGE**

As mentioned previously, the site is currently undeveloped and contains no impervious surfaces. Site runoff drains overland to the east through the vacant open land. It drains as sheet flow and there are no drainage ways or areas of concentrated flow. Normally most runoff is infiltrated into the open field land but in intense storm events runoff may reach and enter the Waihee Ditch, which is located approximately 600 feet makai of the site. The Waihee Ditch flows to Waiale Reservoir via the Hopoi Chute and also to irrigated agricultural fields.

The mountainous offsite land above West Alu Road also contributes runoff to the project site. Offsite area O-1 drains off the steep hillsides and is intercepted by a roadside ditch on the mauka side of West Alu Road. The ditch runoff is eventually collected by a 36-inch culvert, which conveys the runoff under the roadway and into the project site. This runoff currently disperses into the open field land. Offsite Area O-2 is located to the northwest and sheet flows off West Alu Road and into the site. Offsite Area O-3 is an offsite area on the existing WTP site where the new WTP driveway is to be installed.

The County of Maui stormwater rules state that drainage areas under 100 acres are to be designed and analyzed for the 10 or 50-year storm. Since the project drainage areas are less than 100 acres, the 10-year storm was used for design of drainage systems and for comparison of existing and proposed site runoff. The 10-year design storm can be used to design the storm drain systems, however 50-year design must be used for sumps or low points.

The results of the hydrologic analysis are summarized in Table 1 below:

**Table 1: Existing Conditions, 10-Year Runoff**

Drainage Area	Contributing Area (ac)	Existing Q 10 (cfs)	Flows To
Drainage Area 1	2.251	4.15	Waihee Ditch
Drainage Area O-1	16.6	27.80	Waihee Ditch
Drainage Area O-2	2.3	4.98	Waihee Ditch
Drainage Area O-3	0.118	0.37	Waihee Ditch
<b>TOTAL TO</b>			
<b>WAIHEE DITCH</b>	<b>21.269</b>	<b>37.30</b>	

See Exhibit 2 for the Existing Conditions Drainage Area Map and Exhibit 4 for the Offsite Drainage Area Map. Hydrology Calculations can be found in Appendix A.

**D. FLOOD ZONE**

The project site is not within any Federal Emergency Management Agency (FEMA) flood zone area. The entire area lies within Zone X, which are areas determined to be outside the 0.2 percent annual chance (500-year) floodplain.

Flood zone classifications are based on FEMA Flood Insurance Rate Map (FIRM) number 1500030391E, revised September 19, 2012. Refer to Appendix D for a Flood Hazard Assessment Report (FHAT).

#### **IV. PROPOSED IMPROVEMENTS**

##### **A. GRADING**

The site grading will feature excavation on the mauka end and embankment on the makai end so that a relatively level pad area can be provided for the development of the new water treatment plant. Embankment slopes will be limited to two feet horizontal to one foot vertical. No retaining walls will be used. The excavation and embankment volumes will be 10,601 and 1,447 cubic yards (cy) respectively for a net volume of 9,154 cy of excess material. The maximum cut will be about 16 feet and the maximum embankment will be about 8 feet.

##### **B. DRAINAGE**

As mentioned previously, the Iao Surface Water Treatment Plant Project is within the Kehalani Mauka Development. The Kehalani Mauka Development has an approved drainage master plan by Warren S. Unemori Engineering (see attached Exhibit 5 from Unemori's drainage master plan). The master plan report is titled "*Drainage Report, Kehalani Offsite Drainage System- Phase 1, Wailuku, Maui, Hawaii*", and was last revised in January 2004. The report designed the current back-bone drainage system that collects and conveys Kehalani Mauka Development runoff to a downstream stormwater management system. The report also designed the downstream stormwater management system, which includes the 490 acre-foot Waikapu Retention Basin located adjacent to Waiale Road.

The runoff from the proposed project site and its offsite contributing areas will be collected by a new onsite storm drain system. A 36-inch inlet headwall will collect runoff coming into the site from the existing 36-inch West Alu Road culvert. Eight grated drain inlets will collect runoff from the project site plus offsite areas O-2 and O-3. The proposed storm drain system will then convey

runoff approximately 1500 feet to Kehalani Parkway where it will connect into the 54-inch storm drain located within the roadway. The storm drain flow is then conveyed to the Waikapu Retention Basin located near Waiale Road.

Management of peak runoff is provided by the Waikapu Retention Basin, which is designed to fully retain the 100-year, 24-hour runoff from the full build-out of all phases of the Kehalani Mauka Development plus its mauka offsite contributing areas. The runoff from this project will be retained in the basin.

The proposed project design conforms to what was assumed in the drainage master plan report. The drainage master plan assumed a runoff curve number of 85 for all of the fully developed Kehalani Mauka Development, which equates to 45 percent impervious coverage over hydrologic soil group C soils. The proposed project site will have 47 percent impervious, which is roughly in line with the assumed average.

Since this project conforms to the drainage design set forth in the approved Kehalani Mauka Development drainage master plan, it therefore also meets the requirements listed in the County of Maui Storm Drainage Manual.

The proposed conditions runoff is summarized in Table 2 on the following page. Note that the proposed storm drain system runoff will be completely retained such that there will be zero discharge to any downstream drainage system.

**Table 2: Prop. Conditions, 10-Year Runoff**

Drainage Area	Contributing Area (ac)	Prop. Q 10 (cfs)	Flows To
Drainage Area 1	0.115	0.84	DI D-1
Drainage Area 2	0.260	2.05	DI C-1
Drainage Area 3	0.081	0.32	DI B-3
Drainage Area 4	0.134	1.10	DI B-2
Drainage Area 5	0.294	1.06	DI E-2
Drainage Area 6	0.419	2.86	DI E-1
Drainage Area 7	0.456	1.53	Headwall A
Drainage Area 8	0.151	0	Lagoons
Drainage Area 9	0.341	1.21	Waihee Ditch
Drainage Area O-1	16.6	27.80	Headwall A
Drainage Area O-2	2.3	4.98	DI E-2
Drainage Area O-3	0.118	0.58	DI B-2
<b>TOTAL TO WAIHEE DITCH</b>	<b>0.341</b>	<b>1.21</b>	<b>(36 cfs Decrease)</b>
<b>TOTAL TO PROP. STORM DRAIN SYSTEM</b>	<b>20.928</b>	<b>43.12</b>	<b>(43 cfs Increase)</b>

- Note:
1. The sludge lagoon has an open top and retains what rainfall lands on it.
  2. The Proposed Storm Drain System runoff will be fully retained in the existing Offsite Waikapu Retention Basin such that there will be zero discharge to any downstream drainage system.

A hydraulic analysis was also completed on the proposed storm drain system. Calculations show that the pipes are adequately sized for the 10-year storm. Additionally the two sump drain inlets (DI B-2 and DI B-3) and the inlet headwall (Headwall A) have adequate intake capacity for the 50-year storm.

See Exhibit 3 for the Proposed Conditions Drainage Area Map. Refer to Appendix A for Hydrology Calculations and Appendix B for Hydraulic Calculations.

**C. RUNOFF WATER QUALITY**

Water quality treatment is also provided and will comply with the County's recently adopted "Rules for the Design of Storm Water Treatment Best Management Practices". Since the existing Waikapu Retention Basin has capacity to completely retain the 100-year, 24-hour storm, it is inferred that the one-inch water quality storm runoff is also fully retained. All suspended solids and potential pollutants will be captured in the basin and will not contribute to any downstream drainage-ways. Refer to Appendix C for water quality calculations.

A maintenance plan will be developed for managing the BMPs on the future site. The plan will include requirements for removing accumulated sediments and debris, maintaining vegetation, and performing regular inspections so that the BMPs operate effectively into the future.

**D. EROSION CONTROL**

Temporary erosion control measures will be incorporated during construction to minimize soil loss and erosion hazards. Best Management Practices may include temporary sediment basins, temporary diversion berms and swales to intercept runoff, silt fences, dust fences, slope protection, stabilized construction entrances and truck wash-down areas. Periodic water spraying of loose soils will be employed to minimize air-borne dirt particles. The project will also need to apply for and meet the requirements of a National Pollution Discharge Elimination System (NPDES) permit.

## **V. CONCLUSION**

The proposed improvements for this project will be designed in accordance with the Department of Public Works (DPW) Storm Drainage Rules. The proposed storm drain system will have adequate capacity and the post-development runoff will be retained. Erosion control and water quality measures will be provided to minimize pollution during and after construction. The project will also comply with the County's recently adopted "Rules for the Design of Storm Water Treatment Best Management Practices".

Based on the information presented in this report, the drainage design for this project will have no adverse effects on the existing facilities or on the surrounding environment.

## REFERENCES:

1. Department of Public Works & Waste Management, County of Maui. (November 1995). *Rules for the Design of Storm Drainage Facilities in the County of Maui*, Title MC-15, Subtitle 01, Chapter 4.
2. Department of Public Works & Waste Management, County of Maui. (November 9, 2012). *Rules for the Design of Storm Water Treatment Best Management Practices*, Title MC-15, Subtitle 01, Chapter 111.
3. USDA, Natural Resources Conservation Service (formerly Soil Conservation Service) in Cooperation with the University of Hawaii Agricultural Experiment Station. (August 1972). *Soil Survey of Island of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii*.
4. Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at: <http://websoilsurvey.nrcs.usda.gov/>. Accessed 01/08/2014.
5. Federal Emergency Management Agency. (September 19, 2012). *Flood and Insurance Rate Map, Maui County, Hawaii*. Map Number 1500030391E.
6. State of Hawaii, Department of Land and Natural Resources, Engineering Division, National Flood Insurance Program (NFIP). Flood Hazard Assessment Tool. Available online at: <http://gis.hawaiiinfip.org/FHAT>, Accessed 11/07/2014.
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8. Giambelluca TW, Chen Q, Frazier AG, Price JP, Chen Y-L, Chu P-S, Eischeid J., and Delparte, D. 2011. The Rainfall Atlas of Hawai'i. Available online at <http://rainfall.geography.hawaii.edu>. Accessed 11/07/2014.
9. Warren S. Unemori Engineering, Inc. (January 2004). *Kehalani Offsite Drainage System- Phase 1, Wailuku, Maui, Hawaii*.
10. Warren S. Unemori Engineering, Inc. (May 28, 2013). *Project Plans: Kehalani Parkway - Mauka Loop*.
11. Hirata and Associates, Inc. (June 18, 2014). *Foundation Investigation, Iao Surface Water Treatment Plant Upgrades, Wailuku, Maui, Hawaii, DWS Job No. 12-03*.
12. Munekiyo & Hiraga, Inc. (October 25, 2013). *Letter: Early Consultation Request for Proposed Iao Water Treatment Plant Upgrades, Wailuku, Maui, Hawaii; DWS Job No. 12-03; TMK (2) 3-5-001:067 (por.) and 091 (por.)*.



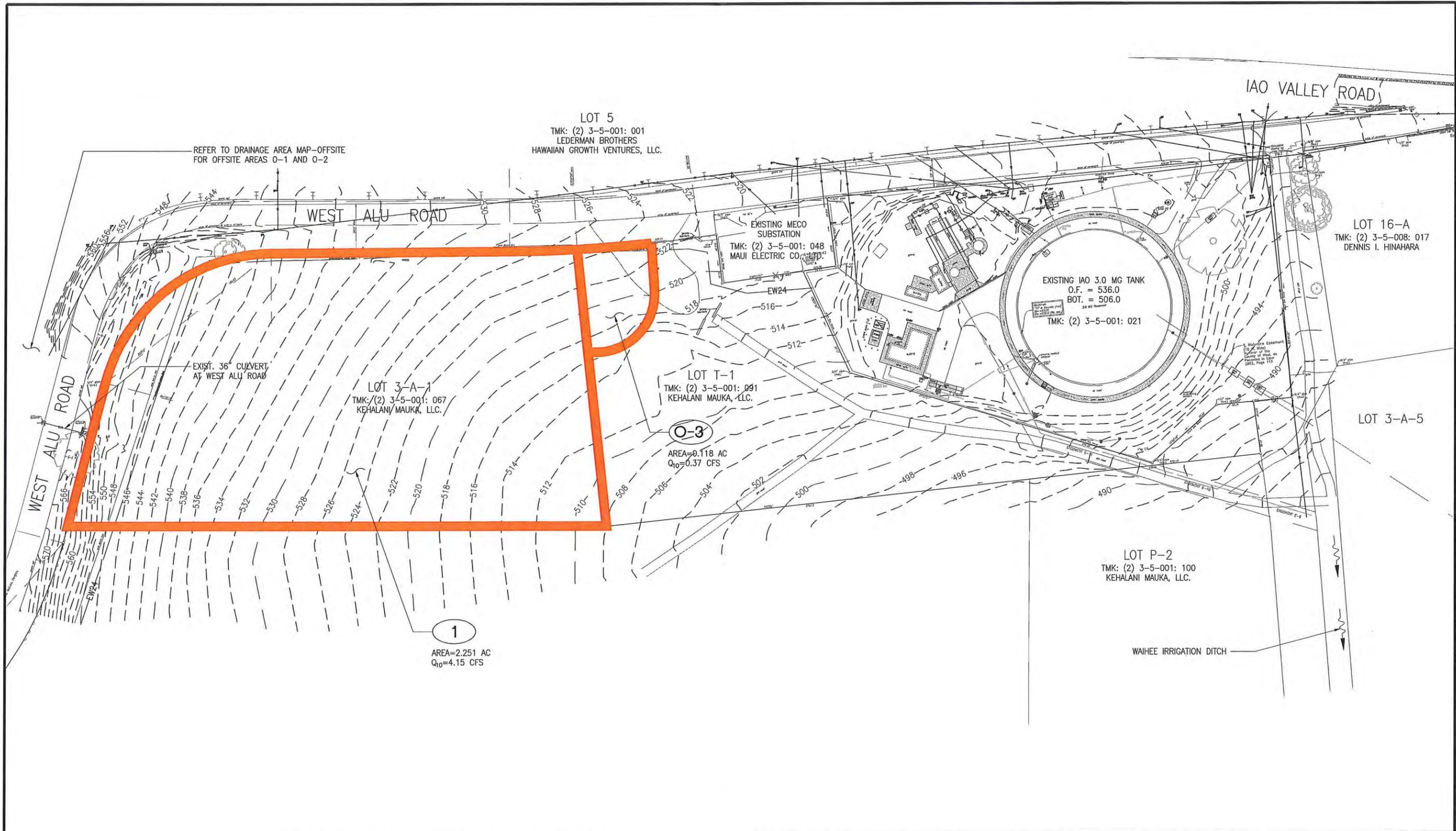
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# EXHIBITS

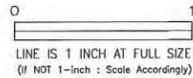
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**DRAINAGE AREA MAP-EXISTING CONDITIONS**

SCALE: 1" = 80'



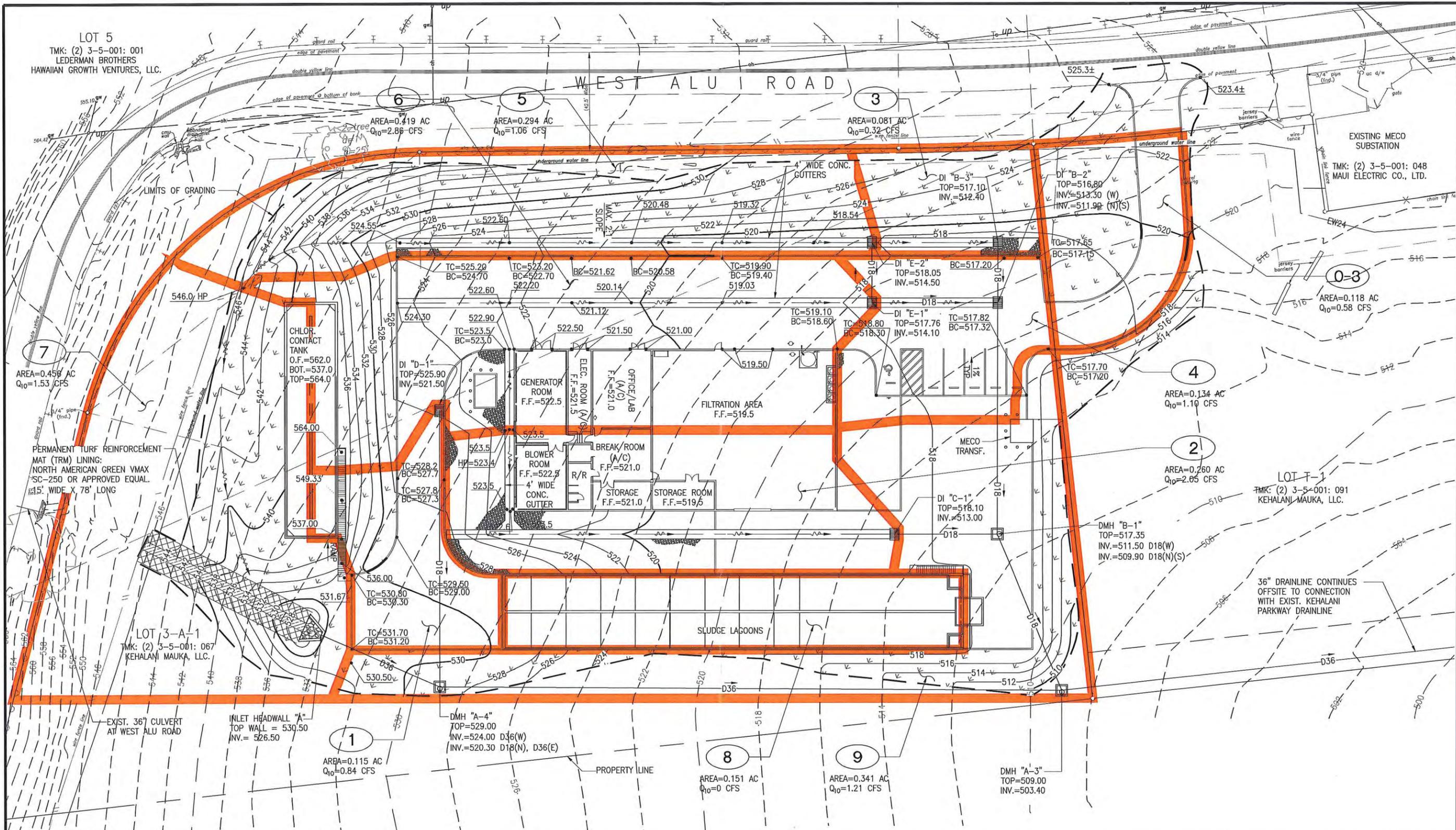
DRAINAGE REPORT  
IAO SURFACE WATER  
TREATMENT PLANT UPGRADES  
WAILUKU, MAUI, HAWAII

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DRAINAGE AREA MAP-EXISTING  
CONDITIONS

EXHIBIT

2



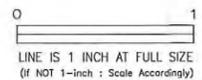
LOT 5  
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 LEDERMAN BROTHERS  
 HAWAIIAN GROWTH VENTURES, LLC.

EXISTING MECO  
 SUBSTATION  
 TMK: (2) 3-5-001: 048  
 MAUI ELECTRIC CO., LTD.

LOT F-1  
 TMK: (2) 3-5-001: 091  
 KEHALANI MAUKA, LLC.

LOT 3-A-1  
 TMK: (2) 3-5-001: 067  
 KEHALANI MAUKA, LLC.

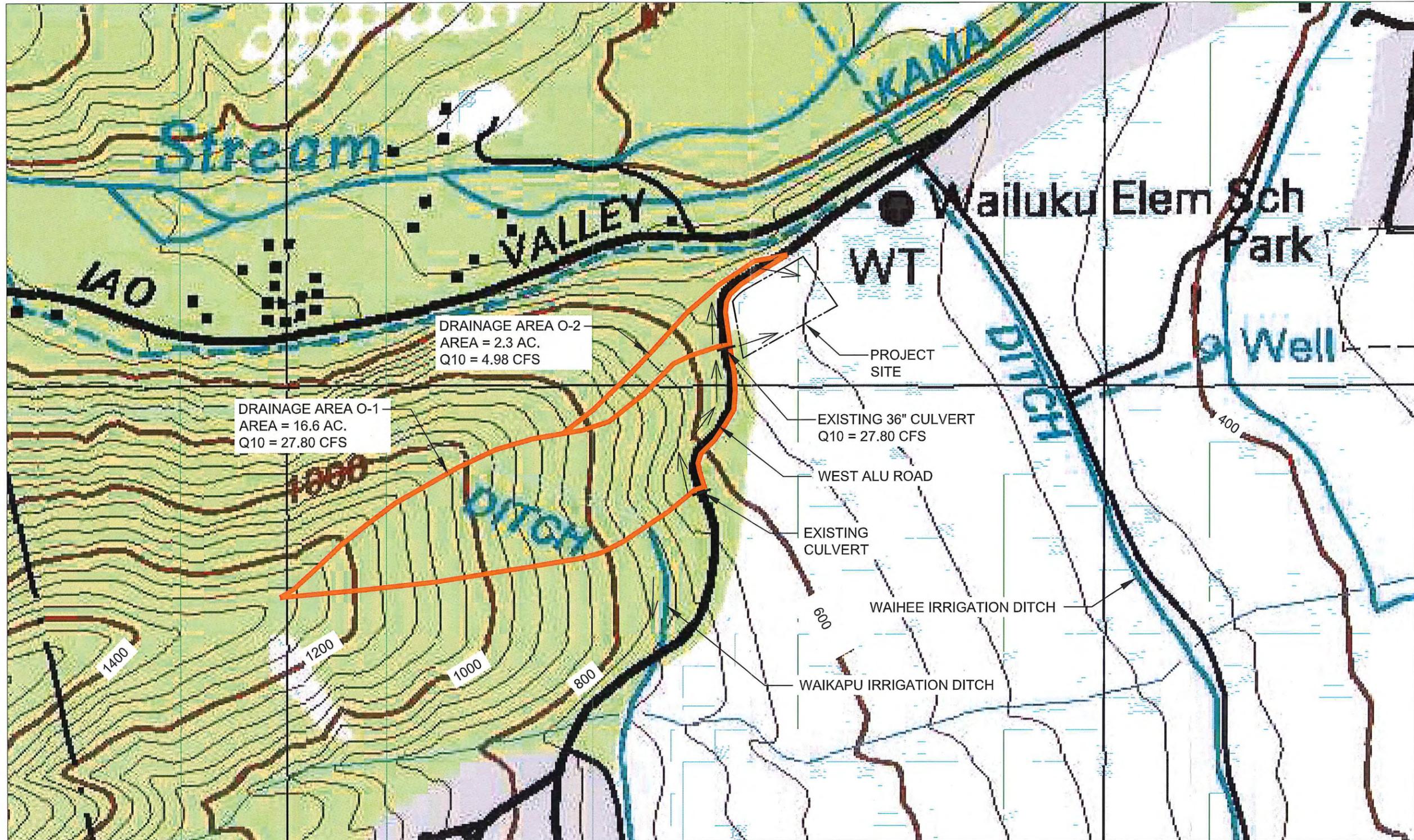
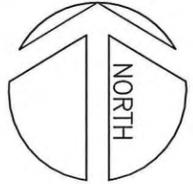
**DRAINAGE AREA MAP-PROPOSED CONDITIONS**  
 SCALE: 1" = 40'



DRAINAGE REPORT  
 IAO SURFACE WATER  
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 DRAINAGE AREA MAP-PROPOSED  
 CONDITIONS

EXHIBIT  
**3**



MAP SCALE 1" = 400'



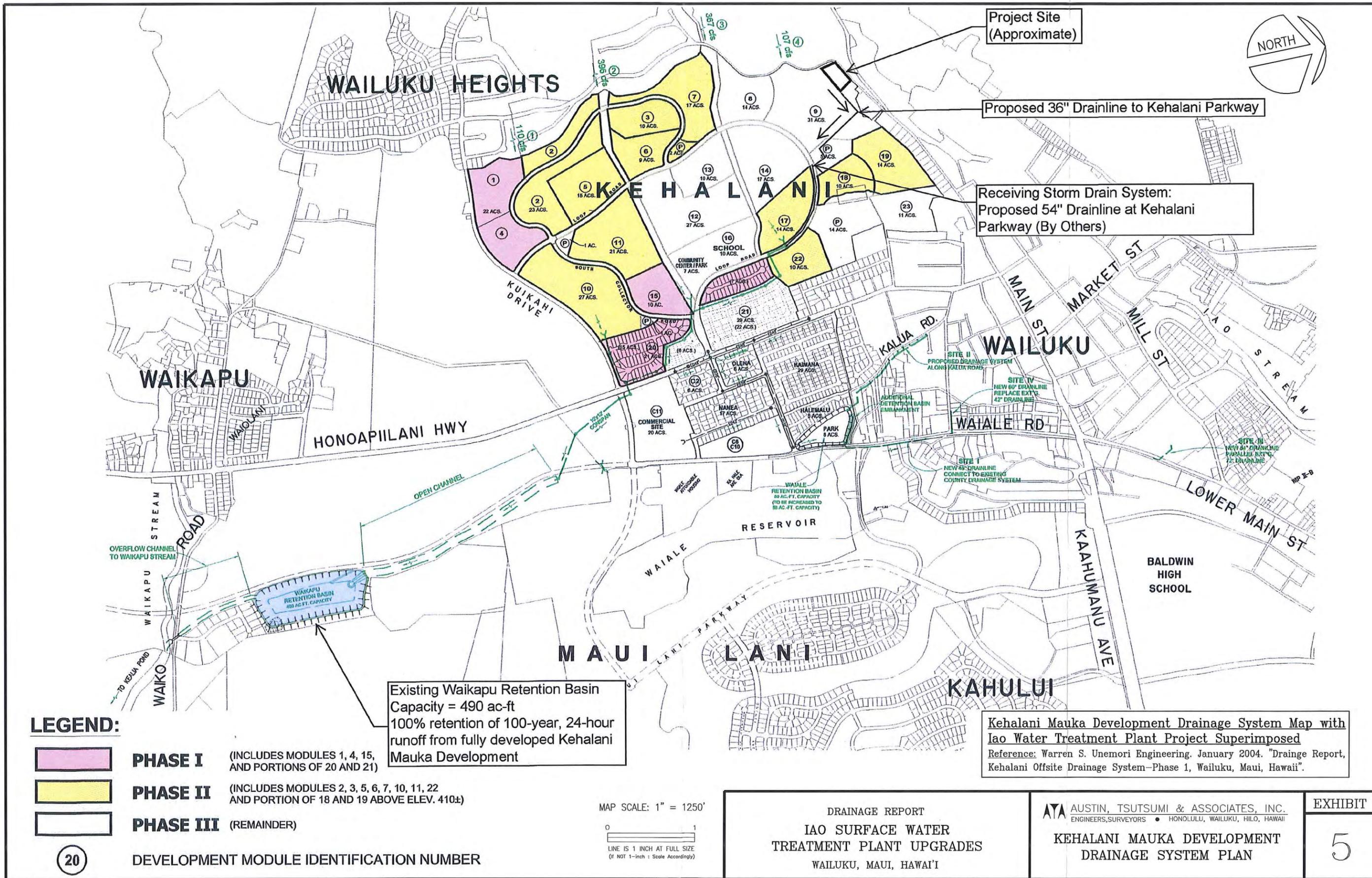
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TREATMENT PLANT UPGRADES  
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DRAINAGE AREA MAP—  
OFFSITE

EXHIBIT

4





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# APPENDIX A

## Hydrology Calculations

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## APPENDIX A

### DRAINAGE AREA CALCULATIONS EXISTING CONDITIONS

Drainage Area Label	Drainage Area Description	Area (acres)	Runoff Coeff.	Tc (min)	10-Yr Design Intensity (in/hr)	10-Yr, 1-Hr Runoff	
						Flow (cfs)	Volume (cf)
1	Onsite Area	2.251	0.35	16.5	5.27	4.15	7,470
O-1	Offsite to Ex. 36" Culv. & Site	16.6	0.41	27.7	4.07	27.80	50,040
O-2	Offsite to Site from W. Alu Rd	2.3	0.46	22.2	4.66	4.98	8,964
O-3	Offsite Area at Prop. Entrance	0.118	0.45	9.0	6.94	0.37	666
<b>Total to Waihee Ditch</b>		<b>21.269</b>				<b>37.30</b>	<b>67,140</b>

- Notes:
1. All drainage areas are less than 100 acres. The Rational Method ( $Q = CIA$ ) is used to determine runoff.
  2. 10-year design is used for most drainage areas. 50-year design is used for runoff to proposed DI B-2 and B-3 which are located in a sump low point.
  3. Refer to Runoff Coefficient Calculations for determination of "C" value.
  4. Refer to Time of Concentration Calculations for determination of "Tc" value.
  5. Rainfall Intensity obtained from the NOAA Precipitation Frequency Data Server, accessed online at: <http://hdsc.nws.noaa.gov/hdsc/pfds>
  6. Runoff volume determined using triangular Rational Method hydrograph ending at 1-hour. Hydrograph Volume =  $(Q \text{ ft}^3/\text{sec}) \times (60 \text{ sec}/\text{min}) \times (60 \text{ min}/\text{hr}) \times (1/2)$

## APPENDIX A

### DRAINAGE AREA CALCULATIONS PROPOSED CONDITIONS

Drainage Area Label	Flows To	Area (acres)	Runoff Coeff.	Tc (min)	10-Yr Design Intensity (in/hr)	10-Yr, 1-Hr Runoff		50-Yr Design Intensity (in/hr)	50-Yr, 1-Hr Runoff	
						Flow (cfs)	Volume (cf)		Flow (cfs)	Volume (ac-ft)
1	DI D-1	0.115	0.84	5.0	8.75	0.84	1,512	-	-	-
2	DI C-1	0.260	0.90	5.0	8.75	2.05	3,690	-	-	-
3	DI B-3	0.081	0.48	5.7	8.43	0.32	576	12.05	0.46	828
4	DI B-2	0.134	0.93	5.0	8.75	1.10	1,980	12.50	1.57	2,826
5	DI E-2	0.294	0.46	7.0	7.85	1.06	1,908	-	-	-
6	DI E-1	0.419	0.87	6.9	7.89	2.86	5,148	-	-	-
7	Headwall A	0.456	0.43	7.2	7.76	1.53	2,754	-	-	-
8	Lagoon	0.151	0.00	5.0	8.75	0.00	0	← See Note 7 Below		
9	Waihee	0.341	0.59	12.2	6.02	1.21	2,178	-	-	-
O-1	Headwall A	16.6	0.41	27.7	4.07	27.80	50,040	-	-	-
O-2	DI E-2	2.3	0.46	22.2	4.66	4.98	8,964	-	-	-
O-3	DI B-2	0.118	0.66	7.9	7.44	0.58	1,044	10.62	0.82	1,476
<b>Total to Waihee Ditch</b>		<b>0.341</b>				<b>1.21</b>	<b>2,178</b>	<b>(36 cfs Decrease)</b>		
<b>Total to Prop. Storm Drain Sys.</b>		<b>20.928</b>				<b>43.12</b>	<b>77,616</b>	<b>(43 cfs Increase. See Note 8)</b>		

- Notes:
1. All drainage areas are less than 100 acres. The Rational Method ( $Q = CIA$ ) is used to determine runoff.
  2. 10-year design is used for most drainage areas. 50-year design is used for DI B-2 and B-3 due to their location in a sump low point.
  3. Refer to Runoff Coefficient Calculations for determination of "C" value.
  4. Refer to Time of Concentration Calculations for determination of "Tc" value.
  5. Rainfall Intensity obtained from the NOAA Precipitation Frequency Data Server, accessed online at: <http://hdsc.nws.noaa.gov/hdsc/pfds>
  6. Runoff volume determined using triangular Rational Method hydrograph ending at 1-hour. Hydrograph Volume =  $(Q \text{ ft}^3/\text{sec}) \times (60 \text{ sec}/\text{min}) \times (60 \text{ min}/\text{hr}) \times (1/2)$
  7. Lagoon has open top and captures all rainfall that falls directly on it.
  8. The prop. storm drain system runoff will be fully retained in the existing offsite Waikapu Retention Basin such that there will be zero discharge to any downstream drainage system.

