



FILE COPY
Water has no substitute.....Conserve it

AUG 08 2014

July 15, 2014

Jessica Wooley, Director
Office of Environmental Quality Control
235 South Beretania Street, Room 702
Honolulu, Hawaii 96813

REC'D
14 JUL 18 P 4:22
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

RE: JOB NO. 11-02, PLH-01A REPLACEMENT OF GROVE FARM TANKS #1 AND #2, LIHU'E, KAUA'I, HAWAI'I, TMK: (4) 3-3-03:46
FINAL ENVIRONMENTAL ASSESSMENT

Dear Ms. Wooley:

The County Department of Water hereby transmits the final environmental assessment and anticipated finding of no significant impact (FEA -AFONSI) for the Replacement of Grove Farm Tanks #1 and #2 situated at TMK:(4) 3-3-03: 46, in the Lihu'e District on the island of Kaua'i, for publication in the next available edition of the Environmental Notice.

The County Department of Water has included copies of comments and responses received during the 30-day public comment period on the draft environmental assessment and anticipated finding of no significant impact (DEA-AFONSI).

Also enclosed are the following: 1) Completed OEQC Publication Form; 2) Two (2) copies of the FEA-AFONSI; 3) An Adobe Acrobat PDF file of the same; 4) An electronic copy of the publication form in MS Word. Simultaneous with this letter, we have submitted the summary of the action in a text file by electronic mail to your office.

If there are any questions, please contact Wayne Wada of Esaki Surveying and Mapping, Inc. at (808) 246-0625.

Sincerely,

Kirk Saiki, P.E.
Acting Manager and Chief Engineer

rs/ce

Enclosures

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

Name of Action: Replacement of Grove Farm Tanks #1 and #2

Island and Tax Map Key: Kaua`i, T.M.K: (4) 3-3-03: 46

Proposing Agency: Department of Water, County of Kaua`i

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):

- | | |
|---|--|
| <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 determination² 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 determination³ 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

FOR OEQC USE ONLY
Date Received:
Date Published:

² 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.

³ 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)

FOR OEQC USE ONLY
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 determination⁴ 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).

⁴ 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.

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

Project Name: Replacement of Grove Farm Tanks #1 and #2
Island: Kauai
District: Līhuʻe
TMK: (4) 3-3-03: 46
Permits: Department of Health – NPDES (Hydrotesting water), Community Noise Permit
Public Works –Building Permit, Road Permit for work within County R.O.W., and Approval to connect and discharge to the County Drainage System

Proposing/Determination Agency: Department of Water, County of Kauai
(Address, Contact Person, Telephone) 4398 Pua Loke Street, Lihue, HI 96766
Keith Aoki – 808-245-5411

Accepting Authority:
(for EIS submittals only)

Consultant: Esaki Surveying and Mapping, Inc.
(Address, Contact Person, Telephone) 1610 Haleukana Street, Lihue, HI 96766
Maren Arismendez-Herrera – 808-246-0625

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); 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); 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); 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). 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); 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); 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)

The County of Kauai, Department of Water proposes to replace Grove Farm Tanks #1 and #2 in Līhuʻe, Kauaʻi. The project's purpose is to increase water storage within the Puhi - Līhuʻe - Hanamāʻulu service area and improve service to the Līhuʻe community. The existing tanks have leaks and are in need of replacement, demolition of these tanks will be in conjunction with the construction work for the Hokulei Village Shopping Center. As part of this project, a replacement tank will be constructed in their place. The proposed project does not include development of a new distribution line or new source of water. The proposed project also includes plans for proposed water treatment plant.

FINAL
ENVIRONMENTAL ASSESSMENT
AND
FINDING OF NO SIGNIFICANT IMPACT (FONSI)

REPLACEMENT OF GROVE FARM TANKS #1 AND #2

LĪHUʻE, KAUAʻI, HAWAII

Submitted in Accordance with
Requirements for Chapter 343, HRS and
Chapter 200 of Title II, Administrative Rules
Department of Health, State of Hawaiʻi

Prepared for the

Department of Water
County of Kauaʻi

By

Esaki Surveying and Mapping, Inc.

July 2014

FINAL ENVIRONMENTAL ASSESSMENT

Proposed Action: REPLACEMENT OF GROVE FARM TANKS #1 AND #2
Applicant: DEPARTMENT OF WATER
COUNTY OF KAUA'I
Location: LIHU'E, KAUA'I, HAWAII
TMK: (4) 3-3-03: 46
Determination: EIS REQUIRED _____ NOT REQUIRED X

.....

Agencies and Organizations Consulted or Contacted
in Preparing this Assessment

Copies of the draft environmental assessment and a letter requesting comments on the proposed project were sent to the parties listed on the next page. Comments and response letters have been reproduced and included in Appendix B

- State : Department of Health – Solid and Hazardous Waste Branch
Department of Health – Safe Drinking Water Branch
Department of Health – Clean Water Branch
Department of Health – Clean Air Branch
Department of Land and Natural Resources – State Historic Preservation Division
- County : Department of Public Works
Fire Department
Planning Department
Police Department
Transportation Agency
- Others : Hirata & Associates, Inc.*
(received written report, see Appendix A)
Kauai Island Utility Cooperative
Oceanic Time Warner Cable
Hawaiian Telcom

* Copy of the draft environmental assessment and letter requesting comments were not sent to Hirata & Associates, Inc.

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Possible Permits Required

Federal	N/A
State	Department of Health– NPDES (Hydrotesting water) Community Noise Permit
County	Public Works – Building Permit, Road Permit for work within County Right of Ways, and Approval to connect and discharge to the County Drainage System

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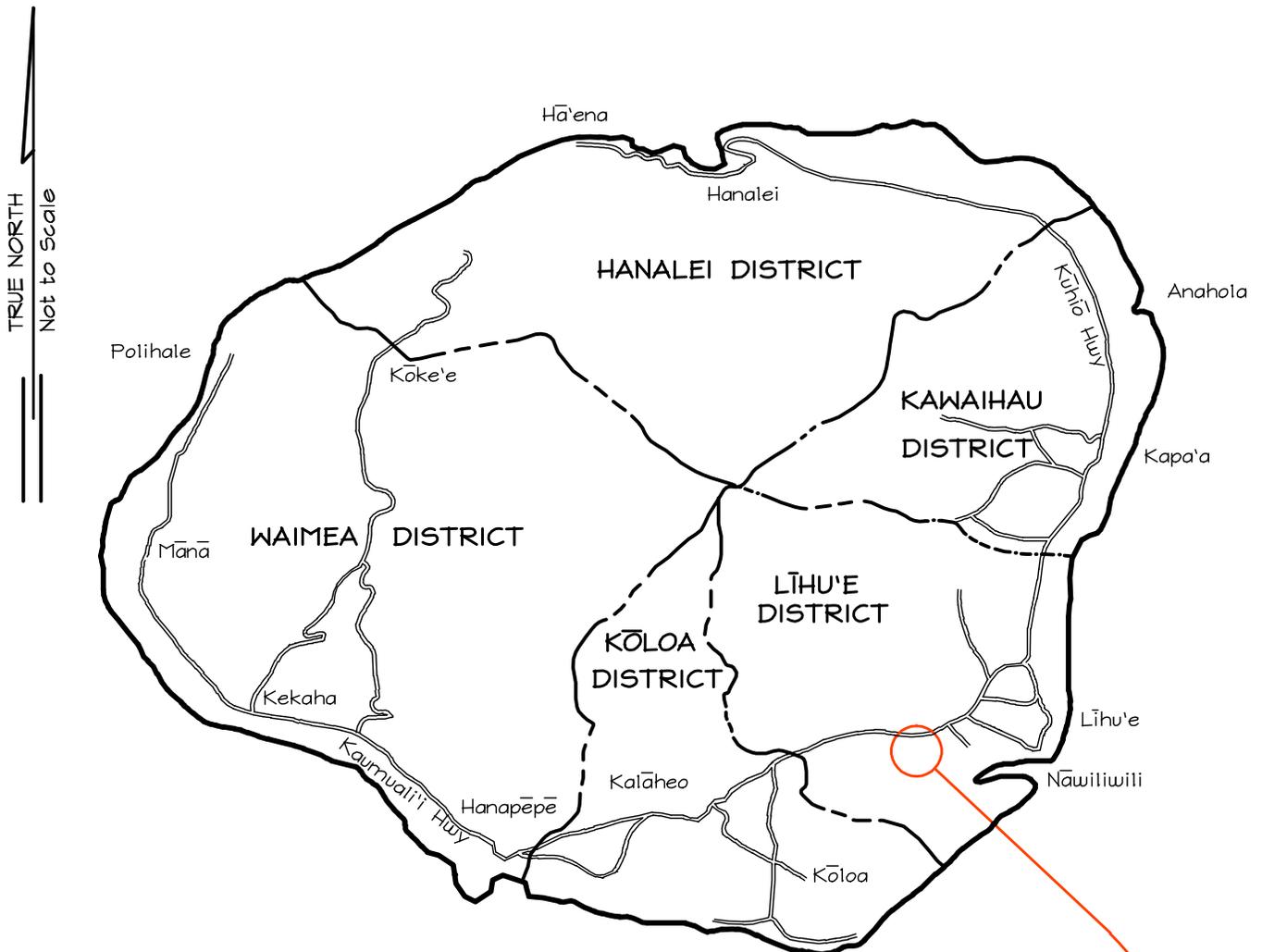
SECTION I

DESCRIPTION OF THE PROPOSED PROJECT

The County of Kaua`i, Department of Water proposes to replace Grove Farm Tanks #1 and #2 in Līhu`e, Kaua`i in the State of Hawai`i (see Figure 1), located along Nuhou Street. The existing tanks have leaks and are in need of replacement, demolition of these tanks will be in conjunction with the construction work for the Hokulei Village Shopping Center.

The project's purpose is to replace the demolished tanks and to increase water storage within the Puhī - Līhu`e - Hanamā`ulu service area (see Figures 2 and 3), the increase in water storage capacity for this water system is required to help meet the service area needed storage reserve. The project site is located within Lot 1546, more specifically identified by tax map key as (zone 4) 3-3-03: 46 (see Figure 4). The subject property is bordered by Kaumuali`i Highway, Nuhou Street and private properties in the "Kukui Grove Village - West" subdivision.

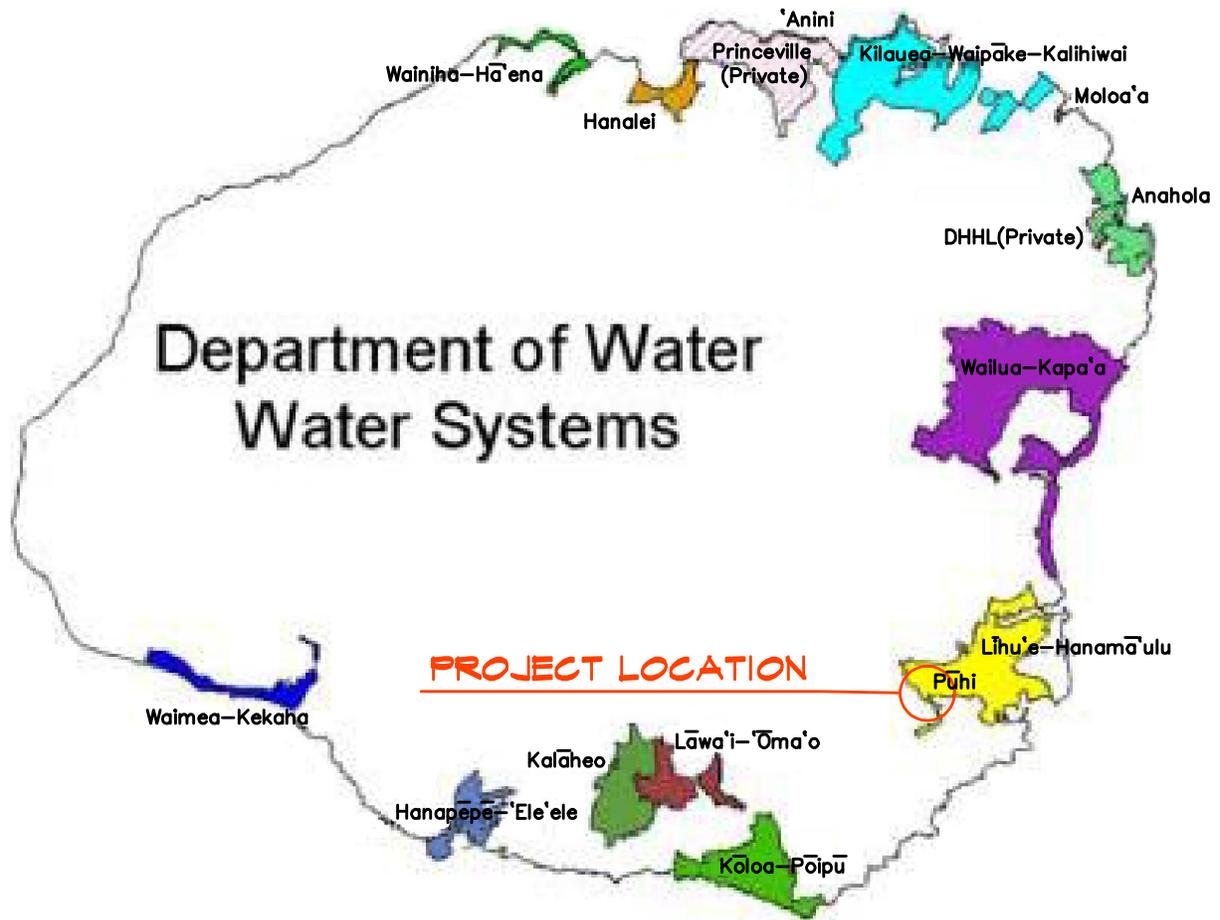
The primary access to the project is Nuhou Street, which is a paved privately owned roadway that is for public use and maintained by the County of Kauai. Existing land uses within the immediate area of the project include a mix of uses comprised of residences, commercial uses and a public school.



PROJECT LOCATION
 T.M.K: (4) 3-3-03: 046

ESAKI SURVEYING AND MAPPING, INC.
 Engineers, Land Surveyors & Planners
 1610 Haleukana Street
 Līhu'e, Kaua'i, Hawai'i

FIGURE I
ISLAND OF KAUA'I
 REPLACEMENT OF
 GROVE FARM TANKS #1 AND #2
 JOB NO. 11-02, PLH-02
 Lihu'e, Kaua'i, Hawai'i



Source: Water Plan 2020

ESAKI SURVEYING AND MAPPING, INC.

Engineers, Land Surveyors & Planners
 1610 Haleukana Street
 Līhu'e, Kaua'i, Hawai'i

FIGURE 2
DOW SERVICE AREAS MAP
 REPLACEMENT OF
 GROVE FARM TANKS #1 AND #2
 JOB NO. 11-02, PLH-02
 Līhu'e, Kaua'i, Hawai'i

Service Area	Description
Waimea-Kekaha	The service area is comprised of two relatively compact small towns. Waimea is the civic center of the West Side, home to the high school, hospital, and other community facilities as well as a variety of restaurants and retail stores. Kekaha includes a residential community that supports diversified agricultural and a small industrial area that was occupied by the former Kekaha Sugar Plantation. The area also supports the nearby Pacific Missile Range Facility and west side State parks.
Hanapepe-Eleele	The service area includes Kauai's second commercial harbor, Port Allen, the island's major electrical power generating station, and other industrial uses. Across the highway are Hanapepe Town and the residential community of Hanapepe Heights. Eleele has a small business area and residential communities.
Kalaheo	Kalaheo has small-town commercial uses concentrated along the highway and along Papalina Road.
Lawai-Omao	The west side has three small-town/rural service areas: Lawai-Omao, Kalaheo, and Waimea-Kekaha. The Kalaheo and Lawai-Omao service areas consist primarily of agricultural homestead lands that have been subdivided and developed at various densities of residential use.
Koloa-Poipu	The service area consists of a concentration of resorts along the coast, with residential communities clustered near the coast and around Koloa Town. Poipu is Kauai's fastest-growing resort destination, and the service area includes several projects yet to be constructed.
Puhi-Lihue-Hanamaulu	The most diverse customer base. The area includes Kauai's major airport and commercial harbor, the largest concentration of industrial uses, Wilcox Hospital, hotels, a broad range of government and business uses, and residential neighborhoods.
Wailua-Kapaa	The service area has hotel and business uses clustered along the coastal highway. Schools, hospitals, and urban residential neighborhoods are located along the highway, as well as along two major roads that extend inland towards the mountains at the north and south ends of the Wailua-Kapaa basin – Kuamoo Road and Kawaihau Road. The central part of the basin is comprised of old agricultural homesteads that are gradually transitioning to residential use.
Anahola	In Anahola, the major landowner is the Department of Hawaiian Homelands (DHHL), which develops residential lots and agricultural homesteads for lease to native Hawaiians. The Anahola service area also includes privately owned residential and agricultural lots in and around Anahola Valley. Portions of the water system are owned by either the DOW or DHHL. DOW operates the system in partnership with DHHL.
Molooa	These east side rural communities include Molooa and Anahola. Molooa is the DOW's smallest service area consisting of two small clusters of residences. Water is purchased from a state well that is currently operated by a private landowner in the area. Water from this source also supplies the agricultural activities in the area.
Kilauea-Waipake-Kalihiwai	The service area is comprised of Kilauea Town and a number of non-contiguous agricultural subdivisions that extend towards the mountains or the coast on either side of the highway. While Kilauea Town is a compact node of urban-density residential use and neighborhood businesses, the largest part of the service area consists primarily of low-density residential use, mixed with small farms.
Anini	The service area consists of a narrow strip of beach residences. The water is purchased from Princeville Utilities
Hanalei	The service area consists of residences and small-town business uses. Narrow roadways and one-lane bridges limit development in these areas.
Wainiha-Haena	The system serves residences along the coast and in Wainiha Valley.

Source: Water Plan 2020

ESAKI SURVEYING AND MAPPING, INC.

Engineers, Land Surveyors & Planners
1610 Haleukana Street
Lihue, Kauai, Hawaii

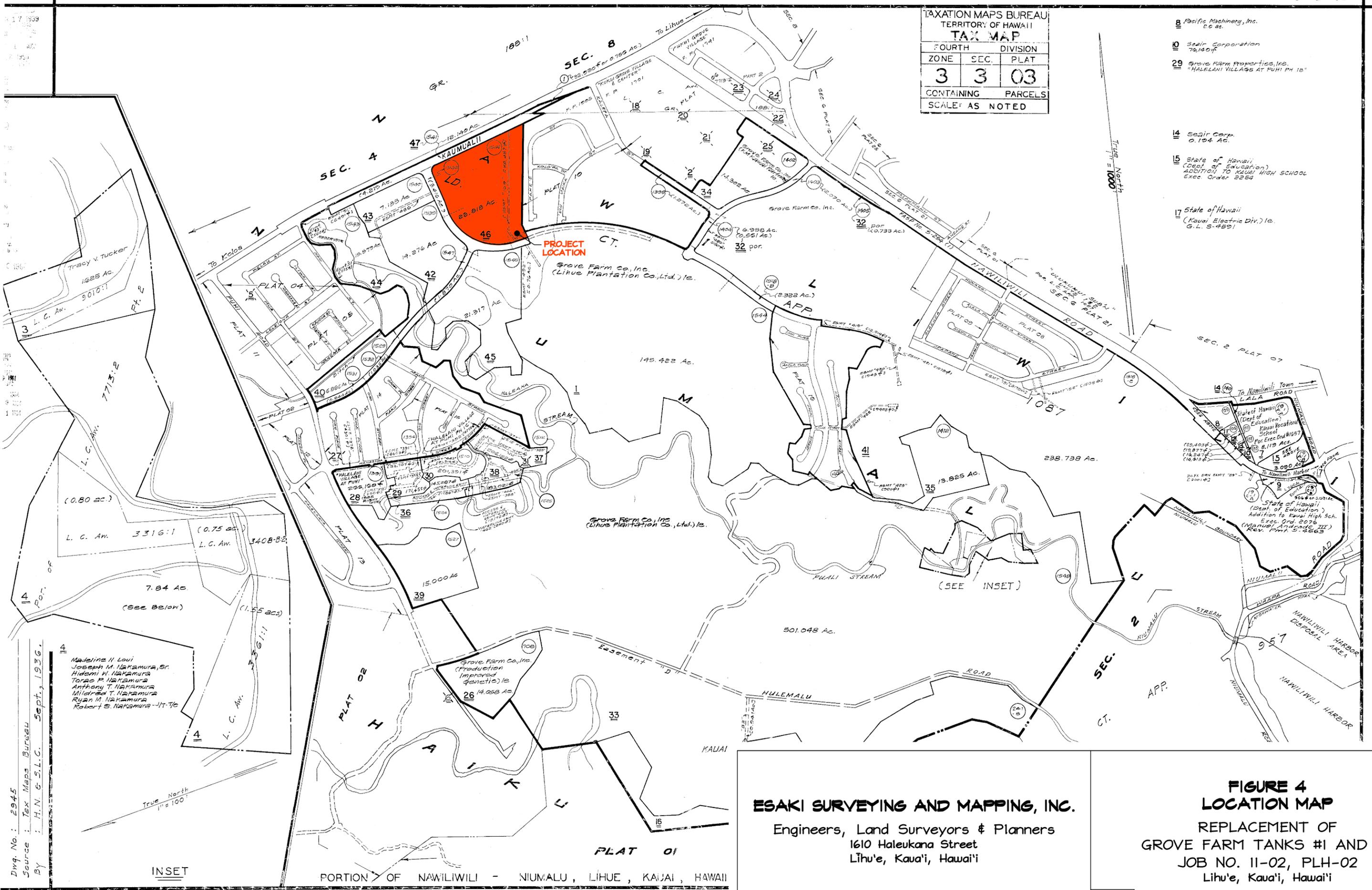
**FIGURE 3
DOW SERVICE AREAS TABLE**

REPLACEMENT OF
GROVE FARM TANKS #1 AND #2
JOB NO. 11-02, PLH-02
Lihue, Kauai, Hawaii

TAXATION MAPS BUREAU
TERRITORY OF HAWAII
TAX MAP

FOURTH DIVISION		
ZONE	SEC.	PLAT
3	3	03
CONTAINING PARCELS		
SCALE: AS NOTED		

- 8 Pacific Machinery, Inc. 2.0 ac.
- 10 Seair Corporation 76,140 ft.
- 29 Grove Farm Properties, Inc. "HALELANI VILLAGE AT PUHI Pt. 18"
- 14 Seair Corp. 0.154 Ac.
- 15 State of Hawaii (Dept. of Education) ADDITION TO KAUIHI HIGH SCHOOL Exec. Order 2254
- 17 State of Hawaii (Kauai Electric Div.) i.e. G.L. S-4891



Dwg. No.: 2945
Source: Tax Maps Bureau
By: H.N.G.S.L.C. Sept., 1936.

