DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAI'I
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February 6, 2015

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OFC. OF ENVIRONMENTAL QUALITY CONTROL

Ms. Jessica Wooley, Director
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu HI 96813

FINAL ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT FOR PI'IHONUA-KUKUAU RESERVOIR AND TRANSMISSION IMPROVEMENTS, TAX MAP KEYS (3RD) 2-5-065:037; VARIOUS COUNTY ROAD RIGHTS-OF-WAY 2-5-060 (HOKULANI STREET), 2-5-035 (HOKULANI STREET), AND 2-5-011 (KAUMANA DRIVE); EASEMENTS OVER 2-5-006:061, 142 AND 149, AND 2-4-075:49, HILO, SOUTH HILO DISTRICT, HAWAI'I ISLAND, STATE OF HAWAI'I

The Hawai'i County 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 MS Word.

Should there be any questions, please contact Mr. Lawrence Beck of our Water Resources and Planning Branch at 961-8070, extension 260.

Sincerely yours,

Quirino Antonio, Jr., P.E.
Manager-Chief Engineer

LB:dfg

Enc.

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

OEQC PUBLICATION FORM

Project Name Pi'ihonua-Kukuau Reservoir and Transmission Improvements
Island: Hawai'i
District: South Hilo
TMK: **(**3rd) TMKs: 2-5-065:037; Various County Road Rights-of-way 2-5-060 (Hokulani Street), 2-5-035 (Hokulani Street), and 2-5-011 (Kaumana Drive); Easements Over 2-5-006:061, 142 and 149, and 2-4-075:49
Permits: County of Hawai'i, Department of Public Works: Grubbing and Grading Permits, Permit for Work in County ROW, Building Division Approval and Building Permit
County of Hawai'i, Planning Department Plan Approval
Department of Health, National Pollutant Discharge Elimination System Permit

Proposing/Determination Agency:

Hawai'i County Department of Water Supply
345 Kekuanaoa Street, Suite 20
Hilo, Hawai'i 96720
Attn Larry Beck, P.E.
Ph. (808) 961-8070 X260

Consultant:

Geometrician Associates
PO Box 396
Hilo HI 96721
Ron Terry Ph. (808) 969-7090 rterry@hawaii.rr.com

Status (check one only):

__DEA-AFNSI — Submit the proposing agency notice of determination/transmittal on agency letterhead, a hard copy of DEA, a completed OEQC publication form, along with an electronic word processing summary and a PDF copy (you may send both summary and PDF to oeqchawaii@doh.hawaii.gov); a 30-day comment period ensues upon publication in the periodic bulletin.

_x_FEA-FONSI — Submit the proposing agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and a PDF copy (send both summary and PDF to oeqchawaii@doh.hawaii.gov); no comment period ensues upon publication in the periodic bulletin.

__FEA-EISPN — Submit the proposing agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and PDF copy (you may send both summary and PDF to oeqchawaii@doh.hawaii.gov); a 30-day consultation period ensues upon publication in the periodic bulletin.

__Act 172-12 EISPN — Submit the proposing agency notice of determination on agency letterhead, an OEQC publication form, and an electronic word processing summary (you may send the summary to oeqchawaii@doh.hawaii.gov). NO environmental assessment is required and a 30-day consultation period upon publication in the periodic bulletin.

__DEIS — The proposing agency simultaneously transmits to both the OEQC and the accepting authority, a hard copy of the DEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the DEIS (you may send both the summary and PDF to oeqchawaii@doh.hawaii.gov); a 45-day comment period ensues upon publication in the periodic bulletin.

__FEIS — The proposing agency simultaneously transmits to both the OEQC and the accepting authority, a hard copy of the FEIS, a completed OEQC publication form,

a distribution list, along with an electronic word processing summary and PDF copy of the FEIS (you may send both the summary and PDF to oeqchawaii@doh.hawaii.gov); no comment period ensues upon publication in the periodic bulletin.

__ Section 11-200-23 Determination

The accepting authority simultaneously transmits its determination of acceptance or nonacceptance (pursuant to Section 11-200-23, HAR) of the FEIS to both OEQC and the proposing agency. No comment period ensues upon publication in the periodic bulletin.

__Section 11-200-27 Determination

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

__Withdrawal (explain)

Summary The County of Hawai‘i, Department of Water Supply (DWS) prepared an EA and issued a FONSI in 1996 for a water system improvements project in upper Hilo. Since then, only one segment of the transmission waterline was installed. Upon re-evaluation, DWS determined that the planned reservoir required upsizing. Because of this, as well as changes in the project area and permit requirements, DWS has decided to prepare another EA. In addition to the reservoir, which will be 25 feet high and about 130 feet in diameter, improvements on the reservoir property include flow control valves and piping for water level control, paving and fencing. The length of new transmission line is 6,500 feet. The Project promotes public health and safety by improving water storage capacity for the Hilo area. The contractor will implement Best Management Practices that minimize the impact of sediment, storm water runoff and construction materials on receiving waters. Most parts of the Project site have already been heavily disturbed through sugar cane agriculture, subdivision, paving and previous waterline infrastructure projects. No archaeological sites are present, but archaeological monitoring will be conducted in one undeveloped section. Biological surveys found mainly alien organisms and no threatened or endangered species. There will be vegetation removal timing and/or nest survey restrictions to minimize impacts to Hawaiian hoary bats and Hawaiian Hawks. No cultural resources are present and there are no traditional and customary practices that require protection. Landscaping in conformance with requirements will be installed.

FINAL ENVIRONMENTAL ASSESSMENT

PI‘IHONUA-KUKUAU RESERVOIR AND TRANSMISSION IMPROVEMENTS

DWS JOB NO. 94-590

TMKs: (3rd) 2-5-065:037; Various County Road Rights-of-way 2-5-060 (Hokulani Street), 2-5-035 (Hokulani Street), and 2-5-011 (Kaumana Drive); Easements Over 2-5-006:061, 142 and 149, and 2-4-075:49 Hilo, South Hilo District, Hawai‘i Island, State of Hawai‘i

February 2015

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

FINAL ENVIRONMENTAL ASSESSMENT

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PROPOSING/
APPROVING 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) prepared an Environmental Assessment (EA) and issued a Finding of No Significant Impact in 1996 for a water system improvements project in upper Hilo. The Project included a new 1.0 million-gallon (MG) reservoir on a property on Haleloke Street, relocation of an existing water main at the reservoir site, and construction of 8,400 linear feet of 16-inch transmission main from the new reservoir to the Sunrise Estates Subdivision on Kukuau Street. Existing water lines were planned to be retained to provide system redundancy.

In 2008, DWS conducted a systematic review of the Project, concluding that the reservoir required upsizing to 2.0 MG in order to meet current and future demand. In addition to the reservoir structure, which will be 25 feet high and about 130 feet in diameter, improvements on the reservoir property include flow control valves and piping for water level control, paving, fencing and appurtenant improvements. The remaining elements of the Project are identical or have changed in only minor ways, including a reduction in the overall length of new transmission line to 6,500 feet, as the portion along Haleloke Street was subsequently installed by a private developer. In 2014, DWS completed additional studies and decided that it was ready to proceed with construction. Because of the substantial change in reservoir size, DWS has determined that another environmental assessment is required.

The Project promotes public health and safety by improving water storage capacity for the Hilo area. The contractor will obtain a National Pollutant Discharge Elimination System permit with Best Management Practices that minimize the potential impact of sediment, storm water runoff and construction materials on receiving waters. Most parts of the Project site have already been heavily disturbed through sugar cane agriculture, subdivision, paving and previous waterline infrastructure projects. An archaeological inventory survey determined that no historic properties are present, but archaeological monitoring will be conducted in one section as part of an approved survey for an undeveloped portion of the project site. Biological surveys found mainly alien organisms and no threatened or endangered species. There will be vegetation removal timing and/or nest survey restrictions to minimize impacts to Hawaiian hoary bats and Hawaiian Hawks. No cultural resources are present and there are no traditional and customary practices that require protection. Landscaping in conformance with requirements will be installed.

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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) prepared an Environmental Assessment (EA) in 1996 for a water system improvements project in upper Hilo (“the Project”). One aspect of the Project involved construction of a new 1.0 million-gallon (MG) reservoir with appurtenances on portion of a large parcel of land that was at the time in the process of subdivision, but which is now a 46,276 square foot (sf) property within Punahoa Mauka Estates subdivision on Haleloke Street, identified as TMK (3rd) 2-5-065:037 (Figures 1, 2 & 3b). The Project also included minor relocation of an existing water main that cuts diagonally in an easement across the proposed reservoir site, and construction of approximately 8,400 feet of 16-inch transmission main from the reservoir to the Sunrise Estates Subdivision on Kukuau Street along County roads within TMK plats 2-5-060 (Hokulani Street); 2-5-035 (Hokulani Street); 2-5-011 (Kaumana Drive); and on easements within properties 2-5-006:061 (owner: Kidds Development),142 (State of Hawai‘i) and 149 (Brilhante Hawaii Inc.), and 2-4-075:049 (Maxine Pacheco) (Figure 3a). Existing water lines were planned to remain to provide system redundancy. As shown in the aerial view Figure 1c, most of the waterline corridor is on already developed streets, but a portion is on undeveloped non-native forest land between Kaumana Drive and Kukuau Street, along a route that follows an existing water main.

The County DWS determined on September 9, 1996, that no significant impacts would occur as a result of the project and issued a Finding of No Significant Impact. This allowed the project to proceed, although it was not built because of delays in transferring the reservoir site lot to DWS due to multiple ownership changes, easement acquisitions and other factors. In 2008, DWS reached an agreement with the property owner for payment for the reservoir site. DWS conducted a systematic project review, concluding that one particular aspect required adjustment for optimal functioning of the system. The original 1.0 MG reservoir was planned to be upsized to 2.0 MG to accommodate current and estimated future demand for the service area (Figure 3). The reservoir will be 25 feet high and about 130 feet in diameter, which can be accommodated on the approximately one-acre lot. In addition to the reservoir structure itself, improvements on the reservoir property will include the water main relocation, flow control valves and piping for water level control, paving, fencing, and appurtenant improvements. The remaining elements of the Project are identical or have changed in only minor ways, including a reduction in the overall length of new transmission line to 6,500 feet, as the portion along Haleloke Street was subsequently installed by a private developer. In 2014, DWS completed additional studies and decided that it was ready to proceed with construction.

Because of the substantial change in reservoir diameter (roughly 40%) and reservoir volume (100%), DWS has determined that another Environmental Assessment (SEA) is required.

