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DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAI'I
345 KEKŪANAŌ'A STREET, SUITE 20 • HILO, HAWAI'I 96720
TELEPHONE (808) 961-8050 • FAX (808) 961-8657

October 31, 2017

Mr. Scott Glenn, Director
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu HI 96813

Dear Mr. Glenn:

Subject: Final Environmental Assessment and Finding of No Significant Impact for Waiaha Transmission Waterline, Tax Map Keys 7-5-014:002, 003, 006, 016 and 027; 7-5-015:015 and 7-5-013:027; and R.O.W. of Māmalahoa Highway Within Plats 7-5-012, 013, 014 and 016, North Kona District; Hawai'i Island, State of Hawai'i

The County of Hawai'i, Department of Water Supply (DWS) hereby transmits the final Environmental Assessment and Finding of No Significant Impact (FEA-FONSI) for the subject project for publication in the next available edition of the Environmental Notice.

We have included, in Appendix 1b, copies of comments and responses that we received during the 30-day public comment period on the Draft Environmental Assessment and Anticipated Finding of no Significant Impact (DEA-AFONSI).

Enclosed is a completed OEQC Publication Form, one copy of the FEA-FONSI, a CD with an Adobe Acrobat PDF file of the same, and an electronic copy of the publication form in Microsoft Word.

Should there be any questions, please contact Mr. Gerald Yorita at (808) 961-8070, extension 248.

Sincerely yours,

Keith K. Okamoto, P.E.
Manager-Chief Engineer

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OFC. OF ENVIRONMENTAL QUALITY CONTROL

GY:dfg

Enc.

copy - Ron Terry, Ph.D., Project Environmental Consultant

. . . Water, Our Most Precious Resource . . . Ka Wai A Kāne . . .

The Department of Water Supply is an Equal Opportunity provider and employer.

18-215

AGENCY
PUBLICATION FORM

Project Name:	Waiaha Transmission Water Line
Project Short Name:	Waiaha Transmission Water Line
HRS §343-5 Trigger(s):	Use of County Land and Funds
Island(s):	Hawai'i
Judicial District(s):	North Kona
TMK(s):	(3rd) -5-014:002, 003, 006, 016 and 027; 7-5-015:015 and 7-5-013:027; and ROW of Māmalahoa Highway within Plats 7-5-012, 013, 014 & 016
Permit(s)/Approval(s):	Hawai'i County Public Works Department Permit to Construct Within Right of Way National Pollutant Discharge Elimination System Permit (NPDES) Permit to discharge stormwater effluent and hydrotesting effluent into the County's stormwater drain system.
Proposing/Determining Agency:	County of Hawai`i Department of Water Supply
Contact Name, Email, Telephone, Address	Gerald Yorita, gyorita@hawaiidws.org (808) 961-7248 345 Kekuanaoa Street, Suite 20 Hilo, Hawai'i 96720
Accepting Authority:	(for EIS submittals only)
Contact Name, Email, Telephone, Address	
Consultant:	Geometrician Associates
Contact Name, Email, Telephone, Address	Ron Terry, rterry@hawaii.rr.com (808) 969-7090 PO Box 396 Hilo HI 96721

Status (select one)	**Submittal Requirements**
___ DEA-AFNSI	Submit 1) the proposing agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the DEA, and 4) a searchable PDF of the DEA; a 30-day comment period follows from the date of publication in the Notice.
_X_ FEA-FONSI	Submit 1) the proposing agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEA, and 4) a searchable PDF of the FEA; no comment period follows from publication in the Notice.
____ FEA-EISPN	Submit 1) the proposing agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEA, and 4) a searchable PDF of the FEA; a 30-day comment period follows from the date of publication in the Notice.
____ Act 172-12 EISPN ("Direct to EIS")	Submit 1) the proposing agency notice of determination letter on agency letterhead and 2) this completed OEQC publication form as a Word file; no EA is required and a 30-day comment period follows from the date of publication in the Notice.
____ DEIS	Submit 1) a transmittal letter to the OEQC and to the accepting authority, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the DEIS, 4) a searchable PDF of the DEIS, and 5) a searchable PDF of the distribution list; a 45-day comment period follows from the date of publication in the Notice.
____ FEIS	Submit 1) a transmittal letter to the OEQC and to the accepting authority, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEIS, 4) a searchable PDF of the FEIS, and 5) a searchable PDF of the distribution list; no comment period follows from publication in the Notice.

____	FEIS Acceptance Determination	The accepting authority simultaneously transmits to both the OEQC and the proposing agency a letter of its determination of acceptance or nonacceptance (pursuant to Section 11-200-23, HAR) of the FEIS; no comment period ensues upon publication in the Notice.
	FEIS Statutory Acceptance	Timely statutory acceptance of the FEIS under Section 343-5(c), HRS, is not applicable to agency actions.
____	Supplemental EIS 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 or is not required; no EA is required and no comment period ensues upon publication in the Notice.
____	Withdrawal	Identify the specific document(s) to withdraw and explain in the project summary section.
____	Other	Contact the OEQC if your action is not one of the above items.

Project Summary. The Hawai'i County DWS proposes a mile-long 16-inch water transmission line on Māmalahoa Highway. Most work will be conducted within the right-of-way, with connections to the Waiaha 2-MG Reservoir and the Puaa Booster Pump Station, and possible minor use of private properties at culvert crossings. Work will involve an excavated trench with a 3-foot backfill cover and supported culvert crossings. The Puaa Pump Station pumps will be upsized to 350 gpm with technology allowing flexibility in controlling water flow. Localized and temporary traffic congestion, construction noise, emissions and fugitive dust could affect nearby properties during daytime over periods of days to weeks over the course of 16 months, as work moves along the road. Permit conditions permits will minimize impacts of traffic, air quality, noise, and stormwater runoff. The corridor has long been disturbed through by paving, grading and vegetation control. Archaeological survey documented nine historic sites, mostly Historic-era walls and culverts, few of which will be affected and none of which are significant. No rare, threatened or endangered plant species are present. Vegetation removal restrictions and, if appropriate, hawk nest surveys, will minimize impacts to endangered Hawaiian hoary bats and Hawaiian hawks. No cultural uses occur within the paved roadway or shoulders, and cultural resources will not be affected.

Final Environmental Assessment

Waiaha Transmission Water Line

DWS JOB NO. 2016-1043

TMKs: 7-5-014:002, 003, 006, 016 and 027; 7-5-015:015 and 7-5-013:027; and ROW of Māmalahoa Highway within Plats 7-5-012, 013, 014 & 016

North Kona District, Hawai‘i Island, State of Hawai‘i

November 2017

County of Hawai‘i
Department of Water Supply
345 Kekuanaoa Street, Suite 20
Hilo, Hawai‘i 96720

Final Environmental Assessment

Waiaha Transmission Water Line

DWS JOB NO. 2016-1043

TMKs: 7-5-014:002, 003, 006, 016 and 027; 7-5-015:015 and 7-5-013:027; and ROW of Māmalahoa Highway within Plats 7-5-012, 013, 014 & 016

North Kona District, Hawai‘i Island, State of Hawai‘i

PROPOSING/
DETERMINING AGENCY:

County of Hawai‘i
Department of Water Supply
345 Kekuanaoa Street, Suite 20
Hilo, Hawai‘i 96720

CONSULTANT:

Geometrician Associates LLC
PO Box 396
Hilo HI 96721

CLASS OF ACTION:

Use of County Land
Use of County Funds

This document is prepared pursuant to:

The Hawai‘i Environmental Policy Act,
Chapter 343, Hawai‘i Revised Statutes (HRS), and
Title 11, Chapter 200, Hawai‘i Department of Health Administrative Rules (HAR).

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SUMMARY

The County of Hawai‘i, Department of Water Supply (DWS) proposes to construct a 16-inch water transmission line and associated infrastructure for a length of approximately one mile between Kamila Place and Waterpipe Road along Māmalahoa Highway in Kona. The project corridor extends between Palani Junction and the community of Holualoa, at elevations ranging from 1,480 to 1,500 feet above sea level, approximately 2.5 miles inland from the Kailua Bay. The intermittent Wai‘aha Stream crosses the project corridor, as do three small, unnamed intermittent drainages.

Most work will be conducted within the right-of-way of Māmalahoa Highway, with connections to the Waiaha 2-MG Reservoir and the Puaa Booster Pump Station, and possible minor use of four private properties where portions of culverts are just outside the right-of-way.

The new water line will be installed primarily within an excavated trench with a minimum 3-foot backfill cover. Where culverts are crossed, the water line will be independently supported by a new concrete structure that will be parallel to the existing culvert headwall, except at one location where the water line will be placed under the culvert. The inlet flow channel side walls will be “notched” to accommodate the water line and support beam. The three pumps at the Puaa Pump Station will also be upsized to 350 gpm, with the ability to be controlled with variable frequency drives to allow flexibility in controlling water flow going north. A new enclosure may be built to house the electrical equipment.

The proposed work has the potential to produce localized and temporary traffic congestion as well as construction noise, emissions and fugitive dust, which could temporarily affect nearby properties. Construction will occur in front of individual properties during periods varying between several days and several weeks. This will take place over the course of about 16 months, as work moves progressively from one end of the water line installation to the other. Construction work will be confined to daytime hours from 7:30 am to 3:30 pm.

The contractor will obtain a National Pollutant Discharge Elimination System permit with Best Management Practices that will minimize the potential impact of sediment, storm water runoff and construction materials on receiving waters. The project corridor has long been disturbed through by paving, grading and vegetation control. An archaeological inventory survey documented nine historic sites, all from the Historic Era, each significant for information content only. There will be no effects to significant historic sites. Botanical surveys found mainly non-natives and no rare, threatened or endangered plant species. Vegetation removal restrictions and, if appropriate, hawk nest surveys, will minimize impacts to endangered Hawaiian hoary bats and Hawaiian hawks. No cultural uses such as gathering occur within the paved roadway or shoulders of the project corridor, and the cultural resources and values of Kona will not be affected directly or indirectly.

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PART 1: PROJECT DESCRIPTION, PURPOSE AND NEED AND ENVIRONMENTAL ASSESSMENT PROCESS

1.1 Project Description, Location and Property Ownership

The County of Hawai‘i, Department of Water Supply (DWS) proposes to construct a 16-inch water transmission line and associated infrastructure for a length of approximately one mile between Kamila Place and Waterpipe Road along Māmalahoa Highway (State Route 180) in Kona.

The project corridor extends between Palani Junction and the community of Holualoa, at elevations ranging from 1,480 to 1,500 feet above sea level. The area is situated approximately 2.5 miles inland from the shoreline at Kailua Bay. The intermittent Wai‘aha Stream crosses under the project corridor, as do three small, unnamed intermittent drainages.

Most work will be conducted within the paved surface and shoulders in the right-of-way of Māmalahoa Highway, within Plats 7-5-012, 013, 014 and 016. The water line will also connect to the Waiaha 2-million gallon (MG) Reservoir (TMK 7-5-014:016, 7-5-015:015) and the Puaa Booster Pump Station (TMK 7-5-013:027). These properties are owned by the County of Hawai‘i (Figures 1-3). There may be very minor use of four private properties where portions of culverts extend just outside the road right-of-way (TMK 7-5-014:002 and 003; owner Skip Paul Daulen: 7-5-014:006: owner: Robert Wood and Sharon Dolezal; and 7-5-014:027; owner Wray H. Kondo).

The installation of the new water line will take place primarily within an excavated trench. The trench will be backfilled to existing grade with a minimum 3-foot backfill cover. Where culverts are crossed, the water line will be placed on a structure that is supported by or parallel to the existing culvert structure, except at one location where the water line will be placed under the culvert. The inlet flow channel side walls will be “notched” to accommodate the water line and support beam where the water line transitions from underground to aboveground. A typical trench cross-section and a typical culvert crossing are shown in Figure 3b. The total volume of excavation is estimated at 1,200 cubic yards. Some excavated material will be used for backfill. The contractor will have the option of hauling the remainder to the landfill or finding a beneficial use for the material as fill.

In addition, the three pumps at the Puaa Pump Station will be upsized from their current 100 to 300 gallons per minute (gpm) pumping rate to 350 gpm. DWS will be able to control the flow from the pumps using variable frequency drives, allowing flexibility in controlling water flow going north. To house the new electrical equipment, either the existing enclosure will be used or a new enclosure with masonry walls and a corrugated metal roof will be built.

As with most construction projects on roadways, the proposed work has the potential to produce localized and temporary traffic congestion as well as construction noise, emissions and fugitive dust, which could temporarily affect nearby properties. Construction will occur in front of individual properties for periods varying between several days and several weeks. This will take place over the course of about 16 months, as work moves progressively from one end of the water

Figure 1. Location Map

Base Map © Google Earth

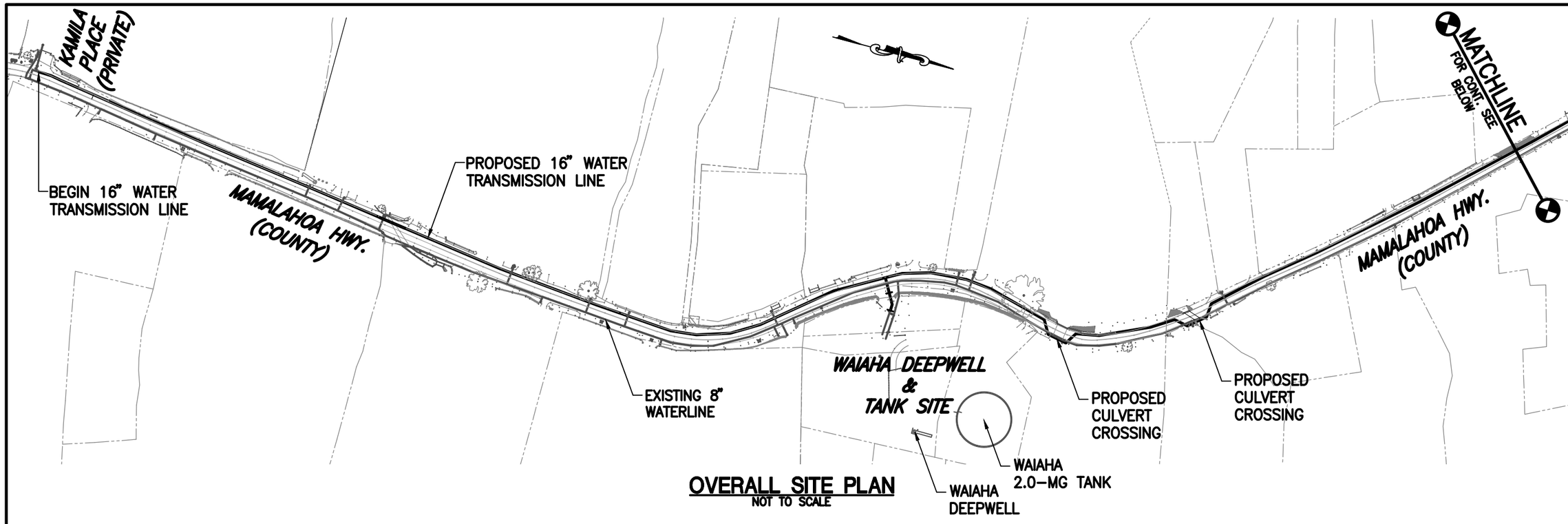
Figure 2. Project Corridor Photos

Southern portion of project corridor ▲ ▼ Waiaha Drainage

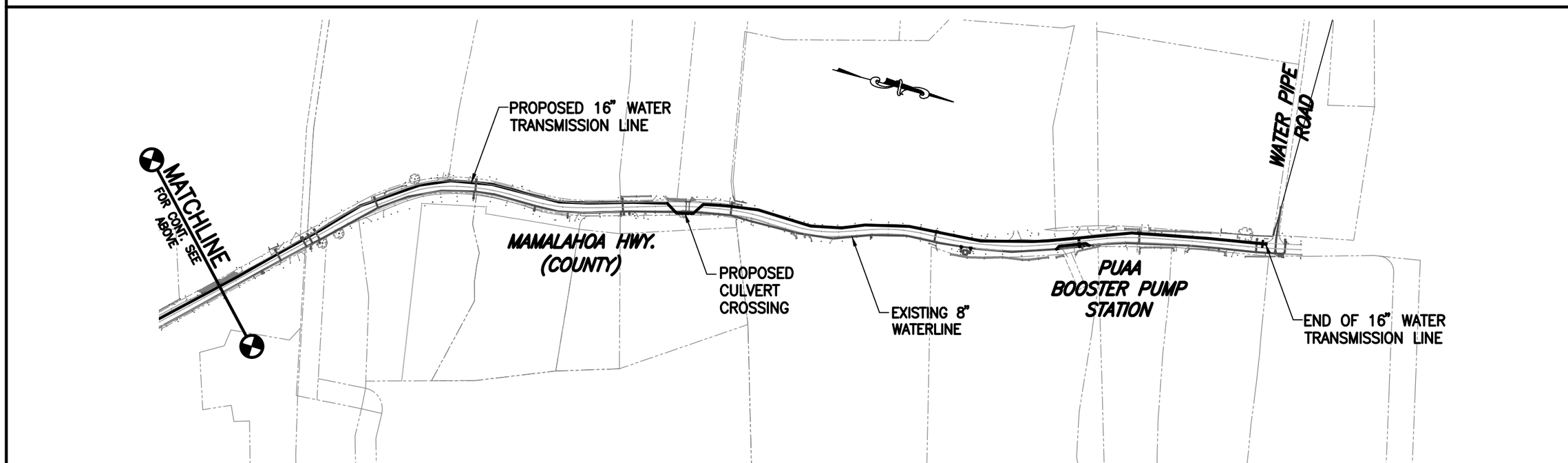
Figure 2 Project Corridor Photos (cont'd)

Existing 8-inch waterline culvert crossing, similar to proposed method ▲

▼ Northern portion of project corridor at Puaa Booster Pump Station



OVERALL SITE PLAN
NOT TO SCALE



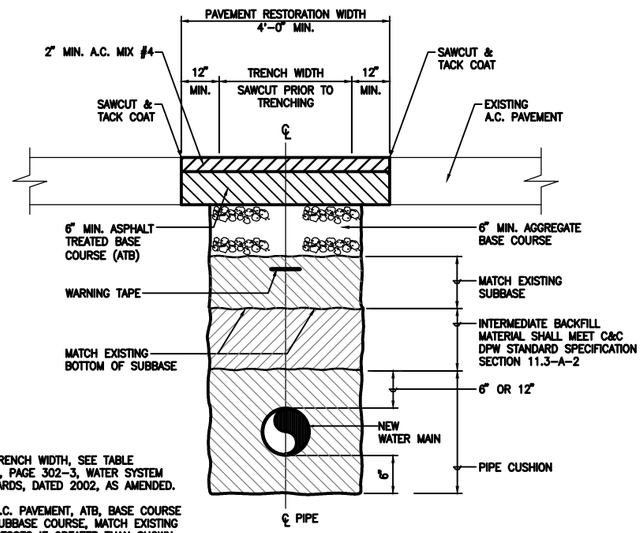
OVERALL SITE PLAN
NOT TO SCALE

WAIAHA WATER SYSTEM IMPROVEMENTS - TRANSMISSION - ENVIRONMENTAL ASSESSMENT

OVERALL SITE PLAN

Figure 3a

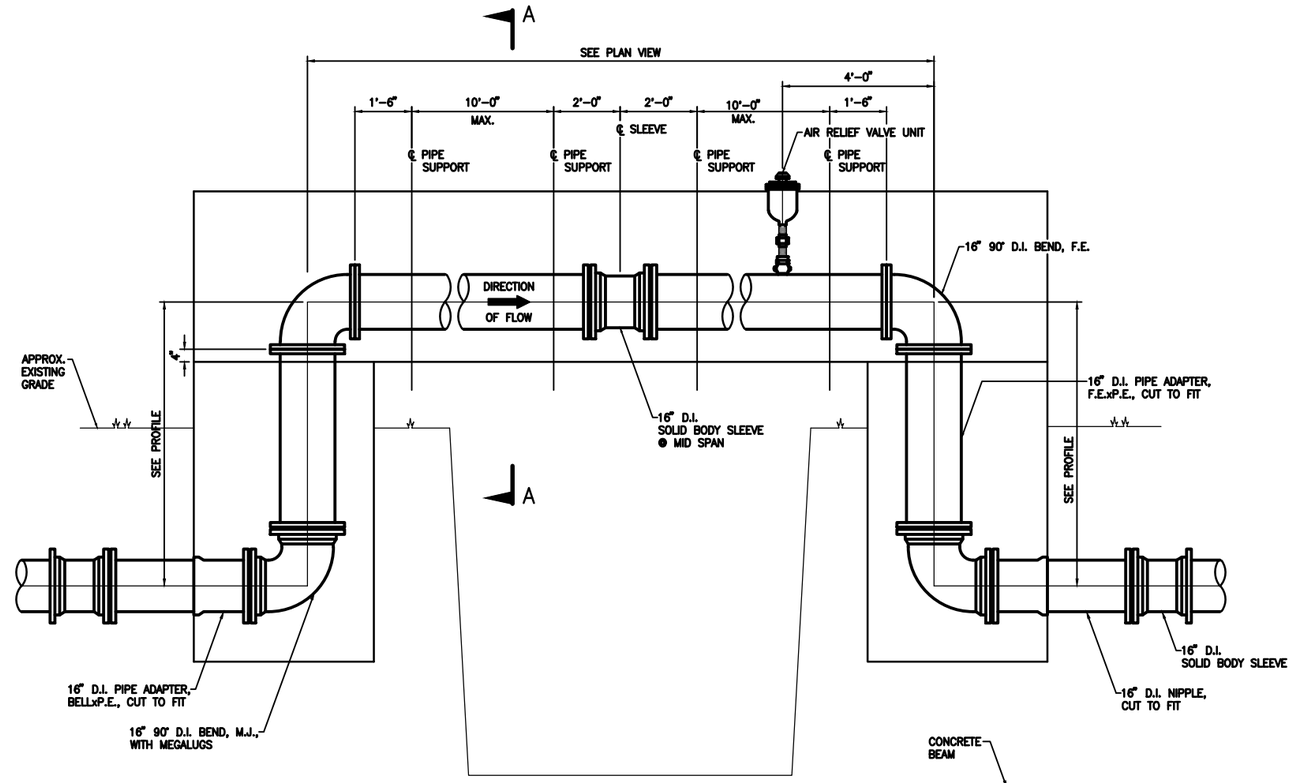
O:\Qproj\2016\216-052 Waiaha Water Transmission Line\Ron Terry (Mapping)\CADD\Fig 3a.dwg PLOT DATE: 5/17/2017



NOTES:

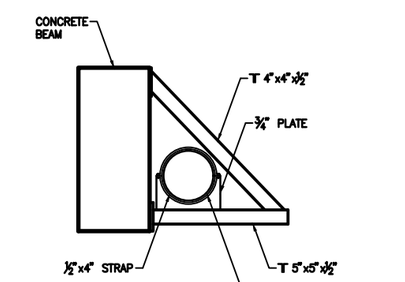
1. FOR TRENCH WIDTH, SEE TABLE 300-1, PAGE 302-3, WATER SYSTEM STANDARDS, DATED 2002, AS AMENDED.
2. FOR A.C. PAVEMENT, ATB, BASE COURSE AND SUBBASE COURSE, MATCH EXISTING THICKNESSES IF GREATER THAN SHOWN ON THIS DETAIL.
3. FOR PIPES 4" TO 12" DIAMETER, THE PIPE CUSHION SHALL BE 6" ABOVE THE TOP OF PIPE. FOR PIPES LARGER THAN 12" DIAMETER, THE PIPE CUSHION SHALL BE 12" ABOVE THE TOP OF PIPE.

TYPICAL TRENCH SECTION DETAIL
NOT TO SCALE



ELEVATION

DETAIL OF PROPOSED CULVERT CROSSINGS
NOT TO SCALE



NOTE:
ALL STRUCTURAL SHAPES AND PLATES SHALL BE TYPE 316L STAINLESS STEEL. BOLTS & NUTS SHALL BE TYPE 316L STAINLESS STEEL.

PROVIDE ⅛" NON-METALLIC PIPE WEAR PAD. PIPING TECHNOLOGY & PRODUCTS, INC., OR APPROVED EQUAL.

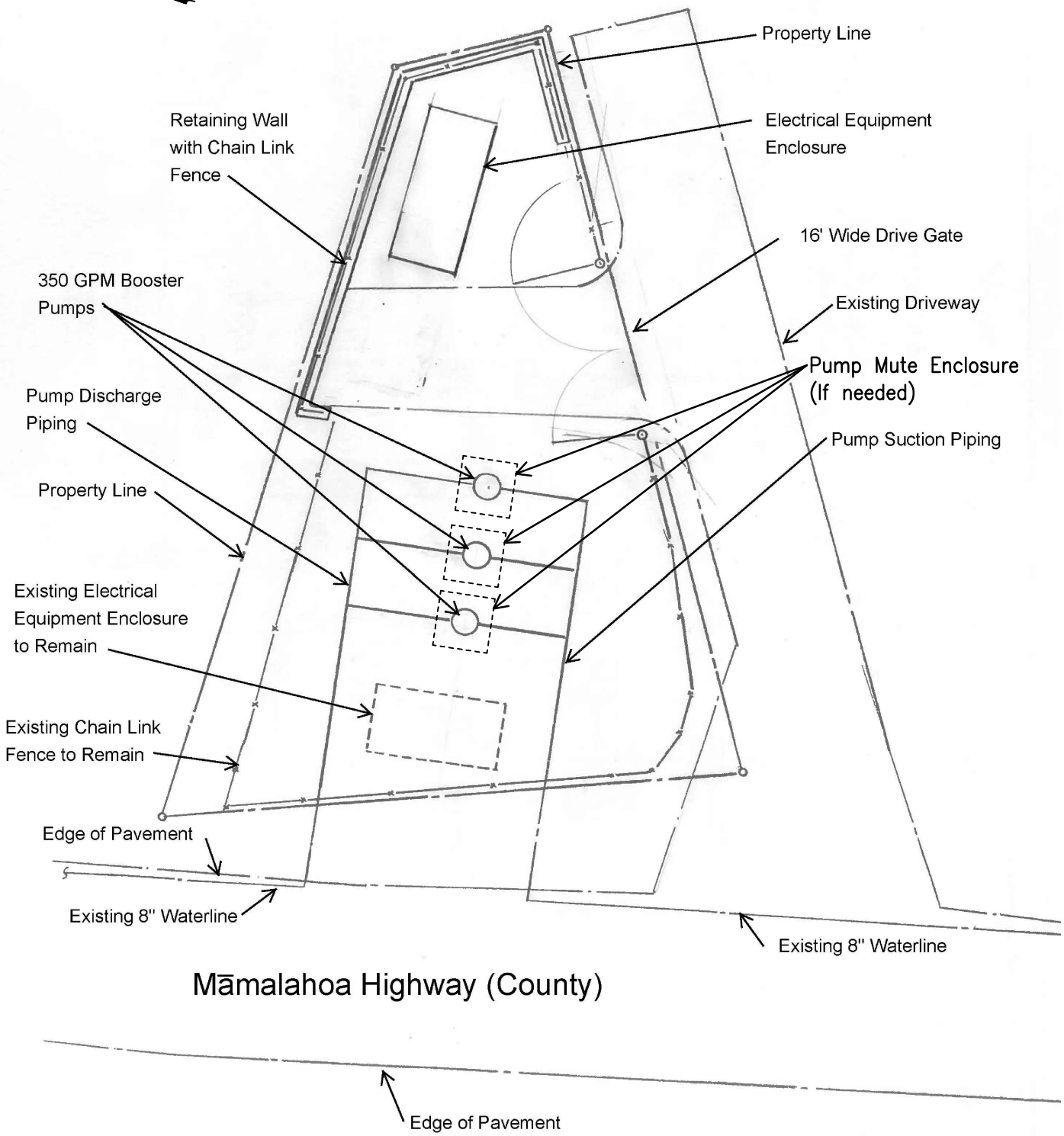
SECTION A-A

WAIAHA WATER SYSTEM IMPROVEMENTS - TRANSMISSION - ENVIRONMENTAL ASSESSMENT

TYPICAL TRENCH CROSS SECTION ON TYPICAL CULVERT CROSSING

Figure 3b

O:\Oproj\2016\216-052 Waiaha Water Transmission Line\Ron Terry (Mapping)\CADD\Fig 3b.dwg PLOT DATE: 5/17/2017



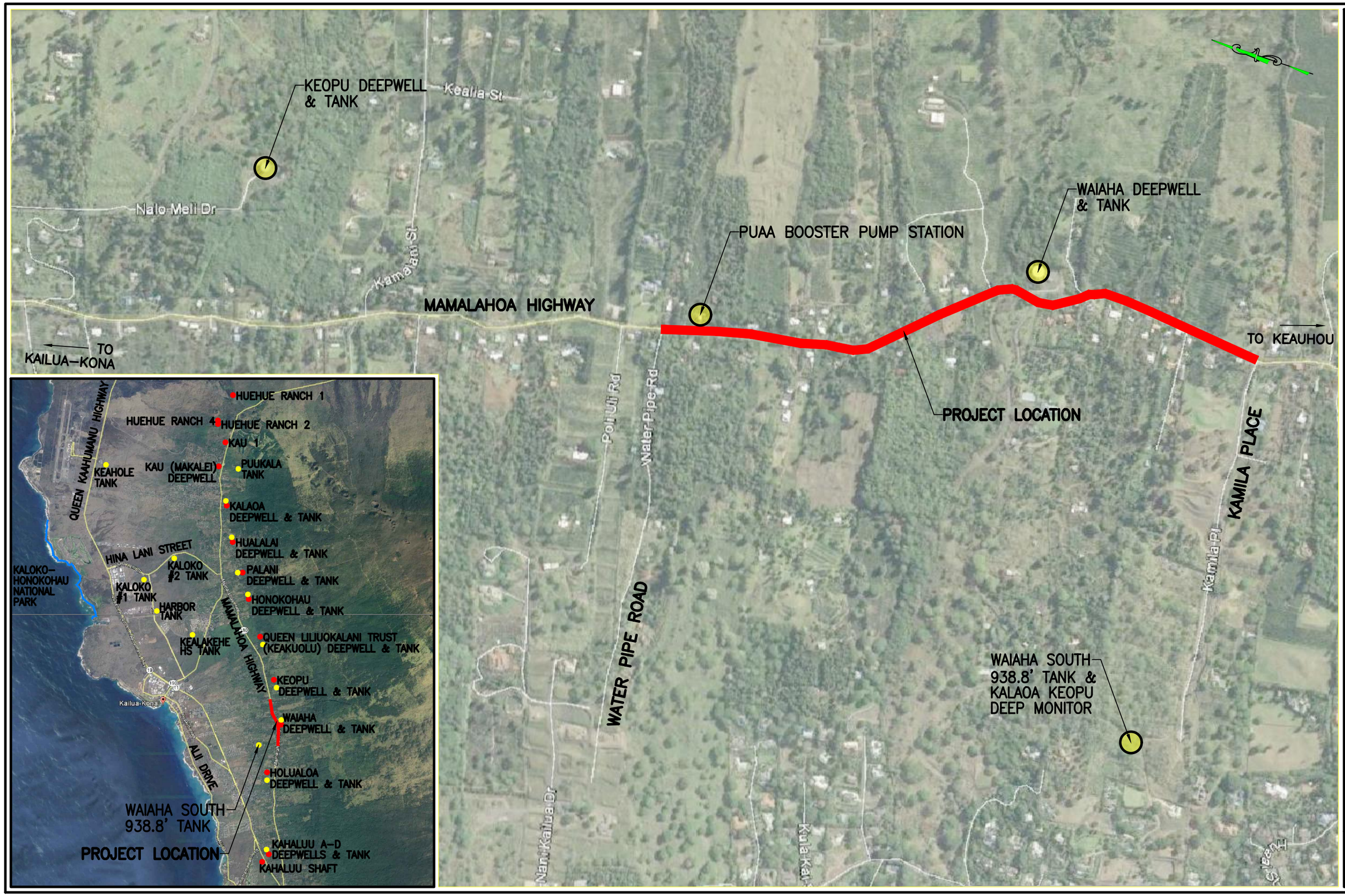
WAIAHA WATER SYSTEM IMPROVEMENTS - TRANSMISSION - ENVIRONMENTAL ASSESSMENT

PUA'A BOOSTER PUMP STATION SITE PLAN

TMK: 7-5-013: 027

Figure 3c

O:\Proj\2016\216-052 Waiaha Water Transmission Line\Ron Terry (Mapping)\CADD\Fig 3c.dwg PLOT DATE: 7/28/2017



WAIAHA WATER SYSTEM IMPROVEMENTS - TRANSMISSION - ENVIRONMENTAL ASSESSMENT

NORTH KONA WATER SYSTEM SELECTED FEATURES

Figure 4

O:\Oproj\2016\216-052 Waiaha Water Transmission Line\Ron Terry (Mapping)\CADD\Fig 4.dwg PLOT DATE: 5/16/2017

line installation to the other. Construction work will be confined to daytime hours from 7:30 am to 3:30 pm.

The Project is expected to cost in the range of $3 million, an estimate that will be refined as project design proceeds. If approvals and funding proceed as planned, design will be finished by late 2017, and construction will begin in mid-2018 and will last approximately 16 months.

1.2 Background and Purpose and Need

Background: North Kona Water System

The North Kona Water System serves almost the entire North Kona District. With 45 percent of the total number of hotel rooms on the island, North Kona is a major visitor industry center, with direct national and international flights to Kona International Airport at Keahole. In addition to tourism, the northern half of the Kona coffee belt lies within North Kona. The coffee belt has the ideal climate without the need for irrigation for this crop. The demand and value of Kona coffee has steadily increased to over $40 million. In addition to coffee, Kona has many commercial fruit and flower orchards.

North Kona supports many other industries, including, fishing, and quarrying, manufacturing, service, wholesale and retail activities. North Kona is also the center for government and industrial activities for West Hawaiʻi. Additionally, Kona is also home to “big-box” retailers such as Costco, K-Mart and Walmart, as well as international sporting events such as the IronMan Triathlon, the Hawaiian International Billfish Tournament and the Senior PGA Tournament of Champions at the Hualālai Resort. Another major facility is the Natural Energy Laboratory of Hawaii Authority (NELHA), a $100 million ocean science and technology park located at Keahole Point. In 2017, the facility hosted 30 client projects/firms in the aquaculture, biotech, energy and water industries, which together employed several hundred people.

Potable water is a key requirement for Kona residents, visitors and businesses. The North Kona Water System extends from Kona International Airport south to the South Kona District boundary, where interconnection with the South Kona Water System is made. The Kona districts lacked County water systems until funds were provided by the Legislature in 1951. The first increment of the North Kona Water System was completed in 1953. Surface water from Waiaha Stream was diverted into large storage tanks located in Waiaha above Māmalahoa Highway, filtered, then piped down to Kailua by a small transmission line to large tanks above Kailua Village. This provided the impetus for the resort development that occurred in subsequent years. The first potable water wells were not placed into service until 1967. Expansion of the system, mainly through legislative funds, continued for years. Most of the small pipelines initially installed have been replaced with larger mains.

The system eventually expanded south to Keauhou, permitting the development of hotels along this coastline. Extension to Kona International Airport opened up a new area for development, including as the Honokōhau Small Boat Harbor. The expansion program also involved the existing farming

community in the *mauka* areas, and the system eventually was extended from Kalaoa Homesteads in the north to the South Kona boundary, a distance of over 18 miles.

The North Kona Water system currently consists of wells, reservoirs, transmission lines, distribution lines, and associated facilities such as pressure relief-valves and booster pump stations. Water is derived from wells that tap the Hualālai Aquifer Sector Area (ASEA), and specifically the Keauhou Aquifer System Area (ASYA) along Hualālai's main northwest-southeast rift zone.

DWS operates 11 principal municipal wells, including the Kahaluʻu Shaft, four other Kahaluʻu Wells, and five high level wells at Holualoa, Waiaha, Honokōhau, Keahuola, and Kalaoa (Figure 4). According to information reported by well owners to the Hawaiʻi State Commission on Water Resources Management (CWRM), total pumpage in the Keauhou AYSA system as of 2016 was about 13 million gallons per day (MGD) and it did not vary substantially through the year. Of this 13 MGD total, about 11 MGD was pumped by DWS' North Kona System wells. DWS' total can further be divided into about 7 MGD by its six basal wells in Kahaluʻu and Holualoa and 4 MGD by its five high level wells from Kalaoa to Waiaha. Pumpage from these four wells began in the late 1990s and has averaged about 3.5 MGD since 2004.

These five high level wells are upgradient of Kaloko-Honokōhau National Park (the National Park), which seeks to maintain the quantity and characteristics of its groundwater to preserve the integrity of its biological resources and cultural resources and traditional cultural practices. The Keauhou AYSA has a sustainable yield of 38 MGD. Maintaining the sustainability of the source and its beneficial uses and values is a key goal of DWS. In order to accomplish this while minimizing withdrawal from the northern part of the aquifer above Honokōhau and achieving the overall goal of sustainability throughout the region, development of future high-level wells for the DWS system is encouraged in areas generally between 1,500 foot and 1,800-foot ground elevations, *mauka* of Māmalahoa Highway. This area is generally between the QLT Deepwell in the Keauhou ASYA and the Halekiʻi Deepwell in the Kealakekua ASYA (see Figure 4).

To distribute water to its customers efficiently and economically, DWS operates a storage system consisting of reservoirs and major transmission lines that convey water from wells to reservoirs or from reservoir to reservoir. Two trends have developed over the last 50 years: (1) a shift in the majority of water demand from the *mauka* farming and residential areas to the coastal resorts, residence and commercial areas; and (2) a move away from basal sources located near the sea to *mauka* wells relying on higher-level aquifers. The location of planned reservoirs and transmission lines has gradually adapted to these changes. There are currently 50 major reservoirs varying in size from 0.1 to 2.0 MG, and 11 smaller tanks. Major transmission lines connect these facilities.

Background: Water System Planning

The primary objective of the Hawaiʻi Water Use and Development Plan (HWUDP) is to set forth the allocation of water to land use. As required by the Hawaiʻi Administrative Rules (HAR) Title 13, Chapter 170, Hawaiʻi Water Plan, each of the four counties is responsible to prepare a WUDP to include, but not be limited to the following:

1. Status of county water and related land development including an inventory of existing water uses for domestic, municipal, and industrial users, agriculture, aquaculture, hydropower development, drainage, reuse, reclamation, recharge, and resulting problems and constraints;
2. Future land uses and related water needs; and
3. Regional plans for water developments including recommended and alternative plans, costs, adequacy of plans, and relationship to the water resource protection plan and water quality plan.

The County of Hawaiʻi adopted by ordinance the Water Use and Development Plan Update dated August 2010 (2010 HWUDP), and the Commission on Water Resource Management (CWRM) granted approval in December 2011. The 2010 HWUDP update implemented a broad, uniform approach island-wide to conservatively evaluate the County's land use policies set forth in the County General Plan and Zoning Code. The General Plan is the long-range conceptual land use plan for the island of Hawaiʻi, while the Zoning Code is the legal instrument that regulates land development and implements the General Plan policies. The intent of the 2010 HWUDP was to guide the County in prioritization and focus of future assessment efforts.

The 2010 HWUDP identified two aquifer sectors to be considered for further evaluation and detailed assessment. One was the Hualālai ASEA/Keauhou ASYA, which includes the location of the proposed Waiaha Transmission Water line project. The update consisted of two phases. The first phase involved the refinement of the water demand scenarios and projection. This was completed in 2015 (DWS 2015). The second phase (DWS 2016) focused on the development of source development strategies and scenarios, and also explored methods to identify traditional and customary native Hawaiian rights, cultural uses or other public trust purposes related to, affected or impacted by ground water development, and also dealt with how those impacts should be mitigated.

Throughout the HWUDP planning process, DWS has envisioned a number of source development strategies to focus on meeting the anticipated demand scenario. The implementation strategies provided guidance for further integration and planning coordination of water resource management with the development of land use policies to ensure sustainable management of water resources. The great majority of development associated with the anticipated demand scenario is expected to be supplied by the DWS system; hence, source development will principally involve DWS and its partnerships with private entities and State agencies.

Long-range planning to guide the development of its water service areas and the use of its resources is outlined in 20-year Water Master Plans (WMPs), the latest of which is dated 2006. Long-range development timetables are difficult to predict, since development projects are often market and economically driven. Conceptual options for long-term source development and infrastructure improvements are usually linked to future expected private land development projects, which are always subject to change, postponement or cancellation. Near-term needs are provided for DWS and its partnerships through the DWS 5-year Capital Improvement Program (CIP).

The 2006 WMP identified the projects DWS expected to require during the 2007-2026 planning period. Some of the CIP projects outlined in the WMP for the North Kona Water System have already been implemented, including:

- Palani Transmission System, which included transmission water mains and 2.0 MG and 1.0 MG reservoirs to transmit high-level water from three separate sources directly to the Kailua-Kona and Kealakehe areas.
- Palamanui Water System Phase 1, which included a transmission water main and 0.5 MG reservoir to provide a backup connection between the mauka and makai water systems.
- Waiaha Corridor Improvements, which was a private/public project that included a transmission water main and two 1.0 MG reservoirs to bring high-level water from the Waiaha Deepwell down to the lower elevations and allow blending with the basal water.
- Keopu-Puʻuhonua Production Well and 1.0 MG Reservoir, including transmission main, to bring high level water to the north where it can be transmitted down to lower elevations via the Palani and Hina Lani transmission systems.

Some departures from the WMP have occurred for these projects, such as changes in storage capacity and transmission infrastructure size and alignment. Certain projects proposed in the WMP were not completed for various reasons including poor well results or stalled development. Other projects that have been completed but were not part of the WMP include the Palani Ranch Deepwell, which was a public-private project where DWS participated financially in upsizing the reservoir that was part of the Project in order to better serve the needs of the North Kona community. These departures from the WMP demonstrate the difficulty in predicting specific future water system infrastructure improvement projects.

Proposed DWS 5-year CIP projects are focused on increasing high-level source capacity, which will ultimately reduce the use of basal sources, as well as transmission projects to increase the utilization of existing sources. These projects were also not part of the WMP and include the proposed project, which is identified in bold font in the list below.

- Proposed 16-inch Transmission Upgrade, funded by the Hawaiʻi Housing Finance & Development Corporation, which will increase the size of the transmission main south of the QLT high-level well.
- **Proposed 16" Waiaha Transmission Upgrade, which will increase the size of transmission main between the Waiaha *mauka-makai* corridor and proposed Waiaha wells.**
- Proposed Keauhou-Kamehameha #2 Production Well, a new high-level well.
- Keauhou Transmission Improvements, which will deliver water from the proposed Keauhou-Kamehameha #2 well.
- Queen Kaʻahumanu Widening 16" Transmission Water line.
- North Kona Well (Waiaha Well #2).

An important goal of the current CIP program implementing and adapting the WMP is to enable water transmission from existing and proposed sources to accommodate future anticipated water demands. Implementation of these plans will allow the most efficient and economical use of water and will also promote the use of well sources in the area specified in the HWUDP.

Purpose and Need for Proposed Waiaha Transmission Line

The existing 8-inch water line that connects to the Waiaha Reservoir is too small to efficiently accomplish water transmission for present and future water demand in the North Kona Water System as envisioned in the HWUDP and the Water Master Plan. Specifically, DWS is forced to throttle flow into the 1.0-MG Waiaha South 938.8' Reservoir to curb the water flow to the amount that can be accommodated in the 8-inch water line. This also restricts the utilization of the Waiaha Deepwell capacity. There is limited ability to have water flow in both directions in the Waiaha area along the Māmalahoa Highway, and this makes it difficult to shift to redundant sources in case of well pump breakdowns. Furthermore, the current arrangement limits the ability to incorporate future well sources that are expected to be developed in the desired area in the south.

The purpose of constructing a 16-inch transmission water line is thus to optimize the function of the North Kona water system by:

- Allowing full use of the Waiaha Deepwell and the Waiaha 2 MG Reservoir
- Providing critical redundancy in case there are problems with another part of the system
- Efficiently supporting existing uses and planned development, and
- Improving the water system for customers.

1.3 Environmental Assessment Process

This Environmental Assessment (EA) is being conducted in accordance with Chapter 343 of the Hawai‘i Revised Statutes (HRS). This law, along with its implementing regulations, Title 11, Chapter 200, of the Hawai‘i Administrative Rules (HAR), is the basis for the environmental review process in the State of Hawai‘i. According to Chapter 343, an EA is prepared to determine impacts associated with an action, to develop mitigation measures for adverse impacts, and to determine whether any of the impacts are significant according to thirteen specific criteria.

Part 4 of this document states the anticipated finding that no significant impacts are expected to occur; Part 5 lists each criterion and presents the preliminary findings for each made by the Hawai‘i County Department of Water Supply, the proposing/determining agency. If, after considering comments to the Draft EA, the agency concludes that, as anticipated, no significant impacts would be expected to occur, then the agency will issue a Finding of No Significant Impact (FONSI), and the action will be permitted to proceed towards required permits and approvals and to construction. If the agency concludes that significant impacts are expected to occur as a result of the proposed action, then an Environmental Impact Statement (EIS) will be prepared.

1.4 Public Involvement and Agency Coordination

The following agencies and organizations were consulted in development of the environmental assessment:

Federal:	Kaloko-Honokōhau National Historical Park	
State:	Department of Health	Office of Hawaiian Affairs
County:	Department of Environmental Management Police Department	Public Works Department County Council
Private:	Hawai‘i Island Chamber of Commerce ‘Aha Moku 43 Adjacent Landowners/Residents	Sierra Club Kamehameha Schools

Copies of communications received during early consultation are contained in Appendix 1a. Comments to the Draft EA and responses to these comments are contained in Appendix 1b. Various places in the Final EA have been modified to reflect input received in the comment letters; additional or modified non-procedural text is denoted by double underlines, as in this sentence.

PART 2: ALTERNATIVES

2.1 No Action

Under the No Action Alternative, the new transmission water line would not be built. The goal of efficiently interconnecting elements of the North Kona Water System so that the Waiaha Reservoir and Waiaha Deepwell can be used at full capacity would be more difficult to meet. Because of its mandate to provide reliable and high-quality water service to all its customers, the Hawai‘i County Department of Water Supply considers the No Action Alternative unacceptable.

The No Action Alternative would avoid impacts related to this particular use of land, which are primarily temporary construction-related impacts to air quality, noise and traffic. The No Action Alternative serves as a useful baseline for analysis of both the temporary adverse impacts and the benefits of a better integrated and more efficient water system, and it is retained for analysis in this EA for impact comparison purposes.

2.2 Alternative Strategies and Locations

Aside from the proposed physical water line, there are no other practical, economical and environmentally sound approaches involving source or storage improvements that could accomplish the goals of the Project. During early phases of project planning, DWS evaluated its system and determined that the proposed route along Māmalahoa Highway provides the best overall location to meet the Project’s purpose and need, as the elements that require interconnection – the Waiaha Deepwell and Puaa Booster Pump Station – are also located along the highway. Alternative routes *mauka* or *makai* of Mamālahoa Highway would require the acquisition and use of private property and disturbance of residences and farms for construction and maintenance. In some cases, this disturbance would be substantial, as the area on both sides of the highway is densely occupied. Furthermore, new culverts might be required at intermittent stream crossings, which could involve State and federal permits and considerable time and expense. By contrast, the proposed project corridor follows an existing highway, takes advantage of existing culverts, and minimizes property impacts and the necessity for property acquisition. Although construction will temporarily inconvenience traffic and residents, there do not appear to be any severe environmental impacts or other disadvantages associated with the specific project corridor. Accordingly, no alternative water line routes have been advanced for detailed study in the Environmental Assessment.

PART 3: ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION MEASURES

Basic Geographic Setting

The proposed water line and surrounding areas that could be affected by construction are termed the *project corridor*. The term *project area* is used in a more flexible sense to refer to *mauka* Kona or West Hawai‘i, depending on the resource under discussion. The project corridor extends 0.98 miles along Mamālahoa Highway between Kamila Place in the south and Water Pipe Road in the north at an elevation of about 1,490 feet. It passes agricultural, residential and water supply infrastructure land uses. Mamālahoa Highway in this area is part of the recently designated Māmalahoa Kona Heritage Corridor (see Figures 1-4).

3.1 Physical Environment

3.1.1 Climate, Geology, Soils and Geologic Hazards

Environmental Setting

Temperatures are moderate and the annual rainfall is about 45 to 50 inches, increasing slightly from south to north (Giambelluca et al 2013). The area is more humid than coastal areas with similar elevation because of both fog drip off vegetation and the lower temperature due to higher elevation, which reduces evapotranspiration. Winds are generally light upslope sea breezes in the daytime and light downslope land breezes at night.