## APPENDIX A

### RUNOFF COEFFICIENT CALCULATIONS

Drainage Area Label	C <sub>10</sub> = 0.35		C <sub>10</sub> = 0.40		C <sub>10</sub> = 0.40		C <sub>10</sub> = 0.85		C <sub>10</sub> = 0.95		Weighted Avg. Coeff.	
	Ex. Tall Grass/ Brush		Ex. Woods Brush		Grass Cover (Graded Area)		Dirt/ Bare Soil		Impervious Surfaces		TOTAL	
	Area (sf)	Area (%)	Area (sf)	Area (%)	Area (sf)	Area (%)	Area (sf)	Area (%)	Area (sf)	Area (%)	Area (sf)	Runoff Coeff.
<b>Existing Conditions</b>												
1	98,069	100.0	0	0.0	0	0.0	0	0.0	0	0.0	98,069	0.35
O-1	0	0.0	707,587	97.9	0	0.0	0	0.0	15,072	2.1	722,659	0.41
O-2	0	0.0	86,821	88.3	0	0.0	0	0.0	11,520	11.7	98,341	0.46
O-3	4,105	79.7	0	0.0	0	0.0	1,044	20.3	0	0.0	5,149	0.45
<b>Proposed Conditions</b>												
1	0	0.0	0	0.0	1,040	20.7	0	0.0	3,993	79.3	5,033	0.84
2	0	0.0	0	0.0	0	0.0	5,662	50.0	5,670	50.0	11,332	0.90
3	0	0.0	0	0.0	2,996	84.8	308	8.7	230	6.5	3,534	0.48
4	0	0.0	0	0.0	40	0.7	686	11.8	5,098	87.5	5,824	0.93
5	0	0.0	0	0.0	11,240	87.8	723	5.7	832	6.5	12,795	0.46
6	0	0.0	0	0.0	2,599	14.2	1,048	5.7	14,608	80.0	18,255	0.87
7	0	0.0	0	0.0	18,662	94.0	0	0.0	1,189	6.0	19,841	0.43
8	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	6,600	0.00
9	0	0.0	0	0.0	8,674	58.4	5,734	38.6	444	3.0	14,852	0.59
O-1	(No Change, See Existing Conditions)											
O-2	(No Change, See Existing Conditions)											
O-3	0	0.0	0	0.0	2,748	53.4	0	0.0	2,400	46.6	5,148	0.66

**Surface Type Detailed Descriptions:**

- Ex. Tall Grass/ Brush, Good Cover, Steep Slopes, HSG C
- Ex. Woods, Good Cover, V. Steep Slopes, HSG C
- Grass Cover (Graded Area), V. Slopes, HSG C
- Dirt Roadways or Bare Soil HSG C
- Impervious Surfaces (Pavement, Buildings, Pads, etc)

Note: 1. Lagoon has open top and captures all rainfall that falls directly on it.

APPENDIX A

TIME OF CONCENTRATION CALCULATIONS

Drain Area Label	Flow Segment 1			Flow Segment 2			Flow Segment 3			Flow Segment 4			TOTAL Time (min)				
	Overland Flow			Overland Flow			Concentrated Flow			Concentrated Flow							
	Surf. Type	Length (ft)	Slope (%)	Time (min)	Surf. Type	Length (ft)	Slope (%)	Time (min)	Surf. Type	Length (ft)	Slope (%)	Time (min)	Surf. Type	Length (ft)	Slope (%)	Time (min)	
<b>Existing Conditions</b>																	
1	Grass	440	9.3	16.5	-	-	-	0	-	-	-	0	-	-	-	0	16.5
O-1	Woods	1,730	39.3	27.0	-	-	-	0	Paved	590	8.5	0.7	-	-	-	0	27.7
O-2	Woods	830	34.9	21.7	-	-	-	0	Paved	350	7.1	0.5	-	-	-	0	22.2
O-3	Grass	90	9.4	9.0	-	-	-	0	-	-	-	0	-	-	-	0	9.0
<b>Proposed Conditions</b>																	
1	Grass	25	30.1	3.0	Pave	45	5.6	0.5	-	-	-	0	-	-	-	0	3.5*
2	Gravel	25	11.6	1.0	-	-	-	0	Pave	200	3.0	0.7	-	-	-	0	1.7*
3	Grass	40	23.6	5.5	-	-	-	0	Pave	65	3.9	0.2	-	-	-	0	5.7
4	Gravel	25	2.0	1.8	Pave	30	2.8	0.6	Pave	45	2.0	0.2	-	-	-	0	2.6*
5	Grass	35	12.3	6.0	-	-	-	0	Grass	75	28.5	0.3	Pave	195	3.5	0.7	7.0
6	Grass	65	31.4	6.2	-	-	-	0	Pave	195	3.3	0.7	-	-	-	0	6.9
7	Grass	70	20.4	7.0	-	-	-	0	Grass	65	19.3	0.2	-	-	-	0	7.2
8	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	0	0.0*
9	Grass	175	7.4	12.2	-	-	-	0	-	-	-	0	-	-	-	0	12.2
O-1	(No Change, See Existing Conditions)																
O-2	(No Change, See Existing Conditions)																
O-3	Grass	70	10.4	7.8	-	-	-	0	Pave	20	2.0	0.1	-	-	-	0	7.9

- Notes:
1. County of Maui Storm Drain Manual Plate 1 used for the determination of overland flow time.
  2. County of Maui Storm Drain Manual Table 4 used for the determination of concentrated flow time.
  3. A pipe flow rate of 5 fps was assumed.
  4. Time of concentrations marked with asterisk (\*) are rounded up to 5 minutes minimum for runoff calculations.

## APPENDIX A

### SUMMARY OF PROCESS DISCHARGES

Process Flow	Description	Approx. Frequency	Estimated Flow Rate	Flow Rate (cfs)	Flows To
1	Backwash from the strainers	Hourly	150 gpm	0.33 cfs	Waihee Ditch
2	Bypass flow of raw water supply (if raw water is too dirty)	Monthly	4.8 MGD	7.43 cfs	Waihee Ditch
3	Washout water from the Chlorine Contact Tank (CCT)	Rare	300 gpm	0.67 cfs	DI D-1
4	Overflow from the CCT	Rare	4.8 MGD	7.43 cfs	DI D-1

- Notes:
1. Process Flows 1 and 2 first go to the sludge lagoons. The decant from the sludge lagoons then goes to the existing storm drain system at the existing Iao Water Treatment Plant, which discharges to the Waihee Irrigation Ditch.
  2. Process Flows 3 and 4 are rare and it would be extremely unlikely that they would occur at the same time as the 10-year storm. For this reason, Process Flows 3 and 4 are not added to the 10-year storm flows in the storm drain HGL analysis.



**NOAA Atlas 14, Volume 4, Version 3**  
**Location name: Wailuku, Hawaii, US\***  
**Coordinates: 20.8835, -156.5125**  
**Elevation: 493 ft\***  
 \* source: Google Maps



**POINT PRECIPITATION FREQUENCY ESTIMATES**

S. Perica, D. Martin, B. Lin, T. Parzybok, D. Riley, M. Yekta, L. Hiner, L.-C. Chen, D. Brewer, F. Yan, K. Maitaria, C. Trypaluk, G. M. Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aeriels](#)

**PF tabular**

Precipitation data is specific to project location.

**PRECIPITATION DATA**  
(in inches per hour)

Interpolate to find 10-year Rainfall Intensity for the storm duration equal to the Tc.

<b>PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)<sup>1</sup></b>										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	<b>4.10</b> (3.44-4.66)	<b>5.41</b> (4.60-6.36)	<b>7.25</b> (6.10-8.60)	<b>8.75</b> (7.25-10.4)	<b>10.8</b> (8.77-13.0)	<b>12.5</b> (9.98-15.2)	<b>14.2</b> (11.1-17.6)	<b>16.1</b> (12.3-20.2)	<b>18.7</b> (13.7-24.0)	<b>20.9</b> (14.8-27.2)
10-min	<b>3.04</b> (2.56-3.45)	<b>4.01</b> (3.41-4.72)	<b>5.38</b> (4.52-6.38)	<b>6.49</b> (5.37-7.74)	<b>8.02</b> (6.50-9.66)	<b>9.25</b> (7.40-11.3)	<b>10.6</b> (8.26-13.0)	<b>11.9</b> (9.11-15.0)	<b>13.9</b> (10.2-17.8)	<b>15.5</b> (11.0-20.2)
15-min	<b>2.55</b> (2.14-2.89)	<b>3.36</b> (2.85-3.95)	<b>4.50</b> (3.79-5.34)	<b>5.43</b> (4.50-6.48)	<b>6.71</b> (5.45-8.09)	<b>7.74</b> (6.20-9.44)	<b>8.84</b> (6.91-10.9)	<b>9.99</b> (7.62-12.5)	<b>11.6</b> (8.52-14.9)	<b>13.0</b> (9.19-16.9)
30-min	<b>1.79</b> (1.50-2.03)	<b>2.36</b> (2.01-2.78)	<b>3.17</b> (2.66-3.76)	<b>3.82</b> (3.16-4.56)	<b>4.72</b> (3.83-5.69)	<b>5.45</b> (4.36-6.64)	<b>6.22</b> (4.86-7.67)	<b>7.03</b> (5.37-8.81)	<b>8.18</b> (6.00-10.5)	<b>9.12</b> (6.46-11.9)
60-min	<b>1.18</b> (0.990-1.34)	<b>1.55</b> (1.32-1.83)	<b>2.08</b> (1.75-2.47)	<b>2.51</b> (2.08-3.00)	<b>3.11</b> (2.52-3.74)	<b>3.58</b> (2.87-4.37)	<b>4.09</b> (3.20-5.05)	<b>4.62</b> (3.53-5.80)	<b>5.38</b> (3.95-6.89)	<b>6.00</b> (4.25-7.82)
2-hr	<b>0.804</b> (0.696-0.934)	<b>1.08</b> (0.920-1.27)	<b>1.44</b> (1.22-1.72)	<b>1.73</b> (1.44-2.07)	<b>2.13</b> (1.74-2.58)	<b>2.45</b> (1.96-3.00)	<b>2.77</b> (2.17-3.43)	<b>3.11</b> (2.38-3.91)	<b>3.58</b> (2.63-4.60)	<b>3.97</b> (2.81-5.19)
3-hr	<b>0.603</b> (0.522-0.699)	<b>0.816</b> (0.696-0.959)	<b>1.09</b> (0.920-1.30)	<b>1.31</b> (1.09-1.57)	<b>1.62</b> (1.32-1.95)	<b>1.86</b> (1.49-2.27)	<b>2.10</b> (1.65-2.60)	<b>2.36</b> (1.81-2.96)	<b>2.72</b> (2.00-3.48)	<b>3.01</b> (2.13-3.93)
6-hr	<b>0.383</b> (0.328-0.447)	<b>0.514</b> (0.438-0.606)	<b>0.696</b> (0.585-0.827)	<b>0.840</b> (0.698-1.01)	<b>1.04</b> (0.847-1.26)	<b>1.19</b> (0.958-1.46)	<b>1.36</b> (1.06-1.68)	<b>1.52</b> (1.17-1.92)	<b>1.76</b> (1.29-2.26)	<b>1.94</b> (1.38-2.55)
12-hr	<b>0.237</b> (0.204-0.276)	<b>0.320</b> (0.272-0.376)	<b>0.437</b> (0.367-0.518)	<b>0.531</b> (0.441-0.634)	<b>0.664</b> (0.541-0.801)	<b>0.771</b> (0.617-0.941)	<b>0.883</b> (0.692-1.09)	<b>1.00</b> (0.765-1.26)	<b>1.17</b> (0.857-1.50)	<b>1.30</b> (0.924-1.70)
24-hr	<b>0.146</b> (0.125-0.171)	<b>0.200</b> (0.171-0.234)	<b>0.276</b> (0.236-0.324)	<b>0.339</b> (0.288-0.399)	<b>0.429</b> (0.360-0.507)	<b>0.503</b> (0.418-0.598)	<b>0.582</b> (0.478-0.696)	<b>0.668</b> (0.541-0.804)	<b>0.792</b> (0.626-0.963)	<b>0.893</b> (0.692-1.10)
2-day	<b>0.092</b> (0.081-0.105)	<b>0.125</b> (0.110-0.143)	<b>0.172</b> (0.151-0.197)	<b>0.211</b> (0.183-0.243)	<b>0.266</b> (0.229-0.308)	<b>0.311</b> (0.265-0.362)	<b>0.359</b> (0.301-0.421)	<b>0.411</b> (0.339-0.485)	<b>0.485</b> (0.390-0.580)	<b>0.545</b> (0.429-0.660)
3-day	<b>0.066</b> (0.058-0.075)	<b>0.090</b> (0.079-0.102)	<b>0.124</b> (0.109-0.141)	<b>0.152</b> (0.133-0.174)	<b>0.193</b> (0.167-0.222)	<b>0.227</b> (0.194-0.263)	<b>0.263</b> (0.222-0.307)	<b>0.303</b> (0.252-0.356)	<b>0.360</b> (0.292-0.428)	<b>0.408</b> (0.323-0.490)
4-day	<b>0.053</b> (0.047-0.060)	<b>0.072</b> (0.064-0.082)	<b>0.100</b> (0.088-0.113)	<b>0.123</b> (0.108-0.140)	<b>0.157</b> (0.136-0.179)	<b>0.185</b> (0.159-0.213)	<b>0.215</b> (0.183-0.250)	<b>0.249</b> (0.208-0.291)	<b>0.298</b> (0.242-0.353)	<b>0.339</b> (0.269-0.406)
7-day	<b>0.034</b> (0.030-0.038)	<b>0.046</b> (0.041-0.052)	<b>0.064</b> (0.056-0.072)	<b>0.078</b> (0.069-0.089)	<b>0.100</b> (0.087-0.115)	<b>0.118</b> (0.102-0.136)	<b>0.138</b> (0.117-0.160)	<b>0.160</b> (0.133-0.187)	<b>0.192</b> (0.156-0.227)	<b>0.219</b> (0.174-0.262)
10-day	<b>0.026</b> (0.023-0.030)	<b>0.035</b> (0.031-0.040)	<b>0.049</b> (0.043-0.055)	<b>0.060</b> (0.052-0.068)	<b>0.076</b> (0.066-0.087)	<b>0.089</b> (0.077-0.103)	<b>0.104</b> (0.088-0.120)	<b>0.120</b> (0.100-0.140)	<b>0.144</b> (0.117-0.170)	<b>0.163</b> (0.130-0.195)
20-day	<b>0.016</b> (0.015-0.019)	<b>0.022</b> (0.019-0.025)	<b>0.030</b> (0.026-0.034)	<b>0.036</b> (0.032-0.041)	<b>0.045</b> (0.039-0.052)	<b>0.053</b> (0.045-0.061)	<b>0.061</b> (0.051-0.070)	<b>0.069</b> (0.058-0.081)	<b>0.082</b> (0.067-0.097)	<b>0.092</b> (0.073-0.110)
30-day	<b>0.013</b> (0.011-0.015)	<b>0.017</b> (0.015-0.019)	<b>0.023</b> (0.020-0.026)	<b>0.028</b> (0.025-0.032)	<b>0.035</b> (0.030-0.040)	<b>0.040</b> (0.035-0.046)	<b>0.046</b> (0.039-0.053)	<b>0.052</b> (0.044-0.061)	<b>0.061</b> (0.050-0.072)	<b>0.068</b> (0.054-0.082)
45-day	<b>0.010</b> (0.009-0.012)	<b>0.014</b> (0.012-0.016)	<b>0.018</b> (0.016-0.021)	<b>0.022</b> (0.020-0.025)	<b>0.027</b> (0.024-0.031)	<b>0.031</b> (0.027-0.036)	<b>0.035</b> (0.030-0.041)	<b>0.040</b> (0.033-0.046)	<b>0.046</b> (0.037-0.054)	<b>0.050</b> (0.040-0.060)
60-day	<b>0.009</b> (0.008-0.010)	<b>0.012</b> (0.011-0.014)	<b>0.016</b> (0.014-0.018)	<b>0.019</b> (0.017-0.021)	<b>0.023</b> (0.020-0.026)	<b>0.026</b> (0.022-0.030)	<b>0.029</b> (0.025-0.034)	<b>0.032</b> (0.027-0.038)	<b>0.037</b> (0.030-0.043)	<b>0.040</b> (0.032-0.048)

<sup>1</sup> Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at low er and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

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**PF graphical**





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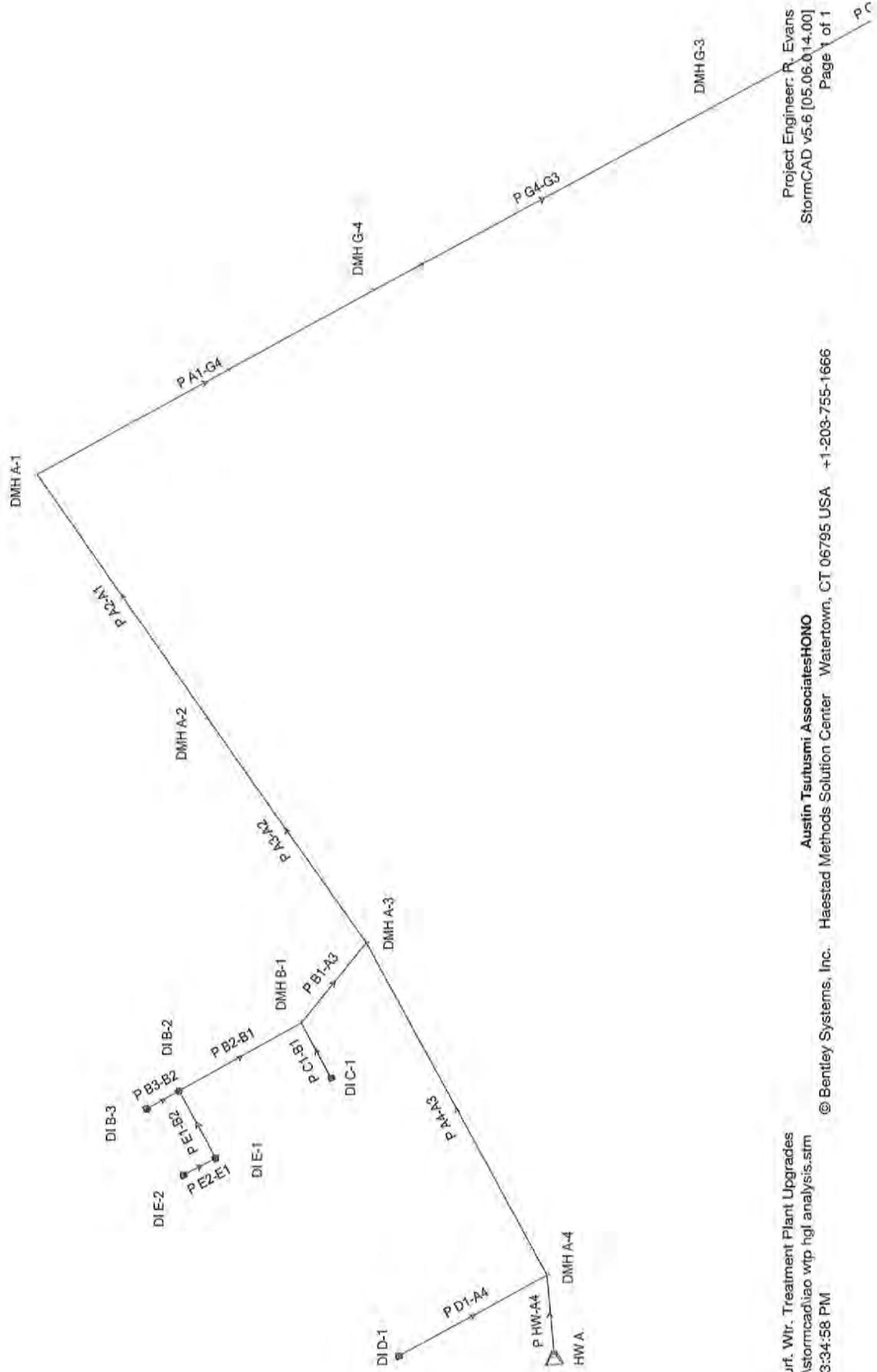
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# APPENDIX B