Figure 1a. General Location Map

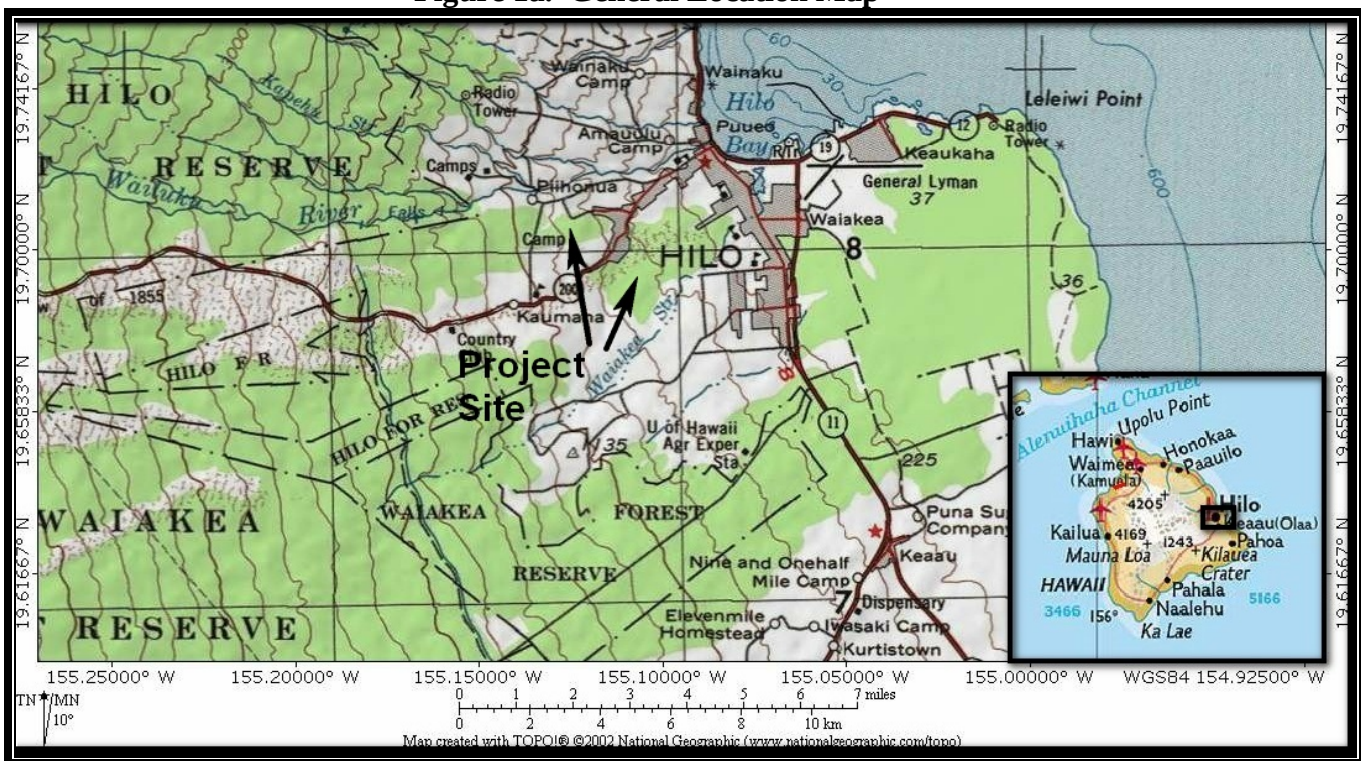


Figure 1b. Reservoir Site TMK Map

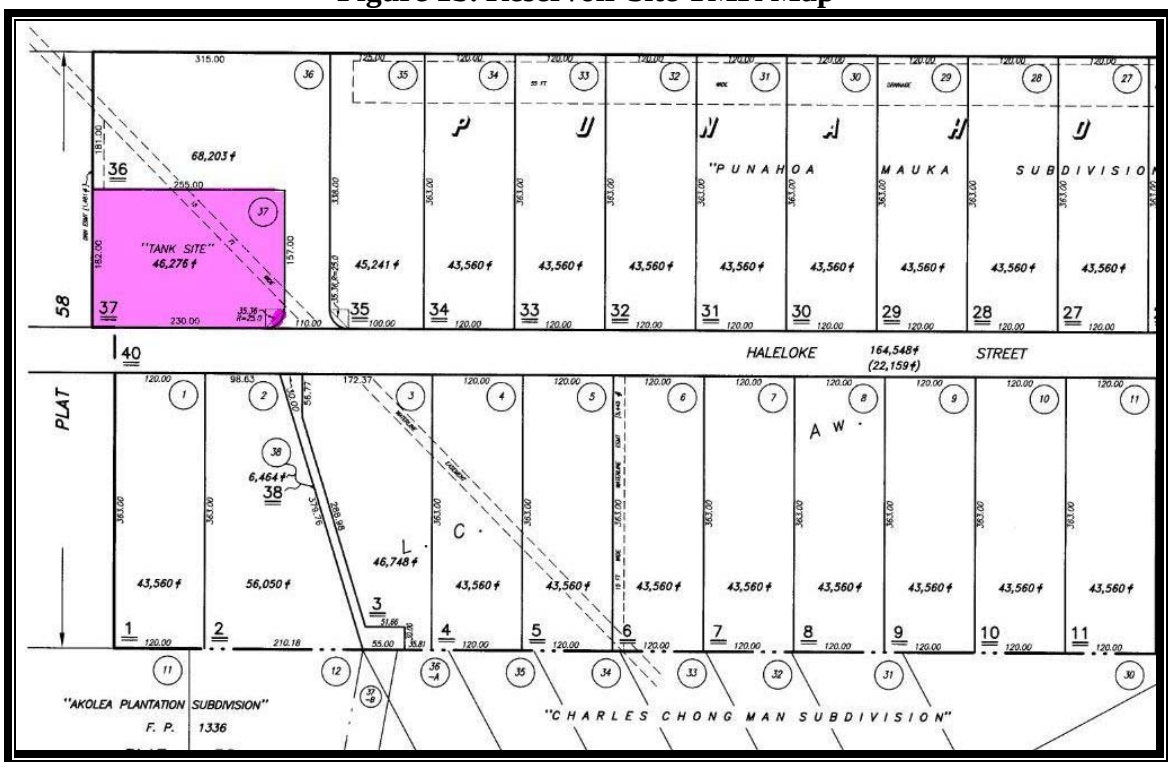


Figure 1c Aerial Image

Figure 2. Project Site Photos

Reservoir Site from Southeast ▲ ▼ Reservoir Site from Southwest

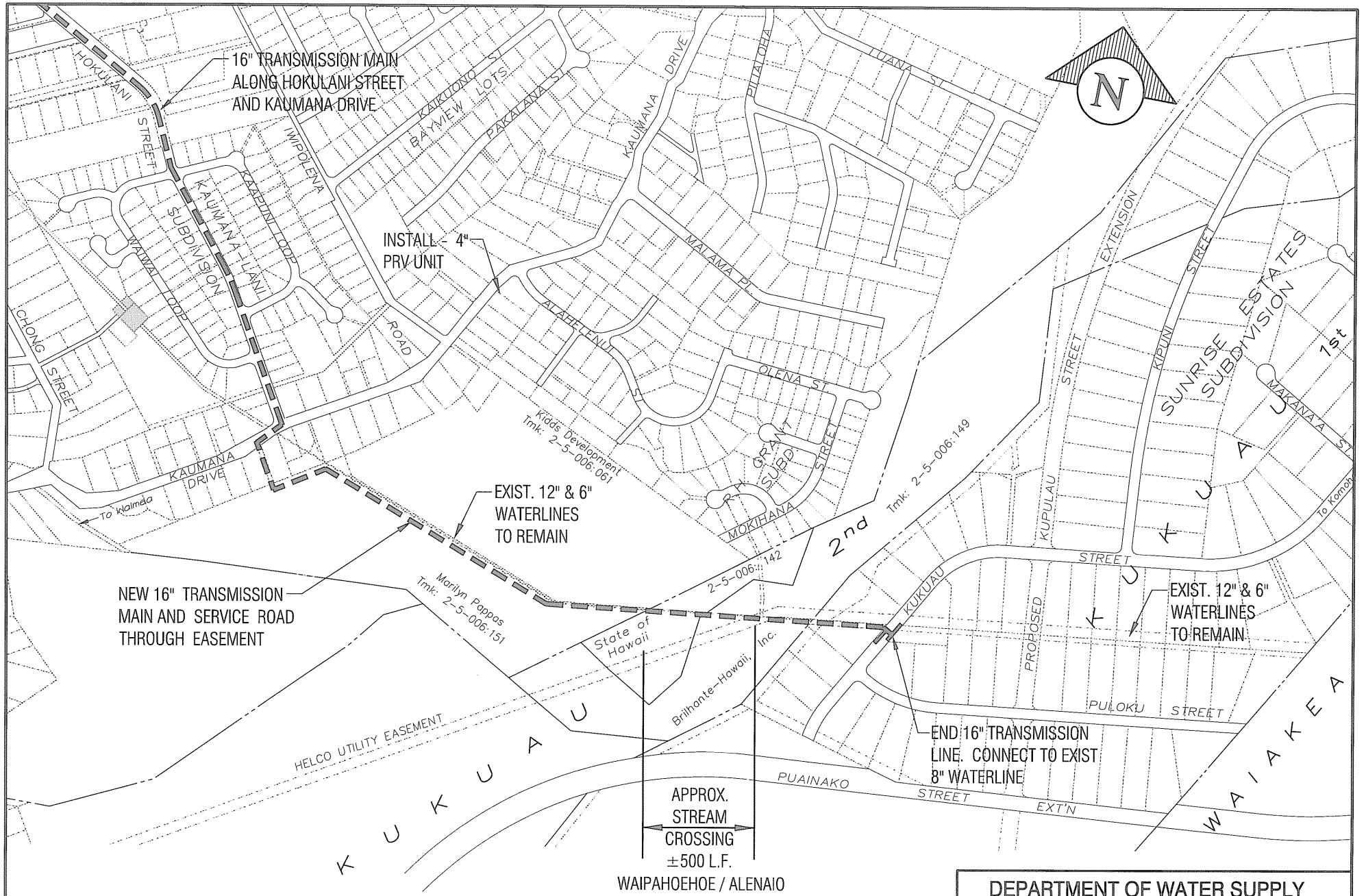
Figure 2 Project Site Photos (cont'd)

View Makai from end of Hokulani Street and Completed Transmission Line ▲

▼ Hokulani Street Waterline Corridor

Figure 2 Project Site Photos (cont'd)

Transmission Line Route Near Kukuau Street ▲ ▼ Transmission Line Route near Waipahoehoe Stream



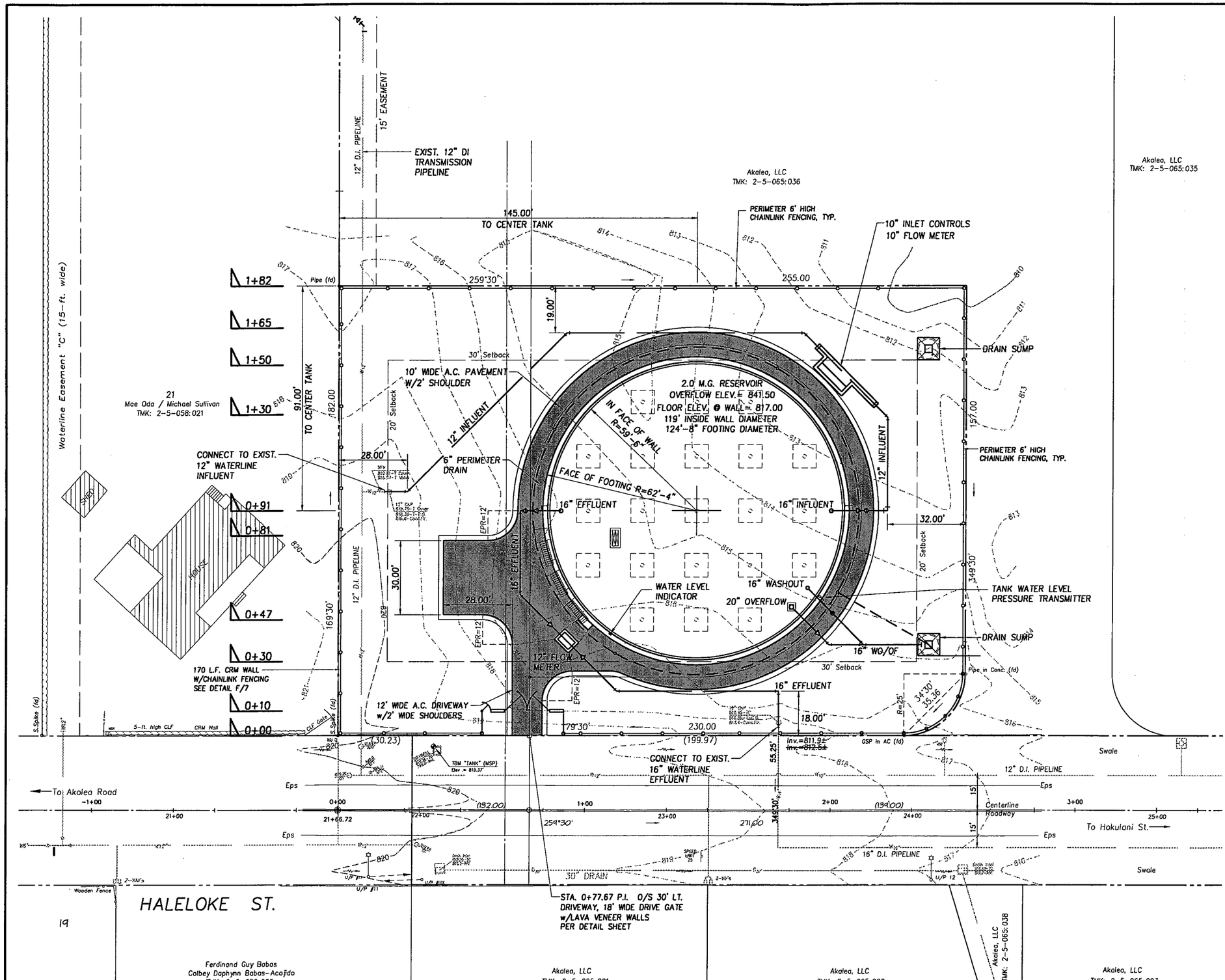
INABA ENGINEERING, INC.
273 WAIANUENUE AVE.
HILO, HAWAII 96720

LOCATION PLAN

NOT TO SCALE

DEPARTMENT OF WATER SUPPLY
COUNTY OF HAWAII

PIIHONUA-KUKUAU RESERVOIR
AND TRANSMISSION IMPROVEMENTS
JOB NO. 94-590



RESERVOIR SITE

SCALE: 1"=20'

JASON K. INABA LICENSED PROFESSIONAL ENGINEER No. 6188-C HAWAII, U.S.A. PRELIMINARY

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.

DEPARTMENT OF WATER SUPPLY
COUNTY OF HAWAII

PROJECT: PIIHONUA - KUKUAU RESERVOIR AND TRANSMISSION IMPROVEMENTS

RESERVOIR SITE LAYOUT PLAN

DWG. NO. CR-1

SHEET NO. OF SHEETS

JOB NO. 94-590

The Project is expected to cost in the range of $5 million to $6 million, with the reservoir accounting for approximately $2.5 million. The additional cost of upsizing is estimated at $1.0 million. If approvals and funding proceed as planned, design will be finished by the winter of 2014, and construction may start as soon as spring 2015 and finish within approximately 18 to 24 months. These estimates will be refined as the Project proceeds.

1.2 Purpose and Need

The Project will promote public health and safety by improving water service for the Hilo community. The improvements are necessary to increase the storage capacity of the Pi‘ihonua water system service area – which would provide additional reserve during power outages and help optimize pumping hours – and to improve water pressure for existing and entitled developments. Although the interconnection of the Hilo water system allows some flexibility in locating storage and transmission facilities, the Pi‘ihonua water service area provides the best overall location for the required function, as it is already served by a water main and is in the vicinity of deep wells. The reservoir site on Haleloke Street is at the proper elevation to provide optimum service. In addition to providing critical storage at an elevation where it would be usable to serve a large number of customers during a power outage, the tank location is well suited in terms of pressure. The elevation would provide pressure relief for the pipeline descending from the upper regions of Pi‘ihonua before pressure becomes excessive. It would also hold adequate working pressures for current and future users to be served at elevations below the tank. Locating the tank higher or lower would not optimize both of these needs. Construction of this new reservoir will also allow the DWS to retire the old Camp POW/Kaumana 50,000-gallon tank, which is non-standard, too small for optimal use, and at the end of its service life.

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.

As discussed in Section 1.1, the County DWS determined on September 9, 1996, that no significant impacts would occur as a result of the project and issued a Finding of No Significant Impact. The 1996 Final EA is incorporated by reference in this document, and is available for review in the *Online Library* at http://hawaii.gov/health/environmental/oeqc/index.html/. For reasons discussed in Section 1.1, the project did not proceed. The original 1.0 MG reservoir is being upsized to 2.0 MG to accommodate current and estimated future demand for the service area. Because of the substantial change in reservoir diameter (roughly 40%) and reservoir volume (100%), DWS has determined that another EA is required.

The remaining features of the Pi‘ihonua-Kukuau Reservoir and Transmission Improvements project are identical or have changed in non-substantial ways. The portion of the proposed transmission line along Haleloke Street and a portion of Hokulani Street were already completed by the private developer of the Punahoa Mauka Estates in fulfillment of their subdivision conditions. The remainder of the route is the same as that covered by the 1996 EA.

However, there have been changes in laws, regulations, and policies – notably policies interpreting the Clean Water Act, new National Pollutant Discharge Elimination System Permit thresholds and requirements, new listed threatened and endangered species and protocols for avoiding impacts, and new standards for archaeological surveys under Chapter 6e, HRS. This EA addresses current laws, regulations and policies for environmental resources and impacts.

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/approving 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:	U.S. Army Corps of Engineers, Honolulu District	
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 Neighboring landowners	Sierra Club

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 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 water system, including the upsized 2.0 MG reservoir, would not be built. At some point in the future the quality of water service in this part of Hilo may not be adequately dependable or able to meet the normal growth in service area demand. 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, including specific temporary construction-related impacts to air quality, noise and traffic, and operational impacts related to the visual and sound environment. The reservoir lot would, however, be available for any uses consistent with its Agricultural 1-acre County zoning, including a single-family home as permissible under rules governing agricultural properties, and various agricultural uses. Because it is unlikely that the property would remain permanently vacant, the No Action Alternative assumes an eventual residential or residential-agricultural use as a baseline of comparison with the Project’s impacts.

2.2 Alternative Locations and Strategies

During early phases of project planning, DWS evaluated its services in Hilo and determined that the Pi‘ihonua water service area provides the best overall location for the required function, as it is already served by a water main and is in the vicinity of deep wells. Furthermore the site on Haleloke Street is at the proper elevation to provide optimum service. In addition to providing critical storage at an elevation where it would be usable to serve a large number of customers during a power outage, the tank location is well suited in terms of pressure. The elevation would provide pressure relief for the pipeline descending from the upper regions of Pi‘ihonua before pressure becomes excessive. It would also hold adequate working pressures for current and future users to be served at elevations below the tank. Locating the tank higher or lower would not optimize both of these needs. The proposed waterline corridor follows the exact alignment of existing waterlines, and no other route would be more direct or economical or less environmentally disruptive. As there do not appear to be severe environmental impacts or other disadvantages associated with the specific project site, which has good access, appropriate land use designations, and no apparent environmental issues, no alternative reservoir sites have been advanced in the Environmental Assessment. There is no other approach to water storage and transmission that would accomplish the goals of the Project.

PART 3: ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION MEASURES

Basic Geographic Setting

The property upon which the new reservoir would be constructed is referred to throughout this EA as the *reservoir site*. The proposed waterline and surrounding areas that could be affected by construction are termed the *waterline corridor*. The generic term *project site* refers to the sum of these two areas. The term *project area* is used in a more flexible sense to refer to upper Hilo or East Hawai‘i, depending on the resource under discussion.

The reservoir site is located at approximately 825 feet in elevation in the *ahupua‘a* of Punahoa 1. It is directly east of what was for several decades the *makai* end of Haleloke Street, which was extended further *makai* in 2014 to serve the Punahoa Mauka Estates residential-agricultural subdivision. Haleloke Street now provides access to Hokulani Street and thence to Kaumana Drive. The waterline corridor runs from the *mauka* end of Hokulani Street at 780 feet in elevation along that street to Kaumana Drive, and then across currently undeveloped land to Kukuau Street at 480 feet in elevation (see Figure 1c).