The geologic substrate in this area is ash-covered lava flows from Hualālai Volcano dated to more than 10,000 years before the present (Wolfe and Morris 1996). The soil along the project corridors is classified by the U.S. Natural Resources Conservation Service (formerly Soil Conservation Service) within several soil complexes, including the Honuaula, Napoopoo-Honuaula- and Honuaula-Kealakekua types (U.S. Soil Conservation Service 1973). These soils are fairly similar and consist of rocky or cobbly silt clay loams over a lava bedrock located a few feet at most below the surface. Although all soils are well drained, runoff potential is variable. This type of soil is typically used for coffee and fruit farms.

The entire Big Island is subject to geologic hazards, especially lava flows and earthquakes. The U.S. Geological Survey assesses volcanic hazard in this area of Kona, which is on the slopes of the inactive volcano Hualālai, as Lava Flow Hazard Zone 4, on a scale of ascending risk 9 to 1 (Heliker 1990:23). The hazard risk is based on the fact that Hualālai has steep slopes and is historically the third most active volcano on the island. In volcanic hazard Zone 4, about 5 percent of the area has been covered with lava since 1800, with less than 15 percent covered in the past 750 years.

The Island of Hawai‘i experiences high seismic activity and is at risk from major earthquake damage (USGS 2000), especially to structures that are poorly designed or built. On Sunday, October 15, 2006, two damaging earthquakes of magnitude 6.7 and 6.0 struck the west side of

Hawai‘i Island. These earthquakes caused no known damage to the water infrastructure in this area. There are moderate slopes and stable soils along the water line route, and no evidence of subsidence or rockfall or landslides. The entire project corridor has geologic conditions acceptable for the proposed water line use. Lava tubes, which are the long cavities left behind by underground channels of lava, are common on pahoehoe lava flows in Hawai‘i, but can also be present on ‘a‘a flows, which are more common on the project corridor. Some lava tubes have openings large enough for human entry and may thus be classified as caves. Lava tube caves in Hawai‘i may have value as historic sites, recreation areas, as unique geological features, or for other reasons. No lava tubes were observed during the course of biological or archaeological fieldwork on the water line corridor. Most large lava tubes near the surface would have been previously breached by the Māmalahoa Highway. However, due to the 1-mile length perpendicular to the slope, smaller lava tubes could be present not far from the surface.

Impacts and Mitigation Measures

In general, geologic conditions impose no constraints on the proposed action, and the proposed water line is not imprudent to construct. Any water infrastructure that serves the well-populated Kona area must be constructed within an area of similar or greater volcanic hazard. The substrate of the entire project corridor is suitable for excavation and use for water lines, as existing lines present over most of the route indicate. In general, the project corridor appears to be located on an appropriate substrate for water line construction, and no geotechnical concerns are anticipated. The water line and associated facilities will be designed in accordance with the DWS Water System Standards and the County of Hawaii Standard Specifications for Public Works Construction. In addition, any structures needed for this project will be design in accordance with applicable codes and standards to accommodate the island’s seismic activity.

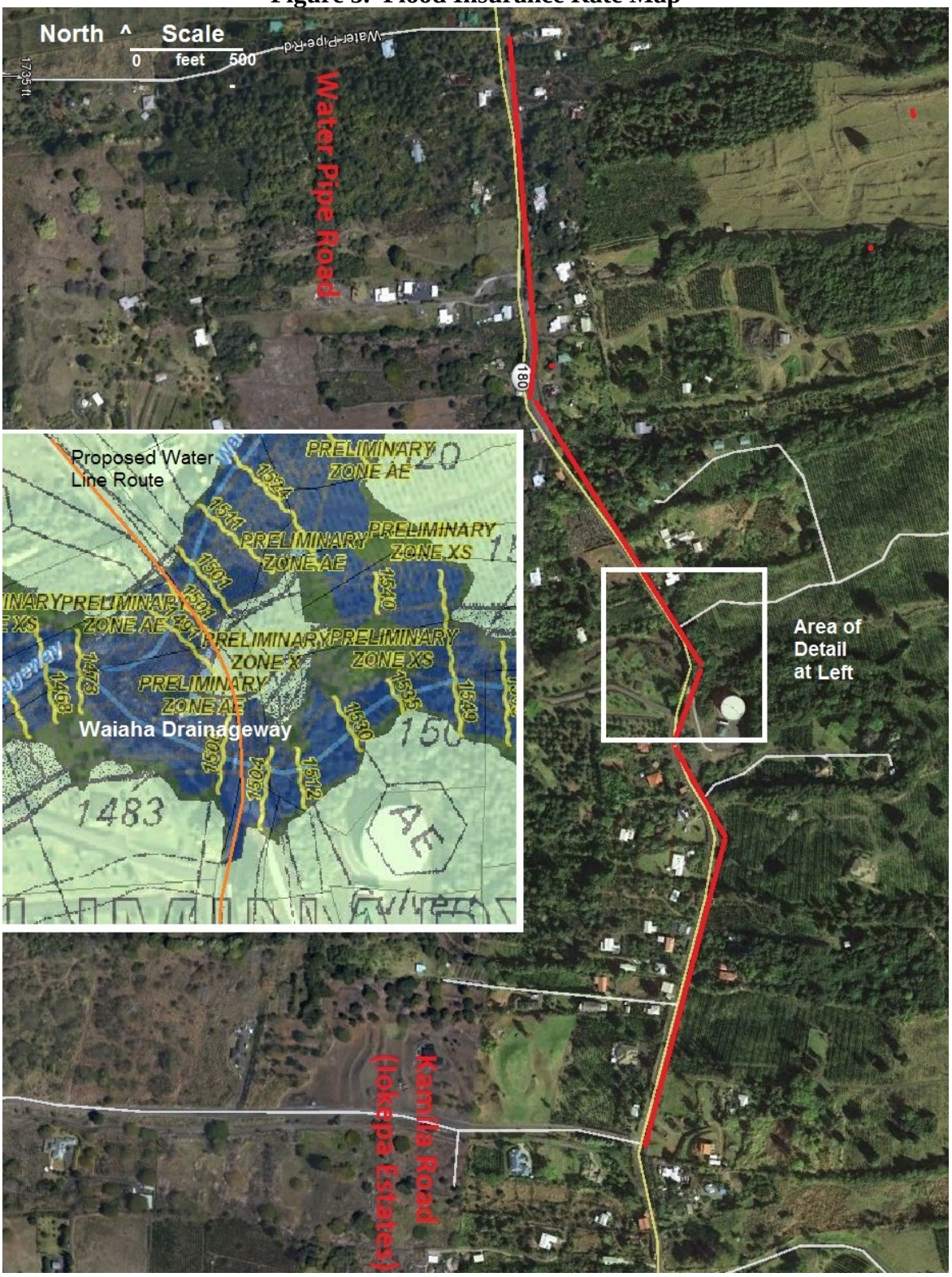
3.1.2 Drainage, Water Features and Water Quality

Existing Environment

The Federal Emergency Management Agency’s Flood Insurance Rate Map (FIRM) 0714C shows the existing water line and the project corridor primarily within Flood Zone X, outside of the 500-year flood plain, with a small portion crossing over the Waiaha Drainageway just *mauka* of where it splits into two channels. Waiaha Drainageway flows under Māmalahoa Highway in two culverts that extend through a roadway prism of fill material that was emplaced over a century ago when the highway was constructed. The existing water line is contained within the roadway prism and does not extend into the channel of the drainageway. At the culvert opening the existing 8-inch water line is suspended with straps from the culvert headwall structure.

These channels are within Flood Zone AE, which is defined as the area inundated by 1% annual chance flooding, for which Base Flood Elevations (BFE) have been determined. The Hawai‘i State Department of Land and Natural Resources (DLNR) has initiated a preliminary revision of the flood zones to account for decades of surface erosion and land use changes that have changed flood flow patterns will result in a Letter of Map Revision (LOMR) that will slightly change the flood zone

Figure 5. Flood Insurance Rate Map



Source: Preliminary DFIRMs: http://gis.hawaiinfip.org/fhat/

boundaries in this area and other areas of the Island of Hawai‘i (Figure 5). In addition to designated flood zones, local shallow flooding after very heavy rains may also occur in various places along the route, even if there is no flood zone associated with them. Several other smaller drainageways with culverts are also present outside designated flood zones.

Impacts and Mitigation Measure

Because of the limited scale of construction and the environmental setting, the risks for flooding or impacts to water quality are very minor. Generally, the drainage will be designed to comply with all County codes and ordinances. Policies implementing Chapter 27 of the Hawai‘i County Code require that all drainage that crosses the site be accommodated and that all post-development runoff generated from the site be handled onsite. The final design, which will come after the EA and will be reviewed and approved by the County of Hawai‘i, Department of Public Works, will ensure that there are no drainage impacts to the adjacent properties.

In order to minimize the potential for sedimentation and erosion, the contractor shall be required to perform all earthwork and grading in conformance with Chapter 10, Erosion and Sediment Control, Hawai‘i County Code. Although construction will likely disturb less than one acre of soil, a National Pollutant Discharge Elimination System (NPDES) permit will be required for storm water discharge and hydrotesting discharge involved as part of connecting the new water lines to the existing water system. This permit will be applied for by the construction contractor and obtained before the Project commences. This permit requires the completion of a Storm Water Pollution Prevention Plan (SWPPP). In order to properly manage storm water runoff, the SWPPP will describe the emplacement of a number of best management practices (BMPs) for the Project. Although the precise list of BMPs and their exact locations have not yet been developed, the following types of BMPS are expected:

<u>Structural BMPS</u>:

- These will include silt fences and/or compost filter socks, snake bags for drain/drywell inlet protection, sediment traps and filter berms.
- The contractor will be required to make every effort to install structural BMPs as near the pollutant source as practicable.
- Inlet protection shall serve as the last measure to prevent pollutants from entering the storm drain system.
- The contractor will be required to inspect erosion and sediment control measures twice daily and after 0.5 inches of rainfall.

<u>Non-Structural BMPs</u>

- All waste materials shall be collected and stored in a securely lidded, leak proof metal dumpster, which shall be emptied a minimum of once per week.
- All hazardous waste materials shall be disposed of in the manner specified by local or State or federal regulations.
- All sanitary waste shall be collected from the portable restroom facilities a minimum of once per week, and more often, as necessary.

- All erosion and sediment control measures shall be inspected daily prior to and after each day's construction.
- All control measures, per approved NPDES plan, shall be maintained in good working order, with repairs, if necessary, initiated within twenty-four (24) hours of problem discovery.
- The contractor will be required to follow good housekeeping practices for materials to prevent spills or leaks, including storing only enough products and material required to perform the job, keeping products in their original containers, having secondary containment for appropriate products, and following manufacturers' directions for proper use and disposal.
- Hazardous products shall be kept in their original containers with the original manufacturer's labeling, with material safety data sheets (MSDS) retained and available for review by users, with all hazardous waste material disposed of in a manner permitted by local, State or federal regulations.
- All on-site vehicles shall be monitored for leaks and shall be subject to regular preventive maintenance to reduce the chance of leaks occurring, with leaks that cannot be repaired immediately contained in spill pans or other appropriate containers.
- Concrete trucks shall discharge drum wash water only at designated sites, and no wash water shall be discharged to the storm drain system.

3.1.3 Flora, Fauna and Ecosystems

Existing Environment

Gagne and Cuddihy (1990) classified the natural, pre-human vegetation in areas with a similar geology, elevation and rainfall as Mesic Ōhiʻa/Lama Forest, defining this as an open forest dominated by ʻōhiʻa (*Metrosideros polymorpha*) and/or lama (*Diospyros sandwicensis*) that occurs on youthful ʻaʻa substrates with annual rainfall of about 40 inches in leeward Hawaiʻi. The canopy is generally 30 to 50 feet high and there is a well-developed layer of diverse trees, shrubs, herbs and ferns. These original communities, however, have been destroyed or heavily degraded by cattle grazing and clearing for coffee and fruit tree farms and residences.

A botanical reconnaissance was conducted by Dr. Ron Terry in March 2017. The vegetation of the project corridor is now managed vegetation, either farm/yard-edge vegetation, or roadside weeds that are mown, cut and/or sprayed with herbicide. No remnant native forest is present. Prominent ornamental/crop trees and shrubs that are adjacent to the water line corridor include avocado (*Persea americana*), African tulip (*Spathodea campanulata*), mango (*Mangifera indica*), jacaranda (*Jacaranda mimosifolia*), Cook Island pine (*Araucaria columnaris*), kukui (*Aleurites moluccana*), coffee (*Coffea arabica*), (*Eriobotrya japonica*), noni (*Morinda citrifolia*), citrus (*Citrus* spp.), coconut (*Cocos nucifera*), hapuʻu pulu (*Cibotium glaucum*) and macadamia nut (*Macadamia integrifolia*). The most common weedy species were guinea grass (*Megathyrsus maximus*), Napier grass (*Pennisetum purpureum*), guava (*Psidium guajava*), comb hyptis, (*Hyptis pectinata*), sword fern (*Nephrolepis multiflora*), rose apple (*Syzygium jambos*), woodrose (*Merremia tuberosa*), Cuban jute (*Sida rhombifolia*), wild bitter melon (*Momordica charanti*a), hairy spurge (*Euphorbia*

hirta), sourbush (*Pluchea carolinensis*), octopus tree (*Schefflera actinophylla*), wedelia (*Sphagneticola trilobata*), and hairy horseweed (*Conyza bonariensis)*. One native species – the vine morning glory or koali ʻawa (*Ipomoea indica*) – was observed. No rare, threatened or endangered plant species were observed on or immediately around the project corridor.

Wide-ranging terrestrial vertebrates listed as threatened or endangered may be present in this part of Kona and may overfly, roost, nest, or utilize resources here, including the endangered Hawaiian hawk (*Buteo solitarius*) and the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*). Less likely but still possible to be present flying above the area are three threatened or endangered seabirds, the endangered Hawaiian petrel (*Pterodroma sandwichensis*), the endangered band-rumped storm petrel (*Oceanodroma castro*), and the threatened Newell's shearwater (*Puffinus auricularis newelli*). The transmission water line route is mostly paved, but there are scattered tall trees of a variety of species fringing the area and on adjacent farms. This habitat does not appear to be conducive to providing nesting sites for Hawaiian hawks. However, it is conceivable that the shrubby vegetation may serve as roosts for Hawaiian hoary bats. No species such as tree tobacco (*Nicotiana glauca*) that provide habitat for the egg and larval stages of the endangered Blackburn's sphinx moth (*Manduca blackburni*) are present.

Impacts and Mitigation Measures

Because of the lack of native ecosystems or threatened or endangered species in this disturbed area, no adverse impacts to biological resources would occur as a result of building the new water line, provided the following mitigation measures are enforced during construction:

- Although Hawaiian hawks (*Buteo solitarius*) are not currently known to nest near the project corridor, and no clearing of vegetated areas with tall trees is required, if any becomes necessary, it will be conducted outside the March to October time period. If such work in this time period is unavoidable, it will be preceded by a search for hawk nests using standard methods by a qualified biologist.
- If no temporary or permanent lighting or erect structures such as poles are required during construction, as currently planned, no impacts to listed seabirds are anticipated. If lighting is installed for either temporary or permanent uses in association with the Project, it will be shielded in conformance with the Hawaiʻi County Outdoor Lighting Ordinance (Hawaiʻi County Code, Article 9). This will reduce the risk that the threatened or endangered seabirds that may be attracted to and then disoriented by the lighting. Additionally, no nighttime construction work will be allowed during the seabird-fledging season, which runs from September 15 through December 15 each year.
- Impacts to the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*) will be avoided by the timing of vegetation removal, if any is necessary. During clearing, grubbing or tree trimming/cutting, the removal of tall, woody vegetation can temporarily displace bats using the vegetation for roosting. As bats use multiple roosts within their home territories, this disturbance from the removal of vegetation is likely to be minimal. However, during the pupping season, from about June 1 to September 15 each year, female bats carrying pups may be less able to rapidly vacate a roost site when the vegetation is cleared. Additionally,

adult female bats sometimes leave their pups in the roost tree while they forage, and very small pups may be unable to flee a tree that is being felled. Accordingly, there will be no clearing of woody vegetation (whether native or non-native) taller than 15 feet during the Hawaiian hoary bat pupping season.

Kaloko-Honokōhau National Historic Park is an important natural and cultural resource in Kona. It is located just north of Honokōhau Harbor, south of O‘oma Beachside Villages, and *makai* of the Kaloko Industrial complex, and above that, the residential and farming neighborhoods of the northern part of urban Kona (see Figure 4). The Park is located five miles from the proposed transmission water line. Notable resources at the Park include Kaloko Fishpond, which is being restored for traditional and productive aquaculture use for human consumption; ‘Ai’opio fishtrap, which is intensely utilized for fishing and traditional and customary cultural practices; ‘Aimakapa fishpond and wetland, which is an important foraging and nesting habitat for the endangered Hawaiian stilt and the endangered Hawaiian coot, and an overall important habitat for migratory waterfowl; and the marine waters, which, like the adjacent coastal waters, are used by juvenile threatened green sea turtles and the endangered hawksbill sea turtle. The endangered Hawaiian monk seal is an occasional visitor to the National Park waters and rests on the shoreline. Healthy brackish water ecosystems within the National Park are important for optimum maintenance of not only habitat for native species, but also the cultural landscape and cultural practices.

As documented in letters to State Commission on Water Resources Management (CWRM) and the Department of Water Supply in the context of EAs and the County of Hawai‘i’s HWUDP planning process (DWS 2015; 2016), the National Park Service has concerns about the County water system, particularly well withdrawals. These issues have led the National Park Service to question whether use defined as “sustainable” by the CWRM adequately protects groundwater resources in the National Park. This led the National Park Service to seek the classification of the Keauhou ASYA as a Groundwater Management Area (GMA), in which the National Park Service and other parties would have a more direct role in determining whether to grant well permits. Although the CWRM determined that at this time a GMA was not justified, concerns remain about possible lowering of the groundwater level and increasing pond salinity as a consequence of wells intercepting groundwater and reducing its flow rate through the Park. In a more general sense, there are also concerns about groundwater pollution resulting from the development in the industrial, recreational and residential area surrounding the Park.

The fact that the water line would be located more than five miles in a straight line and more than three miles south of the area directly upslope from the National Park indicates that construction will pose no risk of direct impacts to water quality and the biological resources that depend upon them. The transmission water line would of course utilize water drawn from wells throughout the North Kona water system, including, potentially, water from wells generally upslope from the National Park. However, it is current DWS policy to construct wells and encourage other well developers to develop wells south of the area of direct concern to the National Park, minimizing the potential for future impacts to the National Park’s groundwater flow rates. It is highly unlikely that the transmission water line would alter groundwater flow within the National Park. The ability to more

efficiently utilize southern wells for consumption further north enabled by the Project would actually help preserve or restore flow near the National Park rather than reduce it.

It is also the case that some of the water that may flow through the transmission line will end up being utilized in homes, businesses, and parks that lie directly upslope of the National Park. This could contribute in a minor and indirect way to the potential for regional groundwater pollution, which could extend to the groundwater resources at the National Park and associated biota. However, construction requires extensive permits that minimize adverse water quality impacts, including County grading permits and National Pollutant Discharge Elimination System permits from the Hawaiʻi State Department of Health. These involve Stormwater Pollution Prevention Plans that incorporate Best Management Practices to reduce erosion and pollution discharge. Development activities with potential to produce substantial pollutant discharges require additional, stricter permits. After construction, occupation and use of housing subdivisions, industrial parks, shopping centers, highways, and parks invariably involve the potential for ongoing pollution. Although these are partially addressed through State and federal hazardous material laws and regulations and wastewater treatment, some residual pollution is possible. Any contribution to indirect and cumulative impact on pollution attributable to the proposed water line would be negligible. This is an ongoing issue that affects the entire region and DWS does not have the authority or ability to rectify future problems should they occur. Furthermore, it is in DWS's interest to avoid groundwater pollution, as this is the critical resource upon which the system relies.

3.1.4 Air Quality, Noise and Scenic Resources

Environmental Setting

Air pollution in West Hawaiʻi is mainly derived from volcanic emissions of sulfur dioxide, which convert into particulate sulfate and produce a volcanic haze (vog) that persistently blankets Kona.

Noise on the project corridor is generally moderate, derived from motor vehicle traffic, farming and yard maintenance, household noises, and natural sounds.

Views along the water line corridor are of Māmalahoa Highway. Although this area has no views listed as significant for their natural beauty in the Hawaiʻi County General Plan, the roadway itself has been recognized as highly scenic. The Māmalahoa Kona Heritage Corridor is a component of the National Scenic Byways Program of the U.S. Department of Transportation, Federal Highway Administration. The program is a grass-roots collaborative effort established to help recognize, preserve and enhance selected roads throughout the United States. The 10-mile long Māmalahoa Kona Heritage Corridor stretches along Māmalahoa Highway between Palani Junction to the north and Honalo Junction to the south. The corridor is noteworthy for its many historical buildings, coffee farms, and art galleries. This scenic byway is celebrated for telling the story of the historic and cultural layers that have contributed to Kona's development. According to the Scenic Byway Committee (2012), set up to help plan for management of the corridor, the road provides a "...close up view of 5,000 to 10,000-year- old lava outcrops, hand-built rock walls, indigenous flora and a rich tapestry of cultural influences."

Impacts and Mitigation Measures

The proposed action would not measurably affect air quality except minimally during construction. The contractor will be required to implement a dust control plan during construction that will minimize both the generation and off-property transmission of dust.

The State of Hawai‘i requires contractors engaged in construction activities to conform with Title 11, Chapter 46, HAR (Community Noise Control). The Hawai‘i State Department of Health’s (HDOH) Noise, Radiation and Indoor Air Quality Branch issues permits for construction activities that may generate noise. The permit is applied for during the construction phase by the contractor. HDOH will review the type of activity, location, equipment, project purpose, and timetable in order to decide upon conditions and mitigation measures. Possible measures include restriction of equipment type, maintenance requirements, restricted hours, and portable noise barriers. The precise combination of mitigation measures, if any, shall be specified by HDOH prior to construction.

On an ongoing basis, although upsizing the three pumps at the Puaa Pump Station has the potential to create slightly more noise, newer pumps are generally less noisy than older ones. If a new electrical equipment enclosure with masonry walls is constructed, noise on the site could actually decrease.

Although construction of the water line will unavoidably and temporarily degrade roadway views, the Project would not be inconsistent with the vision for the Māmalahoa Kona Heritage Corridor to preserve, protect and enhance the special qualities of the area. No permanent scenic impacts would occur, and the historic and natural resources that endow the area with its scenic character would not be compromised or reduced.

3.1.5 Hazardous Substances, Toxic Waste and Hazardous Conditions

Environmental Setting, Impacts and Mitigation Measures

Current and previous use of the project corridor for small farming, small-scale retail and mainly residential uses indicates a low but not negligible probability for hazardous materials. The State of Hawai‘i, Department of Health, Hazard Evaluation and Emergency Response Office maintains a geographic database of hazardous waste generators, hazardous spills, underground and above ground storage tanks (USTs and ASTs), leaking underground storage tanks (LUSTs), and various environmental permits (http://eha-web.doh.hawaii.gov/ehw/). Consultation of this online database did not reveal any incidents, USTs, ASTs, LUSTs, generators or permits along the water line corridor. Visual surveys of the site and its surroundings during surveying, engineering and botanical investigations did not reveal any hazardous materials nor structures, equipment, or storage containers that might be indicative of hazardous material use. Therefore, based upon known prior and present use of the project corridor, no hazardous substances, toxic wastes, or hazardous conditions are expected to be present. If evidence of suspicious materials or conditions appears during additional survey, design, or construction, the DWS will undertake a systematic assessment of the area and issue(s) and remediate appropriately.

3.2 Socioeconomic and Cultural

3.2.1 Land Use and Socioeconomic Characteristics

Land use surrounding the project corridor is primarily residential and small farms. Table 1 provides details on the population and socioeconomic characteristics of Kailua and the County of Hawai‘i from the U.S. 2010 Census of Population.. As with nearly all locations in the State, both Kailua and the island as a whole display marked socioeconomic diversity, with no census-classified racial group representing the majority anywhere. All areas have some of the highest “Two or More Races” responses of anywhere in the U.S., at more than 20%. However, there are differences distinguishing Kailua and other West Hawai‘i communities from Hawai‘i County as a whole. Kailua has a slightly higher proportion of Whites and a lower proportion of Asians, as well as a higher proportion of Native Hawaiians or Pacific Islanders. Kailua’s socioeconomic characteristics reflect in their ethnic, educational attainment, median income and poverty rates the influx of older mainland residents drawn by the drier climate and attractive coastal waters of West Hawai‘i. Somewhat paradoxically, however, there are more elderly in Hilo than in West Hawai‘i, despite the latter’s reputation for attracting retirees. This is explained by the fact that Kailua has a greater proportion in the 25 to 54-year-old category. East Hawai‘i’s lower population in this demographic has resulted from the outflow of young working age people to West Hawai‘i, Honolulu and the mainland. Another difference is the percent of housing for seasonal/vacation use, which reflects the importance of the visitor industry in West Hawai‘i.

Impacts and Mitigation Measures

By improving government services of the Department of Water Supply, the Project would affect and benefit water service in the North Kona District, as discussed in Chapter 1. Water supply infrastructure is frequently located in residential/agricultural areas, and the proposed reservoir and transmission lines are fully compatible with the surrounding agricultural zoning and residential/ agricultural uses. Apart from temporary inconvenience during construction, no adverse socioeconomic effects would occur.

3.2.2 Cultural Resources

Existing Environment

The project corridor extends 0.98 miles along the Māmalahoa Highway, spanning eight North Kona *ahupua‘a.* The project corridor originates at the boundary between Kahului 2 and Puapua‘a 1 and extends northerly through the lands of Kahului 1, Wai‘aha 1-2, and Pua‘a 1-3, terminating in Auhaukea‘e 2 Ahupua‘a (see Figure 1 of Appendix 2). The Wai‘aha Stream drainage crosses the project corridor in Wai‘aha 1 Ahupua‘a, as do three other, small unnamed intermittent drainages. Auhaukea‘e references a Kona land division and an ancient surfing spot. Wai‘aha is literally translated as “gathering water” according to Pukui and Elbert (Wehewehe.org). Kahului is literally translated as “the winning” (Pukui et al. 1976) and Puapua’a is translated as “piglet” (Wehewehe.org).

Table 1. Selected Socioeconomic Characteristics

	Kailua	Hawai‘i County
Population, 2010	11,975	185,079
Persons under 5 years, percent, 2013	6.7%	6.3%
Persons under 18 years, percent, 2013	23.4%	22.2%
Persons 65 years and over, percent, 2013	12.4%	16.8%
Female persons, percent, 2013	49.8%	49.9%
White alone, percent, 2013	36.7%	34.4%
Black or African American alone, percent, 2013	0.4%	0.8%
American Indian and Alaska Native alone, percent, 2013	0.6%	0.6%
Asian alone, percent, 2013	18.1%	22.1%
Native Hawaiian and Other Pacific Islander alone, percent, 2013	15.2%	12.7%
Two or More Races, percent, 2013	25.2%	29.5%
Hispanic or Latino, percent, 2013	12.2%	12.2%
White alone, not Hispanic or Latino, percent, 2013	34.5%	30.7%
Living in same house 1 year & over, percent, 2008-2012	80.3%	86.2%
Foreign born persons, percent, 2008-2012	15.9%	11.9%
Language other than English spoken at home, pct. age 5+, 2008-2012	25.2%	19.4%
High school graduate or higher, percent of persons age 25+, 2008-2012	87.8%	90.6%
Bachelor's degree or higher, percent of persons age 25+, 2008-2012	19.1%	25.6%
Mean travel time to work (minutes), workers age 16+, 2008-2012	18.8	25.4
Homeownership rate, 2008-2012	52.4%	65.1%
Housing units in multi-unit structures, percent, 2008-2012	47.9%	20.2%
Median value of owner-occupied housing units, 2008-2012	$373,600	$326,900
Persons per household, 2008-2012	3.09	2.82
Per capita money income in past 12 months (2012 dollars), 2008-2012	$25,985	$24,882
Median household income, 2008-2012	$60,965	$52,098
Persons below poverty level, percent, 2008-2012	12.2%	17.0%

Source U.S. Census Bureau: State and County QuickFacts. Data derived from Population Estimates, American Community Survey, Census of Population and Housing. https://www.census.gov/quickfacts/table/PST045216/15; accessed March 2017

The place name for Puapua‘a derives from the “supposed resemblance of two large rocks to pigs” (Pukui et al. 1976:192). One reference cited by Maly (1996) notes that the *ahupua’a* from Lanihau to Puapua’a, including the project corridor, provided the food and natural resources to support a 13th century high chief named Pili-a-Ka’aiea (Pili).

The project corridor is situated approximately 2.5 miles inland from the shoreline at Kailua Bay, at elevations ranging from 1,480 to 1,500 feet. This locates it within what is called the *‘apa’a* zone of the Kona Field System, which is designated as State Inventory of Historic Places (SIHP) Site 6601 (Newman 1970, Kelly 1983, Schilt 1984, Cordy 1995). This site extends north to Kāu Ahupua’a, south to Honaunau, and from the coastline to the forested slopes of Hualālai. The area was intensively cultivated and served as the resource base for the large number of chiefs and retainers that occupied the Kailua-Honaunau coast. The characteristics and general locations of the elevation zones of the system described by Newman (1970) have been confirmed and elaborated on by subsequent ethnohistorical investigations (Kelly 1983).

The Kona field system is subdivided into four elevation zones. The *kula* zone extends from sea level to roughly 500 feet. This lower elevation zone traditionally was used for habitation and cultivation of sweet potatoes, paper mulberry (*wauke*), and gourds. Today, remnants of agricultural features, including clearing mounds, planting mounds, planting depressions, modified outcrops, and planting terraces, are still common in this zone. Habitations were scattered throughout the *kula* but concentrated in the area within 700 feet of the shoreline (Cordy 1995). This area was the focus of permanent habitation and activities such as burial, canoe storage, ritual, and marine exploitation. Royal centers and chiefly residences were also situated near the shoreline. These complexes included residences for high status individuals and their supporters and attendants, *heiau*, places of refuge, *holua* slides, and other structures.

The *kalu'ulu* zone extends from 500 to 1000 feet in elevation. The zone was used for cultivating sweet potatoes, paper mulberry, and especially breadfruit. The *'apa'a* zone is situated between 1,000 and 2,500 feet in elevation. This zone traditionally was used for dryland cultivation of taro, sugar cane, sweet potato, and *ti*. Permanent habitations were present in the *'apa'a* zone, but were infrequent (Cordy 1995, Burtchard 1995). Dwellings were observed by early historic chroniclers, but most were probably for temporary use in conjunction with agriculture, bird hunting, and collecting of plant resources. Burials and ritual sites are rare in the upper elevation zones (Kawachi 1989).

Kua'iwi are prominent agricultural features of the *kalu'ulu* and *'apa'a*, zones (Cordy 1995; Newman 1970). These are broad, linear piles of rocks built from stones cleared from the adjacent slopes that also served as field boundaries. *Kua'iwi* are oriented inland-seaward, often interconnected with perpendicular, soil-retaining walls and terraces forming rectangular grid pattern of fields. *Kua'iwi* also served to control rainfall runoff (Kirch 1985). These formal fields contrast with more informal garden areas characterized by scattered agricultural features in very rocky areas, such as young lava flows, and much of the *kula* zone.

The *'ama'u* zone extends from 2,500 to 4,000 feet in elevation. The zone was associated with banana and plantain cultivation. The area supported but temporary habitations associated with agriculture and exploitation of forest resources (Allen 1984).

Maly translated portions of *Ka'ao Ho'oniua Pu'uwai No Ka-Miki* (The Heart Stirring Story of *Ka-Miki)* a legendary account of two supernatural brothers, *Ka-Miki* and *Maka-'iole*), who traveled around the island of Hawai'i. The account was published in serial form between 1914 and 1917 in a Hawaiian newspaper, *Ka Hoku o Hawai'i*. According to Maly, the account was recorded by Hawaiian historians John Wise and J.W.I. Kihe. Based on Maly's translation and study of the account:

> The story is set in about the 13th century, in the time of *Pili-a-Ka'aiea (*Pili), sovereign chief of all Kona, the narrative identifies the lands between Lanihau (Kailua) and Puapua'a as an integral component of Pili's royal domain. Pili was a great advocate of contests in debating, fighting, and contests of physical strength, and Hinakahua at Puapua'a was the site of the chief s longhouses and contest field,

> which supported these activities. While Pili was at Hinakahua he was supported by the agricultural and natural resources of the surrounding ahupuaʻa, including Kahului, Waiʻaha, Puaʻa, Auhaukeaʻe, Hinaloli (Hienaloli), Honuaʻula, Keopu, Moeauoa, and Lanihau. Pili's royal compound was at Niumalu, his canoe fleets were harbored at Oneo, and his wealth-houses (where tribute was kept until it was needed) were situated at Ahuʻena (Lanihau). (Maly 1996:A-2)

Early events documented in the Kona regional traditional history are associated with ʻUmi-a-Liloa. Hawaiʻi was first unified under the rule of ʻUmi-a-Liloa's father and Kona was selected as a dwelling place of chiefs (Kamakau 1961). The area lies within the realm of the traditional Hawaiian political authority that was centered in the Kailua-Keauhou area from at least the 15th century to the reign of Kamehameha I. With the arrival of Kamehameha I and his court in Kona, the area between Kamakahonu (on the north side of the present-day Kailua pier) and Puapua'a became an extended royal center, a hub of activity that focused on the support of the king and his large court. According to Kamakau (1961:221-222):

> …at Kamakahonu could be seen at night the sparkle of lights reflected in the sea like diamonds, from the homes of the chiefs from Kahelo [in Puapuaʻaiki] to Lanihau. The number of chiefs and lesser chiefs reached into the thousands.

The earliest detailed historic account of the area south of Kailua Town including the project area *ahupuaʻa* comes from English missionary William Ellis who visited the area in 1823.

> Leaving Kairua [Kailua], we passed through the villages thickly scattered along the shore to the southward. The country around looked unusually green and cheerful, owing to the frequent rains, which for some months have fallen on this side of the island. Even the barren lava, over which we traveled, seemed to veil its sterility beneath frequent tufts of tan waving grass, or spreading shrubs and flowers.
>
> The sides of the hills, laid out for a considerable extent in gardens and fields, and generally cultivated with potatoes, and other vegetables, were beautiful.
>
> The number of heiaus, and depositories of the dead, which we passed, convinced us that this part of the island must formerly have been populous. The latter were built with fragments of lava, laid up evenly on the outside, generally about eight feet long, from four to six broad, and about four feet high. Some appeared very ancient, others had evidently been standing but a few years.
>
> At Ruapua [Puapua'a] we examined an interesting heiau, called Kauaikaharoa, built of immense blocks of lava and found its dimensions to be 150 feet by 70. At the north end was a smaller enclosure, sixty feet long and ten wide, partitioned off by a high wall, with but one narrow entrance. The places where the idols formerly stood were apparent, though the idols had been removed. (Ellis 1963:72-3)

Schilt (1984) summarized Kailua's early historic period. In the late 1700s to early 1800s, Kamehameha monopolized foreign commerce including the provisioning of trading and whaling ships and, beginning in 1811, the sandalwood trade. The first missionaries arrived in Kailua in 1820, but only stayed a few months. They returned in 1823 and were given land to establish missions and, by 1825, schools. The gradual shift from subsistence farming to a market economy began with the introduction of coffee, corn, pumpkins, cotton, pineapple, and Irish potatoes in the 1820s to 1840s. Introduced crops cultivated in the low elevations near Kailua included melons, cabbage, onions, oranges, and tobacco. The introduction of cattle ranching and commercial coffee production in the mid-1800s caused further change to the traditional agricultural system.

Cattle ranching in Kona began in the early 1900s although free ranging cattle became a problem in the area soon after they were introduced. According to Kelly:

> Cattle, introduced to Kona by Vancouver in 1794, became a nuisance later, when their numbers increased. They fed on grass of the *kula* and from time to time on the thatch of Hawaiian homes and on vegetables in their gardens. The open upland fields, bounded only by low earth and stone walls, were in full cultivation in the 1850s. (Kelly 1983:76)

In the 1840s, political acts of the Hawaiian Kingdom government would change the land tenure system in Hawai‘i. All lands were segregated into one of three categories: "Crown Lands" owned by the occupant of the throne, "Government Lands" controlled by the state, and "*Konohiki* Lands" controlled by the chiefs. These lands "were all subject to the rights of native tenants" (Chinen 1958:29, Beamer 2014:143). In 1846, King Kamehameha III appointed a Board of Commissioners commonly known as the Land Commissioners, to "confirm or reject all claims to land arising previously to the 10th day of December, AD 1845." Notices were frequently posted in *The Polynesian* (Moffat and Kirkpatrick 1995); however, the legislature did not acknowledge this act until June 7, 1848 (Chinen 1958:16; Moffat and Kirkpatrick 1995:48-49) and the act is known today as *The Great Māhele*. In 1850, the Kingdom government passed laws allowing foreigners to purchase fee simple lands (Speakman 2001:91). The Kuleana Act of 1850 allowed for fee simple land ownership by commoners.

The Waihona ‘Aina (2000) Māhele Database, which is a compilation of data from the Indices of Awards (Indices 1929), Native Register (NR n.d.), Native Testimony (NT n.d.), Foreign Register (FR n.d.) and Foreign Testimony (FT n.d.), lists 52 Land Commission Award (LCA) parcels that were claimed in the project area *ahupua‘a.* These LCAs are summarized in Table 1 of Appendix 2 and the location of the majority is shown on Figure 7 of Appendix 2.

The Waihona ‘Aina (2000) Māhele Database provides information on the LCAs. Of the 52 claims, only 38 were subsequently awarded. These consist of eight awarded claims in Auhaukea‘e, eight in Pua‘a, seven in Waiaha, and 15 in Kahului. During the Māhele, the entire *ahupua‘a* of Auhaukea‘e 1 was awarded to Mikahela Kekauonohi as LCA 11216H. Mikahela was a Hawaiian high chiefess, the granddaughter of Kamehameha I, and one of the wives of Kamehameha II (Kame‘elehiwa 1992).

Lot Kapuāiwa (also known as Kamehameha V) ruled the Hawaiian Islands between 1863 and 1872, and was awarded the entirety of Pua‘a 1 as LCA 7715H. The majority of the *ahupua‘a* of Wai‘aha 1 was awarded to physician Seth Andrews as LCA 387, and Grace Kama‘iku‘i Rooke, daughter of John Young and Mary Kuamo‘o, was awarded the entire *ahupua‘a* of Kahului (LCA 8516B). The awarded *kuleana* parcels range from 0.06 to 334 acres in area with an average of 7.14 acres. Excluding the large *ahupua‘a* claims, the average awarded parcel is 1.2 acres. The claim testimonies refer to 101 cultivated areas referenced as either *kihapai*, *mala*, patches or other cultivated areas. In several cases the plots are described by reference to the Kona Field System zone where they were situated (*kula or apa‘a*). Named crops include potatoes and taro. The claims mention a total of 26 house lots with at least 17 houses. Of the 26 house lots, ten were enclosed by stone walls.

The awarded *kuleana* LCA parcels are clustered in two areas: near the ocean along the inland and seaward sides of the coastal road, or along the inland and seaward sides of the Māmalahoa Highway Road at elevations ranging from approximately 1,100 and 1,650 feet. Most of the coastal parcels were house lots. Five of the awarded claims are located above 1,900 feet in elevation.

Six of the awarded claims consist of a coastal lot and an associated upland lot (LCA 6699, 7073, 7336, 7968, 10267, and 10374). This pattern of coastal house lots and associated upland agricultural parcels is seen throughout the Kona region. This coastal/upland relationship is described by Borthwick et al. (1997:10) below:

> This Mahele induced pattern reflects the traditional Hawaiian settlement pattern where permanent habitation was concentrated at the coast and subsistence oriented agricultural pursuits extend up slope in a zonal pattern based on the correlation between rainfall and elevation. Traditionally there was a continuum of utilization through the zones (Kula, Kalu‘ulu, Apa'a, and Ama‘u). However, because of restrictions of the Kuleana Act itself, claimants were only awarded certain specific lots. Thus, the mid-1800s settlement pattern, as evidenced by the LCA data, included permanent habitation coastal house lots with upland agricultural lots. The upland lots, however, were separated by a considerable expanse of land that had formerly (traditionally) been an integral part of the agricultural system which provided the necessary mix of subsistence oriented crops. (Borthwick et al. 1997:10)

Māmalahoa Highway is adjacent to five of the 38 awarded LCAs (LCAs 7350, 7496B, 9944, 10252, and 10374; see Figure 7 of Appendix 2).

- LCA 7350 is a 1.65-acre parcel located in Kahului 1 Ahupua‘a. This parcel was claimed by Kialoa, who obtained it in 1844 from the konohiki. According to Native Register 262v8 and Native Testimony 671v8, the claim included 15 cultivated patches.
- LCA 7496B is a 1.9-acre parcel located in Papalua ili in Kahului 1 Ahupua‘a. This parcel was claimed by Keaweehu, who obtained it from Ipunui in 1848. According to Native

Register 262v8 and Native Testimony 671v8, the claim included two areas of cultivated land and one partially cultivated area.

- LCA 9944 was claimed by Nalima and consisted of four parcels of unstated size located in the *ili* of Kukuipuloa, in Kahului 1 Ahupuaʻa. This parcel was obtained from Opuni during Governor Adams (Kuakini) times. According to Native Register 472v8 and Native Testimony 517v4, the claim included two *kihapai*, with one located next to a road, and the other in the apaʻa zone of the Kona Field System.
- LCA 10252 is a 1.4-acre claim located in Kamuku and Halewaawaa ili in Kahului 1 Ahupuaʻa. This LCA was claimed by Maliu, who obtained it from Kahenu during the time of Kamehameha II. According to Native Register 475v8 and Native Testimony 538v4, the claim included two areas of cultivated land, five cultivated *kihapai*, and a house lot.
- LCA 10374 is a 2.97-acre claim of Halewaawaa ili in Kahului 1 Ahupuaʻa. This LCA parcel was claimed by Nalawaia, although no information on who or when he obtained it is available. According to Native Register 479v9 and Native Testimony 529v4, the claim included an enclosed house lot with two houses, two areas of cultivated or partially cultivated land, and one cultivated *kihapai*.

J.S. Emerson's 1800s Register Map 1280 of Kailua Town and vicinity (a portion of which is reproduced in Figure 8 of Appendix 2) depicts the seaward boundary of the inland forest at approximately 600 feet in elevation in the project area. The path of the Māmalahoa Highway is also shown in this map, indicating the road was in use at this time. That map also showed land grants in the area. Māmalahoa Highway was bordered by six land grants. These consist of Grant 976 to Kapae in Kahului 1, Grant 926 to Pupule and Grant 982 to Naipu-wailuni in Puaʻa 2, and Grant 985 to J.W. Naihe, Grant 986 to Nauama, and Grant 1567 to Hoopii in Auhaukeaʻe 2. The map also depicts two houses about 1,000 feet west of Māmalahoa Highway. Queen Emma, wife of Alexander Liholiho (Kamehameha II), had a residence and associated gardens in Waiʻaha, and Kuhaupio's had a house in Puaʻa 3.

Commercial sugar cane cultivation in the Kailua area was attempted in the late 1800s and early 1900s, but was abandoned by the mid-1920s (Kelly 1983). The Kona Sugar Company was established in 1899 and built the first mill in 1901 in upland Waiʻaha overlooking Kailua. The mill was situated above the Kahului-Hienaloli Road near the 700-foot elevation. According to Maly, the sugarcane fields "... extended south from Waiʻaha to Hōlualoa-Kaumalumalu, on fee and leasehold lands. With the success of the sugar crop, the plantation fields were soon expanded south in favorable localities, including the *kula* lands between Honalo and Kalukalu-Onouli" (2001:283). A railroad line, constructed to transport sugar cane to the mill, originated in this location and extended 11 miles to the south, where it terminated in Keopuka in South Kona. Construction of this substantial railroad line began in 1901 by the West Hawai'i Railway Company (Condé and Best 1973). Despite the efforts required to construct the sugar cane mill and railroad line, the venture was not successful. "The railroad record disappears in 1918 and the sugar company went into receivership in 1926" (Burtchard 1996:49).

Cattle ranching and coffee cultivation continued during the late 1800s and 1900s. A 1928 USGS quadrangle map reproduced as Figure 9 in Appendix 2 shows numerous houses along the shoreline inland of Kahalu‘u Bay. Houses are also clustered along the inland and seaward sides of the Māmalahoa Highway.

By the 1970s, the rapidly developing tourism industry in Kona began to displace some ranching and commercial agriculture (except coffee production, which was centered in the coffee belt that includes Māmalahoa Highway and stretches the length of the old Kona field system) in favor of subdivisions, resorts, and commercial establishments. The use of the present project area was probably limited to coffee farming and cattle ranching. In 1927, rancher Manuel Gomes bought tracts of land in Wai‘aha and Kahului and used these lands for cattle grazing until the 1960s.

Kepa Maly conducted an informant interview that is relevant to the present project. The interview was undertaken in conjunction with the O’Hare and Wolforth (1998) inventory survey of a 32-acre parcel in Kahului 1 Ahupua‘a, on the western side of the Kuakini Highway. This interview was conducted with life-long Kona resident Joseph (Joe) Gomes on March 13, 1996. According to Maly:

> Joseph (Joe) Gomes was born in 1916 at Hōlualoa *mauka.* His father, Manuel Gomes, came to Hawai`i from Portugal in about 1883. After having lived and worked in Kau for a time, Manuel Gomes moved to Kona and was able to lease land in Honua‘ula and Keahuolu for his own ranching operations. When the Kona Sugar Company went out of business in 1927, the elder Mr. Gomes was able to purchase the lands of Kahului 1 and 2, and Wai‘aha 1 and 2, which he developed into ranching operations. Following his father's death in 1959, Joe Gomes inherited the family's Kona ranch lands, and he and his family still run cattle on portions of their land. Mr. Gomes has clear recollections of land use—associated with ranching activities—on the *kula.*… He describes the construction or modification of rock walls, use of the Kuakini Wall, development of paddocks, and some sites from earlier Hawaiian occupation of the land. His interview also describes the differences between walls of early Hawaiian construction and later work done for the ranches. Additionally, Mr. Gomes’ interview provides a colorful description of ranching.

To summarize the above cultural-historical information for the purposes of analyzing potential cultural impacts, this portion of Kona clearly has a rich cultural heritage. The current landscape reflects both continuity (in traditional names and stories) and change (in land use and demographics). Although traditional gathering of resources on intensively used private properties adjacent to Mamālahoa Highway ceased long ago, the cultural history is manifest in the small landholdings, often bordered by rock walls, as well as the cornucopia of fruit tree and flower species that has diversified through time. Public or private projects that transform this landscape may detract from its cultural values. This threat helped prompt the designation of this portion of Māmalahoa Highway as the Māmalahoa Kona Heritage Corridor Scenic Byway.

Impacts and Mitigation Measures

The context of the proposed water line within the cultural landscape of the *apaʻa* zone of the Kona field system and current coffee belt is that it is centered in the primary transportation corridor, Māmalahoa Highway. Almost the entirety of the proposed improvements would be located under the paved roadway or unpaved shoulders. The only exceptions are at the culverts, where the proposed water line, just as current water lines, extend out of the ground and are suspended over the culvert inlets below the highway, crossing the culvert inlet walls using a visually unobtrusive design. This roadway does not exhibit any remnants of traditional culture use such as ancient archaeological sites or groves of cultural vegetation. It does not support any traditional resource uses, nor are there any Hawaiian customary and traditional rights or practices known to be associated with the roadway. The Office of Hawaiian Affairs and neighboring landowners were consulted as part of early consultation. Although there are no indications so far from literature review or consultation with State Historic Preservation Division, the Office of Hawaiian Affairs, or local residents that there are any traditional cultural properties or practices on or near the project corridor, various parties were supplied a copy of the Draft EA in order to help finalize this finding.

As it currently appears that no resources or practices of a potential traditional cultural nature (i.e., landform, vegetation, etc.) are present on or near the project corridor, and there is no evidence of any traditional gathering uses or other cultural practices, the proposed construction and maintenance of the water line would not likely impact any culturally valued resources or cultural practices. This conclusion has been reviewed based on additional input received during review of the Draft EA. No party reviewing the Draft EA supplied any additional cultural information.