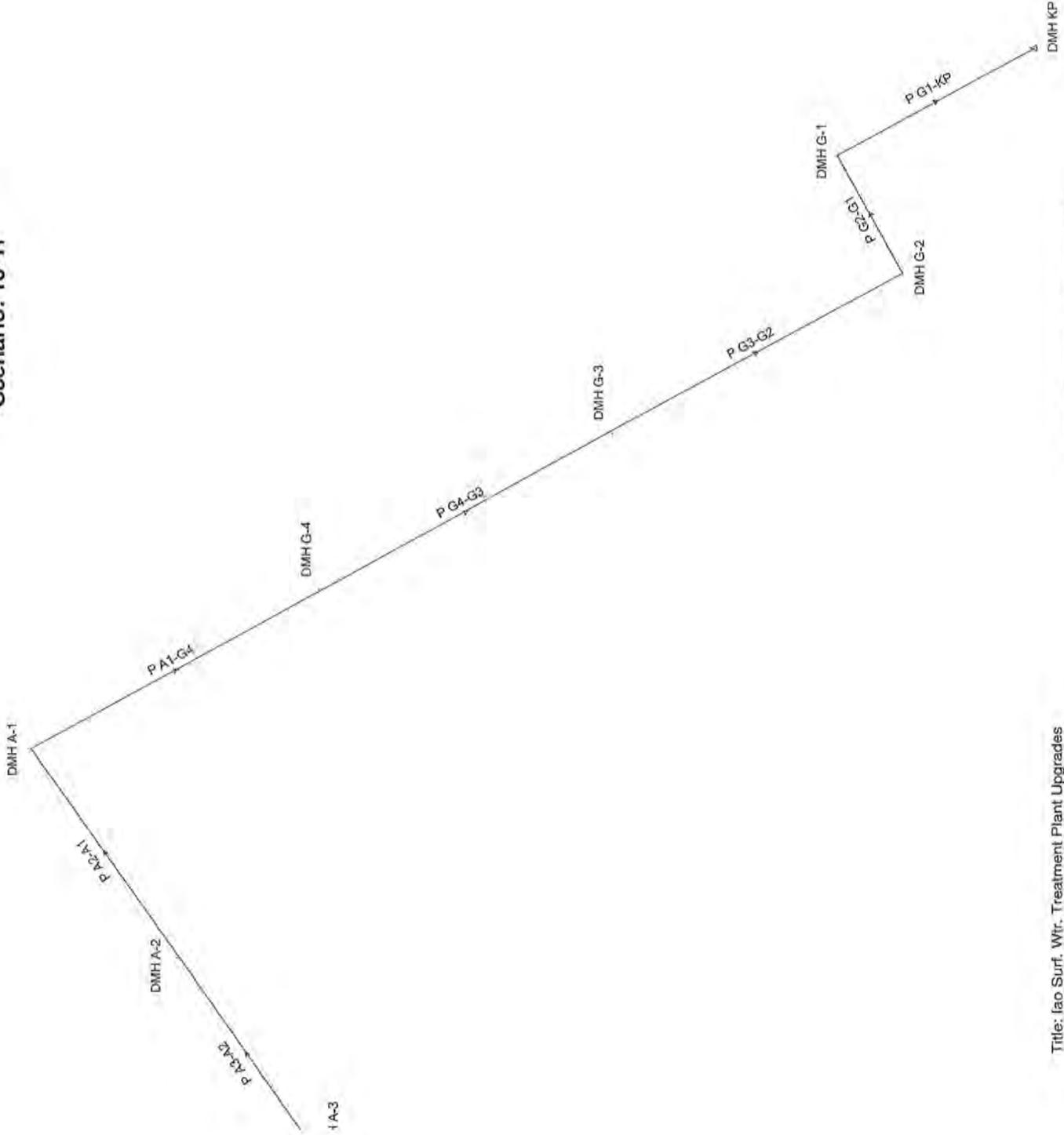
## Hydraulic Calculations

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# Scenario: 10-Yr



Scenario: 10-Yr



Scenario: 10-Yr

HGL Report- Iao WTP

Line	Label	Number of Sections	Section Size	Material Description	Manning's n	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft)	Pipe Slope (ft/ft)	Hydraulic Slope (ft/ft)	Total System Flow (cfs)	Full Flow Capacity (cfs)	Avg. Velocity (ft/s)	Normal Depth / Diameter (d/D) (%)	Hydraulic Grade Line Out (ft)	Element Headloss (ft)	Hydraulic Grade Line In (ft)	Ground Elevation (ft)
1	DMH KP										43.12				460.00	0.00	460.00	472.00
2	P G1-KP	1	36 inch	Corrugated HDPE (Smooth)	0.012	463.50	465.35	185.00	0.0100	0.0125	43.12	72.25	10.67	55.6	465.18	2.31	467.49	473.00
3	DMH G-1										43.12				467.49	1.49	468.98	473.00
4	P G2-G1	1	36 inch	Corrugated HDPE (Smooth)	0.012	465.35	469.50	111.00	0.0374	0.0240	43.12	139.71	17.41	38.1	468.98	2.66	471.64	483.00
5	DMH G-2										43.12				471.64	1.49	473.13	483.00
6	P G3-G2	1	36 inch	Corrugated HDPE (Smooth)	0.012	469.50	472.25	275.00	0.0100	0.0046	43.12	72.25	10.67	55.6	473.13	1.26	474.39	484.00
7	DMH G-3										43.12				474.39	0.50	474.89	484.00
8	P G4-G3	1	36 inch	Corrugated HDPE (Smooth)	0.012	472.25	475.00	275.00	0.0100	0.0082	43.12	72.25	10.67	55.6	474.89	2.25	477.14	480.00
9	DMH G-4										43.12				477.14	0.50	477.64	480.00
10	P A1-G4	1	36 inch	Corrugated HDPE (Smooth)	0.012	475.00	481.50	272.00	0.0239	0.0221	43.12	111.69	14.78	43.1	477.64	6.00	483.64	494.75
11	DMH A-1										43.12				483.64	1.49	485.13	494.75
12	P A2-A1	1	36 inch	Corrugated HDPE (Smooth)	0.012	485.60	492.00	212.00	0.0302	0.0345	43.12	125.54	16.11	40.4	486.82	7.32	494.14	499.00
13	DMH A-2										43.12				494.14	0.50	494.64	499.00
14	P A3-A2	1	36 inch	Corrugated HDPE (Smooth)	0.012	492.00	503.40	197.00	0.0579	0.0553	43.12	173.81	20.40	33.9	494.64	10.90	505.54	509.00
15	DMH A-3										43.12				505.54	0.70	506.23	509.00
16	P A4-A3	1	36 inch	Corrugated HDPE (Smooth)	0.012	503.40	520.30	270.00	0.0626	0.0587	30.17	180.77	18.97	27.6	506.23	15.85	522.08	529.00
17	DMH A-4										30.17				522.08	1.11	523.19	529.00
18	P HW-A4	1	36 inch	Corrugated HDPE (Smooth)	0.012	524.00	526.50	56.00	0.0446	0.0578	29.33	152.66	16.67	29.7	525.02	3.24	528.25	530.50
19	HW A										29.33				528.25	0.00	528.25	530.50
20	P B1-A3	1	18 inch	Corrugated HDPE (Smooth)	0.012	503.40	509.90	73.00	0.0890	0.0687	12.95	33.95	17.92	42.8	506.23	5.01	511.25	517.35
21	DMH B-1										12.95				511.25	0.65	511.90	517.35
22	P B2-B1	1	18 inch	Corrugated HDPE (Smooth)	0.012	509.90	511.90	100.00	0.0200	0.0127	10.90	16.09	9.78	60.3	511.90	1.27	513.17	516.80
23	DI B-2										10.90				513.17	1.09	514.26	516.80
24	P B3-B2	1	18 inch	Corrugated HDPE (Smooth)	0.012	511.90	512.40	26.00	0.0192	0.0000	0.32	15.78	0.18	9.9	514.26	0.00	514.26	517.10
25	DI B-3										0.32				514.26	0.00	514.26	517.10
26	P E1-B2	1	18 inch	Corrugated HDPE (Smooth)	0.012	513.30	514.10	55.00	0.0145	0.0191	8.90	13.72	8.26	58.6	514.20	1.05	515.25	517.76
27	DI E-1										8.90				515.25	0.87	516.12	517.76
28	P E2-E1	1	18 inch	Corrugated HDPE (Smooth)	0.012	514.10	514.50	26.00	0.0154	0.0028	6.04	14.11	3.42	45.7	516.12	0.07	516.19	518.05
29	DI E-2										6.04				516.19	0.00	516.19	518.05
30	P C1-B1	1	18 inch	Corrugated HDPE (Smooth)	0.012	511.50	513.00	45.00	0.0333	0.0383	2.05	20.78	7.49	21.2	511.82	1.72	513.54	518.10
31	DI C-1										2.05				513.54	0.00	513.54	518.10
32	P D1-A4	1	18 inch	Corrugated HDPE (Smooth)	0.012	520.30	521.50	119.00	0.0101	0.0001	0.84	11.43	0.48	18.3	523.19	0.01	523.20	525.90
33	DI D-1										0.84				523.20	0.00	523.20	525.90

## Culvert Calculator Report

### Existing 36" W. Alu Rd. Culvert

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	562.00 ft	Headwater Depth/Height	0.92
Computed Headwater Elev.	560.36 ft	Discharge	27.80 cfs
Inlet Control HW Elev.	560.12 ft	Tailwater Elevation	0.00 ft
Outlet Control HW Elev.	560.36 ft	Control Type	Entrance Control

Grades			
Upstream Invert	557.61 ft	Downstream Invert	556.67 ft
Length	35.00 ft	Constructed Slope	0.026857 ft/ft

Hydraulic Profile			
Profile	S2	Depth, Downstream	1.19 ft
Slope Type	Steep	Normal Depth	1.03 ft
Flow Regime	Supercritical	Critical Depth	1.71 ft
Velocity Downstream	10.62 ft/s	Critical Slope	0.004558 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.013
Section Material	Concrete	Span	3.00 ft
Section Size	36 inch	Rise	3.00 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev.	560.36 ft	Upstream Velocity Head	0.70 ft
Ke	0.50	Entrance Loss	0.35 ft

Inlet Control Properties			
Inlet Control HW Elev.	560.12 ft	Flow Control	Unsubmerged
Inlet Type	Square edge w/headwall	Area Full	7.1 ft <sup>2</sup>
K	0.00980	HDS 5 Chart	1
M	2.00000	HDS 5 Scale	1
C	0.03980	Equation Form	1
Y	0.67000		

## Culvert Calculator Report Proposed 36" Onsite Headwall

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	529.50 ft	Headwater Depth/Height	0.95
Computed Headwater Elev.	529.34 ft	Discharge	29.33 cfs
Inlet Control HW Elev.	529.09 ft	Tailwater Elevation	0.00 ft
Outlet Control HW Elev.	529.34 ft	Control Type	Entrance Control
Grades			
Upstream Invert	526.50 ft	Downstream Invert	524.25 ft
Length	60.00 ft	Constructed Slope	0.037500 ft/ft
Hydraulic Profile			
Profile	S2	Depth, Downstream	1.07 ft
Slope Type	Steep	Normal Depth	0.97 ft
Flow Regime	Supercritical	Critical Depth	1.75 ft
Velocity Downstream	12.94 ft/s	Critical Slope	0.004642 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.013
Section Material	Concrete	Span	3.00 ft
Section Size	36 inch	Rise	3.00 ft
Number Sections	1		
Outlet Control Properties			
Outlet Control HW Elev.	529.34 ft	Upstream Velocity Head	0.73 ft
Ke	0.50	Entrance Loss	0.36 ft
Inlet Control Properties			
Inlet Control HW Elev.	529.09 ft	Flow Control	Unsubmerged
Inlet Type	Square edge w/headwall	Area Full	7.1 ft <sup>2</sup>
K	0.00980	HDS 5 Chart	1
M	2.00000	HDS 5 Scale	1
C	0.03980	Equation Form	1
Y	0.67000		







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CIVIL ENGINEERS • SURVEYORS

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# APPENDIX C

## Water Quality Calculations

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## APPENDIX C

### WATER QUALITY CALCULATIONS

Page 1

#### A. Description:

The project is located within the Kehalani Mauka master planned area. As part of the Drainage Master Plan for Kehalani Mauka, a large offsite retention basin was constructed roughly 2 miles southeast of the project site, along Waiale Road. The basin, known as Waikapu Retention Basin, is designed to completely retain the 100-year, 24-hour runoff from the fully developed Kehalani Mauka development area.

Waikapu Retention Basin has a storage volume of 490 ac-ft without any low-flow outlet. Stormwater will be completely retained, thereby capturing all suspended solids and allowing them to settle out. The captured stormwater will then infiltrate into the soils and recharge groundwater. The practice of extended detention is recognized by the County of Maui as an acceptable Water Quality BMP.

Reference: Department of Public Works & Waste Management, County of Maui, *Rules for the Design of Storm Water Treatment Best Management Practices*, Title MC-15, Subtitle 01, Chapter 111.

#### B. Determine Water Quality Design Volume (WQDV):

$$WQDV = C \times P \times A \times 3630$$

WQDV = Water Quality Design Volume (cf)

C = Runoff Coefficient

P = Design Storm for Water Quality

A = Drainage Area (acres)

3630 = Conversion Factor = (43,560 ft<sup>2</sup>/ac) (1ft/12in)

Next Determine runoff coefficient, C:

$$C = 0.05 + (0.009 \times IMP)$$

IMP = Percent Impervious Area Within Drainage Area

Impervious Area on Site = 1.061 ac

Total Site Area = 2.251 ac

$$IMP = (1.061 \text{ ac} / 2.251 \text{ ac}) = 47.1\%$$

$$C = 0.05 + (0.009 \times 47.1)$$

$$C = 0.47$$

Next calculated required WQDV for site:

$$WQDV = (0.47) (1.00 \text{ in}) (2.251 \text{ ac}) (3630)$$

$$WQDV = 3,840 \text{ cf}$$

#### Summary of Required Water Quality Volume:

Drainage Area	IMP (ac)	IMP %	C	P (in)	A (ac)	Factor	WQDV (cf)	WQDV (ac-ft)
Onsite	1.061	47.1	0.47	1.00	2.251	3630	3,840	0.088
Offsite	0.634	3.3	0.08	1.00	18.966	3630	5,508	0.126
<b>Total</b>								<b>0.215</b>

Notes: Gravel/ Bare soil counted as impervious surface.

C. Design System:

1. Check Water Quality Volume at Basin

Total WQDV Required = 0.215 ac-ft

Total WQDV Provided at Waikapu Basin = 490.00 ac-ft

**Adequate treatment volume is provided.**

Since the existing Waikapu Retention Basin has capacity to retain the 100-year 24-hour storm runoff, it therefore has capacity to store the lesser 1-inch water quality storm.

**Additional Information:** The Dam Safety Division of the DLNR is requiring the owner to install submersible outflow pumps at the basin as a safety measure. As of November 2014, the plan for the pumps is being reviewed by DLNR and the pumps have not been installed yet. However, even after the future pumps are installed, the basin will still provide sufficient storage for the water quality volume.

The retention basin bottom invert is 270 ft. The first pump will not turn on until the water surface reaches an elevation of 280 ft. At elevation 280 ft the basin has a cumulative storage capacity of 89.488 acre-feet, which is still sufficient for 100% retention of the water quality storm runoff from the entire Kehalani Mauka Development and its contributing offsite areas.

**FORM B**



**COUNTY OF MAUI**  
**DEPARTMENT OF PUBLIC WORKS**  
**DEVELOPMENT SERVICES ADMINISTRATION**  
**250 SOUTH HIGH STREET**  
**WAILUKU, HAWAII 96793**  
**Ph: (808)270-7242 Fax: (808)270-7972 Inspector: (808)270-7366**

**STORMWATER RUNOFF  
CONTROL PRACTICES AND  
MAINTENANCE PLAN**

**INTRODUCTION**

Increases in impervious surfaces associated with development can increase runoff, degrade water quality, and negatively impact streams, coastal waters, and other water bodies. The best way to mitigate these impacts is to treat, infiltrate, or store runoff onsite before it can impact water bodies downstream.

This General Permit allows the permit holder to construct the proposed project, subject to special conditions and requirements to mitigate stormwater impacts due to development.

**OWNER/PERMITTEE INFORMATION**

Project Name:	Iao Surface Water Treatment Plant Upgrades
Address:	No assigned address
Tax Map Key:	(2) 3-5-001: 067 (POR.), (2) 3-5-001: 091 (POR.)
Permit No.:	
Facility Contact Name:	County of Maui Department of Water Supply
Phone Number:	(808) 270-7730
E-Mail:	Water.Supply@co.maui.hi.us

**REQUIRED BEST MANAGEMENT PRACTICES**

To the maximum extent feasible, runoff from paved areas and other impervious surfaces, roof drains, and other onsite drainage systems shall not be allowed to directly drain into the street, gutter, storm drain, or drainage ditch, or any stream, creek, or other body of water. Rather runoff shall be directed to vegetated areas, gravel or sand pits, retention ponds, vegetated swale, tree wells, planter areas, porous pavements, or other treatment devices.

**TREATMENT CONTROL MEASURES**

- |   |   |  |
|---|---|--|
| <input checked="" type="checkbox"/> Detention Basin | <input type="checkbox"/> Bioretention           | <input type="checkbox"/> Pre-fabricated Treatment Device |
| <input type="checkbox"/> Infiltration Basin/Trench  | <input type="checkbox"/> Vegetated Swale        | <input type="checkbox"/> Porous Pavement                 |
| <input type="checkbox"/> Sand Filter                | <input type="checkbox"/> Vegetated Filter Strip | <input type="checkbox"/> Subsurface Drainage System      |
| <input type="checkbox"/> Other                      |   |  |

Note: The Existing Waikapu Retention Basin adjacent to Waiale Road provides treatment and storage for a large portion of the Kehalani Development Master Plan area, which this project is a part of. The WQDV and the 100-year storm are completely retained in the basin.

- Attach appropriate checksheet.
- 8-1/2x11 exhibit showing location and size of the treatment control measure shall be provided.

**MAINTENANCE REQUIREMENT**

- Property owner shall provide adequate long term maintenance to ensure that all storm water control facilities remain in proper working condition.
- County representatives are authorized to enter the property at reasonable times and in a reasonable manner for the purpose of inspecting the facilities.
- Appropriate maintenance checklists are attached.

**OWNER'S CERTIFICATION**

- The site shall be developed and maintained in accordance with all provisions of this plan.
- Compliance with the provisions of this plan shall remain as a condition of the associated building permit or subdivision approval in perpetuity and shall run with the land unless otherwise released in writing by the County of Maui.

Name	Signature	Date
------	-----------	------

**STORMWATER POST-DEVELOPMENT  
CONTROL MEASURE MAINTENANCE  
CHECK LIST FOR:**



**COUNTY OF MAUI**

**DETENTION BASIN**

**MAINTENANCE REQUIREMENTS**

Maintenance Activity	Schedule
Reconstruct or replace facility when it no longer functions properly.	As needed
Ensure that appropriate site runoff continues to flow to facility.	Annual
Assess overall operation of facility and make necessary repairs.	Annual
Inspect, clean, and repair all pretreatment areas.	Annual, After major storms
Maintain establishment of vegetation and replant bare areas.	Annual
Remove unwanted trees, brush, and weeds.	Annual
Repair inlet and outlet structures, overflow, low flow channels, and any other structures.	Annual, After major storms
Remove trash and debris.	Annual, After major storms
Repair erosion and other damage.	Annual, After major storms
Remove sediment from main basin	When 50% of original volume has been lost
Other:	





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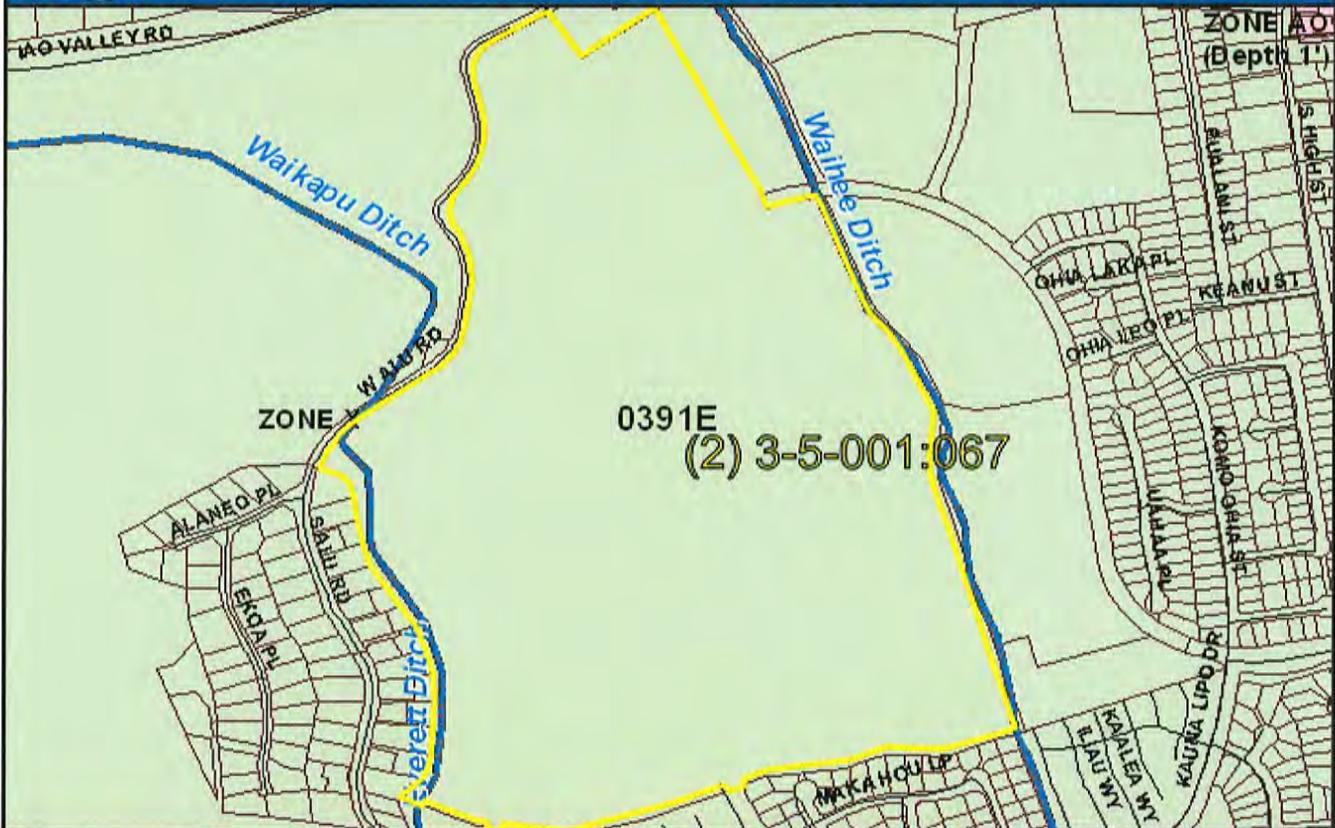
# APPENDIX D

## Flood Hazard Assessment Report

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# State of Hawaii FLOOD HAZARD ASSESSMENT REPORT



## NATIONAL FLOOD INSURANCE PROGRAM

### FLOOD ZONE DEFINITIONS

**SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD** – The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zone A, AE, AH, AO, V, and VE. The Base Flood Elevation (BFE) is the water-surface elevation of the 1% annual chance flood. Mandatory flood insurance purchase applies in these zones:

- Zone A:** No BFE determined.
- Zone AE:** BFE determined.
- Zone AH:** Flood depths of 1 to 3 feet (usually areas of ponding); BFE determined.
- Zone AO:** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined.
- Zone V:** Coastal flood zone with velocity hazard (wave action); no BFE determined.
- Zone VE:** Coastal flood zone with velocity hazard (wave action); BFE determined.
- Zone AEF:** Floodway areas in Zone AE. The floodway is the channel of stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without increasing the BFE.

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

- Zone XS (X shaded):** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
- Zone X:** Areas determined to be outside the 0.2% annual chance floodplain.

### OTHER FLOOD AREAS

- Zone D:** Unstudied areas where flood hazards are undetermined, but flooding is possible. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

### PROPERTY INFORMATION

<b>COUNTY:</b>	MAUI
<b>TMK NO:</b>	(2) 3-5-001-067
<b>PARCEL ADDRESS:</b>	S ALU RD WAILUKU, HI 96793
<b>FIRM INDEX DATE:</b>	SEPTEMBER 19, 2012
<b>LETTER OF MAP CHANGE(S):</b>	NONE
<b>FEMA FIRM PANEL(S):</b>	1500030391E
<b>PANEL EFFECTIVE DATE:</b>	SEPTEMBER 25, 2009

<b>PARCEL DATA FROM:</b>	JULY 2013
<b>IMAGERY DATA FROM:</b>	MAY 2005

### IMPORTANT PHONE NUMBERS

<u>County NFIP Coordinator</u>	
County of Maui	
Carolyn Cortez	(808) 270-7253
<u>State NFIP Coordinator</u>	
Carol Tyau-Beam, P.E., CFM	(808) 587-0267

*Disclaimer: The Department of Land and Natural Resources (DLNR) assumes no responsibility arising from the use of the information contained in this report. Viewers/Users are responsible for verifying the accuracy of the information and agree to indemnify the DLNR from any liability, which may arise from its use.*

*If this map has been identified as 'PRELIMINARY' or 'UNOFFICIAL', please note that it is being provided for informational purposes and is not to be used for official/legal decisions, regulatory compliance, or flood insurance rating. Contact your county NFIP coordinator for flood zone determinations to be used for compliance with local floodplain management regulations.*

# **APPENDIX C.**

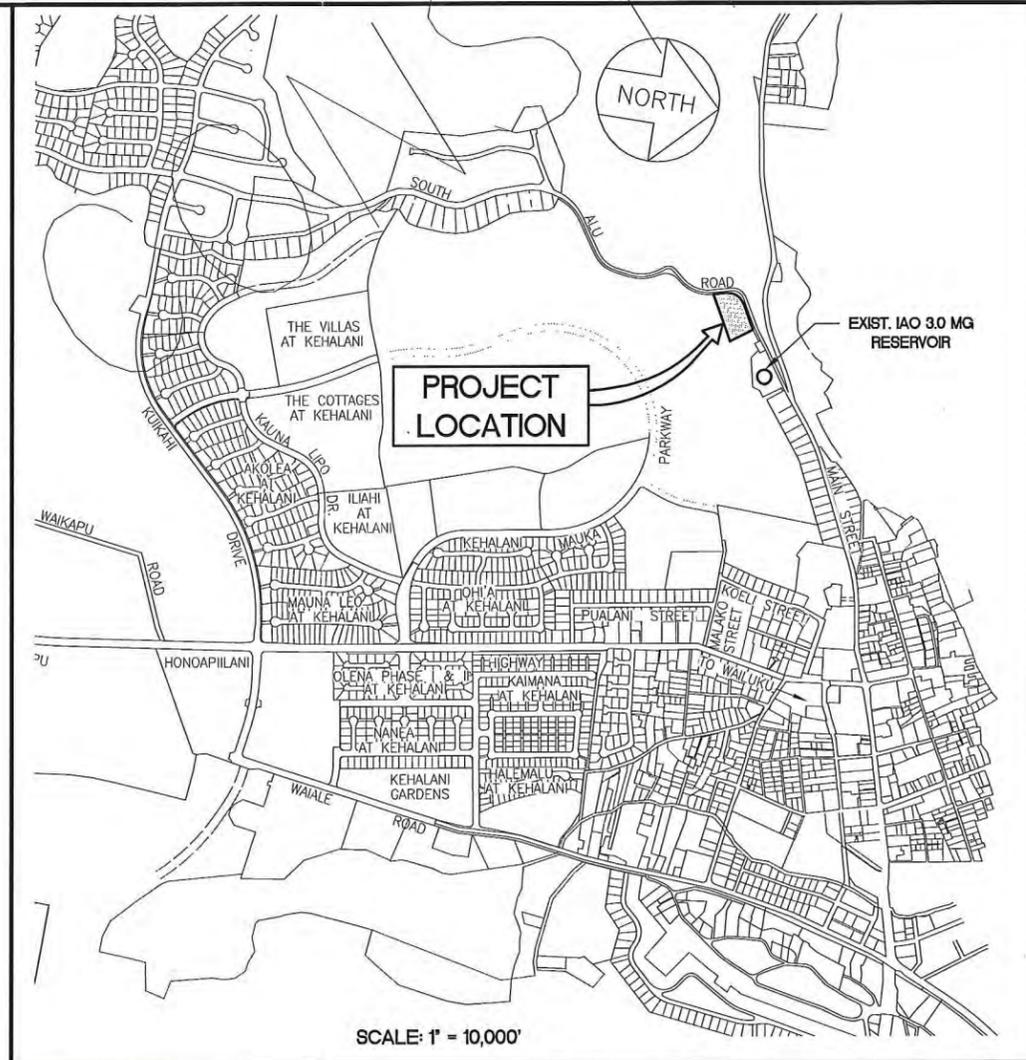
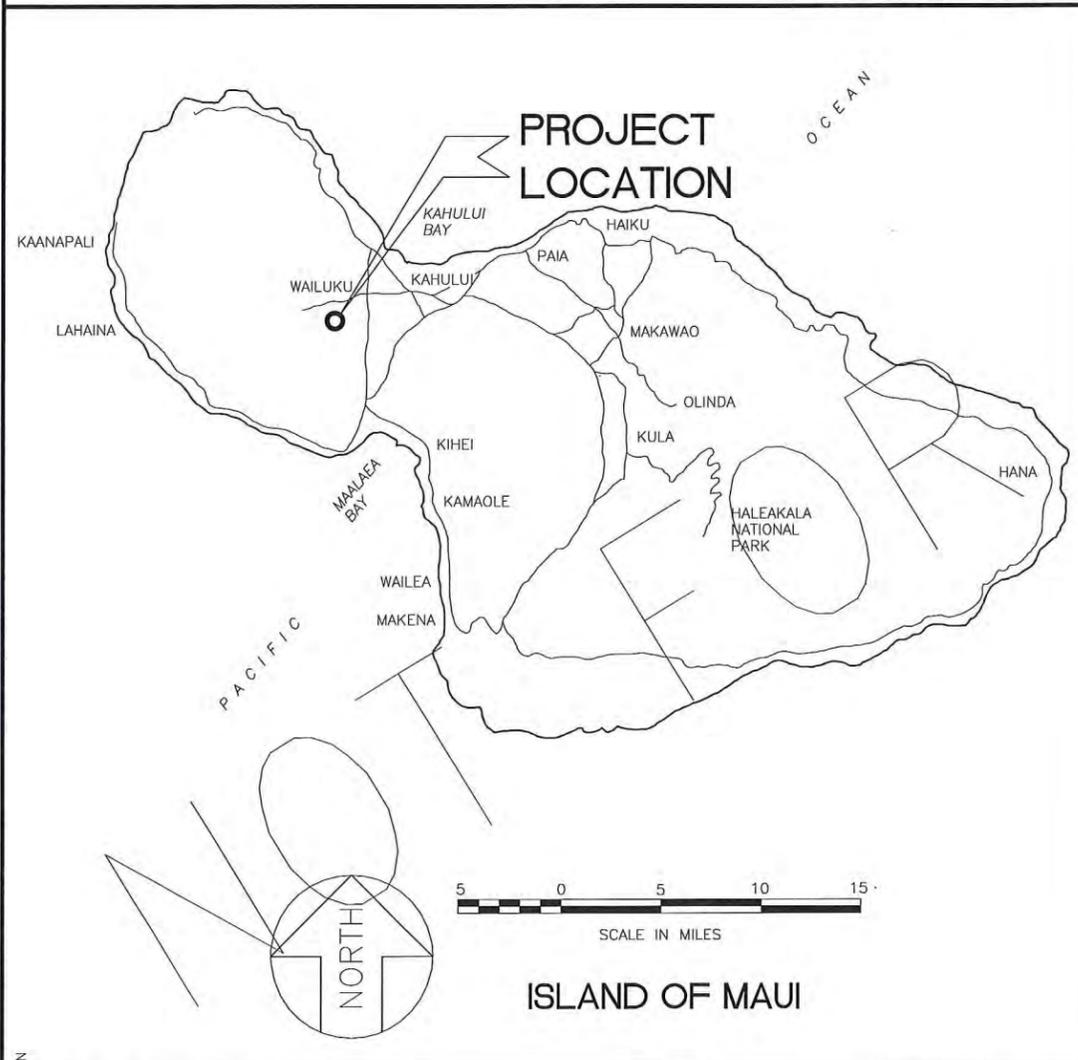
## **Preliminary Plans**

DEPARTMENT OF WATER SUPPLY  
 COUNTY OF MAUI  
 WAILUKU, MAUI, HAWAII  
**IAO SURFACE WATER TREATMENT PLANT UPGRADES**  
 DWS JOB NO. 12-03  
 IAO, MAUI, HAWAII  
 TAX MAP KEY: (2) 3-5-001:067 (PORTION) AND 091 (PORTION)