3.1 Physical Environment

3.1.1 Climate, Geology, Soils and Geologic Hazards

Environmental Setting

The climate in the area is mild and moist, with an average annual rainfall of about 185 inches (Giambelluca et al 2014. Winds are generally light trades from the east-northeast, shifting to downslope drainage winds at night. The island of Hawai‘i has not experienced sustained winds greater than 70 MPH in at least the last century, although gusts of 40 MPH from the south or north occasionally occur (gusts to 54 MPH were reported at Hilo Airport from Tropical Storm Iselle in August 2014).

Geologically, this part of Hilo is located on the lower flank of Mauna Loa volcano. The surface consists of weathered basalt soils on Holocene-era lava flows (3,000 to 5,000 years before present) from the Ka‘ū Basalt series from Mauna Loa (Wolfe and Morris 1996). The soil on the reservoir site and much of the waterline corridor is classified by the U.S. Natural Resources Conservation Service (formerly Soil Conservation Service) as Keaukaha extremely rocky muck (rKFD), which formed in organic material and ash overlying pahoehoe lava and is found on slopes of 6 to 20 percent (U.S. Soil Conservation Service 1973). The very shallow soil ranges in depth from three to 10 inches and is well-drained, with rapid runoff and permeability. This type of soil is typically found in ‘ohi‘a-lehua forests, although a few areas are used for pasture.

Lava tubes, which are the long cavities left behind by underground channels of lava, are common on pahoehoe lava flows in the area. 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. A lava tube is present on the properties just to the north. This lava tube has several openings and a course that is also followed by an ephemeral stream that fills up the lava tube during rains. There is no evidence of lava tubes on the reservoir property itself.

The reservoir site appears to be located on an appropriate substrate for construction of a reservoir, and no geotechnical or groundwater seepage concerns are anticipated. A geotechnical site investigation was performed in September 2001 and a foundation investigation report was submitted in December 2001. The report indicated that based upon exploratory borings and engineering analyses, the site, from a geotechnical viewpoint, can be developed as planned. During construction, additional probing will be conducted to determine if any voids or unsuitable soils are present, and remediation of the surface will be undertaken as necessary. The substrate of the entire waterline corridor is suitable for excavation and use for waterlines, as existing lines present over most of the route indicate.

The entire Big Island is subject to geologic hazards, especially lava flows and earthquakes. Volcanic hazard as assessed by the U.S. Geological Survey in this area of South Hilo is Zone 3, on a scale of ascending risk from 9 to 1 (Heliker 1990:23). The high hazard risk is based on the fact that Mauna Loa is presently an active volcano. Volcanic hazard Zone 3 areas have had 1-5 percent of their land area covered by lava or ash flows since the year 1800, but are at lower risk than Zone 2 areas because of their greater distances from recently active vents and/or because the local topography makes it less likely that flows will cover these areas.

In terms of seismic risk, the entire Island of Hawai‘i is rated Zone 4 Seismic Hazard (Uniform Building Code, 1997 Edition, Figure 16-2). Zone 4 areas are at risk from major earthquake damage, especially to structures that are poorly designed or built, as the 6.7-magnitude quake of October 15, 2006, demonstrated. There are moderate slopes and stable soils at the reservoir site, which exhibits no evidence of subsidence or rockfall, landslides or other forms of mass wasting. The entire waterline corridor has geologic conditions acceptable for this use.

Impacts and Mitigation Measures

A neighboring resident expressed concern about the potential of the reservoir to block tradewinds and/or focus tropical storm or hurricane winds in such a way as to cause direct or debris-related wind damage (see Appendix 1a for letter). Extremely large buildings such as skyscrapers that are densely clustered in urban environments can substantially influence the wind flow (Arakawa and Tsutsumi 1967). Complex situations involving trees, structures and houses are difficult to mathematically model, although sophisticated wind tunnel experiments can be conducted to reasonably simulate the effects of structures on wind flow (Arya 1989; Lawson 2001). The experience of State and local governments in Hawai‘i has not led them to require wind studies or other special considerations as part of the permitting process for any kind of moderately scaled structures, including above-ground water reservoirs, apartments, or commercial buildings. Consultation with Department of Public Works officials on this issue indicated that adverse wind

effects have not been reported even for much larger buildings than the proposed reservoir. The reservoir, which will be 25 feet high and about 130 feet in diameter, is similar in bulk to a small, two-story commercial or apartment building, for which there are no wind study requirements in federal, State or Hawai‘i County environmental law or building codes. Although the reservoir will block some wind, the cylindrical shape will tend to allow wind to flow around the structure more than would occur with an angular structure. In terms of debris from hurricanes, the reservoir is built to withstand high winds and would not be a source of debris. During high wind events it would act to some extent as a shield from windblown debris such as roofing iron or tree branches.

Under the No Action Alterative, if the property were not developed for a reservoir, it would either grow densely with trees, or could have a large structure or even a complex of structures used for farming and/or a residence. Any of these would also block or funnel winds at least to some extent. During high wind events, houses, farm structures, or weak-branched trees such as albizia would likely pose a much greater debris problem than a reservoir.

In general, geologic conditions impose no constraints on the proposed action, and the proposed water system improvements are not imprudent to construct. The County-standard post-tensioned reservoir will be designed in accordance with applicable American Water Works Association and American Concrete Institute standards for Seismic Zone 4, as well as all applicable County Building Department requirements.

A neighboring resident expressed concern about effects to the lava tube on the adjacent property that approaches as close as 50 feet to the area that will be graded for the reservoir (see Appendix 1a for letter). Based on the effects of other County construction projects, it appears extremely unlikely that the planned grading would have any effects on the lava tube, which is a stable structure that has withstood much greater vibration from earthquakes, as well as the force of running water and debris. The lava tube has been photographed to provide a baseline for comparison with after-project construction.

3.1.2 Drainage, Water Features and Water Quality

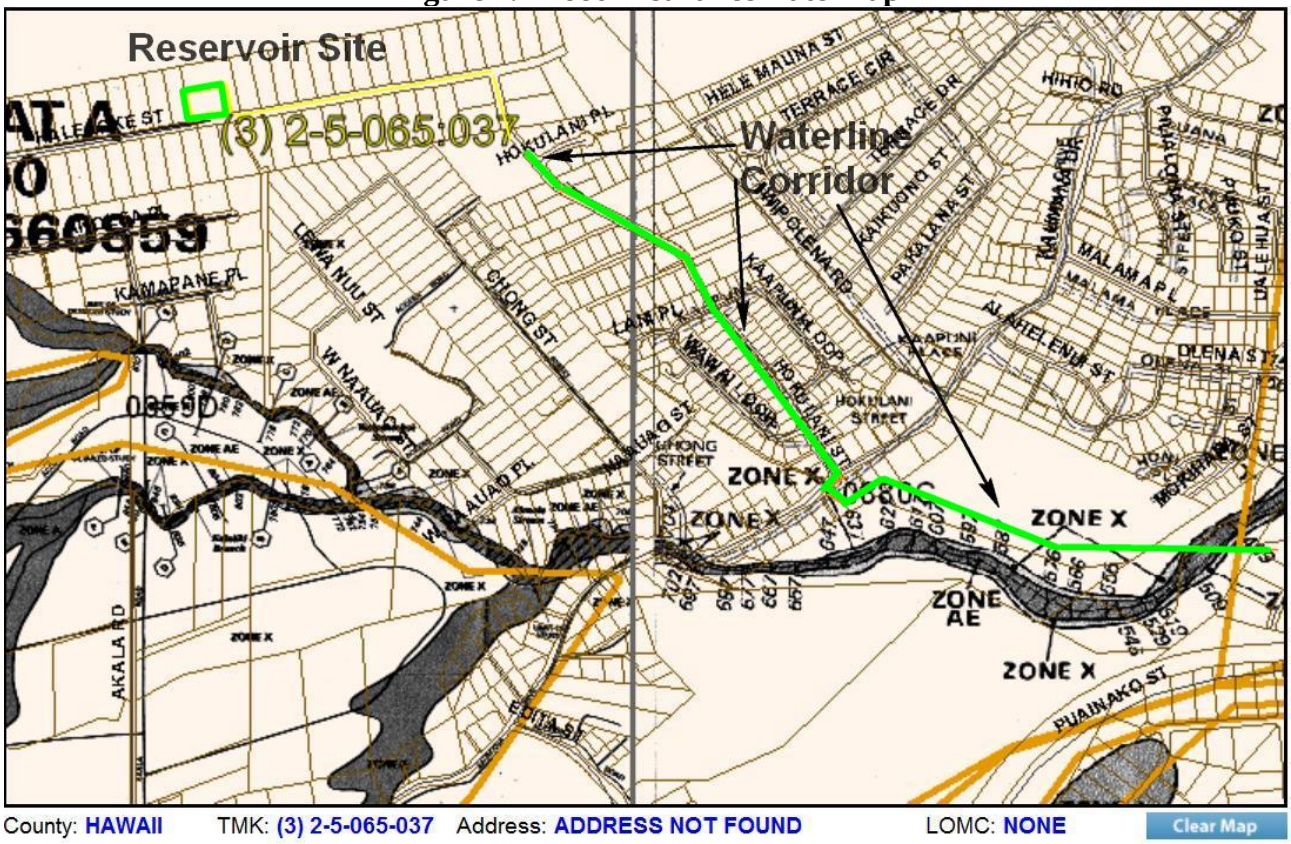
Existing Environment

The Federal Emergency Management Agency’s Flood Insurance Rate Map (FIRM) 1551660859D (4/2/2004) shows the reservoir site within Flood Zone X, outside of the 500-year flood plain (Figure 4). Local flooding after very heavy rains may occur associated with an ephemeral stream that lies to the north of the lot. Waters may occasionally overtop the northwestern corner of the reservoir lot. The neighboring residents reported that a small swale that flows during heavy rains passes drainage from their lot onto the reservoir lot. They expressed concerns about blockage of this flow which would back up onto their property (see Appendix 1a for letter).

The waterline corridor is mainly within Zone X but also crosses a flood zone (Figure 4) associated with Waipahoehoe Stream. Fieldwork evaluation, confirmed through consultation with the U.S. Army Corps of Engineers (USACE) and maps from the U.S. Fish and Wildlife Service, indicated

that no wetlands or other waters of the U.S. are present on any part of the project site except at one intermittent stream crossing. One segment of the transmission waterline portion of the Project involves the installation of a new 16-inch main across two branches of the intermittent Waipahoehoe Stream (see Figure 1c). It will be installed along an easement that already contains a 12-inch waterline that is above-ground on concrete piers and a 6-inch waterline that is buried and concrete-jacketed at the crossings. The new line will be installed in an excavated trench with a minimum 3-foot backfill cover. The trenches would be backfilled to existing grades. There will also be a new concrete service road over the waterline to aid in maintenance and prevent washout of the pipeline. The total volumes of excavation and fill are each estimated at 30 cubic yards, with a total area of 0.023 acres.

Figure 4. Flood Insurance Rate Map



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

By letter of January 17, 2014, the USACE authorized the proposal under Nationwide Permit #12 (NWP 12), Utility Line Activities (see correspondence in Appendix 1a). The approval was authorized subject to compliance with general and special conditions. These included the need to receive Water Quality Certification (WQC) from the State of Hawai‘i Department of Health, Clean Water Branch, and to implement and abide by the terms of the WQC, and also to stop work and notify the USACE if any human burials, cultural resources or historic properties are discovered during construction and may be affected by the work. The permit is valid for two years after the

granting date, unless NWP 12 is revoked during that time. If the work is not completed within two years, the applicant must contact the USACE to continue and may need to reapply for the permit. 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.

The Hawai‘i State Commission on Water Resource Management (CWRM), Stream Protection and Management Branch, has the responsibility to protect stream channels from alteration whenever practicable to provide for fishery, wildlife, recreational, aesthetic, scenic, and other beneficial instream uses in the State of Hawai‘i under the authorization of the State Water Code (Code), Chapter 174C, Hawai‘i Revised Statutes, and Chapter 13-169, Hawai‘i Administrative Rules (Protection of Instream Uses of Water). Pursuant to the Code, §174C-71(3)(A), the Commission "shall require persons to obtain a permit from the Commission prior to undertaking a stream channel alteration." The term "stream channel" is defined in the Code, §174C-3, as a "watercourse with a definite bed and banks which periodically or continuously contains flowing water." Furthermore, the Code defines "stream" as any "natural watercourse in which water usually flows in a defined bed or channel." In 2008, CWRM evaluated a submittal from the project's engineering consultant Inaba Engineering, Inc., and determined that the project would not require a Stream Channel Alteration Permit (SCAP) (see letter in Appendix 1a).

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. Because the total project will disturb more than one acre of soil, a National Pollutant Discharge Elimination System (NPDES) permit will 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, the SWPPP will describe the emplacement of a number of best management practices (BMPs) for the Project. The current plan calls for the following types of BMPS, among numerous others, [as may be necessary or appropriate for the actual field situation] (see Appendix 4 for full list):

<u>Structural BMPS</u>:

- Silt Fences	- Inlet Protection	- Coverings
- Hydromulching	- Sediment Traps	- Stabilized Construction Entrances
- Diversion Ditches	- Vegetative Stabilization	- Filter Berms

- Sediment Basins

- 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.

Non-Structural BMPs

- 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

The natural vegetation of this part of South Hilo was most likely lowland rain forest dominated by ʻōhiʻa (*Metrosideros polymorpha*) and koa (*Acacia koa*) (Gagne and Cuddihy 1990). These original

communities, however, have been destroyed or heavily degraded by sugar cane cultivation, cattle grazing, and clearing for small farms and residences, and the vegetation is now either managed vegetation (i.e., farms, pasture or landscaped grounds) or adventive "communities" of various alien weeds. There are only small areas of remnant forest, present mainly above the settlements and former sugar cane lands.

The current vegetation of the reservoir site is highly disturbed, some of it recently in association with subdivision construction. Botanical surveys by Ron Terry, Ph.D., and Layne Yoshida, B.A., determined that the flora consists primarily of alien trees and shrubs, with a number of weedy forbs and grasses (Appendix 2). At the reservoir site, the dominant woody plants are *Trema orientalis*, melochia (*Melochia umbellata*) strawberry guava (*Psidium cattleianum*), and the dominants in the understory are the weeds broomsedge (*Schizachyrium condensatum*), *Hyptis pectinata*, and buttonweed (*Spermacoce* sp.). Only a few common native plants are present, including ʻōhiʻa, the uluhe fern (*Dicranopteris linearis*), and some sedges and forbs. Most of the waterline corridor is paved, but on the vacant land traversed by the transmission line, the vegetation is dominated by strawberry guava, melochia, *Melastoma candidum*, Alexandra palms (*Archontophoenix alexandrae*), rose apple (*Syzygium jambos*), and warabi fern (*Diplazium esculentum*). The same suite of native plants found at the reservoir site is also present, at low levels. Wetlands and riparian vegetation with both native and non-native elements are present at the crossing of Waipahoehoe Stream. There are no rare or endangered plant species on or immediately around the reservoir site or waterline corridor.