3.2.3 Archaeology and Historic Sites

An archaeological survey of the project corridor, which consisted of the right-of-way of Māmalahoa Highway and areas immediately adjacent that could potentially be affected by water line construction, was prepared by archaeologists Haun and Associates in 2017. The study corridor ranged in width from 20 to 100 feet, and extended from the centerline of the Māmalahoa Highway to the west. To be conservative, the study corridor was considerably wider than the project's disturbance corridor. The study is contained in full in Appendix 2 and is summarized below.

Based on their review of the environment and other archaeological and cultural studies in the area, which is part of the *ʻapaʻa* zone of the Kona Field System, pre-Western contact sites expected within this area would potentially consist of habitation sites, primarily temporary habitations used in conjunction with agriculture, bird hunting, and collecting of plant resources. The remnants of formal fields, delineated by inland-seaward *kuaʻiwi* and cross-slope walls may be present. Sites dating to the mid- to late 1800s would include agricultural and habitation sites. Differences in agricultural sites from the previous periods may be evident as a result of a shift to a market-based economy, which favored cultivated fields as opposed to small garden plots. Walls designed to control cattle and trails or roads for horse and wagon traffic also may be present. Sites associated with the 20th century would likely not include any traditional agricultural and habitation features, but would instead include residences and transportation infrastructure such as roads. Ranching

activity and coffee cultivation, which continues in the general area today, would be evidenced by walls, corrals, fences, clearing piles of stone associated with pasture improvement and terraces built to retain soil for the coffee fields.

The project corridor was subjected to a 100% surface examination, with the surveyors walking transects at 3 to 5 meter intervals. Ground surface visibility throughout the project corridor was excellent. The features identified during the survey were marked with flagging tape and their locations were determined with the aid of a Global Positioning System (GPS) device. The boundaries for most of the sites were defined based on proximity and probable age. Features that are likely of similar age and are less than 15 meters apart are considered to be one site. Detailed plan maps were made for about half of the sites, created with hand held tapes and compasses. Exceptions consist of isolated sections of stone walls or retaining walls. All of the sites were documented through standardized site and feature forms and photography. No subsurface testing was conducted and no cultural material was recovered for analysis. The features of the 5,190-foot long corridor are mapped and photographed in Figures 12-45 of Appendix 2.

The archaeological inventory survey of the corridor identified nine sites with ten features (Table 2). All date from the Historic Era, and most were built during the 20th century. The identified features consist of four culverts, three retaining walls, and three walls. Feature function includes water control (4), livestock control (3) and transportation (3). No cultural materials, other than modern trash along the highway, were noted during the project.

The nine sites and ten features identified during the survey are all associated with the historic Māmalahoa Highway, which was in use as early as the 1880s as depicted in Emerson's map of the Kailua area. Four features (Sites 30667, 30669, 30670, Feature A, and 30674) consist of water control features used to channel stream runoff water safely beneath the highway. Site 30669, Wai‘aha Bridge, was originally constructed in 1920, but portions of it have subsequently been re-built. The remaining culverts likely date to the mid-20th Century based on their appearance. Three of the features (Sites 30671, 30672, and 30673) are retaining walls built to support the *makai* side of the highway. These features also interpreted as dating to the mid-20th Century due to their appearance. Two of the features (Sites 30668 and 30675) are stone walls likely constructed to prevent grazing livestock from entering the road. The remaining feature (Site 30670, Feature B) is a stone wall used to keep cattle out of an adjacent stream drainage. The walls were likely built soon after the construction of the upland road.

It should also be noted that the project corridor passes by the historic Holualoa Cemetery, where the wall and stairs were dismantled and reconstructed in 2009 due to impacts from a 2006 earthquake. Although the walls and stairs are not historic properties, it should be further noted that the project will not affect them.

Table 2. Summary of Archaeological Sites

SIHP Site No.	Formal Type	Function	No. of Features	Ahupuaʻa	Tax Map Key (3rd. Div.)	Formal type			Function		
						Culvert	Retaining wall	Wall	Water control	Livestock control	Transportation
30667	Culvert	Water control	1	Kahului 2	7-5-012:011	1			1		
30668	Wall	Livestock control	1	Kahului 1	7-5-012:024			1		1	
30669	Culvert (bridge)	Water control	1	Waiʻaha 1-2	7-5-012:040	1			1		
30670	Complex	Water control, livestock control	2	Puaʻa 3	7-5-012:031	1		1	1	1	
30671	Retaining wall	Transportation	1	Puaʻa 3	7-5-012:031		1				1
30672	Retaining wall	Transportation	1	Puaʻa 3	7-5-012:036		1				1
30673	Retaining wall	Transportation	1	Puaʻa 1	7-5-016:035		1				1
30674	Culvert	Water control	1	Puaʻa 2	7-5-016:032	1			1		
30675	Wall	Livestock control	1	Auhaukeaʻe 2	7-5-016:019			1		**1**	

The sites identified during the survey were assessed by the archaeologists for significance based on Hawaiʻi Administrative Rules (HAR) §13-275-6. According to (HAR) §13-275-6 (b), a site must possess integrity of location, design, setting, materials, workmanship, feeling, and association and shall meet one or more of the following criteria:

1. Criterion "a": Be associated with events that have made an important contribution to the broad patterns of our history;
2. Criterion "b": Be associated with the lives of persons important in our past;
3. Criterion "c": Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; or possess high artistic value;
4. Criterion "d": Have yielded, or is likely to yield, information important for research on prehistory or history;
5. Criterion "e": Have an important traditional cultural value to the native Hawaiian people or to another ethnic group of the state due to associations with traditional cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts – these associations being important to the group's history and cultural identity.

All of the sites within the project corridor date from the Historic Era are assessed as significant under Criterion "d" only, based on the above criteria. The sites have yielded information important for understanding road infrastructure activity and historic ranching within the area. No further work is recommended for any site.

Impacts and Mitigation Measures

The proposed project will be excavating primarily within the pavement and shoulders of Māmalahoa Highway and will not have any impact on the majority of these sites. The only exceptions are portions of culvert features. With one exception, the water line will be placed above ground near the culverts. The water line will cross three culverts (Sites 30669, 30670, and 30674) on the eastern side above the culvert inlet flow channel. The inlet flow channel side walls will be "notched" to accommodate the water line and support beam where the water line transitions from underground to aboveground (see Figure 3b for details). Because data has already been gathered from these sites, the archaeological survey concluded that the project would have no impact on significant archaeological sites. The State Historic Preservation Division is currently reviewing the archaeological survey, which was provided to their office on May 23, 2017. The Final EA was expected to report an update of coordination with SHPD. However, as of November 1, 2017, SHPD had not yet responded.

3.3 Public Facilities, Utilities and Services

Roadways

As shown in Figure 3a, the proposed water line would be located almost entirely within the right-of-way of Mamālahoa Highway, also designated Route 180. Project construction would thus occur within this roadway, varying between travel lanes, paved shoulders and adjacent unpaved areas. A permit is required for work within the County Right-of-Way per Chapter 22 of the Hawai‘i County Code. Where longitudinal trenching is proposed within any existing County road, DPW will require cold-planing and resurfacing of the entire lane trenched or damaged by the project. Traffic flow will be disrupted during construction hours, which are expected to be restricted primarily to weekdays in daylight hours. This will occur over the course of the project duration of about 16 months, as construction moves progressively from one end of the water line installation to the other. Construction work will be confined to daytime hours from 7:30 am to 3:30 pm. No other roadway or other major projects that might affect this right-of-way are known to be planned for this period.

As mitigation, professional traffic control will be utilized to optimize traffic flow. Access to all properties will be maintained at all times, except in infrequent cases where access must be closed for brief periods. Such situations will be negotiated with the access holder(s). Two lanes for traffic movement shall be provided between the hours of 3:30 pm and 8:00 am. The project will require a permit from work within the County right-of-way from the Hawai‘i County Department of Public Works (DPW). Construction plans will be submitted for review and approval by DPW prior to bidding.

Utilities and Drainage Facilities

A number of other utilities or public facilities besides County water utilize the roadside area, including electric/telephone/CATV lines; and drainage infrastructure. The existing electric/ telephone/CATV lines are overhead and the project will not affect them. These locations will be indicated on design plans and construction contractors will be aware of and will take action to prevent damage and reduce any interruption in service to the minimum time necessary. Appropriate coordination with HELCO and Hawaiian Telcom will be conducted during design and construction to ensure that their utility lines are not adversely affected.

Culverts under the road pass several local intermittent drainages, into which road storm runoff is conducted directly or via collection drains. Some road drainage is also handled via shallow drywells. Existing DPW drains and drywells will not be impacted. All work within the flood zone and drainageways shall comply with Chapter 27 of the Hawai‘i County Code. With the approval of DPW, where culverts are crossed, the water line will be independently supported by a new concrete structure that will be parallel to the existing culvert headwall. The inlet flow channel side walls will be “notched” to accommodate the water line and support beam where the water line transitions from underground to aboveground. This will not affect culvert function in any way.

The new 16-inch water line installation will require several temporary water service shut-offs when the new water line is connected to existing water lines at the following locations:

- Kamila Place Intersection
- Water Pipe Road Intersection
- Puaa Booster Pump Station.
- New Pressure Reducing Valve Station

For each connection, a temporary outage to the water system will occur when the existing water system is momentarily shut down to connect to the new water line. Customers will be notified prior to these brief shutdowns to minimize inconvenience.

Police, Fire, Emergency Medical, Solid Waste and other Public Facilities and Services

Emergency medical and fire services are available at the Kailua Fire Station, located on Palani Road 4 road miles from the project. The Hawai‘i County Police Department serves the Kailua area from a station at Kealakehe, 6 road miles away. The nearest hospital is Kona Hospital, on the Hawai‘i Belt Road (State Route 11), 10 road miles away. All facilities that might be required for incidents related to construction are thus located in or near the project area.

Various recreational, educational and social service facilities are located nearby, including a park in Holualoa, and various parks and recreational facilities in Kailua, *makai* of the project area. All are outside of the area affected by the project. The operation of and access to all public facilities or services would not be adversely affected in any substantial way by the project.

The construction waste generated by the project shall be disposed of at a solid waste disposal facility that complies with the applicable provisions of Title 11, Hawai‘i Administrative Rules, Chapter 11-58.1 “Solid Waste Management Control.” The open burning of any of these wastes on or off site will not be allowed.

3.4 Secondary and Cumulative Impacts

The proposed project would not involve any secondary or cumulative impacts, such as population changes or effects on public facilities, because it simply fulfills the mandate of the Department of Water Supply to provide high-quality service to its customers in existing service areas. Although the Project would provide some short-term construction jobs, these would almost certainly be filled by local residents and would not induce in-migration.

Cumulative impacts result when implementation of several projects that individually have limited impacts combine to produce more severe impacts or conflicts in mitigation measures. The adverse effects of the Project – very minor and temporary disturbance to air quality, noise, and visual quality during construction – are very limited in severity, nature and geographic scale. Consultation of the OEQC Environmental Notice and the Planning Department files did not indicate any roadway or development projects being undertaken in the area that would combine in such a way as to produce adverse cumulative effects or involve a commitment for larger actions. Several wells are in planning in the Waiaha area, one by DWS, and another by a non-profit entity Laʻiʻōpua 2020 that would supply water to the Villages of Laʻiʻōpua, a component of the Department of Hawaiian Home Lands housing program. The DWS will be able to control timing of its well project to ensure that cumulative construction-related impacts and water service outage impacts are minimized to the extent feasible. As the Laʻiʻōpua 2020 project will also be conducted in close coordination with DWS, similar precautions can and will be undertaken. In addition, there will continue to be periodic construction of individual single-family residences in the general area. Some home construction may occur simultaneously with the water line construction, with minor levels of air quality, noise, erosion and sedimentation impacts. Current State and County regulations do not require mitigation for construction of single-family homes. However, even if construction of the water line and one or several homes occur simultaneously, the very limited scale would not produce significant cumulative impacts that would require mitigation beyond that imposed for the water line project.

3.5 Required Permits and Approvals

The following permits and approvals would be required:

- Hawaiʻi County Public Works Department Permit to Construct Within Right of Way
- National Pollutant Discharge Elimination System Permit (NPDES)
- Permit to discharge stormwater effluent and hydrotesting effluent into the County's stormwater drain system.

3.6 Consistency with Government Plans and Policies

3.6.1 Hawaiʻi State Plan

Adopted in 1978 and last revised in 1991 (Hawaiʻi Revised Statutes, Chapter 226, as amended), the Plan establishes a set of themes, goals, objectives and policies that are meant to guide the State's long-run growth and development activities. The three themes that express the basic purpose of the

Hawai‘i State Plan are individual and family self-sufficiency, social and economic mobility, and community or social well-being. The proposed project would promote these goals by modernizing and improving water service for the North Kona district.

3.6.2 Hawai‘i County Zoning, General Plan and Kona Community Development Plan

Hawai‘i County Zoning. The project corridor transits primarily A-1a (Agricultural, minimum lot-size 1 acre) zoning on the *mauka* side of Mamālahoa Highway and A-5a (Agricultural, minimum lot-size five acres) zoning on the *makai* side. Utility lines are permitted in all zoning districts. No part of the project corridor is situated within the County’s Special Management Area (SMA).

The Hawai‘i County General Plan Land Use Pattern Allocation Guide (LUPAG). The LUPAG map component of the General Plan is a graphic representation of the Plan’s goals, policies, and standards as well as of the physical relationship between land uses. It also establishes the basic urban and non-urban form along with certain planned public and cultural facilities, public utilities and safety features, and transportation corridors. The project corridor transits Important Agricultural Lands, where public utilities such as water lines are permitted.

The General Plan for the County of Hawai‘i is a policy document expressing the broad goals and policies for the long-range development of the Island of Hawai‘i. The plan was adopted by ordinance in 1989 and revised in 2005 (Hawai‘i County Planning Department).

The General Plan itself is organized into thirteen elements, with policies, objectives, standards, and principles for each. There are also discussions of the specific applicability of each element to the nine judicial districts comprising the County of Hawai‘i. Most relevant to the proposed project are the following Goal and Policies, and Courses of Action:

PUBLIC UTILITIES

Goals
(a) Ensure that properly regulated, adequate, efficient and dependable public and private utility services are available to users.
(b) Maximize efficiency and economy in the provision of public utility services.
(c) Design public utility facilities to fit into their surroundings or concealed from public view.

Policies
(a) Public utility facilities shall be designed to complement adjacent land uses and shall be operated to minimize pollution or disturbance.
(b) Provide utilities and service facilities that minimize total cost to the public and effectively service the needs of the community.
(c) Utility facilities shall be designed to minimize conflict with the natural environment and natural resources.
(d) Improvement of existing utility services shall be encouraged to meet the needs of users.

(f) Develop short and long-range capital improvement programs and plans for public utilities within its jurisdiction that are consistent with the General Plan.

PUBLIC UTILITIES – WATER

Policies
(a) Water system improvements shall correlate with the County's desired land use development system.
(b) All water systems shall be designed and built to Department of Water Supply standards.
(c) Improve and replace inadequate systems.
(e) Water system improvements should be first installed in areas that have established needs and characteristics, such as occupied dwellings, agricultural operations and other uses, or in areas adjacent to them if there is need for urban expansion.

Standard
(a) Public and private water systems shall meet the requirements of the Department of Water Supply and the Subdivision Control Code.

Courses of Action – North Kona

b) Continue to evaluate growth conditions to coordinate improvements as required to the existing water system in accordance with the North Kona Water System Master Plan.

Discussion: The proposed project satisfies relevant goals, policies and standards, as well as courses of action related to water systems North Kona District.

ECONOMIC GOALS

(a) Provide residents with opportunities to improve their quality of life through economic development that enhances the County's natural and social environments.
(b) Economic development and improvement shall be in balance with the physical, social, and cultural environments of the island of Hawaii.
(d) Provide an economic environment that allows new, expanded, or improved economic opportunities that are compatible with the County's cultural, natural, and social environment.

Discussion: The proposed construction and operation of the water line is in balance with the natural, cultural and social environment of the County, would create temporary construction jobs for local residents, and would indirectly boost the economy through construction industry purchases from local suppliers. A multiplier effect takes place when these employees spend their income for food, housing, and other living expenses in the retail sector of the economy. Such activities are in keeping with the overall economic development of the island.

ENVIRONMENTAL QUALITY GOALS

(a) Define the most desirable use of land within the County that achieves an ecological balance providing residents and visitors the quality of life and an environment in which the natural resources of the island are viable and sustainable.
(b) Maintain and, if feasible, improve the existing environmental quality of the island.
(c) Control pollution.

ENVIRONMENTAL QUALITY POLICIES

(a) Take positive action to further maintain the quality of the environment.

ENVIRONMENTAL QUALITY STANDARDS

(a) Pollution shall be prevented, abated, and controlled at levels that will protect and preserve the public health and well being, through the enforcement of appropriate Federal, State and County standards.
(b) Incorporate environmental quality controls either as standards in appropriate ordinances or as conditions of approval.
(c) Federal and State environmental regulations shall be adhered to.

Discussion: The proposed construction and operation of the transmission water line would not have a substantial adverse effect on the environment and would not diminish the valuable natural resources of the region. The improvements would be compatible with the existing area. Pertinent environmental regulations would be followed, including those for mitigation of water quality impacts.

HISTORIC SITES GOALS

(a) Protect, restore, and enhance the sites, buildings, and objects of significant historical and cultural importance to Hawaii.
(b) Appropriate access to significant historic sites, buildings, and objects of public interest should be made available.

HISTORIC SITES POLICIES

(a) Agencies and organizations, either public or private, pursuing knowledge about historic sites should keep the public apprised of projects.
(b) Amend appropriate ordinances to incorporate the stewardship and protection of historic sites, buildings and objects.
(c) Require both public and private developers of land to provide historical and archaeological surveys and cultural assessments, where appropriate, prior to the clearing or development of land when there are indications that the land under consideration has historical significance.
(d) Public access to significant historic sites and objects shall be acquired, where appropriate.

Discussion: An archaeological inventory survey has properly documented historic properties to ensure that there are no effects to significant historic sites. The survey is under review by the State Historic Preservation Division. There are no known or expected cultural uses on the specific project corridor, and the Project does not affect the cultural values or resources of the area.

FLOOD CONTROL AND DRAINAGE GOALS

(a) Protect human life.
(b) Prevent damage to man-made improvements.
(c) Control pollution.
(d) Prevent damage from inundation.
(e) Reduce surface water and sediment runoff.
(f) Maximize soil and water conservation.

FLOOD CONTROL AND DRAINAGE POLICIES

(a) Enact restrictive land use and building structure regulations in areas vulnerable to severe damage due to the impact of wave action. Only uses that cannot be located elsewhere due to public necessity and character, such as maritime activities and the necessary public facilities and utilities, shall be allowed in these areas.
(g) Development-generated runoff shall be disposed of in a manner acceptable to the Department of Public Works and in compliance with all State and Federal laws.

FLOOD CONTROL AND DRAINAGE STANDARDS

(a) "Storm Drainage Standards," County of Hawaii, October, 1970, and as revised.
(b) Applicable standards and regulations of Chapter 27, "Flood Control," of the Hawaii County Code.
(c) Applicable standards and regulations of the Federal Emergency Management Agency (FEMA).
(d) Applicable standards and regulations of Chapter 10, "Erosion and Sedimentation Control," of the Hawaii County Code
(e) Applicable standards and regulations of the Natural Resources Conservation Service and the Soil and Water Conservation Districts.

Discussion: The Project will conform to all applicable drainage regulations and policies of the County of Hawai‘i.

NATURAL BEAUTY GOALS

(a) Protect, preserve and enhance the quality of areas endowed with natural beauty, including the quality of coastal scenic resources.
(b) Protect scenic vistas and view planes from becoming obstructed.

(c) Maximize opportunities for present and future generations to appreciate and enjoy natural and scenic beauty.

NATURAL BEAUTY POLICIES

(a) Increase public pedestrian access opportunities to scenic places and vistas.
(b) Develop and establish view plane regulations to preserve and enhance views of scenic or prominent landscapes from specific locations, and coastal aesthetic values.

Discussion: The improvements are minor and consistent with traditional uses of the land and will not cause scenic impacts or impede access.

NATURAL RESOURCES AND SHORELINES GOALS

(a) Protect and conserve the natural resources from undue exploitation, encroachment and damage.
(b) Provide opportunities for recreational, economic, and educational needs without despoiling or endangering natural resources.
(c) Protect and promote the prudent use of Hawaii's unique, fragile, and significant environmental and natural resources.
(d) Protect rare or endangered species and habitats native to Hawaii.
(e) Protect and effectively manage Hawaii's open space, watersheds, shoreline, and natural areas.
(f) Ensure that alterations to existing land forms, vegetation, and construction of structures cause minimum adverse effect to water resources, and scenic and recreational amenities and minimum danger of floods, landslides, erosion, siltation, or failure in the event of an earthquake.

NATURAL RESOURCES AND SHORELINES POLICIES

(a) Require users of natural resources to conduct their activities in a manner that avoids or minimizes adverse effects on the environment.
(c) Maintain the shoreline for recreational, cultural, educational, and/or scientific uses in a manner that is protective of resources and is of the maximum benefit to the general public.
(d) Protect the shoreline from the encroachment of man-made improvements and structures.
(h) Encourage public and private agencies to manage the natural resources in a manner that avoids or minimizes adverse effects on the environment and depletion of energy and natural resources to the fullest extent.
(p) Encourage the use of native plants for screening and landscaping.
(r) Ensure public access is provided to the shoreline, public trails and hunting areas, including free public parking where appropriate.
(u) Ensure that activities authorized or funded by the County do not damage important natural resources.

Discussion: The Project is not located near the coast, and no aspect of the Project would adversely affect natural resources.

The Kona Community Development Plan (CDP) (Hawai‘i County Planning Department 2008) has many elements and wide-ranging implications, but there are several major strategies that embody the guiding principles related to land use, housing, public facilities, infrastructure and services, and transportation. All aspects of the Project are consistent with the CDP. Only a few transmission water lines are named in the CDP, but *Action PUB–4.1a* specifies: “Update, as necessary, DWS’s master plan for Kona to support future growth in the TODs [Transit Oriented Development].” As a critical link in the overall North Kona Water System, the project helps fulfill that action. It also supports the CDP’s overall strategy for “Energy” through Conservation and energy efficiency of the water system.

3.6.3 Hawai‘i State Land Use Law

All land in the State of Hawai‘i is classified into one of four land use categories – Urban, Rural, Agricultural, or Conservation – by the State Land Use Commission, pursuant to Chapter 205, HRS. The project corridor is within the Agricultural Land Use District, and utility lines are allowed in this district with no Chapter 205, HRS permitting required by the State Land Use Commission.

3.6.4 Hawai‘i Water Plan

The *Hawai‘i Water Plan* includes plans developed by the Hawai‘i State Commission on Water Resources Management (CWRM) dealing with the issues of protecting water resources, ensuring water quality, developing water resources, and serving State projects.

The purpose of the plans is to set forth specific objectives, policies, programs and projects to guide State and county governments. In summary, they plan present guidelines for development of water resources for municipal, agricultural and industrial requirements; preservation of ecological, recreational, and aesthetic values and quality; and regulation of the use of water to assure adequate supplies for the future. The Project would develop transmission facilities in a rational manner to maintain water supply and drinking water quality, assure adequate water for planned growth, and it would not adversely affect ecological, recreational or aesthetic values. The Project is thus consistent with the basic guidelines of the plan.

Component plans include the *Water Quality Plan* and the *Agricultural Water Use and Development Plan* (from 1990 and 2008, respectively), but the most relevant plans for this discussion are the *Water Resources Protection Plan* (2008), the *State Water Projects Plan, Volume 2, Island of Hawai‘i* (2003), and the *Hawai‘i County Water Use and Development Plan Update* (2010).

The *Water Resources Protection Plan* inventoried the water resources of the State, determined their sustainable yields based on available data, and recommended means of conserving and augmenting these resources. The proposed project does not involve source development, and instead is focused on transmission. The Keauhou ASYA of the Hualālai Aquifer Sector has not been declared a Groundwater Management Area by the CWRM. There will be no effect on aquifer pumpage.

The primary objective of the *State Water Projects Plan, Volume 2, Island of Hawai‘i* (SWPP) is to provide a framework for the planning and implementation of water development strategy for future State projects. No State projects are triggering the current proposal, but the transmission water line could assist the non-profit entity La‘i‘ōpua 2020 to convey water northwards to the Villages of La‘i‘ōpua, a component of the Department of Hawaiian Home Lands housing program, should its project to drill a well prove successful. It does not directly affect any other proposed State projects, but optimizing the transmission of water will promote orderly and efficient use of existing water, thus supporting the goals of the SWPP.

The *Hawai‘i County Water Use and Development Plan Update* (HWUDP) (Hawai‘i County DWS 2010 – also discussed above in Section 1.2 in the context of the background of the project) amended a plan from 1990. This plan is meant to aid CWRM in granting permits for water use and designating water management areas, as well as serving as a reference document of current and future water resource conditions. In overview, the HWUDP includes an inventory of existing water uses and developments by hydrologic units, addresses future land uses and water needs, and is consistent with State and County land and water policies. This plan also guides DWS in future operations and in identifying the improvements and facilities required to continue to provide safe, affordable and reliable water service to the island of Hawai‘i in a sustainable and financially secure manner.

The primary objective of the HWUDP is to set forth the allocation of water to land use. Each of the four counties is responsible to prepare a WUDP to include, but not be limited to the following:

1. Status of county water and related land development including an inventory of existing water uses for domestic, municipal, and industrial users, agriculture, aquaculture, hydropower development, drainage, reuse, reclamation, recharge, and resulting problems and constraints;
2. Future land uses and related water needs; and
3. Regional plans for water developments including recommended and alternative plans, costs, adequacy of plans, and relationship to the water resource protection plan and water quality plan.

The County of Hawai‘i adopted by ordinance the Water Use and Development Plan Update dated August 2010 (2010 HWUDP), and the CWRM granted approval in December 2011. The 2010 HWUDP update implemented a broad, uniform approach island-wide to evaluate conservatively the County’s land use policies set forth in the County General Plan and Zoning Code. The General Plan is the long-range conceptual land use plan for the island of Hawai‘i, whereas the Zoning Code is the legal instrument that regulates land development and implements the General Plan policies. The intent of the 2010 HWUDP was to guide the County in prioritization and focus of future assessment efforts. The HWUDP provided scenarios of low, medium, and high growth rates and estimated the public water needs for the island for various years in the future. Common to all scenarios is a steadily increasing demand for water.

The 2010 HWUDP identified two aquifer sectors to be considered for further evaluation and detailed assessment. Prioritization of the aquifer areas identified resulted in the selection of the West Mauna Kea Aquifer Sector Area (ASEA) [803]/Waimea Aquifer System Area (ASYA) [80301] and the Hualālai ASEA [809]/Keauhou ASYA [80901] for update. Per decision of the CWRM, the update consisted of two phases. The first phase (Phase 1) refined the water demand scenarios and projections; and the second phase (Phase 2) involved the development of source development strategies and scenarios. Phase 2 also included the following elements:

- Address how proposed source development strategies to meet projected demands may impact cultural uses and rights or other public trust purposes.
- Identify appropriate mitigation measures for potential impacts or alternative strategies

The Project would be consistent with the HWUDP in that it provides important transmission facilities for the efficient and orderly use of water. The Project would not adversely affect in any way cultural uses and rights or other public trust purposes. In its promotion of water system flexibility, it would improve the ability of DWS to provide water to projects in the northern part of North Kona from wells south of the QLT Deepwell, an area that has have been identified as less likely to impact groundwater resources of the Kaloko-Honokōhau National Historical Park.

3.7 Federal "Cross-Cutter" Authorities

The following sub-sections address the proposed project's relationship to other federal "crosscutting" environmental, economic, social, and miscellaneous federal authorities as required by the State of Hawai'i's Drinking Water State Revolving Fund (DWSRF) program.

3.7.1 Archeological and Historic Preservation Act (16 U.S.C. § 469a-1) and National Historic Preservation Act (16 U.S.C. § 470)

An archaeological inventory survey has properly documented historic properties to ensure that there are no effects to significant historic sites. The survey determined that nine sites were present, each of which was significant for information content only. The survey is under review by the State Historic Preservation Division. The Final EA will report on the results of this review.

If previously undocumented sites are inadvertently discovered in other areas, SHPD will be contacted immediately and advised of the circumstances of the find, its location, and the presence or absence of associated cultural resources, as outlined in Hawai'i Administrative Rules 13§13-275-12.

3.7.2 Clean Air Act as Amended (42 USC 7401, et seq.)

As discussed in Section 3.1.4, air quality at the project corridor is acceptable. The site is within an air quality attainment area as defined by the State of Hawai'i Department of Health in its EPA-approved Air Quality program. Excavation will include plans to minimize fugitive dust through watering and planting as soon as feasible. Diesel-powered construction equipment will be used to

excavate trenches for the water line. Emissions from diesel engines will slightly degrade air quality for the short period of time they are in operation. However, all applicable emission and ambient air quality standards will continue to be met. Normal operation of the water line will not produce any on-site air emissions. Consequently, the Project complies with the provision of the Clean Air Act.

3.7.3 Coastal Barriers Resource Act, 16 U.S.C. 3501

The Coastal Barrier Resources Act designated various undeveloped coastal barrier islands, depicted by specific maps, for inclusion in the Coastal Barrier Resources System. No coastal barriers are present in the State of Hawai‘i, and the Project is not inconsistent with the Coastal Barriers Resource Act.

3.7.4 Coastal Zone Management Act, 16 U.S.C.1456(c)(1)

The Hawai’i Coastal Zone Management (CZM) Program was established in 1977 through the adoption of the Coastal Zone Management Act, incorporated in Chapter 205A HRS. Projects with federal involvement significantly affecting areas under jurisdiction of the State CZM Agency may be required to undergo review for consistency with the State’s approved coastal program. The entire State of Hawai‘i is included in the coastal zone for such purposes. The CZM objectives are as follows:

- Recreational Resources. Provide coastal recreational opportunities accessible to the public.
- Historic Resources. Protect, preserve, and, where desirable, restore those natural, man-made historic, and pre-historic resources in the CZM area that are significant in Hawaiian and American history and culture.
- Scenic and Open Space Resources. Protect, preserve, and, where desirable, restore or improve the quality of coastal scenic and open space resources.
- Coastal Ecosystems. Protect valuable coastal ecosystems from disruption and minimize adverse impacts on all coastal ecosystems.
- Economic Use. Provide public or private facilities and improvements important to the State’s economy in suitable locations.
- Coastal Hazards. Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, and subsidence.
- Managing Development. Improve the development review process, communication, and public participation in the management of coastal resources and hazards.
- Public Participation. Stimulate public awareness, education, and participation in coastal management, and maintain a public advisory body to identify coastal management problems and provide policy advice and assistance to the CZM program.
- Beach Protection. Protect beaches for public use and recreation; locate new structures inland from the shoreline setback to conserve open space and minimize loss of improvements due to erosion.
- Marine Resources: Implement the state’s ocean resources management plan.

The project corridor is a minimum of 2.5 miles from the shoreline. No historic sites, coastal ecosystems, streams or wetlands, beaches, scenic or open space resources will be significantly impacted. The DWS has evaluated the Project and believes that it does not impact coastal zone resources and is consistent with the objectives of the program. The Hawai‘i CZM Program is not authorized to provide federal consistency reviews for Safe Drinking Water Act State Revolving Funds projects. However, this EA has been submitted by DWS to the Hawai‘i CZM Program for general review.

3.7.5 Endangered Species Act, 16 U.S.C. 1536(a)(2) and (4), Essential Fish Habitat Consultation Process Under the Magnuson-Stevens Fishery Conservation and Management Act, 16 USC 1801, and Fish and Wildlife Coordination Act, 16 USC 661

The Endangered Species Act (16 U.S.C. §§ 1531-1544, December 28, 1973, as amended 1976-1982, 1984 and 1988) provides broad protection for species of plants and animals that are listed as threatened or endangered in the U.S. or elsewhere. The Act mandates that federal agencies seek to conserve endangered and threatened species and use their authorities in furtherance of the Act's purposes. Provisions are made for listing species, as well as for recovery plans and the designation of critical habitat for listed species. The Act outlines procedures for federal agencies to follow when taking actions that may jeopardize listed species, and contains exceptions and exemptions. Existing biota on and near the project corridor are discussed in Section 3.1.3 of this EA. Inspection of the project corridor has determined that there are no rare or endangered plant species on or immediately around it. Wide-ranging terrestrial vertebrates listed as threatened or endangered may be present in this part of North Kona and may overfly, roost, nest, or utilize resources here, including the endangered Hawaiian Hawk (*Buteo solitarius*), the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*), the endangered Hawaiian Petrel (*Pterodroma sandwichensis*), and the threatened Newell's Shearwater (*Puffinus auricularis newelli*). The transmission line route is almost entirely paved, and adjacent properties support homes and active farming. This habitat does not appear to be conducive to providing nesting sites for Hawaiian Hawks. However, it is conceivable that the shrubby vegetation may serve as roosts for Hawaiian hoary bats. No temporary or permanent lighting or erect structures such as poles are planned, and therefore no impacts to listed seabirds are anticipated. No species such as tree tobacco (*Nicotiana glauca*) that provide habitat for the egg and larval stages of the endangered Blackburn's sphinx moth (*Manduca blackburni*) are present.

Because of the lack of native ecosystems or threatened or endangered species in disturbed area, no adverse impacts to biological resources would occur as a result of building the new water line, provided the following mitigation measures are enforced during construction:

- Although Hawaiian Hawks (*Buteo solitarius*) are not currently known to nest on or near the project corridor, and no vegetation removal is currently anticipated, any major clearing of vegetated areas, should be preceded by a search for hawk nests if the clearing is to occur between March and October, in order to avoid disturbing nesting hawks.

- If no temporary or permanent lighting or erect structures such as poles are required during construction, as currently planned, there should be no impacts to listed seabirds. If lighting is installed for either temporary or permanent uses in association with the Project, it should be shielded in conformance with the Hawai‘i County Outdoor Lighting Ordinance (Hawai‘i County Code, Article 9). This will reduce the risk that the threatened or endangered seabirds Hawaiian Petrel and Newell’s Shearwater that may be attracted to and then disoriented by the lighting. Additionally, no nighttime construction work should be allowed during the seabird-fledging season, which runs from September 15 through December 15 each year. There are no plans for temporary or permanent lighting in association with the Project.
- Impacts to the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*) will be avoided by the timing of vegetation removal, if any is necessary as part of the minimal open space development. During clearing, grubbing or tree trimming/cutting, the removal of tall, woody vegetation can temporarily displace bats using the vegetation for roosting. As bats use multiple roosts within their home territories, this disturbance from the removal of vegetation is likely to be minimal. However, during the pupping season, from about June 1 to September 15 each year, female bats carrying pups may be less able to rapidly vacate a roost site when the vegetation is cleared. Additionally, adult female bats sometimes leave their pups in the roost tree while they forage, and very small pups may be unable to flee a tree that is being felled. At the present, no vegetation removal is planned; if any is required, there will be no clearing of woody vegetation (whether native or non-native) taller than 15 feet during the Hawaiian hoary bat pupping season.

The U.S. Fish and Wildlife Service is being coordinated with as part of the Draft EA review process to verify the biological characterization of the project corridor and the adequacy of the proposed mitigation measures to protect threatened and endangered species. The Final EA will report the results of the coordination.

DWSRF assistance recipients must determine whether a proposed project may adversely affect Essential Fish Habitat (EFH). According to the Western Pacific Regional Fishery Management Council (WESPAC) (2005) in its *Fishery Ecosystem Plan for the Hawaii Archipelago*, several areas of Essential Fish Habitat (EFH) in nearshore (non-pelagic waters) in the Hawaiian Archipelago have been designated approved by the Secretary of Commerce. EFH designations for Bottomfish and Seamount Groundfish, Crustaceans, Precious Corals and Pelagic Management Unit Species (MUS) were approved by the Secretary on February 3, 1999 (64 FR 19068). EFH designations for Coral Reef Ecosystem MUS were approved by the Secretary on June 14, 2002 (69 FR 8336). Maps available at the National Marine Fisheries Service’s Essential Fish Habitat Mapper website do not indicate any areas of EFH near the project area (http://www.habitat.noaa.gov/protection/efh/habitatmapper.html). No aspect of the Project would affect Essential Fish Habitat, as it does not affect or occur near the sea.

Under the Fish and Wildlife Coordination Act, 16 USC 661, DWSRF assistance recipients should seek the assistance of wildlife officials to determine the effect the proposed project may have on wildlife and its habitat. As discussed above, the U.S. Fish and Wildlife Service is being contacted by letter and supplied a copy of the Draft EA to assist in this determination, and apart from the endangered species

discussed above, impacts to which can be avoided, there are not expected to be any wildlife or habitat concerns.

3.7.6 Environmental Justice, Executive Order 12898

The Environmental Justice Executive Order was issued in 1994 for the purpose of protecting low income and minority residents of the United States from disproportionate exposure to environmental and health hazards. As discussed in Section 3.2.1, minorities make up approximately 63.6 percent of the population in Kailua, which is slightly lower than the 65.6 percent of the County as a whole. Median family income in the Kailua area is higher than the County average, and poverty rates are lower, at 12.2 percent, versus 17.0 percent. Nevertheless, it is clear that minority and low income populations are present. The purpose of the proposed water project is to provide residents of North Kona adequate water service that conforms to State and federal standards. The Project will not have any more than minor and temporary adverse secondary environmental, economic, or social impacts, as discussed in previous sections. Moreover, the State and federal regulations regarding safe drinking water are applicable to all water systems in Hawaiʻi, irrespective of the economic or demographic characteristics of their residents. Thus, the proposed Project complies with this Executive Order.

3.7.7 Farmland Policy Protection Act, 7 U.S.C. 4202(8)

The Farmland Protection Policy Act (FPPA) (Public Law 97-98, Sec. 1539-1549) requires identification of proposed actions that would affect any lands classified as prime and unique farmlands. Agencies must consider alternative actions that could reduce adverse effects and ensure that their programs, to the extent practicable, are compatible with State, local government and private programs and policies to protect farmland. The U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) has national leadership for administering the FPPA.

"Farmland," as used in the FPPA and applied to the State of Hawaiʻi, includes Agricultural Lands of Importance in the State of Hawaiʻi (ALISH), a system in which the State Department of Agriculture classifies lands into three categories: 1) Prime Agricultural Land, (2) Unique Agricultural Land, and (3) Other Important Agricultural Land. There are no Prime, Unique, or Other Important Agricultural Lands on the paved surface of Māmalahoa Highway, where the water line will be installed. The Project will not impact such land or the agricultural use of any properties. The Project is intended to serve residents of North Kona, many of whom are involved in agriculture, and it appears to be in in compliance with the FPPA.

3.7.8 Floodplain Management Act, 42 U.S.C., 4321, and Executive Order 11988, Floodplain Management (24 May 1977)

The Floodplain Management Act deals with critical action inside designated floodplains, and Executive Order 11988 requires federal agencies to avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy of the floodplain, and to avoid direct and

indirect support of floodplain development where there is a practicable alternative. In accomplishing this objective, "each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by floodplains."

The project corridor crosses minor drainages through structures on existing culverts and will not impact floodplains. The Project is consistent with EO 11988 and the Floodplain Management Act.

3.7.9 Protection of Wetlands, Executive Order No. 11990 & Exec. Order No. 12608, and Clean Water Act, as Amended (33 USC 1251 et seq.)

Fieldwork confirmed through consultation of maps from the U.S. Fish and Wildlife Service demonstrated that no wetlands or other waters of the U.S. are present on any part of the project corridor that would be affected by construction, as the Project does not involve any fill or temporary use of the stream banks or beds for the drainage crossings on Mamālahoa Highway.

The Project would thus be in compliance with the Clean Water Act, Section 404(b)(1) Guidelines. None of the proposed construction materials would be expected to contain any contaminants.

As discussed in Section 3.1.2, a National Pollutant Discharge Elimination System (NPDES) permit will be need to be obtained by the construction contractor before the Project commences. This permit requires the completion of a Storm Water Pollution Prevention Plan (SWPPP) in order to properly manage storm water runoff through appropriate best management practices (BMPs). Acquisition of the NPDES permit and implementation of the permit conditions will ensure compliance with the Clean Water Act.

3.7.10 Safe Drinking Water Act, 42 U.S.C., 300H-3(E)

The Safe Drinking Water Act (SDWA) is the principal federal law that ensures the quality of Americans' drinking water. Under the SDWA, EPA sets standards for drinking water quality and oversees the states, localities, and water suppliers who implement those standards. The SWDA requires that all public water systems meet stringent water quality standards. These standards cover a long list of potential chemical, radiological and biological contaminants.

The transmission improvements will assist DWS in maintaining the compliance of the North Kona Water System with the standards mandated pursuant to the SDWA. Testing of the water will be undertaken by the County of Hawai‘i before it is connected to the system to ensure that the water is consistent with all State of Hawai‘i and federal standards for potable water.

The Safe Drinking Water Act is also the authority for regulatory protection of principal or sole source aquifers. Specifically, once a sole source aquifer is designated, commitments for federal assistance must ensure that projects will not contaminate the aquifer through a recharge zone so as to create a significant hazard to public health.

As identified by the U.S. Environmental Protection Agency, Region IX groundwater Office (http://water.epa.gov/infrastructure/drinkingwater/sourcewater/protection/upload/SSAGeneralInformation.pdf) (accessed May 2017), there are only two sole source aquifers in Hawaiʻi. They are the Southern Oʻahu Basal Aquifer on the Island of Oʻahu and the Molokaʻi Aquifer on the island of Molokaʻi. There are no sole source aquifers on the Island of Hawaiʻi. The Project will therefore not affect sole source aquifers.

3.7.11 Wild and Scenic Rivers Act, 15 U.S.C. 1271-1287

The Act makes it the national policy that certain rivers of the U.S which, along with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free-flowing condition. There are no designated Wild and Scenic Rivers in the State of Hawaiʻi at this time. Consequently, the Project is consistent with the provisions of the Wild and Scenic Rivers Act.

3.7.12 Demonstration Cities and Metropolitan Development Act of 1966, Pub.L. 89-754, as Amended (42 USC § 3331)

To demonstrate compliance with this Act, the Hawaiʻi State Department of Health requires DWSRF assistance recipients to describe a proposed project's effect on local development plans. Section 3.6 of this EA addresses this requirement by discussing the Project's full consistency with the Hawaiʻi State Plan, the County of Hawaiʻi General Plan, and the Kona Community Development Plan.

3.7.13 Administration of the Clean Air Act and the Water Pollution Control Act with Respect to Federal Contracts or Loans (Executive Order 11738)

Executive Order 11738, entitled "Administration of the Clean Air Act and the Water Pollution Control Act with respect to federal Contracts or Loans," prohibits the provision of Federal assistance to facilities that are not in compliance with either the Clean Water Act or the Clean Air Act unless the purpose of the assistance is to remedy the cause of the violation. As discussed in Sections 4.2.1.2 and 3.2.2, the Project will comply with applicable provisions of the Clean Air Act and Clean Water Act. Consequently, it is consistent with the intent of this Executive Order.

3.7.14 Procurement Prohibitions (Executive Order 11738, Section 306 of the Clean Air Act)

This Executive Order requires recipients of federal assistance to certify that they will not procure goods, services or materials from suppliers who are on the EPA's list of Clean Air Act violators. DWS will comply with this requirement in selecting contractors, construction materials, and other services for the Project.

3.7.15 Procurement Prohibitions (Section 508 of the Clean Water Act)

This Executive Order requires recipients of federal assistance to certify that they will not procure goods, services or materials from suppliers who are on the EPA's list of Clean Water Act violators. DWS will comply with this requirement in selecting contractors, construction materials, and other services for the Project.

3.7.16 Social Policy Authorities

For any Drinking Water State Revolving Fund Loan, the applicant, in this case the County of Hawai‘i, is also required to certify that it has complied, or will comply with, the following federal social policy authorities. This information is required to be contained in an Environmental Assessment, if one is applicable for the Project.

- **Age Discrimination Act of 1975 (42 USC § 6102).** This Act stipulates that no person in the United States shall, on the basis of age, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance. DWS will comply with this requirement in hiring contractors and other staff for the Project.
- **Civil Rights Act of 1964, Title VI (42 USC §2000(d)).** This Act stipulates that no person in the United States shall, on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance. DWS will comply with this requirement in hiring contractors and other staff for the Project.
- **Equal Employment Opportunity (Executive Order 11246, as amended).** This Executive Order requires all recipients of federal contracts to include certain non-discrimination and "affirmative action" provisions in all contracts. The provisions commit the contractor or subcontractor to maintain a policy of non-discrimination in the treatment of employees, to make this policy known to employees, and to recruit, hire and train employees without regard to race, color, sex, religion and national origin. DWS will include these provisions in all contracts for the Project.
- **Minority Business Enterprise Development, Executive Order 12432**. This executive order sets forth in more detail the responsibilities of federal agencies for the monitoring, maintaining of data and reporting of the use of minority enterprises. DWS will comply with all such requirements for all contracts for the Project.
- **National Program for Minority Business Enterprise, Executive Order 11625**. This Executive Order directs federal agencies to promote and encourage the use of minority business enterprises in projects utilizing federal funds. DWS will comply with all such requirements for all contracts for the Project.
- **National Women's Business Enterprise Policy and National Program for Women's Business Enterprise, Executive Order 12138**. This Executive Order directs each department or agency empowered to extend federal financial assistance to any program or activity to issue regulations requiring the recipient of such assistance to take appropriate affirmative action in support of women's business enterprises and to prohibit actions or

policies which discriminate against women's business enterprises on the grounds of sex. DWS will comply with all the Executive Order for the Project.

- **Rehabilitation Act of 1973, 29 USC 794**. This Act mandates that no otherwise qualified handicapped individual in the United States shall, solely by reason of his handicap, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance. DWS will comply with the Act for all contracts for the Project.
- **Small Business Administration Reauthorization and Amendment Act of 1998, Pub. L. 100-590, Section 129**. This Amendment directs federal agencies to promote and encourage the use of small business enterprises in projects utilizing federal funds. DWS will comply with the Act for all contracts for the Project.
- **Department of Veterans Affairs and Housing and Urban Development, and Agencies Appropriations Act, 1993, Pub. L. 102-389**. This Act requires the Administrator of the Environmental Protection Agency, to the fullest extent possible, ensure that at least 8 per cent of federal funding for prime and subcontracts awarded in support of authorized programs, including grants, loans and contracts for wastewater treatment and for leaking underground storage tanks, be made available to businesses or other organizations owned or controlled by socially and economically disadvantaged individuals (within the meaning of Section 8(a)(5) and (6) of the Small Business Act (15 USC 637(a)(5) and (6)), including historically black colleges and universities. For purposes of this section, economically and socially disadvantaged individuals shall be deemed to include women..." DWS will comply with the Act for the Project.
- **Disadvantaged Business Enterprise Rule, 2008, 40 CFR Part 33**. This Rule sets forth in detail the responsibilities of entities receiving an identified loan under a financial assistance agreement capitalizing a revolving loan fund, for the monitoring, maintaining of data and reporting of the use of disadvantaged business enterprises (DBEs). The Applicant is required to comply with 40 CFR Part 33, entitled "Participation by Disadvantaged Business Enterprises in Procurement Under Environmental Protection Agency (EPA) Financial Assistance Agreements" and ensure that all contracts funded by a DWSRF loan include a term or condition requiring compliance with 40 CFR Part 33. The Applicant is required not to discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The Applicant shall carry out applicable requirements of 40 CFR Part 33 in the award and administration of contracts awarded under EPA financial assistance agreements. Failure by the Applicant to carry out these requirements is a material breach of this contract, which may result in the termination of the contract or other legally available remedies. DWS will comply with the Rule for all contracts for the Project.

PART 4: DETERMINATION

Based on the findings below, and in consideration of comments received, the Hawai‘i County Department of Water Supply has determined that the proposed project will not have any significant effect in the context of Chapter 343, Hawai‘i Revised Statues and section 11-200-12 of the State Administrative Rules, and has issued a Finding of No Significant Impact (FONSI).