14
 Marieine H. Loui
 Joseph M. Nakamura, Sr.
 Hidemi W. Nakamura
 Torao P. Nakamura
 Anthony T. Nakamura
 Mildred T. Nakamura
 Ryan M. Nakamura
 Robert S. Nakamura - J.T.T.C.

INSET

ESAKI SURVEYING AND MAPPING, INC.
Engineers, Land Surveyors & Planners
1610 Haleukana Street
Lihue, Kauai, Hawaii

**FIGURE 4
LOCATION MAP**
REPLACEMENT OF
GROVE FARM TANKS #1 AND #2
JOB NO. 11-02, PLH-02
Lihue, Kauai, Hawaii

As shown in Figure 5 there are two existing water tanks located on the southeast corner of the subject property, also known as the Grove Farm Tank Facility. These tanks will be demolished in conjunction with the construction work for the Hokulei Village Shopping Center. As part of this project, these demolished water tanks will be replaced and a new tank will be constructed in their place.

The proposed project calls for the construction of a new 0.5 MG tank. The new storage tank will occupy approximately 4,034 Sq. Ft., it will be constructed of concrete and measure approximately 72 Ft. in diameter and 18 Ft. high (floor elevation to spillway elevation).

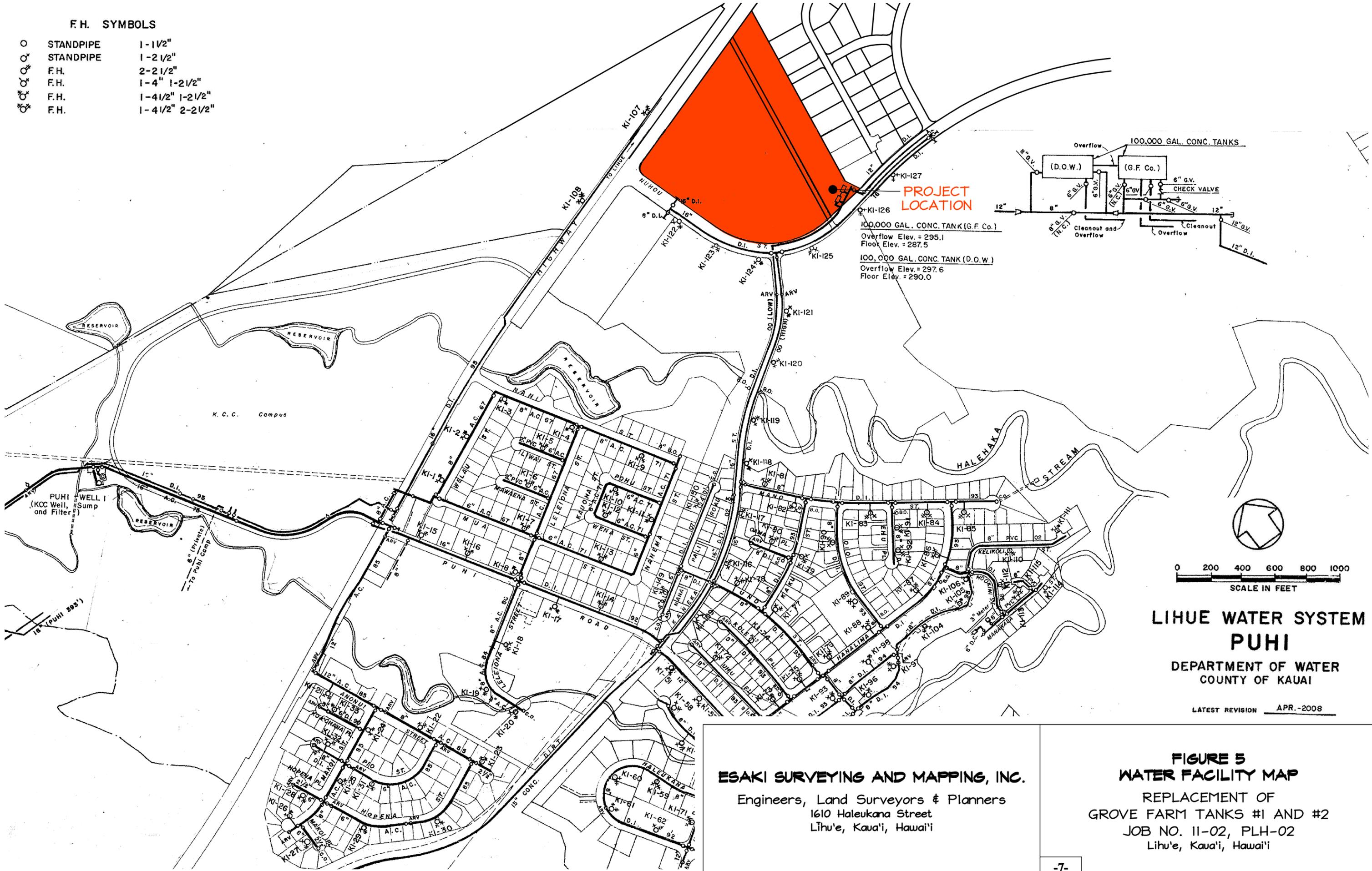
The following improvements will be done in conjunction with the proposed tank: tank drainage system, connecting pipeline and appurtenances, a 10 Ft. wide paved driveway to and around the new tank, 6 Ft. high chain link perimeter fence erected for security purposes, landscaping architecture consisting of grass or ground cover provided for visual enhancement and erosion control, SCADA control system designed to monitor and provide the required controls to operate the tank levels, pumps and control valves, and proposed water treatment plant.

No new source of water or distribution line is being proposed with this project.

The total estimated budget is \$2,000,000 funding will be by the Department of Water. Construction is projected to start in the March 2015 and should be completed in March 2016.

F.H. SYMBOLS

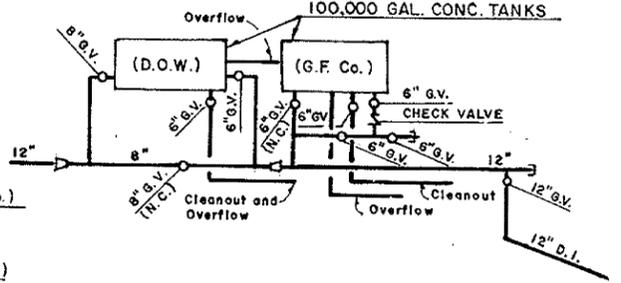
○	STANDPIPE	1-1/2"
○	STANDPIPE	1-2 1/2"
⊗	F.H.	2-2 1/2"
⊗	F.H.	1-4" 1-2 1/2"
⊗	F.H.	1-4 1/2" 1-2 1/2"
⊗	F.H.	1-4 1/2" 2-2 1/2"



PROJECT LOCATION

100,000 GAL. CONC. TANK (G.F. Co.)
 Overflow Elev. = 295.1
 Floor Elev. = 287.5

100,000 GAL. CONC. TANK (D.O.W.)
 Overflow Elev. = 297.6
 Floor Elev. = 290.0



**LIHUE WATER SYSTEM
 PUHI**
 DEPARTMENT OF WATER
 COUNTY OF KAUAI

LATEST REVISION APR.-2008

ESAKI SURVEYING AND MAPPING, INC.
 Engineers, Land Surveyors & Planners
 1610 Haleukana Street
 Lihue, Kauai, Hawaii

**FIGURE 5
 WATER FACILITY MAP**
 REPLACEMENT OF
 GROVE FARM TANKS #1 AND #2
 JOB NO. 11-02, PLH-02
 Lihue, Kauai, Hawaii

SECTION II

DESCRIPTION OF THE AFFECTED ENVIRONMENT

AND POTENTIAL ENVIRONMENT IMPACTS

A. USES

Existing Conditions: The tank will be located on the southeast corner of Lot 1546, which has an area of 22.818 acres and will be home to the Hokulei Village Shopping Center (currently under construction). Lot 1546 which is located to the east of the Nuhou Street and Kaumuali'i Highway intersection. The YMCA of Kaua'i facilities, Chiefess Kamakahahei Middle School and Regency at Puakea Retirement and Assisted Living are located across the street from Lot 1546. There are two existing concrete tanks, each with a 100,000 gallon capacity.

Proposed Actions: See Section I, Description of the proposed project.

Potential Impacts and Mitigative Measures: Construction of the new tank requires demolition of two existing 100,000 gallon tanks. The existing tanks will be demolished in conjunction with the construction work for the Hokulei Village Shopping Center. See Figure 6 for Demolition Plan and Figure 7 for Grading Plan.

B. CLIMATE

Existing Conditions: For Lihue, the annual rainfall amounts to 38 inches per year, with the maximum average precipitation occurring in December. The average temperatures can range from mid 60's to mid 80's (degrees Fahrenheit). On average, the warmest month is August and January is the coolest month.

Potential Impacts and Mitigative Measures: The project will not affect macro or micro weather conditions.

REVISION	DATE	DESCRIPTION	BY	APPROVED

REVISIONS



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

EXPIRES: APRIL 30, 2014

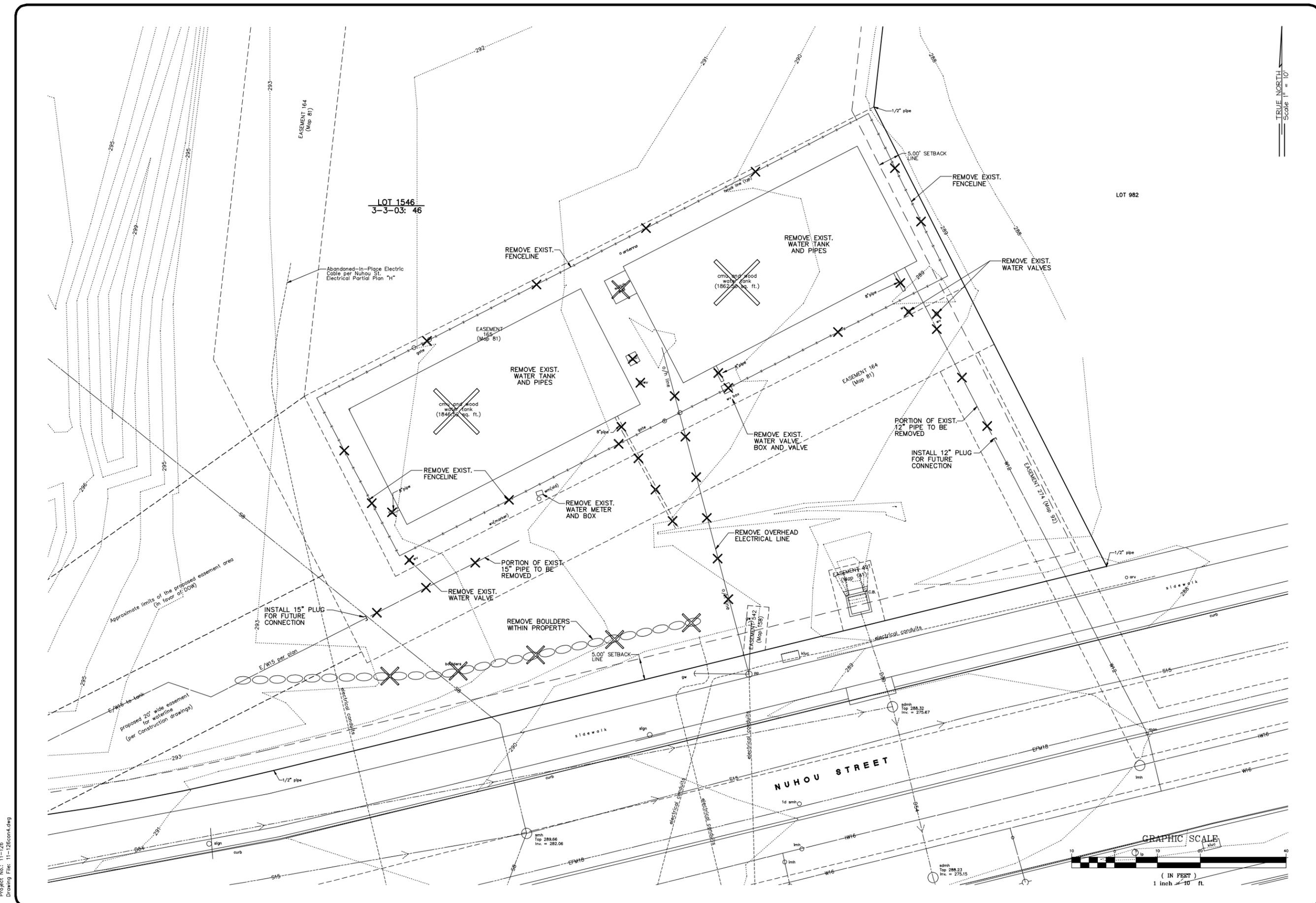
PROJECT:
CONSTRUCTION PLANS FOR 500,000 GAL WATER TANK
Tax Map Key: (4) 3-3-03: Por. 46
Lihue, Kauai, Hawaii

PREPARED FOR:
**Department of Water
County of Kauai**

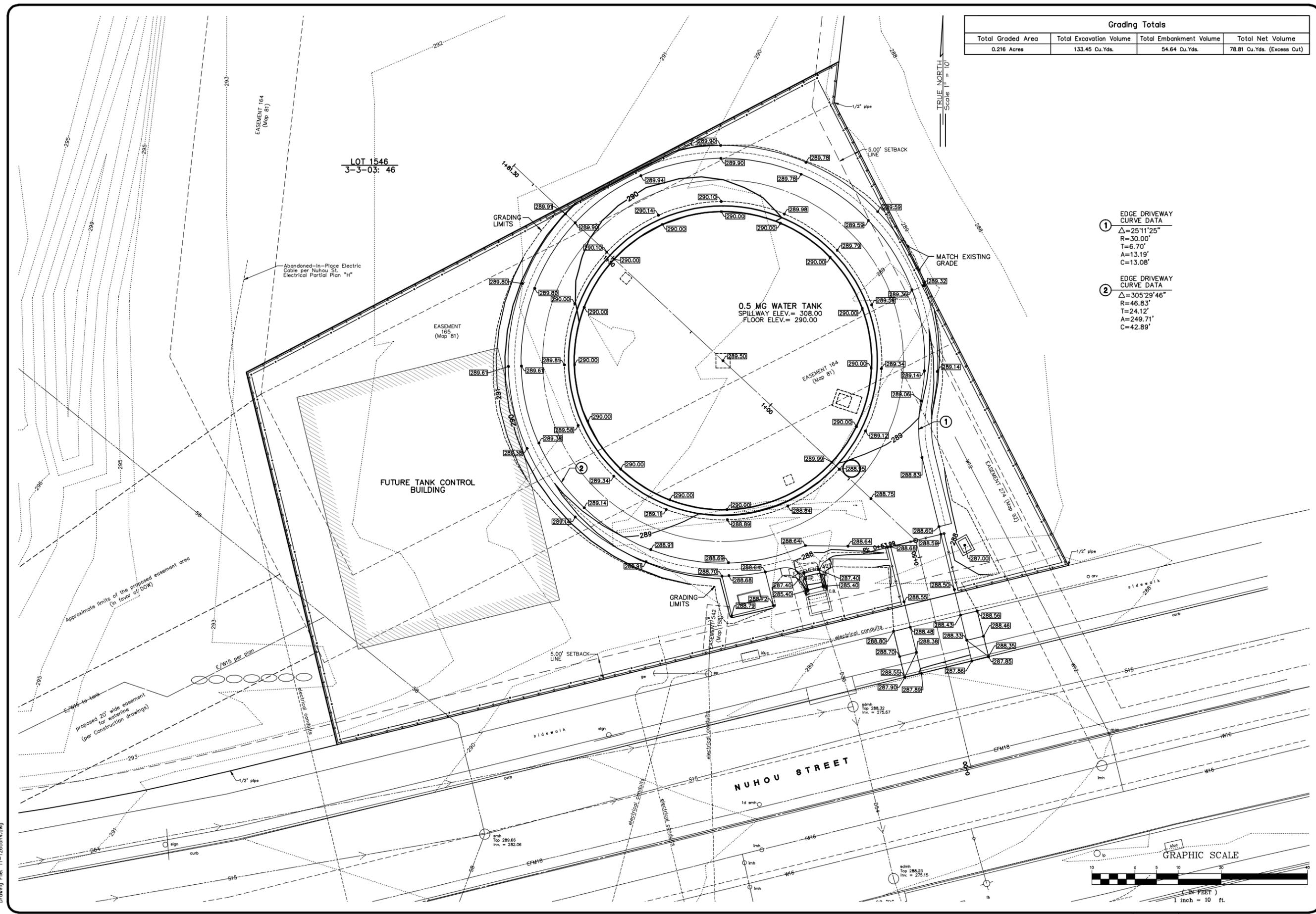
DEMOLITION PLAN

APPROVED:
N/A
COUNTY ENGINEER, DEPT. OF PUBLIC WORKS,
COUNTY OF KAUAI (FOR WORK WITHIN COUNTY R/W) DATE
N/A
MANAGER & CHIEF ENGINEER, DEPT. OF WATER,
COUNTY OF KAUAI DATE

DESIGNED BY: *WV* SHEET
DRAWN BY: *CB, MD* **G-5**
DATE: 10/16/13 5 OF 9 SHEETS



Project No.: 11-126
Drawing File: 11-126con4.dwg



Grading Totals			
Total Graded Area	Total Excavation Volume	Total Embankment Volume	Total Net Volume
0.216 Acres	133.45 Cu.Yds.	54.64 Cu.Yds.	78.81 Cu.Yds. (Excess Cut)

TRUE NORTH
Scale 1" = 10'

- EDGE DRIVEWAY CURVE DATA
- $\Delta = 25^{\circ}11'25''$
 $R = 30.00'$
 $T = 6.70'$
 $A = 13.19'$
 $C = 13.08'$
 - $\Delta = 30^{\circ}29'46''$
 $R = 46.83'$
 $T = 24.12'$
 $A = 249.71'$
 $C = 42.89'$

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 1610 Haleukana Street
 Lihue, Kauai, Hawaii 96766
 Ph. (808) 246-0625 Fax (808) 246-0229

CIVIL ENGINEERS • SURVEYORS • PLANNERS

REVISION	DATE	DESCRIPTION	BY	APPROVED



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

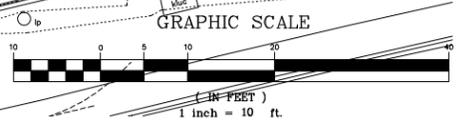
EXPIRES: APRIL 30, 2014

PROJECT:
CONSTRUCTION PLANS FOR 500,000 GAL WATER TANK
 Tax Map Key: (4) 3-3-03: Por. 46
 Lihue, Kauai, Hawaii

PREPARED FOR:
Department of Water County of Kauai

GRADING PLAN

APPROVED:
 N/A
 COUNTY ENGINEER, DEPT. OF PUBLIC WORKS, COUNTY OF KAUAI (FOR WORK WITHIN COUNTY R/W)
 N/A
 MANAGER & CHIEF ENGINEER, DEPT. OF WATER, COUNTY OF KAUAI



Project No.: 11-02
 Drawing File: 11-12Econ4.dwg

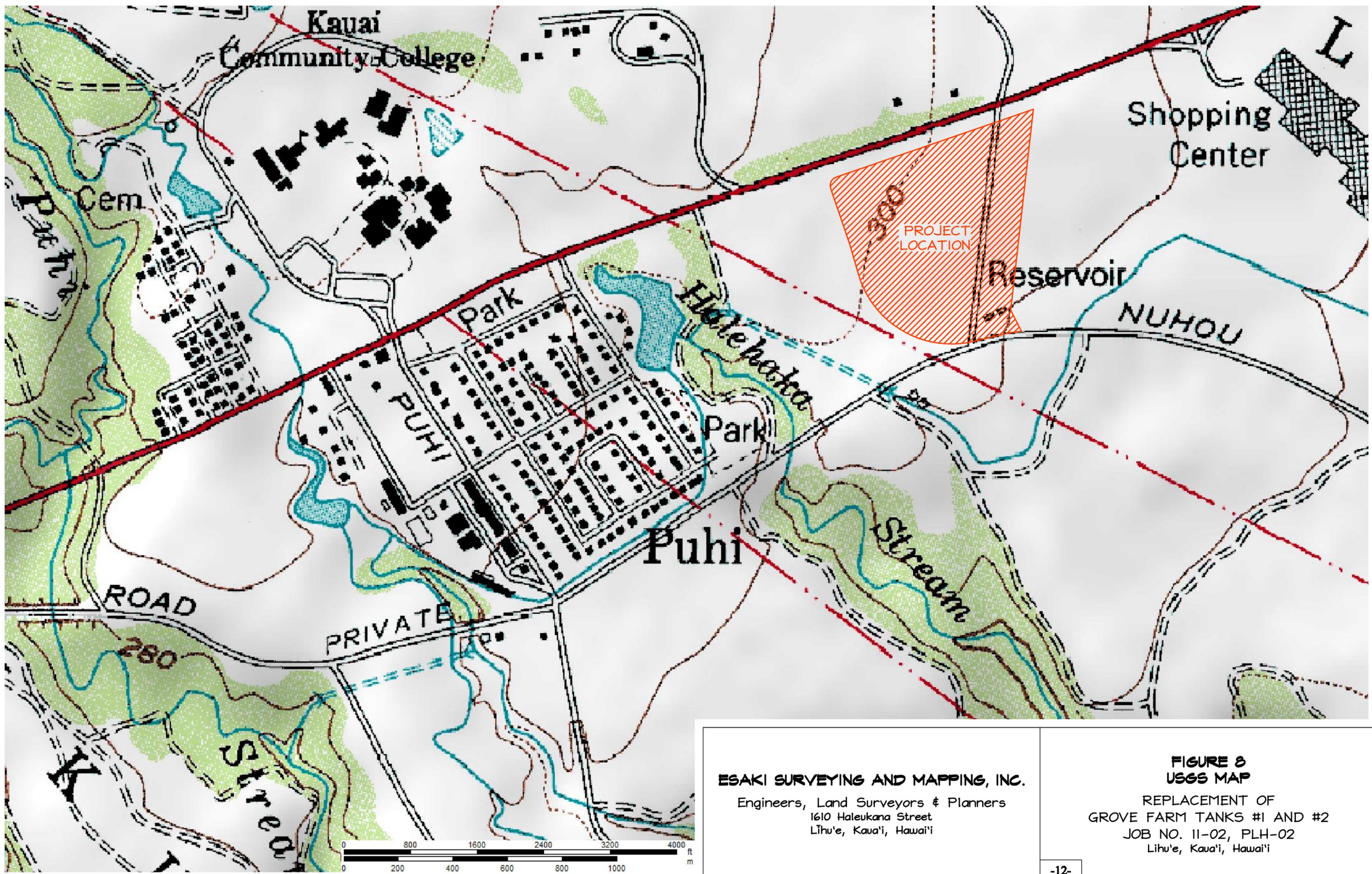
C. GEOLOGY, TOPOGRAPHY AND SOILS

Existing Conditions: Kauai is the fourth largest island in the Hawaiian group and considered to be one of the oldest geologically. The island is volcanic in origin, and in general geological terms, is described as a dissected basaltic dome of a single large shield volcano. Kauai was formed by the passage of the Pacific plate over the Hawai'i hotspot, generating two major lava flows: the Waimea volcanic series and the Kōloa volcanic series. The rocks on Kaua'i are all volcanic, except for minor amounts of sediments derived from volcanic rocks by erosion, and a narrow, discontinuous fringe of calcareous reef and beach deposits.