Wide-ranging terrestrial vertebrates listed as threatened or endangered may be present in this part of Hilo 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 mostly paved, but there are scattered tall ʻōhiʻa, eucalyptus, gunpowder, strawberry guava and other trees on some portions of the waterline corridor as well as on the one-acre reservoir lot. 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 disturbed area, no adverse impacts to biological resources are likely to occur as a result of building the new reservoir, provided the following mitigation measures are enforced during construction (this list adopts or adapts BMPs suggested in the USFWS letter of November 4, 2014, in response to the Draft EA (see Appendix 1b for letter and response):

- Although Hawaiian Hawks (*Buteo solitarius*) are not currently known to nest on the project site, any major clearing of vegetated areas, including the reservoir lot and the portion of the

transmission line that is being excavated within the primarily non-native forested area between Kaumana Drive and Kukuau Street, will 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, 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 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 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 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. There will be no clearing of woody vegetation (whether native or non-native) taller than 15 feet during the Hawaiian hoary bat pupping season.
- Incidental impacts to wetlands vegetation associated with the crossing of Waipahoehoe Stream will be minimized by adhering to the conditions of the Nationwide Permit issued by the Corps of Engineers and all other Best Management Practices for the Project.
- All project construction-related materials and equipment (dredges, backhoes, dump-box trucks, etc.) to be used near watercourses will be inspected for pollutants including, but not limited to; vegetation debris, fouling organisms, grease, oil, etc., and cleaned to remove pollutants prior to use.
- Project related activities should not result in any debris disposal, nonnative species introductions, or attraction of non-native pests to the affected or adjacent areas.
- Project related construction materials (fill, rock, pipe. etc.) will not be stockpiled in, or in close proximity to aquatic or marine habitats, and will be protected from erosion (e.g., with filter fabric, etc.) to prevent material from being carried away by wind or rain.
- Fueling of project-related vehicles and equipment will take place away from the aquatic or marine environment.
- For the work in the delineated area of the stream, DWS will require that contractor coordinate with the DWS inspector and have the inspector onsite prior to the contractor's men and equipment entering the stream area.
- Other than the actual work within the stream area, there is to be no access through the stream area for the construction on either side of the stream area. Those sections will require the use of other access points on either side of the stream.

3.1.4 Air Quality, Noise, Vibration and Scenic Resources

Environmental Setting

Air pollution in East Hawai‘i is minimal, and is mainly derived from volcanic emissions of sulfur dioxide, which convert into particulate sulfate and produce a volcanic haze (vog) that occasionally blankets the district. The persistent tradewinds keep the project area relatively free of vog for most of the year.

Noise at the reservoir site is low and derived mainly from residential and some agricultural activities, with occasional noise from home construction and motor vehicles on adjacent roads. Noise on the waterline corridor varies from moderate (along Hokulani Street) to low (in the undeveloped portions).

Views at the reservoir site and along both the urban street and forested portions of the waterline corridor are subtle and do not include substantial mountain or ocean vistas (see photos in Figure 2). No views listed as significant for their scenic character in the Hawai‘i County General Plan are present in or near the project site.

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.

In response to concerns about potential noise from an adjacent resident (see Appendix 1a for letter), the inlet controls have been relocated to the opposite side of the reservoir. If necessary, a small structure could be placed over the valves to further control sound should there be any actual noise complaints from valve operation after construction. For construction, 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 which 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.

The construction will involve grading and flattening of the site, which is only partially cleared (see Figure 2). Such activities can cause minor vibration of rock. The vibration that will accompany the construction will be similar to what occurred recently during the grading and paving of Haleloke Street and the grading that takes place on other lots in the neighborhood in order to prepare lots and homes. In DWS officials’ experience, grading and surface compaction for reservoirs have not produced permanent effects to nearby homes or other structures. Although the scale of the grading

is unlikely to cause noticeable nearby effects, in response to concerns from a nearby resident (see Appendix 1a for letter), DWS will suggest to the contractor that it would be prudent to carefully document existing conditions of neighboring structures prior to construction.

No scenic sites in the Hawai‘i County General Plan are involved and no scenic impacts are anticipated. The Project includes low-maintenance landscaping with a row of ‘ōhi‘a trees as landscaping on the resident’s side that can soften the visual impact of the tank but not impose inappropriate dense screening ~~shrubs on the Haleloke Street frontage, in accordance with regulations~~. In addition, the residents may wish to erect visual barriers or plant vegetation for a visual buffer on their own properties, if they desire an added visual buffer. No landscaping is required for emplacement of the transmission waterline.

3.1.5 Hazardous Substances, Toxic Waste and Hazardous Conditions

Environmental Setting, Impacts and Mitigation Measures

The context of the site coupled with the absence of any known use of the site for agricultural, residential, or industrial purposes suggests a low probability for hazardous materials. Additionally, visual surveys of the site and its surroundings during surveying, botanical and geotechnical 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 site, 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, it is recommended that the County undertake a systematic assessment of the property.

3.2 Socioeconomic and Cultural

3.2.1 Land Use and Socioeconomic Characteristics

Land use in the immediate vicinity of the reservoir site consists of residential/ agricultural subdivisions. Although the zoning for surrounding areas is agricultural, actual land use is primarily residential. Some eucalyptus timber harvesting has occurred in lands to the north. Land use on the waterline corridor varies from residential and residential-agricultural subdivisions to vacant land.

Table 1 details Hilo’s population and socioeconomic characteristic. Hilo has a diverse population with over 80 percent minorities, mainly Asian and Pacific Islander, within one of the 100 fastest-growing counties in the U.S. It has a median age of over 40 years and more than 37 percent of the population is 65 or older, one of the oldest populations in the State of Hawai‘i. At the same time, more than 4,000 students at UH Hilo, many of whom are not counted in census statistics because

Table 1. Selected Socioeconomic Characteristics

Characteristic	Hilo	State of Hawai‘i
Population, 2010	43,263	1,360,301
Persons under 5 years, percent, 2010	6.0%	6.4%
Persons under 18 years, percent, 2010	21.3%	22.3%
Persons 65 years and over, percent, 2010	18.0%	14.3%
Female persons, percent, 2010	51.2%	49.9%
White alone, percent, 2010	17.6%	24.7%
Black or African American alone, percent, 2010	0.5%	1.6%
American Indian and Alaska Native alone, percent, 2010	0.3%	0.3%
Asian alone, percent, 2010	34.3%	38.6%
Native Hawaiian and Other Pacific Islander alone, percent, 2010	14.2%	10.0%
Two or More Races, percent, 2010	32.5%	23.6%
Hispanic or Latino, percent, 2010	10.4%	8.9%
White alone, not Hispanic or Latino, percent, 2010	15.9%	22.7%
Living in same house 1 year & over, percent, 2008-2012	85.0%	84.9%
Foreign born persons, percent, 2008-2012	8.0%	18.1%
Language other than English spoken at home, pct age 5+, 2008-2012	15.8%	25.7%
High school graduate or higher, percent of persons age 25+, 2008-2012	91.1%	90.3%
Bachelor's degree or higher, percent of persons age 25+, 2008-2012	29.8%	29.6%
Veterans, 2008-2012	4,170	112,589
Mean travel time to work (minutes), workers age 16+, 2008-2012	18.5	25.8
Housing units, 2010	16,905	519,508
Homeownership rate, 2008-2012	63.6%	58.2%
Housing units in multi-unit structures, percent, 2008-2012	23.3%	38.6%
Median value of owner-occupied housing units, 2008-2012	$313,200	$517,000
Households, 2008-2012	15,747	447,453
Persons per household, 2008-2012	2.75	2.95
Per capita money income in past 12 months (2012 dollars), 2008-2012	$25,416	$29,227
Median household income, 2008-2012	$51,929	$67,492
Persons below poverty level, percent, 2008-2012	16.9%	10.8%

their permanent residences are elsewhere, are also present. Several segments of the population that typically exhibit disadvantaged measures of social welfare are disproportionately represented in the population of Hilo as compared to the County or State of Hawai‘i. Median family income is 10 percent less than that of the County as a whole. More than 15 percent of individuals in the County

have income below the poverty level, double the statewide rate. Similar patterns pertain to households receiving welfare, food stamps, and disability payments.

Impacts and Mitigation Measures

By improving government services of the Department of Water Supply, the Project would affect and benefit the district of South Hilo and more specifically Hilo town. 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.

3.2.2 Archaeology and Historic Sites

An Archaeological Reconnaissance Survey of the Pi‘ihonua-Kukuau Transmission Main and Reservoir was prepared by Archaeological Consultants of the Pacific, Inc. in 1996. The work consisted of a 100-percent walk-through survey of the waterline corridor (which at 1996 had two alternative alignments) and reservoir site. No features were found on the reservoir site, while one alternative alignment of the waterline corridor contained several mounds that were not systematically investigated. By letter dated August 22, 1996 (see end of Appendix 1a), the State Historic Preservation Division (SHPD) concurred with the archaeologist’s findings that the reservoir site and most of the transmission line corridor contained no archaeological features. The letter also stated that if the alignment within the undeveloped lands without the mounds was selected, there would be no effect to significant historic sites. SHPD stated that if the alignment with the mounds was chosen, they would require investigation. The Office of Hawaiian Affairs indicated in its 2009 response to early consultation that owing to the long passage of time since the archaeological survey, additional review would be necessary (see letter in Appendix 1a). Accordingly, DWS contracted for an archaeological survey of the entire project area. Haun & Associates, who had conducted an archaeological inventory survey of a property that included the mounds adjacent to the undeveloped portion of the waterline corridor as part of a separate project, performed the survey. The report is contained in full in Appendix 3 and summarized in the section below, in which scholarly references have not been included, but can be found in the appendix.

Under the direction of Dr. Alan Haun, Project Director Shawn Fackler and Field Archaeologist Tammy Gibson performed a field inspection for the proposed project on August 26, 2014. Fieldwork required two person-days to complete. The majority of the project site is within asphalt-paved right-of-ways that include Haleloke Street, Hokulani Street, and a portion of Kaumana Drive, where the ground has been extensively graded and excavated for drainage, electrical poles and waterlines and then paved over. The remaining portion is on the reservoir lots or follows existing utility easements in undeveloped areas. The Waipahoehoe Stream drainage meanders through the central portion. Portions of the undeveloped area have been impacted by historic agricultural activity, as indicated by various introduced crop species. The project corridor in the undeveloped area is affected by the periodic flooding of Waipahoehoe Stream. Modern debris deposited during flooding episodes is present along both sides of the stream. After conducting Section 106 consultation under the National Historic Preservation Act, the U.S. Army Corps of Engineers (USACE), Honolulu District authorized the proposed project to cross Waipahoehoe Stream under

Nationwide Permit #12, Utility Line Activities, without the need for an archaeological monitor (USACE letter to County of Hawai‘i; see sub-Appendix A of Appendix 3).

As mentioned above, Haun & Associates performed an archaeological inventory survey during a separate undertaking that included the area where the waterline corridor passes through undeveloped areas in TMK: (3) 2-5-006: 061 and 151 (see Figure 4 of Appendix 3). The survey documented six sites with 18 features interpreted as historic clearing mounds associated with plantation-era sugar cane cultivation; however, no sites were encountered in the proposed waterline corridor. The sites were likely created during sugar cane cultivation beginning in the first decade of the 20th Century and the area was probably abandoned as too rocky as mechanized equipment gradually replaced manual cultivation methods between the mid-1930s to mid-1940s. The nearby sites were assessed as solely significant for their information content and have yielded information important for understanding historic plantation agriculture in the project area. The describing, mapping, and photographing the six sites adequately documented them. No preservation or data recovery was recommended for the sites; however, SHPD requested archaeological monitoring as a treatment measure (LOG NO: 2011.0722, DOC NO: 1209MV03; sub-Appendix C of Appendix 3). Although this area was planned for clearing and development, none has yet occurred, and therefore these mitigation measures have not yet been implemented.

The archaeological field inspection did not identify any new cultural resources or natural lava formations in any portion of the project site. Moreover, the review of related studies indicated that no cultural resources were encountered in during previous archaeological investigations. Proposed construction activities will be confined to areas previously disturbed by grading, roads, agriculture and utility infrastructure. In accordance with the previous the SHPD request (LOG NO: 2011.0722, DOC NO: 1209MV03), Haun & Associates recommends archaeological monitoring for initial ground altering disturbance in undeveloped areas of TMK: (3) 2-5-006: 061 and 151. 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.

The State Historic Preservation Division is currently reviewing the archaeological survey. The Final EA will report on the results of this review.

3.2.3 Cultural Resources

Existing Environment

The reservoir site lies in the *ahupua‘a* of Punahoa 1. The portion of the waterline corridor outside of developed streets and on vacant land is within the *ahupua‘a* of Ponahawai. According to the research of McEldowney (1979), which subdivided the South Hilo/Puna region into five zones, the project site is within the upland agricultural zone, which ranges from approximately 50 feet to 1,500 feet in elevation. That zone is characterized as having been used for scattered habitation with adjacent garden plots and small groves of economically beneficial tree species. Crops typically

included dryland taro and bananas and occasional stands of kukui, pandanus (hala) and mountain apple trees.

The earliest historical knowledge of Hilo, Punahoa and Ponahawai comes from legends written by Samuel Kamakau (1961) of a 16th-century chief ʻUmi-a-Liloa (son of Liloa), who at that time ruled the entire island of Hawaiʻi. Descendants of Umi and his sister-wife were referred to as "Kona" chiefs, controlling Kaʻū, Kona, and Kohala, while descendants of Umi and his Maui wife were "Hilo" chiefs, controlling Hāmākua, Hilo, and Puna (Kelly 1981:1). According to Kamakau (1961), both sides fought over control of the island, desiring access to resources such as feathers, *māmaki kapa*, and canoes on the Hilo side, and *wauke kapa* and warm lands and waters on the Kona side (Kelly 1981:3).

Sometime near the end of the 16th century or early in the 17th century, the lands of Hilo were divided into *ahupuaʻa*, which till today retain their original names (Kelly 1981:3). These include the *ahupuaʻa* of Puʻuʻeo, Piʻihonua, Pōnohawai, Kūkūau, Waiākea and Punahoa. The design of these land divisions was such that residents could have access to all that they needed to live, with ocean resources at the coast, and agricultural and forest resources in the interior. However, only Waiākea and Piʻihonua – which is located immediately north of Punahoa – provided access to the full range of resources stretching from the sea up to 6,000 feet along the slopes of Mauna Kea (Kelly 1981:5).

Historical accounts (McEldowney 1979) placed the current study area in a zone of agricultural productivity. As Isabella Bird recorded upon arriving in Hilo in 1873:

> "Above Hilo, broad lands sweeping up cloudwards, with their sugar cane, kalo, melons, pine-apples, and banana groves suggest the boundless liberality of Nature" (Bird 1964:38).

Handy and Handy (1972) also described the general region as an agricultural area:

> "On the lava strewn plain of Waiakea and on the slopes between Waiakea and Wailuku River, dry taro was formerly planted wherever there was enough soil. There were forest plantations in Panaewa and in the entire lower fern-forest zone above Hilo town along the course of the Wailuku River" (Handy and Handy 1972:539).

Maly (1996a) referred to a 1922 article from the Hawaiian Language newspaper, *Ka Nupepa Kūʻokuʻa*, where planting on pahoehoe lava flats is described:

> "There are pahoehoe lava beds walled in by the ancestors in which sweet potatoes and sugar cane were planted and they are still growing today. Not only one or two but several times forty (mau kaʻau) of them. The house sites are still there, not one or two but several times four hundred in the woods of the Panaewa. Our indigenous bananas are growing wild, these were planted by the hands of our ancestors" (Maly 1996:A-2).