PART 5: FINDINGS AND REASONS

Chapter 11-200-12, Hawai‘i Administrative Rules, outlines those factors agencies must consider when determining whether an Action has significant effects:

1. *The proposed project will not involve an irrevocable commitment or loss or destruction of any natural or cultural resources*. The Project will benefit water service without affecting natural or cultural resources. An archaeological inventory survey has properly documented historic properties to ensure that there are no effects to significant historic sites. The survey determined that nine sites were present, each of which was significant for information content only. The survey is under review by the State Historic Preservation Division. The Final EA will report on the results of this review.
2. *The proposed project will not curtail the range of beneficial uses of the environment*. The proposed project expands and in no way curtails beneficial uses of the environment.
3. *The proposed project will not conflict with the State's long-term environmental policies*. The State’s long-term environmental policies are set forth in Chapter 344, HRS. The broad goals of this policy are to conserve natural resources and enhance the quality of life. The Project is minor, environmentally beneficial, and fulfills aspects of these policies calling for an improved social environment. It is thus consistent with all elements of the State’s long-term environmental policies.
4. *The proposed project will not substantially affect the economic or social welfare of the community or State*. The Project would not have any adverse effect on the economic or social welfare and would provide North Kona with more efficient water service.
5. *The proposed project does not substantially affect public health in any detrimental way*. The facility would promote public health and safety by improving water transmission efficiency for North Kona, and would thereby enhance the quality of water service.
6. *The proposed project will not involve substantial secondary impacts, such as population changes or effects on public facilities*. No secondary effects are expected to result from the proposed action, which would simply improve water system facilities for an existing service area and would not induce in-migration or affect public facilities.
7. *The proposed project will not involve a substantial degradation of environmental quality*. The Project is minor and environmentally benign, and would thus not contribute to environmental degradation.
8. *The proposed project will not substantially affect any rare, threatened or endangered species of flora or fauna or habitat*. The project corridor supports overwhelmingly alien vegetation. With planned mitigation measures, impacts to rare, threatened or endangered species of flora or fauna would not occur. No indirect effects to offsite biota would be expected through the more efficient transfer of water allowed by the transmission water line.
9. *The proposed project is not one which is individually limited but cumulatively may have considerable effect upon the environment or involves a commitment for larger actions*. The adverse effects of the Project – very minor and temporary disturbance to air quality, noise, and visual quality during construction – are very limited in severity, nature and geographic scale. There do not appear to be any roadway, utility or development projects being undertaken in the area that would combine in such a way as to produce adverse cumulative effects or involve a commitment for larger actions. However, there will continue to be periodic construction of individual single-family

residences in the general area. Some home construction may occur simultaneously with the water line construction, with minor levels of air quality, noise, erosion and sedimentation impacts. Current State and County regulations do not require mitigation for construction of single-family homes. However, even if construction of the water line and one or several homes occur simultaneously, the very limited scale would not produce significant cumulative impacts that would require mitigation beyond that imposed for the water line project.

10. *The proposed project will not detrimentally affect air or water quality or ambient noise levels.* No adverse effects on these resources would occur. Mitigation of construction-phase impacts would preserve water quality. Ambient noise impacts due to construction will be temporary and restricted to daytime hours.

11. *The project does not affect nor would it likely to be damaged as a result of being located in environmentally sensitive area such as a flood plain, tsunami zone, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal area*. Although the Project would be located in an area with volcanic and seismic risk, the entire Island of Hawai‘i shares this risk, and the Project is not imprudent to construct, and employs design and construction standards appropriate to the seismic zone. The water line would cross several stream flood zones would not adversely affect them or be at elevated risk of damage.

12. *The project will not substantially affect scenic vistas and viewplanes identified in county or state plans or studies*. No scenic vistas or viewplanes would be adversely affected by the Project.

13. *The project will not require substantial energy consumption*. The construction and operation of the water transmission line would require minimal consumption of energy, and would ultimately help save energy through efficient delivery of water. No adverse effects would be expected.

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Environmental Assessment

Waiaha Transmission Water Line

APPENDIX 1a
Comments in Response to Early Consultation

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DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
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In reply, please refer to:
File:

EPO 16-393

November 25, 2016

Mr. Ron Terry
Geometrician Associates, LLC
P.O. Box 396
Hilo, Hawaii 96721
Email: rterry@hawaii.rr.com

Dear Mr. Terry:

SUBJECT: Early Consultation for Environmental Assessment (EC EA) for Waiaha Transmission Water Line, North Kona District, Hawaii

The Department of Health (DOH), Environmental Planning Office (EPO), acknowledges receipt of your EC EA to our office on November 15, 2016

In the development and implementation of all projects, EPO strongly recommends regular review of State and Federal environmental health land use guidance. State standard comments and available strategies to support sustainable and healthy design are provided at: http://health.hawaii.gov/epo/landuse. Projects are required to adhere to all applicable standard comments.

EPO has recently updated the environmental Geographic Information System (GIS) website page. It now compiles various maps and viewers from our environmental health programs. The eGIS website page is continually updated so please visit it regularly at: http://health.hawaii.gov/epo/egis.

EPO also encourages you to examine and utilize the Hawaii Environmental Health Portal at: https://eha-cloud.doh.hawaii.gov. This site provides links to our e-Permitting Portal, Environmental Health Warehouse, Groundwater Contamination Viewer, Hawaii Emergency Response Exchange, Hawaii State and Local Emission Inventory System, Water Pollution Control Viewer, Water Quality Data, Warnings, Advisories and Postings.

You may also wish to review the draft Office of Environmental Quality Control (OEQC) viewer at: http://eha-web.doh.hawaii.gov/oeqc-viewer. This viewer geographically shows where some previous Hawaii Environmental Policy Act (HEPA) {Hawaii Revised Statutes, Chapter 343} documents have been prepared.

In order to better protect public health and the environment, the U.S. Environmental Protection Agency (EPA) has developed a new environmental justice (EJ) mapping and screening tool called EJSCREEN. It is based on nationally consistent data and combines environmental and demographic indicators in maps and reports. EPO encourages you to explore, launch and utilize this powerful tool in planning your project. The EPA EJSCREEN tool is available at: http://www.epa.gov/ejscreen.

The Department of Health encourages the application of sustainability strategies and principles early in the planning, review and funding of projects. We also request that you consider conducting a Health Impact Assessment (HIA). More information is available on line at:

- World Health Organization (WHO) HIA information: http://www.who.int/hia/en
- U.S. Centers for Disease Control (CDC) HIA information: https://www.cdc.gov/healthyplaces/hia.htm

- U.S. Environmental Protection Agency (EPA) HIA information: https://www.epa.gov/healthresearch/health-impact-assessments

We request that you utilize all of this information on your proposed project to increase sustainable, innovative, inspirational, transparent and healthy design. Thank you for the opportunity to comment.

We request a written or electronic response confirming your receipt of this DOH EPO comment letter. You may mail your response directly to EPO at 919 Ala Moana Blvd., Suite 312, Honolulu, Hawaii 96814. However, we would prefer an electronic reply to DOH.EPO@doh.hawaii.gov. We expect that our letter(s) and your response(s) will be included in the final document. If you have any questions, please contact me by calling (808) 586-4337.

Mahalo nui loa,

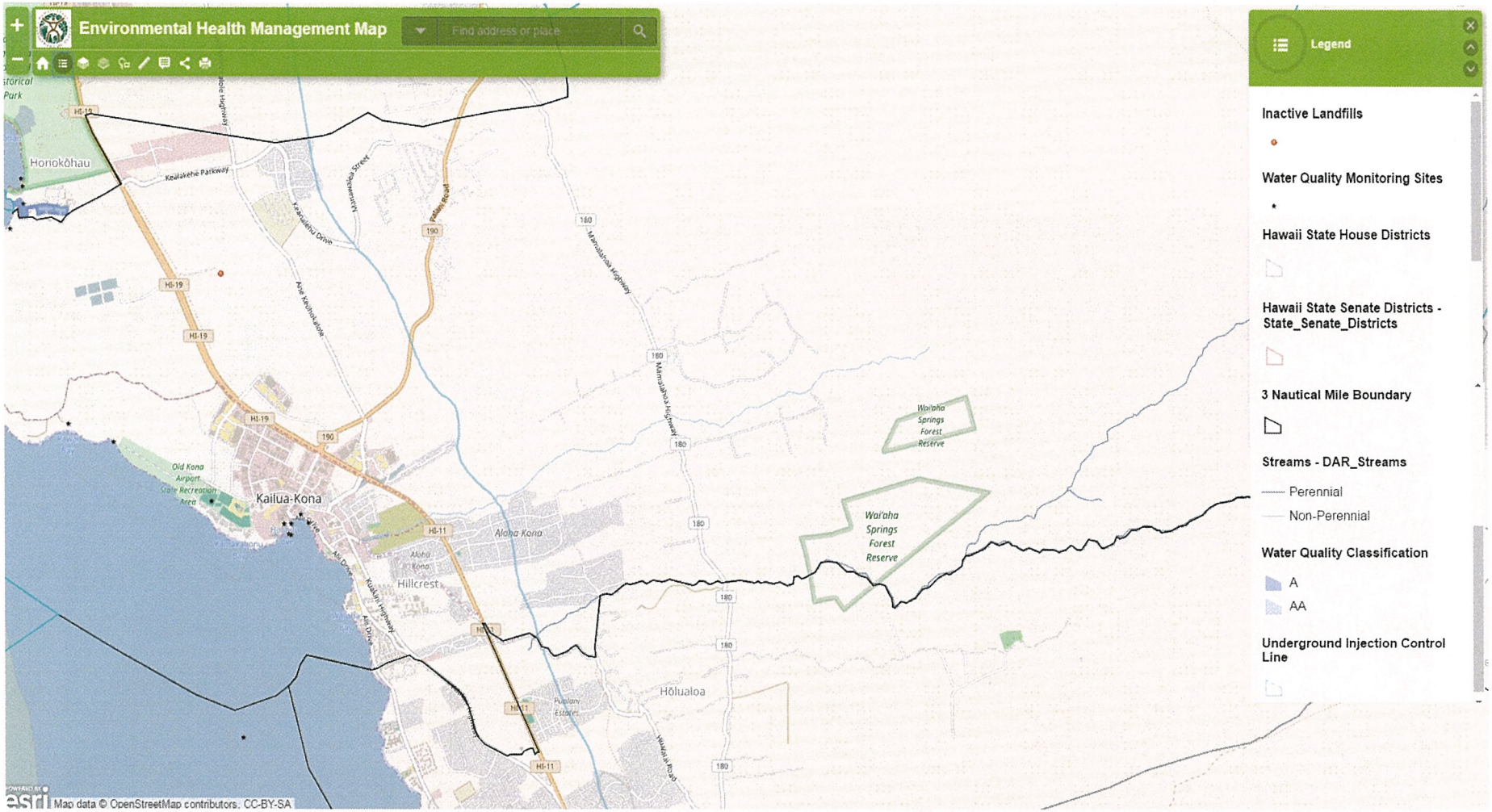
Laura Leialoha Phillips McIntyre, AICP
Program Manager, Environmental Planning Office

LM:nn

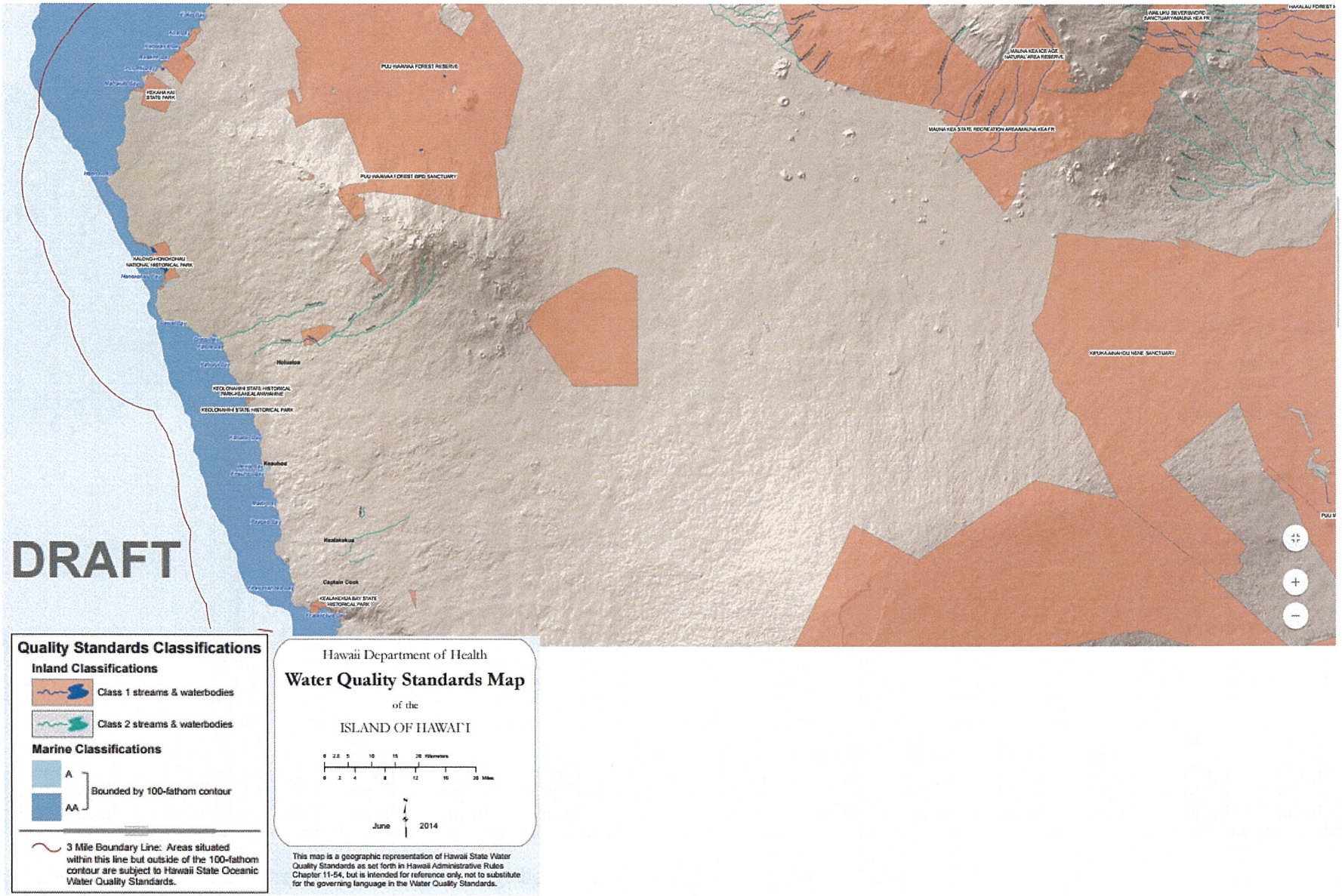
Attachment 1: Environmental Health Management Web App Snipit of Project Area: http://health.hawaii.gov/epo/egis
Attachment 2: Clean Water Branch: Water Quality Standards Map - Hawaii
Attachment 3: Wastewater Branch: Act 120 Cesspool Tax Credit Web App Snipit of Project Area
Attachment 4: Wastewater Branch: Recycled Water Use Map of Project Area
Attachment 5: U.S. EPA EJSCREEN Report for Project Area

c: DOH: DHO HI, SDWB {via email only}

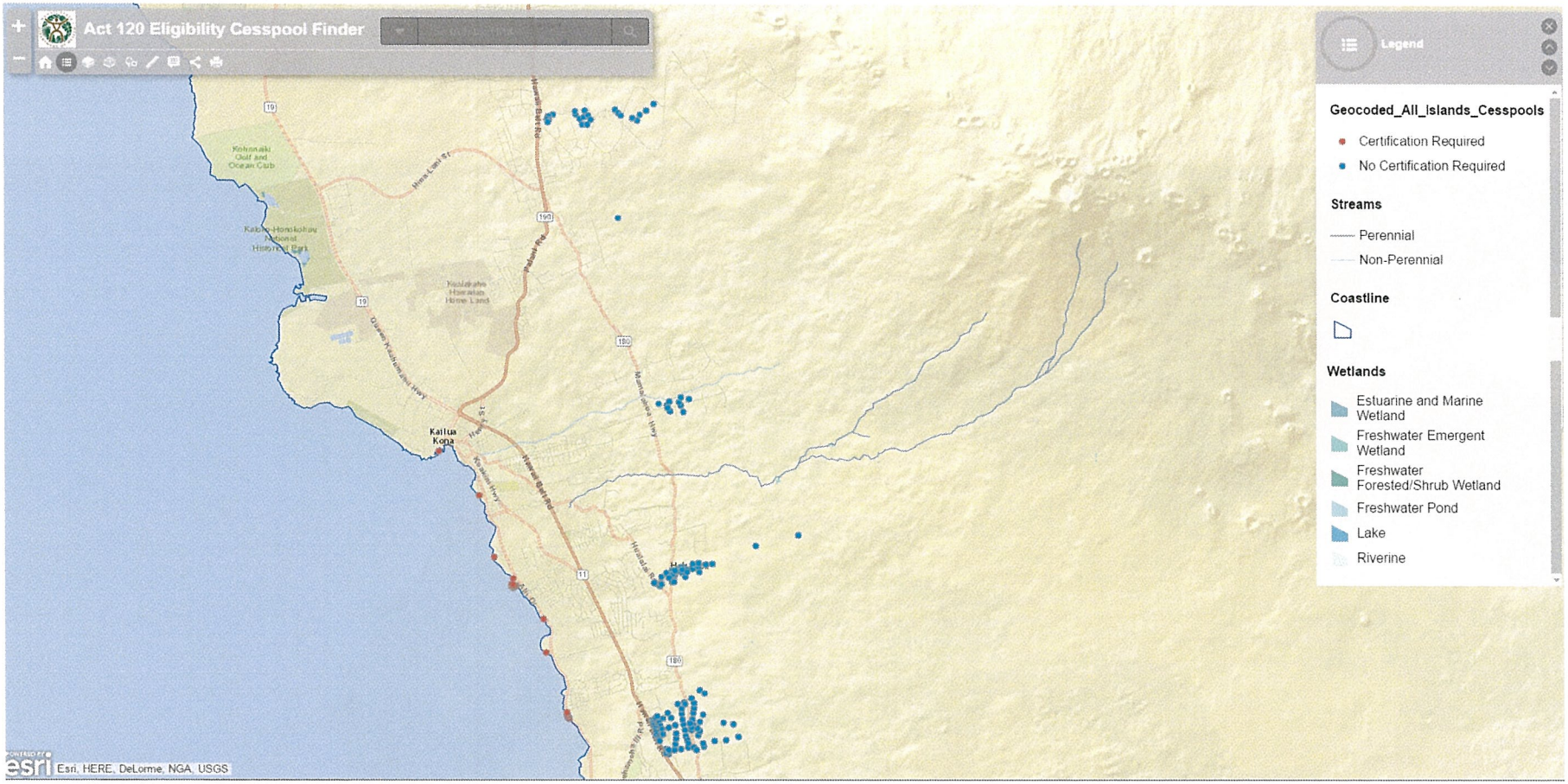
Attachment 1: Environmental Health Management Web App Snipit of Project Area: http://health.hawaii.gov/epo/egis



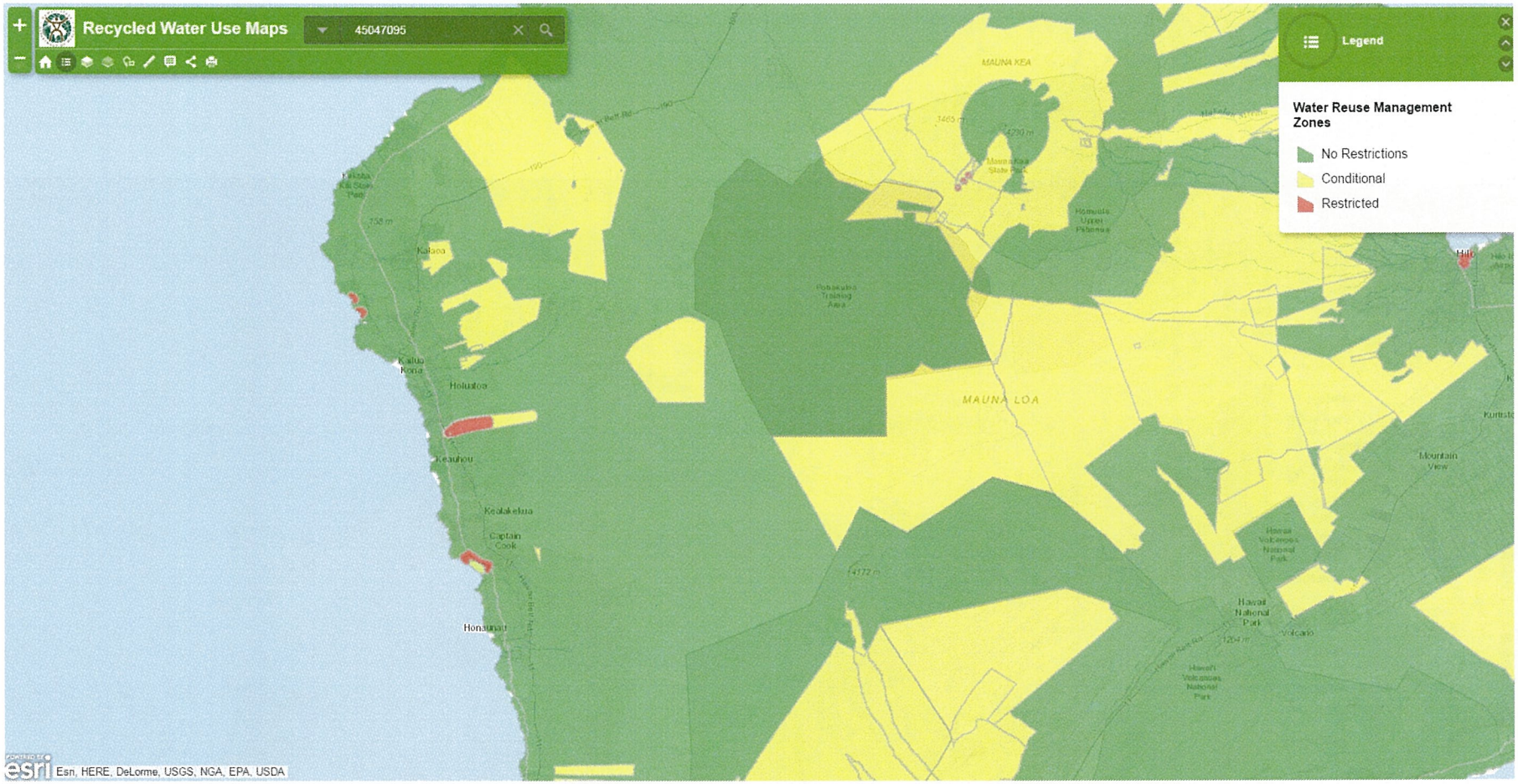
Attachment 2: Clean Water Branch: Water Quality Standards Map - Hawaii



Attachment 3: Wastewater Branch: Act 120 Cesspool Tax Credit Web App Snipit of Project Area



Attachment 4: Wastewater Branch: Recycled Water Use Map of Project Area



Attachment 5: U.S. EPA EJSCREEN Report for Project Area

EJSCREEN Report (Version 2016)

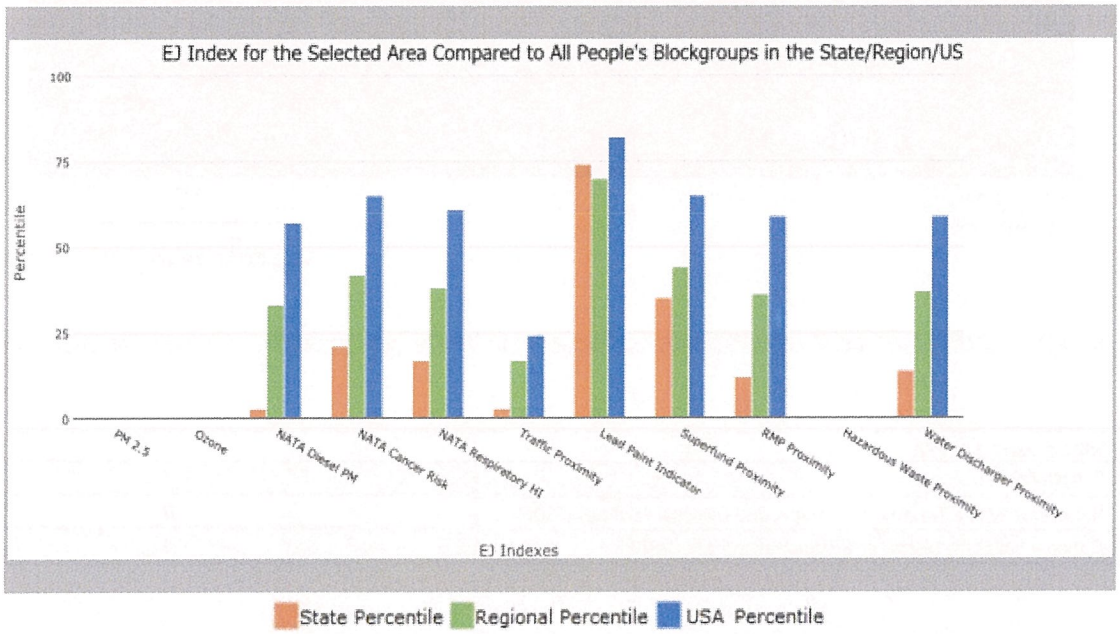
1 mile Ring Centered at 19.632957,-155.948007, HAWAII, EPA Region 9

Approximate Population: 597

Input Area (sq. miles): 3.14

Waiaha Transmission Water Line, North Kona

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
EJ Indexes			
EJ Index for PM2.5	N/A	N/A	N/A
EJ Index for Ozone	N/A	N/A	N/A
EJ Index for NATA* Diesel PM	3	33	57
EJ Index for NATA* Air Toxics Cancer Risk	21	42	65
EJ Index for NATA* Respiratory Hazard Index	17	38	61
EJ Index for Traffic Proximity and Volume	3	17	24
EJ Index for Lead Paint Indicator	74	70	82
EJ Index for Superfund Proximity	35	44	65
EJ Index for RMP Proximity	12	36	59
EJ Index for Hazardous Waste Proximity+	N/A	N/A	N/A
EJ Index for Water Discharger Proximity	14	37	59



This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

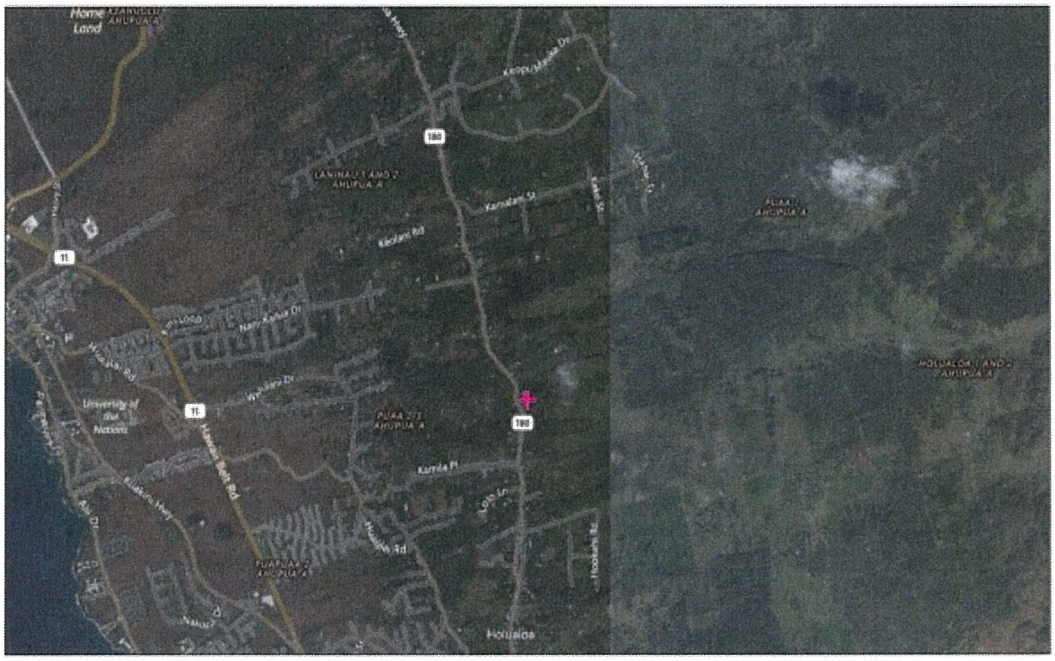
EJSCREEN Report (Version 2016)

1 mile Ring Centered at 19.632957,-155.948007, HAWAII, EPA Region 9

Approximate Population: 597

Input Area (sq. miles): 3.14

Waiaha Transmission Water Line, North Kona



November 25, 2016

Digitized Point

1:36,112

0 0.3 0.6 1.2 mi

0 0.5 1 2 km

© 2016 DigitalGlobe © 2016 GeoEye Earthstar Geographics SIO © 2016 Microsoft Corporation © 2013 NAVTEQ © AND

Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	0
National Pollutant Discharge Elimination System (NPDES)	0

EJSCREEN Report (Version 2016)

1 mile Ring Centered at 19.632957,-155.948007, HAWAII, EPA Region 9

Approximate Population: 597

Input Area (sq. miles): 3.14

Waiaha Transmission Water Line, North Kona

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Environmental Indicators							
Particulate Matter (PM 2.5 in µg/m³)	N/A	N/A	N/A	9.37	N/A	9.32	N/A
Ozone (ppb)	N/A	N/A	N/A	51	N/A	47.4	N/A
NATA* Diesel PM (µg/m³)	0.0326	0.149	21	0.978	<50th	0.937	<50th
NATA* Cancer Risk (lifetime risk per million)	26	34	16	43	<50th	40	<50th
NATA* Respiratory Hazard Index	0.54	1	13	2	<50th	1.8	<50th
Traffic Proximity and Volume (daily traffic count/distance to road)	77	990	41	1100	33	590	47
Lead Paint Indicator (% Pre-1960 Housing)	0.28	0.16	75	0.24	63	0.3	59
Superfund Proximity (site count/km distance)	0	0.098	29	0.15	13	0.13	16
RMP Proximity (facility count/km distance)	0	0.19	3	0.57	1	0.43	1
Hazardous Waste Proximity+ (facility count/km distance)	N/A	0.14	N/A	0.14	N/A	0.11	N/A
Water Discharger Proximity (facility count/km distance)	0	0.34	6	0.2	3	0.31	1
Demographic Indicators							
Demographic Index	41%	52%	17	47%	42	36%	64
Minority Population	58%	77%	16	58%	48	37%	73
Low Income Population	24%	26%	51	36%	35	35%	36
Linguistically Isolated Population	2%	6%	44	9%	31	5%	59
Population With Less Than High School Education	9%	9%	58	17%	37	14%	43
Population Under 5 years of age	4%	6%	22	7%	23	6%	25
Population over 64 years of age	14%	15%	48	13%	67	14%	58

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: https://www.epa.gov/national-air-toxics-assessment.

+ The hazardous waste environmental indicator and the corresponding EJ index will appear as N/A if there are no hazardous waste facilities within 50 km of a selected location.

For additional information, see: www.epa.gov/environmentaljustice

EJSCREEN is a screening tool for pre-decisional use only. It can help identify areas that may warrant additional consideration, analysis, or outreach. It does not provide a basis for decision-making, but it may help identify potential areas of EJ concern. Users should keep in mind that screening tools are subject to substantial uncertainty in their demographic and environmental data, particularly when looking at small geographic areas. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports. This screening tool does not provide data on every environmental impact and demographic factor that may be relevant to a particular location. EJSCREEN outputs should be supplemented with additional information and local knowledge before taking any action to address potential EJ concerns.

William P. Kenoi
Mayor

Randall M. Kurohara
Managing Director

Edward T. Teixeira
Emergency Management Director

County of Hawaii
CIVIL DEFENSE AGENCY
920 Ululani Street • Hilo, Hawai'i 96720-3958
(808) 935-0031 • Fax (808) 935-6460

November 22, 2016

Mr. Ron Terry
Geometrician Associates, LLC
P. O. Box 396
Hilo, Hawaii 96721

Dear Mr. Terry:

Early Consultation for Environmental Assessment
Waiaha Transmission Line, North Kona District, Island of Hawaii

Thank you for your letter subject as above dated November 14, 2016. At this time, this agency does not have any comments regarding the proposed activity's impact. We support the initiative to establish redundant capabilities in water systems including those in North Kona.

Please include this agency in the distribution of the Environmental Assessment when it comes available.

Sincerely,

EDWARD T. TEIXEIRA
Director, Emergency Management

National Park Service
U.S. Department of the Interior

Kaloko-Honokōhau
National Historical Park

73-4786 Kanalani Street # 14
Kailua-Kona, Hawai'i 96740

808 329-6881 Phone
808 329-2597 Fax

Kaloko-Honokōhau

IN REPLY REFER TO:
L7621 (2016-11)

November 30, 2016

Ron Terry, Principal
Geometrician Associates
PO Box 396
Hilo, Hawai'i 96721

Subject: Early Consultation for Environmental Assessment for Waiaha Transmission Water Line, North Kona District, Island of Hawai'i

Dear Mr. Terry:

Thank you for providing the National Park Service with the opportunity to provide input during the early consultation phase of developing an Environmental Assessment for the Waiaha Transmission Water Line in North Kona, on the Island of Hawai'i.

In the recent draft of the Hawai'i County Department of Water Supply's, Water Use and Development Plan, the Department committed to developing new water sources south of the Queen Lili'uokalani Trust deep well in North Kona. We would like to know if this proposed transmission water line is moving the water transmission system toward the Department's stated commitment to develop sources farther south and a transmission system that can move water north.

To assist you in developing the Environmental Assessment, I am attaching a copy of our 2008 letter commenting on a draft Environmental Assessment for the Waiaha Water Systems (Transmission Mains and Reservoirs), North Kona District, Hawai'i.

We look forward to working with you to develop an Environmental Assessment for this project. If you have any questions regarding this letter, please contact Dr. Jeff Zimpfer of my staff (808-329-6881 x1500 or jeff_zimpfer@nps.gov).

Sincerely,

for Tammy Ann Duchesne
Superintendent

United States Department of the Interior
NATIONAL PARK SERVICE
Kaloko-Honokohau National Historical Park
73-4786 Kanalani St., Suite 14
Kailua-Kona, HI 96740

IN REPLY REFER TO:
L7621

April 7, 2008

Ms. Yukie Ohashi
Wai'aha Systems, LLC, Wai'aha Systems II, LLC
P.O. Box 898
Kailua-Kona, HI 96745

RE: National Park Service Response to the Draft Environmental Assessment, **Waiaha Water Systems (Transmission Mains and Reservoirs),** North Kona District, Hawaii.

Dear Ms. Ohashi:

Thank you for providing the National Park Service with the opportunity to review and comment on the draft Environmental Assessment (EA) for the Wai'aha Water System (transmission mains and reservoirs), proposed by Wai'aha Systems LLC/Wai'aha Systems II, LLC. The proposed new transmission lines and tanks will allow the County of Hawaii Department of Water Supply (DWS) to increase production at the Wai'aha well, located in the Keauhou high-level aquifer, about 5.5 miles from Kaloko-Honokohau National Historical Park,. By increasing pumping at the Wai'aha well, the DWS will also be able to alleviate the current rate of pumping at the Kahalu`u shaft located 7.6 miles from the National Park in the Keauhou basal aquifer. The EA states that the Kahalu`u shaft is currently being over-pumped and that water quality from this source is declining, apparently due to saltwater intrusion. We submit the following comments on the draft EA.

This project is of concern to the National Park Service because Kaloko-Honokohau National Historical Park lies in the vicinity of the Wai'aha well and the Park's ground-water dependent cultural and natural resources may be adversely impacted by the cumulative impacts of increased ground-water pumping in the high-level aquifer. Kaloko-Honokohau National Historical Park was authorized in 1978 by Congress to preserve, interpret, and perpetuate traditional native Hawaiian activities and culture (Public Law 95-625). The authorization was based on a study and report by a congressional advisory commission comprised of native Hawaiians. The study recommended that the site that is the Honokohau Settlement National Historical Landmark (designated in 1962) and its adjacent waters be preserved for the benefit of the Hawaiian people and the nation as part of the national park system. Water quality and quantity are vital to the integrity of the Park's mission. The National Park contains two large (11 and 15- acre) ancient Hawaiian fishponds with large associated wetlands, more than 140 known anchialine pools, and 596 acres of marine waters. Each of these water bodies is a significant cultural resource and they

also provide habitat for nine federally protected and candidate endangered species. The National Park water resources are fed by, and in the case of the anchialine pools and `Aimakapa Fishpond, are solely dependent upon, groundwater inputs. The anchialine pools support three known candidate endangered species. `Aimakapa Fishpond and wetland is a significant foraging and nesting habitat for the endangered Hawaiian stilt and the Hawaiian coot, and is an important habitat for migratory waterfowl. The Park boundaries also encompass 546 acres of class AA marine waters which include extensive coral reef habitat, and supports four federally protected marine species.

Secondary and Cumulative Impacts

- Page 23, Secondary and Cumulative Impacts

- Page 26, Determinations with Supporting Findings and Reasons (6) Involves substantial secondary impacts, such as population changes or effects on public facilities

- Page 26, Determinations with Supporting Findings and Reasons (8) Is individually limited but cumulatively has considerable effect on the environment, or involves a commitment for larger actions

In these sections, the draft EA states that the cumulative and secondary impacts, which result when implementation of several projects that individually have limited impacts combine to produce more severe impacts or conflicts in mitigation measures, would be temporary and very limited in severity, nature, and geographic scale. These sections are inadequate and incomplete because they do not describe the hydrologic impacts associated with increased pumping at the Wai'aha well, which will include 1500 units of water to be used by the Applicant. Additionally, increased pumping has the potential to lead to impacts in coastal aquatic ecosystems that support endangered and candidate endangered species and impacts to the cultural practices that rely on these intact ecosystems.

The U.S. Geological Survey notes that "Arguably, there is no volume of ground-water use that can be truly free of any adverse consequence, especially when time is considered. The direct hydrologic effects will be equal to the volume of water removed, but those effects may require decades to centuries to be manifest" (Anderson & Woosley, USGS Circular 1261, 2005). Likewise, if pumping at the Wai'aha well is planned to increase by 1.5 Mgd as a direct result of this project, then the EA should clearly acknowledge that aquifer storage in combination with ground-water discharge to the basal aquifer and the nearshore area will decrease by 1.5 Mgd in the vicinity of the Wai'aha well.

Ground Water

- Page 25, Determination with Supporting Findings and Reasons (3) Conflicts with the State's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS.

- Page 26, Determination with Supporting Findings and Reasons (7) Involves a substantial degradation of environmental quality.

In these sections, the draft EA finds that "Over the long-term, the new water source will improve environmental quality to the overall water resource in North Kona" and ". . . will reduce salt-water infiltration at the lower elevation."

These conclusions are inaccurate because they do not describe the overall long-term impacts to water quality from ground-water pumping. While transferring pumping from the Kahalu`u shaft to the Wai'aha well may temporarily improve water quality in the vicinity of the Kahau`u shaft, saltwater intrusion will continue because the overall ground-water withdrawals will not be reduced. Increasing pumping at the Wai'aha well will decrease aquifer discharge to the basal aquifer over the long term and contribute to saltwater intrusion in the basal aquifer. Changing the point of diversion from the basal aquifer to the high-level aquifer only delays the hydrologic consequences of ground-water pumping.

Impacts and Mitigation Measures

The cumulative impacts of existing ground-water withdrawals, in addition to the future demand for water in the Kona area, pose a serious threat to the purposes and values for which the National Park was established. According to recent reports, pumping in the Keauhou aquifer system averages 12.08 Mgd (http://hi.water.usgs.gov/west_hawaii/ west_hawaii_tab.htm). The National Park Service estimates that satisfying the water needs of all of the currently proposed development in the vicinity of Kaloko-Honokohau National Historical Park will more than double production in the Keauhou aquifer system.

To address these concerns and to confirm the draft EA's determination of no significant long-term secondary or cumulative impacts, a network of observation wells to monitor ground-water levels and saltwater intrusion must be established in the Keauhou aquifer system.

The National Park Service recognizes that water managers do not yet fully understand how the aquifer responds to pumping stresses, nor does the National Park Service yet fully understand the quantity of ground water necessary to sustain resources at Kaloko-Honokohau NHP. Adequate monitoring of well withdrawals and any changes in water levels and salinity are critical to understanding how the Keauhou aquifer system responds to development and managing for sustainability into the future. The National Park Service is developing a program to monitor water levels and water quality in three shallow wells within the Park's boundaries and is committed to improving our understanding of the National Park's ground-water needs.

Similarly, the DWS should identify an observation well in the high-level aquifer near the Waiaha well, in which water levels and fluid conductivity will be monitored on at least a monthly basis to measure changes in aquifer storage and salinity over time and to ultimately evaluate whether current and proposed water use in the Keauhou aquifer system is sustainable.

Thank you for the opportunity to participate in your environmental review process and to provide our comments and concerns on the proposed project.

Sincerely,

Geraldine K. Bell
Superintendent

cc:
K. Inaba, County of Hawaii, Dept. of Water Supply
M. Pavao, County of Hawaii, Dept. of Water Supply
R. Hardy, Commission on Water Resources Management
Office of Environmental Quality Control
C. Yuen, County of Hawaii, Office of Planning
P. Leonard, US Fish and Wildlife Service
National Park Service Pacific West Regional Office
C. Pettee, NPS Water Rights Branch
G. Lind, Office of the Solicitor

William P. Kenoi
Mayor

Harry S. Kubojiri
Police Chief

Paul K. Ferreira
Deputy Police Chief

County of Hawai'i

POLICE DEPARTMENT
349 Kapi'olani Street • Hilo, Hawai'i 96720-3998
(808) 935-3311 • Fax (808) 961-2389

December 2, 2016

Mr. Ron Terry
Principal
Geometrician Associates LLC
P.O. Box 396
Hilo, HI 96721

SUBJECT: EARLY CONSULTATION FOR ENVIRONMENTAL ASSESSMENT FOR WAIAHA TRANSMISSION WATER-LINE, NORTH KONA DISTRICT, ISLAND OF HAWAI'I

Dear Mr. Terry:

This is in response to your letter dated November 14, 2016, regarding a request for comments on the proposed development of the Waiaha transmission water-line in North Kona District.

Thank you for allowing the Hawai'i Police Department to make comments regarding this development. At this time, the Hawai'i Police Department has no comments.

Should you have any questions or concerns please contact Captain Randal M. Ishii, Commander of the Kona District, at 326-4646, extension 299.

Sincerely,

HARRY S. KUBOJIRI
POLICE CHIEF

MITCHELL KANEHAILUA JR.
ASSISTANT POLICE CHIEF
AREA II OPERATIONS

RMI/jaj
RS160728

Harry Kim
Mayor

Wil Okabe
Managing Director

Frank J. De Marco, P.E.
Director

Allan G. Simeon
Deputy Director

County of Hawai'i
DEPARTMENT OF PUBLIC WORKS
Aupuni Center
101 Pauahi Street, Suite 7 · Hilo, Hawai'i 96720-4224
(808) 961-8321 · Fax (808) 961-8630
public_works@hawaiicounty.gov

December 9, 2016

Ron Terry, Principal
Geometricians Associates
P.O. Box 396
Hilo, HI 96721

Subject: Early Consultation for Environmental Assessment
Waiaha Transmission Waterline
Mamalahoa Highway from Kamila Road to Water Pipe Road
North Kona District, Island of Hawaii

We received the subject announcement and have the following comments:

- The proposed waterline crosses Waiaha Draingeway. All work within the flood zone and drainageway shall comply with Chapter 27 of Hawaii County Code and should be designed and constructed to minimize potential damage from flood events.

- A permit is required for work within the County right-of-way. See Chapter 22, Streets and Sidewalks, of Hawaii County Code. Where longitudinal trenching is proposed within any existing County road, we will require cold-planing and resurfacing of the entire lane trenched or damaged by the project.

If you have any questions, please contact Kiran Emler of our Kona office at 323-4851.

Ben Ishii, Division Chief
Engineering Division

KE

c: DPW ENG-HILO/KONA

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE
MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

December 14, 2016

Geometrician Associates, LLC
Attention: Mr. Ron Terry
P.O. Box 396
Hilo, Hawaii 96721

via email: rterry@hawaii.rr.com

Dear Mr. Terry:

SUBJECT: Early Consultation for Environmental Assessment (EA) for Waiaha Transmission Water Line

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

At this time, enclosed are comments from the (a) Engineering Division and (b) Land Division – Hawaii District on the subject matter. Should you have any questions, please feel free to call Lydia Morikawa at 587-0410. Thank you.

Sincerely,

for Russell Y. Tsuji
Land Administrator

Enclosure(s)
cc: Central Files

DAVID Y. IGE
GOVERNOR OF HAWAII

'16 NOV 22 PM 1:54 ENGINEERING

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE
MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

November 21, 2016

MEMORANDUM

RECEIVED
LAND DIVISION
2016 DEC -7 AM 11:17
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

TO: **DLNR Agencies:**
___Div. of Aquatic Resources
___Div. of Boating & Ocean Recreation
From: X Engineering Division
___Div. of Forestry & Wildlife
___Div. of State Parks
X Commission on Water Resource Management
___ Office of Conservation & Coastal Lands
X Land Division – Hawaii District
X Historic Preservation

FROM: To: Russell Y. Tsuji, Land Administrator
SUBJECT: Early Consultation for Environmental Assessment (EA) for Waiaha Transmission Water Line
LOCATION: N. Kona Island of Hawaii; TMK: (3) 7-5: various, including the main reservoir site (3) 7-5-014:016 & booster pump (3) 7-5-013:027
APPLICANT: County of Hawaii, Department of Water Supply

Transmitted for your review and comment is information on the above-referenced project. We would appreciate your comments on this project. Please submit any comments by **December 13, 2016.**

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Lydia Morikawa at 587-0410. Thank you.

Attachments

( ) We have no objections.
( ) We have no comments.
(X) Comments are attached.

Signed: _____

Print Name: Carty S. Chang, Chief Engineer
Date: 12/5/16

cc: Central Files

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LD/Russell Y. Tsuji
Ref: Early Consultation for Environmental Assessment (EA) for Waiaha Transmission Water Line

COMMENTS

The rules and regulations of the National Flood Insurance Program (NFIP), Title 44 of the Code of Federal Regulations (44CFR), are in effect when development falls within a designated Flood Hazard.

The owner of the project property and/or their representative is responsible to research the Flood Hazard Zone designation for the project. Flood Hazard Zone designations can be found using the Flood Insurance Rate Map (FIRM), which can be accessed through the Flood Hazard Assessment Tool (FHAT) (http://gis.hawaiinfip.org/FHAT).

Be advised that 44CFR reflects the minimum standards as set forth by the NFIP. Local community flood ordinances may take precedence over the NFIP standards as local designations prove to be more restrictive. If there are questions regarding the local flood ordinances, please contact the applicable County NFIP Coordinators below:

- Oahu: City and County of Honolulu, Department of Planning and Permitting (808) 768-8098.
- Hawaii Island: County of Hawaii, Department of Public Works (808) 961-8327.
- Maui/Molokai/Lanai County of Maui, Department of Planning (808) 270-7253.
- Kauai: County of Kauai, Department of Public Works (808) 241-4846.

Signed: _____
CARTY S. CHANG, CHIEF ENGINEER

Date: 12/5/16

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

2016 NOV 23 P 12:26

RECEIVED
LAND DIVISION
HILO, HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

November 21, 2016

RECEIVED
LAND DIVISION
2016 NOV 30 AM 10:50
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

MEMORANDUM

TO: **DLNR Agencies:**
___Div. of Aquatic Resources
___Div. of Boating & Ocean Recreation
X Engineering Division
___Div. of Forestry & Wildlife
___Div. of State Parks
X Commission on Water Resource Management
___ Office of Conservation & Coastal Lands
X Land Division – Hawaii District
X Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Early Consultation for Environmental Assessment (EA) for Waiaha Transmission Water Line
LOCATION: N. Kona Island of Hawaii; TMK: (3) 7-5: various, including the main reservoir site (3) 7-5-014:016 & booster pump (3) 7-5-013:027
APPLICANT: County of Hawaii, Department of Water Supply

Transmitted for your review and comment is information on the above-referenced project. We would appreciate your comments on this project. Please submit any comments by **December 13, 2016.**

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Lydia Morikawa at 587-0410. Thank you.

Attachments

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

Signed: [signature]

Print Name: GORDON C. HEIT
Date: 11/28/16

cc: Central Files

Harry Kim
Mayor

Wil Okabe
Managing Director

Frank J. De Marco, P.E.
Director

Allan G. Simeon
Deputy Director

County of Hawai'i
DEPARTMENT OF PUBLIC WORKS
Aupuni Center
101 Pauahi Street, Suite 7 · Hilo, Hawai'i 96720-4224
(808) 961-8321 · Fax (808) 961-8630
public_works@hawaiicounty.gov

December 9, 2016

Ron Terry, Principal
Geometricians Associates
P.O. Box 396
Hilo, HI 96721

Subject: Early Consultation for Environmental Assessment
Waiaha Transmission Waterline
Mamalahoa Highway from Kamila Road to Water Pipe Road
North Kona District, Island of Hawaii

We received the subject announcement and have the following comments:

- The proposed waterline crosses Waiaha Draingeway. All work within the flood zone and drainageway shall comply with Chapter 27 of Hawaii County Code and should be designed and constructed to minimize potential damage from flood events.