Ground elevations within the project area ranges from a high of 293 feet to a low of 287 feet above mean sea level for the tank location. Cross slope is minimal. See Figure 8 for USGS Map.

The soils of Kauai have developed primarily from volcanic materials and have concentrated iron and aluminum in the profiles. The quantities of silica and bases are low, particularly in the high rainfall areas, due to leaching of these materials. According to the U.S. Department of Agriculture (USDA), Natural Resources Conservation Service, the soil in the region is primarily Lihue silty clay (LhB) with a small portion being Puhi silty clay loam (PnB). See Figure 9 for Soils Map.

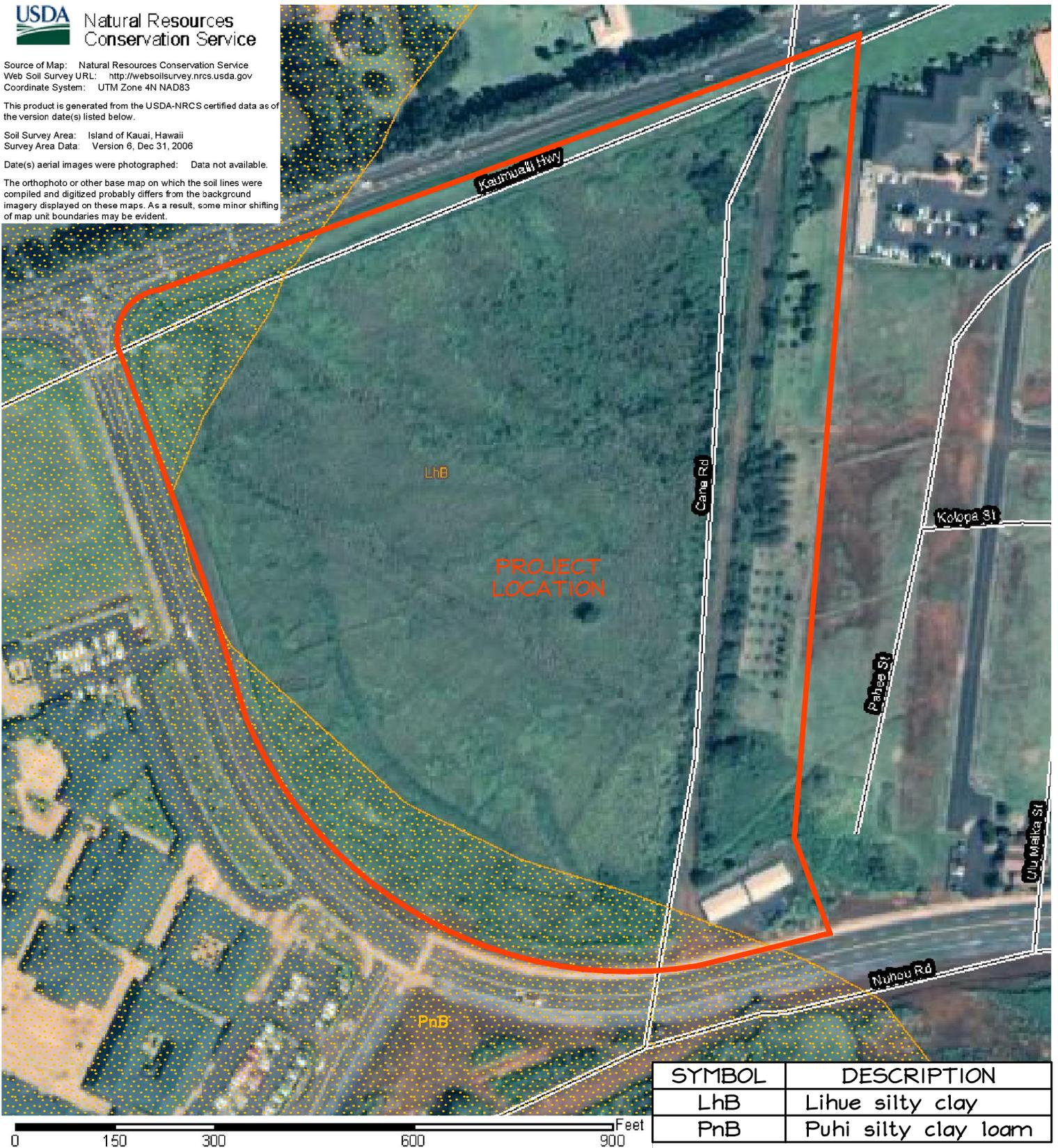
The Lihue series consists of deep, well drained soils that formed in material weathered from basic igneous rock and influenced by tropospheric dust. The Lihue soils have slow to rapid runoff depending on slope, and moderately rapid permeability; the soils are on uplands and have slope gradients ranging from 0 to 40 percent, with the dominant slope ranging from 3 to 15 percent.



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FIGURE 8
USGS MAP
 REPLACEMENT OF
 GROVE FARM TANKS #1 AND #2
 JOB NO. 11-02, PLH-02
 Lihu'e, Kauai, Hawaii

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
 Coordinate System: UTM Zone 4N NAD83
 This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.
 Soil Survey Area: Island of Kauai, Hawaii
 Survey Area Data: Version 6, Dec 31, 2006
 Date(s) aerial images were photographed: Data not available.
 The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.



SYMBOL	DESCRIPTION
LhB	Lihue silty clay
PnB	Puhi silty clay loam

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**FIGURE 9
 SOILS MAP**

REPLACEMENT OF
 GROVE FARM TANKS #1 AND #2
 JOB NO. 11-02, PLH-02
 Lihue, Kaua'i, Hawai'i

The Puhi series consists of deep, well drained soils that formed in material weathered from basic igneous rock. Puhi soils have very slow to rapid runoff, depending upon slope, and moderately rapid permeability; the soils are on uplands and have slopes of 3 to 40 percent, with dominant slopes from 3 to 15 percent.

Potential Impacts and Mitigative Measures: Impacts occurring on the physical terrain from development of the project site are expected to be minimal. Since the site is relatively flat, minimum grading will be required. To minimize soil erosion during the construction process, erosion control measures will be designed and implemented in accordance with applicable governmental regulations.

D. HYDROLOGY

Existing Conditions: The State Department of Land and Natural Resources (DLNR), Commission on Water Resource Management (CWRM) has established ground-water hydrologic units to provide a consistent basis for managing ground water resources. The units are primarily determined by subsurface conditions. In general, each island is divided into regions; each region is comprised of smaller sub-regions (see Figure 10). The proposed project site is located within the Līhu`e region, in the Hanamā`ulu sub-region. The CWRM lists the Hanamā`ulu sub-region as having a sustainable yield of 36 million gallons per day.

There are no wetlands within the project area (see Figure 11), but there are wetlands in the vicinity of project area which can be identified as:

- Riverine R3UBH: riverine system which covers 5.01 acres, it is an upper perennial subsystem with an unconsolidated bottom and is permanently flooded.



HANALEI
86 MGD / 202

KALIHUWAI
11 MGD / 20201

KILAUEA
5 MGD / 20105

Haena

Hanalei

Kalihiwai

Moloaa

Kalalau

HANALEI
34 MGD / 20202

Anahola

NAPALI
17 MGD / 20204

WAINIHA
24 MGD / 20203

ANAHOLA
17 MGD / 20104

WAIMEA
37 MGD / 20302

Kapaa

KEKAHA
10 MGD / 20301

WAILUA
43 MGD / 20103

Wailua

LIHUE
131 MGD / 201

MAKAWELI
26 MGD / 20303

Hanamaulu

Kekaha

HANAMAULU
36 MGD / 20102

LIHUE

Nawiliwili

WAIMEA
95 MGD / 203

Waimea

Makaweli

KOLOA
30 MGD / 20101

PROJECT LOCATION

Hanapepe

HANAPEPE
22 MGD / 20304

Makahuena Pt.



COMMISSION ON
WATER RESOURCE MANAGEMENT

ISLAND OF KAUAI

TOTAL = 312 MGD

HYDROLOGIC UNITS
Sustainable Yield / Aquifer Code

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FIGURE 10 GROUND WATER HYDROLOGIC UNITS

REPLACEMENT OF
GROVE FARM TANKS #1 AND #2
JOB NO. 11-02, PLH-02
Lihu'e, Kaua'i, Hawai'i



U.S. Fish and Wildlife Service
National Wetlands Inventory

Mar 12, 2012



Wetlands

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

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

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**FIGURE II
 WETLANDS MAP**

REPLACEMENT OF
 GROVE FARM TANKS #1 AND #2
 JOB NO. 11-02, PLH-02

Līhu'e, Kaua'i, Hawai'i

- Freshwater Pond PUBHx: palustrine systems which encompass 1.26 acres and 1.39 acres respectively, have an unconsolidated bottom, are permanently flooded, and lie within a basin or channel that have been dug, gouged, blasted or suctioned through artificial means by man.

There are no coastal waters in the vicinity of the project area.

Proposed Actions: Demolition of two existing 100,000 gallon tanks, grubbing and grading of tank site and construction of new tank and access road to tank.

Potential Impacts and Mitigative Measures: Most of the improvements will occur within the previously developed tank site area. Best Management Practices (BMP's) shall be provided at all times to the maximum extent practicable to prevent discharge of pollutants, including sediment and contaminants from the construction site to streams, watercourses, natural areas and the property of others.

As a result, no direct impacts on ground, surface and coastal waters should occur. All discharges related to the project construction or operation activities, whether or not NPDES permit coverage and/or Section 401 WQC are required, will comply with the State's Water Quality Standards (HAR, Chapter 11-54).

E. FLOOD HAZARD AND DRAINAGE

Existing Conditions: Lot 1546 is not in an identified flood area and is designated as "Zone X" on Kaua'i County's Flood Insurance Rate Map dated November 26, 2010. Zone X is defined as "Areas determined to be outside the 0.2% annual chance flood plain." See Figure 12 for Flood Hazard Assessment Report.

The subject property is located outside of the tsunami evacuation zone and is not threatened by any potential tsunami inundation (see Figure 13).



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

COUNTY: KAUAI
TMK NO: (4) 3-3-003-046
PARCEL ADDRESS:
FIRM INDEX DATE: NOVEMBER 26, 2010
LETTER OF MAP CHANGE(S): NONE
FEMA FIRM PANEL(S): 1500020309E-SEPTEMBER 16, 2005
 1500020307E-SEPTEMBER 16, 2005

PARCEL DATA FROM: DECEMBER 2009
IMAGERY DATA FROM: MAY 2005

IMPORTANT PHONE NUMBERS

County NFIP Coordinator
 County of Kauai
 Wynne Ushigome, P.E. (808) 241-4890
State NFIP Coordinator
 Carol Tyau-Beam, P.E., CFM (808) 587-0267

Disclaimer: The Department of Land and Natural Resources 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 Department of Land and Natural Resources from any liability, which may arise from its use.

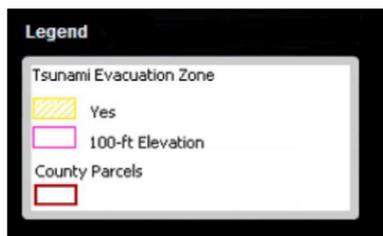
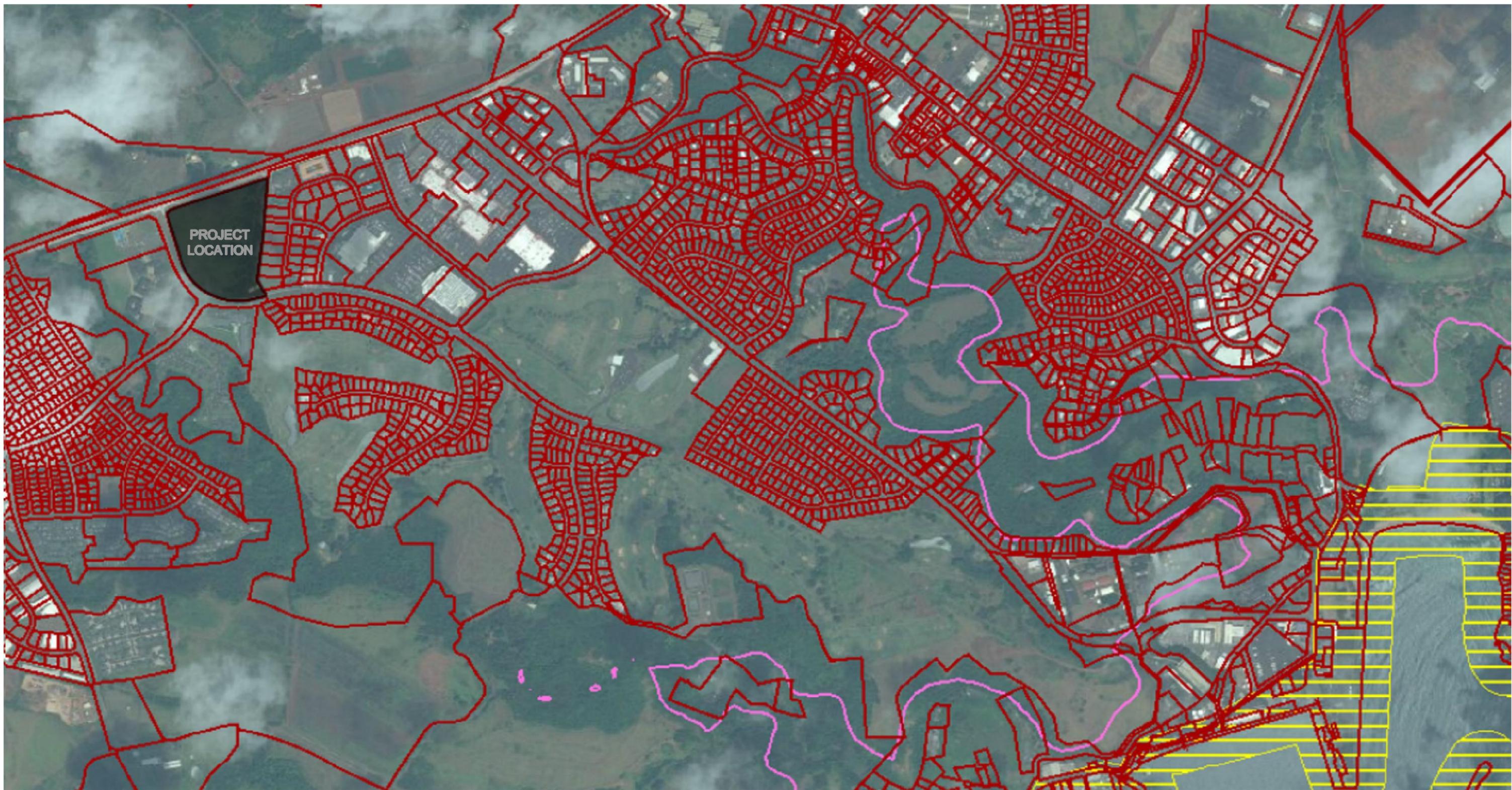
Preliminary DFIRM Disclaimer: If this map has been identified as "PRELIMINARY", please note that it is being provided for commenting purposes only and is not to be used for official/legal decisions or regulatory compliance.

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FIGURE 12 FLOOD INSURANCE RATE MAP

REPLACEMENT OF
 GROVE FARM TANKS #1 AND #2
 #1 AND #2
 JOB NO. 11-02, PLH-02
 Lihue, Kauai, Hawaii



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FIGURE 13
TSUNAMI EVACUATION ZONE MAP
 REPLACEMENT OF
 GROVE FARM TANKS #1 AND #2
 JOB NO. 11-02, PLH-02
 Līhu'e, Kaua'i, Hawai'i

Proposed Actions: There will be no action that will affect the base flood elevation.

Potential Impacts and Mitigative Measures: Flows from the washout and overflow lines of the new tank will be directed to an existing drain structure located along Nuhou Street. Approval to connect and discharge to the County Drainage System from the Department of Public Works will be required.

F. FLORA AND FAUNA

Existing Conditions: Vegetation on the site consists of heavy ground cover and trees such as coconut trees, kukui nut trees, etc. The property does not contain any rare, threatened or endangered species of flora. Considering the proximity of the property to the residential and commercial neighborhood and public school, there are no rare, threatened, or endangered species of fauna known to exist on the project site.

Proposed Actions: The site currently contains groundcover that will require grubbing, clearing and removal. Landscaping will occur in the last stage of construction.

Potential Impacts: Adverse impacts are not anticipated. The proposed project is not expected to have a significant impact on flora or fauna as the site was previously developed for the construction of the two concrete tanks.

G. HISTORIC SITES

Existing Conditions: The subject site was previously developed as indicated by the existing tank facilities. There is no evidence that any potentially significant cultural resources exist on the project site.

The Kauai General Plan contains a set of Heritage Resources Maps, these maps document important natural, scenic and historic features that are important to the County of Kaua'i and that are intended to be conserved. See Figure 14 for the Heritage Resource map for the Lihue Planning District.

Proposed Action: Grubbing and grading of tank site, demolition of existing tanks and construction of new tank, access road to tank, connecting pipeline and security fence.

Potential Impacts: Should subsurface features or qualified burials be unearthed during construction activities, work shall cease in the immediate area of the find and the find shall be protected from further damage. The Contractor will notify the County of Kaua'i Planning Department and the State Historic Preservation Division. Disinterment of qualified gravesites shall comply with Chapter 6E H.R.S.

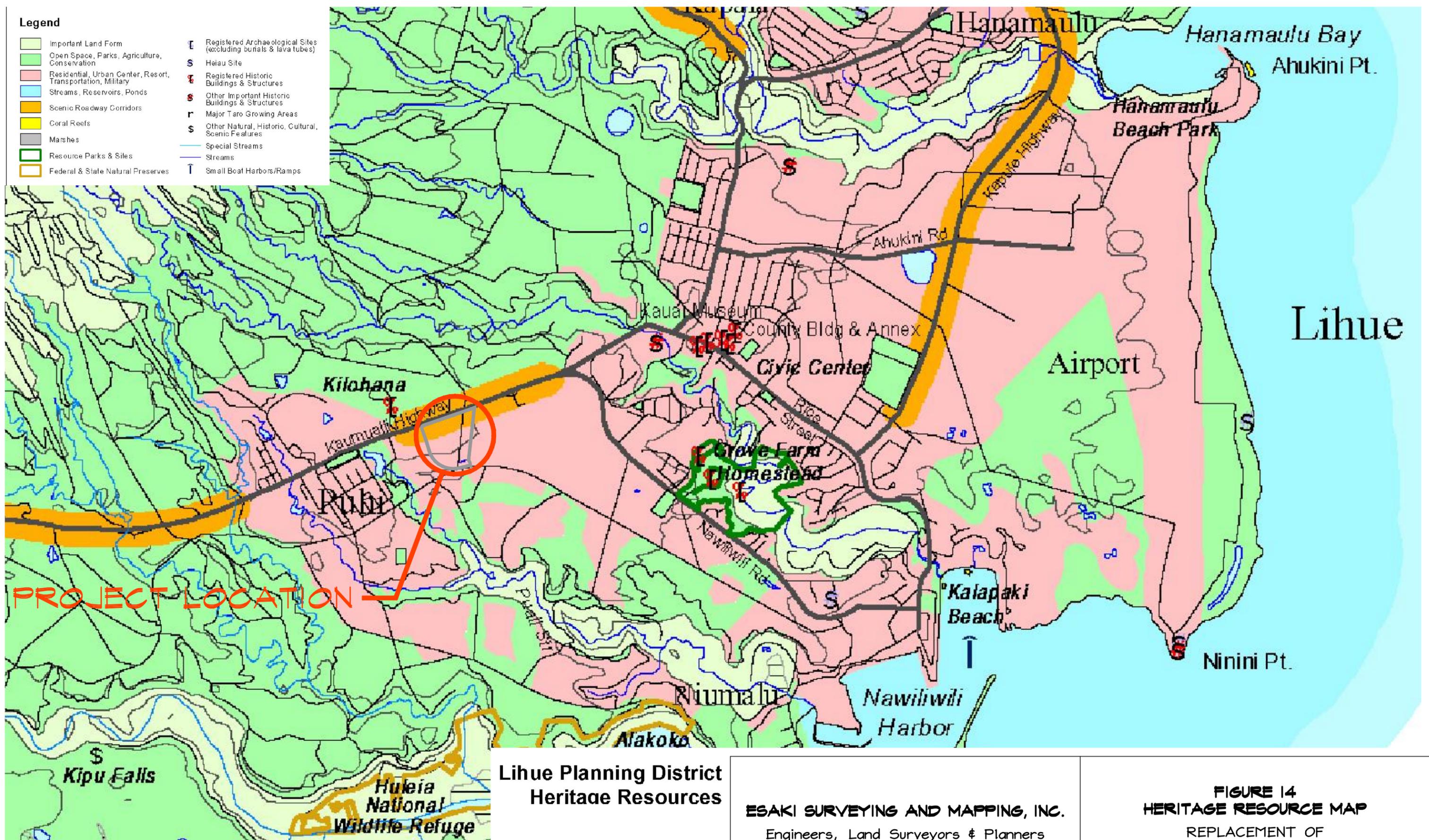
H. LAND USE CONTROLS

Existing Conditions: The property is classified as Urban by the State Land Use Commission, and is in the County Zoning District of General Commercial (C-G), see Figure 15. The proposed project will not require a Class IV Zoning Permit or a Use Permit (See Appendix C, page C-1).