Punahoa, along with Waiākea and Pi‘ihonua, was held by Kamehameha I until the time of his death in 1819, at which time his holdings were passed down to his son, Liholiho. Following the Māhele, the population of Hilo grew and the scattered upland habitations gave way to sugar cultivation (McEldowney 1979:37). By 1905, according to Thrum (1923), the Hawaii Mill Company had 10 miles of cane flumes and produced 25 tons of sugar per day. In 1920, the Hawaii Mill Company was taken over by the Hilo Sugar Company (Kelly 1981). Commercial sugar production lasted in Waiākea and Punahoa until the mid-twentieth century, at which time many of the fields were converted to pastures associated with cattle ranching.

Following the Māhele, Kamehameha IV leased large portions of Waiākea to outside interests for pasture and sugarcane cultivation. In 1861, S. Kipi leased the Crown Lands of Waiākea for the rate of $600 dollars a year to be used as pasture land for five years (Kelly et al. 1981; Maly 1996). In 1874, the first lease for sugarcane cultivation in Waiākea was granted to Rufus A. Lyman for a term of 25 years. The lease granted him all the privileges of the land including the use of the fishponds and the cutting of firewood (Maly 1996a). This lease was eventually transferred to the Waiākea Mill Company, founded by Alexander Young and Theo H. Davies, and the Waiākea sugar plantation was established. Similar activities were taking place in the neighboring *ahupua‘a* of Punahoa and Ponahawai.

Most land in the waterline corridor was farmed for sugar cane in the early 20th century. The reservoir site itself was never cultivated for sugar and does not exhibit any remnants of traditional culture use such as 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 property. 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 site, various parties are being supplied a copy of the EA in order to help finalize this finding.

Impacts and Mitigation Measures

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 reservoir site or waterline corridor that make up the project site, and there is no evidence of any traditional gathering uses or other cultural practices, the proposed construction and maintenance of these water facilities 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 cultural information.

3.3 Infrastructure

3.3.1 Utilities

Existing Facilities and Services

Electrical power to the facility will be supplied by Hawai‘i Electric Light Company (HELCO), a privately owned utility company regulated by the State Public Utilities Commission, via their island-wide distribution network. Electrical service is needed and available at the reservoir site. The water source is the network operated and maintained by the County of Hawai‘i’s Department of Water Supply. Telephone service is available from Hawaiian Telcom and will be used to provide a SCADA/ telemetering service to the reservoir connected to the DWS system. No wastewater system is available or necessary for the Project.

Impacts and Mitigation Measures

The proposed action would not have any substantial impact on existing electrical facilities. Appropriate coordination with HELCO and Hawaiian Telcom will be conducted during design and construction to ensure that their utility lines are not adversely affected. No other utilities will be affected in any way.

3.3.2 Roadways

Existing Facilities

Haleloke Street and Hokulani Streets, two-lane roads maintained by the County of Hawai‘i, will provide access to the reservoir (see maps and photos in Figures 1-3).

Impacts and Mitigation Measures

The proposed action would require construction vehicles to access the site during a period of several months for grading, hauling fill and materials and building the reservoir. Construction of the reservoir would have a negligible effect on local traffic, as Haleloke Street and Hokulani Street have relatively low traffic levels. Construction plans will include provisions to provide access to all properties during this period. The new driveway would require a permit from the Hawai‘i County Department of Public Works (DPW) and must comply with Chapter 22 of the Hawai‘i County Code. Construction plans will be submitted for review and approval signature by DPW prior to bidding. Operationally, a negligible increase in traffic related to occasional DWS visits is expected.

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. However, there will continue to be periodic construction of individual single-family residences in directly adjacent 37-lot Punahoa Mauka Estates subdivision. Some home construction may occur simultaneously with reservoir and transmission 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 new reservoir 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 reservoir project. Furthermore, there do not appear to be any other 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.

3.5 Required Permits and Approvals

The following permits and approvals would be required:

- Hawai‘i County Building Division Approval and Building Permit
- Hawai‘i County Planning Department Approval
- Hawai‘i County Public Works Department Grading Permit and Permit to Construct Within Right of Way
- National Pollutant Discharge Elimination System Permit (NPDES)

3.6 Consistency With Government Plans and Policies

3.6.1 Hawai‘i State Plan

Adopted in 1978 and last revised in 1991 (Hawai‘i 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 South Hilo district.

3.6.2 Hawai‘i County Zoning and General Plan

Hawai‘i County Zoning. The reservoir property is zoned Agriculture, with a one-acre minimum lot size (A-1a). The reservoir is a permitted use within this district. The waterline corridor transits a

number of different zoning districts, and utility lines are permitted in all districts. No part of the project site 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 for areas within the planned public and cultural facilities, public utilities and safety features, and transportation corridors. The reservoir site is classified as Rural in the LUPAG. Use of this site for a reservoir is consistent with this designation. The waterline corridor transits a number of LUPAG designations, and utility lines are permitted in all designations.

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 Department of Planning).

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.

<u>PUBLIC UTILITIES</u>

<u>Policies</u>
<u>(c) Utility facilities shall be designed to minimize conflict with the natural environment and natural resources.</u>

Goals
(c) Design public utility facilities to fit into their surroundings or concealed from public view.

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 – South Hilo
(a) Continue to implement water system maintenance and improvement programs in order to provide the city with a dependable and consistently safe drinking water supply.

Discussion: The proposed project satisfies relevant policies, standards and courses of action related to water systems in the South Hilo District, and the visual screening and position of inlet control valve relative to the existing adjacent residence conforms as much as feasible with the GP's intent to minimize conflict with adjacent uses.

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 system 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 water system would not have a substantial adverse effect on the environment and would not diminish the valuable natural resources of the region. The reservoir and associated 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. There are no known or expected cultural uses on the project site, which does not appear to contain any cultural resources.

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.

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 new reservoir site is in the State Land Use Agricultural District. The proposed use is consistent with intended uses for this Land Use District. The waterline corridor is within both the Agricultural and Urban Land Use Districts, and utility lines are allowed in both these districts 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 are 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 storage and 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 storage and transmission. The Hilo Aquifer System of the Northeast Mauna Loa Aquifer Sector, it has not been declared a Groundwater Management Area by the State Commission on Water Resources Management. There will be no effect on aquifer pumpage. In any case, there is no recognized current or foreseeable threat of exceeding the 347 million gallons per day that is the sustainable level of withdrawal from

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. Although no State projects are triggering the current proposal, in 2003 the State recognized the need for about 3.45 million gallons per day in new projects by 2018 in the Hilo area. Several of the projects, including the Hilo Judiciary Complex and various campus facilities at the University of Hawaii at Hilo, have already been built. Another major project, the Hilo High School

Gymnasium, has just finished construction. Many of the projects, however, are still in planning. As the Project does not involve source development, it does not directly affect these proposed State projects, but optimizing the storage and 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 (HCWUDP) (Hawai'i County DWS 2010) amends a plan from 1990 and 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. The HCWUDP 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 *Hawai'i County Water Use and Development Plan Update* provides scenarios of low, medium, and high growth rates and estimates 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 Hilo Aquifer System of the Northeast Mauna Loa Aquifer Sector, encompassing the Urban Hilo area, has the highest current water usage on the island. Due to the high annual rainfall, it also has the island's highest sustainable yield, which can easily support the LUPAG and Zoning maximum density full build-out demands, even if worst-case agricultural demands are included. One recommendation for this sector area was to improve the efficiency of the DWS Hilo Water System; loss of source water through leakage is suspected. The detriment is the excess cost of production, rather than loss of a limited supply of sources. The Project would be consistent with the HCWUDPU in that it provides important storage and transmission facilities water for the efficient and orderly use of water, replacing older and outmoded water tank infrastructure.

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)

As discussed in detail in Section 3.2.2, although archaeological clearance for the project had been obtained in 1996, owing to the passage of time and other circumstances, DWS contracted for an archaeological survey of the entire project area. The report is contained in full in Appendix 3. Under the direction of Dr. Alan Haun, Project Director Shawn Fackler and Field Archaeologist Tammy Gibson performed a field inspection for the proposed project on August 26, 2014. Fieldwork required two person-days to complete. The majority of the project site is within asphalt-paved right-of-ways that include Haleloke Street, Hokulani Street, and a portion of Kaumana Drive, where the ground has been extensively graded and excavated for drainage, electrical poles and

waterlines and then paved over. The remaining portion is on the reservoir lots or follows existing utility easements in undeveloped areas. The Waipahoehoe Stream drainage meanders through the central portion. Portions of the undeveloped area have been impacted by historic agricultural activity, as indicated by various introduced crop species. The project corridor in the undeveloped area is affected by the periodic flooding of Waipahoehoe Stream. Modern debris deposited during flooding episodes is present along both sides of the stream. After conducting Section 106 consultation under the National Historic Preservation Act, the U.S. Army Corps of Engineers (USACE), Honolulu District authorized the proposed project to cross Waipahoehoe Stream under Nationwide Permit #12, Utility Line Activities, without the need for an archaeological monitor (USACE letter to County of Hawai‘i; see sub-Appendix A of Appendix 3).

As part of prior work for the developer of a property (TMK: (3) 2-5-006: 061 and 151) through which the waterline corridor passes, Haun & Associates performed an archaeological inventory survey. The survey documented six sites with 18 features interpreted as historic clearing mounds associated with plantation-era sugar cane cultivation; however, no sites were encountered in the proposed waterline corridor. The sites were likely created during sugar cane cultivation beginning in the first decade of the 20th Century and the area was probably abandoned as too rocky as mechanized equipment gradually replaced manual cultivation methods between the mid-1930s to mid-1940s. The nearby sites were assessed as solely significant for their information content and have yielded information important for understanding historic plantation agriculture in the project area. The describing, mapping, and photographing the six sites adequately documented them. No preservation or data recovery was recommended for the sites; however, SHPD requested archaeological monitoring as a treatment measure (LOG NO: 2011.0722, DOC NO: 1209MV03; sub-Appendix C of Appendix 3). Although this area was planned for clearing and development, none has yet occurred, and therefore these mitigation measures have not yet been implemented.

The archaeological field inspection did not identify any new cultural resources or natural lava formations in any portion of the project site. Moreover, the review of related studies indicated that no cultural resources were encountered in during previous archaeological investigations. Proposed construction activities will be confined to areas previously disturbed by grading, roads, agriculture and utility infrastructure. In accordance with the previous the SHPD request (LOG NO: 2011.0722, DOC NO: 1209MV03), Haun & Associates recommends archaeological monitoring for initial ground altering disturbance in undeveloped areas of TMK: (3) 2-5-006: 061 and 151. 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.

The State Historic Preservation Division is currently reviewing the archaeological survey. The Final EA will report on the results of this review.

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 site is good. 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. Grading and excavation will include plans to minimize fugitive dust through watering and planting as soon as feasible. Diesel-powered construction equipment will be used to grade the reservoir site and excavate water lines. 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 reservoir will not produce on-site air emissions, will not alter air flow in the vicinity, and will have no other measurable effect on the area's micro-climate. 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 reservoir and transmission line are a minimum of 2.6 miles mile 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 reservoir site and the waterline corridor that make up the project site are discussed in Section 3.1.3 of this EA. Inspection of the project site 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 Hilo 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 mostly paved, but there are scattered tall ʻōhiʻa, eucalyptus, gunpowder, strawberry guava and other trees on some portions of the waterline corridor as well as on the one-acre reservoir lot. 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 reservoir, 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 site, any major clearing of vegetated areas, including the reservoir lot and the portion of the transmission line that is being excavated within the primarily non-native forested area between Kaumana Drive and Kukuau Street, 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 are anticipated. 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.
- 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. There should be no clearing of woody vegetation (whether native or non-native) taller than 15 feet during the Hawaiian hoary bat pupping season.
- Incidental impacts to wetlands vegetation associated with the crossing of Waipahoehoe Stream will be minimized by adhering to the conditions of the Nationwide Permit issued by the Corps of Engineers and all other Best Management Practices for the Project.

The U.S. Fish and Wildlife Service is being consulted for technical assistance as part of the EA process to verify the characterization of the project site and the adequacy of the proposed mitigation measures to protect threatened and endangered species. The Final EA will report the results of the technical assistance consultation.

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, there were no 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 82 percent of the population, which is slightly higher than the 75 percent of the State as a whole. Several segments of the population that typically exhibit disadvantaged measures of social welfare are disproportionately represented in the population of Hilo as compared to the State of Hawai‘i. Median family income is only 75 percent of the State as a whole, while the poverty rate for individuals is 50 percent higher. Similar patterns pertain to households receiving welfare, food stamps, and disability payments. The purpose of the proposed water project is to provide residents of Hilo adequate water service that conforms to State and federal standards. The Project will not have adverse secondary environmental, economic, or social impacts, as discussed in Section 3.2.1. Moreover, the State and federal regulations regarding safe drinking water are applicable to all water systems in Hawai‘i, 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 Hawai‘i, includes Agricultural Lands of Importance in the State of Hawai‘i (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 at the reservoir site or the waterline corridor that make up the project site. The Project will not impact continued such land or the agricultural use of any

properties. The Project is intended to serve residents of Hilo, 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 reservoir site is not within a designated floodplain, and the waterline corridor crosses but will not impact the floodplain, and 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 and confirmed through consultation with the U.S. Army Corps of Engineers (USACE) and 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 site except at one intermittent stream crossing. As discussed in Section 1.1., one segment of the transmission waterline portion of the Project involves the installation of a new 16-inch main across two branches of the intermittent Waipahoehoe Stream (see Figure 1c). It will be installed along an easement that already contains a 12-inch waterline that is above-ground on concrete piers and a 6-inch waterline that is buried and concrete-jacketed at the crossings. The new line will be installed in an excavated trench with a minimum 3-foot backfill cover. The trenches would be backfilled to existing grades. There will also be a new concrete service road over the waterline to aid in maintenance and prevent washout of the pipeline. The total volumes of excavation and fill are each estimated at 30 cubic yards, with a total area of 0.023 acres. It will take about 10 days to conduct the work.

By letter of January 17, 2014, the USACE authorized the proposal under Nationwide Permit #12 (NWP 12), Utility Line Activities (see correspondence in Appendix 1a). The approval was authorized subject to compliance with general and special conditions. These included the need to receive Water Quality Certification (WQC) from the State of Hawai‘i Department of Health, Clean Water Branch, and to implement and abide by the terms of the WQC, and also to stop work and notify the USACE if any human burials, cultural resources or historic properties are discovered during construction and may be affected by the work. The permit is valid for two years after the granting date, unless NWP 12 is revoked during that time. If the work is not completed within two years, the applicant must contact the USACE to continue and may need to reapply for the permit.

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, because the total project will disturb more than one acre of soil and there is a need for dewatering, 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 storage and transmission improvements will assist DWS in maintaining the compliance of the Hilo 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) (checked August 2014), there are only two sole source aquifers in Hawai‘i. They are the Southern O‘ahu Basal Aquifer on the Island of O‘ahu and the Moloka‘i Aquifer on the island of Moloka‘i. There are no sole source aquifers on the Island of Hawai‘i. 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 Hawai‘i 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 Hawai‘i 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 Hawai‘i State Plan and the County of Hawai‘i General 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 above, 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, which are not present.
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 the upper parts of Hilo 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 storage capacity for upper Hilo, 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 site supports overwhelmingly alien vegetation. Impacts to rare, threatened or endangered species of flora or fauna would not occur.
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. However, there will continue to be periodic construction of individual single-family residences in directly adjacent 37-lot Punahoa Mauka Estates subdivision. Some home construction may occur simultaneously with reservoir and transmission 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 new reservoir 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 reservoir project. Furthermore, there do not appear to be any other 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.
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.
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 reservoir and other facilities would require minimal consumption of energy. No adverse effects would be expected.