FOR PRODUCTION

PROJECT LOCATION MAP

APPROVED



CHIEF, ENVIRONMENTAL MANAGEMENT DIVISION  
 DEPARTMENT OF HEALTH, STATE OF HAWAII

DATE

---

DIRECTOR, DEPARTMENT OF WATER SUPPLY  
 COUNTY OF MAUI

DATE

---

COUNTY ENGINEER, DEPARTMENT OF PUBLIC WORKS  
 COUNTY OF MAUI

DATE

Y:\2013\13-002\DESIGN\DRAWINGS\T-1 - TITLE SHEET.DWG Feb 03, 2015 - 2:54 PM

FILE	POCKET	FOLDER	NO.
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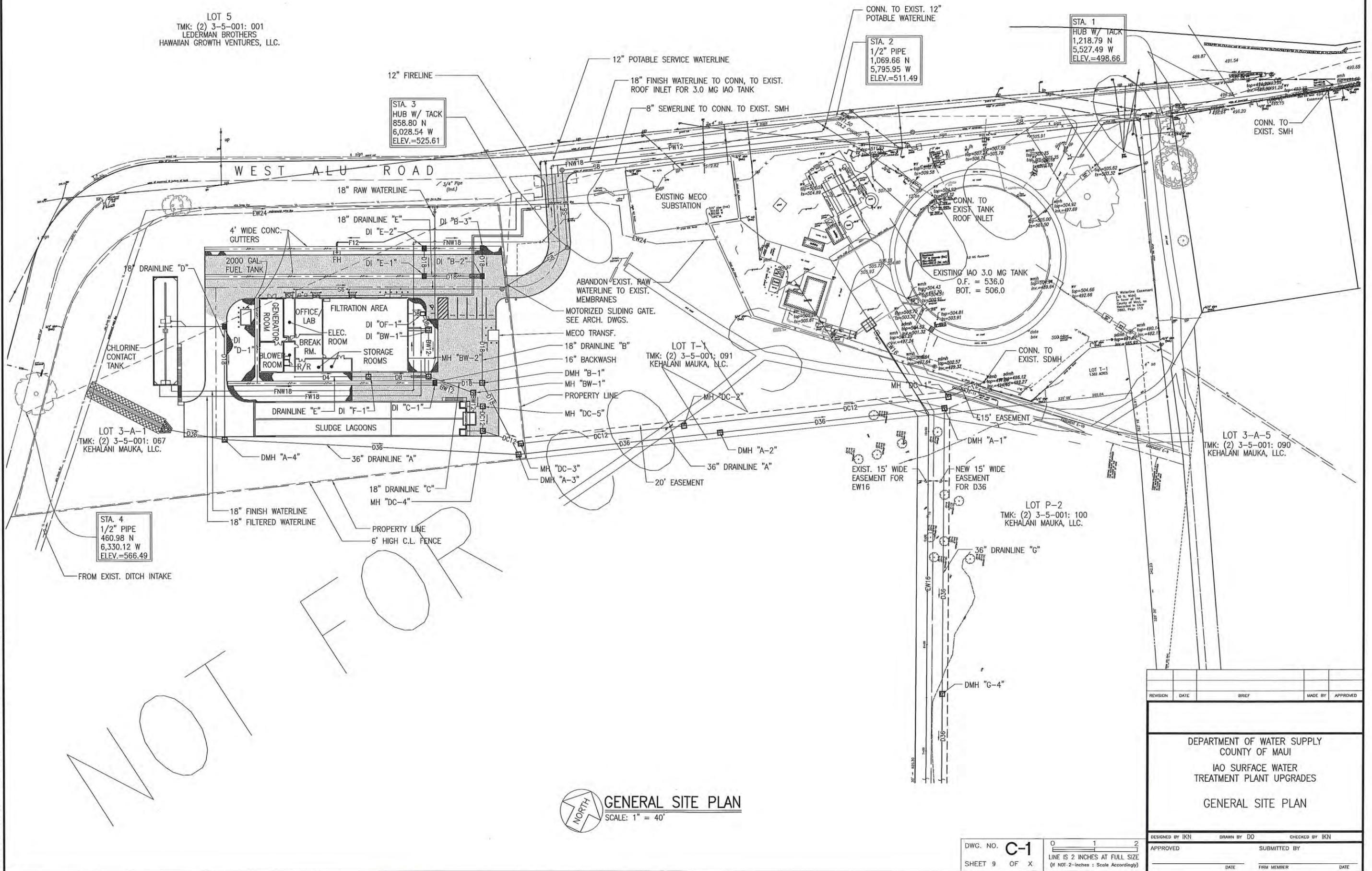
LOT 5  
 TMK: (2) 3-5-001: 001  
 LEDERMAN BROTHERS  
 HAWAIIAN GROWTH VENTURES, LLC.

STA. 3  
 HUB W/ TACK  
 858.80 N  
 6,028.54 W  
 ELEV.=525.61

STA. 2  
 1/2" PIPE  
 1,069.66 N  
 5,795.95 W  
 ELEV.=511.49

STA. 1  
 HUB W/ TACK  
 1,218.79 N  
 5,527.49 W  
 ELEV.=498.66

STA. 4  
 1/2" PIPE  
 460.98 N  
 6,330.12 W  
 ELEV.=566.49



LOT 5  
 TMK: (2) 3-5-001: 001  
 LEDERMAN BROTHERS  
 HAWAIIAN GROWTH VENTURES, LLC.

STA. 3  
 HUB W/ TACK  
 858.80 N  
 6,028.54 W  
 ELEV.=525.61

WEST ALU ROAD

LOT 3-A-1  
 TMK: (2) 3-5-001: 067  
 KEHALANI MAUKA, LLC.

LOT T-1  
 TMK: (2) 3-5-001: 091  
 KEHALANI MAUKA, LLC.

Curve #	Δ	Δ/2	R	T	Ch	Lc
①	93°58'39"	46°59'20"	40.00'	42.88	58.50'	65.61'

**WTP SITE PLAN**  
 SCALE: 1" = 20'

DWG. NO. **C-2**  
 SHEET 10 OF X  
 LINE IS 2 INCHES AT FULL SIZE  
 (IF NOT 2-INCHES : SCALE ACCORDINGLY)

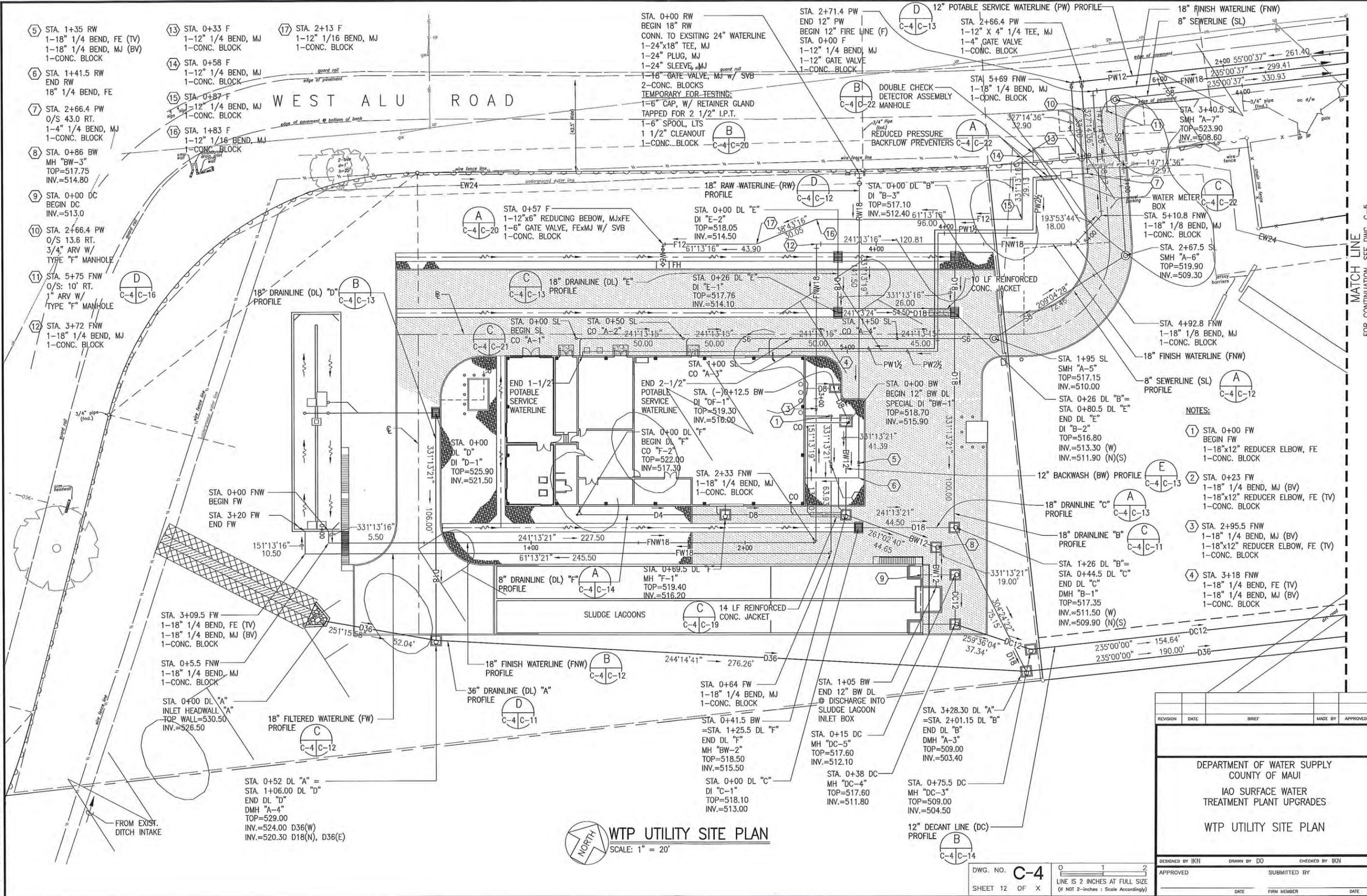
REVISION	DATE	BREF	MADE BY	APPROVED
DEPARTMENT OF WATER SUPPLY COUNTY OF MAUI IAO SURFACE WATER TREATMENT PLANT UPGRADES WTP SITE PLAN				
DESIGNED BY IKN		DRAWN BY DO		CHECKED BY IKN
APPROVED		SUBMITTED BY		
DATE	FIRM MEMBER	DATE		

F:\Y:\2013\13-002\DESIGN\DRAWINGS\C-2 - WTP SITE PLANDWG Feb 03, 2015-1:53 PM

MATCH LINE  
 FOR CONTINUATION, SEE DWG. C-3



FN:\2013\13-002\DESIGN\DRAWINGS\C-4 - WTP UTILITY SITE PLAN.DWG Feb 03, 2015 11:57 PM



FOR CONTINUATION, SEE DWG. C-5

REVISION	DATE	BRIEF	MADE BY	APPROVED

DEPARTMENT OF WATER SUPPLY  
COUNTY OF MAUI  
IAO SURFACE WATER  
TREATMENT PLANT UPGRADES  
WTP UTILITY SITE PLAN

DESIGNED BY IKH	DRAWN BY DO	CHECKED BY IKH
APPROVED	SUBMITTED BY	

DWG. NO. **C-4**  
SHEET 12 OF X  
LINE IS 2 INCHES AT FULL SIZE  
(IF NOT 2-INCHES : SCALE ACCORDINGLY)

FN:\2013\13-002\DESIGN\DRAWINGS\C-5 - UTILITY OFF-SITE PLAN.DWG Feb 03, 2015-2:00 PM

MATCH LINE  
FOR CONTINUATION SEE DWG. C-4

STA. 0+00 PW12  
BEGIN 12" PW  
CONN. TO EXISTING 12" WATERLINE  
1-12"x12" TEE, MJ  
2-12" SPOOLS, PE, 12" LONG  
2-12" SLEEVE, MJ  
1-12" GATE VALVE, MJ, W/SVB  
1-CONC. BLOCK  
TEMPORARY FOR TESTING:  
1-12" CAP, W/ RETAINER GLAND  
TAPPED FOR 4" I.P.T.  
1-12" SPOOL, LTS  
4" CLEANOUT  
1-CONC. BLOCK

TMK (2) 3-5-001:001  
LEDERMAN BROTHERS  
HAWAIIAN GROWTH VENTURES, LLC.

STA. 8+68.4 FNW  
1-18" 1/4 BEND, MJ  
1-CONC. BLOCK

STA. 6+71.5 SL  
SMH "A-8"  
TOP=509.20±  
INV.=502.00

18" FINISH WATERLINE TO  
CONN. TO EXIST. ROOF INLET  
FOR 3.0 MG IAO TANK

12" POTABLE SERVICE  
WATERLINE TO WTP

WEST ALU ROAD  
235'28'21"  
250.00

8" SEWERLINE  
EXISTING MECO  
SUBSTATION  
TMK (2) 3-5-001: 048  
MAUI ELECTRIC CO., LTD.

STA. 0+05 PW  
1-12" 1/8 BEND, MJ  
1-CONC. BLOCK

STA. 9+12.9 FNW  
1-18" 1/8 BEND, MJ  
1-CONC. BLOCK

CONN. TO EXIST. TANK  
ROOF INLET

STA. 9+66.9 FNW  
1-18" 1/4 BEND, MJ,  
W/ RESTRAINED JOINTS  
1-CONC. BLOCK

STA. 9+87.5± FNW  
END FNW  
CONN. TO EXIST. 12"  
1/8 BEND, MJ (TY)

EXISTING IAO TANK  
O.F. = 536.0  
BOT. = 506.0

STA. 9+21.5 SL  
SMH "A-9"  
TOP=498.10±  
INV.=493.00

STA. 10+68± SL  
END SL  
CONNECT TO EXIST. SMH  
TOP=491.66±  
INV.=488.0

LOT 16-A  
TMK (2) 3-5-008:017  
DENNIS I. HINAHARA

LOT WD-3  
TMK (2) 3-5-001:096  
KEHALANI MAUKA, LLC.

C Waterline Easement  
(10 ft. Wide)  
in favor of the  
County of Maui, as  
Recorded in Liber  
2882, Page 113

STA. 5+16± DC12  
CONN. TO EXIST. SDMH  
TOP=497.58±  
INV.=494.50

STA. 2+30 DC12  
MH "DC-2"  
TOP=501.50  
INV.=497.35

12" DECANT  
36" DRAINLINE "A"

STA. 4+80 DC12  
MH "DC-1"  
TOP=498.00  
INV.=494.85

STA. 5+19.30 DL "A"  
DMH "A-2"  
TOP=499.00  
INV.=492.00

STA. 0+00 DL "G"  
=STA. 7+31.30 DL "A"  
END DL "A"  
BEGIN DL "G"  
DMH "A-1"  
TOP=494.50  
INV.=483.80 (IN)  
INV.=481.50 (OUT)

LOT P-2  
TMK (2) 3-5-001: 100  
KEHALANI MAUKA, LLC.

NORTH  
UTILITY OFF-SITE PLAN  
SCALE: 1" = 20'

36" DRAINLINE "C"  
SEE DWG. C-15  
FOR PLAN AND PROFILE

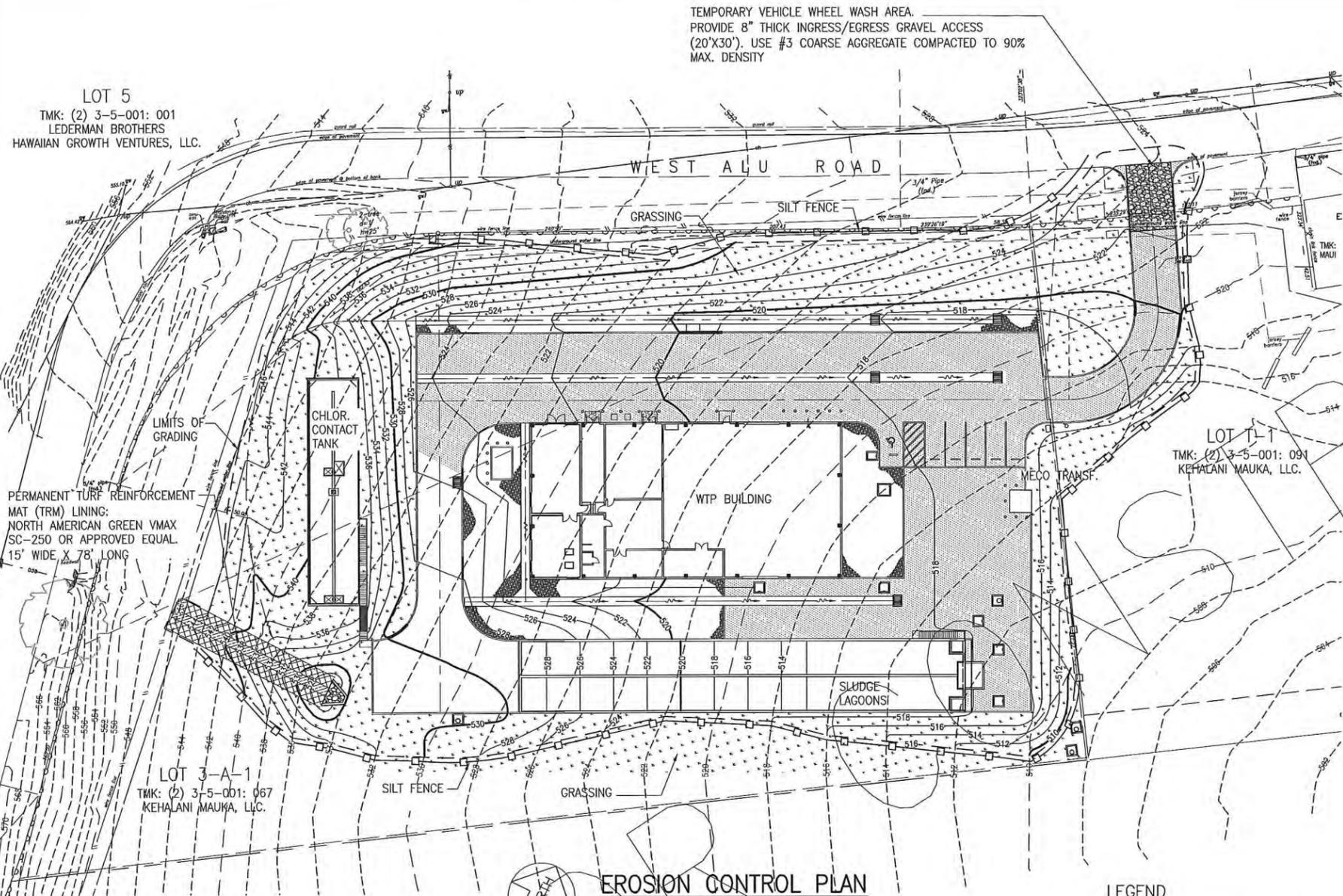
REVISION	DATE	BRIEF	MADE BY	APPROVED
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DEPARTMENT OF WATER SUPPLY  
COUNTY OF MAUI  
IAO SURFACE WATER  
TREATMENT PLANT UPGRADES  
UTILITY OFF-SITE PLAN

DESIGNED BY IKN	DRAWN BY DO	CHECKED BY IKN
APPROVED	SUBMITTED BY	
DATE	FIRM MEMBER	DATE

DWG. NO. C-5  
SHEET 13 OF X  
SCALE: 1" = 20'  
LINE IS 2 INCHES AT FULL SIZE  
(IF NOT 2-INCHES : Scale Accordingly)





TEMPORARY VEHICLE WHEEL WASH AREA.  
 PROVIDE 8" THICK INGRESS/EGRESS GRAVEL ACCESS  
 (20'X30'). USE #3 COARSE AGGREGATE COMPACTED TO 90%  
 MAX. DENSITY

LOT 5  
 TMK: (2) 3-5-001: 001  
 LEDERMAN BROTHERS  
 HAWAIIAN GROWTH VENTURES, LLC.

LOT 1-1  
 TMK: (2) 3-5-001: 091  
 KEHALANI MAUKA, LLC.

PERMANENT TURF REINFORCEMENT  
 MAT (TRM) LINING:  
 NORTH AMERICAN GREEN VMAX  
 SC-250 OR APPROVED EQUAL.  
 15' WIDE X 78' LONG

LOT 3-A-1  
 TMK: (2) 3-5-001: 067  
 KEHALANI MAUKA, LLC.

**MINIMUM BEST MANAGEMENT PRACTICES**

**DRAINAGE.** HANDLE TO CONTROL EROSION, PREVENT DAMAGE TO DOWNSTREAM PROPERTIES AND RETURN TO THE NATURAL DRAINAGE COURSE IN A MANNER WHICH MINIMIZES SEDIMENTATION OR OTHER POLLUTION TO THE MAXIMUM EXTENT PRACTICABLE.

**DUST CONTROL.** CONTROL DUST EMISSIONS TO THE MAXIMUM EXTENT PRACTICABLE THROUGH BMP'S SUCH AS WATER SPRINKLING, DUST FENCES, LIMITING AREA OF DISTURBANCE AND TIMELY GRASSING OF FINISHED AREAS.

**VEGETATION.** RETAIN NATURAL VEGETATION, SPECIALLY GRASSES, WHEREVER FEASIBLE. AVOID STORAGE OR GRUBBED MATERIAL NEAR WATERCOURSES.

**EROSION CONTROL.** STABILIZE ALL DISTURBED AREAS WITH EROSION CONTROL MEASURES SUCH AS VEGETATION, RUNOFF DIVERSION, CHECK DAMS, MULCHING, BLANKETS, BONDED FIBER MATRICES, AND VEHICLE WHEEL WASH FACILITIES.

**SEDIMENT CONTROL.** CAPTURE SEDIMENT TRANSPORTED IN RUNOFF TO MINIMIZE THE SEDIMENT FROM LEAVING THE SITE WITH METHODS SUCH AS SEDIMENT BASIN, SEDIMENT TRAPS, SILT FENCES, SAND BAGS, AND VEGETATED FILTER STRIPS.

**MATERIAL AND WASTE MANAGEMENT.** PROPERLY STORE TOXIC MATERIAL AND PREVENT THE DISCHARGE OF POLLUTANTS ASSOCIATED WITH CONSTRUCTION MATERIALS.

**TIMING OF CONTROL MEASURE IMPLEMENTATION.** TIMING OF CONTROL MEASURES SHALL BE IN ACCORDANCE WITH THE APPROVED EROSION CONTROL PLAN. DISTURBED AREAS OF CONSTRUCTION SITES THAT WILL NOT BE REDISTURBED FOR TWENTY-ONE DAYS OR MORE WILL BE STABILIZED (GRASSED OR GRAVELED) BY NO LATER THAN THE FOURTEENTH DAY AFTER THE LAST DISTURBANCE.

**MATting.** INSTALL EROSION CONTROL MATting FOR ALL SLOPES GREATER THAN 3H:1V.

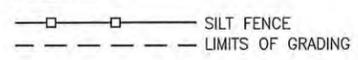
**ADDITIONAL BEST MANAGEMENT PRACTICES (BMP'S):**

1. GRAVEL CONSTRUCTION ENTRANCE FOR EACH INGRESS AND EGRESS.
2. PERIMETER RUNOFF CONTROL.
3. MEASURES TO CONTROL EROSION AND OTHER POLLUTANTS SHALL BE IN PLACE BEFORE ANY EARTH MOVING PHASE OF THE GRADING IS INITIATED.
4. CONTRACTOR SHALL CONSTRUCT PROCESS WATER BASIN TO HAVE PROCESS WATER SUCH AS CHLORINATED WATER, HYDROSTATIC TESTING WATER, WASHWATER AFTER CLEANING CONCRETE TRUCKS, ETC. BE CONTAINED WITHIN THE BASIN AND PERCOLATE INTO THE SOIL.
5. CONTRACTOR AND/OR OWNER SHALL COMPLY WITH CHAPTER 11-55, WATER POLLUTION CONTROL, HAWAII ADMINISTRATION RULES, DEPT. OF HEALTH WHICH REQUIRES AN NPDES PERMIT FOR CERTAIN CONSTRUCTION ACTIVITY.
6. CONTRACTOR SHALL OBTAIN APPROVAL OF A GRADING PHASING PLAN BY THE DEPARTMENT OF PUBLIC WORKS & ENVIRONMENTAL MANAGEMENT PRIOR TO CONSTRUCTION.

**EROSION CONTROL PLAN**

SCALE: 1" = 30'

**LEGEND**

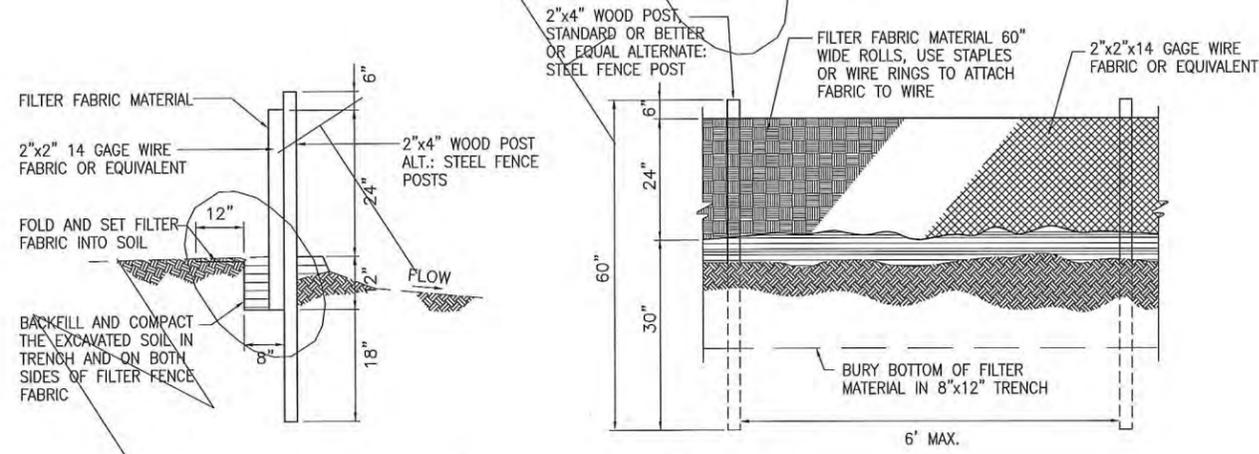


**TEMPORARY EROSION CONTROL MEASURES**

1. TEMPORARY GROUND COVER SHALL BE APPLIED WITHIN A PERIOD OF 30 CALENDAR DAYS AFTER THE SITE HAS BEEN GRADED, OR BARED OF VEGETATION, OR IF FINAL GRADING OF THE SITE WILL BE SUSPENDED FOR MORE THAN 30 CALENDAR DAYS. ALL COST FOR MAINTAINING IRRIGATING AND REMOVING TEMPORARY EROSION CONTROL MEASURES WILL BE BORNE BY THE CONTRACTOR.
2. THE CONTRACTOR MAY USE HYDRO-MULCH TO APPLY THE TEMPORARY GROUND COVER.
3. TEMPORARY GROUND COVER SHALL CONSIST OF 2,000 LBS. PER ACRE WOOD CELLULOSE FIBER MULCH AND 65 LBS. PER ACRE TACKIFIER.

**TEMPORARY DUST CONTROL MEASURES**

1. EXCAVATION, EMBANKMENT AND IMPORTED MATERIALS SHALL BE KEPT DAMPENED WITH WATER DURING THE GRADING OPERATIONS.
2. THE CONTRACTOR SHALL MAINTAIN A SUITABLE WATER SYSTEM AND DAMPEN THE GRADED OR GRUBBED SITE WITH WATER.
3. AT THE END OF EACH DAY, SEVEN (7) DAYS A WEEK, THE PROJECT SITE SHALL BE KEPT DAMP WITH WATER. THE SITE SHALL BE SUFFICIENTLY DAMPENED SO THAT THE SITE WILL REMAIN MOISTENED DURING THE NIGHT.