- A permit is required for work within the County right-of-way. See Chapter 22, Streets and Sidewalks, of Hawaii County Code. Where longitudinal trenching is proposed within any existing County road, we will require cold-planing and resurfacing of the entire lane trenched or damaged by the project.

If you have any questions, please contact Kiran Emler of our Kona office at 323-4851.

Ben Ishii, Division Chief
Engineering Division

KE

c: DPW ENG-HILO/KONA

Harry Kim
Mayor

Michael Yee
Director

Daryn Arai
Deputy Director

West Hawai'i Office
74-5044 Ane Keohokalole Hwy
Kailua-Kona, Hawai'i 96740
Phone (808) 323-4770
Fax (808) 327-3563

County of Hawai'i

PLANNING DEPARTMENT

East Hawai'i Office
101 Pauahi Street, Suite 3
Hilo, Hawai'i 96720
Phone (808) 961-8288
Fax (808) 961-8742

January 17, 2017

Mr. Ron Terry
Geometrician Associates, LLC
P.O. Box 396
Hilo, HI 96721

Dear Mr. Terry:

Subject: Pre-Consultation for Draft Environmental Assessment
Project: Waiaha Transmission Water Line
Māmalahoa Highway Right-of-Way, North Kona, Hawai'i

Thank you for your letter dated November 14, 2016, requesting comments from this office regarding the preparation of a Draft Environmental Assessment (DEA) for the subject project. We apologize for the delayed response.

The County of Hawai'i, Department of Water Supply proposes to construct a 16-inch water transmission line and associated infrastructure for a length of approximately one mile between Kamila Place and Waterpipe Road adjacent to Māmalahoa Highway. All work is expected to be conducted within the right-of-way of Māmalahoa Highway, with the possible exception of the connection at the Waiaha 2MG Reservoir and the connection to the Pua'a Booster Pump Station.

There is no County zoning for the Māmalahoa Highway Right-of-Way. Neighboring properties are zoned Agricultural by the County and within the State Land Use Agricultural district. In addition, according to the County of Hawai'i General Plan 2005, (amended December 2006), the neighboring properties are designated as Important Agricultural Lands by the Land Use Pattern Allocation Guide. Although the entire island of Hawai'i is within the Coastal Zone Management Area, the subject area is not located within the Special Management Area.

The project site is located in the Kona Community Development Plan (CDP) planning area. The Kona CDP was adopted by Ordinance No. 08-13, effective as of September 25, 2008.

Please include a discussion about the transmission line in relationship to the goals, objectives, policies, and actions of the Kona CDP.

We have no further comments to offer at this time. If you have any questions or need further assistance, please feel free to contact Bethany Morrison of this office at (808) 961-8138.

Sincerely,

for MICHAEL YEE
Planning Director

BJM:ja
\\COH33\planning\public\wpwin60\Bethany\EA-EIS Review\preconsultdraftea waiaha transmission water line.doc

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Environmental Assessment

Waiaha Transmission Water Line

APPENDIX 1b
Comments to Draft EA and Responses

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DAVID Y. IGE
GOVERNOR OF HAWAII

VIRGINIA PRESSLER, M.D.
DIRECTOR OF HEALTH

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

In reply, please refer to:
File:

EPO 17-206

August 31, 2017

Mr. Ron Terry
Geometrician Associates
P.O. Box 396
Hilo, Hawaii 96721
Email: rterry@hawaii.rr.com

Dear Mr. Terry:

SUBJECT: Draft Environmental Assessment (DEA) for Waiaha Transmission Water Line North Kona, Hawaii TMK: (3) 7-5-014:002, 003, 006, 016 and 027; 7-5-015:015 and 7-5-013:027; and ROW of Māmalahoa Highway within Plats 7-5-012, 013, 014 & 016

The Department of Health (DOH), Environmental Planning Office (EPO), acknowledges receipt of your DEA to our office via the OEQC link:
http://oeqc2.doh.hawaii.gov/EA_EIS_Library/2017-08-23-HA-DEA-Waiaha-Transmission-Water-Line.pdf

We understand from the OEQC publication form project summary that *"The Hawai'i County DWS proposes a mile-long 16-inch water transmission line on Mamalahoa Highway. Most work will be conducted within the right-of-way, with connections to the Waiaha 2-MG Reservoir and the Puaa Booster Pump Station, and possible minor use of private properties at culvert crossings. Work will involve an excavated trench with a 3-foot backfill cover and supported culvert crossings. The Puaa Pump Station pumps will be upsized to 350 gpm with technology allowing flexibility in controlling water flow. Localized and temporary traffic congestion, construction noise, emissions and fugitive dust could affect nearby properties during daytime over periods of days to weeks over the course of 16 months, as work moves along the road."*

Hawaii's environmental review laws require Environmental Assessments (EAs) and Environmental Impact Statements (EISs) to consider health in the discussion and the mitigation measures to reduce negative impacts. In its definition of 'impacts,' §11-200-2, Hawaii Administrative Rules (HAR) includes health effects, whether primary (direct), secondary (indirect), or cumulative. Further, §11-200-12(b)(5), HAR, lists public health as one of the criteria for determining whether an action may have a significant impact on the environment.

We advocate that you consider health from a broad perspective; one that accounts for the social, economic, and environmental determinants of health and wellbeing. Community well-being can be impacted by access to physical activity, health care, feelings of social connectedness and safety. Design solutions that take these factors into consideration positively contribute to the social determinants of health in a community, improving the well-being of those who live there by influencing health promoting behaviors. Social determinants contribute to preventable chronic diseases such as asthma, diabetes, obesity, and cardiovascular disease.

In the development and implementation of all projects, EPO strongly recommends regular review of State and Federal environmental health land use guidance. State standard comments to support sustainable healthy design are provided at: http://health.hawaii.gov/epo/landuse. Projects are required to adhere to all applicable standard

comments. EPO has an updated environmental Geographic Information System (GIS) website page http://health.hawaii.gov/epo/egis It compiles various maps and viewers from our environmental health programs.

We suggest you review the requirements of the Clean Water Branch (Hawaii Administrative Rules {HAR}, Chapter 11-54-1.1, -3, 4-8) and/or the National Pollutant Discharge Elimination System (NPDES) permit (HAR, Chapter 11-55) at: http://health.hawaii.gov/cwb. If you have any questions, please contact the Clean Water Branch (CWB), Engineering Section at (808) 586-4309 or cleanwaterbranch@doh.hawaii.gov. If your project involves waters of the U.S., it is highly recommended that you contact the Army Corps of Engineers, Regulatory Branch at: (808) 835-4303.

Injection wells used for the subsurface disposal of wastewater, sewage effluent, or surface runoff are subject to environmental regulation and permitting (HAR, Chapter 11-23, "Underground Injection Control {UIC}"). DOH approval must be obtained before any injection well construction commences. A UIC permit must be issued before any injection well operation occurs. For specific questions please email sdwb@doh.hawaii.gov or call (808) 586-4258.

Please note that all wastewater plans must conform to applicable provisions (HAR, Chapter 11-62, "Wastewater Systems"). We reserve the right to review the detailed wastewater plans for conformance to applicable rules. Should you have any questions, please review online guidance at: http://health.hawaii.gov/wastewater and contact the Planning and Design Section of the Wastewater Branch (WWB) at (808) 586-4294.

If temporary fugitive dust emissions could be emitted when the project site is prepared for construction and/or when construction activities occur, we recommend you review the need and/or requirements for a Clean Air Branch (CAB) permit (HAR, Chapter 11-60.1 "Air Pollution Control"). Effective air pollution control measures need to be provided to prevent or minimize any fugitive dust emissions caused by construction work from affecting the surrounding areas. This includes the off-site roadways used to enter/exit the project. The control measures could include, but are not limited to, the use of water wagons, sprinkler systems, and dust fences. For questions contact the Clean Air Branch via e-mail at: Cab.General@doh.hawaii.gov or call (808) 586-4200.

Any waste generated by the project (that is not a hazardous waste as defined in state hazardous waste laws and regulations), needs to be disposed of at a solid waste management facility that complies with the applicable provisions (HAR, Chapter 11-58.1 "Solid Waste Management Control"). The open burning of any of these wastes, on or off site, is strictly prohibited. You may wish you review the Minimizing Construction & Demolition Waste Management Guide at: http://health.hawaii.gov/shwb/files/2016/05/constdem16.pdf Additional information is accessible at: http://health.hawaii.gov/shwb. For specific questions call (808) 586-4226.

If noise created during the construction phase of the project may exceed the maximum allowable levels (HAR, Chapter 11-46, "Community Noise Control") then a noise permit may be required and needs to be obtained before the commencement of work. Relevant information is online at: http://health.hawaii.gov/irhb/noise EPO recommends you contact the Indoor and Radiological Health Branch (IRHB) at (808) 586-4700 with any specific questions. owners/tenants must comply with State Law (HRS, Chapter 128D, "Environmental Response Law", Chapter 451, "State Contingency Plan").

EPO also encourages you to examine and utilize the Hawaii Environmental Health Portal at: https://eha-cloud.doh.hawaii.gov. This site provides links to our e-Permitting Portal, Environmental Health Warehouse, Groundwater Contamination Viewer, Hawaii Emergency Response Exchange, Hawaii State and Local Emission Inventory System, Water Pollution Control Viewer, Water Quality Data, Warnings, Advisories and Postings.

You may also wish to review the draft Office of Environmental Quality Control (OEQC) viewer at: http://eha-web.doh.hawaii.gov/oeqc-viewer. This viewer geographically shows where some previous Hawaii Environmental Policy Act (HEPA) {Hawaii Revised Statutes, Chapter 343} documents have been prepared.

To better protect public health and the environment, the U.S. Environmental Protection Agency (EPA) has developed a new environmental justice (EJ) mapping and screening tool called EJSCREEN. It is based on nationally consistent data and combines environmental and demographic indicators in maps and reports. EPO encourages you to explore, launch and utilize this powerful tool in planning your project. The EPA EJSCREEN tool is available at: http://www.epa.gov/ejscreen.

We hope this information is helpful. If you have any questions please contact us at DOH.epo@doh.hawaii.gov or call us at (808) 586-4337. Thank you for the opportunity to comment.

Mahalo nui loa,

Laura Leialoha Phillips McIntyre, AICP
Program Manager, Environmental Planning Office

LM:nn

c: Gerald Yorita, County of Hawaii, Dept. of Water Supply (via email: gyorita@hawaiidws.org)
DOH: DHO HI, DDEH, EMD, CWB, SDWB, WWB, CAB, SHWB, IRHB {via email only}

Attachment: U.S. EPA EJSCREEN Report for Project Area

Please be advised:
The Environmental Planning Office (EPO), along with the Clean Air, Clean Water, and Wastewater Branches will be moving in December 2017. The new address, for EPO, **as of January 1, 2018**, will be :
Environmental Planning Office, DOH, Hale Ola, 2827 Waimano Home Road #109, Pearl City, Hawaii 96782
Please feel free to come and visit our new offices anytime. Please note that there is a security guard at the bottom of the hill (before entering DOH property). Our office phone numbers, email and website will all remain the same.

Attachment: U.S. EPA EJSCREEN Report for Project Area

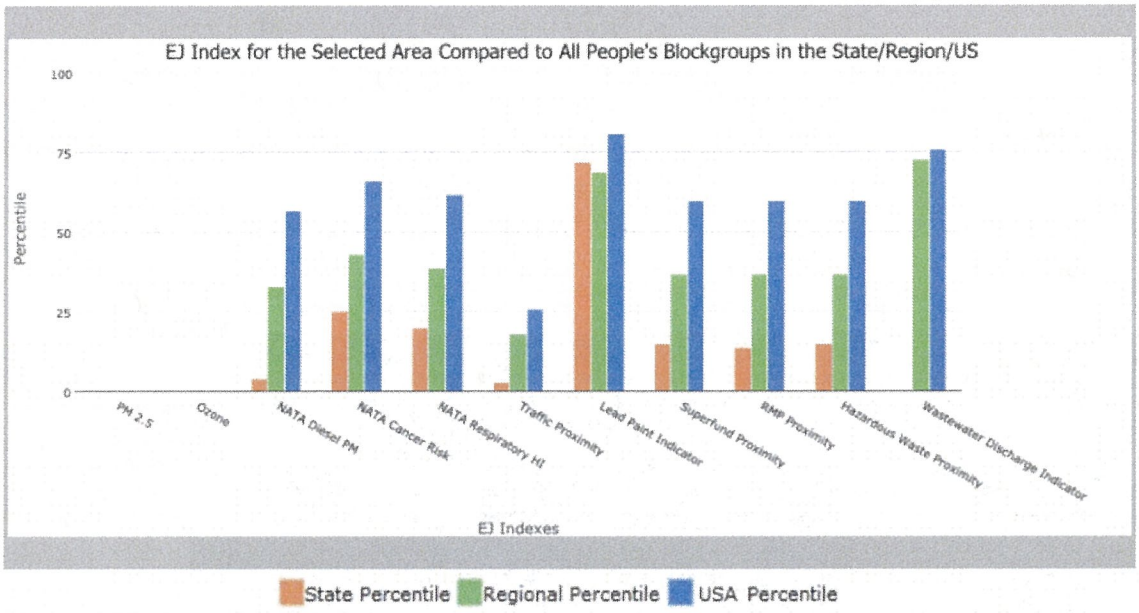
EJSCREEN Report (Version 2017)

1 mile Ring Centered at 19.631196,-155.948493, HAWAII, EPA Region 9

Approximate Population: 599

Input Area (sq. miles): 3.14

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
EJ Indexes			
EJ Index for PM2.5	N/A	N/A	N/A
EJ Index for Ozone	N/A	N/A	N/A
EJ Index for NATA* Diesel PM	4	33	57
EJ Index for NATA* Air Toxics Cancer Risk	25	43	66
EJ Index for NATA* Respiratory Hazard Index	20	39	62
EJ Index for Traffic Proximity and Volume	3	18	26
EJ Index for Lead Paint Indicator	72	69	81
EJ Index for Superfund Proximity	15	37	60
EJ Index for RMP Proximity	14	37	60
EJ Index for Hazardous Waste Proximity	15	37	60
EJ Index for Wastewater Discharge Indicator	N/A	73	76



This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

EJSCREEN Report (Version 2017)

1 mile Ring Centered at 19.631196,-155.948493, HAWAII, EPA Region 9

Approximate Population: 599

Input Area (sq. miles): 3.14

August 30, 2017

Digitized Point

1:4,514

0 0.0375 0.075 0.15 mi

0 0.05 0.1 0.2 km

Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	0

EJSCREEN Report (Version 2017)

1 mile Ring Centered at 19.631196,-155.948493, HAWAII, EPA Region 9

Approximate Population: 599

Input Area (sq. miles): 3.14

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Environmental Indicators							
Particulate Matter (PM 2.5 in µg/m³)	N/A	N/A	N/A	9.9	N/A	9.14	N/A
Ozone (ppb)	N/A	N/A	N/A	41.8	N/A	38.4	N/A
NATA* Diesel PM (µg/m³)	0.0495	0.149	29	0.978	<50th	0.938	<50th
NATA* Cancer Risk (lifetime risk per million)	26	34	19	43	<50th	40	<50th
NATA* Respiratory Hazard Index	0.57	1	17	2	<50th	1.8	<50th
Traffic Proximity and Volume (daily traffic count/distance to road)	96	1000	44	1100	36	590	50
Lead Paint Indicator (% Pre-1960 Housing)	0.22	0.16	70	0.24	58	0.29	53
Superfund Proximity (site count/km distance)	0.0034	0.1	9	0.15	0	0.13	0
RMP Proximity (facility count/km distance)	0.029	0.39	2	0.98	1	0.73	1
Hazardous Waste Proximity (facility count/km distance)	0.0035	0.1	9	0.12	0	0.093	0
Wastewater Discharge Indicator (toxicity-weighted concentration/m distance)	0	0.04	N/A	13	59	30	40
Demographic Indicators							
Demographic Index	44%	51%	26	47%	47	36%	67
Minority Population	59%	77%	17	59%	49	38%	73
Low Income Population	29%	26%	62	36%	44	34%	46
Linguistically Isolated Population	1%	6%	27	9%	21	5%	48
Population With Less Than High School Education	7%	9%	54	17%	33	13%	38
Population Under 5 years of age	6%	6%	44	7%	43	6%	46
Population over 64 years of age	16%	16%	56	13%	74	14%	67

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: https://www.epa.gov/national-air-toxics-assessment.

For additional information, see: www.epa.gov/environmentaljustice

EJSCREEN is a screening tool for pre-decisional use only. It can help identify areas that may warrant additional consideration, analysis, or outreach. It does not provide a basis for decision-making, but it may help identify potential areas of EJ concern. Users should keep in mind that screening tools are subject to substantial uncertainty in their demographic and environmental data, particularly when looking at small geographic areas. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports. This screening tool does not provide data on every environmental impact and demographic factor that may be relevant to a particular location. EJSCREEN outputs should be supplemented with additional information and local knowledge before taking any action to address potential EJ concerns.

geometrician
ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 969-7090 PO Box 396 Hilo Hawaii 96721 rterry@hawaii.rr.com

November 2, 2017

Laura Leialoha Phillips McIntyre, AICP
Environment Planning Office Manager
Hawai'i DOH Environmental Health Administration
919 Ala Moana Blvd, Suite 312
P.O. Box 3378
Honolulu HI 96814

Dear Ms. McIntyre:

SUBJECT: COMMENT TO DRAFT ENVIRONMENTAL ASSESSMENT FOR WAIAHA TRANSMISSION WATER LINE, TMKS: 7-5-014:002, 003, 006, 016 AND 027; 7-5-015:015 AND 7-5-013:027; AND R.O.W. OF MĀMALAHOA HIGHWAY WITHIN PLATS 7-5-012, 013, 014 & 016, NORTH KONA DISTRICT, HAWAI'I ISLAND, STATE OF HAWAI'I

Thank you for your comment letter dated August 31, 2017, urging the Department of Water Supply (DWS) to consider health from a broad perspective, and referring us to websites providing DOH standard comments, the eGIS website, the Hawai'i Environmental Portal, the EPA EJSCREEN, Clean Water Branch Administrative Rules, Wastewater Branch Rules, and the OEQC website.

During EA development, many of these sources were consulted, and the website from the HEER office provided important information on the potential for hazardous materials. It should be noted that no wastewater is involved in the project. Extensive erosion and sedimentation prevention measures along with other measures to protect water quality will be developed and implemented as part of grading and NPDES permits. During construction, the contractor will be required to consult with the Department of Health, and, if appropriate, obtain a permit per Title 11, Chapter 46, HAR (Community Noise Control), and also to conduct all work in conformance with Chapter HAR 11-60.1 (Fugitive Dust). Solid waste will be managed in conformance with all regulations.

We very much appreciate your review of the document. If you have any questions about the EA, please contact me at (808) 969-7090. For questions concerning the project, please contact Mr. Gerald Yorita at (808) 961-7248.

Sincerely,

Ron Terry

Ron Terry, Principal
Geometrician Associates

Cc: Gerald Yorita, DWS; Terry Nago, Okahara and Associates

Harry Kim
Mayor

Paul K. Ferreira
Police Chief

Kenneth Bugado, Jr.
Deputy Police Chief

County of Hawai'i

POLICE DEPARTMENT
349 Kapi'olani Street • Hilo, Hawai'i 96720-3998
(808) 935-3311 • Fax (808) 961-2389

August 31, 2017

Mr. Ron Terry
Principal
Geometrician Associates LLC
P.O. Box 396
Hilo, HI 96721

SUBJECT: PROJECT NAME: WAIAHA TRANSMISSION WATER LINE
ISLAND: HAWAI'I
DISTRICT: NORTH KONA
TMK: (3RD) -5-014:002, 003, 006, 016 AND 027; 7-5-015 AND 7-5-013:027; AND ROW OF MĀMALAHOA HIGHWAY WITHIN PLATS 7-5-012, 013, 014 & 016

Dear Mr. Terry:

This is in response to your letter regarding a request for comments on the Draft Environmental Assessment (DEA) and Anticipated Finding of No Significant Impact (FONSI) for the Waiaha Transmission Water Line project in the North Kona District.

Thank you for allowing the Hawai'i Police Department the opportunity to make comments regarding this project. At this time, the Hawai'i Police Department has no comments.

Should you have any questions or concerns, please contact Captain Gilbert Gaspar Jr., Commander of the Kona District, at 326-4646, extension 299.

Sincerely,

PAUL K. FERREIRA
POLICE CHIEF

MITCHELL KANEHAILUA JR.
ASSISTANT POLICE CHIEF
AREA II OPERATIONS

GG/jaj
RS160728

c: Mr. Gerald Yorita, Department of Water Supply

geometrician

ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 969-7090 PO Box 396 Hilo Hawaii 96721 rterry@hawaii.rr.com

November 2, 2017

Paul K. Ferreira, Chief
Hawai'i County Police Department
349 Kapiolani Street
Hilo HI 96720

Dear Mr. Ferreira:

SUBJECT: COMMENT TO DRAFT ENVIRONMENTAL ASSESSMENT FOR WAIAHA TRANSMISSION WATER LINE, TMKS: 7-5-014:002, 003, 006, 016 AND 027; 7-5-015:015 AND 7-5-013:027; AND R.O.W. OF MĀMALAHOA HIGHWAY WITHIN PLATS 7-5-012, 013, 014 & 016, NORTH KONA DISTRICT, HAWAI'I ISLAND, STATE OF HAWAI'I

Thank you for your comment letter on the Draft EA dated August 31, 2017, in which you stated that at this time, the Police Department does not have any comments.

We very much appreciate your review of the document. If you have any questions about the EA, please contact me at (808) 969-7090. For questions concerning the project, please contact Mr. Gerald Yorita at (808) 961-7248.

Sincerely,

Ron Terry

Ron Terry, Principal
Geometrician Associates

Cc: Gerald Yorita, DWS; Terry Nago, Okahara and Associates

Harry Kim
Mayor

Wil Okabe
Managing Director

Allan G. Simeon
Deputy Director

County of Hawai'i
DEPARTMENT OF PUBLIC WORKS
Aupuni Center
101 Pauahi Street, Suite 7 · Hilo, Hawai'i 96720-4224
(808) 961-8321 · Fax (808) 961-8630
public_works@hawaiicounty.gov

September 28, 2017

Ron Terry, Principal
Geometricians Associates
P.O. Box 396
Hilo, HI 96721

Subject: Draft Environmental Assessment
Waiaha Transmission Waterline
TMKs: 7-5-014:002, 003, 006, 016, and 027; 7-5-015:015 and 7-5-013:027: and ROW of Mamalahoa Highway within Plats 7-5-012, 013, 014, & 016
North Kona District, Hawaii Island, State of Hawaii

We received the subject Draft Environmental Assessment and have the following comment:

- Page 9, Section 1.1 and Page 36, Section 3.3 state that "Construction work will be confined to daytime hours from 7:30 am to 3:30 pm." For work within the County Right-of-Way, please be advised that two lanes for traffic movement shall be provided between the hours of 3:30 pm and 8:00 am.
- All work within the flood zone and drainageways shall comply with Chapter 27 of the Hawaii County Code.
- A permit is required for work within the County Right-of-Way per Chapter 22 of the Hawaii County Code. Where longitudinal trenching is proposed within any existing County road, we will require cold-planing and resurfacing of the entire lane trenched or damaged by the project.

If you have any questions, please contact Natalie Whitworth of our Kona office at 323-4853.

Natali Whitworth
for Ben Ishii, Division Chief
Engineering Division

NW

copy: DPW ENG-HILO/KONA

County of Hawai'i is an Equal Opportunity Provider and Employer.

geometrician
ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 969-7090 PO Box 396 Hilo Hawaii 96721 rterry@hawaii.rr.com

November 2, 2017

Ben Ishii, Engineering Division Chief
Hawai'i County Department of Public Works
101 Pauahi Street, Suite 7
Hilo HI 96720-4224

Dear Mr. Ishii:

SUBJECT: COMMENT TO DRAFT ENVIRONMENTAL ASSESSMENT FOR WAIAHA TRANSMISSION WATER LINE, TMKS: 7-5-014:002, 003, 006, 016 AND 027; 7-5-015:015 AND 7-5-013:027; AND R.O.W. OF MĀMALAHOA HIGHWAY WITHIN PLATS 7-5-012, 013, 014 & 016, NORTH KONA DISTRICT, HAWAI'I ISLAND, STATE OF HAWAI'I

Thank you for your comment letter on the Draft EA dated September 28, 2017. In response to your individual comments:

1. Two lanes of traffic shall be provided between the hours of 3:30 pm and 8:00 am. This requirement has been written into the contract specifications.

2. Work within drainageways shall comply with Chapter 27 of the Hawaii County Code. The Department of Water Supply (DWS) will ensure that the work so complies.

3. Permit for work within the County right-of-way, per Chapter 22 of Hawaii County Code. The DWS will apply for the permit and will ensure that the stated conditions are implemented.

The requirements listed in your letter have been added to the Final EA. We very much appreciate your review of the document. If you have any questions about the EA, please contact me at (808) 969-7090. For questions concerning the project, please contact Mr. Gerald Yorita at (808) 961-7248.

Sincerely,

Ron Terry

Ron Terry, Principal
Geometrician Associates

Cc: Gerald Yorita, DWS; Terry Nago, Okahara and Associates

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE
MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

September 22, 2017

Geometrician Associates, LLC
Attention: Mr. Ron Terry
P.O. Box 396
Hilo, Hawaii 96721

via email: rterry@hawaii.rr.com

Dear Mr. Terry:

SUBJECT: Draft Environmental Assessment for **Waiaha Transmission Water Line**, North Kona, Island of Hawaii; TMK: (3) 7-5-014:002, 003, 006, 016, and 027; (3) 7-5-015:015; and (3) 7-5-013:027; and Right of Way of Mamalahoa Highway within Plats 7-5-012, 013, 014, and 016

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

At this time, enclosed are comments from the (a) Engineering Division and (b) Land Division – Hawaii District on the subject matter. Should you have any questions, please feel free to call Darlene Nakamura at (808) 587-0417. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosures
cc: Central Files
Hawaii County Department of Water Supply (w/copy)
Attn: Mr. Gerald Yorita (via email: gyorita@hawaiidws.org)

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

'17 SEP 14 PM 12:41
DEPT. OF LAND & NATURAL RESOURCES STATE OF HAWAII
RECEIVED LAND DIVISION
'17 SEP 08 PM 12:08 ENGINEERING

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

September 8, 2017

MEMORANDUM

TO: **DLNR Agencies:**
__Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
From: X Engineering Division
__Div. of Forestry & Wildlife
__Div. of State Parks
X Commission on Water Resource Management
__Office of Conservation & Coastal Lands
X Land Division – Hawaii District
X Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Draft Environmental Assessment for **Waiaha Transmission Water Line**
LOCATION: North Kona, Island of Hawaii; TMK: (3) 7-5-014:002, 003, 006, 016, and 027; (3) 7-5-015:015; and (3) 7-5-013:027; and Right of Way of Mamalahoa Highway within Plats7-5-012, 013, 014, and 016
APPLICANT: Geometrician Associates on behalf of Hawaii County Department of Water supply

Transmitted for your review and comment is information on the above-referenced subject matter. We would appreciate your comments on this project which can be found at:

1. https://hawaiioimt.sharepoint.com/sites/dlnr-ld (using the Chrome browser)
2. Username: your Hawaii.gov email address
3. Password: outlook password (if you do not know it, please contact IT by email to reset and get a password)
4. Click on: Request for Comments, then click on the subject link. Please contact Quoc Le at (808) 587-0423 or quoc.le@hawaii.gov if there are any issues accessing the document.

Please submit any comments by **September 20, 2017**. If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Darlene Nakamura at 587-0417. Thank you.

Attachments

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

Signed: _____

Print Name: Carty S. Chang, Chief Engineer

Date: 9/12/17

cc: Central Files

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

2017 SEP 11 P 2: 14

RECEIVED
LAND DIVISION
HILO, HAWAII

September 8, 2017

MEMORANDUM

From
To:

DLNR Agencies:
__Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
X Engineering Division
__Div. of Forestry & Wildlife
__Div. of State Parks
X Commission on Water Resource Management
__Office of Conservation & Coastal Lands
X Land Division – Hawaii District
X Historic Preservation

To:

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Draft Environmental Assessment for **Waiaha Transmission Water Line**
LOCATION: North Kona, Island of Hawaii; TMK: (3) 7-5-014:002, 003, 006, 016, and 027; (3) 7-5-015:015; and (3) 7-5-013:027; and Right of Way of Mamalahoa Highway within Plats7-5-012, 013, 014, and 016
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1. https://hawaiiolmt.sharepoint.com/sites/dlnr-ld (using the Chrome browser)
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4. Click on: Request for Comments, then click on the subject link. Please contact Quoc Le at (808) 587-0423 or quoc.le@hawaii.gov if there are any issues accessing the document.

Please submit any comments by **September 20, 2017.** If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Darlene Nakamura at 587-0417. Thank you.

Attachments

FAXED
9/20/17 KL

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

Signed: Candace Martin
Print Name: CANDACE MARTIN
Date: 9/19/2017

cc: Central Files

geometrician

ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 969-7090 PO Box 396 Hilo Hawaii 96721 rterry@hawaii.rr.com

November 2, 2017

Russell Y. Tsuji, Administrator
Hawai'i State DLNR Land Division
P.O. Box 621
Honolulu HI 96809

Dear Mr. Tsuji:

SUBJECT: COMMENT TO DRAFT ENVIRONMENTAL ASSESSMENT FOR WAIAHA TRANSMISSION WATER LINE, TMKS: 7-5-014:002, 003, 006, 016 AND 027; 7-5-015:015 AND 7-5-013:027; AND R.O.W. OF MĀMALAHOA HIGHWAY WITHIN PLATS 7-5-012, 013, 014 & 016, NORTH KONA DISTRICT, HAWAI'I ISLAND, STATE OF HAWAI'I

Thank you for your comment letter on the Draft EA dated September 22, 2017, to which memos from two DLNR Divisions were attached. We wish to acknowledge the no-comment memo by the Land Division - Hawai'i District, as well as the no-additional comment memo from the Engineering Division.

We very much appreciate your review of the document, including circulation to various DLNR agencies. If you have any questions about the EA, please contact me at (808) 969-7090. For questions concerning the project, please contact Mr. Gerald Yorita at (808) 961-7248.

Sincerely,

Ron Terry

Ron Terry, Principal
Geometrician Associates

Cc: Gerald Yorita, DWS; Terry Nago, Okahara and Associates

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Environmental Assessment

Waiaha Transmission Water Line

APPENDIX 2
Archaeological Report

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1269-050217

DRAFT

ARCHAEOLOGICAL INVENTORY SURVEY

WAIʻAHA TRANSMISSION WATERLINE

AUHAUKEAʻE 2, PUAʻA 1-3, WAIʻAHA 1-2, AND KAHULUI 1-2

NORTH KONA DISTRICT, ISLAND OF HAWAIʻI

TMK: (3) 7-5-012: PORTIONS 001, 004, 011, 019, 020, 024, 029-031, 036, 039, 040, AND 7-5-016: PORTIONS 019, 020, 022, 023, 025, 029, 032-035, 043, 050, AND 051

HAUN & ASSOCIATES

ARCHAEOLOGICAL, CULTURAL, AND HISTORICAL RESOURCE MANAGEMENT SERVICES

73-1168 KAHUNA AʻO ROAD, KAILUA-KONA HI 96740

PHONE: 808-325-2402 FAX: 808-325-1520

1269-050217

DRAFT

ARCHAEOLOGICAL INVENTORY SURVEY

WAIʻAHA TRANSMISSION WATERLINE

AUHAUKEAʻE 2, PUAʻA 1-3, WAIʻAHA 1-2, AND KAHULUI 1-2

NORTH KONA DISTRICT, ISLAND OF HAWAIʻI

TMK: (3) 7-5-012: PORTIONS 001, 004, 011, 019, 020, 024, 029-031, 036, 039, 040, AND 7-5-016: PORTIONS 019, 020, 022, 023, 025, 029, 032-035, 043, 050, AND 051

Prepared by:

Alan E. Haun, Ph.D.
and
Dave Henry, B.S.

Prepared for:
Ron Terry
PO Box 396
Hilo, HI 96721

May 2017

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MANAGEMENT SUMMARY

Haun & Associates conducted an archaeological inventory survey of a 2.85-acre corridor centered on the right-of-way of Mamalahoa Highway for the installation of a transmission waterline. The corridor is 5,190 ft (1,582 meters) long by 20 ft to 100 ft (6.0 to 30.4 meters) wide and extends through Auhaukea‘e 2, Pua‘a 1-3, Waiaha 1-2, and Kahului 1-2 Ahupua‘a, North Kona District, Hawai‘i Island. The corridor extends through portions of 25 Tax Map Key (TMK) parcels (TMK: [3] 7-5-012: Portions 001, 004, 011, 019, 020, 024, 029-031, 036, 039, 040, and 7-5-016: Portions 019, 020, 022, 023, 025, 029, 032-035, 043, 050, and 051).

The archaeological inventory survey objective is to satisfy current historic preservation regulatory review inventory requirements of the Department of Land and Natural Resources-State Historic Preservation Division (DLNR-SHPD), as contained within Hawai‘i Administrative Rules, Title 13, DLNR, Subtitle 13, Chapters 275 and 276, State Historic Preservation Rules. This AIS report was prepared to record and synthesize the data gathered from background research and field survey.

The survey documented nine sites with ten features. The identified features consist of four culverts, three retaining walls, and three walls. Feature function includes water control (4), livestock control (3) and transportation (3). The sites and features identified during the project are all associated with the historic Mamalahoa Highway.

The nine sites are assessed as significant solely for their information content. The mapping, written description and photography have adequately documented them and no further work or preservation is recommended. The County of Hawai‘i has no plans to impact any of the sites, except the three culverts during the installation of the proposed Wai‘aha Transmission Waterline.

Cover photo: Mamalahoa Highway (view to north)

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INTRODUCTION

At the request of Mr. Ron Terry on behalf of the County of Hawai‘i Department of Water Supply, Haun & Associates completed an archaeological inventory survey (AIS) of a 2.85-acre corridor centered on the right-of-way of Mamalahoa Highway for the installation of a transmission waterline. The corridor is 5,190 ft (1,582 meter) long by 20 ft to 100 ft (6.0 to 30.4 meter) wide and extends through Auhaukea‘e 2, Pua‘a 1-3, Waiaha 1-2, and Kahului 1-2 Ahupua‘a, North Kona District, Hawai‘i Island (**Figure 1**). The corridor extends through portions of 25 Tax Map Key (TMK) parcels (TMK: [3] 7-5-012: Portions 001, 004, 011, 019, 020, 024, 029-031, 036, 039, 040, and 7-5-016: Portions 019, 020, 022, 023, 025, 029, 032-035, 043, 050, and 051; **Figure 2** and **Figure 3**).

The project objective is to comply with historic preservation regulatory review requirements of the Department of Land and Natural Resources-State Historic Preservation Division (DLNR-SHPD), as contained within Hawai‘i Administrative Rules, Title 13, DLNR, Subtitle 13, State Historic Preservation Rules (HAR, Chapters 275 and 276 DLNR 2003). This AIS report was prepared to record and synthesize the data gathered from background research, and field survey. The proposed project will excavate trenches for the installation of a transmission waterline, to be located along the western side of the existing Mamalahoa Highway. The waterline will also be aboveground and will cross three culverts (Sites 30669, 30670, and 30674) on the eastern side above the culvert inlet flow channel. The inlet flow channel side walls will be “notched” to accommodate the waterline and support beam where the waterline transitions from underground to aboveground.

The survey fieldwork was conducted March 2-6, 2017 by Haun & Associates Project Supervisor Solomon Kailihiwa, M.A., and field archaeologist Katelyn Ingersol, B.A., under the overall direction of Dr. Alan Haun. Approximately four person days of labor were required to complete the fieldwork portion of the project. Described in this final report are the project scope of work, field methods, background information, survey findings, and significance assessments of the sites with recommended treatments.

Scope of Work

Based on SHPD rules for inventory surveys the following specific tasks were determined to constitute an appropriate scope of work for the project:

1. Conduct background review and research of existing archaeological and historical documentary literature relating to the project area and its immediate vicinity--including examination of Land Commission Awards, *ahupua’a* records, historic maps, archival materials, archaeological reports, and other historical sources;
2. Conduct a high intensity, 100% pedestrian survey coverage of the project area;
3. Conduct detailed recording of all potentially significant sites including scale plan drawings, written descriptions, and photographs, as appropriate;
4. Conduct limited subsurface testing (manual excavation) at selected sites to determine feature function;
5. Analyze background research and field data; and
6. Prepare and submit Final Report.

Project Area Description

The project area consists of a linear corridor along the Mamalahoa Highway that extends through eight North Kona *ahupua‘a* at elevations ranging from approximately 1,480 to 1,500 ft. The elevations presented in this report are in feet above mean sea level. The corridor originates at the boundary between Kahului 2 and Puapua‘a 1 and extends

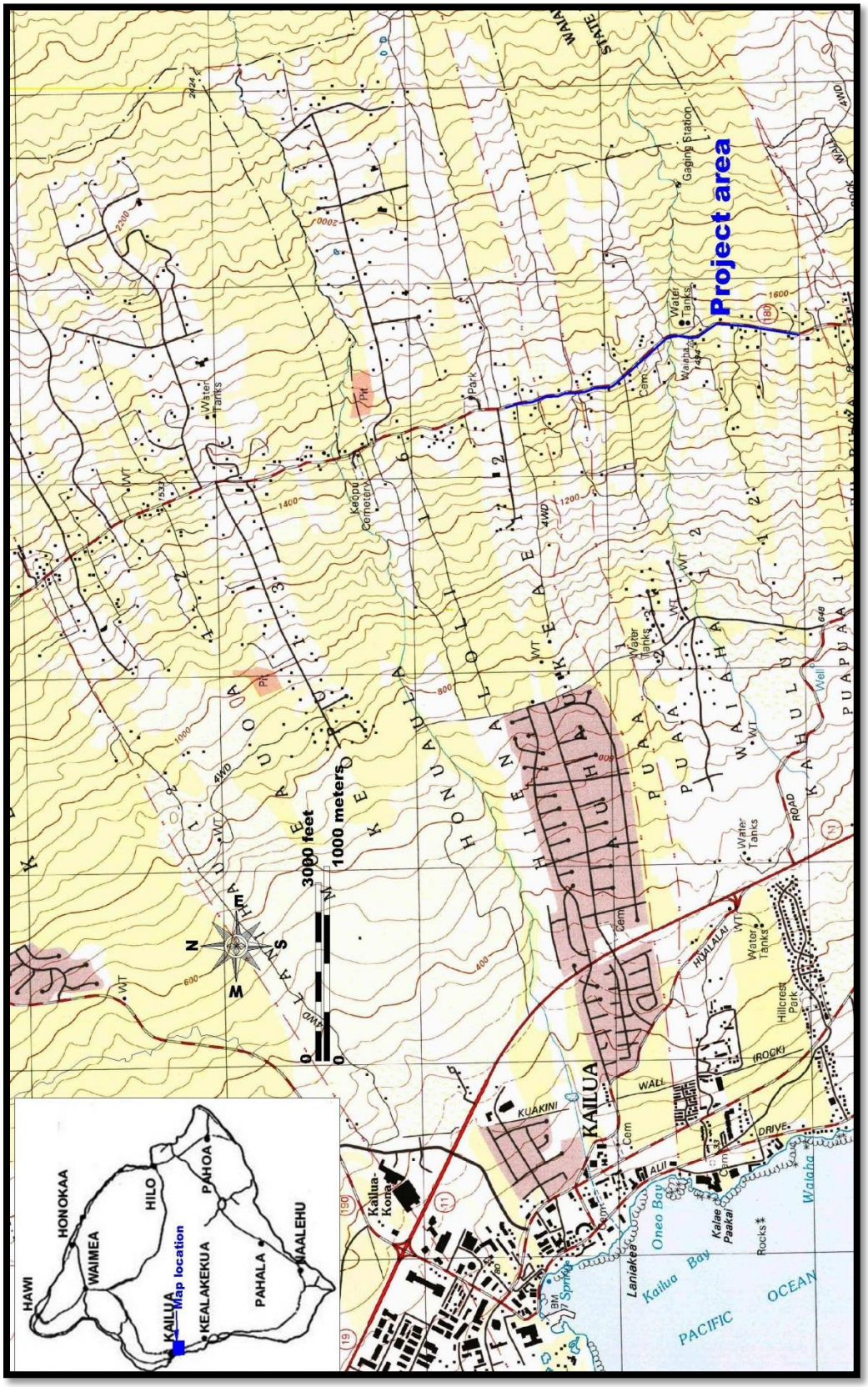

Figure 1. Portion of 1998 USGS 7.5' Kailua Quadrangle showing project area

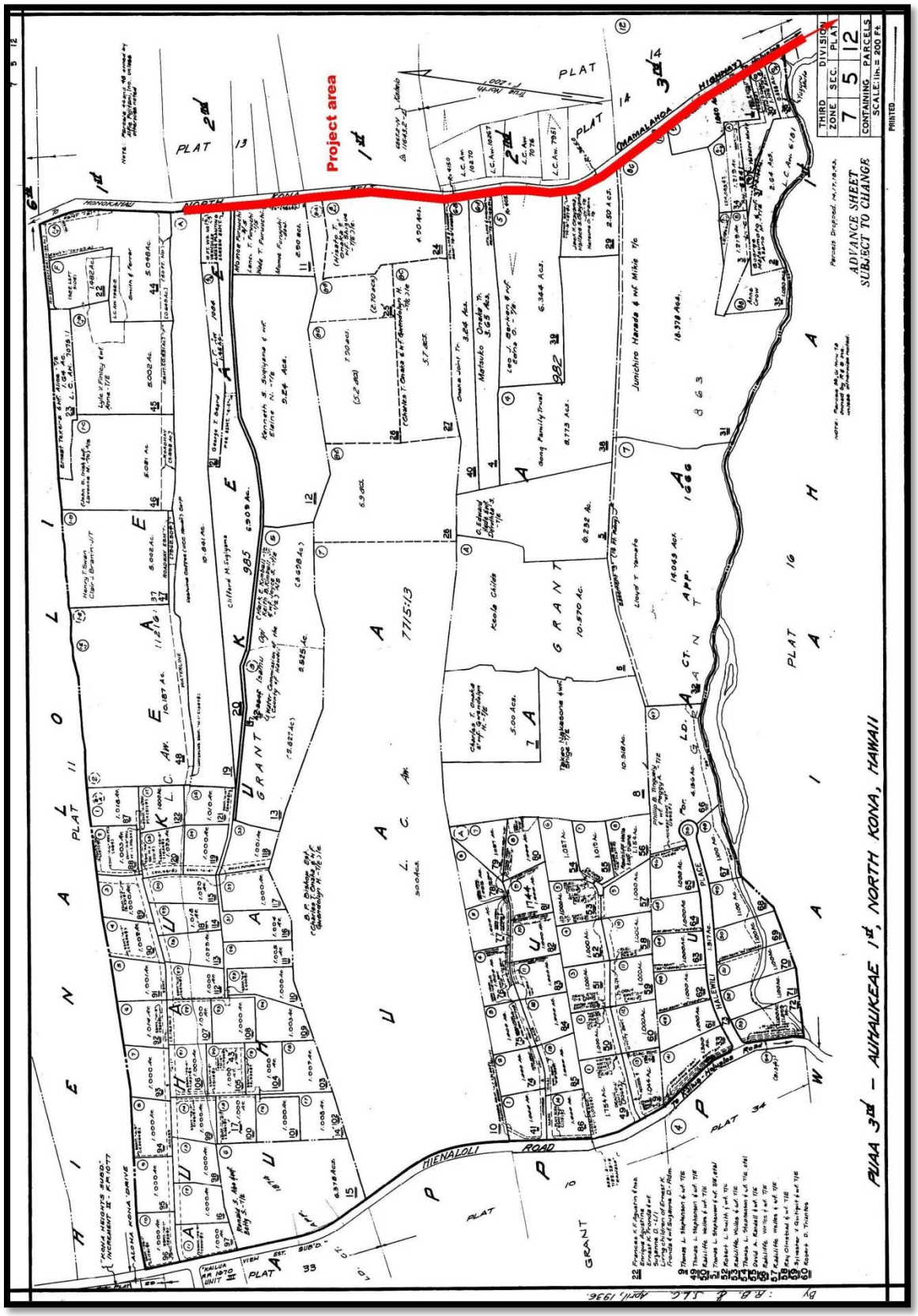

Figure 2. Tax Map Key (3) 7-5-012 showing portion of project area corridor

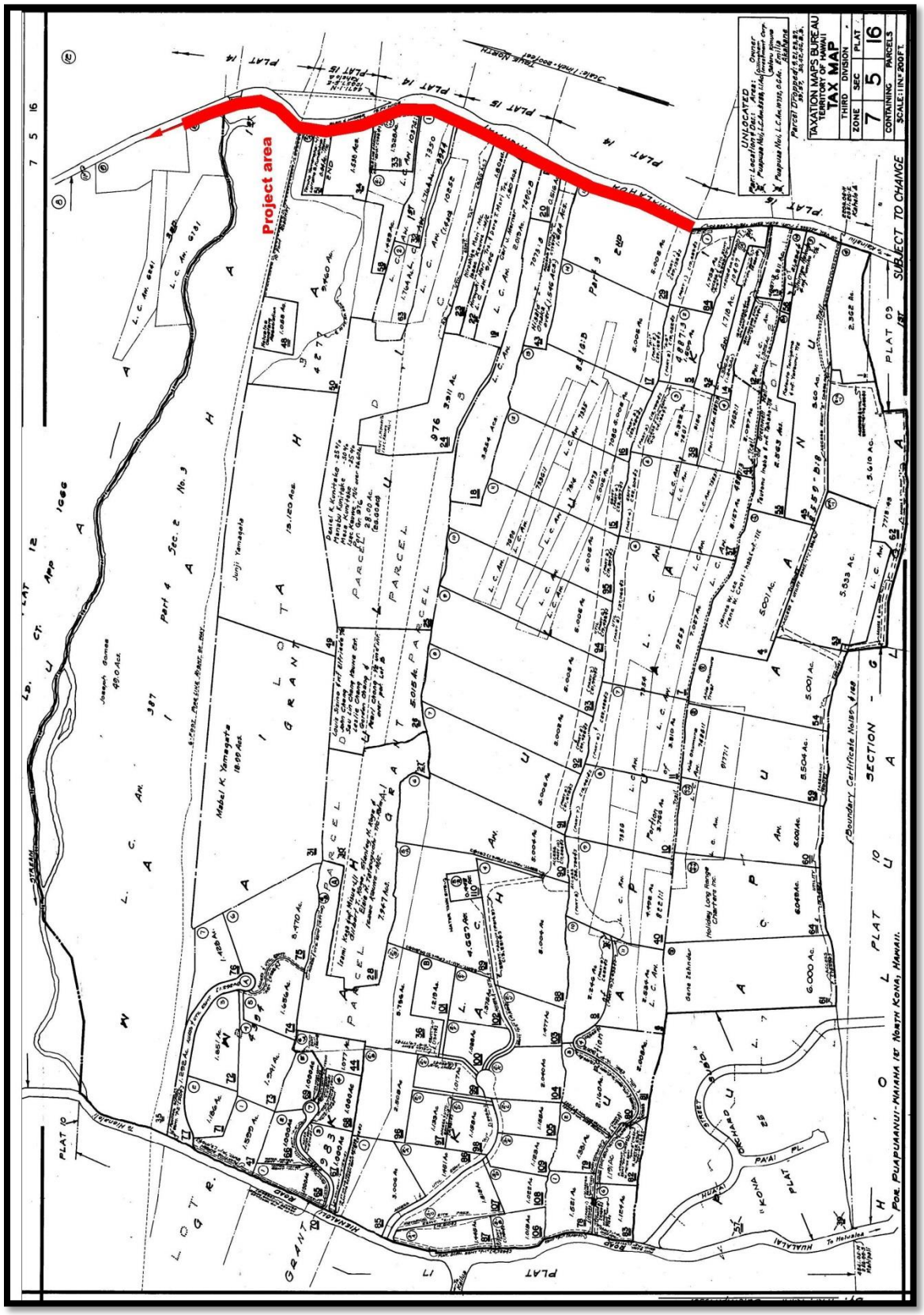

Figure 3. Tax Map Key (3) 7-5-015 showing portion of project area corridor

in a northerly direction for 1,580 meters (0.98 miles), passing through the lands of Kahului 1, Wai‘aha 1-2, and Pua‘a 1-3, terminating in Auhaukea‘e 2 Ahupua‘a (see **Figure 1**). The corridor ranges in width from 20 ft to 100 ft wide (6.0 to 30.4 meters), and extends from the centerline of the Mamalahoa Highway to the west. The project corridor is situated approximately 4,000 to 4,350 meters (2.5 to 2.7 miles) inland from the shoreline at Kailua Bay. The section of the Mamalahoa Highway associated with the present project is located between Palani Junction and the community of Holualoa.