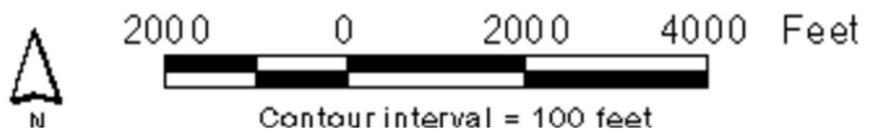
According to the State Land Use Commission, the Urban District generally includes lands characterized by “city-like” concentrations of people, structures and services. This District also includes vacant areas for future development. Jurisdiction of this district lies primarily with the respective counties. Generally, lot sizes and uses permitted in the district area are established by the respective county through ordinances or rules.

Legend

- Important Land Form
- Open Space, Parks, Agriculture, Conservation
- Residential, Urban Center, Resort, Transportation, Military
- Streams, Reservoirs, Ponds
- Scenic Roadway Corridors
- Coral Reefs
- Marshes
- Resource Parks & Sites
- Federal & State Natural Preserves
- Registered Archaeological Sites (excluding burials & lava tubes)
- Heiau Site
- Registered Historic Buildings & Structures
- Other Important Historic Buildings & Structures
- Major Taro Growing Areas
- Other Natural, Historic, Cultural, Scenic Features
- Special Streams
- Streams
- Small Boat Harbors/Ramps



**Lihue Planning District
Heritage Resources**



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**FIGURE 14
 HERITAGE RESOURCE MAP**
 REPLACEMENT OF
 GROVE FARM TANKS #1 AND #2
 JOB NO. 11-02, PLH-02
 Lihue, Kauai, Hawaii

LEGEND
ZONING DISTRICTS

RESIDENTIAL DISTRICT
 R-1 (1 UNIT/ACRE) **R-1** R-6 (6 UNITS/ACRE) **R-6**
 R-2 (2 UNITS/ACRE) **R-2** R-10 (10 UNITS/ACRE) **R-10**
 R-4 (4 UNITS/ACRE) **R-4** R-20 (20 UNITS/ACRE) **R-20**

RESORT DISTRICT
 RR-10 (10 UNITS/ACRE, 20 HOTEL RMS. PER ACRE) **RR-10**
 RR-20 (10 UNITS/ACRE, 40 HOTEL RMS. PER ACRE) **RR-20**

COMMERCIAL DISTRICT
 NEIGHBORHOOD **C-N**
 GENERAL **C-G**

INDUSTRIAL DISTRICT
 LIMITED **I-L**
 GENERAL **I-G**

AGRICULTURE DISTRICT
AG

OPEN DISTRICT
O

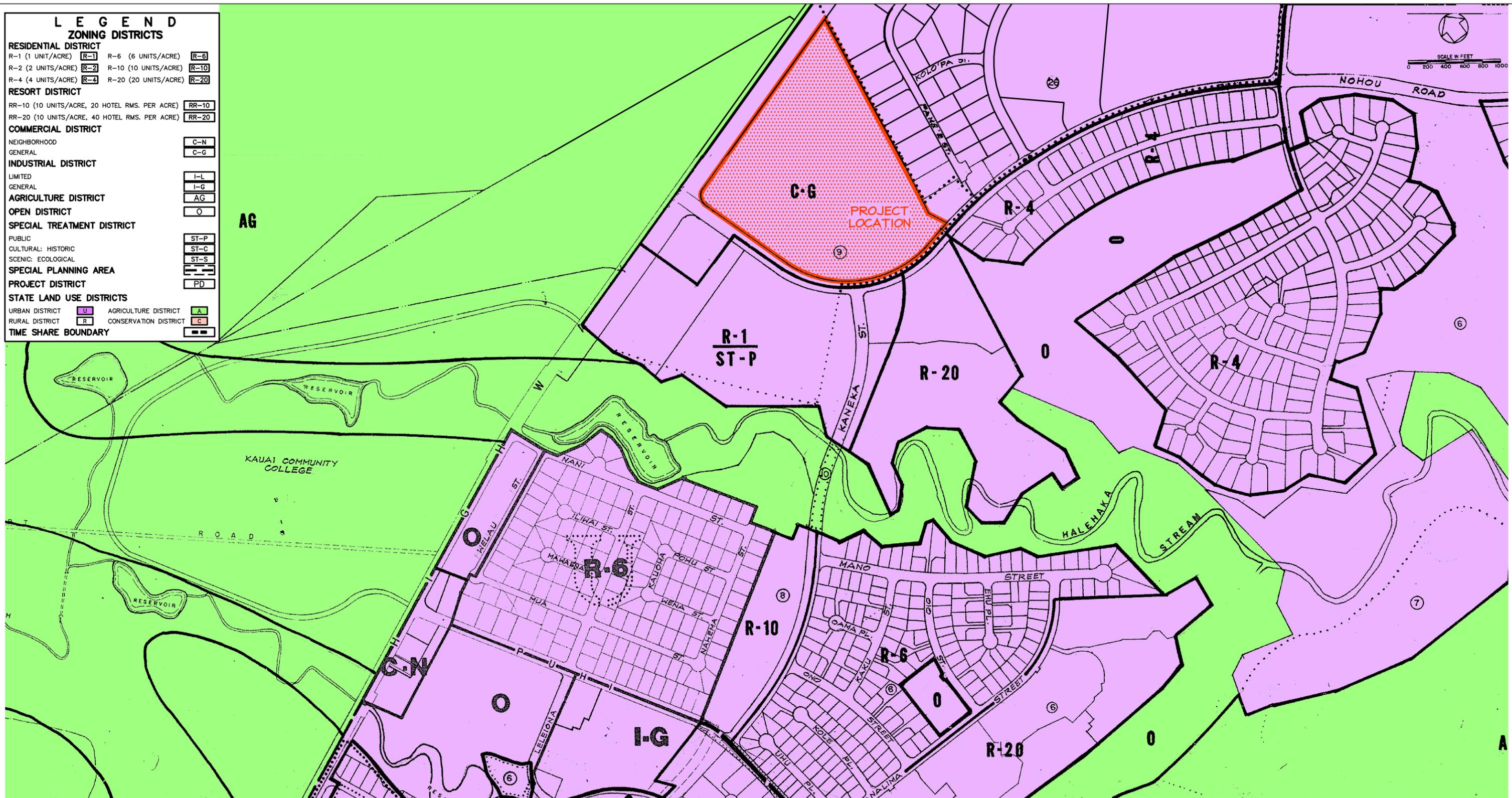
SPECIAL TREATMENT DISTRICT
 PUBLIC **ST-P**
 CULTURAL: HISTORIC **ST-C**
 SCENIC: ECOLOGICAL **ST-S**

SPECIAL PLANNING AREA
SP

PROJECT DISTRICT
PD

STATE LAND USE DISTRICTS
 URBAN DISTRICT **U** AGRICULTURE DISTRICT **A**
 RURAL DISTRICT **R** CONSERVATION DISTRICT **C**

TIME SHARE BOUNDARY
TS



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FIGURE 15
ZONING MAP
 REPLACEMENT OF
 GROVE FARM TANKS #1 AND #2
 JOB NO. 11-02, PLH-02
 Lihue, Kauai, Hawaii

© Amended from O, I-L, I-G to I-L 10-18-01 by ZA-2001-2
 © ZA-93-3
 © Amended from Ag. District (A) to General Commercial District (C-G) by COUNCIL 1-19-88 Ordinance No. PM-160-88

The Kauai County Comprehensive zoning states that the General Commercial District shall include uses and services which are less frequently used and which are normally supplemented by and dependent upon the aggregate activities of a central commercial center serving several residential neighborhoods and which are less compatible with the environmental qualities of residential districts.

The project area is located outside of the Special Management Area (SMA) and is not subject to the County's SMA rules and regulations, see Figure 16.

The Kauai General Plan contains a set of Land Use maps that depict the policy for long-range land uses and future growth. See Figure 17 for the Land Use map for the Lihue Planning District.

Proposed Action: The proposed use of the property will be consistent with the conditions of the surrounding region and with the current use of the project site.

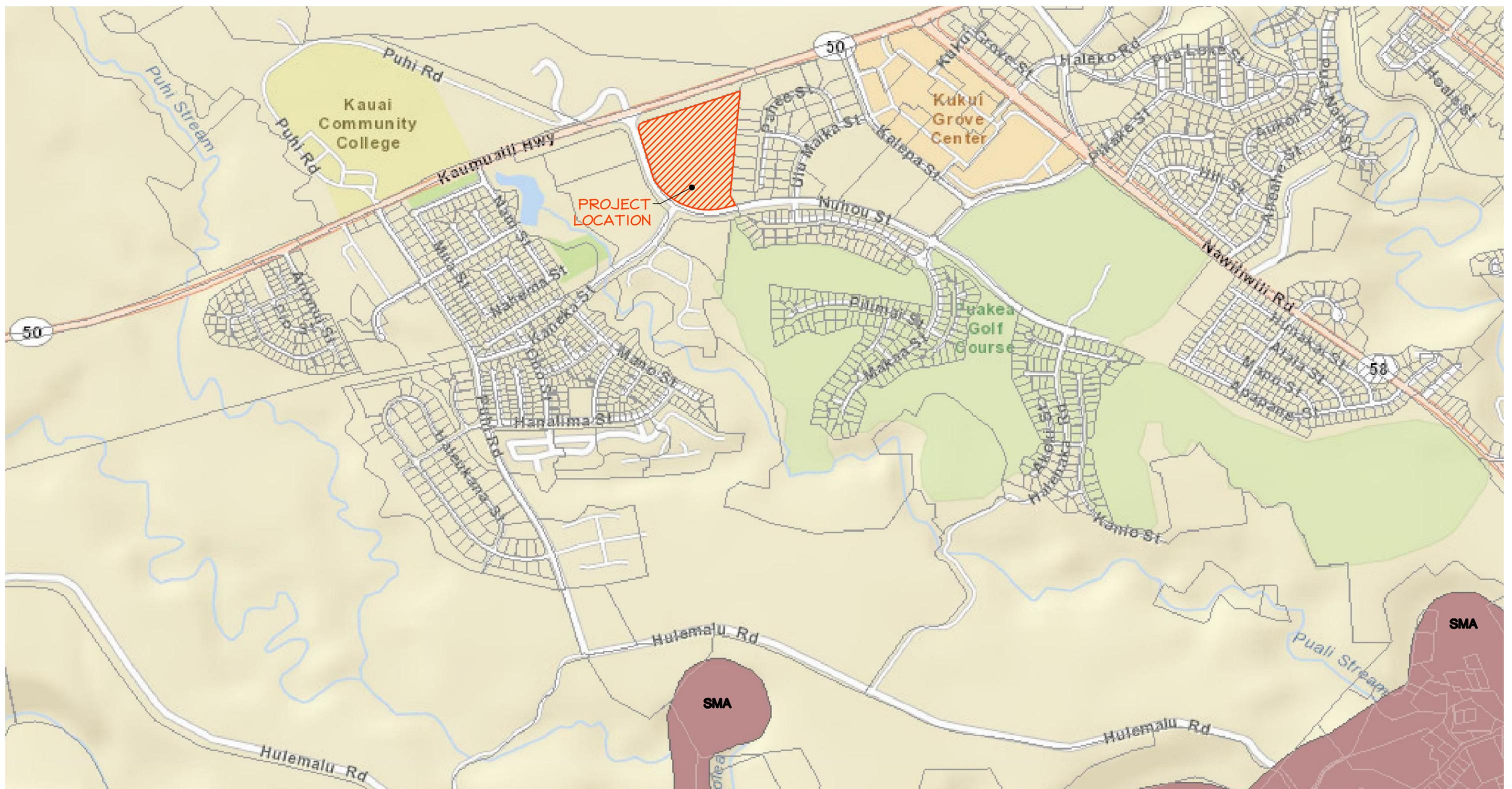
Potential Impacts: The proposed use should not conflict with the zoning of nearby properties.

I. AIR QUALITY

Existing Conditions: There are no major air pollutant generators in the project area. Occasional dust is generated by local traffic.

Potential Impacts and Mitigative Measures: Construction activities may result in short-term air quality impacts, including the generation of dust from soil excavation and emissions from construction vehicles and equipment.

To mitigate these impacts, all phases of excavation and construction will be required to comply with the Hawai'i Administrative Rules, §11-60.1-33 on Fugitive Dust and all applicable County ordinances.

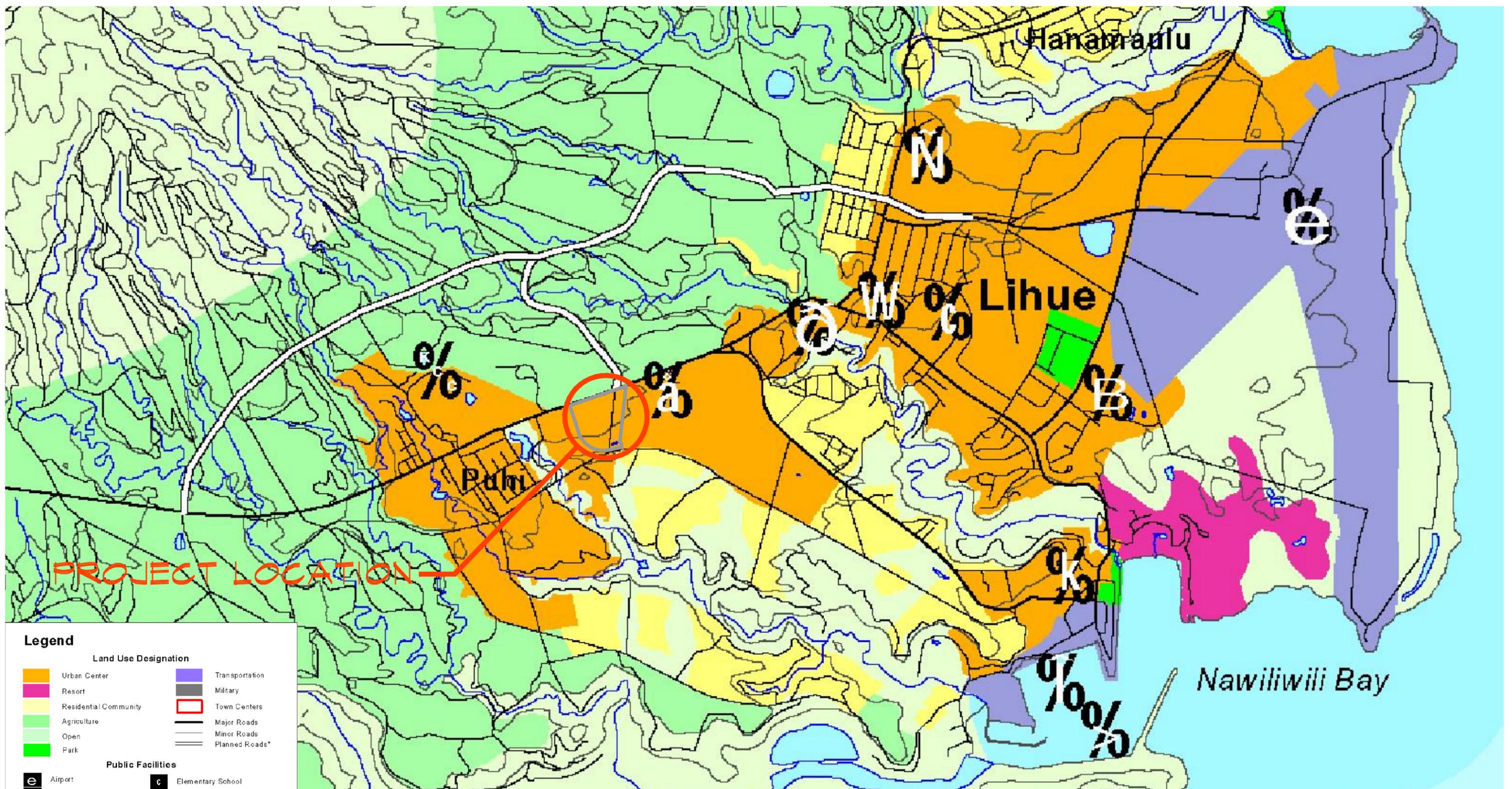


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**FIGURE 16
 SMA MAP**

REPLACEMENT OF
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 JOB NO. 11-02, PLH-02
 Lihue, Kauai, Hawaii

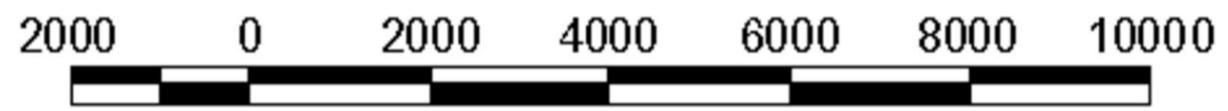


Legend

Land Use Designation	
Urban Center	Transportation
Resort	Military
Residential Community	Town Centers
Agriculture	Major Roads
Open	Minor Roads
Park	Planned Roads*
Public Facilities	
Airport	Elementary School
Civic Center	Intermediate/Middle School
Commercial Harbor	High School
Community College	Landfill
Correctional Center	Hospital
Electric Power Plant	Sugar Mill
Electric Power (future)	Wastewater Treatment Plant
Small Boat Harbor	

* actual alignment to be determined

**Lihue Planning District
Land Use Map**



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**FIGURE 17
LAND USE MAP**
 REPLACEMENT OF
 GROVE FARM TANKS #1 AND #2
 JOB NO. 11-02, PLH-02
 Lihue, Kauai, Hawaii

To comply with the fugitive dust regulations, the Department of Water will require that the Contractor implement adequate dust control measures, such methods include, but are not limited to, the following:

- Planning different phases of construction, focusing on minimizing the amount of dust generating materials and activities, centralizing on-site vehicular traffic routes, and locating potentially dusty equipment to areas of the least impact;
- Providing an adequate water source at the site prior to start-up of construction activities;
- Landscaping and providing rapid covering of bare areas, including slopes, starting from the initial grading phase;
- Providing adequate dust control measures during weekends, after hours, and prior to daily start-up of construction activities;
- Minimizing dust from shoulders and access roads; and
- Controlling dust from debris being hauled away from the project site. Also, controlling dust from daily operations of material being processed, stockpiled, and hauled to and from the facility.

Exhaust emissions from construction equipment and vehicles are not anticipated to significantly alter ambient air quality and can be minimized by proper operation and maintenance of all petroleum-fueled equipment. In addition, the prevailing winds can be expected to dilute and disperse exhaust emissions away from existing homes. At completion of the project, air quality for the existing residential community will revert to pre-construction levels.

J. NOISE

Existing Conditions: The property is currently being impacted by noise mainly from local traffic and the nearby middle school, and also temporarily from construction work for the Hokulei Village Shopping Center.

Proposed Actions: Noise levels are expected to increase once construction starts on the property. Maximum sound level would fall in the 85-96 dB(A) range with the latter generated by earth moving and pneumatic impact equipment.

Noise should be most pronounced during site work followed by reductions in frequency and duration during actual construction and post construction phases.

Potential Impacts and Mitigative Measures: The project abuts an existing residential development and it is possible that residents may be disturbed by construction noises. Although noise cannot be eliminated entirely and may be thought of as a short-term deleterious consequence, the Contractor will provide effective control measures to minimize construction related noise from impacting the residents in the immediate area. The hours of operation will also be regulated. If required, a Department of Health Community Noise Permit will be obtained. In the long run, it is anticipated that noises emanating from the completed project will be similar to the pre-construction levels.

K. HOUSING

Potential Impacts and Mitigative Measures: Puhi has a total of 1,042 housing units of which 94.7% are occupied. The median number of rooms is 4.6 and the median home value is \$405,700. When completed, the proposed project will upgrade the water system in the Puhi - Līhu`e - Hanamā`ulu service area and will provide landowners in the Līhu`e area with more storage capacity.

L. SOCIO ECONOMIC CHARACTERISTICS

Existing Conditions: The project is located in the Puhi Census-Designated Place (CDP). A CDP can be described as a geographic entity within an unincorporated place identified by the United States Census Bureau for statistical purposes.

Demographic and other information was reviewed from the 2010 U.S Census, see Figure 18 for demographic characteristics. Based on the data shown in Figure 18, the Puhi CDP has a slightly younger population than the County, with a median age of 40.1 years compared to 41.3 years.

The Puhi CDP has a similar racial mix to the County and has a comparable percentage of family and nonfamily households when compared to the County.

Potential Impacts: There will be no action that will affect the demographic characteristics of the Puhi CDP.

M. PUBLIC UTILITIES AND SERVICES

1. Access:

Existing Conditions: Access to the project site will be from Nuhou Street. Kaumuali`i Highway is a State Right of Way with a paved surface. Nuhou Street is a privately owned Right of way that is for public use and maintained by the County of Kauai, it also has a paved surface.

Additionally, the State Department of Transportation - Highways Division has an independent project referred to as “Kaumuali`i Highway Widening, from Lihu`e to west of Maluhia Road, Federal Aid Project No. STP-050-1(26)” which involves widening Kaumuali`i Highway from a two-lane undivided roadway to a four lane divided roadway.