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ENVIRONMENTAL ASSESSMENT

PI‘IHONUA-KUKUAU RESERVOIR AND TRANSMISSION IMPROVEMENTS

APPENDIX 1a
Comments in Response to Early Consultation and Other Correspondence

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William P. Kenoi
Mayor

Harry S. Kubojiri
Police Chief

Paul K. Ferreira
Deputy Police Chief

County of Hawaii

POLICE DEPARTMENT
349 Kapiolani Street • Hilo, Hawaii 96720-3998
(808) 935-3311 • Fax (808) 961-8865

July 28, 2009

Mr. Ron Terry
Geometrician Associates
P. O. Box 396
Hilo, HI 96720

Dear Mr. Terry:

Re: Early Consultation to Supplemental Environmental Assessment to Cover Upsizing of Reservoir for the Pi'ihonua-Kukuau Transmission Main and Reservoir Project

Staff, upon reviewing the provided documents and visiting the proposed site, does not anticipate any significant impact to traffic and/or other public safety concerns related to this project.

Thank you for allowing us the opportunity to comment.

If you have any questions or concerns, please contact Captain Kenneth Vieira of our S. Hilo Patrol Division at 961-2214.

Sincerely,

DEREK D. PACHECO
ASSISTANT POLICE CHIEF
AREA I OPERATIONS

KV:lli

William P. Kenoi
Mayor

Lono A. Tyson
Director

Ivan M. Torigoe
Deputy Director

County of Hawai'i

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

25 Aupuni Street • Hilo, Hawai`i 96720
(808) 961-8083 · Fax (808) 961-8086
http://co.hawaii.hi.us/directory/dir_envmng.htm

July 30, 2009

Mr. Ron Terry
Principal
GEOMETRICIAN ASSOCIATES, LLC
P. O. Box 396
Hilo, HI 96721

RE: Early Consultation for Supplemental Environmental Assessment to Cover Upsizing of Reservior for the Pi`ihonua-Kūkūau Transmission Main and Reservoir Project
TMK: 2-5-008:024 (por.), South Hilo District, Island of Hawai`i

Dear Mr. Terry,

We have no comments to offer on this Project.

Thank you for allowing us to review and comment on this project.

Sincerely,

Lono A. Tyson
DIRECTOR

11960A

PHONE (808) 594-1888

FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

HRD09/4564

August 17, 2009

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

RE: Early consultation request, supplemental environmental assessment, Pi'ihonua-Kūkūau reservoir, Hilo, Hawai'i, TMK: 2-5-008:024.

Aloha e Ron Terry,

The Office of Hawaiian Affairs (OHA) is in receipt of the above-mentioned letter dated July 20, 2009. OHA has reviewed the project and offers the following comments.

OHA understands that the project has changed in scope enough to warrant additional assessment since the original review was prepared in 1996. OHA appreciates the pro-active and forward looking stance that the applicant has taken in this case. We advocate for updated surveys for the areas of investigation cited in the invitation to comment especially since the previous data and information gathered is by now over 10 years old.

Thank you for the opportunity to comment. If you have further questions, please contact Grant Arnold by phone at (808) 594-0263 or e-mail him at granta@oha.org.

'O wau iho nō me ka 'oia'i'o,

Clyde W. Nāmu'o
Administrator

C: OHA Hilo CRC

1592 Haleloke St.
Hilo, HI 96720-1572
August 20, 2009

Ron Terry
Geometrician Associates, LLC
PO Box 396
Hilo, HI 96721

Dear Mr. Terry:

Thank you for the opportunity to meet recently with you and Mr. Jason Inaba to discuss the Supplemental Draft Environmental Assessment (EA) you are preparing for the proposed water tank adjacent to our property. As you know, we have a number of concerns that we hope the EA will address. Those concerns are listed and discussed below:

Visual impact of the tank

We are very concerned about the appearance of the tank. It is obvious from the drawing we examined during your visit that the tank is massive and would completely dwarf our house. Furthermore, the tank, while it would be at home in an industrial area, does not seem to us compatible in appearance with a residential neighborhood like ours. We request that you include in the EA an assessment of the visual impact of the tank on our neighborhood and an assessment of the efforts that the Department of Water Supply would make to lessen that impact.

Among other things we are concerned about is the color of the tank. We have noticed that the tank on the Puainako Extension was painted an extremely unattractive green color and that graffiti apparently were later painted over with a different unattractive green. The fact that the Puainako tank has remained in that unattractive state for a long period of time makes us concerned as to whether or not the Department of Water Supply will have the will and means to maintain the appearance of the tank adjacent to us-- to remove graffiti and to maintain whatever vegetation that is planted on the tank site.

Impact on tradewinds

As we noted above, the tank dwarfs our house. We request that the EA include an assessment of the impact the completed tank would have on the tradewinds reaching our house. (We consulted the Atlas of Hawaii (3rd Edition) and noted that diagrams in that book suggest that tradewinds in our area come from a direction only slightly North of due East, which indicates that the tank could have an impact on our tradewind flow.)

Hurricanes and tropical storms

We also are concerned about the impact that the tank would have on winds created by hurricanes and tropical storms. We understand that storm winds accelerate as they travel uphill. Currently, the forest makai of the tank is being cleared to develop more houses, and we have heard that the forest makai of the new housing development and north of the tank site also may be logged, which we believe could further accelerate storm winds. We request that the EA assess the impact of the tank on storm winds in our area, taking all relevant factors into consid-

eration. What impact would the tank have during wind storms? Under some conditions, would it channel storm winds toward our home and other homes built in the vicinity of the tank?

Interference with drainage

We are concerned that changes to the tank site undertaken to prepare it for the tank could interfere with drainage of rain water from our property. As you know, rain in upper Hilo can be very heavy in some years. (In a recent twelve-month period, we received a total of about 220 inches of rain, according to our rain gauge records.) We therefore request that the EA include an assessment of the effect the project could have on drainage of rain water from our property.

Noise from the construction of the tank and the operations associated with the completed tank

We know that the pipes and valves associated with the tank will produce some noise. We request that the EA discuss the levels of noise that would be created and assess the efficacy of efforts that could be made to mitigate that noise.

Vibrations during construction--impact on our home and nearby lava tubes

We understand that strong vibrations would be created during the preparation of the tank site. We request that the EA include an assessment of the potential effects of those vibrations on the structural integrity of our house.

As you know, there is a large lava tube that runs beneath the North end of our property and about 100 feet north of the tank site. As you saw during your site visit, the roof of that lava tube already has collapsed in two places in the vicinity of the proposed tank, and there is a pool where children swim when there is water in the lava tube. We therefore also are concerned about the impact of vibrations on the structural integrity of that important geological feature of our neighborhood. We request that the EA include an assessment of the potential for damage to that lava tube and any other lava tubes in the vicinity of the tank.

Dust created during the construction of the tank

We request that the EA include an assessment of the dust that would be created during site preparation and construction of the tank and an assessment of the effectiveness of the dust mitigation measures that would be taken.

Thank you for your attention to the issues we have raised. We do want to receive notice when the EA is completed and available on the county website and at the public library.

Your Truly,

Mae Oda
Michael Sullivan

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

COPY

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

MICHAEL D. WILSON, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTY
GILBERT COLOMA-AGARAN

AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND ENVIRONMENTAL AFFAIRS
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION DIVISION
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

August 22, 1996

Mr. Joseph Kennedy
Archaeological Consultants of Hawaii
59-624 Pupukea Road
Haleiwa, Hawaii 96712

LOG NO: 17891 ✓
DOC NO: 9608PM13

Dear Mr. Kennedy:

SUBJECT: ***"Archaeological Reconnaissance Survey and Assessment of the Piihonua-Kukuau Transmission Main & Reservoir"***
(Lantinis and Kennedy 1996)
Punahoa 1, Ponahawai, and Kukuau 1, South Hilo, Hawaii Island
TMK: 2-5-08; 2-5-60; 2-5-35; 2-5-11: 04; 2-5-06: 61, 142, 149; 2-4-75

Thank you for your letter of August 15, 1996, the one copy of the subject report, and a copy of the August 14 letter from Roy Takemoto.

As you know, we do not review reconnaissance survey reports because they do not meet minimal standards of our office for archaeological surveys. The survey, which was undertaken in response to our initial review of the proposed project (letter dated June 25, 1996 from Hibbard to Uchida), does appear to have been successful in determining the presence/absence of historic sites in different sectors of the proposed transmission main. It is our understanding that no evidence of historic sites was found in either of the two alternative alignments of Sections 1 and 2, but that there are some stone mounds/platforms in Section 3. According to the letter from Mr. Takemoto, the Hawaii County Department of Water Supply will ensure that the selected alignment avoids the historic remains in Section 3. This avoidance would result in this project having "no effect" on significant historic sites. If realignment is not possible, then impacts to sites seem likely to occur, and we would require an archaeological inventory survey of Section 3.

Though we have already said that we do not review reconnaissance survey reports, a State site number should have been assigned to what you found and described. Since all of the remains are clustered in one area we think you could use just one site number. Please contact our office to get a number. Minimally, use of this site number would require an errata sheet be sent to our office and to your client to go with the report. Ideally, the report could undergo some minor revisions in the text and illustrations to include this number. We would suggest the latter

approach for ease of your client. When you submit the errata sheet or revised report would you also please send a second copy to Marc Smith for our Hilo office library.

If you have any questions please contact Patrick McCoy (587-0006).

Aloha,

DON HIBBARD, Administrator
State Historic Preservation Division

PM:amk

c. Roy Takemoto

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

NATIONWIDE PERMIT
AGENCY COORDINATION NOTICE

To:
John Nakagawa, Office of Planning, CZM Program, jnakagaw@dbedt.hawaii.gov
Darryl Lum, Clean Water Branch, State DOH, darryl.lum@doh.hawaii.gov
Director, City Dept. of Planning & Permitting, DPW, Aupuni Center, 101 Pauahi Street, #7, Hilo, HI 96720
Administrator, State Historic Preservation, DLNR.Intake.SHPD@hawaii.gov
Kathryn Keala, Office of Hawaiian Affairs, kathyk@oha.org
Po'o, Hui Malama I Na Kupuna 'O Hawai'i Nei, halealoha@wave.hicv.net
Leimana DaMate, Aha Kiole Advisory Committee, P.O. Box 6573, Oceanview, HI 96737
Piilani Kaawaloa, 'Aha Kiole Advisory Committee, P.O. Box 688, Pāhoa, HI 96778

Response Deadline: December 9, 2013
***NOTE** – If **no response** is received by the U.S. Army Corps of Engineers, Honolulu District ("this office" or "the Corps") by the response deadline above, this office will assume that your agency or organization has no comments on the proposed project.

Reference: POH-2008-00268, County of Hawaii Department of Water Supply (DWS)

Location: In Waipahoehoe Stream at/near TMK 325006142 and 325006149, Hilo, Hawaii, Coordinates: Latitude 19.694528° N, Longitude 155.112278° W

Permit Type: Nationwide Permit 12, Utility Line Activities
Permit Authority: Section 404

Project Description: The applicant proposes to install a new 16-inch diameter water transmission main across Waipahoehoe Stream as part of the Piihonua-Kukuau Reservoir and Transmission Improvements. The transmission main will be installed along an existing easement that contains an existing 12-inch water line (above ground on concrete piers over the crossings of the two branches of the stream bed) and a 6-inch water line (buried and concrete jacketed at the crossings). The new line will be installed in an excavated trench with a minimum 3-foot backfill cover per DWS standards. The trenches would be backfilled to existing grades, to include a new concrete service road over the waterline to aid maintenance and prevent washout of the pipeline. The total volumes of excavation (and fill) are each estimated to be 30 cubic yards (CY), with a total area of 0.023 acres. The total duration of the work is estimated to be 10 days. The applicant's project description, site photos, and proposed site-specific best management practices BMPS for the work are attached. The purpose of the project is to improve water service and increase reliability of the Hilo water system; the improvements are necessary because the existing 12-inch and 6-inch lines are old, fragile and near the end of practical service life.

Coastal Zone Management Act: By letter dated March 16, 2012 the Hawaii Coastal Zone Management (CZM) Program, Office of State Planning, Department of Business, Economic Development, and Tourism, provided consistency general concurrence for NWP 12 within the Coastal Zone Management Act Federal Consistency Review of the 2012 Nationwide Permits.

Section 401 of the Clean Water Act: The Corps may not issue a DA permit for the proposed activity until a certification or waiver of certification as required under Section 401 of the Clean Water Act, has been received from the State of Hawaii Department of Health.

National Historic Preservation Act, Section 106:
The Corps has determined that the proposed work has no potential to cause effect to any historic property listed, or eligible for listing, in the National Register of Historic Places because the Hawai'i and National Register of Historic Places does not list any historic properties within or in the vicinity of the area of potential effect (APE) for the project.

The Corps also requests consultation with the Native Hawaiian Organizations and individuals to gather information regarding historic properties as well as the ethnographic and historic uses in the proposed permit area.

Please submit any comments you may have within 15 days of the date of this letter (30 days **ONLY IF** an extension is requested in the original 15 day comment period). If no response is received within the 15-day period, it will be determined that you have no comments. Please cite reference number POH-2008-00268 in your comments. Comments may be mailed to: Regulatory Branch (CEPOH-EC-R/E. Stevens); U.S. Army Corps of Engineers, Honolulu District; Building 230; Fort Shafter, Hawaii 96858-5440. Alternatively, comments may be transmitted via fax to (808) 438-4060 or via e-mail to emilee.r.stevens2@usace.army.mil with the reference number as the subject title.

Should you have questions or require additional information, please contact Emilee Stevens at (808) 835-4310 or via e-mail at Emilee.R.Stevens2@usace.army.mil.

Sincerely,

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

Enclosures

U.S. ARMY CORPS OF ENGINEERS

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT

(33 CFR 325)

OMB APPROVAL NO. 0710-0003
EXPIRES: 31 AUGUST 2012

Public reporting for this collection of information is estimated to average 11 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of the collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters, Executive Services and Communications Directorate, Information Management Division and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

PRIVACY ACT STATEMENT

Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public and may be made available as part of a public notice as required by Federal law. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued. One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and/or instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETE

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME	8. AUTHORIZED AGENT'S NAME AND TITLE (agent is not required)
First - Quirino Middle - Last - Antonio, P.E.	First - Jason Middle - K. Last - Inaba
Company - Dept of Water Supply, County of Hawaii	Company - Inaba Engineering, Inc.
E-mail Address - Lawrence Beck, P.E.(LBeck@hawaiidws.org)	E-mail Address - inabaeng@hawaii.rr.com
6. APPLICANT'S ADDRESS:	**9. AGENT'S ADDRESS:**
Address- 345 Kekuanaoa Street, Suite 20	Address- 273 Waianuenue Ave.
City - Hilo State - Hawaii Zip - 96720 Country - USA	City - Hilo State - Hawaii Zip - 96720 Country - USA
7. APPLICANT'S PHONE NOs. w/AREA CODE	**10. AGENTS PHONE NOs. w/AREA CODE**
a. Residence b. Business 808-961-8070 x260 c. Fax 808-961-8080	a. Residence b. Business 808-961-3727 x203 c. Fax 808-935-8033

STATEMENT OF AUTHORIZATION

11. I hereby authorize, Inaba Engineering, Inc. to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

SIGNATURE OF APPLICANT — DATE 11/19/13

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions) Piihonua-Kukuau Reservoir and Transmission Improvements
DWS Job No. 94-590

13. NAME OF WATERBODY, IF KNOWN (if applicable)	14. PROJECT STREET ADDRESS (if applicable)
Unnamed Stream. (Alenaio stream,Waiolama Canal 3 miles)	Address N/A
15. LOCATION OF PROJECT Latitude: °N 19°41'40.30" Longitude: °W 155°06'44.20"	City - Hilo State- HI Zip- 96720

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions)
State Tax Parcel ID 3rd. Div. 2-5-006: 142 & 149 Municipality
Section - Township - Range -

17. DIRECTIONS TO THE SITE

Starting at Komohana/Mohouli Street Intersection, continue mauka/west on Mohouli Street and take first left at Kukuau Street. Continue up to near the end of Kukuau Street. On right side of street between 1056 (vacant lot) and 1070 (residence) Kukuau Street there is a waterline easement with two above ground waterlines. Follow waterlines north into vegetated area approximately 900 lineal feet from edge of a.c. pavement to proposed crossing site.