**SILT FENCE DETAIL A**  
 NOT TO SCALE

REVISION	DATE	BRIEF	MADE BY	APPROVED

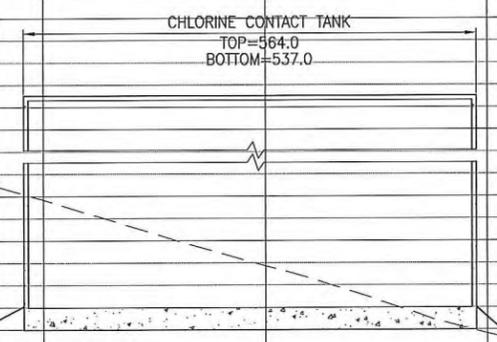
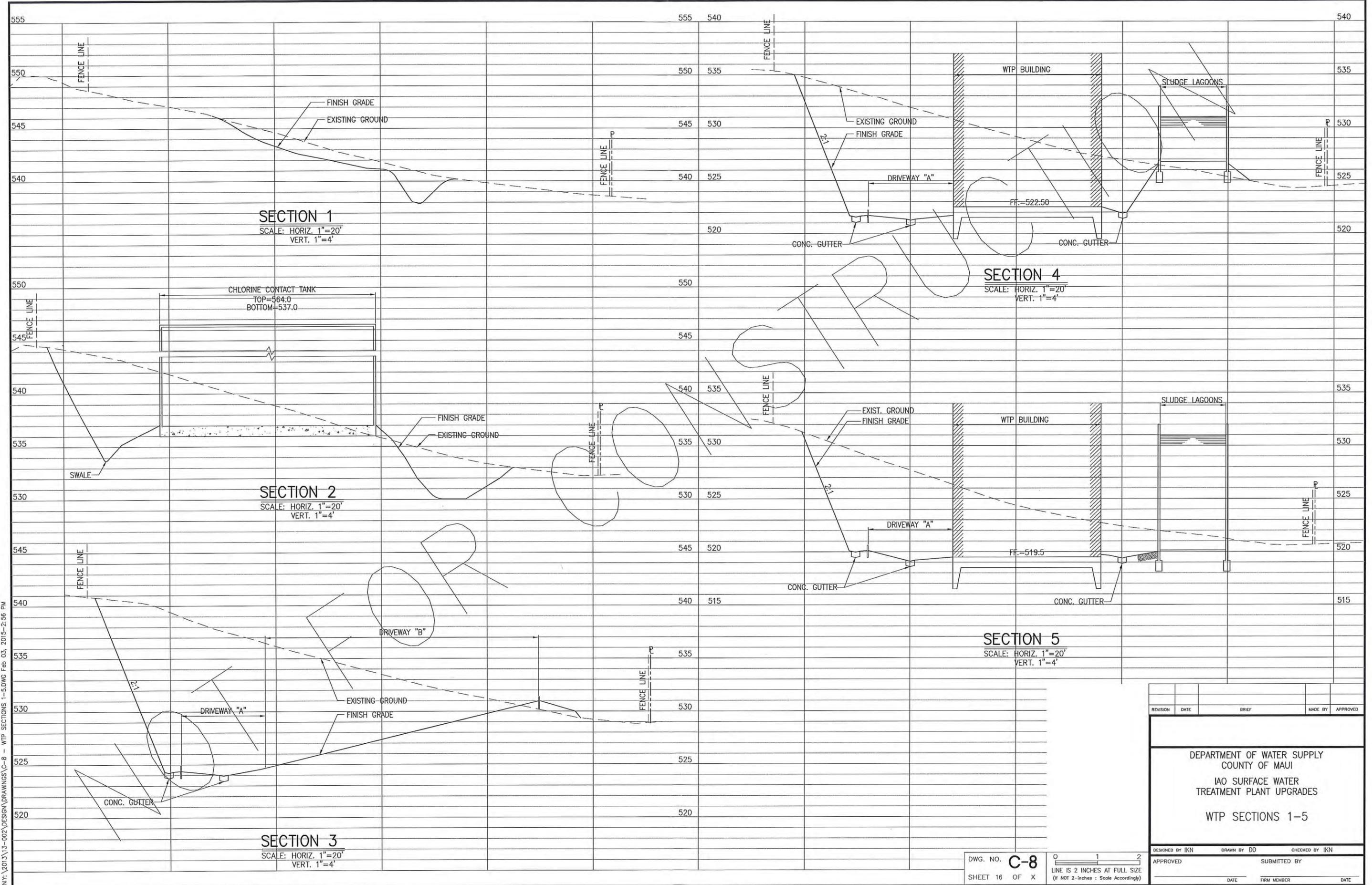
DEPARTMENT OF WATER SUPPLY  
 COUNTY OF MAUI  
 IAO SURFACE WATER  
 TREATMENT PLANT UPGRADES  
**EROSION CONTROL PLAN AND DETAILS**

DESIGNED BY IKN	DRAWN BY DO	CHECKED BY IKN
APPROVED	SUBMITTED BY	

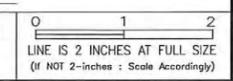
DWG. NO. **C-7**  
 SHEET 15 OF X  
 LINE IS 2 INCHES AT FULL SIZE  
 (IF NOT 2-INCHES : SCALE ACCORDINGLY)

F:\NY\_2013\13-002\DESIGN\DRAWINGS\C-7 - EROSION CONTROL PLAN.DWG Feb 03, 2015-2:03 PM

F:\Y:\2013\13-002\DESIGN\DRAWINGS\C-8 - WTP SECTIONS 1-5.DWG Feb 03, 2015-2:56 PM



DWG. NO. **C-8**  
 SHEET 16 OF X



REVISION	DATE	BRIEF	MADE BY	APPROVED

DEPARTMENT OF WATER SUPPLY  
 COUNTY OF MAUI  
 IAO SURFACE WATER  
 TREATMENT PLANT UPGRADES  
 WTP SECTIONS 1-5

DESIGNED BY IKN	DRAWN BY DO	CHECKED BY IKN
APPROVED	SUBMITTED BY	
	DATE	FIRM MEMBER
		DATE

F:\Y:\2013\13-002\DESIGN\DRAWINGS\C-9 - WTP SECTIONS 6-9.DWG Feb 03, 2015--2:57 PM



**SECTION 6**  
 SCALE: HORIZ. 1"=20'  
 VERT. 1"=4'

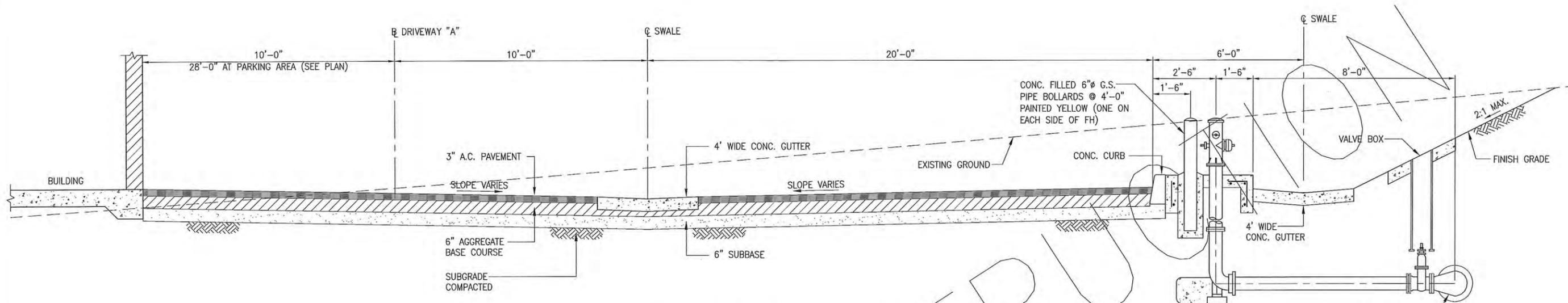
**SECTION 8**  
 SCALE: HORIZ. 1"=20'  
 VERT. 1"=4'

**SECTION 7**  
 SCALE: HORIZ. 1"=20'  
 VERT. 1"=4'

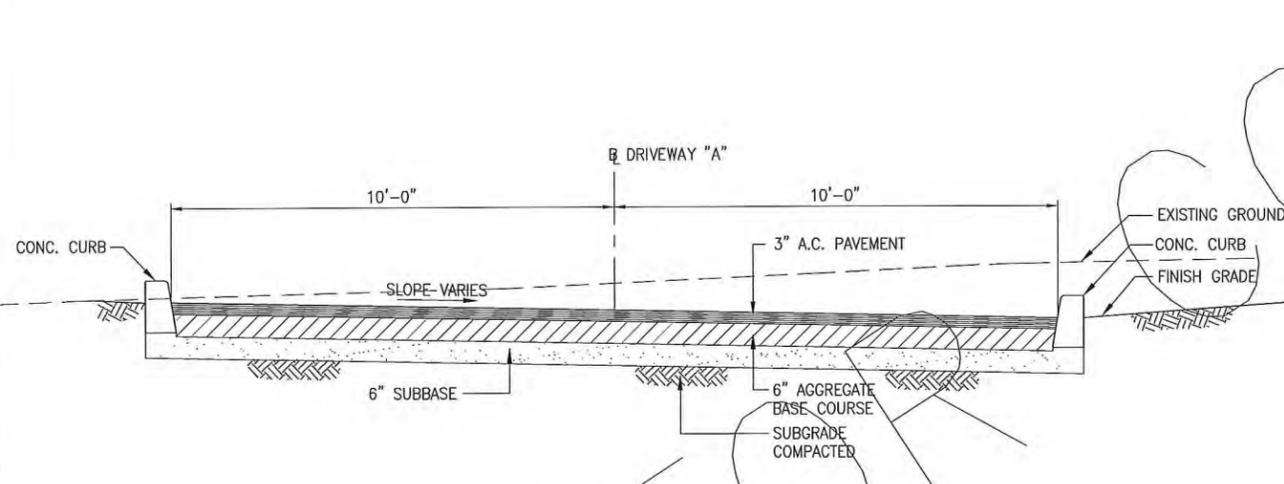
**SECTION 9**  
 SCALE: HORIZ. 1"=20'  
 VERT. 1"=4'

REVISION	DATE	BRIEF	MADE BY	APPROVED
DEPARTMENT OF WATER SUPPLY COUNTY OF MAUI IAO SURFACE WATER TREATMENT PLANT UPGRADES  WTP SECTIONS 6-9				
DESIGNED BY IKN		DRAWN BY DO		CHECKED BY IKN
APPROVED		SUBMITTED BY		

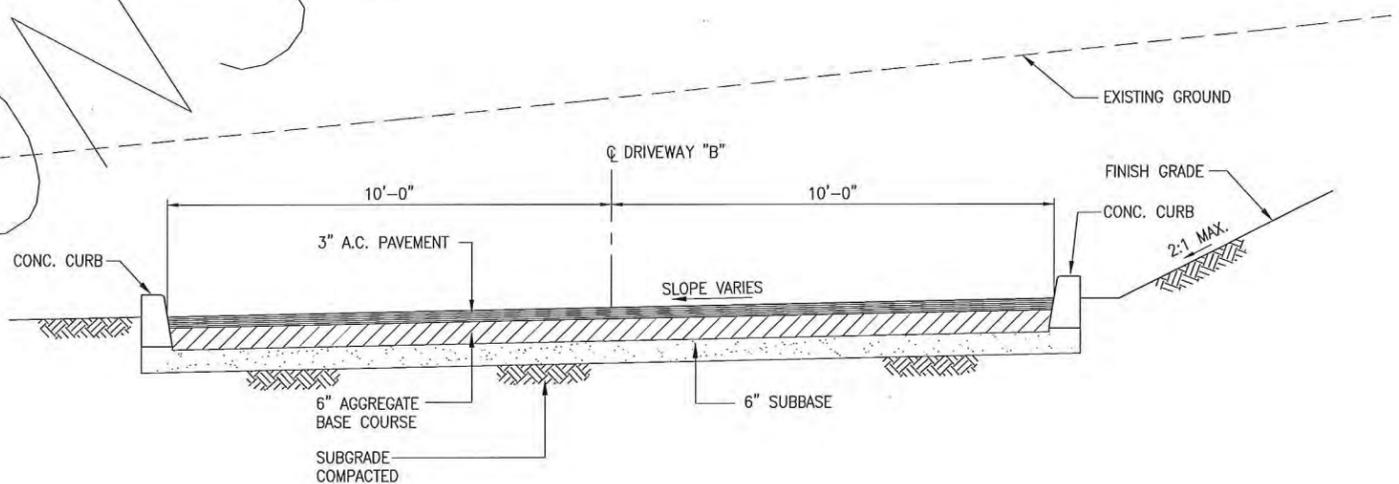
DWG. NO. **C-9**  
 SHEET 17 OF X  
 0 1 2  
 LINE IS 2 INCHES AT FULL SIZE  
 (IF NOT 2-INCHES : SCALE ACCORDINGLY)



**DRIVEWAY "A" TYPICAL SECTION FROM CHAIN LINK GATE TO END** (A)  
SCALE: 1/2"=1'-0"  
C-10



**DRIVEWAY "A" TYPICAL SECTION STA. 0+00 TO CHAIN LINK GATE** (B)  
SCALE: 1/2"=1'-0"  
C-10



**DRIVEWAY "B" TYPICAL SECTION** (C)  
SCALE: 1/2"=1'-0"  
C-10

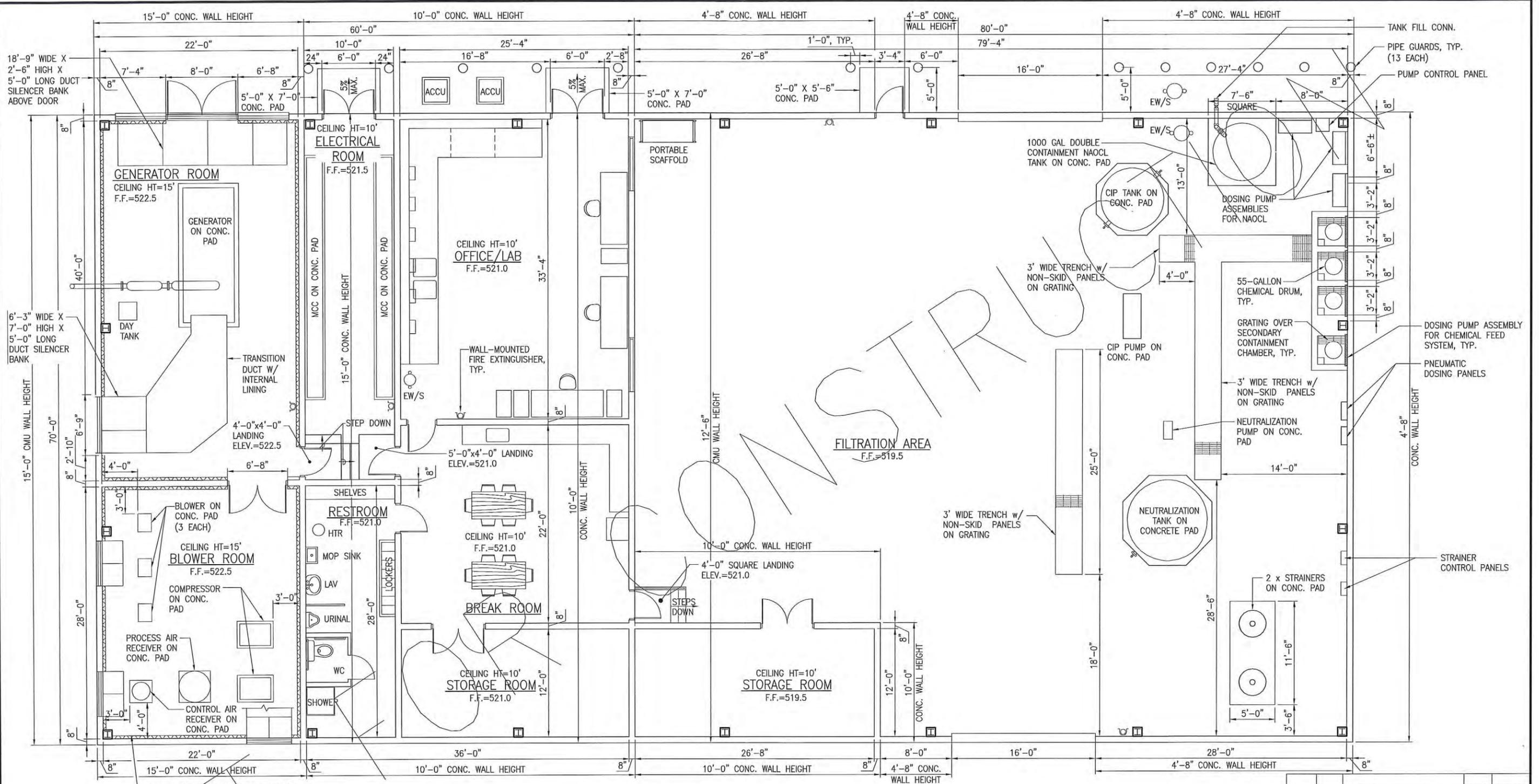
F:\Y:\2013\13-002\DESIGN\DRAWINGS\C-10 - ROAD A AND B TYPICAL SECTIONS.DWG Feb 03, 2015-2:03 PM

NO

REVISION	DATE	BRIEF	MADE BY	APPROVED
DEPARTMENT OF WATER SUPPLY COUNTY OF MAUI IAO SURFACE WATER TREATMENT PLANT UPGRADES  DRIVEWAY "A" AND DRIVEWAY "B" TYPICAL SECTIONS				
DESIGNED BY IKN		DRAWN BY DO		CHECKED BY IKN
APPROVED		SUBMITTED BY		

DWG. NO. **C-10**  
SHEET X OF X  
 0 1 2  
 LINE IS 2 INCHES AT FULL SIZE  
 (IF NOT 2-INCHES : SCALE ACCORDINGLY)

F:\NY\_2013\13-002\DESIGN\DRAWINGS\A-1 - PRELIMINARY FLOOR PLAN.DWG Feb 03, 2015-2:08 PM



**NOTE:**  
CONCRETE PAD DIMENSIONS ARE APPROXIMATE AND SUBJECT TO REVISION BASED ON REQUIREMENTS OF EQUIPMENT TO BE FURNISHED



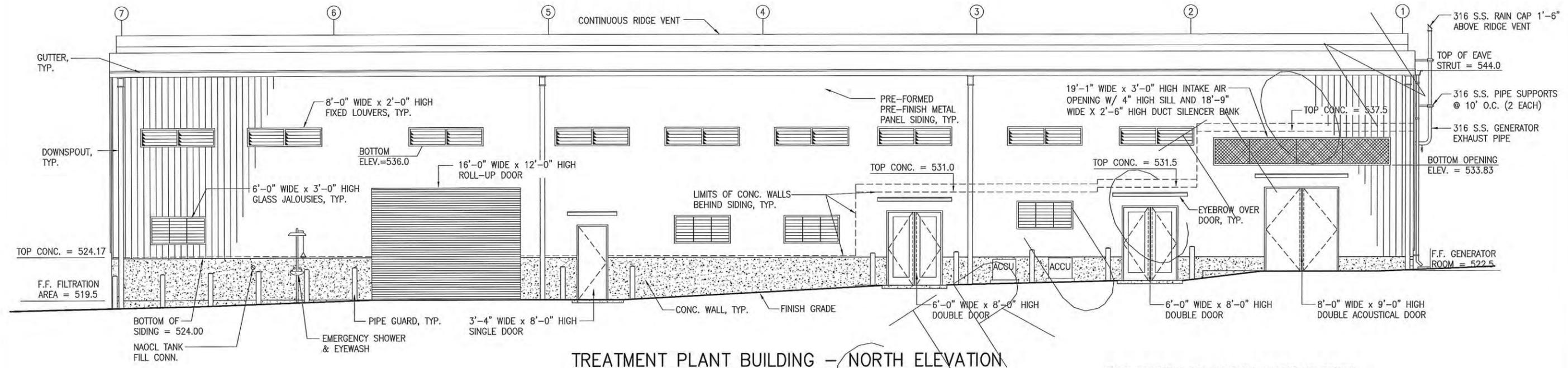
**TREATMENT PLANT BUILDING - PRELIMINARY FLOOR PLAN**  
SCALE: 3/16"=1'-0"

REVISION	DATE	BRIEF	MADE BY	APPROVED

DEPARTMENT OF WATER SUPPLY  
COUNTY OF MAUI  
IAO SURFACE WATER  
TREATMENT PLANT UPGRADES  
TREATMENT PLANT BUILDING  
PRELIMINARY FLOOR PLAN

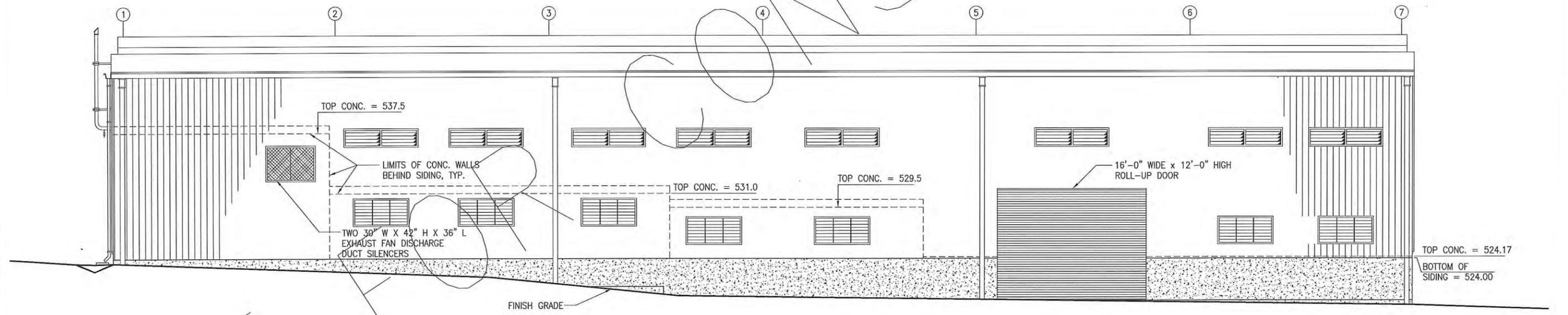
DWG. NO. **A-1**  
SHEET X OF X  
LINE IS 2 INCHES AT FULL SIZE  
(IF NOT 2-INCHES : Scale Accordingly)

DESIGNED BY IKN DRAWN BY DO CHECKED BY IKN  
APPROVED SUBMITTED BY  
DATE FIRM MEMBER DATE



**TREATMENT PLANT BUILDING – NORTH ELEVATION**  
 SCALE: 3/16"=1'-0"

NOTE: DIMENSIONS FOR DOORS AND LOUVERS ARE OPENING SIZES IN CMU WALL/METAL PANEL SIDING.



**TREATMENT PLANT BUILDING – SOUTH ELEVATION**  
 SCALE: 3/16"=1'-0"

F:\Y:\2013\13-002\DESIGN\DRAWINGS\A-2 - ELEVATIONS.DWG Feb. 03, 2015 - 2:38 PM

NOT

REVISION	DATE	BRIEF	MADE BY	APPROVED
DEPARTMENT OF WATER SUPPLY COUNTY OF MAUI IAO SURFACE WATER TREATMENT PLANT UPGRADES  TREATMENT PLANT BUILDING ELEVATIONS – NORTH AND SOUTH				
DESIGNED BY IKN		DRAWN BY DO		CHECKED BY IKN
APPROVED		SUBMITTED BY		

DWG. NO. **A-2**  
 SHEET X OF X

0 1 2  
 LINE IS 2 INCHES AT FULL SIZE  
 (IF NOT 2-INCHES : Scale Accordingly)



FW:\2013\13-002\DESIGN\DRAWINGS\A-4 - SITE ELEVATIONS.DWG Feb 03, 2015- 2:45 PM

SLUDGE LAGOON RAILING (BEYOND)

INLET BOX

SLUDGE LAGOONS (BEYOND)

FINISH GRADE

TREATMENT PLANT BUILDING

TOP = 548.0

ACCESS ROAD BEYOND

TOP = 564.0

CHLORINE CONTACT TANK

FINISH GRADE

ACCESS ROAD

### TREATMENT PLANT SITE - NORTH ELEVATION

SCALE: 3/32"=1'-0"

CHLORINE CONTACT TANK

ACCESS ROAD

TREATMENT PLANT BUILDING (BEYOND)

SLUDGE LAGOON RAILING

FINISH GRADE

SLUDGE LAGOONS

INLET BOX

### TREATMENT PLANT SITE - SOUTH ELEVATION

SCALE: 3/32"=1'-0"

NOT FOR CONSTRUCTION

REVISION	DATE	BRIEF	MADE BY	APPROVED

DEPARTMENT OF WATER SUPPLY  
 COUNTY OF MAUI  
 IAO SURFACE WATER  
 TREATMENT PLANT UPGRADES  
 TREATMENT PLANT SITE ELEVATIONS

DESIGNED BY IKN	DRAWN BY DO	CHECKED BY IKN
APPROVED	SUBMITTED BY	

DWG. NO. **A-4**  
 SHEET X OF X  
 0 1 2  
 LINE IS 2 INCHES AT FULL SIZE  
 (IF NOT 2-INCHES : SCALE ACCORDINGLY)

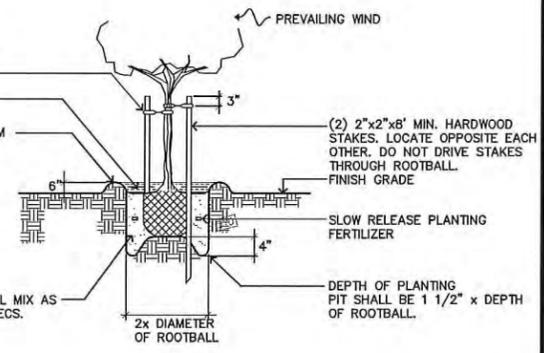
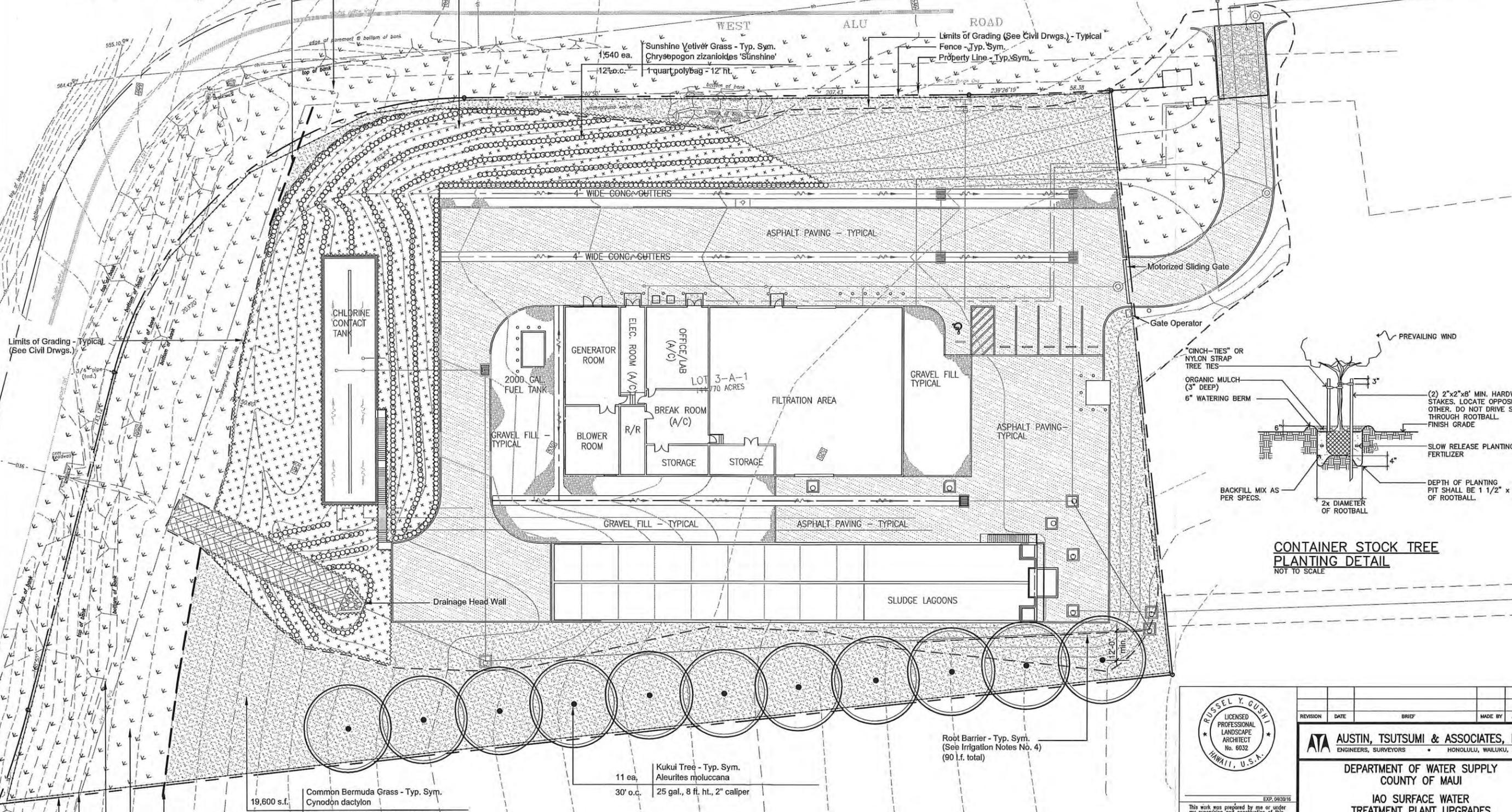
Existing 'Naturalized' Vegetation to Remain  
Typ. Sym.