DEMOGRAPHIC CHARACTERISTICS				
SUBJECT	PUHI CDP		KAUA'I COUNTY	
	Number	Percent	Number	Percent
Total Population	2,906	100.0	67,091	100.0
AGE				
Under 5 years	186	6.4	4,281	6.4
5 to 9 years	188	6.5	4,179	6.2
10 to 14 years	198	6.8	4,055	6.0
15 to 19 years	187	6.4	4,146	6.2
20 to 24 years	156	5.4	3,472	5.2
25 to 29 years	166	5.7	4,161	6.2
30 to 34 years	188	6.5	3,980	5.9
35 to 39 years	178	6.1	4,018	6.0
40 to 44 years	202	7.0	4,354	6.5
45 to 49 years	273	9.4	4,849	7.2
50 to 54 years	243	8.4	5,390	8.0
55 to 59 years	180	6.2	5,483	8.2
60 to 64 years	131	4.5	4,738	7.1
65 to 69 years	114	3.9	3,234	4.8
70 to 74 years	89	3.1	2,113	3.1
75 to 79 years	73	2.5	1,632	2.4
80 to 84 years	62	2.1	1,390	2.1
85 years and over	92	3.2	1,616	2.4
Median age (years)	40.1	(X)	41.3	(X)
RACE				
White	531	18.3	22,159	33.0
Black or African American	6	0.2	278	0.4
American Indian and Alaska Native	4	0.1	254	0.4
Asian	1,587	54.6	21,016	31.3
Native Hawaiian and Other Pacific Islander	118	4.1	6,060	9.0
Some Other Race	30	1.0	608	0.9
Two or More Races	630	21.7	16,716	24.9
HOUSEHOLDS BY TYPE				
Total households	932	100.0	23,240	100.0
Family households (families)*	661	70.9	16,147	69.5
Nonfamily households*	271	29.1	7,093	30.5
Average household size	3.10	(X)	2.84	(X)
Average family size*	3.63	(X)	3.31	(X)
HOUSING OCCUPANCY AND TENURE				
Total housing units	1,024	100.0	29,793	100.0
Owner-occupied housing units	582	56.8	13,968	46.9
Renter-occupied housing units	350	34.2	9,272	31.1
Vacant housing units	92	9.0	6,553	22.0
<p>"Family households" consist of a householder and one or more other people related to the householder by birth, marriage, or adoption. They do not include same-sex married couples even if the marriage was performed in a state issuing marriage certificates for same-sex couples. Same-sex couple households are included in the family households category if there is at least one additional person related to the householder by birth or adoption. Same-sex couple households with no relatives of the householder present are tabulated in nonfamily households.</p> <p>"Nonfamily households" consist of people living alone and households which do not have any members related to the householder.</p>				
Source: U.S. Census Bureau, 2010 Census.				

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Engineers, Land Surveyors & Planners
1610 Haleukana Street
Lihū'e, Kaua'i, Hawai'i

**FIGURE 18
DEMOGRAPHIC CHARACTERISTICS**

REPLACEMENT OF
GROVE FARM TANKS #1 AND #2
#1 AND #2
JOB NO. 11-02, PLH-02
Lihū'e, Kaua'i, Hawai'i

This project is currently under construction, completion is anticipated in mid-2015, and the first segment (Anonui Road, west of the Kauai Community College campus to the approach to the Lihue Mill Bridge) was completed September, 2012.

2. Water:

Existing Conditions: The County of Kaua'i, Department of Water operates 13 water systems island wide. The project area is within the Puhi - Līhu'e - Hanamā'ulu water system which has the most diverse customer base. The proposed project will upgrade the existing system in this service area by increasing the storage capacity for customers in the area.

Potential Impacts and Mitigative Measures: The tank replacement will allow the Department of Water to help meet system demands and help to provide adequate storage capacity, especially during peak hours and emergencies, and will help to ensure an adequate and continuous supply of water to satisfy the current and future needs of customers served by this system.

3. Wastewater:

Existing Conditions: There is no public wastewater collection and disposal system in the project area; private individual systems are currently in use. Puhi Sewer & Water Co, Inc. currently provides wastewater services to certain areas of Puhi and Līhu'e and has a wastewater facility located at the end of Kani`o Street, Tax Map Key (4) 3-3-03: 35. Puhi

Sewer & Water Co, Inc. is governed by the Public Utilities Commission (PUC) and is a subsidiary of Grove Farm Properties.

Proposed Actions: No service improvements are planned at this time.

4. Solid Waste:

Existing Conditions: There is only one County sanitary landfill located in Kekaha, and four refuse transfer stations, the closest transfer station is the Līhu`e Transfer Station. Residential refuse collection services are available for the residential homes neighboring Kaumuali`i Highway and located across Chiefess Kamakahele Middle School. A typical refuse crew consists of one truck driver and two refuse collectors. Collection crews deliver refuse to the Refuse Transfer Station where refuse is loaded into high cube trailers and delivered to the Kekaha landfill.

Non-residential solid waste disposal in this area is provided by a private waste disposal company. Collected refuse is delivered to the Kekaha landfill for disposal.

Proposed Actions: All solid waste generated during project construction and by plant operations shall go to a DOH-permitted solid waste disposal or recycling facility.

5. Fire Protection:

Existing Conditions: Fire protection service for the project area is provided by the Līhu`e Fire Station which is one of eight County fire stations. Four (4) men are assigned to the station with three (3) on duty at all times with major firefighting equipment.

The Fire Department's Fire/Rescue/HazMat/Medical Response Operations program provides fire protection and suppression, rescue (ocean and land), hazmat and emergency medical services (basic life support).

Proposed Actions: No changes in existing service are planned for the proposed project.

6. Police Protection:

Existing Conditions: There are three Patrol Service Bureaus: Hanalei District (in the north), Līhu'e District (in the southeast) and Waimea District (in the southwest). The Līhu'e District provides police services from the south (starting at the Maluhia Tree Tunnel) to the east side (Kukui Street in Kapa`a Town) and incorporates the two busiest and most populated areas: the Kapa`a and Līhu'e communities, including Puhi, Nāwiliwili, Hanamā`ulu, and Wailua. When fully staffed, the Līhu'e District is composed of: 1 Lieutenant (a.k.a. District Commander), 3 Sergeants, 21 Police Officers, 1 full-time Clerk and 1 part-time Clerk. The Līhu'e District office is located on the first floor of the Kaua`i Police Department Headquarters in Līhu'e.

Proposed Actions: None.

7. Public Schools:

Existing Conditions: The Department of Education (DOE) has designated the entire Island of Kaua`i as a single district, this district is composed of three complexes: Waimea, Kaua`i and Kapa`a. Lihue is within the DOE's Kaua`i complex. Member schools of the Kaua`i complex are Elsie H.

Wilcox Elementary School, King Kaumuali'i Elementary School, Chiefess Kamakahelei Middle School and Kaua'i High School. The area also has a Public Charter School: Kawaikini New Century Public Charter School.

Proposed Action: None.

8. Utilities:

Existing Conditions: Electrical power and telephone services are available from overhead distribution lines along Kaumuali'i Highway, while underground electrical and telephone services run along Nuhou Street.

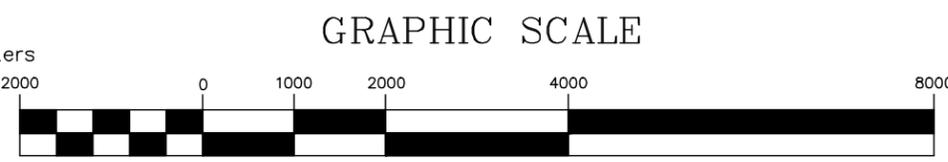
Proposed Actions: Electrical service for the operation of the facilities will be required. A Supervisory Control and Data Acquisition (SCADA) system will be installed at the new tank site to monitor and control tank operations. The SCADA system will be connected to existing Hawaiian Telcom lines.

9. Visual Effects:

Existing Conditions: This project involves construction of a new tank. The visual impact of the new tank will be comparable to the previous tank, although, the new tank is larger and taller than the existing tanks. For the short term, construction activities will affect aesthetics but in the long term, the installation of the water storage tank will not be detrimental to the aesthetics of the area. All exposed areas will be grassed in accordance with the County's grading ordinance. Therefore, no significant visual effect is expected.



- Ⓐ Puhi Sewer & Water Co., Inc. – Wastewater Facility
- Ⓑ Līhu'e Refuse Transfer Station
- Ⓒ Līhu'e Fire Station
- Ⓓ Kaua'i Police Department – Līhu'e Headquarters
- Ⓔ Elsie H. Wilcox Elementary School
- Ⓕ King Kaumuali'i Elementary School
- Ⓖ Chiefess Kamakahēlei Middle School
- Ⓗ Kaua'i High School
- Ⓘ Kawaikini New Century Public Charter School



GRAPHIC SCALE
 (IN FEET)
 1 inch = 2000ft.

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FIGURE 19
PUBLIC UTILITIES AND SERVICES MAP
 REPLACEMENT OF
 GROVE FARM TANKS #1 AND #2
 #1 AND #2
 JOB NO. 11-02, PLH-02
 Līhu'e, Kaua'i, Hawai'i

SECTION III

ALTERNATIVES TO THE PROPOSED ACTION

a) Alternative: Larger Tank

A 0.5 MG tank will help to meet the water storage need in Puhi - Līhu`e - Hanamā`ulu. A larger size tank would not be practicable due to the size constraint of the site.

b) Alternative: Smaller Tank

Because the Puhi - Līhu`e - Hanamā`ulu water service area has increasing demand, a smaller tank would not help meet the storage capacity needs of existing and future demands of the area. Furthermore, reducing the size of the new tank would not significantly reduce the environmental impacts associated with the project. For these reasons, this is an unacceptable alternative.

c) Alternative: Delayed Action

Delaying the project could negatively affect DOW customers in the Puhi - Līhu`e - Hanamā`ulu service area if a problem arose with storage elsewhere in the system, leaving the area without adequate water reserves. The system's deficiency would result in decreased system reliability and potentially inadequate fire protection capabilities. Additionally, conditions would only worsen as the population in the service area grows. Consequently, this is not a viable alternative.

d) Alternative: No Action

The existing tanks are temporarily off line until they are demolished and replaced.

A no action alternative should not be considered because the tanks are leaking and in need of replacement. An inadequate storage facility may result in an interruption of service during maximum day demand through the highest usage season and inadequate supply during severe fire emergencies.

e) Alternative: Increasing Existing Tank Size

This alternative is commonly dismissed from serious consideration since concrete tanks are typically designed to the original design capacity, and are not structurally expandable. Also, it would be hard to undertake the tank expansion while maintaining water quality in the reservoir and continuing to serve customers in the Puhī - Līhu`e - Hanamā`ulu area.

f) Alternative: Different Location

An alternative tank site would involve the development of a new suitable tank site. Department of Water would have to undertake the removal of the existing tanks once the new tank is completed or abandon in place the existing tanks. Additionally, the development of a new suitable tank site would result in further postponement of this much need system upgrade.

SECTION IV

ASSESSMENT PROCESS AND DETERMINATION OF SIGNIFICANCE

Assessment Process

The scope of the project was discussed with the Applicant and representatives of the Department of Water. Based on information obtained, the Environmental Assessment was prepared. Time was spent evaluating the site and observing conditions in the surrounding area.

Determination of Significance and Recommendation

Chapter 200 of Title 11, Administrative Rules of the Department of Health entitled “Environmental Impact Statement Rules” established criteria for evaluating whether and action may have a significant effect on the environment. The relationship of the proposed project to these criteria is discussed below.

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

Since the site was previously a tank site, the project will not result in a significant loss or destruction of natural or cultural resources.

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

Proposed improvements would involve facility upgrades and existing land uses. Considering the existing zoning of the land, the proposed development is considered an appropriate use.

3. *Conflicts with the State's long-term environmental policies of goals and guidelines are expressed in Chapter 344, Hawai'i Revised Statutes, and any revisions thereof and amendments thereto, court decisions or executive orders.*

The project enriches the well being of the area with no damage to the environment.

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

The budget for the project \$2,000,000 will not substantially affect the economy adversely while providing a public utility. The jobs created will temporarily boost the economy.

5. *Substantially affects public health.*

The project will not require the use of hazardous materials or construction methodology that would be detrimental to the public health and safety of the area residents. Therefore, the project will not substantially affect public health. It is an implementing action that improves a public utility.

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

The number of lots, population and demand for public services and facilities will not be increased due to this project.

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

Any effect on the environment during construction will be limited in area and short in duration.

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

The proposed project does not involve a commitment for larger actions in the immediate area but is part of a multi-phased project.

The proposed action represents the complete facility, with plans for proposed water treatment plant.

9. *Substantially affects a rare, threatened, or endangered species (plant and animal) or its habitat.*

The site is devoid of rare, threatened, or endangered species (plant and animal) as it is in an existing tank site, therefore, the project will not result in substantial negative effects on significant fauna and flora species (rare, threatened, or endangered) in the area.

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

Although fugitive dust and noises created during construction cannot be completely eliminated, such conditions can be mitigated and will only be temporary.

11. *Affects on environmentally sensitive area such as a flood plain, tsunami zone, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters.*

The proposed project is not in any such zone nor will it affect any such area.

12. *Substantially affects scenic vistas and vine plants identified in County or State plans or studies.*

The project location is an existing tank site and will not affect scenic vistas or vine plants.

13. *Requires substantial energy consumption.*

The only energy consumption will be for construction equipment and operation of the tank controls (after construction). The amount of electricity required will be small, and will not make a noticeable contribution to the island's overall energy use.

Based on the above criteria, the proposed project should not result in significant adverse environmental impacts. Potential environmental impacts are sufficiently disclosed in this Environmental Assessment and considered to be insignificant; therefore, it is recommended that Environmental Impact Statement is not required.

SECTION V

NAMES OF GROUPS AND INDIVIDUALS AFFECTED

BY THE PROPOSED PROJECT

<u>Tax Map Key</u>	<u>Names and Addresses</u>
(4) 3-3-03: 45	Regency at Puakea LLC. 2130 Kaneka Street Līhu`e, HI 96766
(4) 3-3-17: 01	Grove Farm Properties Inc. P.O. Box 662069 Līhu`e, HI 96766
(4) 3-3-17: 62	Dawn M. Murata Trust 4218 Puu Pinao Pl. Koloa, HI 96756
(4) 3-3-10: 16	Charles Tom & Bao Maria Pham Raco P.O. Box 1983 Līhu`e, HI 96766
(4) 3-3-10: 17	Grove Farm Land Corp. P.O. Box 662069 Līhu`e, HI 96766
(4) 3-3-10: 18	Air Dog Inc. 2841 Nimitz Hwy Honolulu, HI 96815

Names and addresses of affected groups and individuals were obtained from the County of Kaua`i Real Property Assessment and Treasury Divisions website (www.kauaipropertytax.com)

SECTION VI

REFERENCES

Water Plan 2020.

County of Kauaʻi, Department of Water.

March 2001.

Prepared by R.W. Beck and CH2MHill.

Tax Map (4) 3-3-03.

County of Kauaʻi, Real Property Assessment Division.

Corrected: December 11, 1984.

Līhuʻe Water System map.

County of Kauaʻi, Department of Water.

Latest revision: June, 2008.

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey.

Available online at <http://websoilsurvey.nrcs.usda.gov/>. Accessed November 17, 2011

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Official Soil Series Descriptions.

Available online at <http://soils.usda.gov/technical/classification/osd/index.html>.

Accessed: March 8, 2013.

Ground Water Hydrologic Unit Map, Island of Kauaʻi.

State of Hawaiʻi, Department of Land and Natural Resources - Commission on Water Resource Management.

Updated August 28, 2008.

U. S. Fish and Wildlife Service. Publication date September 26, 2011. National Wetlands Inventory website. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. <http://www.fws.gov/wetlands/>

National Flood Insurance Program.

Flood Hazard Assessment Tool.

Available online at <http://gis.hawaiiinfip.org/fhat/>

Accessed: November 17, 2011.

Puhi Zoning map.

County of Kauaʻi, Planning Department.

March, 1972. Latest revision: March 9, 1972.

Kaua`i 2012 Land Use District Boundary map.

State of Hawaiʻi, Land Use Commission.

http://luc.state.hi.us/maps/kauai_slud_2012.pdf

2007-2011 American Community Survey.

U.S. Census Bureau.

2010 Demographic Profile Data for Puhi CDP, Hawai'i.

U.S. Census Bureau. 2010 Census.

County of Kaua'i, Department of Public Works – Solid Waste Division

<http://www.kauai.gov/Government/Departments/PublicWorks/SolidWaste/tabid/121/Default.aspx>

Accessed: March 2012.

County of Kaua'i, Fire Department

<http://www.kauai.gov/Government/Departments/FireDepartment/tabid/107/Default.aspx>

Accessed: March 2012.

County of Kaua'i, Police Department

<http://www.kauai.gov/Government/Departments/PoliceDepartment/Departments/PatrolServicesBureau/PSBWaimeaDistrict/tabid/323/Default.aspx>

Accessed: March 2012.

State of Hawai'i, Department of Education

http://165.248.6.166/data/complex.asp?key_complex=42

Accessed: March 2012.

**FOUNDATION INVESTIGATION
0.5 MG WATER TANK
REPLACE GROVE FARM TANKS
#1 AND #2
PUHI, KAUAI, HAWAII**

for

ESAKI SURVEYING & MAPPING, INC.

**HIRATA & ASSOCIATES, INC.
W.O. 11-5201
November 28, 2011**



Hirata & Associates

Geotechnical
Engineering

Hirata & Associates, Inc.

99-1433 Koaha Pl
Aiea, HI 96701
tel 808.486.0787
fax 808.486.0870

November 28, 2011
W.O. 11-5201

Mr. Dennis Esaki
Esaki Surveying & Mapping, Inc.
1610 Haleukana Street
Lihue, Hawaii 96766

Dear Mr. Esaki:

Our report, "Foundation Investigation, 0.5 MG Water Tank, Replace Grove Farm Tanks #1 and #2, Puhi, Kauai, Hawaii," dated November 28, 2011, our Work Order 11-5201 is enclosed. This investigation was conducted in general conformance with the scope of services presented in our proposal dated May 19, 2011.

The surface soil was classified as reddish brown to brown clayey silt. The clayey silt was generally in a stiff condition, with occasional medium stiff sections, and extended to depths ranging from about 9 to 14 feet. Underlying the clayey silt was mottled reddish brown completely weathered basalt. The weathered basalt was in a medium stiff to stiff condition and extended to the maximum depths drilled. Laboratory testing on the clayey silt indicated that the soil has a low expansion potential. Neither groundwater nor seepage water was encountered in the borings.

Conventional shallow foundations bearing directly on the stiff, undisturbed clayey silt may be used to support the proposed water storage tank. The tank slab should be underlain by a minimum 6 inches of aggregate base course in lieu of the typical 4-inch gravel cushion.

The following is a summary of our geotechnical recommendations. This summary is not intended to be a substitute for our report which includes more detailed explanations of our recommendations, as well as additional requirements.

- Allowable bearing value = 3,000 psf
- Coefficient of friction = 0.4
- Passive earth pressure = 300 pcf

We appreciate this opportunity to be of service. Should you have any questions concerning this report, please feel free to call on us.

Very truly yours,

HIRATA & ASSOCIATES, INC.

Rick Yoshida

Vice President

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FOUNDATION INVESTIGATION
0.5 MG WATER TANK
REPLACE GROVE FARM TANKS #1 AND #2
PUHI, KAUAI, HAWAII

INTRODUCTION

This report presents the results of our foundation investigation performed for the proposed water storage tank in Puhi, Kauai, Hawaii. Our services for this study included the following:

- A visual reconnaissance of the site to observe existing conditions which may affect the project. The general location of the project site is shown on the enclosed Location Map, Plate A2.1.
- A review of available in-house soils information pertinent to the site and the proposed project.
- Drilling and sampling 6 exploratory borings to depths ranging from about 6.5 to 40.5 feet. A description of our field investigation is summarized on Plates A1.1 and A1.2. The approximate exploratory boring locations are shown on the enclosed Boring Location Plan, Plate A2.2, and the soils encountered in the borings are described on the Boring Logs, Plates A4.1 through A4.8.
- Laboratory testing of selected soil samples. Testing procedures are presented in the Description of Laboratory Testing, Plates B1.1 through B1.3. Test results are presented in the Description of Laboratory Testing, as well as on the Unified Soil Classification System Chart (Plate A3.2), Boring Logs (Plates A4.1 through A4.8), Consolidation Test reports (Plates B2.1 and B2.2), Direct Shear Test reports (Plates B3.1 and B3.2), Modified Proctor Test report (Plate B4.1) and CBR Test report (Plate B5.1).
- Engineering analyses of the field and laboratory data.
- Preparation of this report presenting geotechnical recommendations for the design of foundations, including seismic considerations, slabs-on-grade, resistance to lateral pressures, flexible pavement, and site grading.

PROJECT CONSIDERATIONS

The Preliminary Site Plan indicates that the tank will have a diameter of about 70 feet with a capacity of 0.5 MG. We understand that a treatment facility will be planned for the future and will not be included into this project.

The proposed water tank will be above grade, and as a result, only minor site grading is expected.

SITE CONDITIONS

The project site is located on the north side of Nohou Street, between its intersections with Kaneka Street and Ulu Maika Street in Puhi, Kauai. The site is bordered on the west by a dirt road, and on the north and east by undeveloped commercial lots covered by moderate to heavy growth of vegetation.

The site is occupied by two existing 0.1 MG water storage tanks. The existing tanks are rectangular in shape with floor elevations of about +290 and +287.5. A chain-link fence extends around the two tanks. Reinforced concrete barriers and boulders are situated in the southwestern portion of the site.

The site is relatively level with drainage generally flowing in a southeasterly direction. Total relief over the site is approximately 5 feet with elevations ranging from about +293 in the northwest to about +288 in the southeast.

SOIL CONDITIONS

The surface soil was classified as reddish brown to brown clayey silt. The clayey silt was generally in a stiff condition, with occasional medium stiff sections, and extended to depths ranging from about 9 to 14 feet in the borings drilled for the proposed water storage tank, and to the maximum depth drilled of about 6.5 feet in the boring drilled on the southeast area of the site near the proposed driveway.

Laboratory testing on the clayey silt indicates that the soil has a low expansion potential.

Underlying the clayey silt was mottled reddish brown completely weathered basalt. The weathered basalt was in a medium stiff to stiff condition and extended to the maximum depths drilled.

Neither groundwater nor seepage water was encountered in the borings.

CONCLUSIONS AND RECOMMENDATIONS

Based on our exploratory fieldwork and laboratory testing, we believe that from a geotechnical viewpoint, the site can generally be developed as planned.