The Wai‘aha Stream drainage extends through the project area corridor in Wai‘aha 1 Ahupua‘a (see **Figure 1**). Three additional, small unnamed seasonal drainages also pass through the project area. No water was present in any of the streams during the current project and no other water sources are present. Annual rainfall in the vicinity of the project area ranges from 750 to 1,350 mm (29.5 to 53 inches; Giambelluca et al. 2013). The mean average temperature in this general area is c. 75 degrees F (Juvik and Juvik 1989:51).

The vegetation along the project area corridor consists of a variety of non-native plants including Christmas berry (*Schinus terebinthifolius*), asparagus fern (*Asparagus setaceus*), *laua‘e* (*Phymatosorus grossus*), ginger (*Alpinia purpurata*), *ti* (*Cordyline fruticosa*), autograph tree (*Clusia rosea*), philodendron (*Monstera deliciosa*), canna lily (*Canna* sp.), dracaena (Dracaena spp.), and various other grasses, ferns and vines. Overviews of the project area corridor are shown on the cover of this report and in **Figure 4** and **Figure 5**.

The project area corridor extends through several soil types (**Figure 6**). The majority of the 1,580 meter long corridor (1,122 meters; 71%) is located in area of Honuaula extremely stony silt clay loam on 12-20% slopes (HVD - Sato et al. 1973:19). This soil is a well-drained, silty clay loam that formed in volcanic ash. It is typified by a thin surface layer of dark brown silt clay loam overlying a subsoil of dark brown cobbly and stony silty clay loam. *A‘ā* lava forms the bedrock substrate in this area. This soil has rapid permeability, slow runoff, and a slight erosion hazard. This soil type is typically used for coffee cultivation and pastureland.

The soil in the remaining portion of the corridor consists of Honaunau extremely rocky silty clay loam (HRD) on 6-20% slopes (237 meters; 15%), and Kona Extremely Rocky Muck (rKYD) on 6-20% slopes (221 meters; 14%). The Honaunau extremely rocky silty clay loam is a well-drained silty clay loam formed in volcanic ash (*ibid:*18). A typical profile is a 6” thick silt loam surface layer over a 20 inch thick silt loam subsoil. The subsoil is underlain by pahoehoe bedrock. Rock outcrops occupy 25-50% of the ground surface. This soil also has rapid permeability, a slow runoff and a slight erosion hazard. It is classified as suitable for pasture and wildlife habitat.

The Kona Extremely Rocky Muck is typified by a 5 inch thick layer of very dark brown muck over pahoehoe bedrock (*ibid:*32). It is classified as suitable for pasture and for watershed and exhibits a rapid permeability, a medium runoff and a slight erosional hazard (Sato et al. 1973: 32). The underlying lava originated from Hualalai Volcano, deposited more than 10,000 years ago (Wolfe and Morris 2001:12 and Sheet 1).

Figure 4. Project area overview (view to north)

Figure 5. Project area overview (view to northwest)

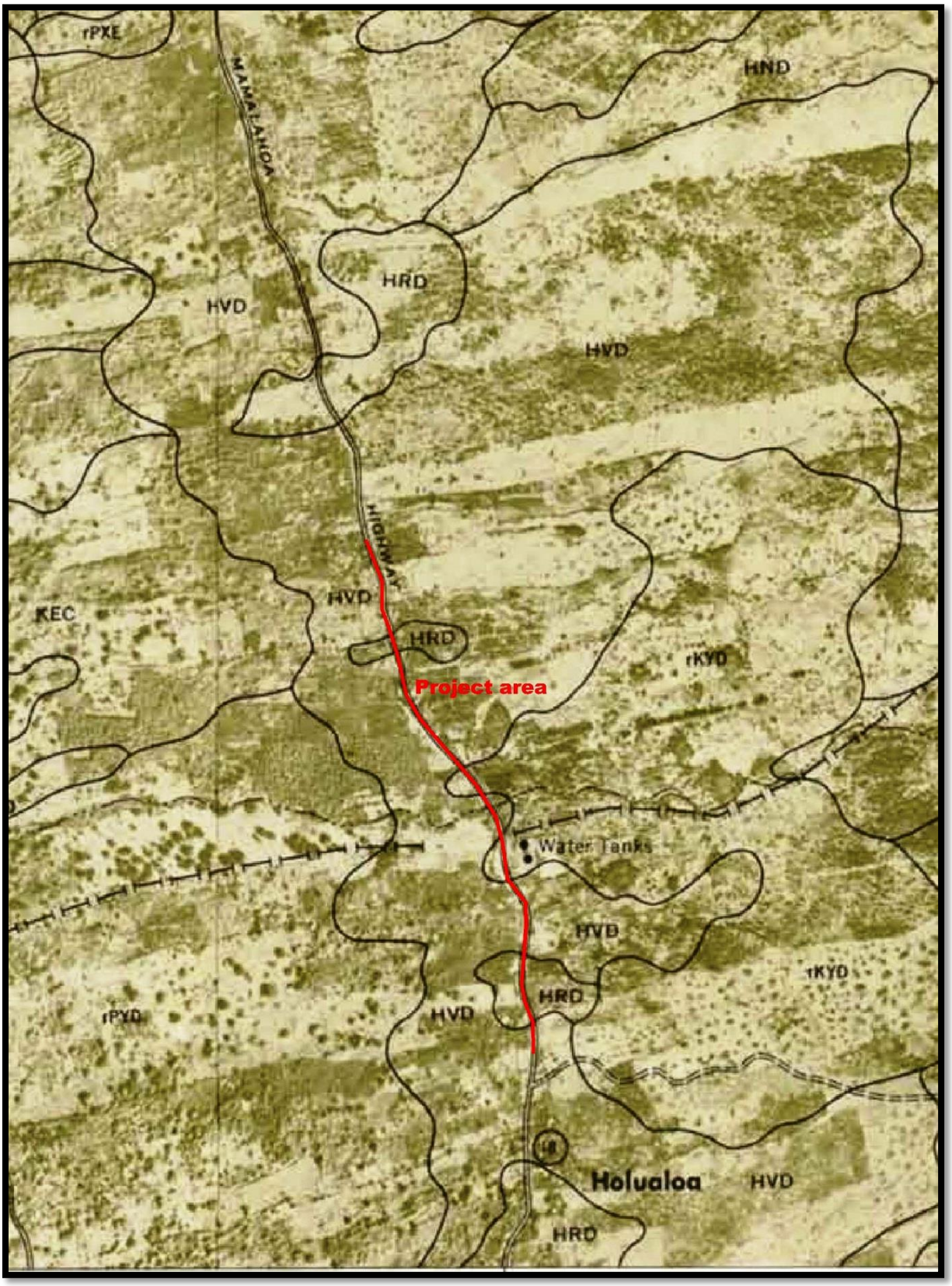

Figure 6. Portion of Sato et al.'s (1973) Sheet 85 soil map

Methods

The project area was subjected to a 100% surface examination with the surveyors walking transects at 3-5 meter intervals. Ground surface visibility throughout the parcel was excellent. The features identified during the survey were flagged with pink and blue flagging tape and their locations were determined with the aid of a Garmin Global Positioning System (GPS) Model 60-series device using the North American Datum (NAD) 1983 datum. The accuracy of the GPS device for a single point is +/- 3-5 m. This accuracy is increased to approximately 2-3 meters by taking multiple points including property corners and overlying the plotted points on a scaled map using AutoCAD software. A metal site tag inscribed with the project and site information was placed at each site, in the location where the GPS points were taken. The location of these site tags are depicted as a “datum” on the site maps presented in the following Findings section.

The boundary for most of the sites was defined based on proximity and probable age. Features that are likely of similar age and are less than 15 meters apart are considered to be one site. Detailed plan maps were made for half of the sites, created with hand held tapes and compasses. Exceptions consist of isolated sections of stone walls (Sites 30668 and 30675) or retaining walls (Sites 30671, 30672, and 30673). All of the sites were documented with the completion of standardized site and feature forms and photographic documentation. No subsurface testing was conducted and no cultural material was recovered for analysis.

ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

Historical Documentary Research

The project area corridor extends through eight North Kona *ahupua‘a,* consisting of Auhaukea‘e 2, Pua‘a 1-3, Wai‘aha 1-2, and Kahului 1-2 (**Figure 7**). Auhaukea‘e references a Kona land division and an ancient surfing spot and Wai‘aha is literally translated as “gathering water” according to Pukui and Elbert (Wehewehe.org). Kahului is literally translated as “the winning” (Pukui et al. 1976) and Puapua’a is translated as “piglet” (Pukui and Elbert 1986; Wehewehe.org). The place name for Puapua‘a derives from the “supposed resemblance of two large rocks to pigs” (Pukui et al. 1976:192). No reference to the translation of Pua‘a was found.

One reference cited by Maly (1996) notes that the *ahupua’a* from Lanihau to Puapua’a, including the project area corridor, provided the food and natural resources to support a 13th century high chief named Pili-a-Ka’aiea (Pili). Maly translated portions of *Ka 'ao Ho’oniua Pu’uwai No Ka-Miki* (The Heart Stirring Story of *Ka-Miki)* a legendary account of two supernatural brothers, *Ka-Miki* and *Maka –’iole*), who traveled around the island of Hawai'i. The account was published in serial form between 1914 and 1917 in a Hawaiian newspaper, *Ka Hoku o Hawai’i*. According to Maly, the account was recorded by Hawaiian historians John Wise and J.W.I. Kihe. Based on Maly’s translation and study of the account:

> The story is set in about the 13th century, in the time of *Pili-a-Ka'aiea (*Pili), sovereign chief of all Kona, the narrative identifies the lands between Lanihau (Kailua) and Puapua'a as an integral component of Pili's royal domain. Pili was a great advocate of contests in debating, fighting, and contests of physical strength, and Hinakahua at Puapua'a was the site of the chief s longhouses and contest field, which supported these activities. While Pili was at Hinakahua he was supported by the agricultural and natural resources of the surrounding ahupua’a*,* including Kahului, Wai'aha, Pua 'a, Auhaukea'e, Hinaloli (Hienaloli), Honua'ula, Keopu, Moeauoa, and Lanihau. Pili's royal compound was at Niumalu, his canoe fleets were harbored at Oneo, and his wealth-houses (where tribute was kept until it was needed) were situated at Ahu'ena (Lanihau). (Maly 1996:A-2)

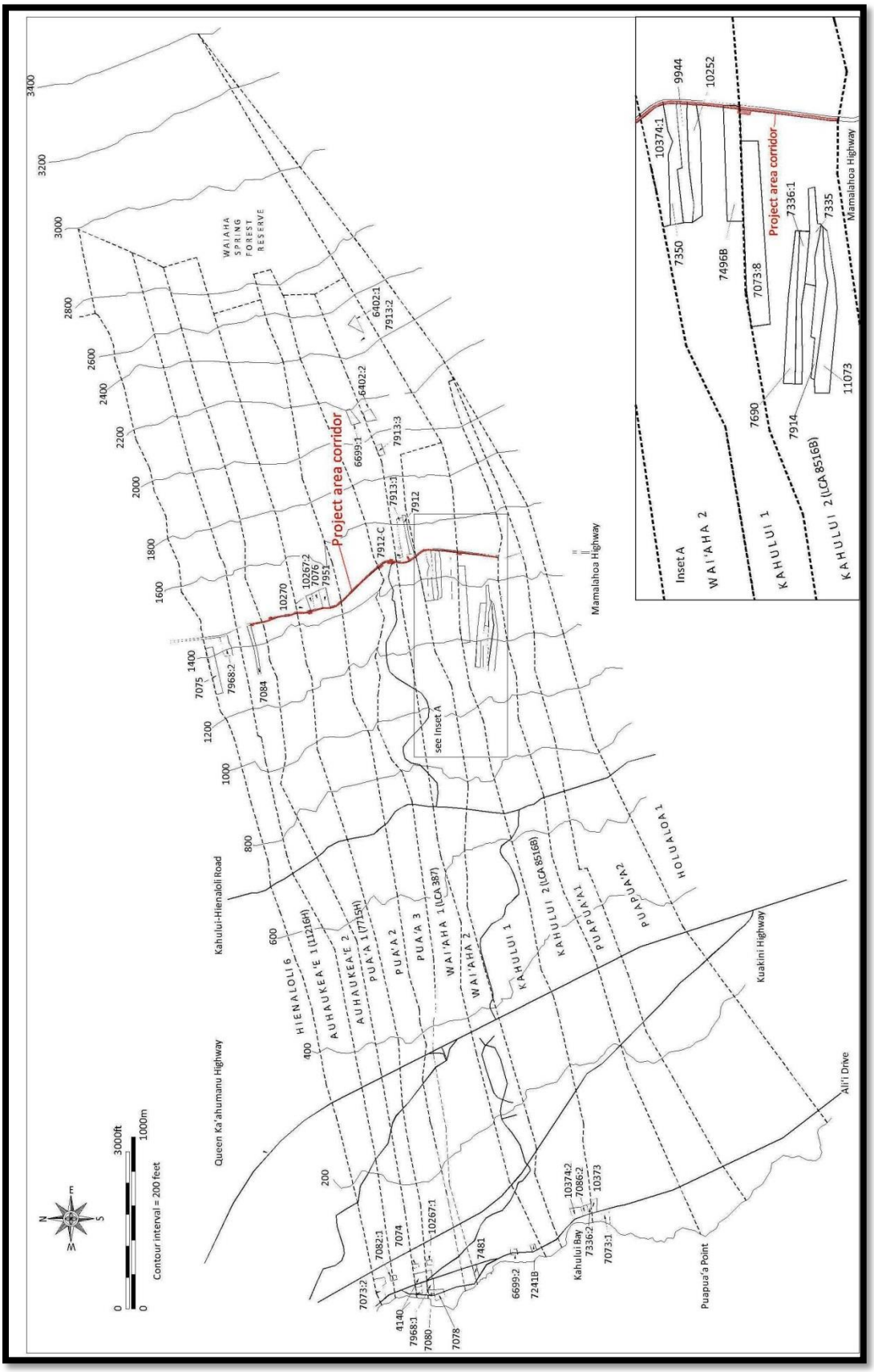

Figure 7. Ahupua'a boundaries and Land Commission Awards

Early events documented in the Kona regional traditional history are associated with 'Umi-a-Liloa. Hawai'i was first unified under the rule of 'Umi-a-Liloa's father and Kona was selected as a dwelling place of chiefs (Kamakau 1961). The area lies within the realm of the traditional Hawaiian political authority that was centered in the Kailua-Keauhou area from at least the 15th century to the reign of Kamehameha I. With the arrival of Kamehameha I and his court in Kona, the area between Kamakahonu (on the north side of the present-day Kailua pier) and Puapua'a became an extended royal center, a hub of activity that focused on the support of the king and his large court. According to Kamakau (1961:221-222):

> …at Kamakahonu could be seen at night the sparkle of lights reflected in the sea like diamonds, from the homes of the chiefs from Kahelo [in Puapua'aiki] to Lanihau. The number of chiefs and lesser chiefs reached into the thousands.

The earliest detailed historic account of the area south of Kailua Town including the project area *ahupua'a* comes from English missionary William Ellis who visited the area in 1823.

> Leaving Kairua [Kailua], we passed through the villages thickly scattered along the shore to the southward. The country around looked unusually green and cheerful, owing to the frequent rains, which for some months have fallen on this side of the island. Even the barren lava, over which we traveled, seemed to veil its sterility beneath frequent tufts of tan waving grass, or spreading shrubs and flowers.
>
> The sides of the hills, laid out for a considerable extent in gardens and fields, and generally cultivated with potatoes, and other vegetables, were beautiful.
>
> The number of heiaus, and depositories of the dead, which we passed, convinced us that this part of the island must formerly have been populous. The latter were built with fragments of lava, laid up evenly on the outside, generally about eight feet long, from four to six broad, and about four feet high. Some appeared very ancient, others had evidently been standing but a few years.
>
> At Ruapua [Puapua'a] we examined an interesting heiau, called Kauaikaharoa, built of immense blocks of lava and found its dimensions to be 150 feet by 70. At the north end was a smaller enclosure, sixty feet long and ten wide, partitioned off by a high wall, with but one narrow entrance. The places where the idols formerly stood were apparent, though the idols had been removed. (Ellis 1963:72-3)

Schilt (1984) summarized Kailua's early historic period. In the late 1700s to early 1800s, Kamehameha monopolized foreign commerce including the provisioning of trading and whaling ships and beginning in 1811 the sandalwood trade. The first missionaries arrived in Kailua in 1820, but only stayed a few months. They returned in 1823 and were given land to establish missions and by 1825 schools. The gradual shift from subsistence farming to a market economy began with the introduction of coffee, corn, pumpkins, cotton, pineapple, and Irish potatoes in the 1820s to 1840s. Introduced early historic crops cultivated in the vicinity of Kailua below 500 ft elevation included melons, cabbage, onions, oranges, and tobacco. The introduction of cattle ranching and commercial coffee production in the mid-1800s caused further change to the traditional agricultural system.

Cattle ranching in Kona began in the early 1900s although free ranging cattle became a problem in the area soon after they were introduced. According to Kelly:

> Cattle, introduced to Kona by Vancouver in 1794, became a nuisance later, when their numbers increased. They fed on grass of the *kula* and from time to time on the thatch of Hawaiian homes

> and on vegetables in their gardens. The open upland fields, bounded only by low earth and stone walls, were in full cultivation in the 1850s. (Kelly 1983:76)

In the 1840s, political acts of the Hawaiian Kingdom government would change the land tenure system in Hawai‘i. All lands were segregated into one of three categories: “Crown Lands” owned by the occupant of the throne, “Government Lands” controlled by the state, and “*Konohiki* Lands” controlled by the chiefs; and “were all subject to the rights of native tenants” (Chinen 1958:29, Beamer 2014:143). In 1846, King Kamehameha III appointed a Board of Commissioners commonly known as the Land Commissioners, to “confirm or reject all claims to land arising previously to the 10th day of December, AD 1845.” Notices were frequently posted in *The Polynesian* (Moffat and Kirkpatrick 1995); however, the legislature did not acknowledge this act until June 7, 1848 (Chinen 1958:16; Moffat and Kirkpatrick 1995:48-49) and the act is known today as *The Great Māhele*. In 1850, the Kingdom government passed laws allowing foreigners to purchase fee simple lands (Speakman 2001:91). The Kuleana Act of 1850 allowed for fee simple land ownership by commoners.

The Waihona ‘Aina (2000) Māhele Database; which is a compilation of data from the Indices of Awards (Indices 1929), Native Register (NR n.d.), Native Testimony (NT n.d.), Foreign Register (FR n.d.) and Foreign Testimony (FT n.d.); lists 52 Land Commission Award (LCA) parcels that were claimed in the project area *ahupua‘a.* These LCAs are summarized in **Table 1** and the location of the majority is shown on **Figure 7**. The Waihona ‘Aina (2000) Māhele Database provides information on the LCAs.

Of the 52 claims, only 38 were subsequently awarded. These consist of eight awarded claims in Auhaukea‘e, eight in Pua‘a, seven in Waiaha, and 15 in Kahului. During the Māhele, the entire *ahupua‘a* of Auhaukea‘e 1 was awarded to Mikahela Kekauonohi as LCA 11216H. Mikahela was a Hawaiian high chiefess, the granddaughter of Kamehameha I, and one of the wives of Kamehameha II (Kame‘elehiwa 1992).

Lot Kapuāiwa (also known as Kamehameha V) ruled the Hawaiian Islands between 1863 and 1872, and was awarded the entirety of Pua‘a 1 as LCA 7715H. The majority of the *ahupua‘a* of Wai‘aha 1 was awarded to physician Seth Andrews as LCA 387, and Grace Kama‘iku‘i Rooke, daughter of John Young and Mary Kuamo‘o, was awarded the entire *ahupua‘a* of Kahului (LCA 8516B).

The awarded *kuleana* parcels range from 0.06 to 334 acres in area with an average of 7.14 acres. Excluding the large *ahupua‘a* claims, the average awarded parcel is 1.2 acres. The claim testimonies refer to 101 cultivated areas referenced as either *kihapai, mala,* patches or other cultivated areas. In several cases the plots are described by reference to the Kona Field System zone where they were situated (*kula or apa‘a*). Named crops include potatoes and taro. The claims mention a total of 26 house lots with at least 17 houses. Of the 26 house lots, ten were enclosed by stone walls.

The awarded *kuleana* LCA parcels are clustered in two areas: near the ocean along the inland and seaward sides of the coastal road, or along the inland and seaward sides of the Mamalahoa Highway Road at elevations ranging from approximately 1,100 and 1,650 ft (see **Figure 7**). Most of the coastal parcels were house lots. Five of the awarded claims are located above 1,900 ft elevation.

There are six of the awarded claims that consist of a coastal lot and an associated upland lot (LCA 6699, 7073, 7336, 7968, 10267, and 10374). This pattern of coastal house lots and associated upland agricultural parcels is seen throughout the Kona region. This coastal/upland relationship is described by Borthwick et al. (1997:10) below:

> This Mahele induced pattern reflects the traditional Hawaiian settlement pattern where permanent habitation was concentrated at the coast and subsistence oriented agricultural pursuits extend up slope in a zonal pattern based on the correlation between rainfall and elevation. Traditionally there was a continuum of utilization through the zones (Kula, Kalu'ulu,

Table 1. Land Commission Awards

LCA	Claimant	Ahupua`a	Ili	Land Use	Date Rec'd	Giver	Acreage	Royal Patent	Sources	Comment
387	Seth Andrews	Waiaha 1	-	Majority of ahupua'a - 1 house lot and cow yard	N/D	N/D	N/A		NR 45-50v2, NT 140v4	
2292*	Kamanawa, wahine	Auhaukea'e	entire ahupua'a	N/D	N/D	N/D	0.00		NR 433v3	awarded land under LCA 4140
		Pua'a	entire ahupua'a	N/D						
3479*	Ioane Kalama	Pua'a 2	Kaawa	house lot, wife's grave	N/D	parents	0.00		NR 169v8	
4113*	Kahue	Auhaukea'e 2	Ililoa	2 cultivated kihapai	Kam 1 times	Kamanawa	0.00		NR 172v8, NT 672v8	
4140	Kamanawa, wahine	Auhaukea'e		house lot	Kam 1 times	father	0.00		NR 384v8, FT 509, 510v3, NT 557v8	
		Auhaukea'e		enclosed lot						
		Pua'a	N/D	house lot, 3 houses	Kam 1 times	father	2.10	2152	NR 141v8, NT 501v4, 646v8	awarded two apana in Pua'a
		Auhaukea'e		house lot in upland						
6376*	Lono	Waiaha	-	House lot	N/D	N/D	0.00		N/D	
6699	Lumaawe	Waiaha 1	Puuko	5 sections of cultivated land and one house lot with 2 houses and 1 enclosure			0.75		NR 413-414v8	
			Muku	2 kihipai			0.25			
6402	Kanahele	Waiaha 2	-	1 section of cultivated land *mauka*			0.8		NR 413v8	
				2 house lots			0.77			
7073	Kapae	Auhaukea'e	Inaimoa, Kamuku	house lot (enclosed)	N/D	Kealoha	1.92		NR 414v8, NT 501v4, 646v8	
7074	Kanewahilani	Pua'a 1	N/D	house lot (enclosed) 3 houses	1845	Punohu	0.18		NR 416v4, NT 535v4	
				house lot (enclosed) no house						
7075	Kaiamakini	Auhaukea'e	Kaleokane	5 cultivated kihapai	Kam 1 times	parents	2.28	8527	NR 416v4, NT 852v7	Kapae was schoolteacher, Awarded 1 apna each in Hienaloli and Auhaukea'e - Kaluulu Zone of Kona Field Sys
		Auhaukea'e	Kaleokane	2 uncultivated kihapai						Kaluulu Zone of Kona Field System (KFS)
		Auhaukea'e	Kaleokane	4 uncultivated kihapai						Kaluulu Zone of KFS
		Auhaukea'e	Kaleokane	potato patch, 5 cultivated kihapai						Apaa Zone of KFS
		Hienaloli 6	N/D	house lot, 2 houses (enclosed)	Kam I times					
7076	Kupihe	Pua'a 2	Ohiki	Kaluulu kihapai	N/D	grandparents	1.10	6105	NR 416v8, NT 512v4	claim mentions 4 parcels
7078	Keulua	Pua'a 2	N/D	house lot (enclosed)	Kam 1 times	parents	0.76	4357	NR417v4, NT 561v4	
7080	Kahaulelio	Pua'a 1	N/D	house lot	N/D	parents	0.18	8521	NR 417v4, NT 558v4	
7082	Keakuakoa	Auhaukea'e 2	Ililoa	house lot (enclosed), cultivated parcels	1825	Manahou	1.92	6445	NR 418v4, NT553v4	awarded 2 apana in Auhaukea'e
7083**	Kaulua	Kahului 1	N/D	house lot (enclosed)	1839	Lumaawe	0.25	none	NR 418v8, NT 513v4	
7084	Kailikulani	Auhaukea'e 2	N/D	house lot (makai)	1846	Kuahine	1.60	4961	NR 419v8, NT 513v4	awarded 1 apana in Auhaukea'e
		Auhaukea'e 2	N/D							
		Auhaukea'e 2	N/D							
		Auhaukea'e 2	N/D							
		Auhaukea'e 2	N/D							
		Auhaukea'e 2	Kamuku							
		Pua'a 1	N/D							
7086	Kalawa	Kahului 2	N/D	N/D	Kam I times	ancestor	1.30	none	NR 419v8, NT 557v4	unclear which parcels awarded
		Kahului 2	Puki	uncultivated kihapai						
		Kahului 2	Puki	cultivated kihapai						
		Kahului 1	Puki	house lot, 2 houses			0.27	5225		

** = Claim not awarded and not depicted on LCA map*

*** = Claim awarded but not depicted on LCA map*

Table 1. Land Commission Awards (cont.)

LCA	Claimant	Ahupua`a	Ili	Land Use	Date Rec'd	Giver	Acreage	Royal Patent	Sources	Comment
7241B	Kalama	Kahului 1	Halewaawaa		N/D	Nalawaia			NR 419v8, NT 514v4	
				cultivated land						
				cultivated land						
7335	Kaanaana	Kahului 2	Kikiaiole		1840	parents	1.20	7066	NR 423v8, NT 499v4	unclear which parcel awarded
				uncultivated kihapai						
				cultivated kihapai						
				cultivated land						Kaluulu to Manuwa
7336	Kuapuu	Kahului 2	Kikiaiole		Kam I times	wife's parents	1.35	3740	NR 424v8, NT 500v4	awarded 2 apana
				house lot (enclosed)						
				cultivated kihapai						
				N/D						
				N/D						
				N/D						
				cultivated kihapai						
				partialy cultivated kihapai						
7350 (In project area)	Kialoa	Kahului 1	N/D	15 patches	1844	konohiki	1.65	7059	NR 262v8, NT 671v8	
7481	Kalae	Waiaha 1	Kamuku	2 partially cultivated land sections	N/D	N/D	1.61	3682	NR 442v8	
7469B (In project area)	Keaweehu	Kahului 1	Papalua		1848	Ipunui	1.90	6277A	NR 444v8, NT 515v4	
				cultivated land						
				partially cultivated land						
				cultivated land						
7690	Kulou	Kahului 2	Kahuki	cultivated land	1843	wife's parents	1.75		NR 445v8, 516v4	
7714-B*	Kekuaiwa	Waiaha	N/A	N/A	N/D	N/D	0.00			
7715H	Lot Kapuaiwa	Pua'a 1	entire ahupua'a	N/D	1848	King	N/D	7845	NR 444v5, NT 244v10	awarded entire ahupua'a
7902*	Kanewahilani	Pua'a			N/D	N/D	0.00		NR 512v8	
			Iliiloa	taro kihapai						
			Kamuku 4	kihapai						
7903*	Kapae	Kahului 2	Lapalua	cultivated land	N/D	N/D	0.00		NR 452v8	
7912	Kanio	Waiaha 2	Kauailo	1 land section	1839	Laiwahine	1.08	7923	NR 514v8	
			Kanailoa	1 land section						
7912-C	Liawahine	Waiaha 2	Hauamauuloa	1 land section	1824	Kaaea	0.29		NR 514v8	
			Waiaha 2	1 land section						
7913	Kaanehe	Waiaha 2	N/D	House lot	N/D	N/D	1.77	5221	NR 453v8	
							0.06			
							0.55			
7914	Kekipi	Kahului 2	N/D	partially cultivated kihapai	Kuakini times	Kaanaana	1.40	7064	NR 453v8, NT 546v4	mentions trail or path for draging canoes
7915	Kekipi	Kahului	N/D	N/D	N/D	N/D	0.00		NR 447v6	
7916*	Kahueai	Pua'a 2	Ohiki	kihapai	N/D	N/D	0.00		NR 514v8	
			Kamuku 1	kihapai						
7917*	Kaleimakalii	Pua'a 2	N/D	N/D	N/D	konhiki	0.00		NR 447v6	
7951	Kanewa (wahine)	Pua'a 2	Kamuku 1	N/D	1819	Waiau	0.88	6106	NR 517v8, NT 647v8	
7953*	Kuahine	Auhaukea'e 2	Puhau, Iliiloa	6 kihapai	time of Kuakini	Kamanawa	2.00	7890	NR 517v8, FT 677v8	Kuahine was a konohiki

Table 1. Land Commission Awards (cont.)

LCA	Claimant	Ahupua`a	Ili	Land Use	Date Rec'd	Giver	Acreage	Royal Patent	Sources	Comment
7968	Kahaunapa	Auhaukea'e 1 & 2	N/D	5 cultivated kihapai	1843	Kamanawa	1.94	6188, 7875	NR 454v8, NT 558v4	Also claimed house lot in Pua'a
			N/D	1 cultivated kihapai						
			Maunui	1 cultivated kihapai						
8222*	Ipunui	Kahului 1	N/D	house lot, 3 houses (enclosed)	1845	Naheana	0.00		NR460v8, 522v4	
8516B	Grace Kamaikui Rooke	Kahului	N/A	N/D	N/D	N/D	ahupua'a	1669	NR 709v3, NT 170v10	awarded entire ahupua'a
9254*	Kauahaawe	Auhaukea'e 1	Pahoa	cultivated land	N/D	kupunas	0.00		NR 547v8	
9944 (In project area)	Nalima	Kahului 1	Kukuipuloa	2 kihapai	Kuakini times	Opunui	N/D	6278	NR 472v8, NT 517v4	1 parcel next to road, one in Apa'a zone
10012*	Laa		Hoolawai	partially cultivated	N/D	kupunas	0.00		NR 582v8	
			Kamuku 2	kihapai						
			Pahoa	3 kihapai						
10252 (In project area)	Maliu	Kahului 1			Kam II times	Kahenu	1.40	6742	NR 475v8, NT 538v4	
			Kamuku	cultivated land						
			Kamuku	N/D						
			Kamuku	cultivated kihapai						
			Halewaawaa	cultivated land						
			Kamuku 2	cultivated kihapai						
			Kamuku	house lot, 3 cultivated kihapai						
10267	Molowaole	Pua'a 2	Ohiki	1 cultivated kihapai	1847	Kamanawa	0.69	5000	NR 477v8, NT 534v4	awarded two apana in Pua'a
				1 cultivated kihapai						
				5 cultivated kihapai						
				house lot (enclosed)						
10270	Mailou	Pua'a 2	Ulumoe	N/D	1824	wife	1.00	8050	NR 588v8, NT 647v8	awarded 1 apana
			Kaawa	N/D						
10373	Niniha	Kahului 2	N/D	house lot	Kam I times	wife's parents	0.77	8060	NR 479v8, NT 533v4	
10374 (In project area)	Nalawaia	Kahului 1	Halewaawaa				2.97		NR 479v9, NT 529v4	awarded 2 apana
				cultivated kihapai	Kam II times	N/D				
				partially cultivated, Kaluulu	Kam II times	N/D				
				cultivated land	Kam II times	N/D				
				house lot, 2 houses (enclosed)	1848	Maliu				
10299*	Malo	Auhaukea'e	N/D	N/D	N/D	N/D	0.00		NR 589v8	
11073	Aikane	Kahului 2	Ohia, Papiha		1839	Iino	1.80	7058	NR 610v8, NT 651v8	
				N/D						
				kula land						
11216H	Mikaahela Kekauonohi	Auhaukea'e 1	N/D	N/D	N/D	N/D	334.00	7580	NT 334v10	awarded entire ahupua'a

Apa'a, and Ama'u). However, because of restrictions of the Kuleana Act itself, claimants were only awarded certain specific lots. Thus, the mid-1800's settlement pattern, as evidenced by the LCA data, included permanent habitation coastal house lots with upland agricultural lots. The upland lots, however, were separated by a considerable expanse of land that had formerly (traditionally) been an integral part of the agricultural system which provided the necessary mix of subsistence oriented crops. (Borthwick et al. 1997:10)

The project area corridor extends through five of the 38 awarded LCAs (LCAs 7350, 7496B, 9944, 10252, and 10374; see **Figure 7**). LCA 7350 is a 1.65 acre parcel located in Kahului 1 Ahupua‘a. This parcel was claimed by Kialoa, who obtained it in 1844 from the konohiki. According to Native Register 262v8 and Native Testimony 671v8, the claim included 15 cultivated patches.

LCA 7496B is a 1.9 acre parcel located in Papalua ili in Kahului 1 Ahupua‘a. This parcel was claimed by Keaweehu, who obtained it from Ipunui in 1848. According to Native Register 262v8 and Native Testimony 671v8, the claim included two areas of cultivated land and one partially cultivated area.

LCA 9944 was claimed by Nalima and consisted of four parcels of unstated size located in the *ili* of Kukuipuloa, in Kahului 1 Ahupua‘a. This parcel was obtained from Opuni during Governor Adams (Kuakini) times. According to Native Register 472v8 and Native Testimony 517v4, the claim included two *kihapai,* with one located next to a road, and the other in the apa‘a zone of the Kona Field System.

LCA 10252 is a 1.4 acre claim located in Kamuku and Halewaawaa ili in Kahului 1 Ahupua‘a. This LCA was claimed by Maliu, who obtained it from Kahenu during the time of Kamehameha II. According to Native Register 475v8 and Native Testimony 538v4, the claim included two areas of cultivated land, five cultivated *kihapai,* and a house lot.

LCA 10374 is a 2.97 acre claim Halewaawaa ili in Kahului 1 Ahupua‘a. This LCA parcel was claimed by Nalawaia, although no information on who or when he obtained it is available. According to Native Register 479v9 and Native Testimony 529v4, the claim included an enclosed house lot with two houses, two areas of cultivated or partially cultivated land, and one cultivated *kihapai.*

Figure 8 is a portion of J.S. Emerson’s 1800s Register Map 1280 of Kailua Town and vicinity. The map shows the seaward boundary of the inland forest was at approximately 600 ft elevation in the project area vicinity. The path of the Mamalahoa Highway is also shown in this map, indicating the road was in use at this time.

The **Figure 8** map also depicts land grants in the area. The project area corridor extends through or is bordered by six land grants. These consist of Grant 976 to Kapae in Kahului 1, Grant 926 to Pupule and Grant 982 to Naipu-wailuni in Pua‘a 2, and Grant 985 to J.W. Naihe, Grant 986 to Nauama, and Grant 1567 to Hoopii in Auhaukea‘e 2. The map also depicts two houses to the west of the Mamalahoa Highway. Queen Emma, wife of Alexander Liholiho (Kamehameha II), had a residence and associated gardens in Wai‘aha, and Kuhaupio’s had a house in Pua‘a 3.

Commercial sugar cane cultivation in the Kailua area was attempted in the late 1800s and early 1900s, but was abandoned by the mid-1920s (Kelly 1983). The Kona Sugar Company was established in 1899 and built the first mill in 1901 in upland Wai‘aha overlooking Kailua. The mill was situated above the Kahului-Hienaloli Road at c. 700 ft elevation (**Figure 9**). According to Maly, the sugarcane fields “... extended south from Wai‘aha to Hōlualoa-Kaumalumalu, on fee and leasehold lands. With the success of the sugar crop, the plantation fields were soon expanded south in favorable localities, including the *kula* lands between Honalo and Kalukalu-Onouli” (2001:283).

A railroad line, constructed to transport sugar cane to the mill originated in this location and extended 11 miles to the south where it terminated in Keopuka in South Kona (**Figure 9**). Construction of this substantial railroad line began in 1901 by the West Hawai’i Railway Company (Condé and Best 1973). According to Burtchard:

> …during its short life span the sugar line was most impressive, at least architecturally. The stone work used to span ravines and other irregularities in Hualalai’s rough western slope provides a number of excellent examples of dry-laid dressed stone masonry over a rubble core berm. The constructed berm ranges from less than one to as much as 15 m (50 feet) in height. The stone work in this feature is uniformly well executed. In recognition of the historical significance of the rail line, the site is listed on the Hawaii Register of Historic Places (Site 50-10-37-37-7214) (1996:49)

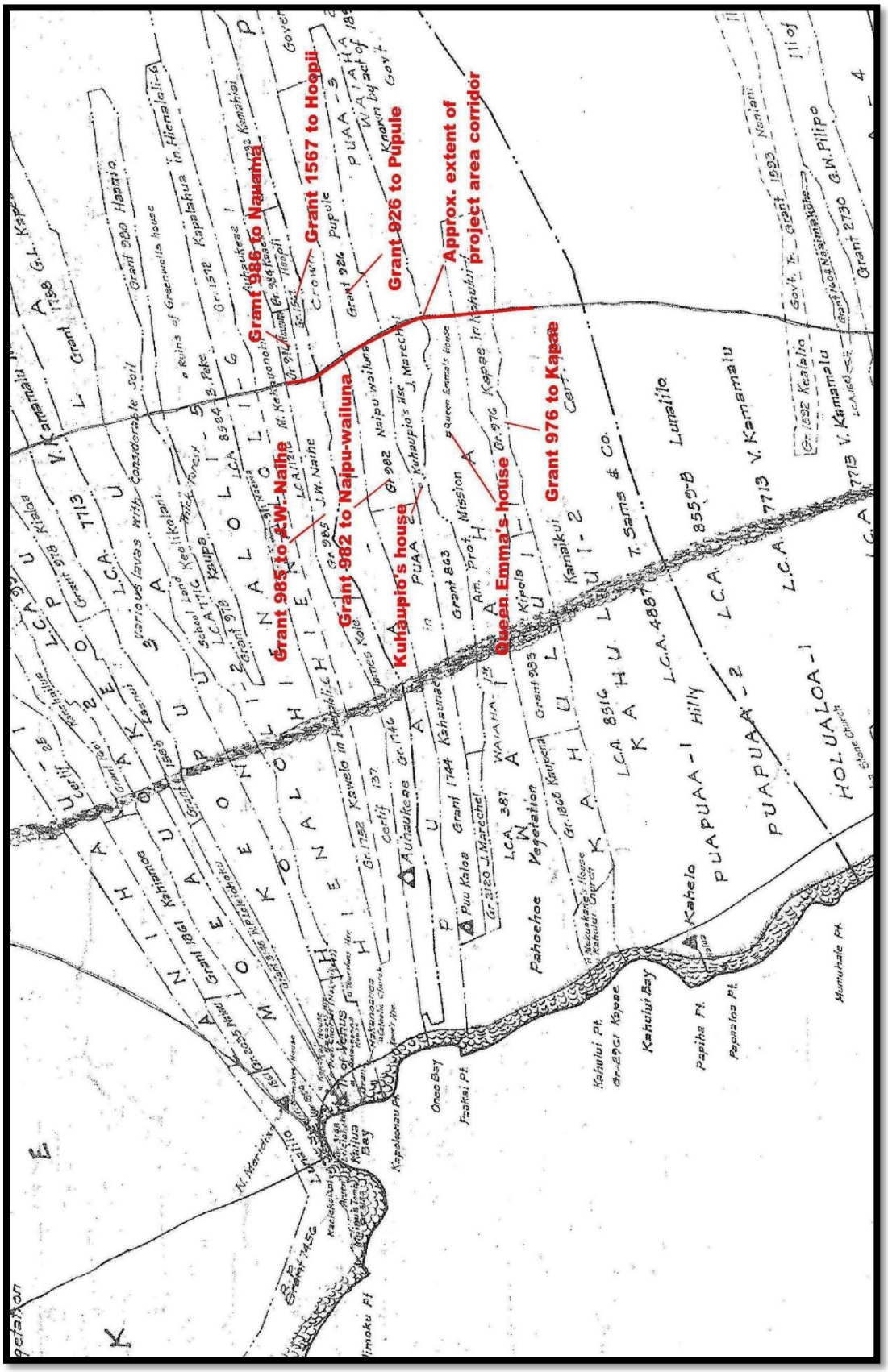

Figure 8. Portion of Emerson's 1880s map of Kailua

Figure 9. Portion of 1928 USGS Kailua quadrangle

Despite the efforts required to construct the mill and railroad line, the venture was not successful. "The railroad record disappears in 1918 and the sugar company went into receivership in 1926" (Burtchard 1996:49). **Figure 9** also indicates that the Mamalahoa Highway was in use in 1928.

Cattle ranching and coffee cultivation continued during the late 1800s and 1900s. The **Figure 9** 1928 USGS quadrangle map shows numerous houses along the shoreline inland of Kahalu'u Bay. Houses are also clustered along the inland and seaward sides of the Mamalahoa Highway.

Figure 10 is a portion of an aerial view of the project area vicinity taken on January 21, 1965 by the U.S. Geological Survey and obtained from the University of Hawai'i at Manoa online library (http://magis.manoa.hawaii.edu). This map shows large scale clearing and cultivated fields to the east and west of the Mamalahoa Highway.

By the 1970s, the rapidly developing tourism industry began to transform the region's land use from ranching and commercial agriculture, except coffee production, to subdivisions, resorts, and commercial establishments. The use of the present project area was probably limited to cattle ranching. In 1927, rancher Manuel Gomes bought tracts of land in Wai'aha and Kahului and used these lands for cattle grazing until the 1960s (Rechtman 2002).

Previous Archaeological Work

A search of the DLNR archives indicates that a minimum of 50 archaeological projects have been conducted in the project area *ahupua'a.* **Figure 11** shows the locations of the projects and **Table 2** summarizes the projects. Not included in the figure or table are the general studies by Thrum (1907) and Stokes (IN Stokes and Dye 1991), which focused on major sites, primarily *heiau*, throughout Hawai'i Island, and the West Hawaii survey by Reinecke (1930). No previous archaeological projects have been conducted within the boundaries of the project area corridor.

The projects in **Table 2** examined nearly 420 acres in the project area *ahupua'a,* identifying 221 sites with 2,844 features. To aid in reconstructing settlement patterns, features were quantified by probable age and function, and the studies are ordered by elevation. Traditional Hawaiian features were categorized as permanent and temporary habitation, agricultural, burial, and ritual. Features not assignable to these categories were categorized as miscellaneous/indeterminate. Traditional sites in this category include trails and *ahu*. Density values are given for sites, features, and habitation and agricultural features.

Overall, the studies have identified 124 permanent habitation features, 45 temporary habitations, 2,421 agricultural features, 24 burials, and 16 ritual features. Historic features were not segregated by function. The majority of the historic features are ranch walls. The projects indicate overall feature density values that range from 0.1 to 111.3 features per acre, with an average per acre density of 7.5 features per acre.

The current project area lies within the *'apa'a* zone of the Kona Field System, SIHP Site 6601 (Newman 1970, Kelly 1983, Schilt 1984, Cordy 1995). This site extends north to Kā'u Ahupua'a, south to Honaunau, and from the coastline to the forested slopes of Hualalai. The area was intensively cultivated and served as the resource base for the large number of chiefs and retainers that occupied the Kailua-Honaunau coast. The characteristics and general locations of the elevation zones of the system described by Newman (1970) have been confirmed and elaborated on by subsequent ethnohistorical investigations (Kelly 1983). The system is subdivided into four elevation zones.