Limits of Grassing - Typ. Sym.

15,200 s.f.  
Common Bermuda Grass/Annual Rye Grass Mixture - Typ. Sym.  
Cynodon dactylon/Lolium multiflorum, Respectively  
4 Parts Common Bermuda Grass to 1 Part Annual Rye Grass  
Seeded @ Rate of 5 lbs./1,000 s.f.

1,540 ea.  
Sunshine Vetiver Grass - Typ. Sym.  
Chrysopogon zizanioides 'Sunshine'  
12' o.c.  
1 quart polybag - 12" ht.

Limits of Grading (See Civil Drwgs.) - Typical  
Fence - Typ. Sym.  
Property Line - Typ. Sym.



11 ea.  
30' o.c.  
Kukui Tree - Typ. Sym.  
Aleurites moluccana  
25 gal., 8 ft. ht., 2\"/>

19,600 s.f.  
Common Bermuda Grass - Typ. Sym.  
Cynodon dactylon  
Seeded @ rate of 4 lbs./1,000 s.f.

**PLANTING PLAN**  
SCALE: 1" = 20'  
NORTH

**ADVANCE COPY**  
**NOT FOR CONSTRUCTION**  
February 17, 2015



EXP. 04/30/16  
This work was prepared by me or under my supervision and construction of this project will be under my observation. (Observation of construction as defined in Chapter 19-115, Subchapter 1, Definitions of the Hawaii Administrative Rules, Professional Engineers, Architects, Surveyors, and Landscape Architects.)

REVISION	DATE	BRIEF	MADE BY	APPROVED

**AUSTIN, TSUTSUMI & ASSOCIATES, INC.**  
ENGINEERS, SURVEYORS • HONOLULU, WAILUKU, HAWAII

**DEPARTMENT OF WATER SUPPLY**  
**COUNTY OF MAUI**  
**IAO SURFACE WATER**  
**TREATMENT PLANT UPGRADES**

**PLANTING PLAN + DETAIL**

DESIGNED BY RYG	DRAWN BY RYG/MA	CHECKED BY RYG
APPROVED	APPROVED	APPROVED
DATE	DATE	DATE

FILE	POCKET	FOLDER	NO.
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DWG. NO. **L-3**  
SHEET 12 OF X  
0 1 2  
LINE IS 2 INCHES AT FULL SIZE  
(IF NOT 2-INCHES : SCALE ACCORDINGLY)

## **APPENDIX D.**

# **Biological Resources Survey**

**BIOLOGICAL RESOURCES SURVEY  
IAO WATER TREATMENT FACILITY PROJECT  
WAILUKU, MAUI, HAWAII**

by

**ROBERT W. HOB DY  
ENVIRONMENTAL CONSULTANT  
Kokomo, Maui  
August 2013**

**Prepared for:  
Department of Water Supply  
County of Maui**

**BIOLOGICAL RESOURCES SURVEY  
IAO WATER TREATMENT FACILITY PROJECT  
Wailuku, Maui, Hawaii**

**INTRODUCTION**

The Iao Water Treatment Facility Project is situated on the upper west edge of Wailuku Town adjacent to West Alu Road (see Figures 1 & 2). The project area is approximately 2.3 acres in size (TMK (2) 3-5-01:067). It lies adjacent to and just above the existing Iao Water Tank site and a Maui Electric Company substation on undeveloped land. This study was initiated in fulfillment of environmental requirements of the planning process.

**SITE DESCRIPTION**

The project area lies on former agricultural land, now fallow, that slopes gently down to the east from the West Maui Mountains at elevations ranging from 575 feet down to 515 feet above sea level. The vegetation consists of a dense growth of tall grasses with a few trees and shrubs. The soil is categorized as Wailuku Silty Clay, 3 to 7% slopes (WvB) which is a deep, well-drained, dark reddish-brown soil developed from alluvium from Iao Valley (Foote et al, 1972). Rainfall averages about 30 inches per year with the bulk falling during a few winter storms.

**BIOLOGICAL HISTORY**

The original vegetation in this area consisted of a dense low statured native forest and shrubland with such components as 'ōhi'a (*Metrosideros polymorpha*), 'a'ali'i (*Dodonaea viscosa*), olopua (*Nestegis sandwicensis*), lama (*Diospyros sandwicensis*), halapepe (*Pleomele auwahiensis*), and a variety of ferns, vines and herbaceous plants.

Hawaiians lived in the area for several centuries, farming in the valley bottoms and lowlands and utilizing forest plants for food, construction materials, weapons, fiber and medicines. They altered the landscape somewhat through cultivation and burning.

During the mid 1800s this area was cleared for sugar cane agriculture and the area was cleared, plowed, planted, burned and harvested in continuous cycles for over 100 years. Native ecosystems were replaced by sugar cane and increasing numbers of agricultural weeds.

When sugar production ended in the 1990s this area was converted to cattle grazing. All of these practices, along with recent fires that have swept through the grass lands, have resulted in an environment that is now nearly totally lacking in native plants and animal species.

## **SURVEY OBJECTIVES**

This report summarizes the findings of a flora and fauna survey of the proposed Iao Water Treatment Facility Project which was conducted in August 2013. The objectives of the survey were to:

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

## **BOTANICAL SURVEY REPORT**

### **SURVEY METHODS**

A walk-through botanical survey method was used for covering the entire project area. An inventory was made on plant species, distribution and abundance and notes were made on terrain and substrate.

### **DESCRIPTION OF THE VEGETATION**

The vegetation within the project area was dominated by one large and densely growing grass, Guinea grass (*Megathyrsus maximus*) which covers the whole area. Two common shrub species included koa haole (*Leucaena leucocephala*) and opiuma (*Pithecellobium dulce*). Four uncommon species of note included swollen fingergrass (*Chloris barbata*), Natal redtop (*Melinis repens*), gycine (*Neonotonia wightii*) and common guava (*Psidium guajava*).

A total of 40 plant species were recorded during the survey. Just one of these was a common dry land native plant, the 'uhaloa (*Waltheria indica*), which is widespread in Hawaii and on many other Pacific islands. The remaining 39 species were pasture plants or agricultural weeds. Many of the smaller species grew along the margins of the project area or in small clearings.

### **DISCUSSION AND RECOMMENDATIONS**

The vegetation throughout the project area is dominated by non-native species that are of no particular environmental interest or concern. Just one common indigenous plant, 'uhaloa, was found growing in a recently disturbed area. No federally listed Endangered or Threatened plant species (USFWS, 2013) were found, nor do any plants that are candidates for such status occur on the project area. No special plant habitats occur on or near the project and no potential wetlands occur in this dry upland site.

This project is not expected to have any significant negative impacts on the botanical resources in this part of West Maui. No recommendations regarding botanical resources are deemed necessary or appropriate.

## PLANT SPECIES LIST

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

For each species, the following information is provided:

1. Scientific name with author citation
2. Common English or Hawaiian name.
3. Bio-geographical status. The following symbols are used:

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

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

Polynesian = all those plants brought to Hawaii during the course of Polynesian migrations.

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

4. Abundance of each species within the project area:

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

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

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

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

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
<b>MONOCOTS</b>			
ASPARAGACEAE (Asparagus Family)			
<i>Asparagus plumosus</i> J.G. Baker	climbing asparagus fern	non-native	rare
POACEAE (Grass Family)			
<i>Chloris barbata</i> (L.) Sw.	swollen fingergrass	non-native	uncommon
<i>Cynodon dactylon</i> (L.) Pers.	Bermuda grass	non-native	rare
<i>Digitaria violascens</i> Link	smooth crabgrass	non-native	rare
<i>Eleusine indica</i> (L.) Gaertn.	wiregrass	non-native	rare
<i>Eragrostis pectinacea</i> (Michx.) Nees	Carolina lovegrass	non-native	rare
<i>Megathyrsus maximus</i> (Jacq.) Simon & Jacobs	Guinea grass	non-native	abundant
<i>Melinis repens</i> (Willd.) Zizka	Natal redtop	non-native	uncommon
<i>Urochloa subquadrifera</i> (Trin.) Webster	-----	non-native	rare
<b>DICOTS</b>			
ACANTHACEAE (Acanthus Family)			
<i>Asystasia gangetica</i> (L.) T. Anderson	Chinese violet	non-native	rare
<i>Thunbergia fragrans</i> Roxb.	white thunbergia	non-native	rare
AMARANTHACEAE (Amaranth Family)			
<i>Alternanthera pungens</i> Kunth	khaki weed	non-native	rare
<i>Amaranthus spinosus</i> L.	spiny amaranth	non-native	rare
ANACARDIACEAE (Mango Family)			
<i>Schinus terebinthifolius</i> Raddi	Christmas berry	non-native	rare
ASTERACEAE (Sunflower Family)			
<i>Calyptocarpus vialis</i> Less.	straggler daisy	non-native	rare
<i>Emilia fosbergii</i> Nicolson	red pualele	non-native	rare
<i>Tridax procumbens</i> L.	coat buttons	non-native	rare
<i>Verbesina encelioides</i> (Cav.) Benth. & Hook.	golden crown-beard	non-native	rare
BIGNONIACEAE (Bignonia Family)			
<i>Spathodea campanulata</i> P. Beauv.	African tulip tree	non-native	uncommon
BORAGINACEAE (Borage Family)			
<i>Heliotropium amplexicaule</i> Vahl	summer heliotrope	non-native	uncommon
<i>Heliotropium procumbens</i> Mill.	four-spike heliotrope	non-native	rare
CASUARINACEAE (She-oak Family)			
<i>Casuarina equisetifolia</i> L.	common ironwood	non-native	rare
EUPHORBIACEAE (Spurge Family)			
<i>Euphorbia hirta</i> L.	hairy spurge	non-native	rare
<i>Ricinus communis</i> L.	Castor bean	non-native	rare
FABACEAE (Pea Family)			
<i>Chamaecrista nictitans</i> (L.) Moench	partridge pea	non-native	uncommon
<i>Crotalaria retusa</i> L.	rattlepod	non-native	rare
<i>Desmodium tortuosum</i> (Sw.) DC.	Florida beggarweed	non-native	rare
<i>Indigofera hendecaphylla</i> Jacq.	creeping indigo	non-native	rare
<i>Leucaena leucocephala</i> (Lam.) de Wit	koa haole	non-native	common
<i>Neonotonia wightii</i> (Wight & Arnott) Lackey	glycine	non-native	uncommon

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
<i>Pithecellobium dulce</i> (Roxb.) Benth.	'ōpiuma	non-native	common
MALVACEAE (Mallow Family)			
<i>Malvastrum coromandelianum</i> (L.) Garcke	false mallow	non-native	rare
<i>Waltheria indica</i> L.	'uhaloa	indigenous	rare
MYRTACEAE (Myrtle Family)			
<i>Eucalyptus robusta</i> Sm.	swamp mahogany	non-native	rare
<i>Psidium guajava</i> L.	common guava	non-native	uncommon
<i>Syzygium cumini</i> (L.) Skeels	Java plum	non-native	rare
NYCTAGINACEAE (Four-o'clock Family)			
<i>Boerhavia coccinea</i> Mill.	scarlet spiderling	non-native	rare
PASSIFLORACEAE (Passion Flower Family)			
<i>Passiflora suberosa</i> L.	cork-bark passion flower	non-native	rare
PROTEACEAE (Protea Family)			
<i>Grevillea robusta</i> A. Cunn. ex R.Br.	silk oak	non-native	rare
SOLANACEAE (Nightshade Family)			
<i>Solanum torvum</i> Sw.	pea aubergine	non-native	rare

## FAUNA SURVEY REPORT

### SURVEY METHODS

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

### RESULTS

#### MAMMALS

Just one non-native mammal, the mongoose (*Herpestes auropunctatus*) was observed during two site visits to the project area. Taxonomy and nomenclature follow Tomich (1986). Deep dense grass made it difficult to see small terrestrial mammals but one would expect there to also be mice (*Mus domesticus*), rats (*Rattus* spp.) and perhaps feral cats (*Felis catus*) in the project area.

A special effort was made to look for the native Hawaiian hoary bat by making an evening survey of the area. When present in an area these bats can be easily identified as they forage for insects, their distinctive flight patterns clearly visible in the glow of twilight. No evidence of such activity was observed though visibility was excellent. In addition a bat detecting device (Batbox IID) was used, set to the frequency of 27,000 to 28,000 hertz which is the typical range within which these bats are known to echolocate. No activity was detected using this device.

#### BIRDS

Birdlife was rather sparse in and around the project area due to the lack of habitat diversity and food resources. Just six species of non-native birds were recorded during two site visits. Taxonomy and nomenclature follow American Ornithologists' Union (2011). Uncommon were zebra dove (*Geopelia striata*), spotted dove (*Streptopelia chinensis*), common myna (*Acridotheres tristis*) and house finch (*Carpodacus mexicanus*), while Japanese white-eye (*Zosterops japonicus*) and gray francolin (*Francolinus pondicerianus*) were rare. A number of other bird species might be expected to frequent this area including, the nutmeg mannikin (*Lonchura punctulata*), chestnut mannikin (*Lonchura malacca*), house sparrow (*Passer domesticus*) and northern cardinal (*Cardinalis cardinalis*). This habitat is not suitable for Hawaii's native forest birds that occur only at higher elevations beyond the range of mosquitoes and the avian diseases they carry and transmit.

#### REPTILES

One reptile, the mourning gecko (*Lepidodactylus lugubris*) was heard calling at dusk during the evening survey.

## INSECTS

A few insect species were seen in the project area during two site visits. Eight species were recorded, representing five insect Orders. Taxonomy and nomenclature follow Nishida et al (1992). Most common were the honey bee (*Apis mellifera*) and the dung fly (*Musca sorbens*). Less common were the Sonoran carpenter bee (*Xylocopa sonorina*), passion flower butterfly (*Agraulis vanillae*) and the large orange sulphur butterfly (*Phoebis agarithe*). One native insect was seen, the green darner dragonfly (*Anax junius*). This indigenous dragonfly is widespread throughout Hawaii and is also found throughout much of North America.

Looked for but not seen was the Endangered Blackburn's sphinx moth (*Manduca blackburni*). None of this moth's specific host plants occur within the project area and no moth's or their larvae were seen.

## DISCUSSION AND RECOMMENDATIONS

The wildlife within and around this project area is composed almost entirely of non-native species. Of a total of 1 mammal, 6 birds, 1 reptile, 8 insects, only one indigenous dragonfly, the green darner (*Anax junius*) was recorded. This dragonfly which is widespread in Hawaii also occurs on the American mainland.

No Endangered or Threatened native animals were found during the survey, nor were any found that are candidates for such status. No special wildlife habitats were found either.

As a result of these findings, it is determined that there is little of environmental concern with regard to animal life within the proposed project. The development of this proposed project is not expected to have a significant negative impact on the native wildlife resources in this part of West Maui.

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

## ANIMAL SPECIES LIST

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

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

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

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

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

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

4. Abundance of each species within the project area:

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

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

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

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

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
<b>MAMMALS</b>			
<i>Herpestes auropunctatus</i> Hodgson	mongoose	non-native	rare
<b>BIRDS</b>			
<i>Geopelia striata</i> L.	zebra dove	non-native	uncommon
<i>Streptopelia chinensis</i> Scopoli	spotted dove	non-native	uncommon
<i>Acridotheres tristis</i> L.	common myna	non-native	uncommon
<i>Carpodacus mexicanus</i> Muller	house finch	non-native	uncommon
<i>Zosterops japonicus</i> Temmink & Schlegel	Japanese white-eye	non-native	rare
<i>Francolinus pondicerianus</i> Gmelin	gray francolin	non-native	rare
<b>REPTILES</b>			
<i>Lepidodactylus lugubris</i> Dumeril & Bibron	mourning gecko	non-native	rare
<b>INSECTS</b>			
Order DIPTERA - flies			
MUSCIDAE (House Fly Family)			
<i>Musca sorbens</i> Wiedemann	dung fly	non-native	common
Order HETEROPTERA - true bugs			
PSYLLIDAE (Psyllid Family)			
<i>Heteropsylla cubana</i> Crawford	koa haole psyllid	non-native	rare
Order HYMENOPTERA - bees, wasps, ants			
APIDAE (Honey Bee Family)			
<i>Apis mellifera</i> L.	honey bee	non-native	common
<i>Xylocopa sonorina</i> Smith	Sonoran carpenter bee	non-native	uncommon
Order LEPIDOPTERA - butterflies, moths			
LYCAENIDAE (Gossamer-winged Butterfly Family)			
<i>Lampides boeticus</i> L.	long tail blue butterfly	non-native	rare
NYMPHALIDAE (Brush-footed Butterfly Family)			
<i>Agraulis vanillae</i> L.	passion flower butterfly	non-native	uncommon
PIERIDAE (White and Sulphur Butterfly Family)			
<i>Phoebis agarithe</i> Boisduval	large orange sulphur butterfly	non-native	uncommon
Order ODONATA - dragonflies, damselflies			
AESHNIDAE (Darner Dragonfly Family)			
<i>Anax junius</i> Drury	green darner	indigenous	rare

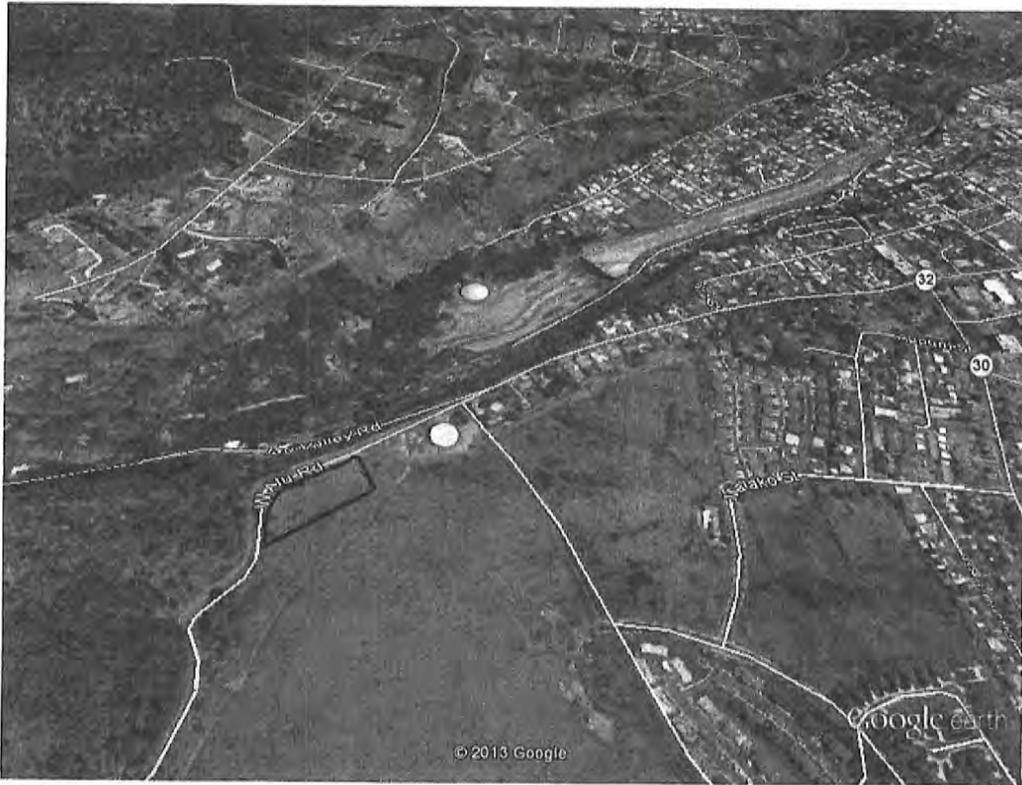


Figure 1. Project location Wailuku, Maui (outlined in black)





Figure 3. View downslope toward project area. A dense growth of Guinea grass with a few koa haole shrubs scattered throughout.



Figure 4. View downslope across project area showing some larger trees.

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# **APPENDIX E.**

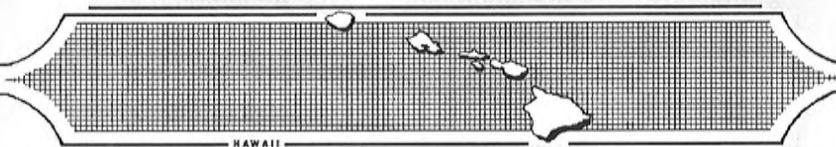
## **Archaeological Assessment**

**AN ARCHAEOLOGICAL ASSESSMENT  
ON A 2.5-ACRE PARCEL FOR THE IAO WATER TREATMENT  
FACILITY PROJECT IN 'ĪAO, WAILUKU AHUPUA`A, WAILUKU  
DISTRICT, ISLAND OF MĀUI, HAWAII  
[TMK: (2) 3-05-001:067]**

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October 2013

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## INTRODUCTION

At the request of Munekiyo and Hiraga, Inc., Scientific Consultant Services, Inc. (SCS) conducted Archaeological Inventory Survey on approximately 2.5-acres of land for the proposed Iao Water Treatment Facility Project in Wailuku, Wailuku Ahupua`a, Wailuku District, Island of Maui, Hawai`i [TMK (2) 3-05-001:067] (Figures 1 and 2). While Inventory-Survey-level investigations were completed, this report is being written as an Archaeological Assessment as a determination of “no findings” was made during fieldwork.

Based on limited archival research, settlement pattern analysis of the project area, and knowledge of previous Inventory Survey on several parcels directly surrounding this larger parcel (Dega 2003), there were restricted expectations prior to fieldwork for documenting significant traditional-period archaeological sites in the project area. Previous archaeological research in adjacent intermediate areas has not yielded many positive results, this perhaps due to historic land use, which led to massive landscape modifications. No historic-period sites were identified on the parcel, however.

The overall purpose of the project was to determine the presence or absence of architecture, midden deposits, and/or artifact deposits on the surface of the project area, as well as assess the potential for the presence of subsurface cultural deposits. If sites/historic properties were identified, they were to be evaluated in terms of significance criteria. In sum, no sites were identified on the surface of the parcel and no areas were readily amenable to testing which would have likely yielded significant results. Extensive alteration by historic and modern grading and grubbing, as explained more below, has significantly altered the natural topography and vegetation of the parcel.

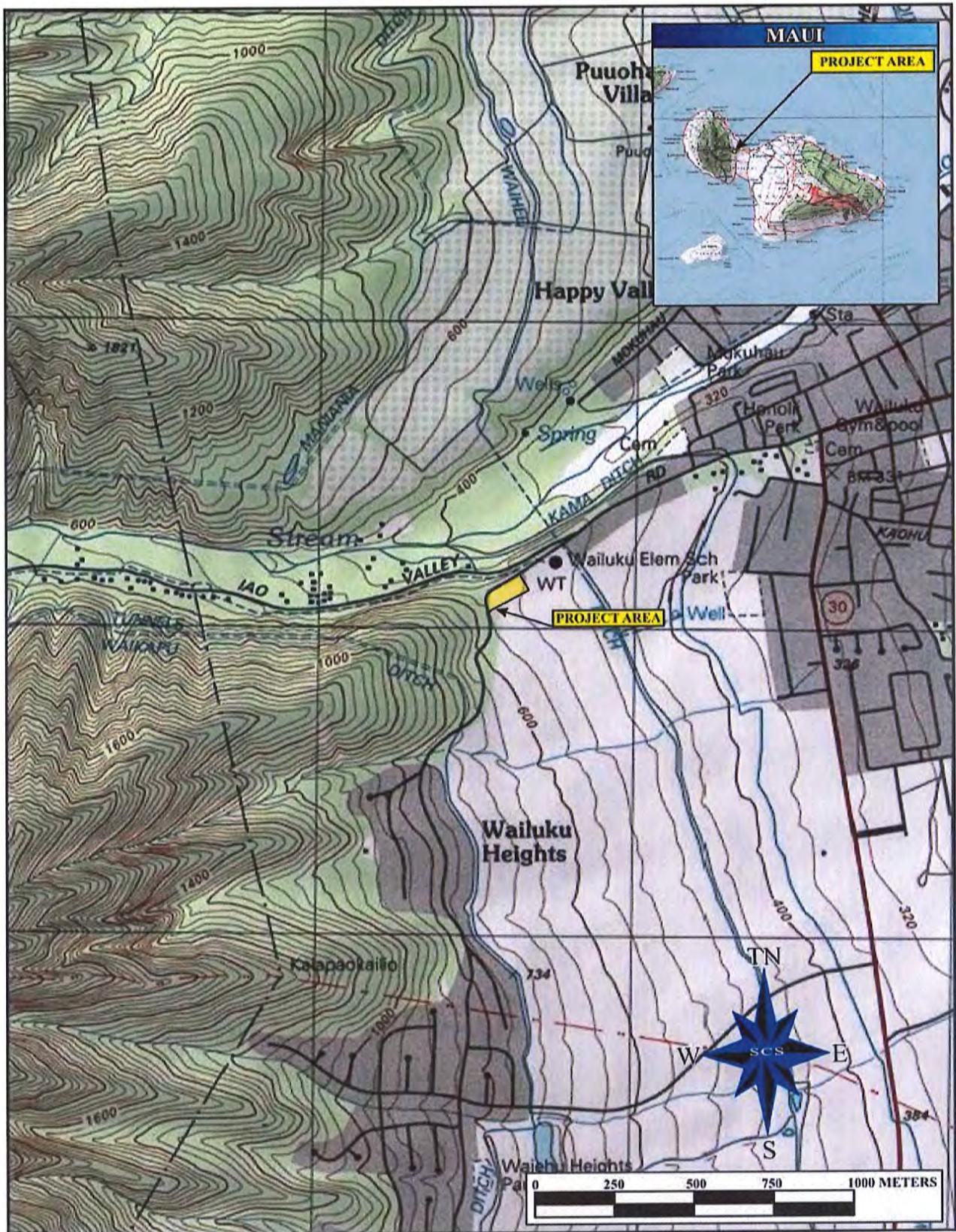


Figure 1: Portion of USGS Topographic Map Showing the Location of the Project Area

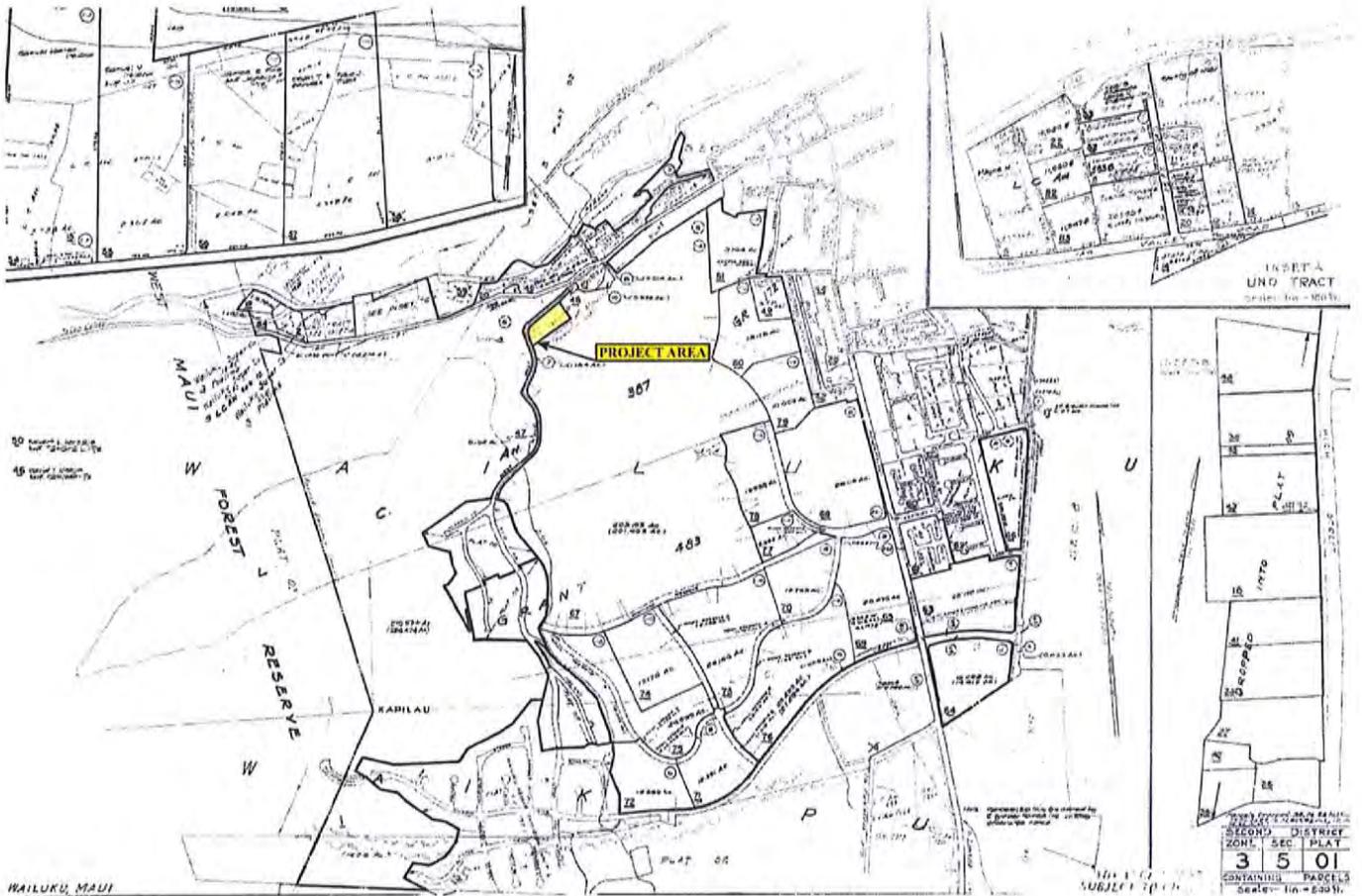


Figure 2: TMK Showing Location of Project Area

## ENVIRONMENTAL SETTING

### **PROJECT AREA LOCATION**

The project area consists of an approximate 2.5-acre of land adjacent to an existing 3.0 million gallon (MG) water tank. The parcel is bounded to the west and south by former agricultural land, to the east by an existing water tank and baseyard, and to the north by Alu Road. The parcel is situated on very slightly sloping to flat land at an elevation of c. 500 ft above mean sea level (amsl) at a distance of 3.9 km (2.4 mi) from the nearest coastline near Kahului Harbor.