Conventional shallow foundations bearing directly on the stiff, undisturbed clayey silt may be used to support the proposed water storage tank. The tank slab should be underlain by a minimum 6 inches of aggregate base course.

Foundations

Conventional shallow foundations founded directly on the stiff, undisturbed clayey silt may be used to support the proposed water storage tank. Foundations may be designed for an allowable bearing value of 3,000 pounds per square foot. The allowable bearing value is for the total of dead and frequently applied live loads and may be increased by one-third for short duration loading which includes the effects of wind and seismic forces.

Foundations should be a minimum 16 inches in width, and be embedded at least 18 inches below finish adjacent grade. Footings located on, or near the top of slopes, should be embedded such that a minimum horizontal distance of 5 feet is maintained between the bottom edge of footing and slope face.

The bottom of all footing excavations should be cleaned of loose or deleterious material prior to placement of reinforcing steel and concrete.

Seismic Design

Based on the borings drilled as part of this study and our knowledge of deep soil conditions in the area, the subsurface soils can be characterized as a stiff soil profile. Therefore, based on the 2006 International Building Code, Site Class D is recommended for this site.

Lateral Design

Resistance to lateral loading may be provided by friction acting at the base of foundations and by passive earth pressure acting on the buried portions of foundations.

A coefficient of friction of 0.4 may be used with the dead load forces. Passive earth pressure may be computed as an equivalent fluid having a density of 300 pounds per cubic foot with a maximum earth pressure of 3,000 pounds per square foot. Unless covered by pavement or concrete slabs, the upper 12 inches of soil should not be considered in computing lateral resistance.

For active earth pressure considerations, equivalent fluid pressures of 40 and 50 pounds per cubic foot may be used for level and sloping backfill conditions, respectively. To prevent buildup of hydrostatic pressures, weepholes or subdrains should be included in the design of all retaining structures.

Foundation Settlement

Although structural loads were not available at the time of this report, based on the stiff condition of the onsite clayey silt, excessive total and differential settlements are not anticipated.

Slabs-on-Grade

The water tank slab should be underlain by a minimum 6 inches of base course. The base course layer is in lieu of the typical 4-inch cushion of clean gravel.

Prior to placement of base course, the exposed subgrade should be scarified to a minimum depth of 6 inches, moisture conditioned to slightly above the optimum moisture content, and compacted to between 90 and 95 percent compaction as

determined by ASTM D 1557. The base course should be compacted to a minimum 95 percent compaction.

Exterior slabs-on-grade and concrete walkways should be underlain by at least 4 inches of aggregate base course in lieu of the gravel cushion.

Pavement Design

Flexible pavement for the proposed access road may be designed based on the following section.

2.0"	Asphaltic Concrete
6.0"	Base Course (minimum CBR = 85)
8.0"	Total Thickness

Prior to placement of the base course, the exposed subgrade soil should be scarified to a minimum depth of 6 inches, moisture conditioned to about 2 percent above optimum moisture content, and compacted to between 90 and 95 percent compaction as determined by ASTM D 1557. The aggregate base course should be compacted to a minimum 95 percent compaction as determined by ASTM D 1557.

Site Grading

Site Preparation - The project site should be cleared of all concrete slabs, vegetation, debris, and other deleterious material. In areas requiring fill placement, the exposed subgrade should be scarified to a minimum depth of 6 inches, moisture conditioned to about 2 percent above optimum moisture content, and compacted to between 90 and 95 percent compaction as determined by ASTM D 1557.

Structural Excavations - Based on our exploratory borings, we believe that excavations into the onsite soils can be accomplished using conventional excavating equipment.

Temporary cuts should be stable at gradients of 1H:1V or flatter. However, the contractor should be responsible for conforming to all OSHA safety standards during construction.

Onsite Fill Materials - The onsite clayey silt will be acceptable for reuse in compacted fills and backfills. All rock fragments larger than 3 inches in maximum dimension should be removed from the onsite clayey silt prior to reuse.

Imported Fill Material - Imported structural fill should be well-graded, non-expansive granular material. Specifications for imported granular structural fill should indicate a maximum particle size of 3 inches, and state that between 8 and 20 percent of soil by weight shall pass the #200 sieve. In addition, the plasticity index (P.I.) of that portion of the soil passing the #40 sieve shall not be greater than 10. Imported structural fill should have a CBR expansion value no greater than 1.0 percent and a minimum CBR value of 15 percent, when tested in accordance with ASTM D 1883.

Compaction - The onsite clayey silt should be placed in horizontal lifts restricted to eight inches in loose thickness and compacted to between 90 and 95 percent compaction as determined by ASTM D 1557. Imported granular structural fill should also be placed in horizontal lifts restricted to eight inches in loose thickness, but compacted to a minimum 95 percent compaction as determined by ASTM D 1557.

Fill placed in areas which slope steeper than 5H:1V should be continually benched as the fill is brought up in lifts.

ADDITIONAL SERVICES

We recommend that we perform a general review of the final design plans and specifications. This will allow us to verify that the foundation design and earthwork

recommendations have been properly interpreted and implemented in the design plans and construction specifications.

For continuity, we recommend that we be retained during construction to (1) observe footing excavations prior to placement of reinforcing steel, and concrete, (2) review and/or perform laboratory testing on import borrow to determine its acceptability for use in compacted fills, (3) observe structural fill placement and perform compaction testing, and (4) provide geotechnical consultation as required. Our services during construction will allow us to verify that our recommendations are properly interpreted and included in construction, and if necessary, to make modifications to those recommendations, thereby reducing construction delays in the event subsurface conditions differ from those anticipated.

LIMITATIONS

The boring logs indicate the approximate subsurface soil conditions encountered only at those times and locations where our borings were made, and may not represent conditions at other times and locations.

This report was prepared specifically for Esaki Surveying & Mapping, Inc. and their subconsultants for design of the proposed water storage tank in Puhi, Kauai, Hawaii. The boring logs, laboratory test results, and recommendations presented in this report are for design purposes only, and are not intended for use in developing cost estimates by the contractor.

During construction, should subsurface conditions differ from those encountered in our borings, we should be advised immediately in order to re-evaluate our recommendations, and to revise or verify them in writing before proceeding with construction.

Our recommendations and conclusions are based upon the site materials observed, the preliminary design information made available, the data obtained from our site exploration, our engineering analyses, and our experience and engineering judgement. The conclusions and recommendations in this report are professional opinions which we have strived to develop in a manner consistent with that level of care, skill, and competence ordinarily exercised by members of the profession in good standing, currently practicing under similar conditions in the same locality. We will be responsible for those recommendations and conclusions, but will not be responsible for the interpretation by others of the information developed. No warranty is made regarding the services performed, either express or implied.

Respectfully submitted,

HIRATA & ASSOCIATES, INC.


Swinerton E. Biacan, Project Engineer


Rick Yoshida, Project Manager



This work was prepared by
me or under my supervision
Expiration Date of License:
April 30, 2012

APPENDIX A

FIELD INVESTIGATION

DESCRIPTION OF FIELD INVESTIGATION

GENERAL

The site was explored on September 23, 26, and 27, 2011, by performing a visual reconnaissance of the site and drilling 6 exploratory test borings to depths ranging from about 6.5 to 40.5 feet with a Mobile B40-L12 truck-mounted drill rig.

During drilling operations, the soils were continuously logged by our field engineer and classified by visual examination in accordance with the Unified Soil Classification System. The boring logs indicate the depths at which the soils or their characteristics change, although the change could actually be gradual. If the change occurred between sample locations, the depth was interpreted based on field observations. Classifications and sampling intervals are shown on the boring logs. A Boring Log Legend is presented on Plate A3.1, while the Unified Soil Classification and Rock Weathering Classification Systems are shown on Plates A3.2 and A3.3, respectively. The soils encountered are logged on Plates A4.1 through A4.8.

Borings were located in the field by measuring/taping offsets from existing site features shown on the plans. Surface elevations at boring locations were estimated based on the Site Plan provided by Esaki Surveying & Mapping, Inc. The accuracy of the boring locations shown on Plate A2.2 and the boring elevations shown on Plates A4.1 through A4.8 are therefore approximate, in accordance with the field methods used.

SOIL SAMPLING

Representative and bulk soil samples were recovered from the borings for selected laboratory testing and analyses. Representative samples were recovered by driving a 3-inch O.D. split tube sampler a total of 18 inches with a 140-pound hammer

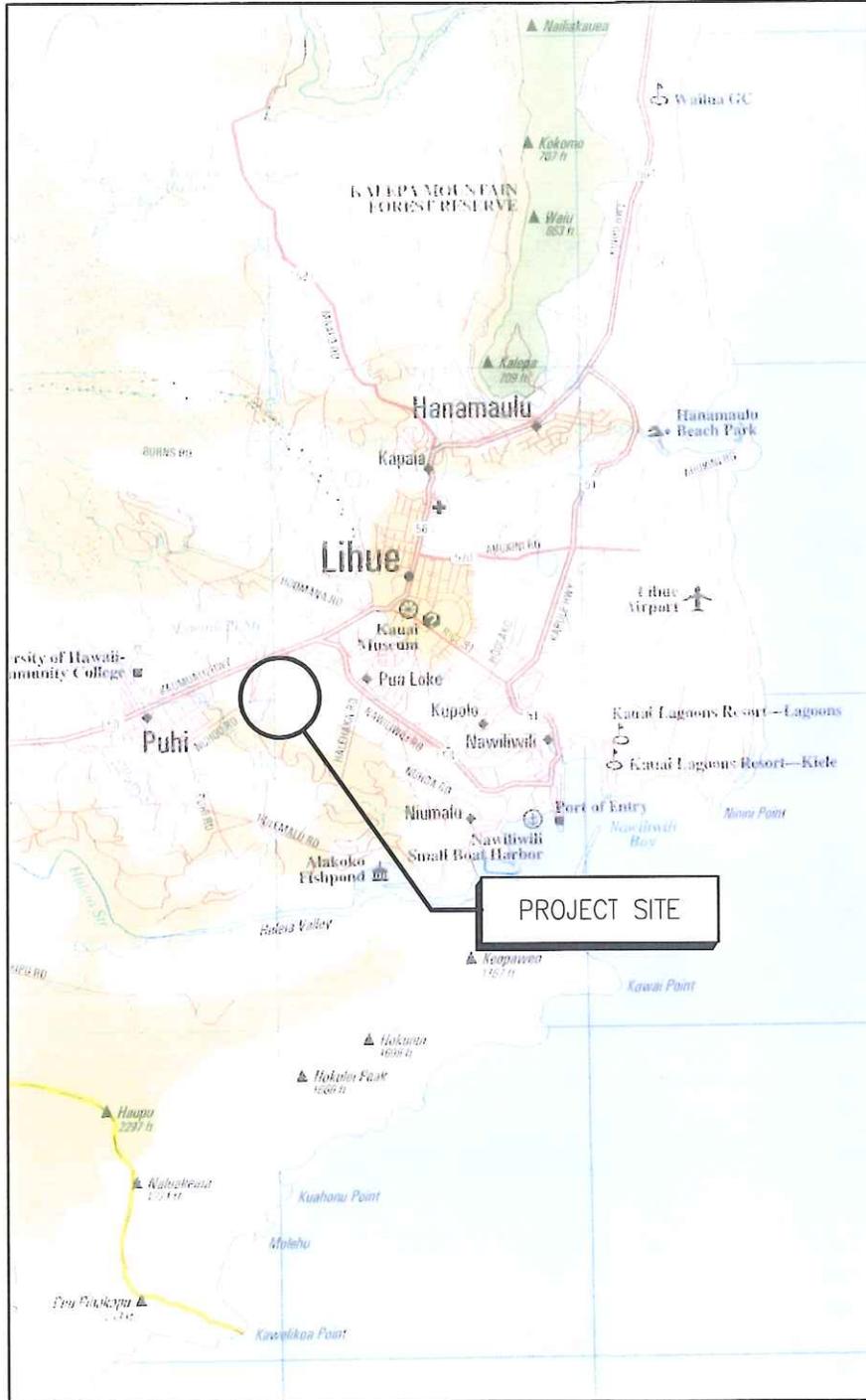
November 28, 2011

W.O. 11-5201

Plate A1.2

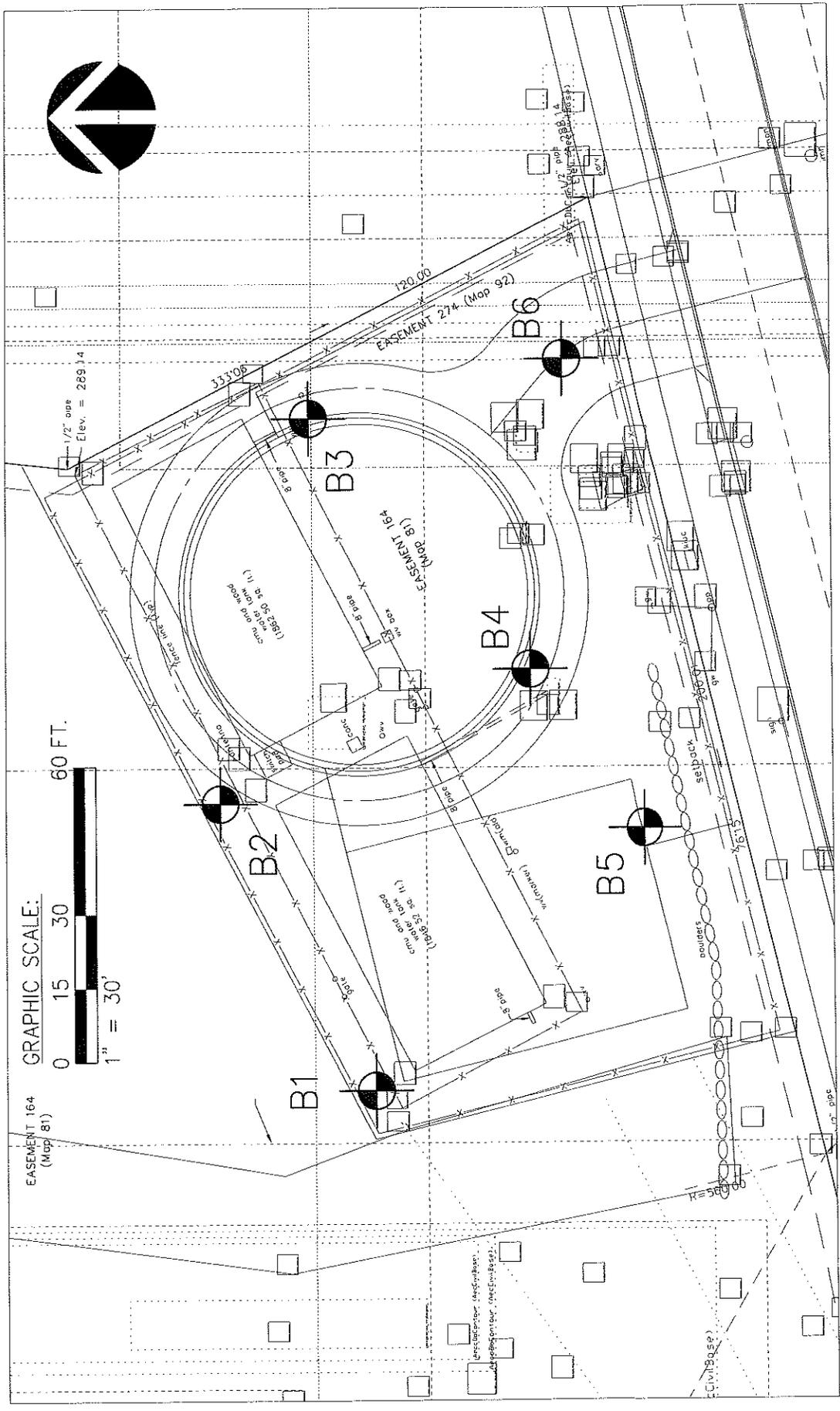
Hirata & Associates, Inc.

dropped from a height of 30 inches. The number of blows required to drive the sampler the final 12 inches are recorded at the appropriate depths on the boring logs, unless noted otherwise. A bulk soil sample was recovered from near boring B6 between depths of about 0.5 and 1.5 feet below existing grade.



Reference: Hawaii Atlas & Gazetteer, Topo Maps of the Entire State
by DeLorme (1999)

W.O. 11-5201	0.5 MG Water Tank, Replace Grove Farm Tanks #1 And #2
Hirata & Associates, Inc.	<p style="text-align: center;">LOCATION MAP</p> <p style="text-align: right;">Plate A2.1</p>



LEGEND:



Approximate location of borings
 Reference: Site Plan provided by Esaki Surveying & Mapping, Inc.

W.O. 11-5201
 Hirata & Associates, Inc.

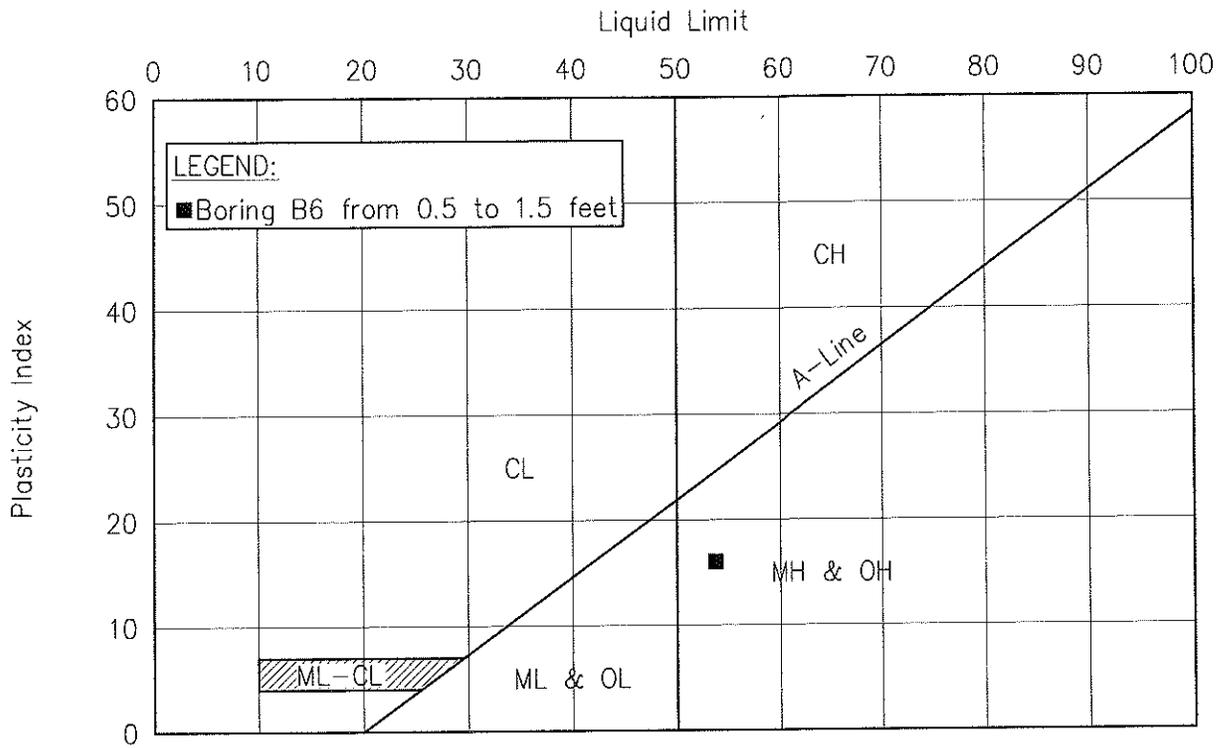
0.5 MG Water Tank, Replace Grove Farm Tanks #1 and #2

BORING LOCATION PLAN

Plate A2.2

MAJOR DIVISIONS		GROUP SYMBOLS	TYPICAL NAMES	
COARSE GRAINED SOILS (More than 50% of the material is LARGER than No. 200 sieve size.)	GRAVELS (More than 50% of coarse fraction is LARGER than the No. 4 sieve size.)	CLEAN GRAVELS (Little or no fines.)	GW Well graded gravels, gravel-sand mixtures, little or no fines.	
			GP Poorly graded gravels or gravel-sand mixtures, little or no fines.	
		GRAVELS WITH FINES (Appreciable amt. of fines.)	GM Silty gravels, gravel-sand-silt mixtures.	
			GC Clayey gravels, gravel-sand-clay mixtures.	
	SANDS (More than 50% of coarse fraction is SMALLER than the No. 4 sieve size.)	CLEAN SANDS (Little or no fines.)	SW Well graded sands, gravelly sands, little or no fines.	
			SP Poorly graded sands or gravelly sands, little or no fines.	
		SANDS WITH FINES (Appreciable amt. of fines.)	SM Silty sands, sand-silt mixtures.	
			SC Clayey sands, sand-clay mixtures.	
		FINE GRAINED SOILS (More than 50% of the material is SMALLER than No. 200 sieve size.)	SILTS AND CLAYS (Liquid limit LESS than 50.)	ML Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
				CL Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
OL Organic silts and organic silty clays of low plasticity.				
SILTS AND CLAYS (Liquid limit GREATER than 50.)	MH Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.			
	CH Inorganic clays of high plasticity, fat clays.			
	OH Organic clays of medium to high plasticity, organic silts.			
HIGHLY ORGANIC SOILS		PT Peat and other highly organic soils.		
		FRESH TO MODERATELY WEATHERED BASALT		
		VOLCANIC TUFF / HIGHLY TO COMPLETELY WEATHERED BASALT		
		CORAL		
SAMPLE DEFINITION				
	2" O.D. Standard Split Spoon Sampler		Shelby Tube	
	3" O.D. Split Tube Sampler		NX / 4" Coring	
			RQD Rock Quality Designation	
			Water Level	
W.O. 11-5201	0.5 MG Water Tank, Replace Grove Farm Tanks #1 and #2			
Hirata & Associates, Inc.	BORING LOG LEGEND			
	Plate A3.1			

PLASTICITY CHART



GRADATION CHART

COMPONENT DEFINITIONS BY GRADATION	
COMPONENT	SIZE RANGE
Boulders	Above 12 in.
Cobbles	3 in. to 12 in.
Gravel	3 in. to No. 4 (4.76 mm)
Coarse gravel	3 in. to 3/4 in.
Fine gravel	3/4 in. to No. 4 (4.76 mm)
Sand	No. 4 (4.76 mm) to No. 200 (0.074 mm)
Coarse sand	No. 4 (4.76 mm) to No. 10 (2.0 mm)
Medium sand	No. 10 (2.0 mm) to No. 40 (0.42 mm)
Fine sand	No. 40 (0.42 mm) to No. 200 (0.074 mm)
Silt and clay	Smaller than No. 200 (0.074 mm)

W.O. 11-5201

0.5 MG Water Tank, Replace Grove Farm Tanks #1 and #2

Hirata & Associates, Inc.