The *kula* zone extends from sea level to 500 ft. Cordy (1995) has suggested that the upper limit of this zone may be higher between 600-700 ft elevation. This lower elevation zone traditionally was used for habitation and cultivation of sweet potatoes, paper mulberry (*wauke*), and gourds. Agricultural features, including clearing mounds, planting mounds, planting depressions, modified outcrops, and planting terraces, are common in this zone (Hammatt and Clark 1980; Hammatt and Folk 1980; Schilt 1984). Habitations are scattered throughout the *kula*, but they are concentrated along the shoreline portion of the zone (Cordy 1995). The shoreline portion, extending approximately 200 meters inland, was the focus of permanent habitation and activities such as burial,

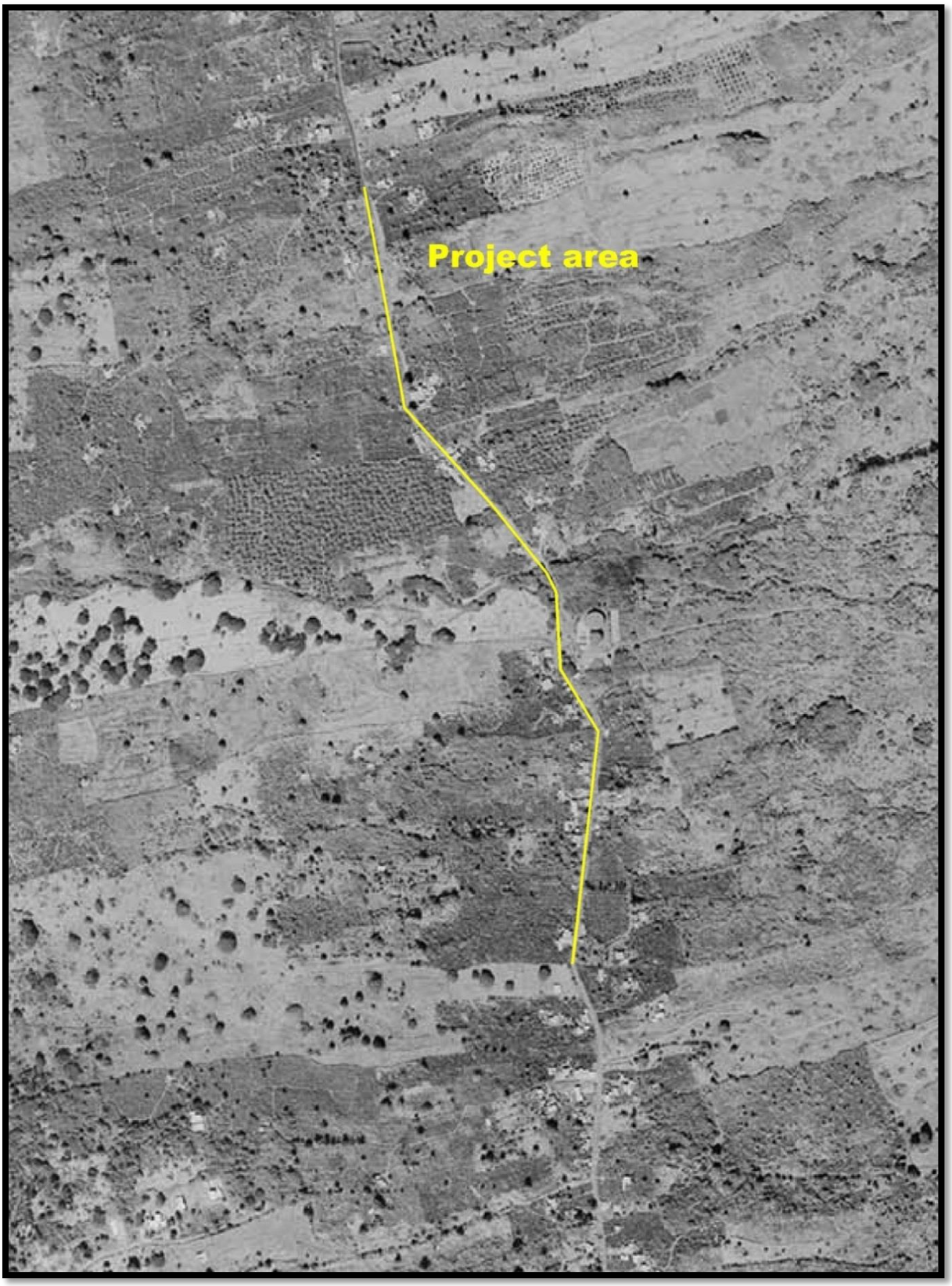

Figure 10. Portion of January 21, 1965 aerial photograph of project area vicinity

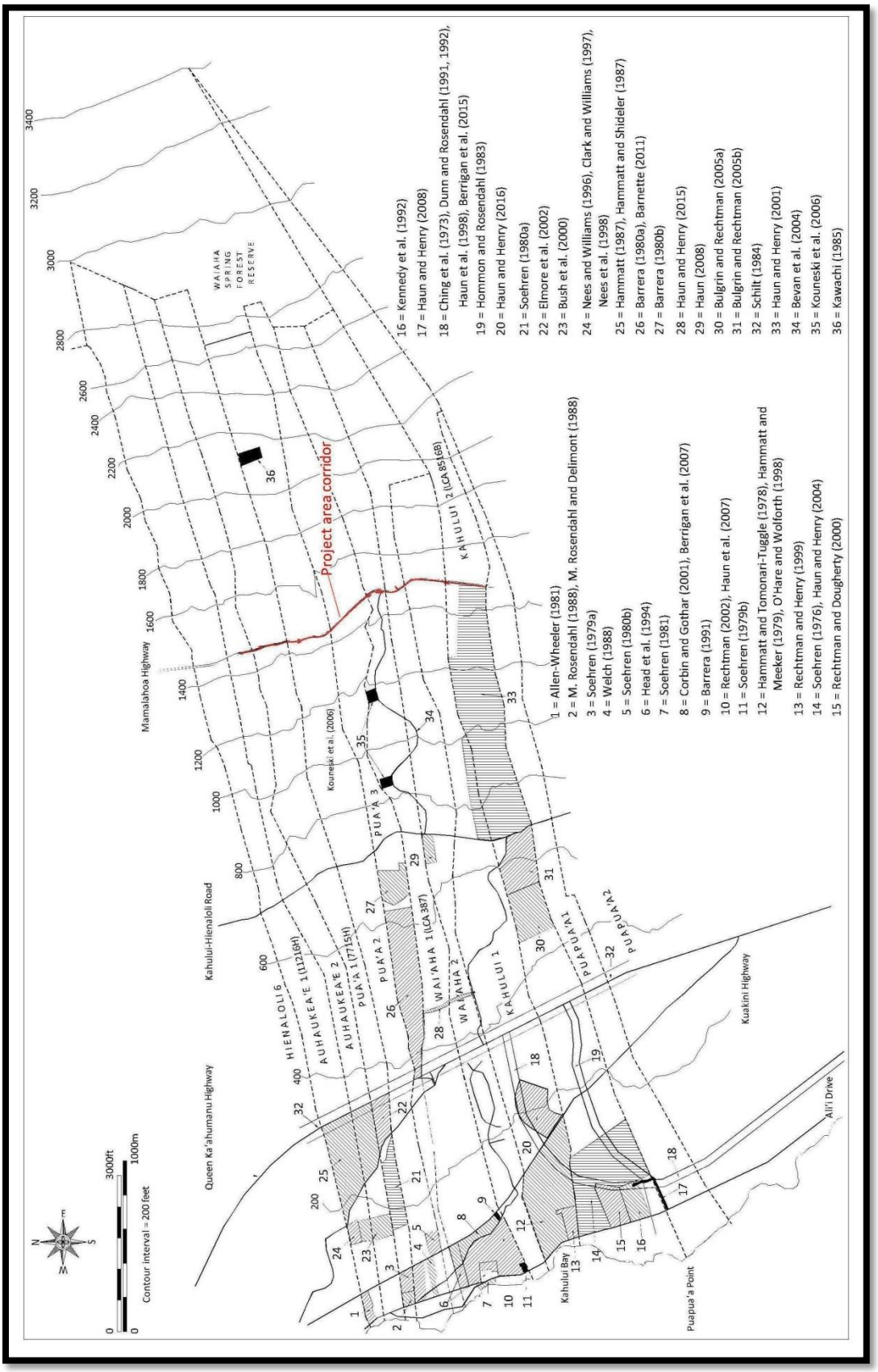

Figure 11. Previous archaeological work in project area *ahupua'a*

Table 2. Summary of previous archaeological work

Author	Land	Study Type*	Elevation (ft AMSL)	Area (ac)	Total sites	Sites/ acre	Total feas	Feas/ acre	Hab Feas	Hab Feas/ acre	Perm Hab Feas	Temp Hab Feas	Ag Feas	Ag Feas/ acre	Burial Feas	Ritual Feas	Trail	Historic Feas	Misc. Feas
Allen-Wheeler (1981)	Auhaukeae 1	RN	0-40	1.15	1	0.9	3	2.6	1	0.9			1					1	
M. Rosendahl (1998), M. Rosendahl and Delimont (1988)	Pua'a 1	IN/DR	10-35	1.35	1	0.7	5	3.7										5	
Soehren (1979a)	Wai'aha 2	RN	10-15	0.79	0														
Welch (1988)	Pua'a 2	RN	40-95	2.5	1	0.4	8	3.2	3	1.2			2			1			1
Soehren (1980b)	Puaa 3	RN	100-140	2.7	2	0.7	2	0.7	2	0.7		2							
Head et al. (1994), Corbin and Gothar (2001), Berrigan et al. (2007)	Wai'aha 1	IN/DR	60-90	5.4	27	0.2	41	7.6	8	0.7		8	13	2.4	3	1		11	5
Soehren (1981)	Wai'aha 1	RN	0-10	0.67	0														
Barrera (1991)	Wai'aha 2	RN	85-90	0.67	0														
Rechtman (2002), Head et al. (1994), Haun et al. (2007)	Wai'aha 1	IN/DR	40-60	19	29	0.7	42	2.2	18	1.1	12	5	10	0.5	2	1		12	12
Soehren (1979b)	Pua'a 1	RN	20-85	4.5	3	0.7	3	0.7	3	0.7									
Hammatt and Tomonari-Tuggle (1978), Hammatt and Meeker (1979), O'Hare and Wolforth (1998)	Kahului 1	IN/DR	15-165	32.0	18	0.6	30	0.9	6	0.2	6				5	11			8
Rechtman and Henry (1999)	Kahului 1 & 2	IN	20-30	2.0	4	2.0	4	2.0											4
Soehren (1976), Haun and Henry (2004)	Kahului 2	AS/IN	10-120	35.1	17	0.5	103	2.9	17	0.5	12	2	74	2.1	6			4	2
Rechtman and Dougherty (2000)	Kahului 2	IN	20-80	12.0	5	0.4	7	0.6	3	0.3	2	1						3	1
Kennedy et al. (1992)	Kahului 2	IN	20-80	5.5	3	0.5	4	0.7							2				2
Haun and Henry (2008)	Kahului 2 and Puapua'a 1	IN	53-82	2.0	6	3.1	17	8.7	5	2.6	5		10	5.1	1			1	
Ching et al. (1973), Hommon and Rosendahl (1983), Dunn and Rosendahl (1991, 1992), Haun et al. (1998), Berrigan et al. (2015)	Portion in Kahului	RN, IN, DR	38-376	22.7	27	1.2	370	16.3	60	2.6	54	6	296	13.0	4		1	7	2
Haun and Henry (2016)	Kahului 1	IN	140-265	14	8	0.6	1558	111.3	30	2.1	28	2	1525	108.9	1	1		1	
Soehren (1980a)	Pua'a 1	RN	150-280	12.9	0	0.0													
Elmore et al. (2002)	Pua'a 1	IN	234-342	9.2	5	0.5	56	6.1	12	1.3		12	41					2	1
Bush et al. (2000)	Auhaukeae	IN	118-168	4	3	0.8	23	5.8					21						
Nees and Williams (1996), Clark and Williams (1997), Nees et al. (1998)	Auhaukeae 1-2	IN/DR	120-160	3	3	1.0	14	4.7	2	0.7		2	8						2
Hammatt (1987), Hammatt and Shideler (1987)	Auhaukeae	RN/EX	170-310	28	3	0.1	3	0.1	1	0.0			2						
Barrera (1980a), Barnette (2011)	Pua'a 3	RN	360-620	15	4	0.3	4	0.3										4	
Barrera (1980b)	Pua'a 3	RN	620-650	5	2	0.4	6	1.2										6+	
Haun and Henry (2015)	Wai'aha 1-2	IN	360-447	1.98	6	3.0	6	3.0	2	1.0			1	0.5				3	
Haun (2008)	Wai'aha 2	IN	640-700	2	6	0.3	6	3.0	1	2.0	1							5	
Bulgrin and Rechtman (2005a)	Kahului 2	AIS	500-550	15	8	0.5			1			1						7	
Bulgrin and Rechtman (2005b)	Kahului 2	AIS	550-670	15	6	0.4	6.00	0.4	1			1						5	
Schilt (1984)	Portion in Auhuakea'e, Pua'a, Wai'aha, and Kahului	RN	320-400	36.6	16	0.4	63	1.7					37	1.0				15	
Haun and Henry (2001)	Kahului 1 & 2	IN	680-1480	87.0	27	0.3	349	4.0	6	0.1	4	2	325	3.7				1	17
Bevan et al. (2004)	Wai'aha 1-2	IN	720-1490	13.2	2	6.6	53	4.0										54	
Kouneski et al. (2006)	Wai'aha 1	IN	880-1180	1.09	3	0.4	18	16.5					17	15.6				1	
Kawachi (1985)	Pua'a 2	RN	1950-1980	35.38	1	0.0	40	1.1	1	0.0		1	38			1			
Total/Average				**418**	**247**	**0.9**	**2844**	**7.5**	**183**	**1.0**	**124**	**45**	**2421**	**15.3**	**24**	**16**	**1**	**142**	**57**

* AS=Assessment, RN=Reconnaissance Survey, IN=Inventory Survey, EX=excavation project, DR=Data Recovery, FI=Field Inspection

canoe storage, ritual, and marine exploitation. Royal centers and chiefly residences were also situated near the shoreline. These complexes included residences for high status individuals and their supporters and attendants, *heiau*, places of refuge, *holua* slides, and other structures.

The *kalu'ulu* zone extends from 500 to 1000 ft elevation. The zone was used for cultivating sweet potatoes, paper mulberry, and especially breadfruit. Archaeologically, this zone is not distinguishable from the adjacent *'apa'a* zone (Cordy 1995). The *'apa'a* zone is situated between 1,000 and 2,500 ft elevation. This zone traditionally was used for dryland cultivation of taro, sugar cane, sweet potato, and *ti*. Permanent habitations were present in the *'apa'a* zone, but were infrequent (Cordy 1995, Burtchard 1995). Dwellings were observed by early historic chroniclers, but most were probably for temporary use in conjunction with agriculture, bird hunting, and collecting of plant resources. Burials and ritual sites are rare in the upper elevation zones (Kawachi 1989).

Kua'iwi are prominent agricultural features of the *kalu'ulu* and *'apa'a*, zones (Cordy 1995; Newman 1970). These are broad, linear piles of rocks built from stones cleared from the adjacent slopes that also served as field boundaries. *Kua'iwi* are oriented inland-seaward often interconnected with perpendicular, soil-retaining walls and terraces forming rectangular grid pattern of fields. *Kua'iwi* also served to control rainfall runoff (Kirch 1985). These formal fields contrast with more informal garden areas characterized by scattered agricultural features in very rocky areas, such as young lava flows, and much of the *kula* zone.

The *'ama'u* zone extends from 2,500 ft to 4,000 ft elevation. The zone was associated with banana and plantain cultivation. The archaeological traits of the zone have not been well defined, but temporary habitations were probably present associated with agriculture and exploitation of forest resources (Allen 1984).

Schilt (1984) used information gathered from the Kuakini Highway Realignment Corridor survey research to propose a five-phase chronology of settlement and field system development in the Kona Field System as follows:

> **Phase I -Pioneer Settlement (**c. A.D. 1050-1400) Very limited, sporadic use of lowland slopes and cave shelters just above the Kailua Bay area. Probably contemporaneous with pioneer settlements along the coast. Development of one or more of the *mauka* sub-zones of the Kona Field System may have commenced in the later portion of this phase.
>
> **Phase II - Garden Developments** (1400-1600/1650) Initial use of the *kula* sub-zone for small gardens and of the caves for temporary shelter. Erosional deposition, resulting from development of the upland sub-zones, began to bury an old ground surface and gradually created deepening soil deposits on *kula* land.
>
> **Phase III- Refuge, Habitation, and Intensive/Extensive Gardening** (1600/1650-1779) Extensive development of at least the *mauka* portion of the *kula* subzone, for sweet potatoes, *wauke*, and probably also gourds. This development was accompanied rarely by permanent habitation and more often by temporary and seasonal habitations among the *kula* gardens. Animal enclosures, probably for pigs, may date to this phase. The upland zones were under complete development by this time. Suitable caves were modified for refuge during times of warfare or social conflict. Caves located in the midst of garden features were intensively used for temporary shelter and work spaces.
>
> **Phase IV - Historic Habitation and Gardening** (1779-1850) The cultivation of *kula* lands gradually decreased in extent and intensity, nevertheless remaining important to a decreasing population. Permanent habitations on the *kula d*uring this phase occurred primarily on the *makai* side of the Great Wall of Kuakini. In 1848, Hawaiians were claiming an undetermined portion of *kula* lands, but none of these *kula* claims were honored by the Board of Land Commissioners (Kelly 1983). Some *kula* lands were being converted to grazing beginning in the 1840s.

> **Phase V - Historic Ranching** (1850-Modern Times) Land-use shifted completely to grazing, following the awards of *kula* lands to chiefs, missionaries, and others (Kelly 1983). Isolated permanent habitations on upland slopes of the *kula* were oriented to ranching. Today ranching is not as extensive as it once was. Kailua in recent years has been rapidly developing as a tourist and urban hub for leeward Hawaii Island (Schilt 1984:284).

While subsequent work has generally confirmed Schilt's chronology, the data from Haun et al. (1998) and Dye and Komori (1992) indicate a peak in dating results in the 1400-1500s and a decline after the mid-1600s. This may indicate that the increase in habitation and agricultural activity in Schilt's Phase III may have begun as much as two centuries earlier.

Consultation

Kepa Maly conducted an informant interview that is relevant to the present project. The interview was undertaken in conjunction with the O'Hare and Wolforth (1998) inventory survey of the 32 acre parcel in Kahului 1 Ahupua‘a, on the western side of the Kuakini Highway (see **Figure 11**). This interview was conducted with life-long Kona resident Joseph (Joe) Gomes on March 13, 1996. According to Maly:

> Joseph (Joe) Gomes was born in 1916 at Hōlualoa *mauka.* His father, Manuel Gomes, came to Hawai`i from Portugal in about 1883. After having lived and worked in Kau for a time, Manuel Gomes moved to Kona and was able to lease land in Honua‘ula and Keahuolu for his own ranching operations. When the Kona Sugar Company went out of business in 1927, the elder Mr. Gomes was able to purchase the lands of Kahului 1 and 2, and Wai`aha 1 and 2, which he developed into ranching operations. Following his father's death in 1959, Joe Gomes inherited the family's Kona ranch lands, and he and his family still run cattle on portions of their land.
>
> Mr. Gomes has clear recollections of land use—associated with ranching activities—on the *kula…* He describes the construction or modification of rock walls, use of the Kuakini Wall, development of paddocks, and some sites from earlier Hawaiian occupation of the land. His interview also describes the differences between walls of early Hawaiian construction and later work done for the ranches. Additionally, Mr. Gomes' interview provides a colorful description of ranching

PROJECT EXPECTATIONS

The project area is situated in the *‘apa‘a* zone of the Kona Field System. Based on previous archaeological research, chronological models (Schilt 1984, Cordy 1995), and historical documentary evidence, pre-contact sites expected within this area would potentially consist of habitation sites, primarily temporary habitations used in conjunction with agriculture, bird hunting, and collecting of plant resources. The remnants of formal fields, delineated by inland-seaward *kua‘iwi* and cross-slope walls may be present. Sites dating to the mid- to late 1800s would include the agricultural and habitation sites mentioned above. Differences in agricultural sites from the previous periods may be evident as a result of a shift to a market-based economy, which presumably would favor cultivated fields as opposed to small garden plots. Walls designed to control cattle and trails or roads for horse and wagon traffic also may be present.

By the beginning of the 1900s, traditional agricultural and habitation sites should be rare. Potential sites include residences and transportation infrastructure such as roads. Ranching activity and coffee cultivation, which continues in the general area today, would be evidenced by walls, corrals, fences, clearing piles of stone associated with pasture improvement and terraces built to retain soil for the coffee fields.

FINDINGS

The overall extent of the 5,190 ft (1,582 meter) long project area corridor is depicted in **Figure 12**. More detailed, enlarged sections of the corridor are shown in **Figure 13** through **Figure 22**, labeled as Map 1 through Map 10. The archaeological inventory survey of the corridor identified nine sites with ten features (**Table 3**). The identified features consist of four culverts, three retaining walls, and three walls. Feature function includes water control (4), livestock control (3) and transportation (3). No cultural materials, other than modern trash along the highway, were noted during the project.

Table 3. Summary of sites

SIHP Site No.	Formal Type	Function	No. of Features	Ahupua'a	Tax Map Key	Formal type			Function			Haun & Associates Temporary field number	GPS coordinates at site datum	
						Culvert	Retaining wall	Wall	Water control	Livestock control	Transportation		Easting	Northing
30667	Culvert	Water control	1	Kahului 2	(3) 7-5-012:011	1			1			1269.1	190743	2173233
30668	Wall	Livestock control	1	Kahului 1	(3) 7-5-012:024			1		1		1269.2	190762	2173378
30669	Culvert (bridge)	Water control	1	Wai'aha 1-2	(3) 7-5-012:040	1			1			1269.3	190705	2173632
30670	Complex	Water control, livestock control	2	Pua'a 3	(3) 7-5-012:031	1		1	1	1		1296.4, 1296.8	190681	2173707
30671	Retaining wall	Transportation	1	Pua'a 3	(3) 7-5-012:031		1				1	1269.6c	190505	2173908
30672	Retaining wall	Transportation	1	Pua'a 3	(3) 7-5-012:036		1				1	1269.6b	190505	2173908
30673	Retaining wall	Transportation	1	Pua'a 1	(3) 7-5-016:035		1				1	1269.6a	190403	2174309
30674	Culvert	Water control	1	Pua'a 2	(3) 7-5-016:032	1			1			1269.6d, 1269.7	190432	2174120
30675	Wall	Livestock control	1	Auhaukea'e 2	(3) 7-5-016:019			1		**1**		1296.9	190379	2174398
		Total	**10**			**4**	**3**	**3**	**4**	**3**	**3**			

Site 50-10-28-30667[1]

Site 30667 is a culvert that extends beneath the Mamalahoa Highway in Kahului 2 Ahupua'a (see **Map 2**; **Figure 14**). The portion of the culvert within the project area originates on the western side of the highway and extends 10 meters to the northeast where it exits the corridor (**Figure 23**). It is 5 ft, 4 inches wide (1.65 meters) and 3 ft, 3 inches (1.0 meters) high. The culvert continues in this direction for an undetermined distance. The culvert has a formed concrete floor and ceiling (**Figure 24**), with the walls built of stacked and mortared boulders and cobbles (**Figure 25**). There is a formed concrete wall at the western end of the culvert that is 8 ft, 2 inches (2.5 meters long) north-south and 1 ft, 4 inches (0.41 meters) wide.

There is a walled drainage channel that extends to the west from the western side of the culvert. The channel is 10ft, 5 inches (3.2 meters wide) with walls present along the north and south side. The northern side is bordered by a retaining wall that appears to be of relatively recent construction, consisting of stacked boulders and cobbles (**Figure 26**). This wall averages 1 ft, 7 inches (0.51 meters) wide. It is 3 ft, 3 inches (1.0 meters) tall on the south side and is level with the soil surface on the north side.

The south side of the drainage is constructed of stacked and mortared boulders and cobbles, similar to the interior walls of the culvert (**Figure 27**). This wall is free-standing and is 2 ft 5 inches (0.75 meters) wide and ranges in

[1] All sites listed on the State Inventory of Historic Places (SIHP). Site numbers are 5 digit sequential numbers by island : 50 = State of Hawai'i, 10= Island of Hawai'i, 28= Kailua quadrangle, 30667 = SIHP site number