### **SOILS**

Soils in the project area consist of Wailuku silty clay (WvB) and Rough Broken Land (rRR) Foote *et al.* 1972:99). The Waikuku Series occurs on 3%-7% slopes and is commonly associated with sugar cane, pasture, and homesites. These are well-drained soils occurring on alluvial fans that have developed from igneous rock. The series profile is composed of reddish-brown silty clay that lies over bedrock. The second series, Rough Broken Land, is characterized by very steep land broken by intermittent drainage channels and occurs on c. 40%-70% slopes. Runoff is rapid and erosion is common. Soil lies over weathered rock, with outcrops, stones, and soil slip common in these areas. The series is associated with watershed and wildlife habitat.

The parcel has clearly been remodeled by earthmoving activities associated with construction of the adjacent water tank facility and previously, by agricultural and road building activities. Impacts on the parcel's ground have been massive.

### **VEGETATION**

Vegetation on the parcel is dominated by *haole koa*, lowland shrubs, grasses, and small (unidentified) weedy plants. The weeds were ubiquitous, making surface visibility only fair.

### **CLIMATE**

Rainfall in this intermediate, leeward-type environment is very modest. The project area receives an average annual rainfall of only 33 to 44 centimeters (Price 1983:63), with much of this rainfall occurring during the winter months (November–April). Seasonal variation in rainfall amount follows normal orographic patterns for leeward-type areas of Maui. The project area occurs just to the south of what may be considered the leeward-windward boundary. At higher elevations within Wailuku Ahupua`a, the amount of rainfall doubles and triples that of the project area. To the north, from `Īao Stream Valley area toward Waihee Valley, rainfall is much more intensive, with combined rainfall and geographic patterns being more conducive to

traditional types of agricultural cultivation (*i.e.*, *lo`i*, sweet potato). The rainfall in this gently sloping project area drains downhill to the east and provides an additional water source for traditional Hawaiian agriculture in the lowland flats to the east of the project area (see Handy and Handy 1972).

### **TRADITIONAL AND HISTORIC SETTING**

Wailuku District inhabits the eastern side of the West Maui Mountains (Mauna Kahalawai) and occupies the isthmus through the center of the island to coastal reaches in Kahukui and Mā`alaea. Wailuku, together with Waikapu, Waihee, and Waiehu, is one of the *Na Wai`Eha*, or "the four waters," known for the occupancy of chiefly individuals (Kame`eleihiwa 1992; Pukui and Elbert 1992; and Creed 1993). Wailuku District and Wailuku Ahupua`a are frequently mentioned in historical texts and oral traditional accounts as being politically, ceremonially, and geographically important areas during traditional times (Cordy 1981, 1996; Kirch 1985). Wailuku was considered a "chiefly center" (Sterling 1998:90) with many of the chiefs and much of the area's population residing near or within portions of `fao Valley and lower Wailuku. The many *heiau* constructed in the Wailuku area point to its ceremonial and religious importance during pre-Contact times. During historic times, after numerous battles in the area, the large concentration of Land Commission Awards granted in Wailuku, particularly in lower `Iao Valley, also attest to a sizeable population base and the importance of the lands for cultivation through time. More recent land use in the area included sugar cane cultivation and use of the land for pasture.

### **THE TRADITIONAL SETTING OF WAILUKU**

Archaeological settlement data indicates that initial colonization and occupation of the Hawaiian Islands first occurred on the windward sides of the main islands, with populations eventually settling into drier leeward areas at later periods (Kirch 1985). Archaeological dates for initial occupation of the Hawaiian Islands far pre-dates accepted ranges gleaned from palynological data. A more secure estimate for initial occupation of the islands is the A.D. 9<sup>th</sup> century (Athens 1997), if one is to lay more credibility with the pollen record than the archaeological record. In the Waihe`e and Waiehu areas of Wailuku, Kirch (1985:87) notes that "a number of coastal dune midden sites have been reported, and at least one of these contained pearl-shell fishhooks similar to those from the Bellows Site, eroding from the wave-cut midden." (The Bellows site, located on the windward coast of O`ahu, has yielded dates of occupation, albeit controversial, from A.D. 300 to 600 [Pearson *et al.* 1971], one of the earliest dated sites in the Hawaiian Islands. For the most part, these dates have now been diagnosed as very

problematical and are no longer valid.) More recent research within Wailuku Ahupua`a indicates that the area was likely settled between c. A.D. 1100 (Kirch 1985:142) and A.D. 1200 (Fredericksen and Fredericksen 1996).

To the north of the current project area lies `Īao Valley, one of the most important locations in the area for prehistoric activity. Connolly (1974:5) states that the pre-Contact valley [ `Īao] had a large population base with "most people residing in a settlement near `Īao Needle," just northwest of the project area. Supposedly, the subsistence base of this population consisted of fish and taro, with Kahului Harbor and the coast close by and *lo`i* systems lining `Īao Valley's stream banks. Prehistoric ditches or *`auwai* were utilized in taro cultivation (Connolly 1974:5). Sterling (1998:86) adds that two *`auwai* within the valley:

have existed immemorially and were evidently constructed for the purpose of irrigating *kalo* on the plains which stretch away to the northward and southward of the [ `Īao] river. Several minor *`auwai* have, since ancient times, tapped the river at different points lower down and spread the water through the lands in the gulch on either side of the river bed.

Handy in Sterling (1998:63) further notes that "From Waihee and Wailuku Valley, in ancient times, was the largest continuous area of wet taro cultivation in the islands." Cheever (1851:124) writes: "the whole valley of Wailuku, cultivated terrace after terrace, gleaming with running waters and standing pools, is a spectacle of uncommon beauty to one that has a position a little above it."

Recent archaeological research (Fredericksen and Fredericksen 1996:52) has revealed that habitation sites along what is now Lower Main Street in Wailuku, "are associated with the rich taro producing lands in the Lower `Īao River flood plain, and the extensive cultivation systems present in `Īao Valley." These habitation sites have been dated to the A.D. 15<sup>th</sup> through 17<sup>th</sup> centuries. The `Īao Valley area was not only renowned for its agricultural base during prehistoric times but its ceremonial and political base as well (see also Cordy 1996; Donham 1996).

No discussion of Wailuku is complete without mentioning the important *heiau* complex above `Īao Valley near its seaward terminus. During the mid to late 18<sup>th</sup> century, the Haleki`i-Pihana *heiau* complex was supposedly designed by a Hawaiian named Kiha (Sterling 1998:89). These monuments, designated as State Site Number 50-50-04-522 are described as very

important *heiau* within Hawaiian history. Yent (1983:7) notes the life cycle of the *ali`i* was represented here. It was the place where Kamehameha I's wife was born, Kahekili lived, and Kekaulike died. Thrum (1909:46) reported that Kamehameha I evoked his war god at Pihana Heiau after his warriors defeated Kalanikupuli's forces during the Battle of `Īao in 1790. The two *heiau* are primarily associated with Kahekili, who is connected with the Haleki`i-Pihana complex between c. A.D. 1765 and 1790, and Kamehameha, during his conquering of Maui in 1792 (Yent 1983:18). Haleki`i and Pihana Heiau are the only remaining pre-Contact Hawaiian structures of religious and historical importance in the Wailuku-Kahului area that are easily accessible to the public (Estioko-Griffin and Yent 1986:3).

The Fredericksens' (1996:52) report states that politically, Wailuku [village] was known as a central settlement for high ranking chiefs and their retinue. The Wailuku area was also witness to many battles, from the Battles of `Īao and Sand Hills to the Battles of Kepaniwai and Kakanilua. The most famous battle was that of Kepaniwai where Kamehameha I, in July 1790, finally wrested control of Maui Island. Kamehameha I and his warriors landed at the Kawela portion of Kahului Bay and proceeded up `Īao and other valleys to score a decisive victory. Wailuku, meaning water of destruction, succinctly describes the area in which many of these major battles occurred. Of additional note is that in the Kauahea area of `Īao Valley warriors apparently dwelt and were "trained in war skills and there was a boxing site in the time of Kahekili" (Sterling 1998:89).

### **TRADITIONAL SETTING OF THE PROJECT AREA AND ENVIRONS**

Creed (1993) has written extensively on the traditional background of the Waikapu-Wailuku area, much of which directly applies to the open landscape of the current project area just to the north of Waikapu. Many classes of sites are found or may have existed in the Waikapu-Wailuku area during traditional times. Creed (1993:19–21) provides an extensive list, including some site types that would not apply to the current parcel due to its distance from major drainages, the coastline, and its open land classification. Traditional sites that would apply include agricultural sites (*kula* lands, *wauke* patches, *hala* trees, pigs, and potato patches), boundary walls, burials (sometimes located in habitation terraces), feather gathering areas (particularly in the mountains to the west), habitation loci, and *pohaku* (an adze stone marks the border between Wailuku and Waikapu). While populations were predominantly centered in `Īao Valley and Waikapu Valley, there was agricultural and habitation activity in the open grasslands of the current project area above the coastal flats. Much evidence for such activities has not yet been found through archaeological means, a situation that places much culpability on historic

land use that may have erased or scattered this evidence. As such, there is much more evidence for historic activities occurring in the area.

### **HISTORICAL TIMES**

Current project area lands were first assigned to the district formerly known as Kula. Taken literally, *Kula* refers to open land or plains (Pukui and Elbert 1992:70). Kula District is known for its dry, arid lands being vacant of perennial streams. Kula was always an arid region, throughout its long, low seashore, vast stony *kula* lands, and broad uplands. There are exceptions in Wailuku as one proceeds along Īao Stream Valley and further to the west/northwest past Waihee and Waiehu. However, even the vast stony *kula* lands were utilized during traditional and historic times. Most evidence for such land utilization has come from historic records.

In 1848, during the late historic period, commissioners of the Great *Mahele* instigated an extreme modification to traditional land tenure on all islands that resulted in a division of lands and a system of private ownership. The *Māhele* was based upon the principles of western law. While a complex issue, many scholars believe that in order to protect Hawaiian sovereignty from foreign powers, Kamehameha III was forced to establish laws changing the traditional Hawaiian society to that of a market economy (Kuykendall Vol. I 1938:145 footnote 47 *et passim*; Daws 1968:111; Kame`eleihiwa 1992:169–170, 176). The dramatic shift from a redistributive economy to a market economy resulted in drastic changes to land tenure, among other things. Case in point, foreigners demanded private ownership of land to ensure their investments (Kuykendall Vol. I 1938: 145 *et passim*; Kame`eleihiwa 1992:178; Kelly 1998:4).

Once lands were made available and private ownership was instituted, native Hawaiians, including the *maka`āinana* (commoners), were able to claim land plots upon which they had been cultivating and living. Oftentimes, foreigners were simply just given lands by the *ali`i*. However, in the case of commoners, they would only make claims only if they had first been made aware of the foreign procedures (*kuleana* lands, land commission awards). These claims could not include any previously cultivated or currently fallow land, *okipu*, stream fisheries, or many other natural resources necessary for traditional survival (Kame`eleihiwa 1992:295; Kirch and Sahlins 1992). Awarded parcels were labeled as Land Commission Awards (LCAs). If occupation could be established through the testimony of witnesses, the petitioners were issued a Royal Patent number and could then take possession of the property. (Chinen 1961:16).

During the *Māhele*, Wailuku District was declared Crown Land and numerous Land Commission Awards, approximately 180, were awarded within Wailuku Ahupua`a while approximately 100 were awarded for Waikapu Ahupua`a (Creed 1993). A handful of foreigners (*i.e.*, Anthony Catalena, James Louzada, E. Bailey) gained control of large parcels of lands that would later be used for mass cultivation of sugar. Significantly, the majority of LCAs were awarded to Hawaiians, a gauge that can be used to measure pre-Contact settlement, since there was little overall change in traditional land use among Hawaiians prior to 1853 (Creed 1993:38).

Land use in Wailuku and Waikapu Ahupua`a in the mid 19<sup>th</sup> and early 20<sup>th</sup> century was largely devoted to the sugar industry. During the 1860s, the sugar business was growing, with plantations and mills at Wailuku, Waihe`e, Waikapu, and Haiku. Many of the plantation camps associated with these mills were centered in the Pu`unene, Kahului, and Wailuku area (see Denham *et al.* 1992:16). Hopoi Camp supposedly occurred near the project area by Hopoi Reservoir but was not relocated during the present investigation. Hopoi Reservoir was constructed by at least by 1922, when references to Hopoi Camp occurred on an area map (M. Kirkendall, personal communication 10.September.2003) Historic utilization of the Waikapu-Wailuku landscape within and near the project area focused on industrial-levels of cultivating sugar cane and pineapple. Water was channeled from traditional sources (*e.g.*, Waikapu Stream, western aquifers or springs) through plantation lands. Both local and imported workers operated on these plantation lands and the area maintained fair population density. Evidence for expansive landscape modifications to accommodate the industrial-level of production is very evident across and near the current subject parcel in the form of the north-south oriented Kama Ditch, Hopoi Reservoir, and several excavated/bunded areas. The significant amount of plastic and rubber tubing found across the surface of the project area attests to even more recent utilization of the open landscape for cultivation. These former sugar cane and pineapple lands are now being reclaimed through residential developments.

### **PREVIOUS ARCHAEOLOGY**

Of interest for the present study are the results from two projects recently conducted just to the south of the current project area, in a similar environment. First, Archaeological Inventory Survey was conducted on approximately 100 acres of land that included five separate lots and a proposed road corridor in the Kehalani Mauka Subdivision (Dega 2003). Three historic sites were documented during this Inventory Survey. State Site Number 50-50-04-5473 has been assigned to Hopoi Reservoir. This reservoir predates Hopoi Camp and was present at least by 1922 (see Dega 2003). Occurring to the immediate east of the reservoir and running north-south to Waikapu is Kama Ditch (State Site No. 50-50-04-5474), a water conduit carrying the precious

commodity to dry southern lands. A single basalt adze (Site 50-50-04-5478) was recovered from the northern flank of Lot 21 along the eastern flank of the parcel. Extensive survey and testing in the area of the isolated find failed to produce additional artifacts or cultural deposits. Representative subsurface testing (18 trenches) on the lots only revealed highly homogenous soil matrices across the open, barren intermediate area.

Archaeological Inventory Survey was also conducted on Kehalani lands just to the east of Honoapiʻilani Highway (Monahan 2003). This survey failed to produce any structures or artifact scatters. Trench excavation demonstrated a fairly consistent subsurface stratigraphy with a thick layer of dark brown silt (Layer II) inclusive of historical garbage (*i.e.*, black plastic and rubber tubing, white plastic irrigation pipes, and black plastic sheeting) over an undisturbed very dark grayish-brown silty clay subsurface (Layer III). A dark brown, silty root mat-layer (Layer I) was present in some units. No undisturbed sandy deposits were encountered, although a few trenches close to the eastern boundary of the project area did contain thin lenses of yellowish-brown sand. These sand lenses were clearly introduced as recent fill. In total, pedestrian survey and subsurface testing demonstrated that both parcels had been extensively altered through grading and other earthmoving activities associated with historic construction (of water features) and cultivation.

In terms of general projects in the Wailuku-Waikapu environs, the earliest archaeological endeavors on Maui were undertaken by Thrum (1909), Stokes (1918), Emory (1921), and Walker (1931). None of their archaeological finds directly pertain to the current project area; however, their data allows for a deeper understanding of the traditional use of the Wailuku-Waikapu area. More recent archaeological work just to the south of the current project area has been limited to two field inspections (Donham 1991, 1995) and on the eastern boundary line of the current project location, two archaeological Inventory Survey-level investigations (Kennedy 1988, 1989; Buffum and Dega 2001). The conclusions offered by these few projects conducted just to the south of the currently-investigated land area primarily indicate that any surface and/or subsurface features of cultural value that were once present within the area have most likely since been destroyed by intensive agricultural use of the land (*i.e.*, sugar cane and/or pineapple cultivation); this pattern was also confirmed by subsurface examination.

Work within Iao Valley environs to the north was also initiated by Thrum (1909) who first identified the much investigated Halekii and Pihana Heiau. In addition to Thrum's work at the monumental structures, Stokes mapped the site in 1916. Walker also recorded the site in 1931, during his island-wide survey of Maui in which he identified many *heiau* within Wailuku

Ahupua`a (Walker 1931). Emory was the next archaeologist working at this important site and during his 1959 campaign, reconstructed portions of Halekii and rendered another map of the Heiau. The most recent work at the site was accomplished by Yent (1983, 1984, 1995) who conducted systematic survey, mapping, and excavations as part of a restoration plan. Yent's (1995) work yielded explicit planviews of the site, detailed profiles of the *heiau*, and revealed construction techniques utilized to build the features.

Prior to the modern era, the only large-scale survey of Wailuku Ahupua`a and environs, albeit biased towards coastal structures, was conducted by Walker (1931). Recently, many other archaeological projects have been conducted in the area and have yielded much data regarding settlement pattern and land utilization within the *ahupua`a*. Kirch (1985:144) notes, however, that "more intensive study of these important regions will help to unravel the sequence of economic, social, and political change that led to the development of the powerful Maui chiefdoms witnessed by Cook and others".

Connolly (1974), as part of the initial `Iao Valley Flood Control Project (Phase I), conducted archaeological survey on a parcel located north and upvalley from the present project area. Connolly's survey augmented a preliminary reconnaissance of the study area by K. Moore of Bishop Museum in April, 1974, the latter noting the presence of stone structural remains thought to be taro or *lo`i* terraces. During survey, Connolly recorded two historic complexes composed of a substantial amount of terraces, free-standing walls, ditches, historic house foundations, and several stone mounds.

Identified by Connolly (1974) and distinguished as State Site No. 50-50-04-2978 (Wallace System Complex) and 50-50-04-2979 (North Terrace System Complex), the former site, located on the south stream bank of `Iao Valley, contained a site composed of twenty terraces, two irrigation ditches, one free-standing, diversionary wall, and two house foundations. The North Terrace System Complex consisted of a wet-land taro system represented by six taro terraces, two free-standing walls, and two stone mounds of unknown function. Connolly believed both sites (and all features) to have been constructed during historic times, the sites presumably constructed by Portugese workers living in a camp within the valley. Several interesting artifacts were also recovered during the survey and represent traditional taro processing: one, fractured basalt *poi* pounder and one, unfinished basalt *poi* pounder.

Cordy (1996) and Donham (1996) provide overview studies of prior archaeological work having been conducted in the area. Cordy (1996) discussed an overview of Mahele documents

on land patterns in the `Iao Valley area that clearly showed that lower valley region contained irrigated taro fields throughout the flood plain and houses and associated grave sites at the base of the sand dunes bordering the sides of the flood plain. Donham (1996) also summarized that house sites occur along the base of the sand dunes, with population movement occurring up valley through time.

Finally, SCS/CRMS, Inc (Spear and Burgett 2003) was contracted by the U.S. Army Corps of Engineers to provide archaeological reconnaissance survey and limited subsurface testing for the alternative channel alignment, `Iao Stream Flood Control Project within `Iao Valley. A 100% reconnaissance survey of the project area revealed only one site (State Site Number 50-50-04-4755; TMK 3-4-32:1). The site is composed of three features. The three features (designated as Features A, B, and C) consist of a concrete foundation with concrete troughs, a soil-filled terrace and retaining wall, and wall remnant, respectively. These features form a small, presumably historic habitation complex-activity area. Overall, the project area was relatively void of visible architectural and/or surface remains, this being the effect of heavy landscape modifications, both cultural and natural processes, to the project area within the last 100 years. However, floodplain agriculture has likely been practiced in the area for hundreds of years with archaeological signatures to these activities being buried in the present floodplain.

### **SETTLEMENT PATTERN**

Archival research and analyses of the generalized settlement pattern for Wailuku District have been the foremost sources for discerning an established settlement pattern for the current project area.

Archaeological evidence suggests that early settlement in the Hawaiian Islands occurred along windward shoreline areas between the A.D. 4<sup>th</sup> and 11<sup>th</sup> centuries. Pollen evidence suggests a settlement date of the A.D. 9<sup>th</sup> century (see Athens 1997). For the most part, these populations used local resources and seldom ventured into upland valleys. Cordy (in Creed 1993) suggests, however, that upper valley areas on windward coasts were likely populated before the A.D. 1100s. Coastal settlement was still dominant, but populations began exploiting and living in more upland *kula* zones. Greater population expansion to inland areas did not occur until the *c.* A.D. 12<sup>th</sup> century but continued through the 16<sup>th</sup> century. Large scale or intensive agricultural endeavors were implemented in association with habitation. Coastal lands were used for settlement and taro was cultivated in near-coastal reaches and in the uplands. Upland areas of Maui such as the Waiohuli-Kula area contained large garden enclosures, ceremonial structures, and permanent habitation sites by *c.* A.D. 1600.

Nearer the coast in intermediate lands (*c.* 60–85 meters amsl), taro was cultivated along stream courses, dryland taro was grown on *kula* lands such as the project area, and populations were settled. It is possible that the *kalo* patches described in the aforementioned LCA accounts originated during the “Expansion Period” of A.D. 1400 to 1600, perpetuating through historic times (Kirch 1985). However, almost no traditional cultivation occurred in the area during the 1850s as pasture land and sugar cane cultivation were already dominating the use of the land (Creed 1993:74). Primary settlement and resource zones lay outside the current medial environmental zone in Wailuku proper, near perennial water sources (ʻĪao Valley, Waihee, Waichu). The only substantial settlement along this medial isthmus zone between 300 and 600 feet amsl was at Waikapu, to the south of the current project area, near the base of Waikapu Stream Valley (see Creed 1993). As the current project area does not contain a perennial water source and is primarily open grassland, the area is considered to lie at the periphery of the more resource-rich zones in Wailuku.

Historic utilization of the Wailuku-Waikapu landscape was dominated by the cash cropping of sugar cane and pineapple, made possible by water channeled from traditional sources (*e.g.*, Waikapu Stream) through plantation lands. Historic features associated with this period are represented as water features in the form of reservoirs (Hopoi Reservoir) and water channels (Kama Ditch, Waihee Ditch). This area was also an important transportation corridor linking both the south and north flanks of the Maui isthmus, with Honoapiʻilani Highway having been demarcated as a Government Road on area maps by 1882 (Creed 1993:20).

Cultivation of sugarcane began to the north in ʻĪao Valley area during the 1850s. Sugarcane became the dominant crop cultivated in the area and provided occupational opportunities for both local and non-local residents. With sugarcane cultivation came irrigation and processing structures across the landscape, these being irrigation ditches, mills, and other infrastructures supporting the cash crop production. During the 20<sup>th</sup> century, sugarcane cultivation continued on an intensive scale. A Portugese worker camp was located within ʻĪao Valley, the camp providing residence to plantation workers. The 1916 flood erased this camp and a rock crusher installed several years previously. After the flood, the sugarcane plantations rebuilt many of the irrigation ditches and mill stations destroyed during the flood. Sugarcane continued to be the dominant activity in the ʻĪao Valley area, only small taro plots still being cultivated. To the south/southwest of the current project area, land was utilized during World War II as a military training area. In addition, ranching became a viable activity in the ʻĪao Valley area, particularly in *mauka* areas below the precipitous cliffs of the West Maui mountain range. Lower reaches of ʻĪao Valley currently have many residences, which lead downslope into the well developed Wailuku Town.

## **METHODS**

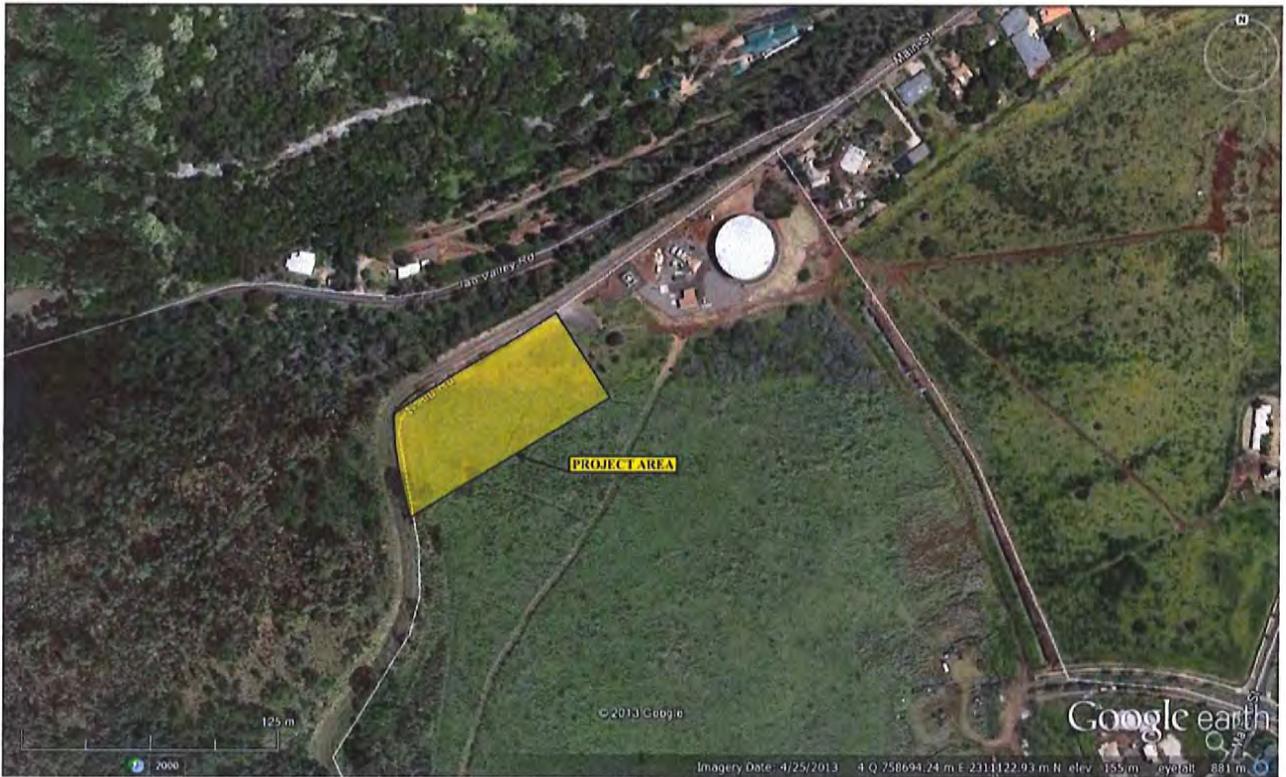
Fieldwork was conducted on August 30, 2013 by SCS personnel Ian Bassford, B.S. under the overall direction of Michael Dega, Ph.D (Principal Investigator). The inventory survey included a 100% pedestrian survey of the project area in <5 m transects. Numerous photographs were taken of the well location and overall project area in addition to written notes and descriptions of the topography and natural environment.