18. Nature of Activity (Description of project, include all features)

The DWS plans to install a new 2 million gallon concrete reservoir and 16" water transmission main. The transmission main will follow along an existing easement that contains existing 12" and 6" waterlines. The existing 12" line is above ground and on concrete piers over the stream bed and the 6" is buried and concrete jacketed at the crossing. The new 16" waterline will be installed in an excavated trench with a minimum 3' cover per DWS standards. Where the line crosses the bed, it is proposed to be backfilled to existing grades. A concrete service road will be place over the waterline to aid maintenance and prevent washout of the pipeline. See attached construction plan & profile and details. The reservoir is located over 8,000 l.f. away from the crossing.

19. Project Purpose (Describe the reason or purpose of the project, see instructions)

The new 16" ductile iron transmission line is needed to promote public health and safety by improving water service and increase reliability of the Hilo water system. The improvements are necessary because the existing 12" & 6" lines are old, fragile and near the end of its practical service life.

USE BLOCKS 20-23 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

Discharges are related to the construction activities associated with the installation of a new 16" ductile iron water transmission line and concrete maintenance/service access road. Typical discharges would be pipe trench excavation and backfill and base course and reinforced concrete for service road.

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards:

Type Amount in Cubic Yards	Type Amount in Cubic Yards	Type Amount in Cubic Yards
SEE ATTACHMENT "A"		

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)

Acres
or SEE ATTACHMENT "A"
Linear Feet

23. Description of Avoidance, Minimization, and Compensation (see instructions)

SEE ATTACHMENT "A"

24. Is Any Portion of the Work Already Complete? ☐ Yes ☒ No IF YES, DESCRIBE THE COMPLETED WORK

25. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (If more than can be entered here, please attach a supplemental list).

N/A

a. Address-

City - State - Zip -

b. Address-

City - State - Zip -

c. Address-

City - State - Zip -

d. Address-

City - State - Zip -

e. Address-

City - State - Zip -

26. List of Other Certificates or Approvals/Denials received from other Federal, State, or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED

* Would include but is not restricted to zoning, building, and flood plain permits

27. Application is hereby made for permit or permits to authorize the work described in this application. I certify that this information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

SIGNATURE OF APPLICANT	DATE	SIGNATURE OF AGENT	DATE
	11/19/13	Jason K Inaba	11-19-13

The Application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

ENG FORM 4345
ATTACHMENT "A"

Item 21 & 22.

Approximate Amount of Materials

Location		Pipeline	Trench Exc/Backfill	Service Road		Surface Area	
		L.F.	C.Y.	Base (CY)	Concrete (CY)	SF	Acres
1.	Stream Crossing #1 Sta 25+00±	37	17	7	10	560	0.013
2.	Stream Crossing #2 Sta 25+80±	28	13	5	8	420	0.01
	TOTAL	65	30	12	18	980	0.023

Approx. Time to Complete Work

Location		PipelineTrench Exc/Backfill	Service Road	
		Days	Base	Concrete
1.	Stream Crossing #1 Sta 25+00±	1	1	3
2.	Stream Crossing #2 Sta 25+80±	1	1	3
	TOTAL Days	2	2	6

Item 23.

During the construction phase, appropriate measures will be taken to minimize and reduce any adverse effects to the environment related to the proposed work. A Best Management Practices (BMP) plan will be developed prior to the start of work and will be implemented during the construction phase. At a minimum, the following site specific measures will be included in the proposed BMP plan:

1. Site Specific Plan
   A. Erosion and sediment controls include the grassing of all exposed surfaces after the completion of grading activities and installation of silt fences at locations indicated on the site plan. Silt fences shall be installed as soon as clearing operations begin. Grassing shall

be done when slopes are graded and no work is anticipated on them for more than 14 days. Project entrance shall be stabilized at start of construction.

B. Other controls:
WASTE DISPOSAL: All Operator's personnel shall be instructed regarding the correct procedures for waste disposal. The Operator's project site supervisor shall be responsible for seeing that these procedures and practices are followed.

Waste Materials;
All waste materials will be collected and stored in a securely lidded metal dumpster. The dumpster shall meet all local County and State solid waste management requirements. All trash and construction debris from the site will be deposited in the dumpster. The dumpster shall be emptied twice weekly or as necessary. No construction waste materials shall be buried on site.

Hazardous Waste;
All hazardous waste materials will be disposed of in the manner specified by local, state or federal regulation or by the manufacturer.

Sanitary Waste;
All sanitary waste will be collected from the portable units a minimum of once per week, or more if necessary.

OFFSITE VEHICLE TRACKING: A stabilized construction entrance shall be provided to help reduce vehicle tracking of sediments off the site. The paved streets adjacent to the site entrances shall be swept daily to remove any excess mud, dirt or rock tracked from the site. Dump trucks hauling material to and from the construction site shall be covered with a tarpaulin.

GOOD HOUSEKEEPING: The Operator will employ good housekeeping practices during the course of the project. The following good housekeeping practices will be followed onsite during the construction period:

- All materials stored onsite shall be stored in a neat, orderly manner and in their appropriate containers where applicable, and if possible, under a roof or other enclosure.

- Containerized products will be kept in their original containers with the original manufacturer's label.

- Where possible, all of a product will be used up before disposing of the container.

- Manufacturer's recommendations for proper use and disposal will be followed.

- The operators site supervisor will inspect daily to insure proper use and disposal of materials on site and to keep all staff on site informed as to all rules and regulations to be followed.

PETROLEUM LEAKAGE: All onsite vehicles and equipment will be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage. Petroleum products will be stored on site in tightly sealed containers which are clearly labeled. Any asphalt substances onsite will be applied according to the manufacturer's recommendations.

The refueling and servicing of heavy equipment will be done in a designated area. Care shall be used in the refueling process to prevent spillage and overflow.

CONCRETE TRUCKS: Concrete trucks will be allowed to washout or discharge concrete and drum wash water only at a designated area. This area will contain all the water and concrete discharged and be maintained by the Operator. At the end of concrete operations, the Operator shall remove and dispose of the concrete sediment and waste residue offsite. Concrete wash water will not be discharged offsite.

FERTILIZERS: Fertilizers will be applied only in the minimum amounts recommended by the manufacturer. Once applied, fertilizer will be worked into the soil to limit exposure to storm water. Storage will be in a covered shed or stored offsite. The contents of any partially used bags of fertilizer will be transferred to a sealable plastic container to avoid spills.

PAINTS: All containers will be tightly sealed and stored when not required for use. Excess paint will not be discharged to the storm sewer system but will be properly disposed of according to manufacturers' instructions or state and local regulations.

C. Description of timing during the construction when measures will be implemented.
   1. Stabilized construction entrances shall be installed before any hauling operations are scheduled to begin.
   2. Silt fences will be installed when clearing, grubbing and grading operations begins.
   3. Equipment servicing and fueling area will be set up when equipment is brought to the site.
   4. Sediment trap will be installed when daylight sections of stream is excavated and graded. When berm for trap is installed, the exposed surfaces of the channel and berm shall be grassed.
   5. As portions of the excavation and embankment slope areas are brought to finish grades, the contractor shall begin grassing operations for areas where activity will not occur for more than 14 days.
   6. The wash out area for concrete trucks shall be set up prior to the start of concrete operations and the arrival of concrete trucks into the site.
   7. Inspection and maintenance procedures shall be done on a regularly scheduled basis.
   8. Remove silt and debris from sediment trap as necessary.
   9. When all construction activity is complete and the site is stabilized, the contractor shall remove the controls and restabilize any areas disturbed by their removal.

2. Inspection and maintenance procedures and schedules for control measures: The following are some of the inspection and maintenance practices that will be used to maintain erosion and sediment controls:

- All control measures shall be inspected at least once each week and following any significant rainfall event which causes storm water runoff.

- All measures will be maintained in good working order; if a repair is necessary, it will be initiated within 24 hours of report.

- Built up sediment will be removed from silt fence when it has reached one-third the height of the fence.

- Silt fence will be inspected for depth of sediment, tears, to see if the fabric is securely attached to the fence posts, and to see that the fence posts are firmly in the ground.

- After first significant rainfall event, inspection shall note whether silt fence is located appropriately. If not, silt fence shall be moved to the location or locations which will provide the best control.

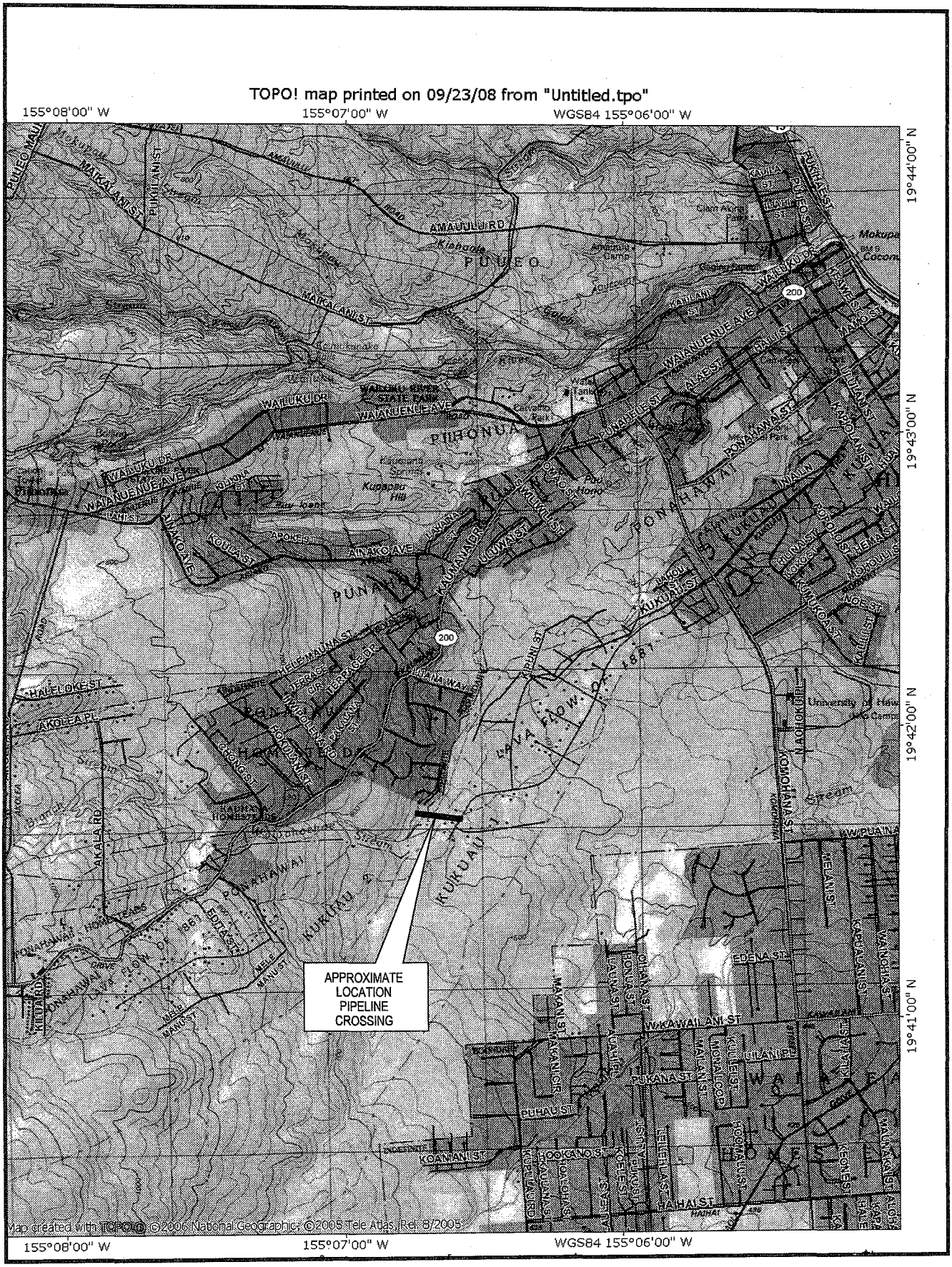
- Temporary and permanent seeding and planting will be inspected for bare spots, washouts, and healthy growth.

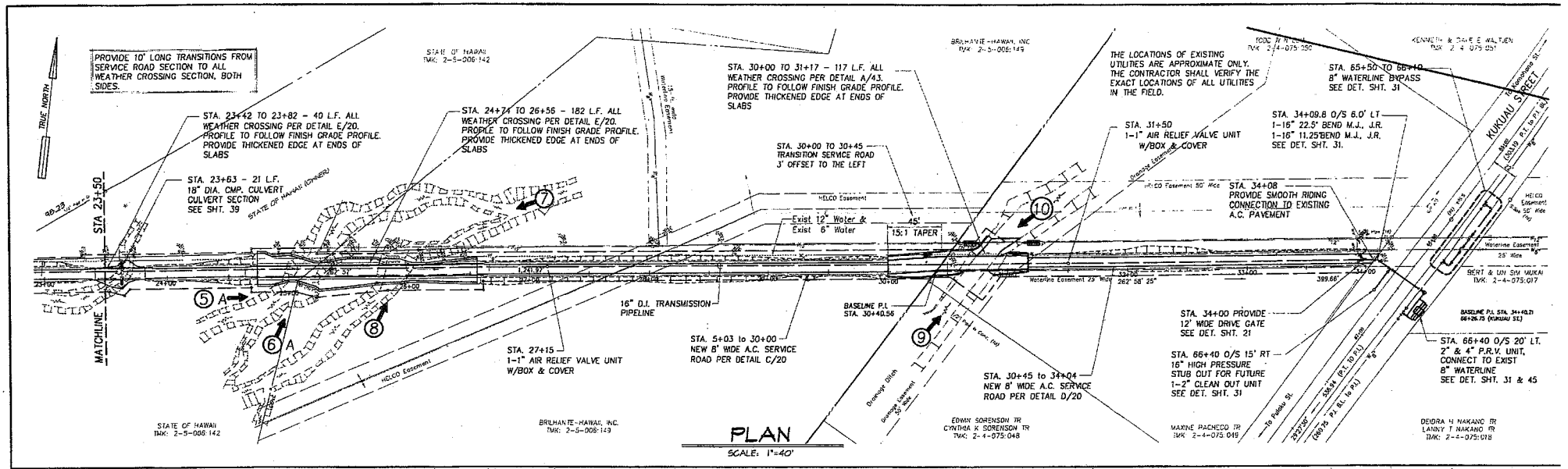
- A maintenance inspection report shall be made after each inspection. The Operator's site supervisor shall be responsible for inspections, maintenance and repair activities, and the filling out of the reports.