UNIFIED SOIL CLASSIFICATION SYSTEM

Plate A3.2

<u>Grade</u>	<u>Symbol</u>	<u>Description</u>
Fresh	F	No visible signs of decomposition or discoloration. Rings under hammer impact.
Slightly Weathered	WS	Slight discoloration inwards from open fractures, otherwise similar to F.
Moderately Weathered	WM	Discoloration throughout. Weaker minerals such as feldspar decomposed. Strength somewhat less than fresh rock but cores cannot be broken by hand or scraped by knife. Texture preserved.
Highly Weathered	WH	Most minerals somewhat decomposed. Specimens can be broken by hand with effort or shaved with knife. Core stones present in rock mass. Texture becoming indistinct but fabric preserved.
Completely Weathered	WC	Minerals decomposed to soil but fabric and structure preserved (Saprolite). Specimens easily crumbled or penetrated.
Residual Soil	RS	Advanced state of decomposition resulting in plastic soils. Rock fabric and structure completely destroyed. Large volume change.

Reference: Soils Mechanics, NAVFAC DM-7.1, Department of the Navy, Naval Facilities Engineering Command, September, 1986.

W.O. 11-5201	0.5 MG Water Tank, Replace Grove Farm Tanks #1 and #2
Hirata & Associates, Inc.	ROCK WEATHERING CLASSIFICATION SYSTEM Plate A3.3

HIRATA & ASSOCIATES, INC.

BORING LOG

W.O. 11-5201

BORING NO. B1 DRIVING WT. 140 lb. START DATE 9/23/11
 SURFACE ELEV. 292.5±* DROP 30 in. END DATE 9/23/11

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
0						Clayey SILT (MH) – Reddish brown to brown, moist, stiff.
		<input type="checkbox"/>	45	86	33	
5		<input type="checkbox"/>	59	85	35	
		<input type="checkbox"/>	30	82	41	
10						Medium stiff at 13 feet.
		<input type="checkbox"/>	18	81	39	
15						COMPLETELY WEATHERED BASALT (WC) – Mottled reddish brown, moist, medium stiff.
		<input type="checkbox"/>	19	72	26	
20						End boring at 19.5 feet.
						Neither groundwater nor seepage water encountered.
25						
30						

* Elevations based on Site Plan provided Esaki Surveying & Mapping, Inc.

BORING LOG

W.O. 11-5201

BORING NO. B2 DRIVING WT. 140 lb. START DATE 9/26/11
 SURFACE ELEV. 291± DROP 30 in. END DATE 9/26/11

DEPTH FOOT	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
0						Clayey SILT (MH) – Reddish brown to brown, moist, stiff.
		<input type="checkbox"/>	34	73	27	
		<input type="checkbox"/>	56	89	29	
5		<input type="checkbox"/>	42	92	29	
		<input type="checkbox"/>	25	73	41	
10						Medium stiff at 9 feet.
15		<input type="checkbox"/>	15	73	45	COMPLETELY WEATHERED BASALT (WC) – Mottled reddish brown, moist, medium stiff to stiff.
		<input type="checkbox"/>	39	86	35	
20		<input type="checkbox"/>	25	72	47	
25		<input type="checkbox"/>	18	66	56	
30		<input type="checkbox"/>				

BORING LOG

W.O. 11-5201

BORING NO. B2 (continued) DRIVING WT. 140 lb. START DATE 9/26/11
 SURFACE ELEV. 291± DROP 30 in. END DATE 9/26/11

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
30						
35			18	67	56	
40			38	65	53	
						End boring at 40.5 feet.
45						
50						Neither groundwater nor seepage water encountered.
55						
60						

BORING LOG

W.O. 11-5201

BORING NO. B3 DRIVING WT. 140 lb. START DATE 9/27/11
 SURFACE ELEV. 289± DROP 30 in. END DATE 9/27/11

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
30						
		<input type="checkbox"/>	34	81	31	Clayey SILT (MH) – Reddish brown to brown, moist, stiff.
		<input type="checkbox"/>	33	87	29	
5		<input type="checkbox"/>	43	81	29	
		<input type="checkbox"/>	20	77	38	
10						Medium stiff at 9 feet.
15		<input type="checkbox"/>	12	70	48	COMPLETELY WEATHERED BASALT (WC) – Mottled reddish brown, moist, medium stiff.
		<input type="checkbox"/>	17	78	42	
20		<input type="checkbox"/>	19	69	51	
25		<input type="checkbox"/>	44	77	44	
		<input type="checkbox"/>				Stiff from 29 feet.
30		<input type="checkbox"/>				

HIRATA & ASSOCIATES, INC.

BORING LOG

W.O. 11-5201

BORING NO. B3 (continued) DRIVING WT. 140 lb. START DATE 9/27/11
 SURFACE ELEV. 289± DROP 30 in. END DATE 9/27/11

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
30						
35			26	61	58	
40			55	Lost Recovery		
						End boring at 40.5 feet.
45						
50						Neither groundwater nor seepage water encountered.
55						
60						

HIRATA & ASSOCIATES, INC.

BORING LOG

W.O. 11-5201

BORING NO. B4 DRIVING WT. 140 lb. START DATE 9/26/11
 SURFACE ELEV. 290± DROP 30 in. END DATE 9/26/11

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
0						Clayey SILT (MH) – Reddish brown to brown, moist, medium stiff.
		<input type="checkbox"/>	21	86	37	
5		<input type="checkbox"/>	21	85	37	
		<input type="checkbox"/>	17	80	37	
10						COMPLETELY WEATHERED BASALT (WC) – Mottled reddish brown, moist, medium stiff.
		<input type="checkbox"/>	15	72	51	
15						
		<input type="checkbox"/>	15	68	58	
20						
		<input type="checkbox"/>	10	67	58	End boring at 29.5 feet. Neither groundwater nor seepage water encountered.
25						
		<input type="checkbox"/>	27	69	50	
30						

BORING LOG

W.O. 11-5201

BORING NO. B5 DRIVING WT. 140 lb. START DATE 9/27/11
 SURFACE ELEV. 291.5± DROP 30 in. END DATE 9/27/11

DEPTH FOOT	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
0						Clayey SILT (MH) – Reddish brown to brown, moist, medium stiff to stiff.
		<input type="checkbox"/>	50	86	28	
		<input type="checkbox"/>	26	88	30	
5		<input type="checkbox"/>	26	81	30	
						COMPLETELY WEATHERED BASALT (WC) – Mottled reddish brown, moist, medium stiff.
10		<input type="checkbox"/>	18	75	43	
						End boring at 15.5 feet.
15		<input type="checkbox"/>	12	75	38	
						Neither groundwater nor seepage water encountered.
20						
25						
30						

HIRATA & ASSOCIATES, INC.

BORING LOG

W.O. 11-5201

BORING NO. B6 DRIVING WT. 140 lb. START DATE 9/27/11
 SURFACE ELEV. 287.5± DROP 30 in. END DATE 9/27/11

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
0						Clayey SILT (MH) – Reddish brown to brown, moist, stiff.
		<input type="checkbox"/>	52	87	26	
		<input type="checkbox"/>	32	85	28	
5		<input type="checkbox"/>	33	80	30	
						End boring at 6.5 feet.
10						Neither groundwater nor seepage water encountered.
15						
20						
25						
30						

APPENDIX B

LABORATORY TESTING

DESCRIPTION OF LABORATORY TESTING

CLASSIFICATION

Field classification was verified in the laboratory in accordance with the Unified Soil Classification System. Laboratory classification was determined by both visual examination and Atterberg Limit tests performed in general accordance with ASTM D 4318. Results of Atterberg Limit tests are plotted on Plate A3.2. The final classifications are shown at the appropriate locations on the Boring Logs, Plates A4.1 through A4.8.

MOISTURE-DENSITY

Representative samples were tested for field moisture content and dry unit weight. The dry unit weight was determined in pounds per cubic foot while the moisture content was determined as a percentage of dry weight. Samples were obtained using a 3-inch O.D. split tube sampler. Test results are shown at the appropriate depths on the Boring Logs, Plates A4.1 through A4.8.

CONSOLIDATION

Selected representative samples were tested for their consolidation characteristics. Test samples were 2.42 inches in diameter and 1 inch high. Porous stones were placed in contact with the top and bottom of test samples to permit addition and release of pore fluid. Loads were then applied in several increments in a geometric progression, and the resulting deformations recorded at selected time intervals. Test results are plotted on the Consolidation Test Reports, Plates B2.1 and B2.2.

SHEAR TESTS

Shear tests were performed in the Direct Shear Machine which is of the strain control type. Each sample was sheared under varying confining loads in order to determine the Coulomb shear strength parameters, cohesion and angle of internal friction. Test results are presented on Plates B3.1 and B3.2.

SWELL TESTS

Swell tests were performed on representative soil samples by placing a 90 psf surcharge load on one-inch high specimens. The samples were inundated with water, and total expansion recorded after a period of at least 24 hours. Test results were recorded as a percentage of original height. Test results are summarized in the following table:

Sample	Sample Type	Recorded Expansion	Moisture Content Prior to Test
B1@2'	Representative	0.2%	33%
B5@5'	Representative	0.8%	30%

PROCTOR TEST

A Modified Proctor test was performed in general accordance with ASTM D 1557 on a bulk soil sample obtained from near boring B6 between depths of about 0.5 and 1.5 feet below existing grade. The test is used to determine the optimum moisture content at which the soil compacts to 100 percent density. Results are shown on Plate B4.1.

CALIFORNIA BEARING RATIO TEST

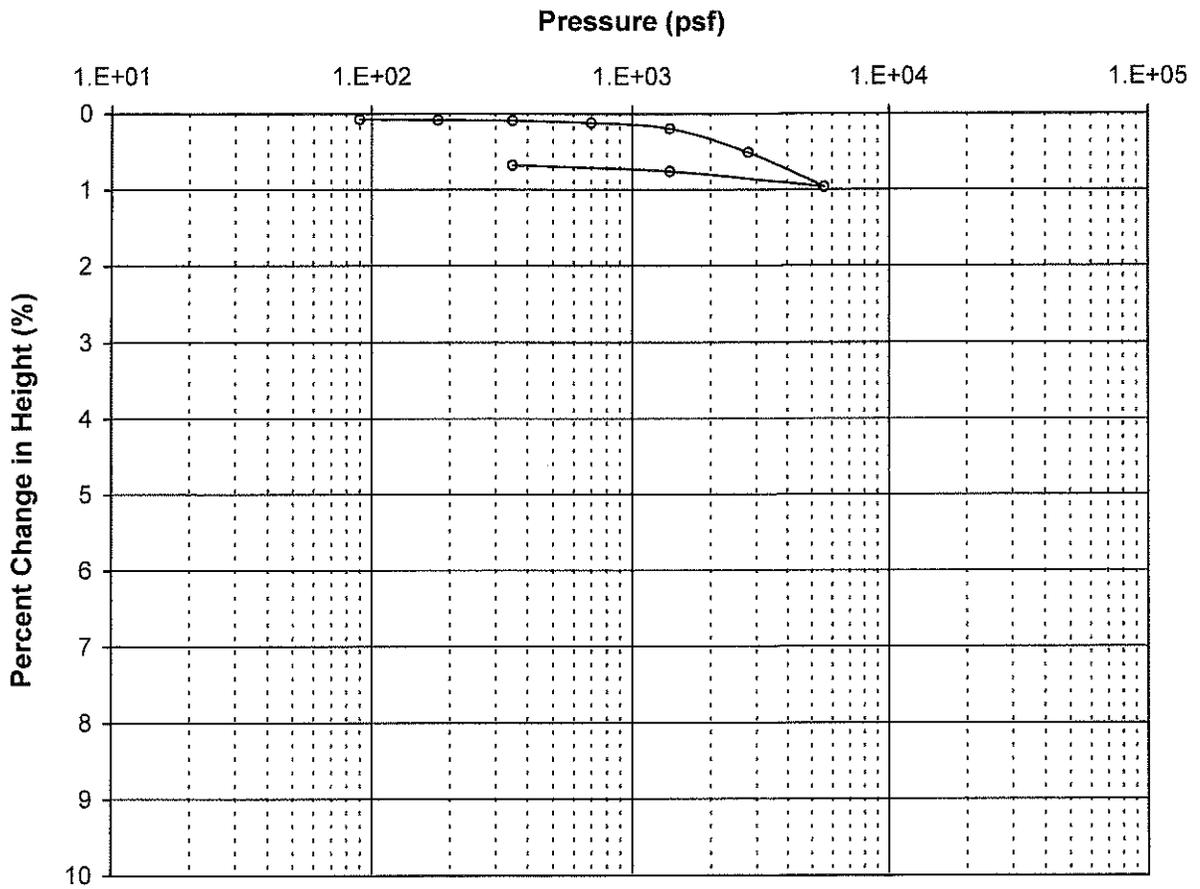
A CBR test was performed in general accordance with ASTM D 1883 on a bulk soil sample obtained from near boring B6 between depths of about 0.5 and 1.5 feet below existing grade. The test is used to evaluate the relative quality of subgrade soils to be used in the design of flexible pavement. Results are shown on Plate B5.1.

EXPANSION INDEX TEST

An expansion index test was performed in general accordance with ASTM D 4829. A surcharge load of 144 psf was placed on a 1-inch high by 4-inch diameter specimen which was molded to about 50 percent saturation. The sample was

inundated with water, and total expansion recorded after volumetric equilibrium was reached. An expansion index test performed on a bulk soil sample obtained from near boring B6 between depths of about 0.5 and 1.5 feet below existing grade, resulted in an expansion index of 23, corresponding to a low expansion potential.

Consolidation Test Results



Sample Description

Boring No.: B1 Depth (ft): 8
 Soil Description: Reddish brown to brown clayey silt

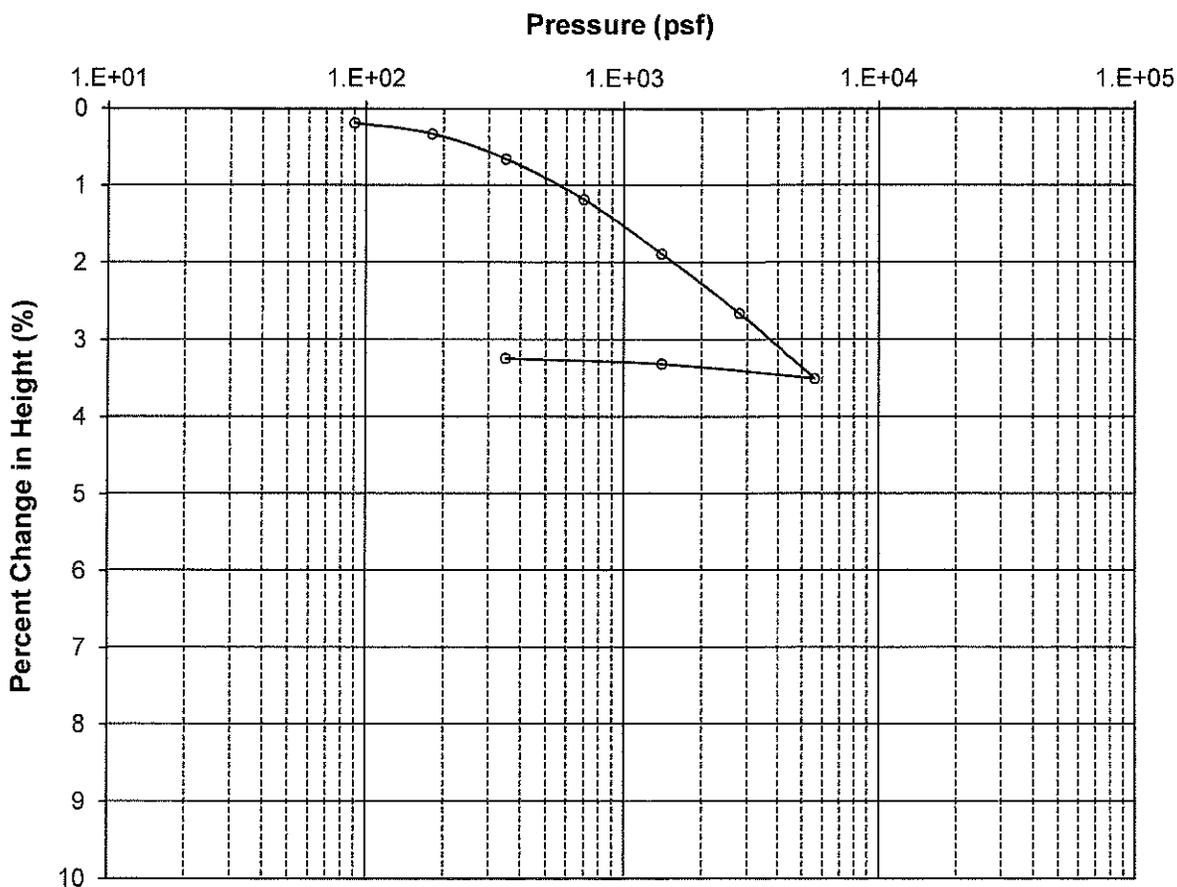
	Moisture Content (%)	Dry Density (pcf)
Initial	40.9	81.7
Final	39.8	82.3

Remark: 10/6/11

W.O. 11-5201	0.5 MG Water Tank, Replace Grove Farm Tanks #1 and #2
Hirata & Associates, Inc.	CONSOLIDATION TEST

Plate B2.1

Consolidation Test Results



Sample Description

Boring No.: B5 Depth (ft): 9

Soil Description: Mottled reddish brown completely weathered basalt

	Moisture Content (%)	Dry Density (pcf)
Initial	42.5	75.1
Final	40.5	77.7

Remark: 10/12/11

W.O. 11-5201

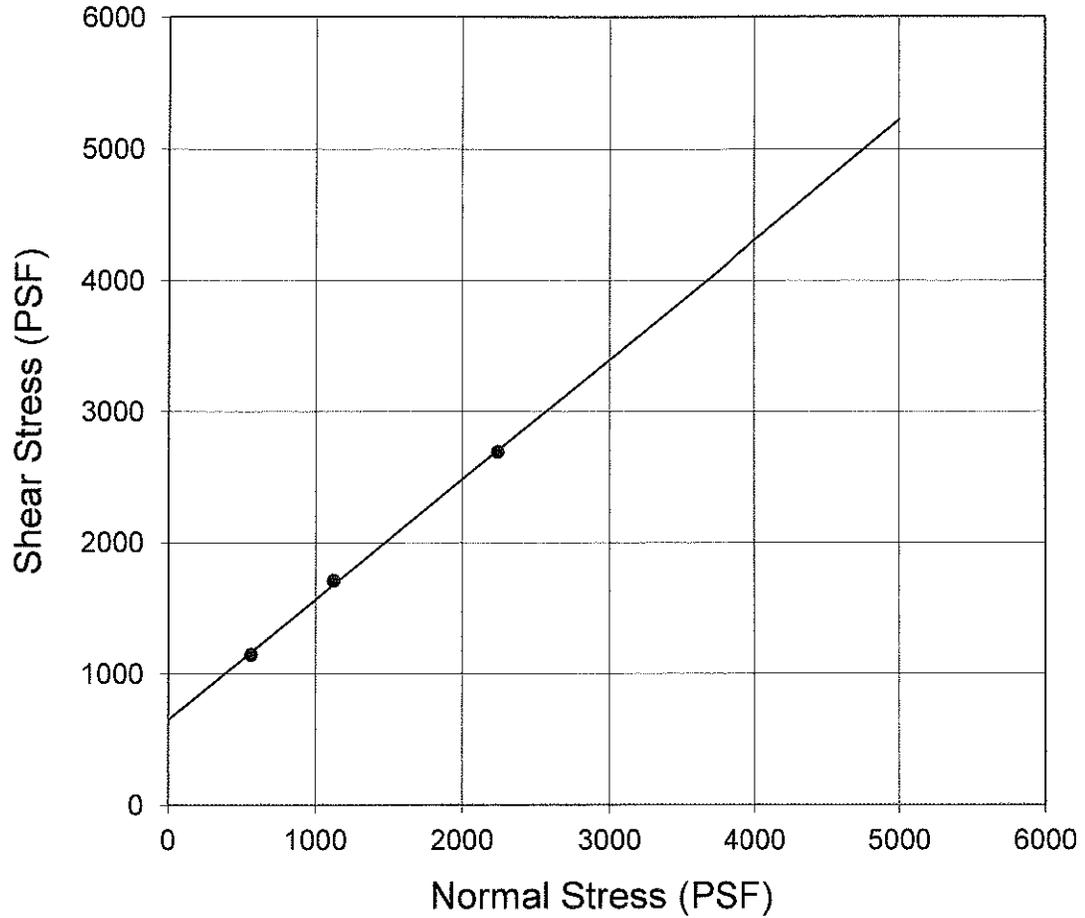
0.5 MG Water Tank, Replace Grove Farm Tanks #1 and #2

Hirata & Associates, Inc.