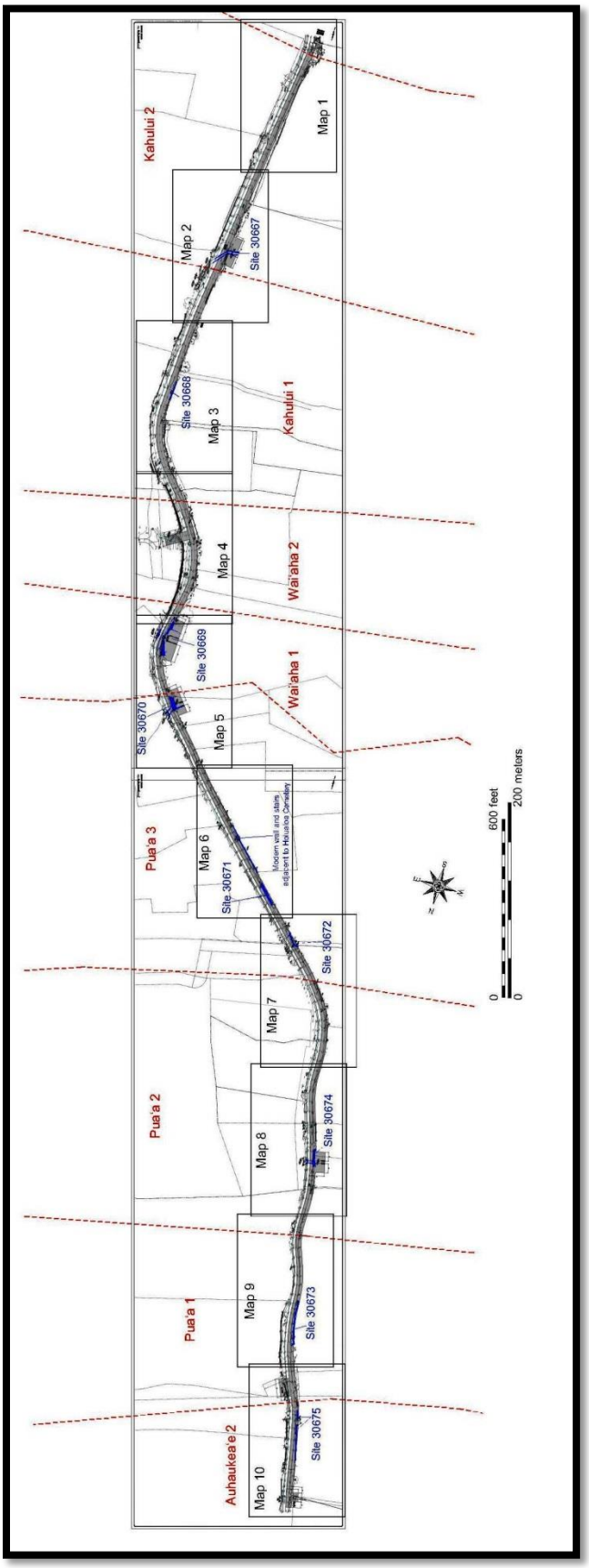

Figure 12. Overall extent of project area showing location of Maps 1-10

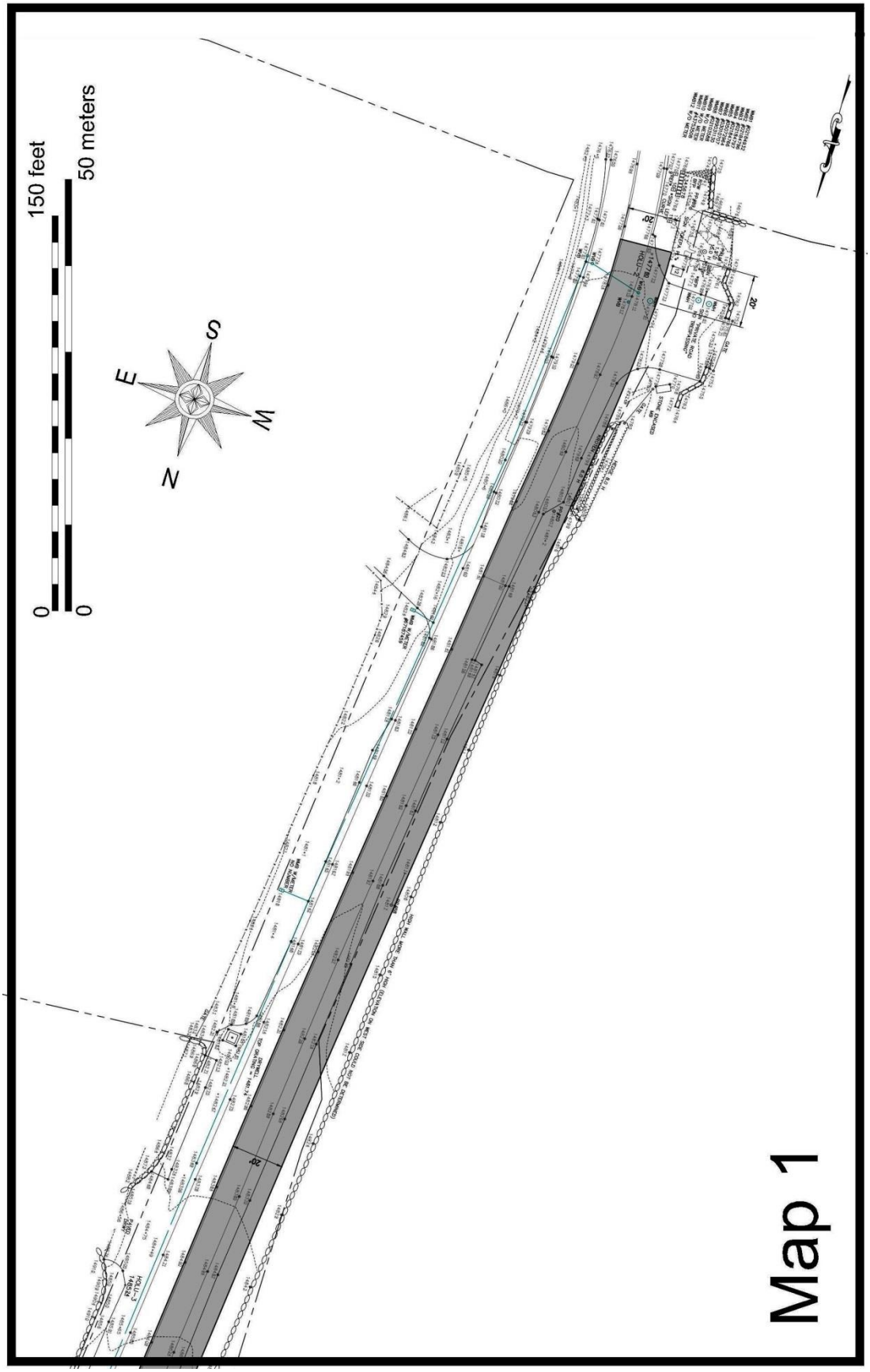

Figure 13. Map 1

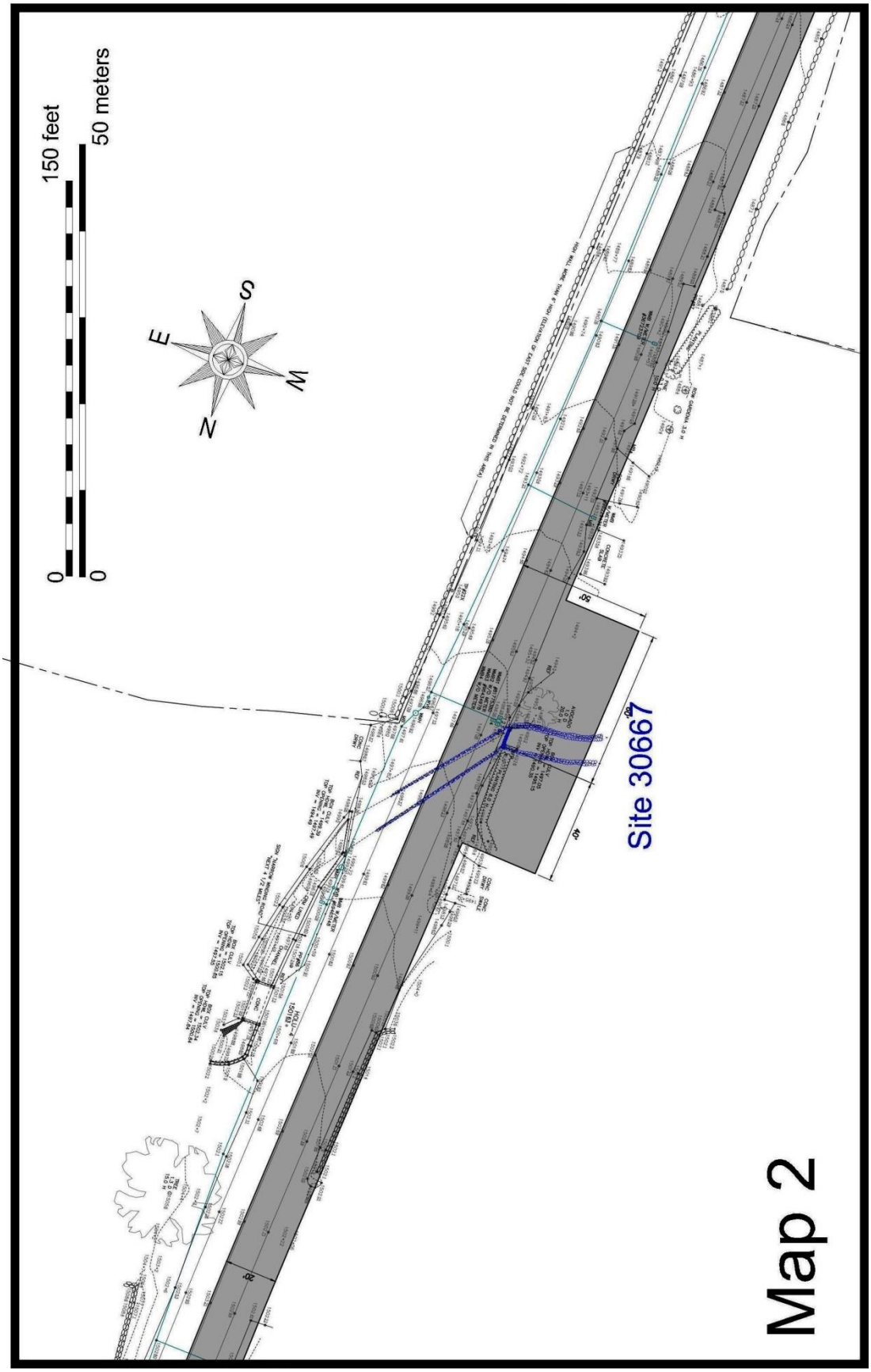

Figure 14. Map 2

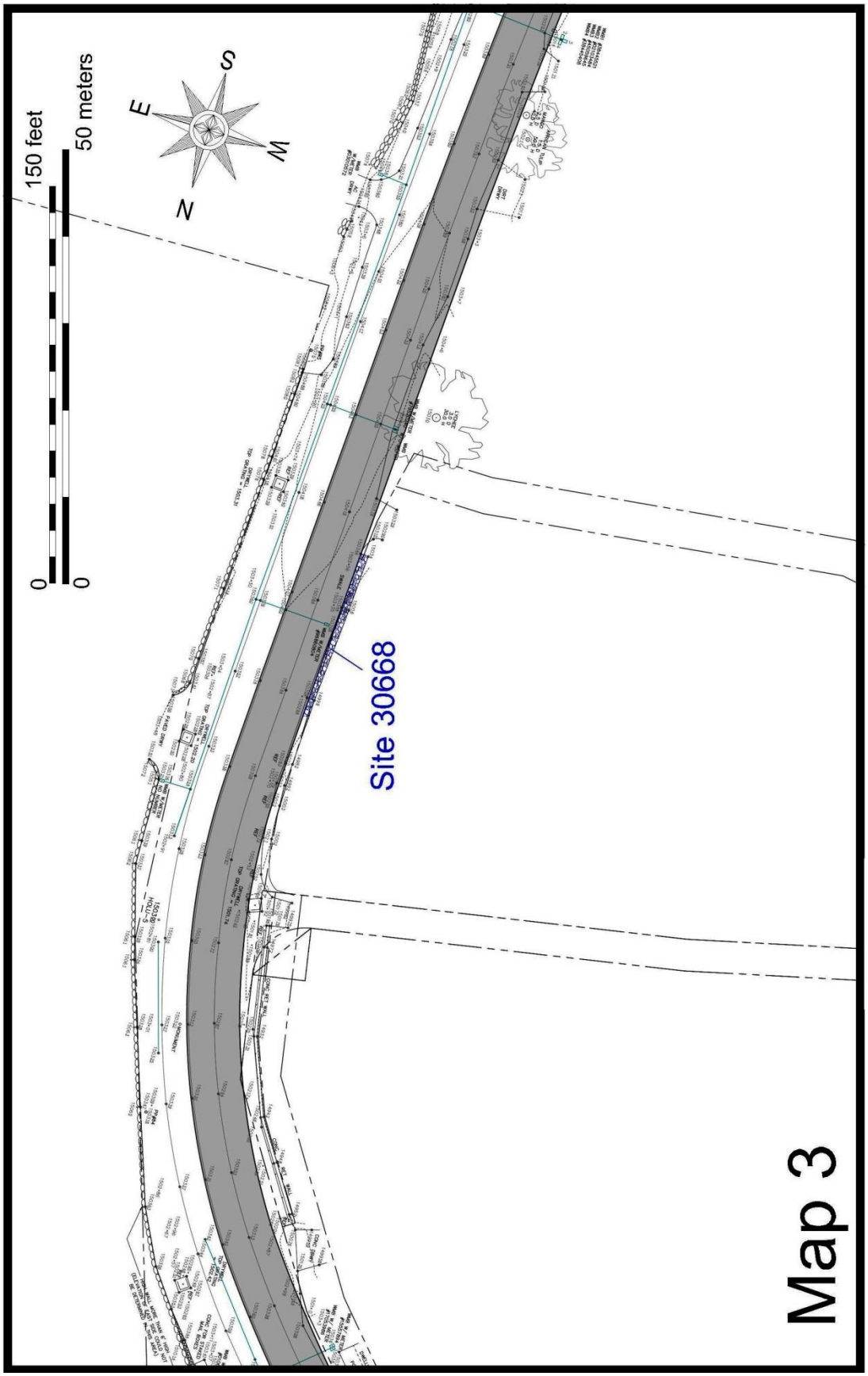

Figure 15, Map 3

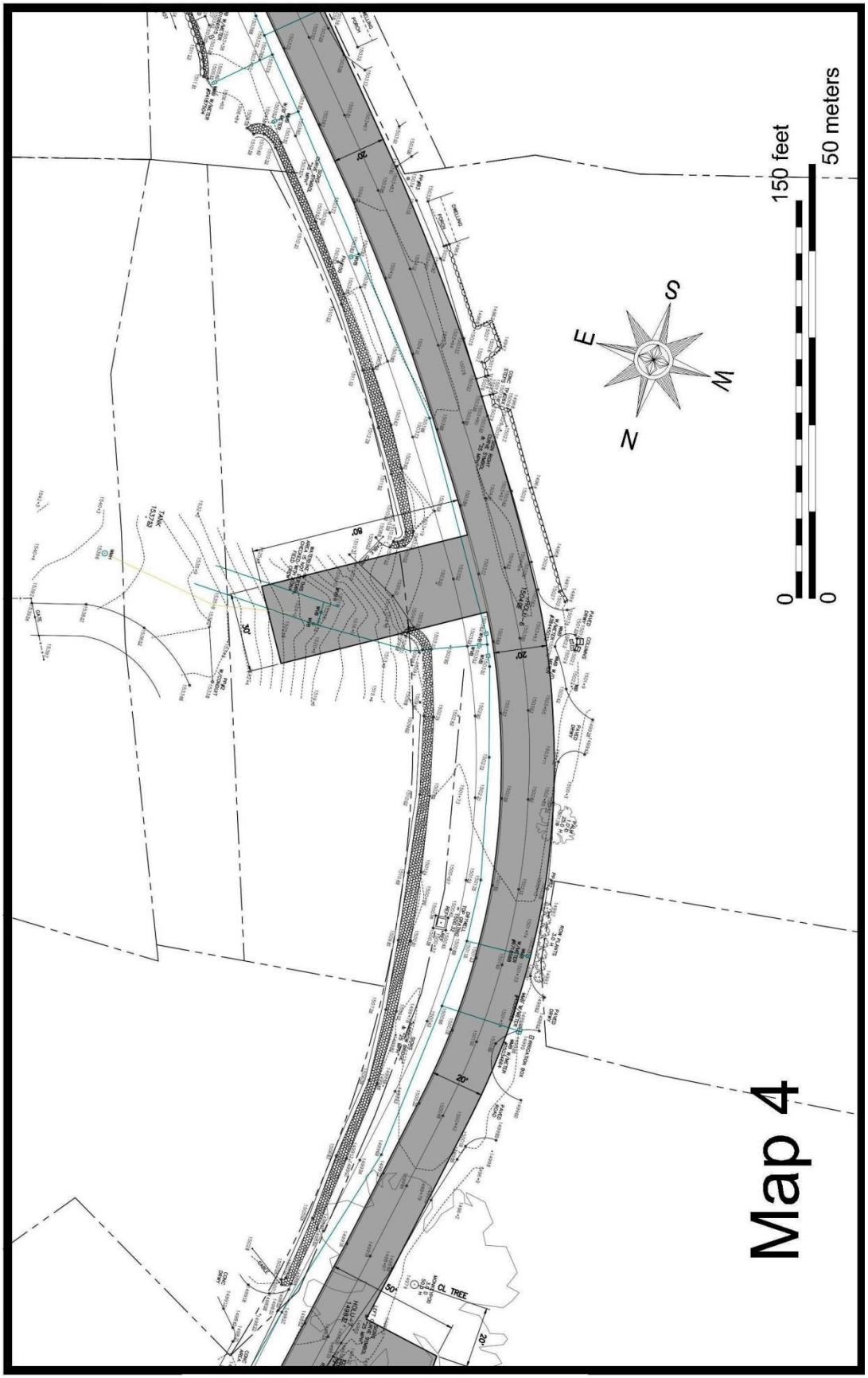

Figure 16. Map 4

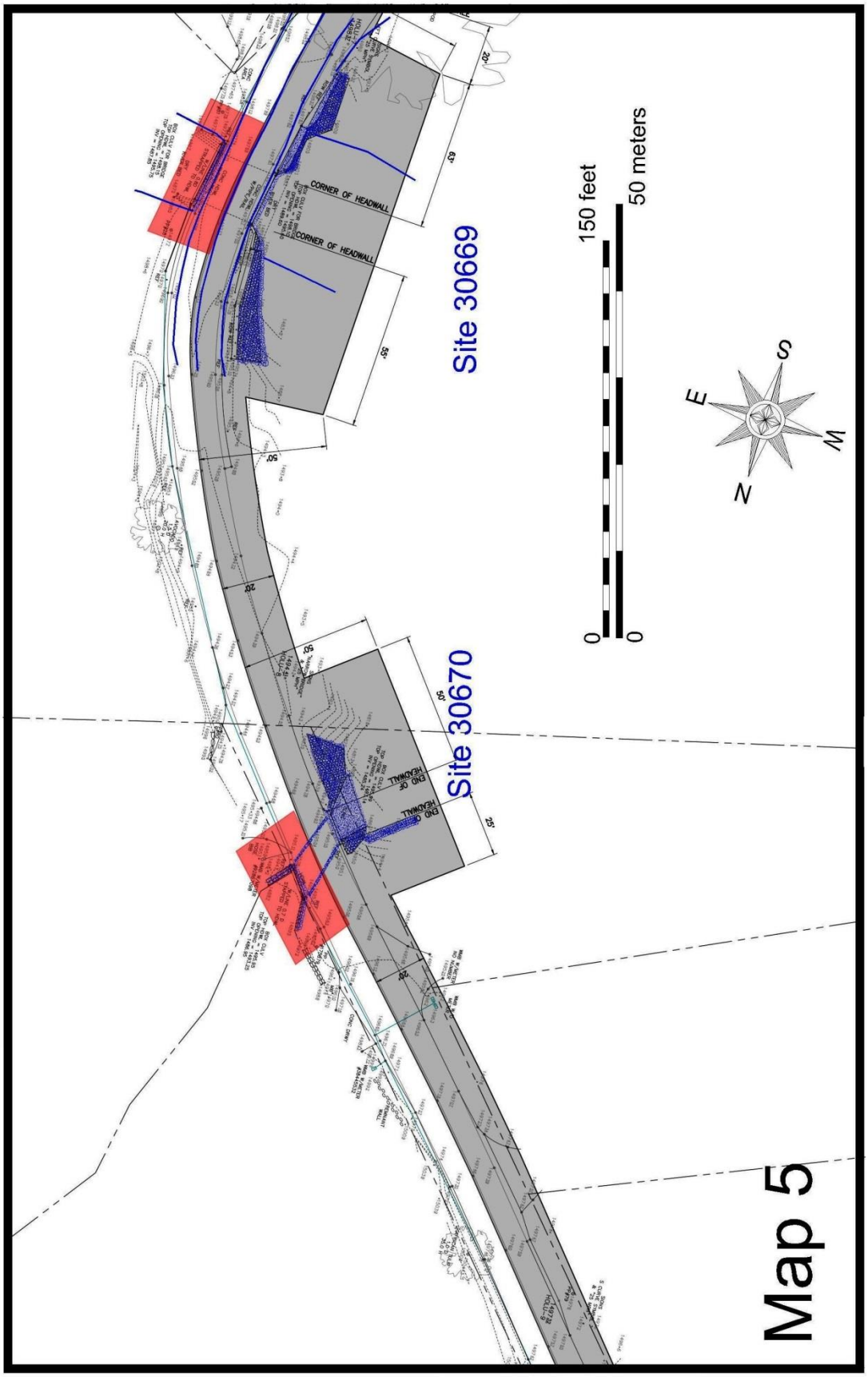

Figure 17. Map 5

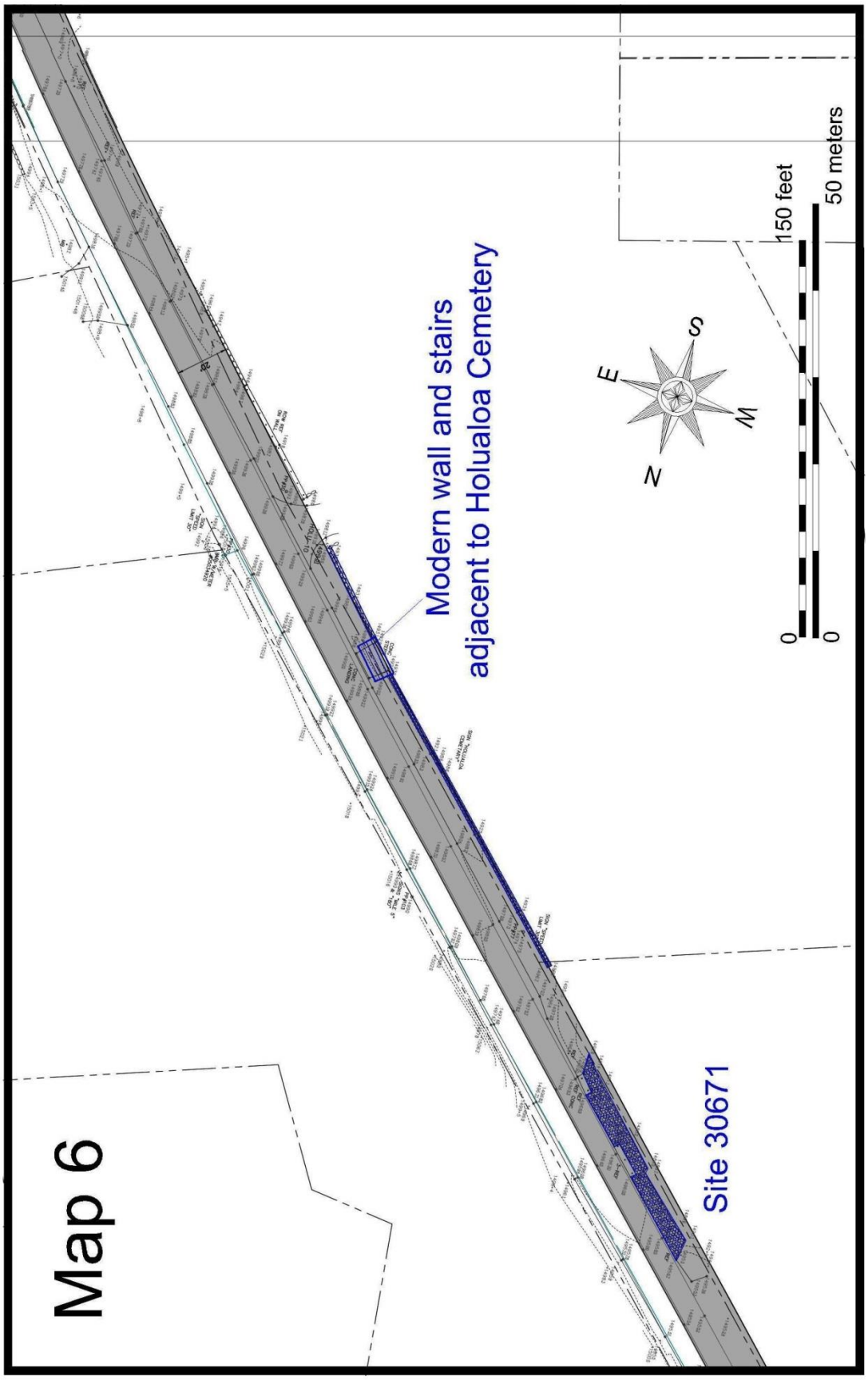

Figure 18. Map 6

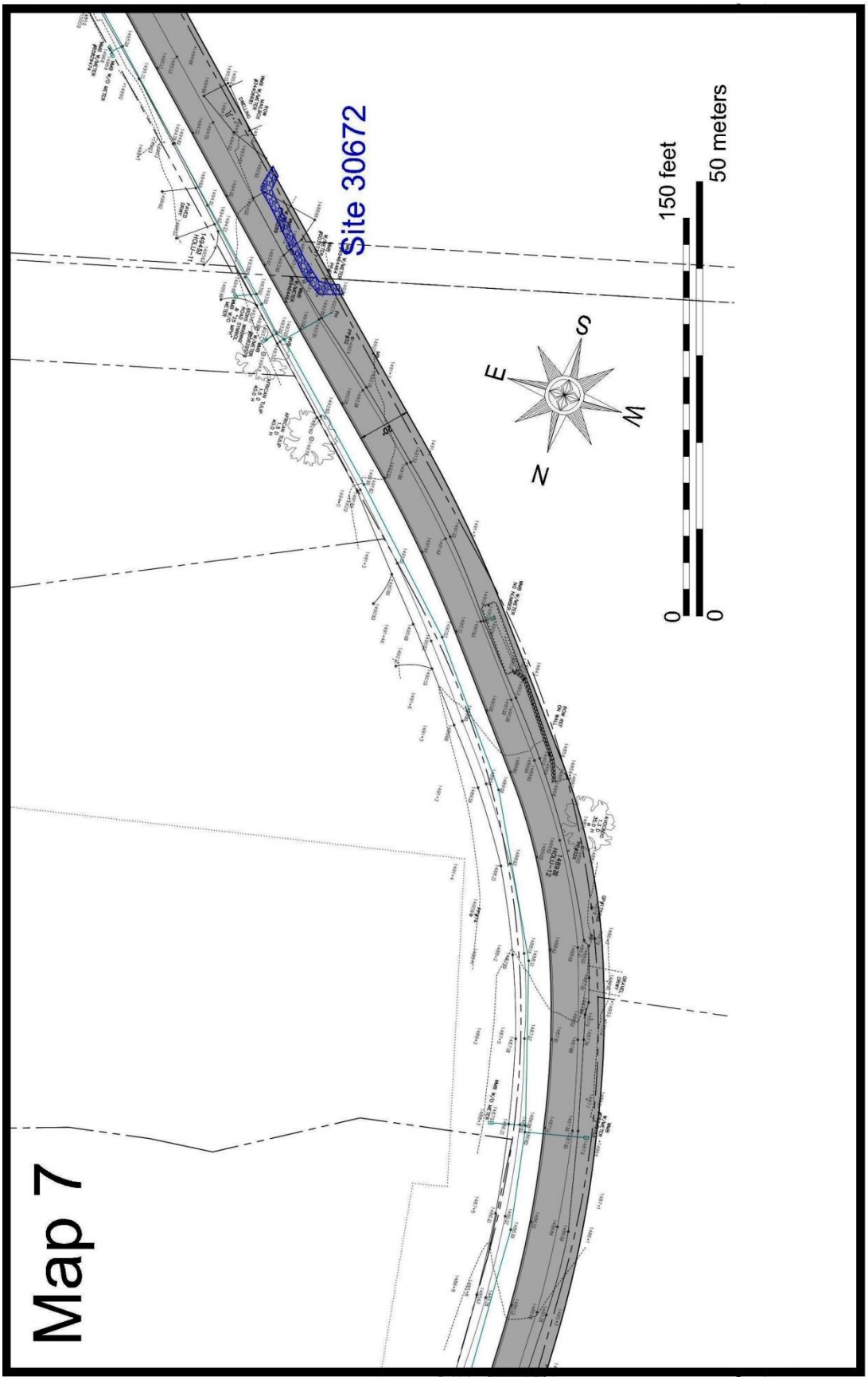

Figure 19. Map 7

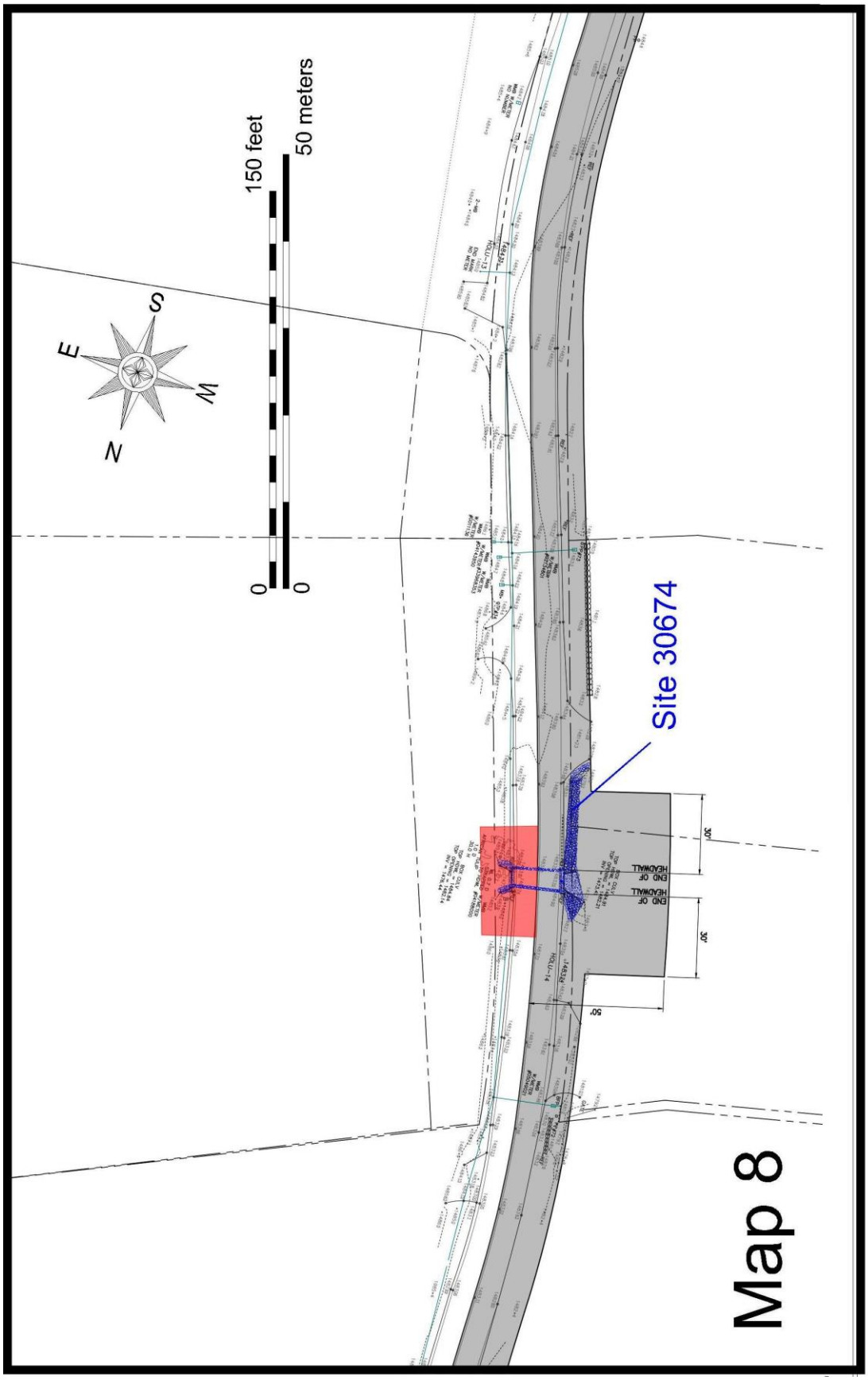

Figure 20. Map 8

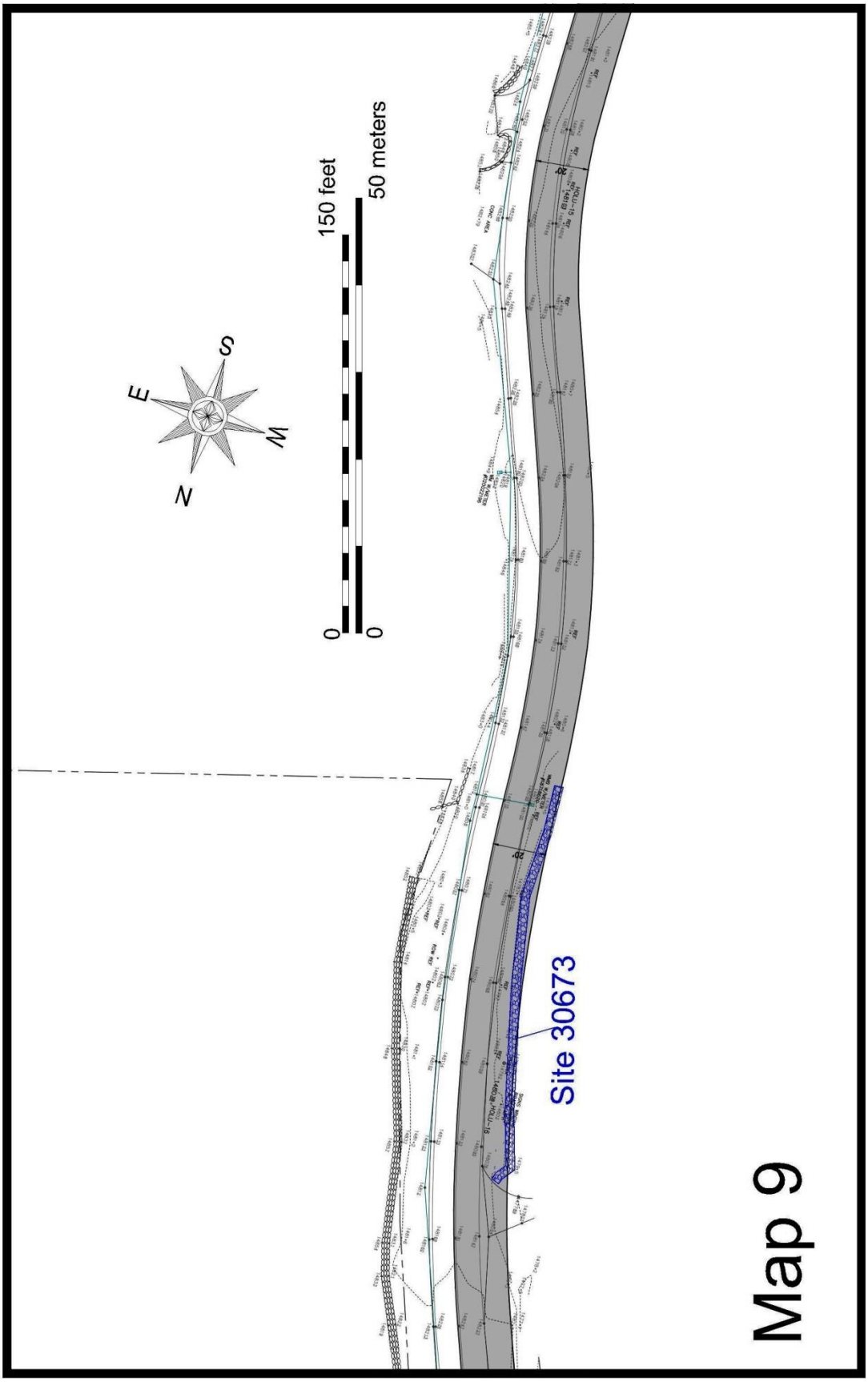

Figure 21. Map 9

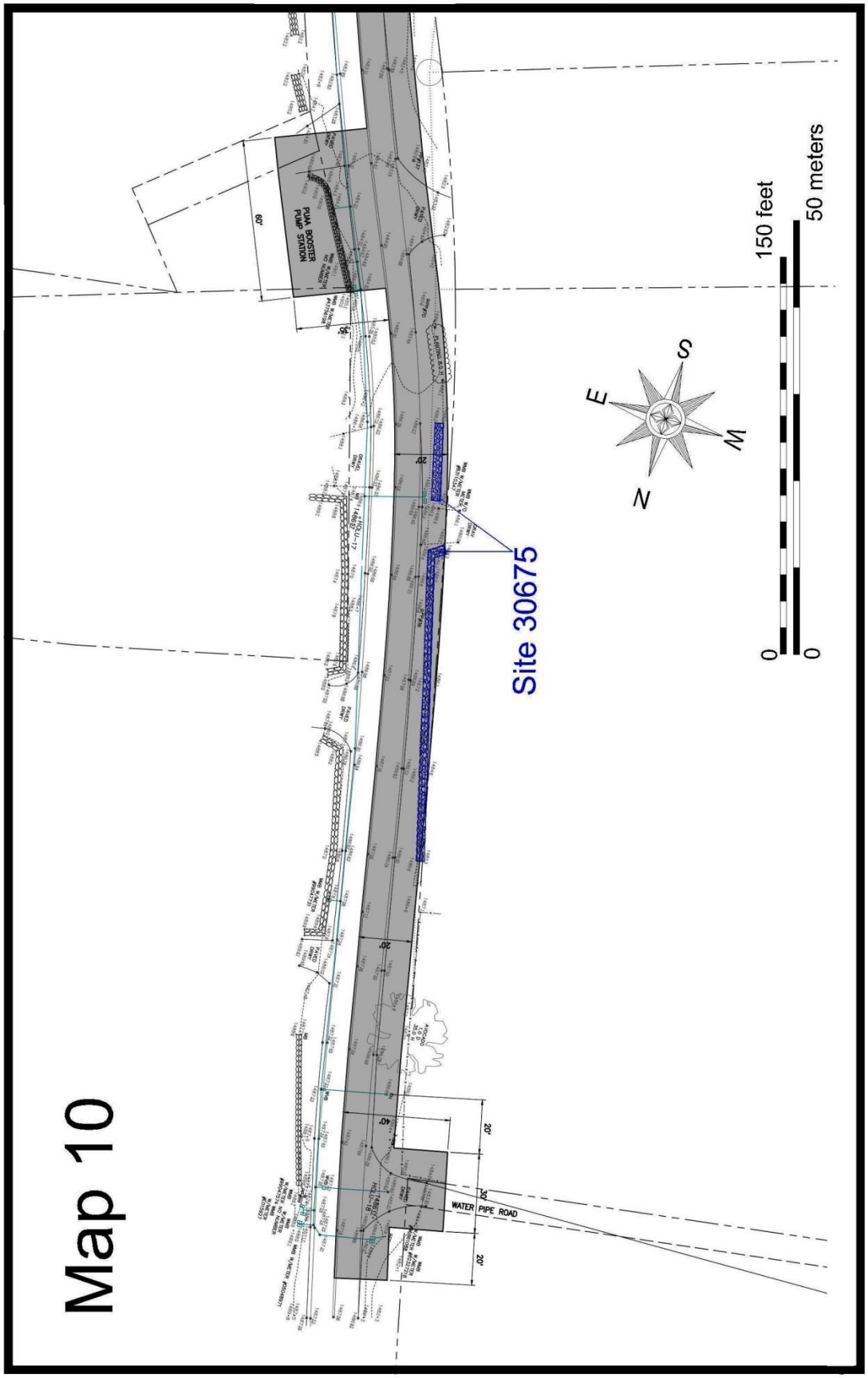

Figure 22. Map 10

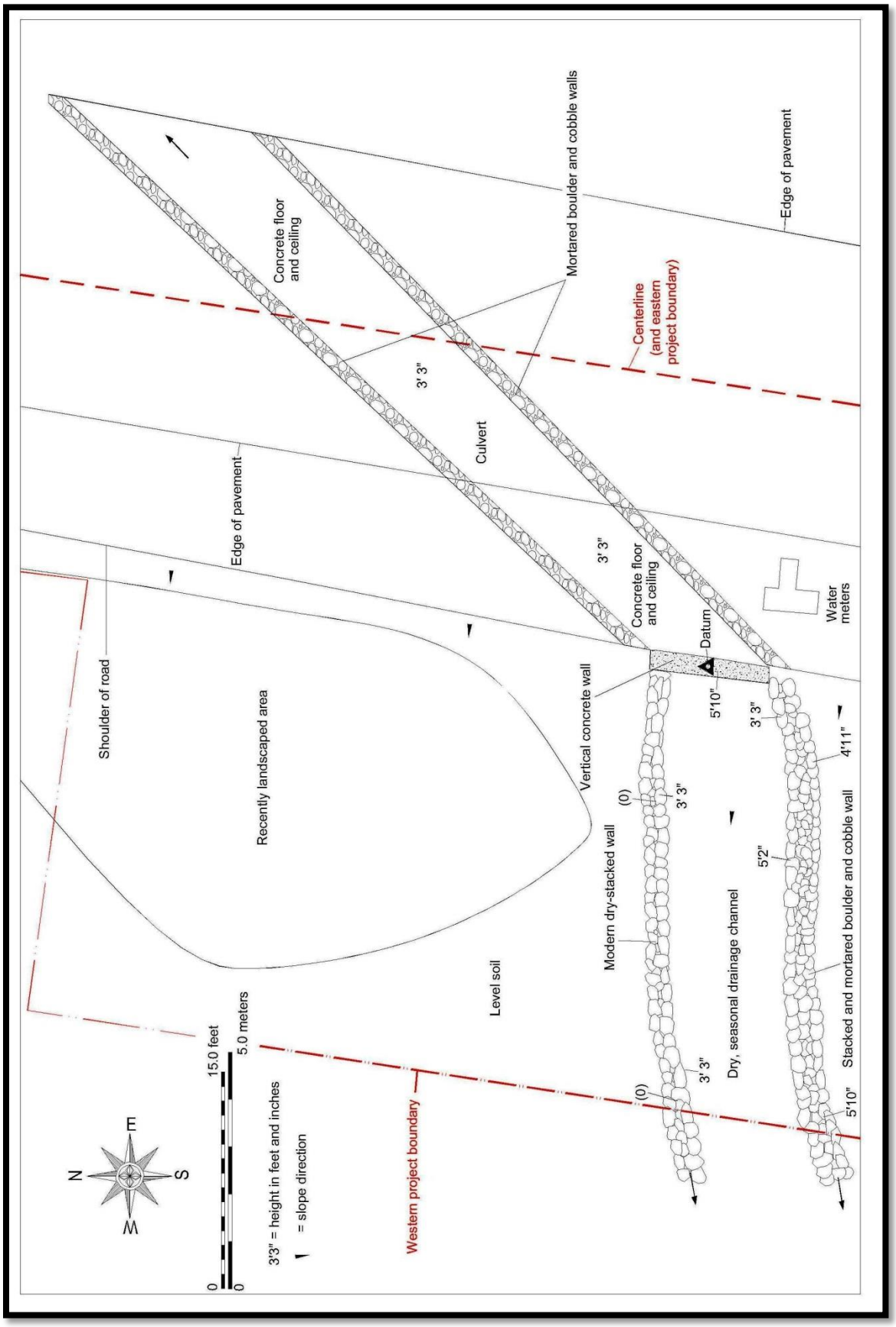

Figure 23. Site 30667 plan map

Figure 24. Site 30667 culvert (view to east)

Figure 25. Site 30667, interior of culvert (view to south)

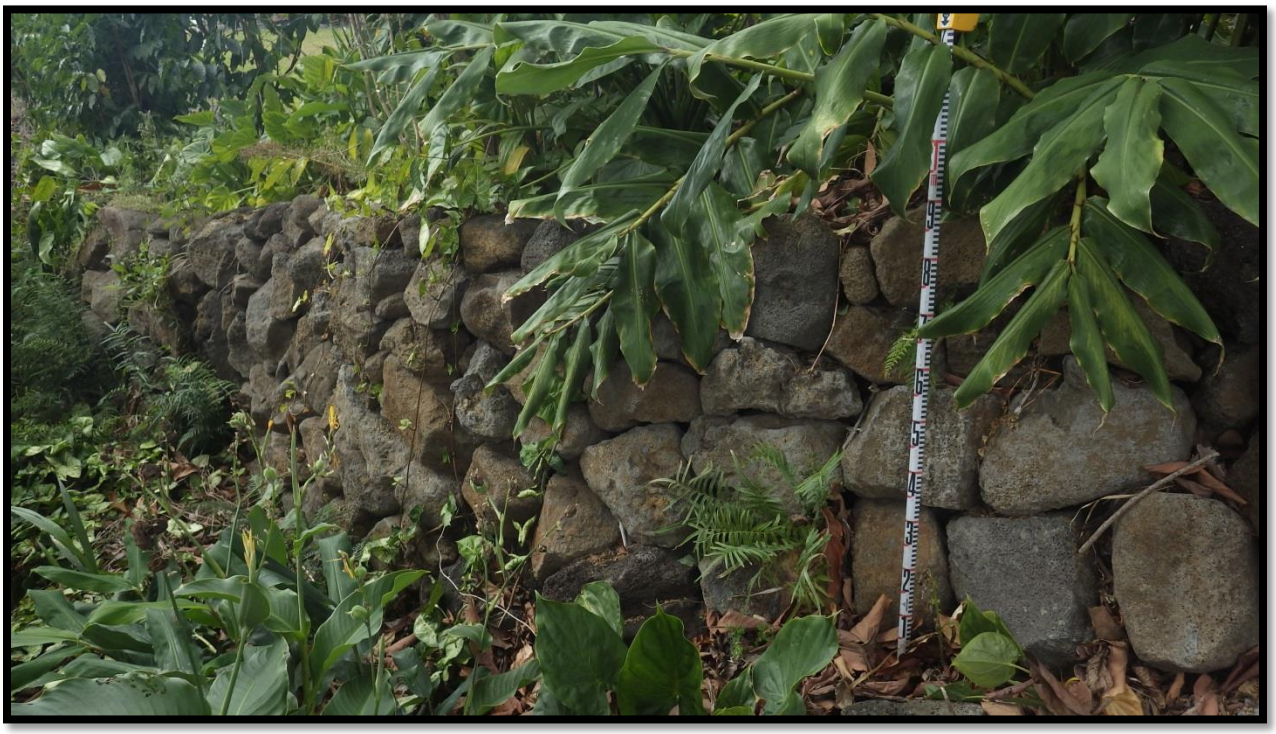

Figure 26. Site 30667, northern wall of drainage channel (view to north-northeast)

Figure 27. Site 30667, southern wall of drainage channel (view to south-southwest)

height from 3 ft, 3 inches (1.0 meters) to 5 ft, 10 inches (1.8 meters). The walled drainage extends to the west outside the project area corridor an undetermined distance.

Site 30667 is interpreted as an historic water control feature used to channel runoff from seasonal, unnamed stream drainage beneath the Mamalahoa Highway. This is based on the site's formal type and appearance. It is unaltered and in good condition. The site is assessed as significant per HAR §13-275-6 under Criterion d (information content).

Site 30668

Site 30668 consists of the disturbed remnant of a stone wall along the seaward side of the highway in Kahului 1 Ahupua'a (see **Map 3**; **Figure 15**). The wall remnant is 90 ft long (27.5 meters; north-south), 2ft, 9 inches to 5ft, 2 Inches (0.85 to 1.6 meters) wide, and 1 ft, 7 inches to 2 ft 1 inch (0.5 to 0.65 meters) high. It consists of one to three courses of stacked boulders and cobbles, likely representing the basal portion of the wall. An overview of the wall is depicted in **Figure 28**.

Figure 28. Site 30668 wall (view to north)

Site 30668 is interpreted as the probable remnant of a livestock control wall, based on its formal type and appearance. It was likely used to restrict grazing cattle from entering the adjacent road. The site is unaltered and in poor condition. Site 30668 is assessed as significant per HAR §13-275-6 under Criterion d (information content).

Site 30669

Site 30669 consists of a culvert that channels water from the Wai'aha Stream drainage beneath the Mamalahoa Highway in Wai'aha 1 Ahupua'a (see **Map 5**; **Figure 17**). The site encompasses an overall area of 116 ft, 5 inches (35.5 meters) long and 41 ft, 11 inches (12.8 meters) wide (**Figure 29**). The site consists of a culvert that extends beneath the Mamalahoa Highway, with concrete wing walls on the western, downslope side (**Figure 30**). The floor, ceiling and walls of the culvert are formed concrete. The walls and ceiling have been painted with graffiti (**Figure 31**). The culvert is 24 ft, 7 inches (7.5 meters) long (east-west), 20 ft (6.1 meters) wide, and 7 ft, 4 (2.25 meters) to 10 ft, 1 inch (3.1 meters) high.

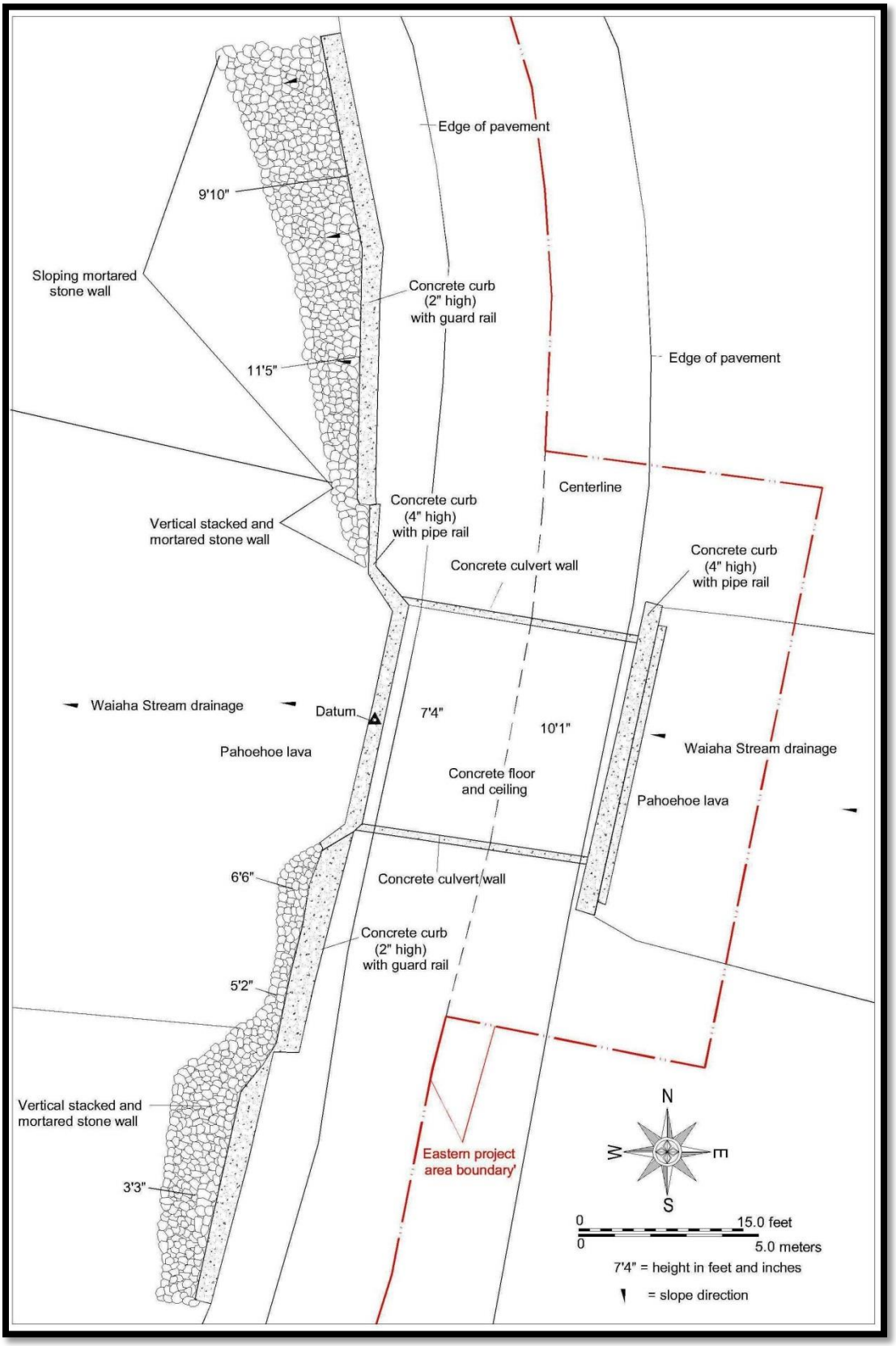

Figure 29. Site 30669 plan map

Figure 30. Site 30669 culvert (view to east-northeast)

Figure 31. Site 30669, interior of culvert (view to north-northeast)

Formed concrete curbs extend along the east and west sides of the highway. The curb on the west side is 116 ft, 5 inches (35.5 meters) long (north-south) and 1 foot, 7 Inches (0.5 meters) to 2 ft, 5 inches (0.75 meters) wide. The curb on the east side is 28 ft, 6 inches (8.7 meters) long (north-south) and 1 foot, 6 inches (0.46 meters) wide. Both curbs are approximately 4 inches (0.12 meters) high containing welded pipe railings over the culvert (see **Figure 30** and **Figure 32**). Metal guard rails are located on the remaining curb on the west side (**Figure 33**).

There are retaining walls below the highway to the south and immediately north of the culvert on the western side (see **Figure 33**). These are comprised of vertical, stacked and faced boulders and cobbles and range and height from 3 ft, 3 inches (1.0 meters) to 6 ft, 6 inches (2.0 meters). The area to the north contains sloping stacked and mortared boulder and cobble walls that are 9 ft, 10 inches (3.0 meters) to 11 ft, 5 inches (34.5 meters) high.

According to the State of Hawai‘i Historic Bridge Inventory and Evaluation report (MKE Associates LLC 2013:6-18), the Site 30669 culvert corresponds to the Wai‘aha Bridge, a Concrete Slab bridge type with a Horizontal Metal railing type, originally built in 1920 . The State of Hawai‘i Historic Bridge Inventory and Evaluation report describes the Wai‘aha Bridge as follows:

> This bridge has lost integrity due to railing replacement in 2008. The original qualities have not been retained and there is insufficient distinction to mitigate the loss of integrity to its railing. In 2006 the bridge was damaged in an earthquake and the wing walls were replaced in 2007. (MKE Associates LLC 2013:6-18)

Site 30669 is interpreted as interpreted as an historic water control feature used to channel water from the Wai‘aha Stream drainage beneath the Mamalahoa Highway. The site has been altered by the 2006 earthquake and rebuilt and is currently in fair condition. Site 30669 is assessed as significant per HAR §13-275-6 under Criterion d (information content).

Site 30670

Site 30670 is a complex comprised of a culvert that extends beneath the highway (Feature A) and a linear stone wall (Feature B) in Pua‘a 3 Ahupua‘a (see **Map 5**; **Figure 17**). The site encompasses an area 75 ft, 5 inches (23.0 meters) long (north-south) and 71 ft, 10 inches (21.9 meters) wide (**Figure 34**) and is located 30 meters north of the Site 30669 bridge. The Feature A culvert is similar to the Site 30667 culvert, with formed concrete floor and ceiling and walls built of stacked and mortared boulders and cobbles (**Figure 35**). The culvert is 26 ft, 10 inches (8.2 meters) long (north-northeast by south-southwest) and 9 ft, 2 inches to 12 ft, 5 inches (2.8 to 2.8 meters) wide. The ceiling heights range from 7 ft (2.15 meters) to 7 ft, 4 inches (2.25 meters).

There is a formed concrete slab located outside the culvert on the western side. There are sloping mortared boulder and cobble walls present to the north and south of the west end of the culvert. These walls are 6 ft, 6 inches (2.0 meters) to 8 ft, 2 inches (2.5 meters) high. There are vertical mortared boulder and cobble wing walls on the eastern side of the culvert, measuring 6 ft (1.85 meters) to 6 ft, 6 inches (2.0 meters) high.

The Feature B wall originates against the northern retaining wall along the west side of the Feature A culvert. It extends to the southwest for 29 ft, 6 inches (9.0 meters) where it exits the project area corridor. The wall continues in this direction an undetermined distance. The wall is built of stacked boulders and cobbles, and is 2 ft, 11 inches (0.9 meters) wide and 5 ft, two inches (1.5 meters) to 6 ft, 6 inches (2.0 meters) high. A portion of the wall is presented in **Figure 36**.

The Feature A culvert is interpreted as an historic water control feature used to divert runoff from a seasonal, unnamed stream drainage beneath the Mamalahoa Highway. The Feature B wall is assigned a livestock control

Figure 32. Site 30669, inland side of culvert showing railing (view to east)

Figure 33. Site 30669, seaward side of culvert showing railings and walls (view to northeast)

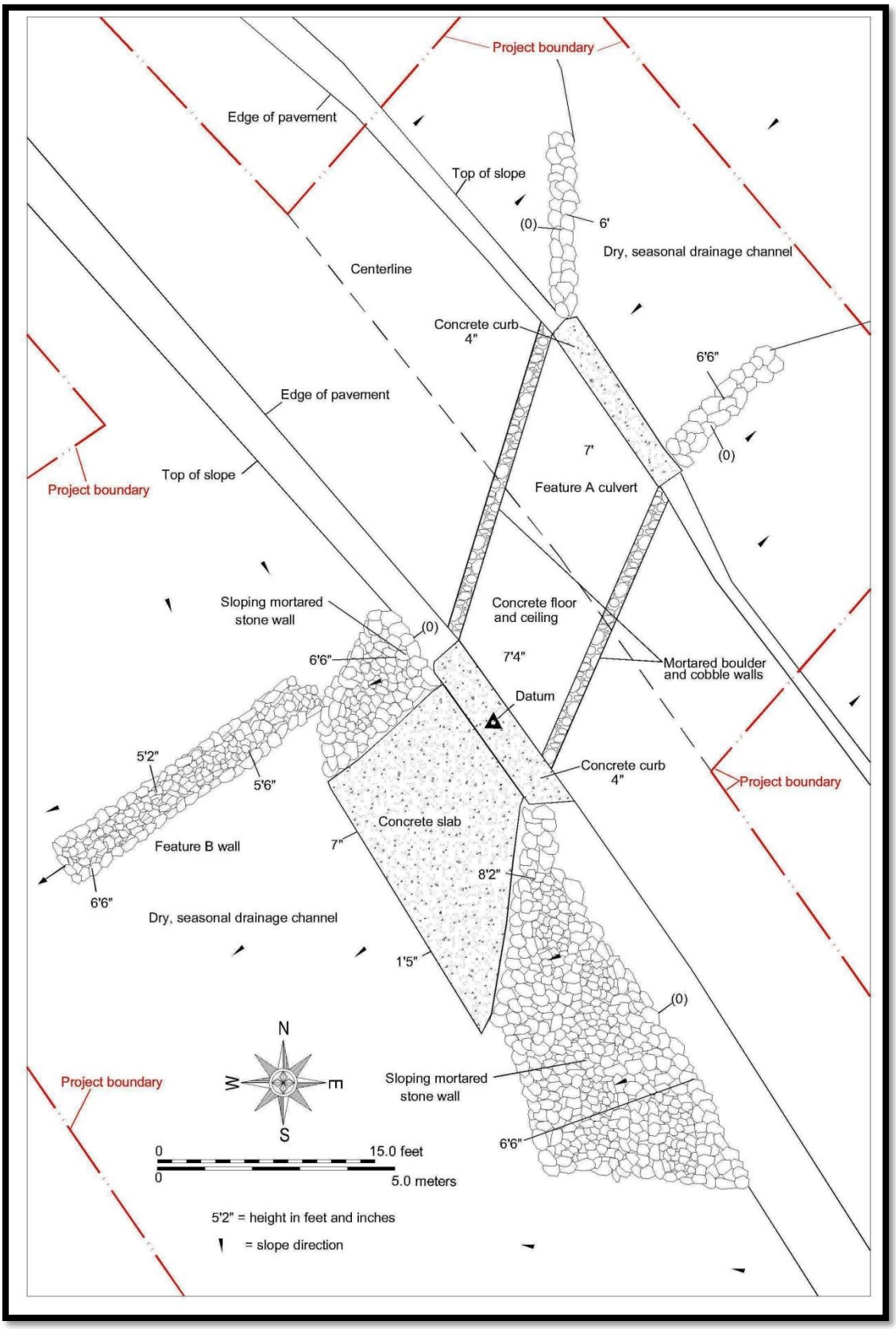

Figure 34. Site 30670 plan map

Figure 35. Site 30670, Feature A culvert (view to east)

Figure 36. Site 30670, Feature B wall (view to north)

feature likely built to prevent grazing cattle from entering the drainage channel. These interpretations are based on the feature's formal type and appearance. The site unaltered and in fair to good condition. It is assessed as significant per HAR §13-275-6 under Criterion d (information content).

Site 30671

Site 30671 is a retaining wall located on the western side of the highway in Pua'a 3 Ahupua'a (**Map 6; Figure 18**). The wall is 85 ft, 7 inches (26.1 meters) long (northwest by southeast) and varies in width from 1 ft 7 inches (0.5 meters) to 6 ft, 6 inches (2.0 meters) wide. The retaining wall is level with the adjacent road surface on the inland side and is 3 ft, 3 inches (1.0 meters) to 6 ft, 11 inches (2.1 meters) high on the seaward side. Modern tires and milled lumber from an adjacent residence is piled against the wall (**Figure 37**).

Site 30671 is interpreted as a transportation-related feature, used to reinforce the adjacent highway. The site is altered and fair condition. It is assessed as significant per HAR §13-275-6 under Criterion d (information content).

Figure 37. Site 30671 retaining wall (view to north)

Site 30672

Site 30672 is a retaining wall located on the western side of the highway in Pua'a 3 Ahupua'a (see **Map 7; Figure 19**). The wall is 55 ft, 5 inches (16.9 meters) long (northwest by southeast) and averages 1 foot, 11 inches (0.6 meters) wide (**Figure 38**). The inland side of the retaining wall is level with the adjacent road surface, and the seaward side is 3 ft, 11 inches (1.2 meters) to 4 ft, 7 inches (1.4 meters) high. Utilities associated with an adjacent residence extend through the wall.

Site 30672 is interpreted as a transportation-related feature, used to reinforce the adjacent highway. The site is altered and in poor to fair condition. It is assessed as significant per HAR §13-275-6 under Criterion d (information content).

Figure 38. Site 30672 retaining wall (view to east)

Figure 39. Site 30673 retaining wall (view to east)

Site 30673

Site 30673 is a retaining wall located on the western side of the highway in Pua‘a 1 Ahupua‘a. (see **Map 9**; **Figure 21**). The retaining wall is 150 ft, 7 inches (45.9 meters) long (north-south) and averages 2 ft, 3 inches (0.7 meters) wide (**Figure 39**). The inland side of the retaining wall is level with the adjacent road surface, and the seaward side is 4 ft, 7 inches (1.4 meters) to 6 ft, 6 inches (2.0 meters) high.

Site 30673 is interpreted as a transportation-related feature, used to reinforce the adjacent highway. The site is altered and in poor to fair condition. It is assessed as significant per HAR §13-275-6 under Criterion d (information content).

Site 30674

Site 30674 is a culvert that extends beneath the Mamalahoa Highway in Pua‘a 2 Ahupua‘a (see **Map 8**; **Figure 20**). The site encompasses an area 60 ft (18.3 meters) long (north-northwest by south-southeast) and 33 ft (10.1 meters) wide (**Figure 40**). The culvert is similar to the Site 30667 and 30670 culverts, with a formed concrete floor and ceiling and walls built of stacked and mortared boulders and cobbles (**Figure 41** and **Figure 42**). The culvert is 17 ft, 8 inches (5.4 meters) long (east-northeast by west-southwest), 5 ft, 8 inches to 6 ft, 6 inches (1.75 to 2.0 meters) wide and 6 ft to 8 ft 9 inches (1.83 to 2.67 meters) in height.

There is a formed concrete slab located outside the culvert on the western side. There are sloping mortared boulder and cobble walls present to the north and south of the west end of the culvert. These walls are 6 ft, 6 inches (2.0 meters) to 8 ft, 2 inches (2.5 meters) high (**Figure 43**).

The culvert is interpreted as an historic water control feature used to divert runoff from a seasonal, unnamed stream drainage beneath the Mamalahoa Highway. This is based on its formal type and appearance. The site unaltered and in fair condition. It is assessed as significant per HAR §13-275-6 under Criterion d (information content).

Site 30675

Site 30675 is a stone wall located along the seaward side of the highway in Auhaukea‘e 2 Ahupua‘a (see **Map 10**; **Figure 22**). The wall measures 166 ft (50.6 meters) long (north-northwest by south-southeast) and 2 ft, 3 inches (0.7 meters) to 2 ft, 11 inches (0.9 meters) tall. Sections of the wall have collapsed, although intact, stacked and roughly faced sections are present. The intact sections average 2 ft, 11 inches (0.9 meters) tall built of boulders and cobbles with a core-filled cobble interior (**Figure 44**). Concrete mortar has been added to the base of the wall in several locations (**Figure 45**).

Site 30675 is interpreted as a livestock control wall used to restrict grazing cattle from entering the adjacent road. This is based on its height and method of construction. The site is altered and in fair condition. Site 30675 is assessed as significant per HAR §13-275-6 under Criterion d (information content).

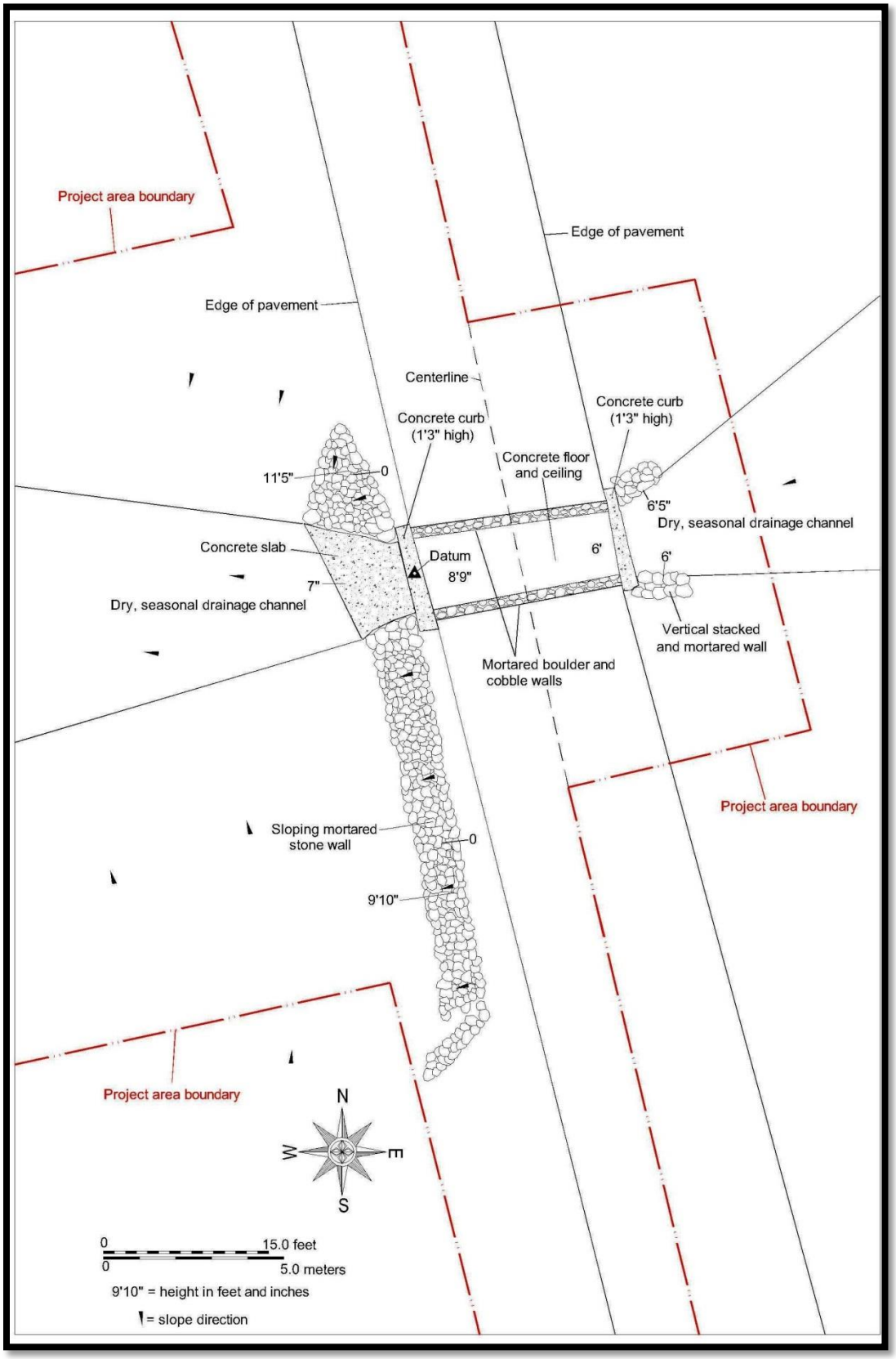

Figure 40. Site 30674 plan map

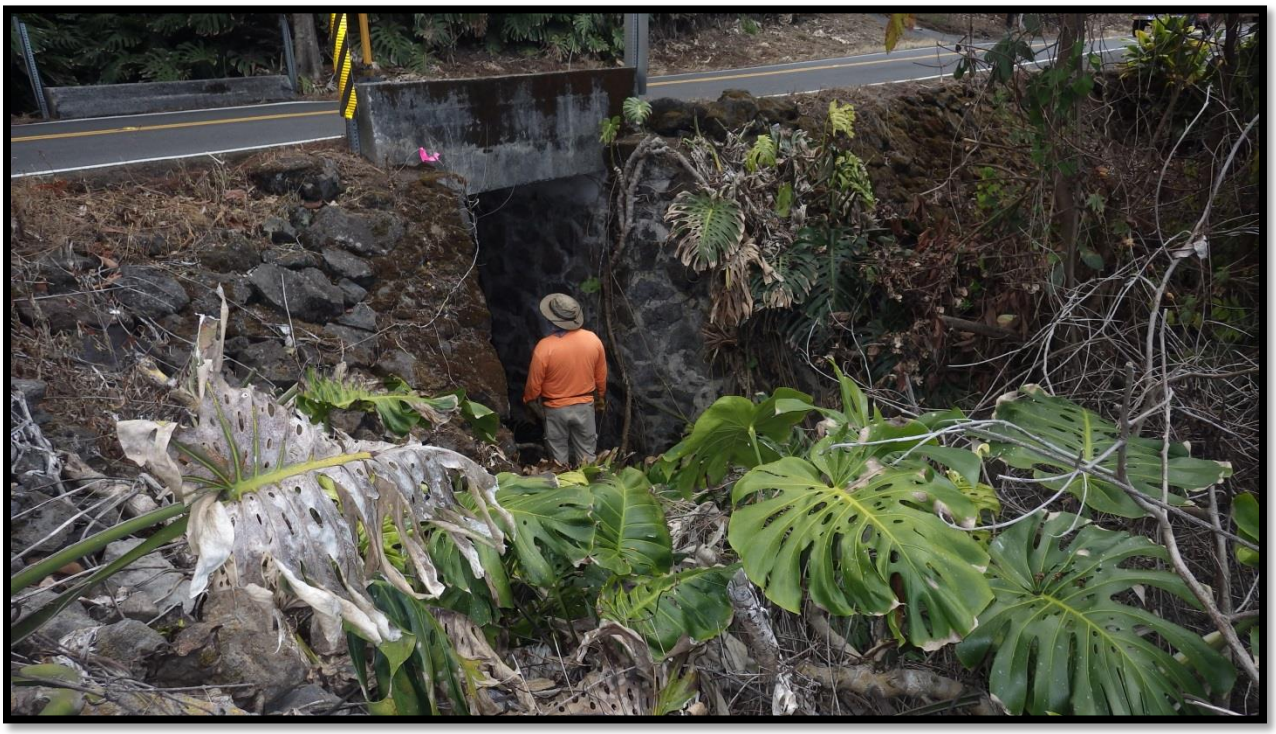

Figure 41. Site 30674 culvert (view to southeast)

Figure 42. Site 30674, interior of culvert (view to east)

Figure 43. Site 30674 retaining wall (view to east)

Figure 44. Site 30675 wall (view to west)

Figure 45. Site 30675 wall with concrete at base (view to west)

CONCLUSION

Discussion

The archaeological inventory survey results conform to the expectations derived from historical and archaeological background research. The nine sites and ten features identified during the project are all associated with the historic Mamalahoa Highway, which was in use as early as the 1880s as depicted in Emerson‘s map of the Kailua area (see **Figure 8**).

Four features (Sites 30667, 30669, 30670, Feature A, and 30674) consist of water control features used to channel stream runoff water safely beneath the highway. The Site 30669 Wai‘aha Bridge was originally constructed in 1920 but portions of it have subsequently been re-built. The remaining culverts likely date to the mid 20th Century based on their appearance.

Three of the features (Sites 30671, 30672, and 30673) are retaining walls built to support the seaward side of the highway. These features also interpreted as dating to the mid 20th Century due to their appearance. Two of the features (Sites 30668 and 30675) are stone walls likely constructed to prevent grazing livestock from entering the road. The remaining feature (Site 30670, Feature B) is a stone wall used to keep cattle out of an adjacent stream drainage. The walls were likely built soon after the construction of the upland road.

Significance Assessments

The sites identified during the survey are assessed for significance based on Hawai‘i Administrative Rules (HAR) §13-275-6. According to (HAR) §13-275-6 (b), a site must possess integrity of location, design, setting, materials, workmanship, feeling, and association and shall meet one or more of the following criteria:

1. **Criterion "a"**: Be associated with events that have made an important contribution to the broad patterns of our history;
2. **Criterion "b"**: Be associated with the lives of persons important in our past;
3. **Criterion "c"**: Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; or possess high artistic value;
4. **Criterion "d"**: Have yielded, or is likely to yield, information important for research on prehistory or history;
5. **Criterion "e":** Have an important traditional cultural value to the native Hawaiian people or to another ethnic group of the state due to associations with traditional cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts—these associations being important to the group’s history and cultural identity.

All of the sites within the project area are assessed as significant under Criterion “d” based on the above criteria (**Table 4**). The sites have yielded information important for understanding road infrastructure activity and historic ranching and within the area.

Treatment Recommendations

The mapping, written description and photography of the nine sites in the project area adequately document them and no further work or preservation is recommended (see **Table 4**). The County of Hawai‘i has no plans to impact any of the sites, except the three culverts during the installation of the proposed Wai‘aha Transmission Waterline. The waterline will be suspended within the right-of-way above culverts, where channel side walls will be “notched” to hold the waterline where it re-enters the subsurface.

Table 4. Site significance and treatment recommendations

SIHP Site Number	Site Type	Site Function	Age	Significance criteria*	Treatment recommendation
30667	Culvert	Water control	Historic	d	No further work
30668	Wall	Livestock control	Historic	d	No further work
30669	Culvert	Water control	Historic	d	No further work
30670	Complex	Water control, livestock control	Historic	d	No further work
30671	Retaining wall	Transportation	Historic	d	No further work
30672	Retaining wall	Transportation	Historic	d	No further work
30673	Retaining wall	Transportation	Historic	d	No further work
30674	Culvert	Water control	Historic	d	No further work
30675	Wall	Livestock control	Historic	d	No further work

** d = Information content*

TRANSLATION OF HAWAIIAN WORDS[1]

a'ā –lava; stony

ahupua'a - traditional Hawaiian land unit usually extending from the uplands to the sea

holua – Sled, especially the ancient sled used on grassy slopes; the sled course

heiau – Pre-Christian place of worship, shrine

kihapai – cultivated patch, garden, orchard, field, small farm

konohiki – headman of an *ahupua'a* land division under the chief

Māhele - land division of 1848

makai – towards ocean

mauka – inland

[1] - from wehewehe.org

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