Archival research entailed investigating the historic and archaeological background of the general project area. This examination included a documentary search of previous archaeological research conducted in this region of Maui as well as a review of archival literature relating to Land Commission Awards and local mythology. The review of historical documents was accomplished in order to understand the impact of post-Contact events on the cultural and archaeological landscape of the region.

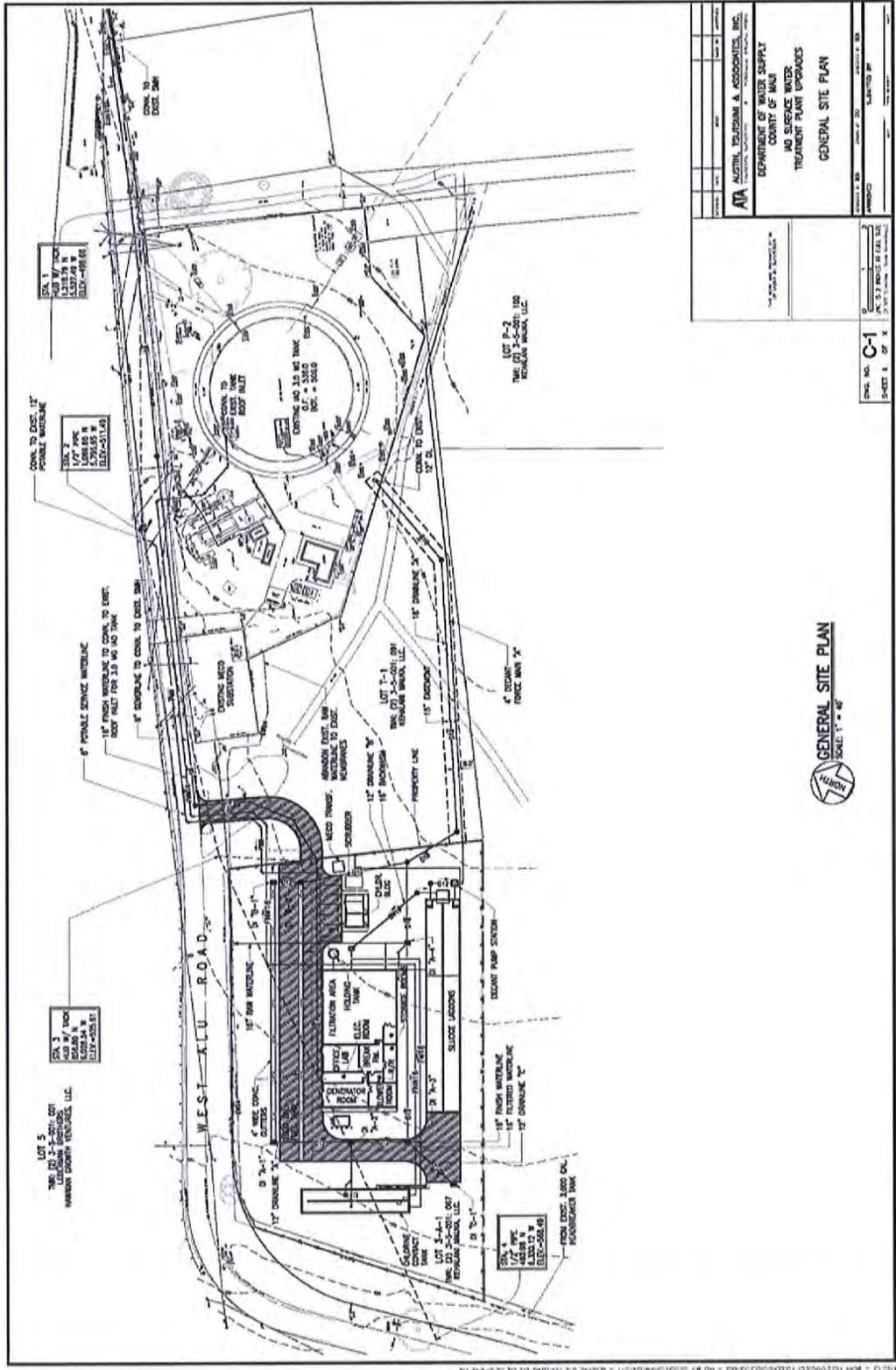
## **RESULTS OF FIELDWORK**

The project area consists of an approximate 1.5-acre parcel located along Alu Road and adjacent to an existing 3.0 MG water tank (Figures 3-6). The ground surface and subterranean reaches of the parcel have been heavily modified through time, given intensive industrial sugar cane plantation cultivation in the area, as well as mechanical grading activities for the existing tank. The survey was negative for both surface materials and areas thought to potentially contain subsurface cultural materials.

The archaeological assessment included a pedestrian inspection of the project area with photographic and written documentation of the proposed well site. No new sites, surface features or midden scatters were identified during the pedestrian survey. Historic and modern agricultural and water tank construction activities adjacent to the current project area has clearly impacted the project areas ground surface and likely destroyed any surface deposits and possibly any near surface cultural deposits or artifacts.



**Figure 3: Aerial Photograph Showing Location of Project Area (Google Earth 2013).**



<b>AA</b> AZUSTAL, TAJIYOHAMI & ASSOCIATES, INC. DEPARTMENT OF WATER SUPPLY COUNTY OF MARI TREATMENT PLANT UPGRADES GENERAL SITE PLAN	
PROJECT NO. 01-01-001-100 SHEET NO. C-1 SCALE: 1" = 40'	DATE: 11/15/10 DRAWN BY: [Name] CHECKED BY: [Name]

**GENERAL SITE PLAN**  
 SCALE: 1" = 40'

Figure 4: Plan View of Proposed Work Site (Courtesy of Muneikiyo and Hiraga, Inc.).



**Figure 5: View Northeast Showing Proposed Location for Proposed Work Site.**



**Figure 6: View North of Proposed Work Site.**

## **SUMMARY AND CONCLUSIONS**

The current Archaeological Assessment, consisting of 100% pedestrian survey of the project area, did not lead to the identification of any surface cultural remains. Historic and modern era agricultural and water storage construction activities in the parcel have likely disturbed any previously existing sites or surface deposits. It is our estimation, based on this Archaeological Assessment, that the proposed undertaking would not have an adverse impact on any archaeological sites or features.

### **ARCHAEOLOGICAL MONITORING**

Archaeological Monitoring is not recommended during the construction activities for the proposed water tank work. However, should the inadvertent discovery of significant cultural materials and/or burials occur during construction, all work in the immediate area of the find must cease and the SHPD be notified to discuss mitigation.

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## **APPENDIX F.**

# **Cultural Impact Assessments**

## **IAO WATER TREATMENT PLANT UPGRADES Cultural Impact Assessment Interview**

Interviewed With: Carl Izumi  
Interview Date: 10/19/2013  
Interviewed By: Bryan Esmeralda, Analyst

The interview with Carl Izumi took place on October 19, 2013 at the Munekiyo & Hiraga, Inc. office in Wailuku, Maui.

Carl Izumi was born and raised on Maui, attended the University of Louisville in Kentucky after graduating from Baldwin High School, and until a few years ago, co-owned a veterinary supply company in Honolulu where he currently resides. Although he now resides in Honolulu, Carl is a Maui boy at heart. Born into a family of all male siblings, Carl, his twin brother, and their older brother lived with their parents on Vineyard Street in Wailuku where their father's medical practice was located until the twins were 5 years old. It was at this time that the family relocated, and moved up the street into the house on Alu Road directly below the site of the Iao Water Tank. The proposed Iao Water Treatment Plant is located adjacent to the Iao Water Tank.

Carl recalls that when the family moved into the house, the water tank already existed in its current location. The tank site, and its location set back from the roadway and within undeveloped open land, provided a recreational area for Carl and his brothers. Here they would play in the shadow of the tank and in the open fields that surrounded it.

In the years that he lived in the house, and through the years in which his family owned it after his leaving the island (over 40 years), Carl does not recall any cultural practices taking place in the vicinity of the Iao Water Tank. The tank is located on the slopes of the West Maui Mountains, and near the entrance to Iao Valley, both culturally significant areas to Native Hawaiians, but the land underlying the tank itself did not play host to any cultural practices.

Currently, the lands are undeveloped or slated for development by the nearby Kehalani Master Planned Community. Prior to this development, the lands were utilized for agricultural purposes for many years. Historically, the area was used for sugar cane cultivation, followed by cattle grazing, which ceased in the late 1990's.

The Izumi family did not experience any problems or hardships as a result of their close proximity to the tank. Noise or air pollution as a result of any maintenance activities did not present a burden on the family, nor did the normal day-to-day operations cause adverse impacts on the living conditions for Carl and his family.

Although the tank site is located near Iao Valley, one of the most culturally significant areas on the island, the site itself holds no significant cultural value today.

**IAO WATER TREATMENT PLANT UPGRADES**  
**Cultural Impact Assessment Interview**

Interviewed with: Tomiko "Helen" (Fukushima) Yamagata  
Interview date: November 19, 2014  
Interviewed by: Charlene Shibuya, Senior Associate, Munekiyo & Hiraga, Inc.

Mrs. Yamagata was interviewed at her residence located at 2317 Vineyard Street in Wailuku town for her recollections of the vacant lands above the Iao water tank off West Alu Road.

She was born in Paia in 1919 and later attended Keahua Elementary school in an old plantation camp that is no longer in existence today. During her childhood, she grew up in Camp 13 of the former Puunene plantation village until she moved back to Paia when she was eighteen (18) years old and became a dress maker at Ikeda Store in Lower Paia.

Helen was not able to attend high school but took up English at Maui Community College and some art classes from Hajime Fujimoto, Art Teacher from Baldwin High School. She returned to live on Kahookele Street in Wailuku at about age 27 to continue as a seamstress and worked for Alice Ideta, Professional Designer whose business was located on Main Street above the former Kress Store building. After the war, business got slow but she continued as a self-employed seamstress.

She married in 1947 and eventually moved to her current address on Vineyard Street and has lived in Wailuku town at that home for about the past 67 years. Her occupation continued as a seamstress working from home while raising her two daughters. This residence is located only about 0.57 miles from the project site and she is very familiar with the project surrounding. After her daughters grew up, she was an avid runner and later walker her covered many routes and long distances in the Wailuku area daily. Her past recollections of the project site is that the existing water tank existed before the initial increment of the Wailuku Heights residential subdivision was built. The surrounding area was all cane field cultivation and throughout the decades, she has not seen any cultural or gathering practices on the project site and surrounding area.

# **APPENDIX G.**

## **Zoning and Flood Confirmation Forms**

14/29/14 -9

COUNTY OF MAUI  
DEPARTMENT OF PLANNING  
One Main Plaza Building  
2200 Main Street, Suite 335  
Wailuku, Hawaii 96793



Zoning Administration and  
Enforcement Division (ZAED)  
Telephone: (808) 270-7253  
Facsimile: (808) 270-7634  
E-mail: [planning@mauicounty.gov](mailto:planning@mauicounty.gov)

### ZONING AND FLOOD CONFIRMATION FORM

(This section to be completed by the Applicant)

APPLICANT NAME Munekiyo & Hiraga, Inc. TELEPHONE 244-2015  
PROJECT NAME Proposed Iao Water Treatment Plant Upgrades E-MAIL planning@mhplanning.com  
PROPERTY ADDRESS S. Alu Road near Inters.w/ Iao Valley Road TAX MAP KEY (2) 3-5-001:067(por.)

Yes  No Will this Zoning & Flood Confirmation Form be used with a Subdivision Application?  
IF YES, answer questions A and B below and comply with instructions 2 & 3 below:

A)  Yes  No Will it be processed under a consistency exemption from Section 18.04.030(B), MCC?  
IF YES, which exemption? (No. 1, 2, 3, 4 or 5) \_\_\_\_\_

B) State the purpose of subdivision and the proposed land uses (ie 1-lot into 2-lots for all land uses allowed by law):  
\_\_\_\_\_

- INSTRUCTIONS:**
- 1) Please use a separate Zoning & Flood Confirmation Form for each Tax Map Key (TMK) number.
  - 2) If this will be used with a subdivision application AND the subject property contains multiple districts/designations of (1) State Land Use Districts, (2) Maui Island Plan Growth Boundaries, (3) Community Plan Designations, or (4) County Zoning Districts; submit a signed and dated Land Use Designations Map, prepared by a licensed surveyor, showing the metes & bounds of the subject parcel and of each district/designation including any subdistricts.
  - 3) If this will be used with a subdivision application AND the subject property contains multiple State Land Use Districts; submit an approved District Boundary Interpretation from the State Land Use Commission.

(This section to be completed by ZAED)

**LAND USE DISTRICTS/DESIGNATIONS (LUD) AND OTHER INFORMATION: 1**

STATE DISTRICT:  Urban  Rural  Agriculture  Conservation  (SMA) Special Management Area

MAUI ISLAND Growth Boundary:  Urban  Small Town  Rural  Planned Growth Area  Outside Growth Boundaries

PLAN Protected Area:  Preservation  Park  Greenbelt  Greenway  Sensitive Land  Outside Protected Areas

COMMUNITY PLAN: PD-3 - project District 3 - Kehalani

COUNTY ZONING: PD-3 - WK/05 - PD3 (Wailuku) Open space

OTHER/COMMENTS: (zoning based on portion provided on attached map)

**FEMA FLOOD INFORMATION:**

FLOOD HAZARD AREA ZONES <sup>3</sup> X  
& BASE FLOOD ELEVATIONS:

FEMA DESIGNATED FLOODWAY For Flood Zone AO, FLOOD DEPTH: \_\_\_\_\_

FLOOD DEVELOPMENT PERMIT REQUIRED (Zones V, VE, A, AO, AE, AH, D, & Floodways) Attached LUD Map  See Additional Comments (Pg.2)  See Attached LUD Map

**SUBDIVISION LAND USE CONSISTENCY:**  Not Consistent, (LUDs appear to have NO permitted uses in common).

Not Applicable, (Due to processing under consistency exemption No. 1, 2, 3, 4, 5).

Interim Zoning, (The parcel or portion of the parcel that is zoned interim shall not be subdivided).

<sup>4</sup> Consistent, (LUDs appear to have ALL permitted uses in common).

<sup>4</sup> Consistent, upon obtaining an SMA, PD, or PH subdivision approval from Planning.

<sup>4</sup> Consistent, upon recording a permissible uses unilateral agreement processed by Public Works (See Pg.2).

- NOTES:**
- 1 The conditions and/or representations made in the approval of a State District Boundary Amendment, Community Plan Amendment, County Change In Zoning, SMA Permit, Planned Development, Project District and/or a previous subdivision, may affect building permits, subdivisions, and uses on the land.
  - 2 Please review the Maui Island Plan and the Community Plan document for any goals, objectives, policies or actions that may affect this parcel.
  - 3 Flood development permits might be required in zones X and XS for any work done in streams, gulches, low-lying areas, or any type of drainageway; Flood development permits are required for work in all other zones. Subdivisions that include/adjoin streams, gulches, low-lying areas, or any type of drainageway might require the following designations to be shown on the subdivision map: 100-year flood inundation limits; base flood elevations; drainage reserves.
  - 4 Subdivisions will be further reviewed during the subdivision application process to verify consistency, unilateral agreement requirements, and the conditions associated with a unilateral agreement [Section 18.04.030.D, Maui County Code].

**REVIEWED & CONFIRMED BY:**

\_\_\_\_\_  
(Signature) John S. Rapacz (Date) 6/12/14

For: John S. Rapacz, Planning Program Administrator, Zoning Administration and Enforcement Division

14-29016-6

JUL 19 2014

COUNTY OF MAUI  
DEPARTMENT OF PLANNING  
One Main Plaza Building  
2200 Main Street, Suite 335  
Wailuku, Hawaii 96793



Zoning Administration and  
Enforcement Division (ZAED)  
Telephone: (808) 270-7253  
Facsimile: (808) 270-7634  
E-mail: [planning@mauicounty.gov](mailto:planning@mauicounty.gov)

### ZONING AND FLOOD CONFIRMATION FORM

(This section to be completed by the Applicant)

APPLICANT NAME Munekiyo & Hiraga, Inc. TELEPHONE 244-2015  
PROJECT NAME Proposed Iao Water Treatment Plant Upgrades E-MAIL planning@mhplanning.com  
PROPERTY ADDRESS S. Alu Road near Inters.w/ Iao Valley Road TAX MAP KEY (2) 3-5-001:091(por.)

Yes  No Will this Zoning & Flood Confirmation Form be used with a Subdivision Application?  
IF YES, answer questions A and B below and comply with instructions 2 & 3 below:

A)  Yes  No Will it be processed under a consistency exemption from Section 18.04.030(B), MCC?  
IF YES, which exemption? (No. 1, 2, 3, 4 or 5) \_\_\_\_\_

B) State the purpose of subdivision and the proposed land uses (ie 1-lot into 2-lots for all land uses allowed by law): \_\_\_\_\_

- INSTRUCTIONS:**
- 1) Please use a separate Zoning & Flood Confirmation Form for each Tax Map Key (TMK) number.
  - 2) If this will be used with a subdivision application AND the subject property contains multiple districts/designations of (1) State Land Use Districts, (2) Maui Island Plan Growth Boundaries, (3) Community Plan Designations, or (4) County Zoning Districts; submit a signed and dated Land Use Designations Map, prepared by a licensed surveyor, showing the metes & bounds of the subject parcel and of each district/designation including any subdistricts.
  - 3) If this will be used with a subdivision application AND the subject property contains multiple State Land Use Districts; submit an approved District Boundary Interpretation from the State Land Use Commission.

(This section to be completed by ZAED)

**LAND USE DISTRICTS/DESIGNATIONS (LUD) AND OTHER INFORMATION:** <sup>1</sup>

STATE DISTRICT:  Urban  Rural  Agriculture  Conservation  (SMA) Special Management Area

MAUI ISLAND Growth Boundary:  Urban  Small Town  Rural  Planned Growth Area  Outside Growth Boundaries

PLAN Protected Area:  Preservation  Park  Greenbelt  Greenway  Sensitive Land  Outside Protected Areas

COMMUNITY PLAN: <sup>2</sup> PD-3 Project District 3 - Kula

COUNTY ZONING: PD-3-WK 3/05 - PD3 (Wailuku) open space

OTHER/COMMENTS: Zoning based solely on portion provided on attached map.

**FEMA FLOOD INFORMATION:**

FLOOD HAZARD AREA ZONES <sup>3</sup> X

& BASE FLOOD ELEVATIONS:

FEMA DESIGNATED FLOODWAY For Flood Zone AO, FLOOD DEPTH: \_\_\_\_\_

FLOOD DEVELOPMENT PERMIT REQUIRED (Zones V, VE, A, AO, AE, AH, D, & Floodways) Attached LUD Map

(PD) Planned Development  
 (PH) Project District  
 See Additional Comments (Pg.2)  
 See Attached LUD Map

**SUBDIVISION LAND USE CONSISTENCY:**  Not Consistent, (LUDs appear to have NO permitted uses in common).

\_\_\_\_\_  
(Signature)  Not Applicable, (Due to processing under consistency exemption No. 1, 2, 3, 4, 5).

Interim Zoning, (The parcel or portion of the parcel that is zoned interim shall not be subdivided).

<sup>4</sup> Consistent, (LUDs appear to have ALL permitted uses in common).

<sup>4</sup> Consistent, upon obtaining an SMA, PD, or PH subdivision approval from Planning.

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**NOTES:**

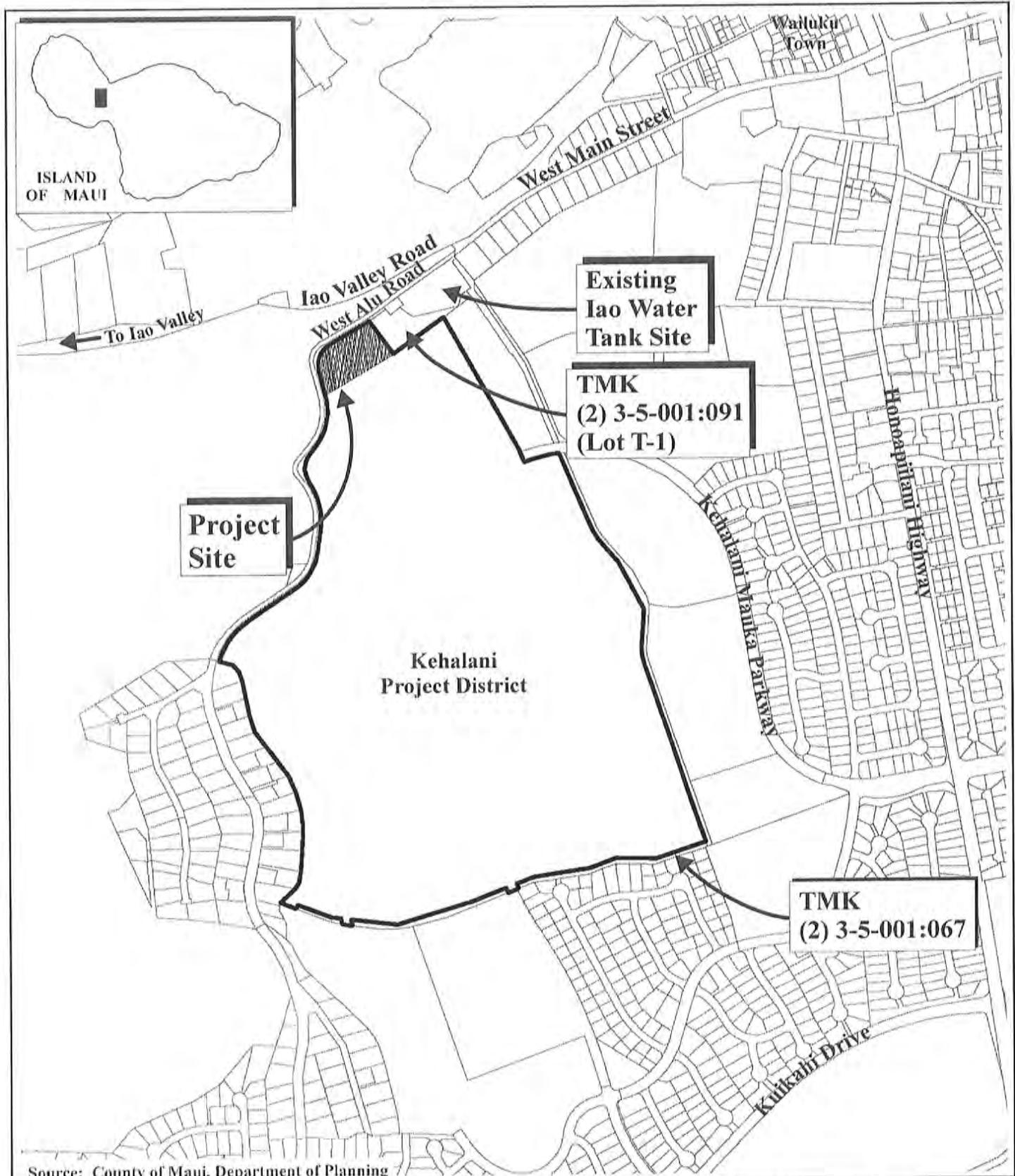
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**REVIEWED & CONFIRMED BY:**

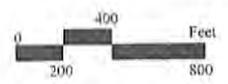
*John S. Rapacz*

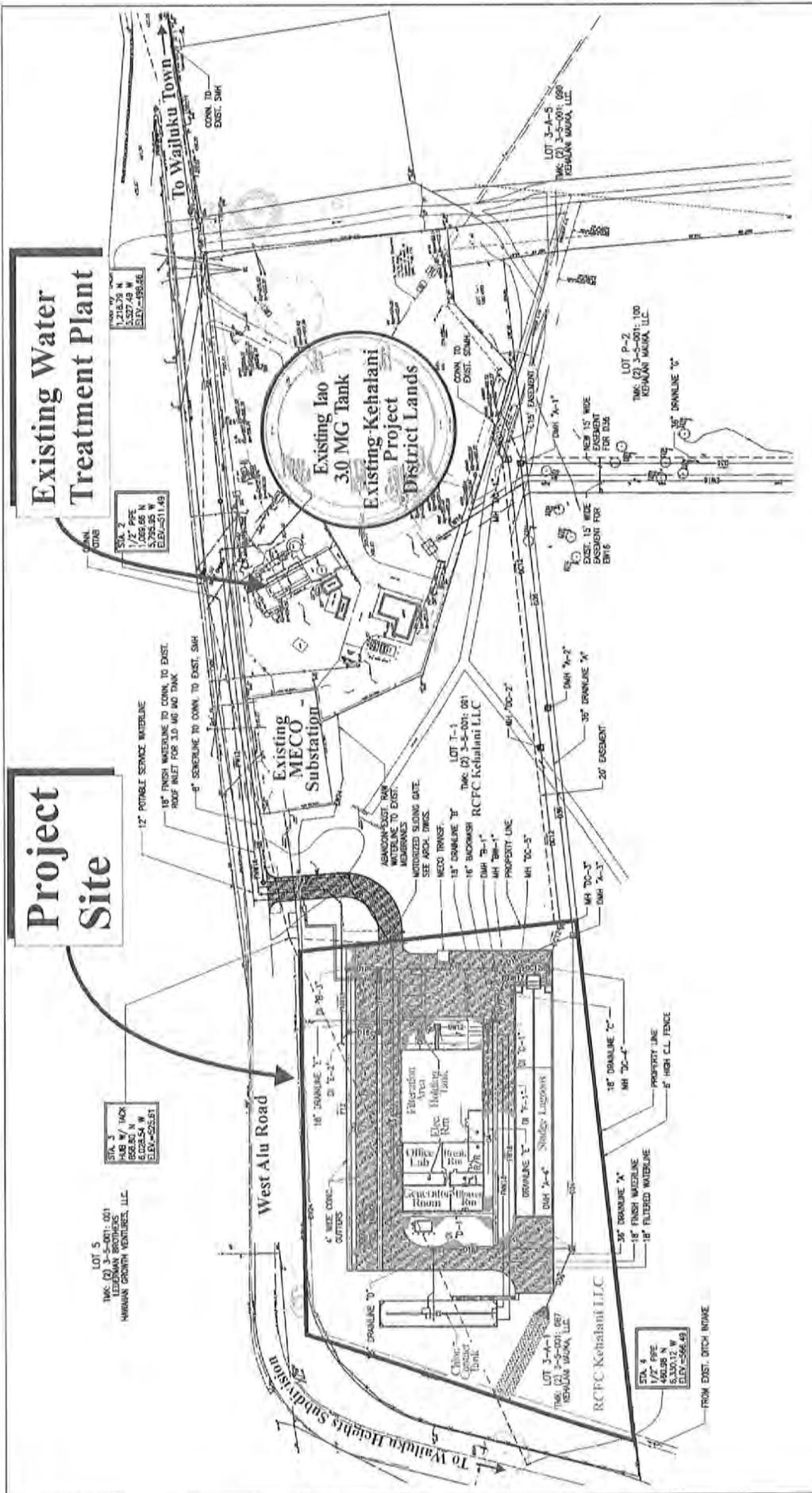
*6/12/14*

For: John S. Rapacz, Planning Program Administrator, Zoning Administration and Enforcement Division



**Figure 1** Proposed Iao Water Treatment Plant Upgrades  
Regional Location Map





**Existing Water Treatment Plant**

**Project Site**

Source: Austin, Tsutsumi & Associates, Inc.

**Figure 2 Proposed Iao Water Treatment Plant Upgrades Site Plan** NOT TO SCALE



Prepared for: County of Maui, Department of Water Supply

MUNEKIYO & HIRAGA, INC.

ATA/Iao WTF Upgrades/Site Plan