CONSOLIDATION TEST

Plate B2.2

Direct Shear Test Results

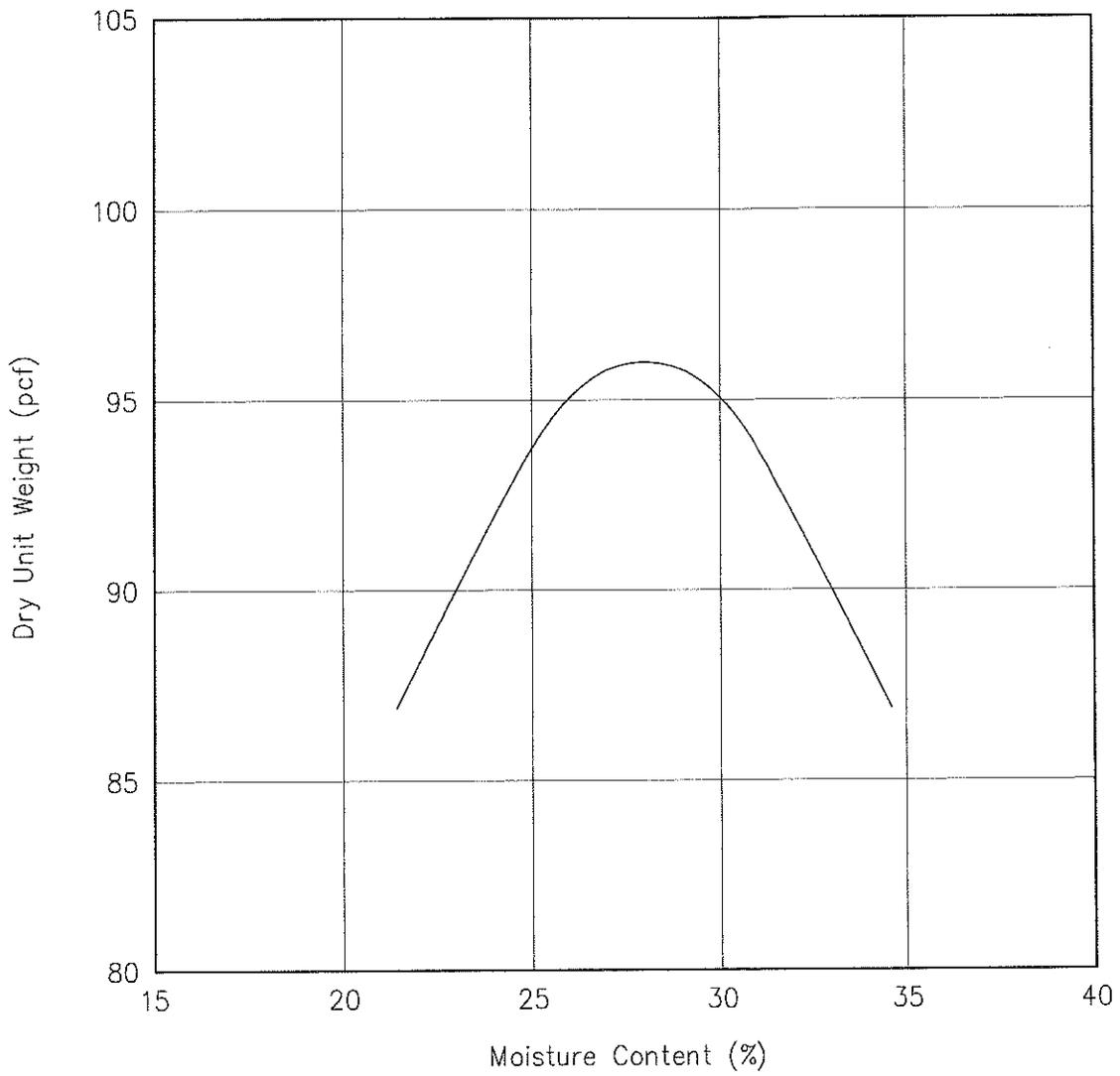


Sample Description

Boring No.: B1 Depth (ft): 4
 Soil Description: Reddish brown to brown clayey silt
 Strength Intercept (C): 655.4 PSF (Peak Strength)
 Friction Angle (ϕ): 42.4 DEG (Peak Strength)

Remark: 10/13/11

W.O. 11-5201	0.5 MG Water Tank, Replace Grove Farm Tanks #1 and #2
Hirata & Associates, Inc.	DIRECT SHEAR TEST



Soil Data

Location: Near boring B6 between 0.5 to 1.5 feet

Description: Reddish brown to brown clayey silt

Test Results

Maximum Dry Density: 96 pcf

Optimum Moisture Content: 28%

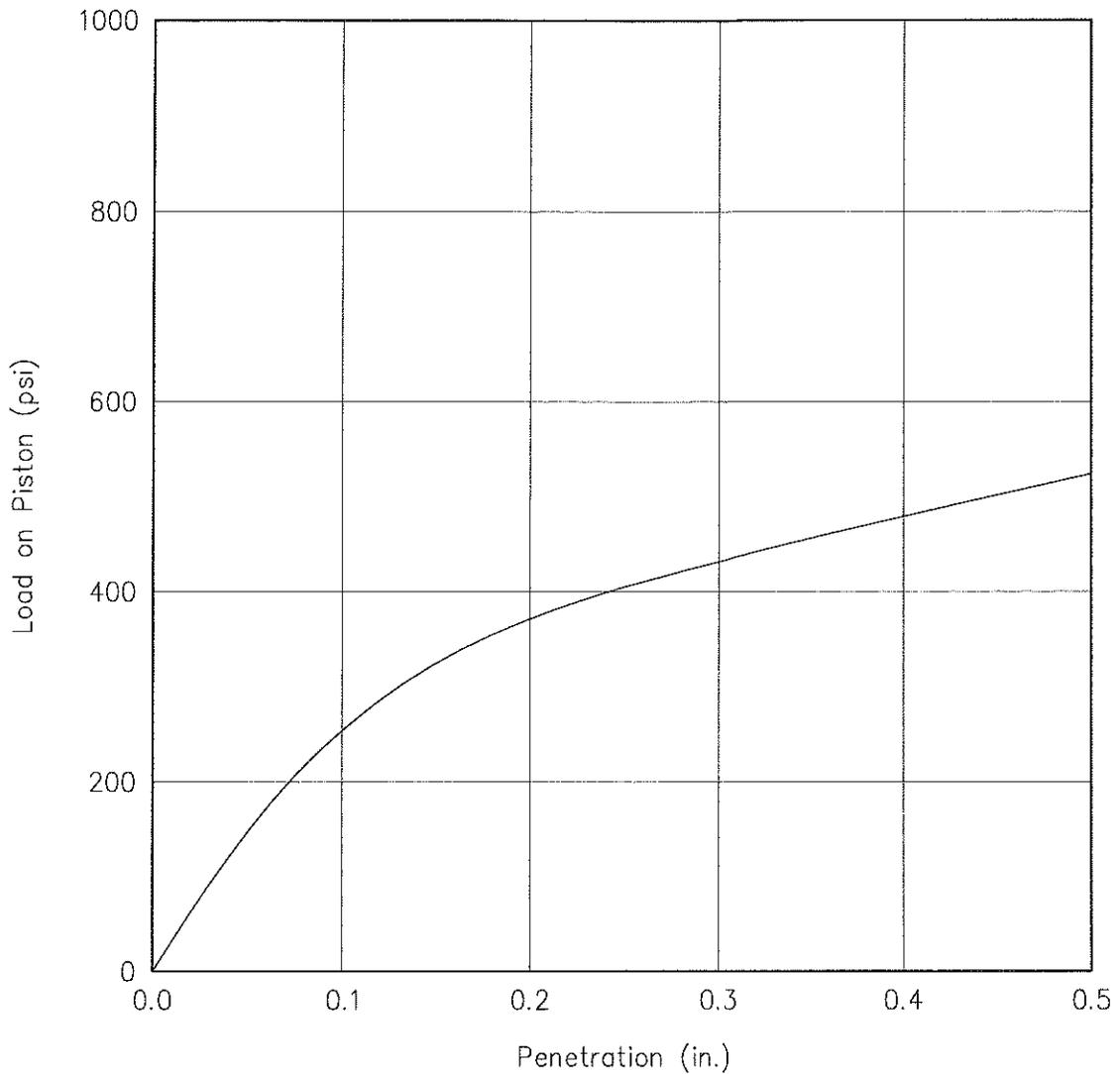
W.O. 11-5201

0.5 MG Water Tank, Replace Grove Farm Tanks #1 and #2

Hirata & Associates, Inc.

MODIFIED PROCTOR CURVE

Plate B4.1



Soil Data

Location: Near boring B6 between 0.5 to 1.5 feet
 Description: Reddish brown to brown clayey silt
 Sample Dry Density: 94 pcf
 Sample Moisture Content: 28%

Test Results

CBR Value: 25%
 Expansion: 0.8%

W.O. 11-5201

0.5 MG Water Tank, Replace Grove Farm Tanks #1 and #2

Hirata & Associates, Inc.

CBR STRESS PENETRATION CURVE

Plate B5.1

APPENDIX B















APPENDIX C

Bernard P. Carvalho, Jr.
Mayor



Michael A. Dahilig
Director of Planning

Nadine K. Nakamura
Managing Director

Dee M. Crowell
Deputy Director of Planning

PLANNING DEPARTMENT
County of Kaua'i, State of Hawai'i

4444 Rice Street, Suite A-473, Lihu'e, Hawai'i 96766
TEL (808) 241-4050 FAX (808) 241-6699

MAY 29 2014

received
5/31/14

Wayne T. Wada, P.E., Project Engineer
Esaki Mapping & Surveying, Inc.
1610 Haleukana Street
Lihu'e, Hawai'i 96766

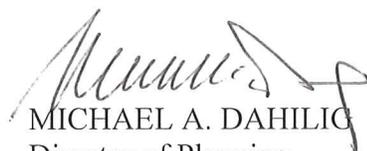
Subject: DRAFT Environmental Assessment
Replacement of Grove Farm Tanks #1 & #2
TMK: (4) 3-3-003:046
Lihu'e, Kaua'i

Thank you for the opportunity to review the DRAFT Environment Assessment involving the demolition and replacement of the Grove Farm Tank Facility in Lihu'e. As represented, Page 6 of the document states:

"The proposed project involves the demolition of two existing 100,000 gallon water tanks and the construction of a new replacement 0.5 MG tank. The new storage tank will occupy approximately 4,034 Sq. Ft., be constructed of concrete and measure approximately 72 Ft. in diameter and 18 Ft. high."

The County Planning Department has reviewed the DRAFT Environmental Assessment for consistency with the General Plan Objectives and Policies as well as the development standards contained in Chapter 8 of the Kaua'i County Code (1987), as amended. Please note that the project's goal to address the need to upgrade existing infrastructure does not require any zoning/land use permits with this agency. Therefore, we have no objections with the proposal.

Should there be any questions relative to the above, please contact Staff Planner Dale A. Cua at (808) 241-4050.


MICHAEL A. DAHILIG
Director of Planning

An Equal Opportunity Employer

NEIL ABERCROMBIE
GOVERNOR OF HAWAII



LINDA ROSEN, M.D., 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
Wada01.docx

June 9, 2014

6/11/14

Esaki Surveying and Mapping, Inc.
Attn: Mr. Wayne T. Wada
1610 Haleukana Street
Lihue, Hawaii 96766

Dear Mr. Wada:

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT
REPLACEMENT OF GROVE FARM TANKS #1 AND #2
LIHUE, KAUAI, HAWAII
TMK: (4) 3-3-03:46

The Safe Drinking Water Branch (SDWB) has reviewed the subject document and has no comments.

If there are any questions, please call Ms. Jennifer Nikaido of the Engineering Section at (808) 586-4258.

Sincerely,

JL Seto
#62
JOANNA L. SETO, P.E., CHIEF
Safe Drinking Water Branch

JN:mc

c: EPO



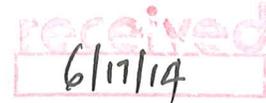
STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HI 96801-3378

In reply, please refer to:
EMD/CWB

06015PJF.14

June 16, 2014

Mr. Wayne T. Wada
Esaki Surveying & Mapping, Inc.
1610 Haleukana Street
Lihue, Hawaii 96766



Dear Mr. Wada:

**SUBJECT: Draft Environmental Assessment (DEA) for
Replacement of Grove Farm Tanks #1 and #2
Lihue, Island of Kauai, Hawaii**

The Department of Health (DOH), Clean Water Branch (CWB), acknowledges receipt of your letter, dated May 22, 2014 (received on May 27, 2014), 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/2013/10/CWB_Oct22.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. National Pollutant Discharge Elimination System (NPDES) permit coverage is required for pollutant discharges into State surface waters and for certain situations involving storm water (HAR, Chapter 11-55).
 - a. Discharges into Class 2 or Class A State waters can be covered under an NPDES general permit only if all of the NPDES general permit requirements are met. Please see the DOH-CWB website (<http://health.hawaii.gov/cwb/>) for the NPDES general permits and instructions to request coverage.

- b. All other discharges into State surface waters and discharges into Class 1 or Class AA State waters require an NPDES individual permit. To request NPDES individual permit coverage, please see the DOH-CWB forms website located at: <http://health.hawaii.gov/cwb/site-map/clean-water-branch-home-page/forms/>.
- c. NPDES permit coverage for storm water associated with construction activities is required if your project will result in the disturbance of one (1) acre or more of total land area. The total land area includes a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under a larger common plan of development or sale. NPDES permit coverage is required before the start of the construction activities.

Land disturbance includes, but is not limited to clearing, grading, grubbing, uprooting of vegetation, demolition (even if leaving foundation slab), staging, stockpiling, excavation into pavement areas which go down to the base course, and storage areas (including areas on the roadway to park equipment if these areas are blocked off from public usage, grassed areas, or bare ground).

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 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.

Mr. Wayne T. Wada
June 16, 2014
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06015PJF.14

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

JF:np

Bernard P. Carvalho, Jr.
Mayor



11-126
Larry Dill, P.E.
County Engineer

Nadine K. Nakamura
Managing Director

Lyle Tabata
Deputy County Engineer

DEPARTMENT OF PUBLIC WORKS

County of Kaua'i, State of Hawai'i

4444 Rice Street, Suite 275, Lihue, Hawai'i 96766
TEL (808) 241-4992 FAX (808) 241-6604

June 18, 2013

Esaki Surveying & Mapping, Inc.
1610 Haleukana Street
Lihue, HI 96766
Attention: Mr. Wayne Wada

mailed
6/25/13

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR
REPLACEMENT OF GROVE FARM TANKS #1 AND #2
LIHUE, KAUA'I, HAWAII PW 05.14.41

Dear Mr. Wada

We reviewed the subject Draft Environmental Assessment (DEA) for the Replacement of Grove Farm Tanks #1 and #2. We offer the following comments:

1. Section II.A. USES:

- A Road Permit is required for this project. The permit is for work within County Right of Ways. Construction plans **shall** be submitted for our review and approval prior to receiving a Road Permit. Additionally, a traffic control plan needs to be incorporated with the Construction Plans and a restoration plan for restoring the damaged trenched asphalt pavement and county road shoulders.

2. Section II.D. HYDROLOGY:

- Since the subject property can be considered as a self-contained property under the control of the Department of Water, the grading work on the property can be exempted from the County's Sediment and Erosion Control Ordinance No. 808 (Section 22-7.6(a)). Although neither a Grading nor a Grubbing Permit is required, we expect the Department of Water to oversee all grading/grubbing activities and self-monitoring of the Best Management Practices (BMP's) at all times to the maximum extent practicable.

3. Section II.E. FLOOD HAZARD AND DRAINAGE

- The DEA states that "Flows from the washout and overflow lines of the new tank will be directed to an existing drain structure located along Nuhou Street." Approval to connect and discharge to the County Drainage system from the Department of Public Works will be required.

We wish to remain on your mailing list in receiving a copy of the Final Environmental Assessment. If you have any questions, or need additional information, please feel free to contact Stanford Iwamoto of my staff at (808) 241-4896 or by email at siwamoto@kauai.gov .

Sincerely,



MICHAEL MOULE, P.E.
Chief, Engineering Division

MM/SI
Copies to: DPW – Permitting
County Engineer



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

In reply, please refer to:
File:

June 24, 2014

S0628LO



Mr. Wayne T. Wada, P.E.
Esaki Surveying and Mapping, Inc.
1610 Haleukana Street
Lihue, HI 96766

Dear Mr. Wada:

SUBJECT: Draft Environmental Assessment
Replacement of Grove Farm Tanks #1 and #2
Lihue, Kauai Water System
TMK: 4-3-3-003:046

Thank you for the opportunity to review the subject document. The Office of Solid Waste Management offers the following comments:

1. We recommend that the project developer draft a solid waste management plan that encompasses all project phases from site clearance, construction, and through to the occupation/operation of the completed project.

Specific examples of elements that the plan should address include:

- recycling of greenwaste during clear and grub activities;
- recycling construction and demolition wastes, if appropriate; and
- the use of recycled content building materials where possible.

2. The developer shall ensure that all solid waste generated during project construction is directed to a Department of Health (DOH)-permitted solid waste disposal or recycling facility. Hawaii Administrative Rules, Chapter 11-58.1, Section 61, states:

- (a) *The aesthetic, nonhazardous, and sanitary storage of solid waste is the responsibility of the person owning, operating, or managing the property, premises, business establishment, or industry where the solid waste is accumulated.*

Mr. Wayne T. Wada
June 24, 2014
Page 2

- (b) *Any person owning, operating, or managing a property, premise, business establishment, or industry has the responsibility of removing accumulated solid waste to an approved solid waste disposal facility. Contractual or other arrangements for the removal of accumulated solid waste shall not relieve a person of this primary responsibility as stated above. Solid waste shall be removed to an approved solid waste disposal facility, prior to creating a nuisance condition, health, or safety hazard.*
3. Solid waste generated by plant operations shall go to a DOH-permitted solid waste disposal or recycling facility.

Please contact Lane Otsu of the Office of Solid Waste Management at (808) 586-4226 with any questions regarding these comments.

Sincerely,


STEVEN Y.K. CHANG, P.E., CHIEF
Solid and Hazardous Waste Branch

ESAKI SURVEYING & MAPPING, INC.

1610 HALEUKANA STREET - LIHUE, KAUAI, HAWAII 96766
(808) 246-0625 FAX: (808) 246-0229
esm@esakimap.Com

July 15, 2014

State of Hawaii, DOH
Clean Water Branch
919 Ala Moana Boulevard, Suite 309
Honolulu, HI 96814

SUBJECT: DRAFT Environmental Assessment (DEA)
Replacement of Grove Farm Tanks #1 and #2
Lihue, Kauai Water System

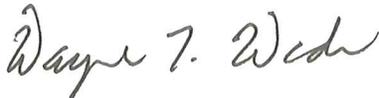
We have received your letter dated June 16, 2014. Your comments have been reviewed and are addressed in the Final Environmental Assessment (FEA) as follows:

- NPDES Permit for Hydrotesting waters is listed under the Possible Permits Required section. We understand that discharges into Class 2 or Class A State waters can be covered under and NPDES general permit, if all of the NPDES general permit requirements are met, and discharges into Class 1 or Class AA State waters require an NPDES individual permit. NPDES Permit for Discharges of storm water associated with construction activities will not be necessary since the total land area to be disturbed is less than one (1) acre.
- The project does not involve work in, over, or under waters of the United States, therefore, it is not necessary we contact the Army Corps of Engineers, Regulatory Branch regarding their permitting requirements.
- All discharges related to the project construction or operation activities, whether or not NPDES permit coverage and/or Section 401 WQC are required, will comply with the State's Water Quality Standards (HAR, Chapter 11-54) as noted under Section II.D Hydrology, of both the DEA and FEA.

We appreciate your cooperation. Your letter will be included in the FEA.

Thank you for participating in the Environmental Assessment review process.

Very truly yours,



Wayne T. Wada, P.E.
Project Engineer

cc: Keith Aoki, P.E., Department of Water, County of Kauai

ESAKI SURVEYING & MAPPING, INC.

1610 HALEUKANA STREET - LIHUE, KAUAI, HAWAII 96766
(808) 246-0625 FAX: (808) 246-0229
esm@esakimap.Com

July 15, 2014

Department of Public Works
County of Kauai
4444 Rice Street, Suite 275
Lihue, HI 96766

SUBJECT: DRAFT Environmental Assessment (DEA)
Replacement of Grove Farm Tanks #1 and #2
Lihue, Kauai Water System

We have received your letter dated June 18, 2014. Your comments have been reviewed and are addressed in the Final Environmental Assessment (FEA) as follows:

- Road Permit for work within County Right of Ways has been added to the Possible Permits Required section of the FEA.
- The Department of Water acknowledges that construction plans shall be submitted to the Department of Public Works for review and approval prior to receiving a Road Permit. Additionally, a traffic control plan will be incorporated with the construction plans and a restoration plan restoring the damaged trenched asphalt pavement and county road shoulders.
- We understand that while neither a Grading nor a Grubbing permit is required, the Department of Water must oversee all grading/grubbing activities done by the Contractor and, as per plan, the Contractor shall be responsible of monitoring the Best Management Practices (BMP's) at all times to the maximum extent practicable.
- Section II.E. Flood Hazard and Drainage, of the FEA, now includes the following: "Approval to connect and discharge to the County Drainage System from the Department of Public Works will be required". It also has been added to the Possible Permits Required section of the FEA.
- Attached is one (1) CD containing a PDF copy of the Final Environmental Assessment as requested in your letter.

We appreciate your cooperation. Your letter will be included in the FEA.

Thank you for participating in the Environmental Assessment review process.

Very truly yours,



Wayne T. Wada, P.E.
Project Engineer

Enclosure

cc: Keith Aoki, P.E., Department of Water, County of Kauai

ESAKI SURVEYING & MAPPING, INC.

1610 HALEUKANA STREET - LIHUE, KAUAI, HAWAII 96766
(808) 246-0625 FAX: (808) 246-0229
esm@esakimap.Com

July 15, 2014

State of Hawaii, DOH
Solid and Hazardous Waste Branch
919 Ala Moana Boulevard, Suite 212
Honolulu, HI 96814

SUBJECT: DRAFT Environmental Assessment (DEA)
Replacement of Grove Farm Tanks #1 and #2
Lihue, Kauai Water System

We have received your letter dated June 24, 2014. Your comments have been reviewed and are addressed in the Final Environmental Assessment (FEA) as follows:

- The Department of Water appreciates your recommendation to draft a solid waste management plan, while no such plan will be developed, the Contractor will be required to implement solid waste management under the Best Management Practices (BMP's), such methods include, but are not limited to, the following:
 - Recycling of greenwaste during clear and grub activities
 - Recycling construction and demolition wastes, if appropriate
 - Use of recycled content building materials where possible
- Section II.M.4. Solid Waste, of the FEA, now includes the following: "All solid waste generated during project construction and by plant operations shall go to a DOH-permitted solid waste disposal or recycling facility."

We appreciate your cooperation. Your letter will be included in the FEA.

Thank you for participating in the Environmental Assessment review process.

Very truly yours,



Wayne T. Wada, P.E.
Project Engineer

cc: Keith Aoki, P.E., Department of Water, County of Kauai