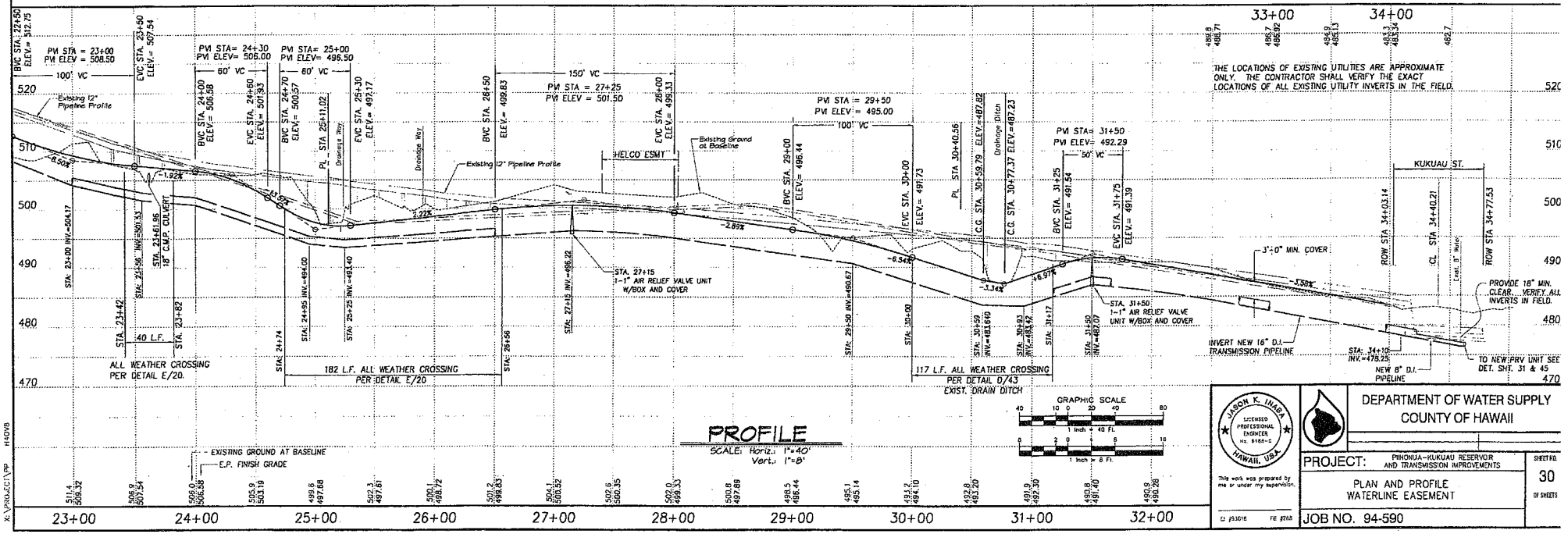
3. Timetable for construction activities. The proposed contract time allowed for this entire project might be approximately 12 months. The actual work in the two stream crossings will be approximately 10 working days, or about 5 days per crossing. The contractor will be encouraged to do the in stream work during the dry periods to minimize the exposure of grading activities to inclement weather.

4. All construction materials related to stream crossing work such as excavated material, pipe cushion, backfill material, etc. will be placed and/or stored in designated areas outside of stream flow areas and protected by erosion and runoff control measures.

August 2, 2013


TOPO! map printed on 09/23/08 from "Untitled.tpo"
155°08'00" W
155°07'00" W
WGS84 155°06'00" W
19°44'00" N
19°43'00" N
19°42'00" N
19°41'00" N
APPROXIMATE LOCATION PIPELINE CROSSING
Map created with TOPO! © 2006 National Geographic, ©2005 Tele Atlas, Rel. 8/2005





JASON K. INABA LICENSED PROFESSIONAL ENGINEER No. 8168-C HAWAII, U.S.A.

This work was prepared by me or under my supervision.

DEPARTMENT OF WATER SUPPLY
COUNTY OF HAWAII

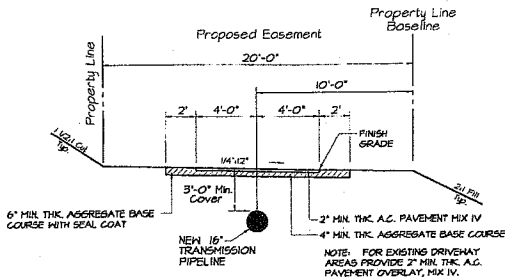
PROJECT: PIHONUA–KUKUAU RESERVOIR AND TRANSMISSION IMPROVEMENTS

PLAN AND PROFILE WATERLINE EASEMENT

SHEET NO. 30 OF SHEETS

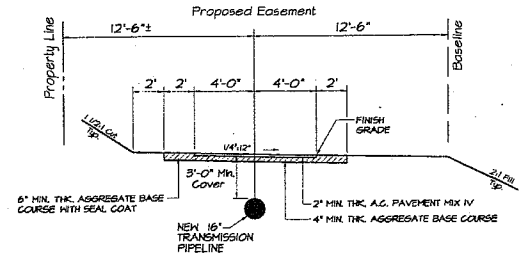
JOB NO. 94-590

X:\PROJECT\PIP_H40V8



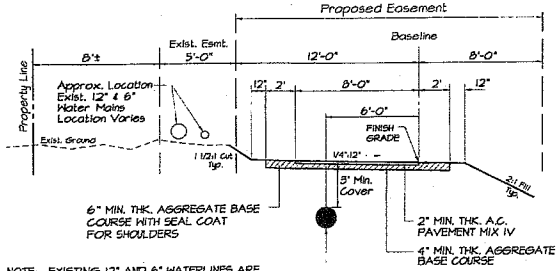
A/20 TYPICAL WATERLINE LOCATION - STA 0+00 TO 2+14 EASEMENT - KAUMANA DRIVE to KUKUAU STREET

Scale: 1/4"=1'-0"



B/20 TYPICAL WATERLINE LOCATION - STA. 2+14 TO 5+03 EASEMENT - KAUMANA DRIVE to KUKUAU STREET

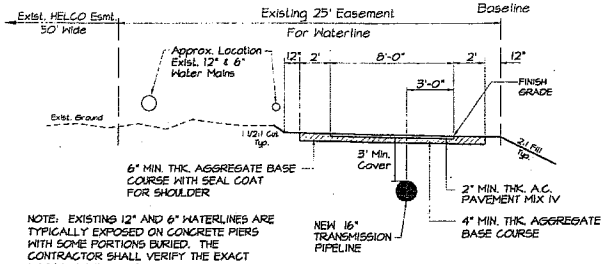
Scale: 1/4"=1'-0"



NOTE: EXISTING 12" AND 6" WATERLINES ARE TYPICALLY EXPOSED ON CONCRETE PIERS WITH SOME PORTIONS BURIED. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATIONS IN THE FIELD.

C/20 TYPICAL WATERLINE LOCATION - STA. 5+03 to 30+00 EASEMENT - KAUMANA DRIVE to KUKUAU STREET

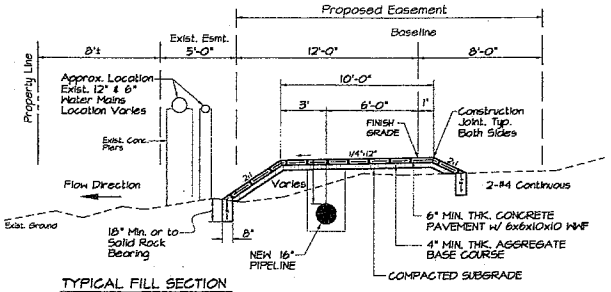
Scale: 1/4"=1'-0"



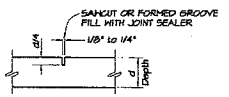
NOTE: EXISTING 12" AND 6" WATERLINES ARE TYPICALLY EXPOSED ON CONCRETE PIERS WITH SOME PORTIONS BURIED. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATIONS IN THE FIELD.

D/20 TYPICAL WATERLINE LOCATION - STA. 30+45 to 34+04 EASEMENT - KAUMANA DRIVE to KUKUAU STREET

Scale: 1/4"=1'-0"

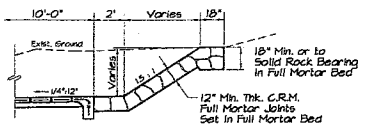


TYPICAL FILL SECTION

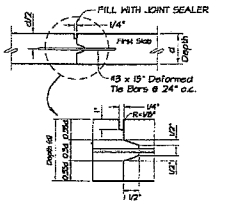


TRANSVERSE & LONGITUDINAL WEAKENED CONTRACTION JOINT

Not to Scale



TYPICAL CUT SECTION



TRANSVERSE & CONSTRUCTION KEYED JOINT WITH TIE BARS

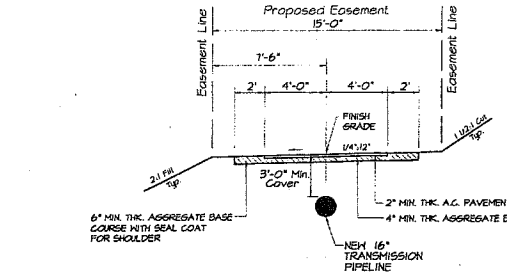
Not to Scale

NOTES:

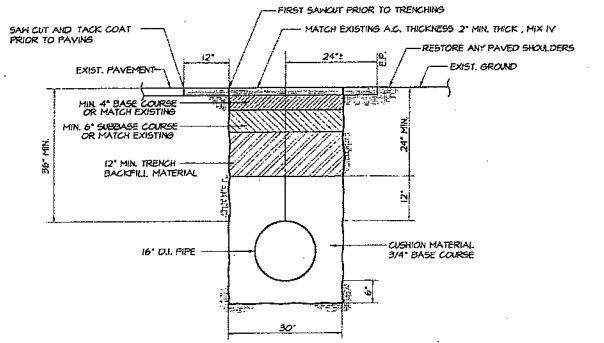
1. TRANSVERSE JOINTS SHALL BE EITHER WEAKENED PLANE CONTRACTION JOINTS OR KEYED CONSTRUCTION JOINTS WITH TIE BARS AND SHALL BE EVENLY SPACED APPROXIMATELY 12 FEET APART.
2. KEYED CONSTRUCTION JOINTS SHALL BE PLACED APPROXIMATELY 60 FEET APART.
3. WEAKENED PLANE CONSTRUCTION JOINTS MAY BE CONSTRUCTED BY SAWING, FORMING DUMMY GROOVE OR INSERTING RIBBON OR PREMOLDED STRIP.
4. ALL JOINTS SHALL BE SLIGHTLY UNDERFILLED WITH AN APPROVED JOINT SEALING MATERIAL.
5. CONCRETE PAVEMENT SHALL BE BRISTLE BRUSH FINISHED TRANSVERSLY ACROSS THE PAVEMENT.

E/20 TYPICAL ALL WEATHER CROSSING - EASEMENT - STA

Scale: 1/4"=1'-0"

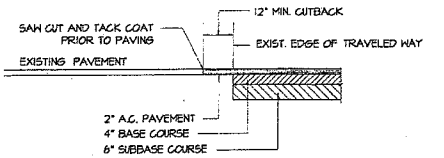


F/20 TYPICAL WATERLINE LOCATION - STA 6+88 TO 10+45 EASEMENT - 12" TRANSMISSION LINE BYPASS



G/20 TRENCH DETAIL WITHIN COUNTY RIGHT-OF-WAY

SCALE: 3/4"=1'-0"



H/20 PAVEMENT CONNECTION DETAIL

NOT TO SCALE

JASON K. INABA LICENSED PROFESSIONAL ENGINEER No. 8188-C HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

DEPARTMENT OF WATER SUPPLY
COUNTY OF HAWAII

PROJECT: PIIHONUA-KUKUAU RESERVOIR AND TRANSMISSION IMPROVEMENTS

TYPICAL SERVICE ROAD SECTIONS CONCRETE ALL WEATHER CROSSING, MISC. DETAILS

JOB NO. 94-590

SHEET NO. 20 OF SHEETS 48

K:\WP\SPECS\TYPSEC 1-1

Station: 25+00
View: DOWNSTREAM (6)A

Station: 25+00
View: STREAM CROSSING (5)A

Station: 26+00
View: DOWN STREAM (8)

Station: 27+00 LEFT
View: UPSTREAM (7)

"INABA ENGINEERING. INC."
<inabaeng@hawaiiantel.net>

09/23/2008 03:37 PM

To robert.k.chong@hawaii.gov
cc
Subject SCAP Determination

Robert K. Chong
DLNR

Subject: Request for Determination of SCAP Requirement

Project: Piihonua-Kukuau Transmission Main & Reservoir
County of Hawaii, Department of Water Supply
Job No. 94-590
Kukuau 2, South Hilo, Hawaii
TMK: 3rd Div. 2-5-006:149, Owner= Brilhante-Hawaii, Inc.
3rd Div. 2-5-006:142, Owner= State of Hawaii

As discussed on Sept. 18, 2008, the DWS plans to install a 16" transmission main across the intermittent Waipahoehoe/Alenaio Stream, and we wanted to get a determination on the need for a DLNR Stream channel alteration Permit. Generally, the new transmission main will follow along an existing easement which contains existing 12" and 6" waterlines. The new 16" waterline will be installed in an excavated trench with a minimum 3' cover per DWS standards. Where the line crosses the intermittent stream bed, it is proposed to be concrete jacketed, backfilled to existing grades, with the surface of the trench hardened where necessary with cement rubble masonry (CRM) to match the existing pahoehoe surface and prevent washout.

The intermittent stream crossing generally falls in the above two properties.

Portions of the waterline alignment beyond the stream channel will include an 8' wide paved or concrete service/access road. It is proposed that the access road will not cross the stream bed.

A “USGS” topo map sketch is attached showing the approximate crossing location as well as a location plan of the transmission line alignment in this area.

Please call or email me if you have any questions or comments, or require additional information. Thank you for your help.

Jason Inaba, P.E.
Inaba Engineering, Inc.
273 Waianuenue Ave.
Hilo, Hawaii 96720

Ph: 808-961-3727 x203
Fx: 808-935-8033 fx
inabaeng@hawaii.rr.com

-------- Original Message --------
Subject:RFD.2032.8 Waipahoehoe Stream

Date: Fri, 26 Sep 2008 13:37:43 -1000
From: Robert.K.Chong@hawaii.gov
To: INABA ENGINEERING. INC. <inabaeng@hawaiiantel.net>

Hello Jason,

This email is in response to your September 23, 2008, email requesting a determination for the proposed 16-inch DWS transmission line across Waipahoehoe Stream in Hilo, Hawaii at TMK: (3) 2-5-006:142.

The Commission on Water Resource Management (Commission), Stream Protection and Management Branch, has the responsibility to protect stream channels from alteration whenever practicable to provide for fishery, wildlife, recreational, aesthetic, scenic, and other beneficial instream uses in the State of Hawaii under the authorization of the State Water Code (Code), Chapter 174C, Hawaii Revised Statutes, and Chapter 13-169, Hawaii Administrative Rules (Protection of Instream Uses of Water).

Pursuant to the Code, §174C-71(3)(A), the Commission "shall require persons to obtain a permit from the Commission prior to undertaking a stream channel alteration." The term "stream channel" is defined in the Code, §174C-3, as a "watercourse with a definite bed and banks which periodically or continuously contains flowing water." Furthermore, the Code defines "stream" as any "natural watercourse in which water usually flows in a defined bed or channel."

Based on the information you provided, the Commission will not require a Stream Channel Alteration Permit (SCAP) to be submitted for the proposed project because a non-perennial stream is not considered a natural watercourse.

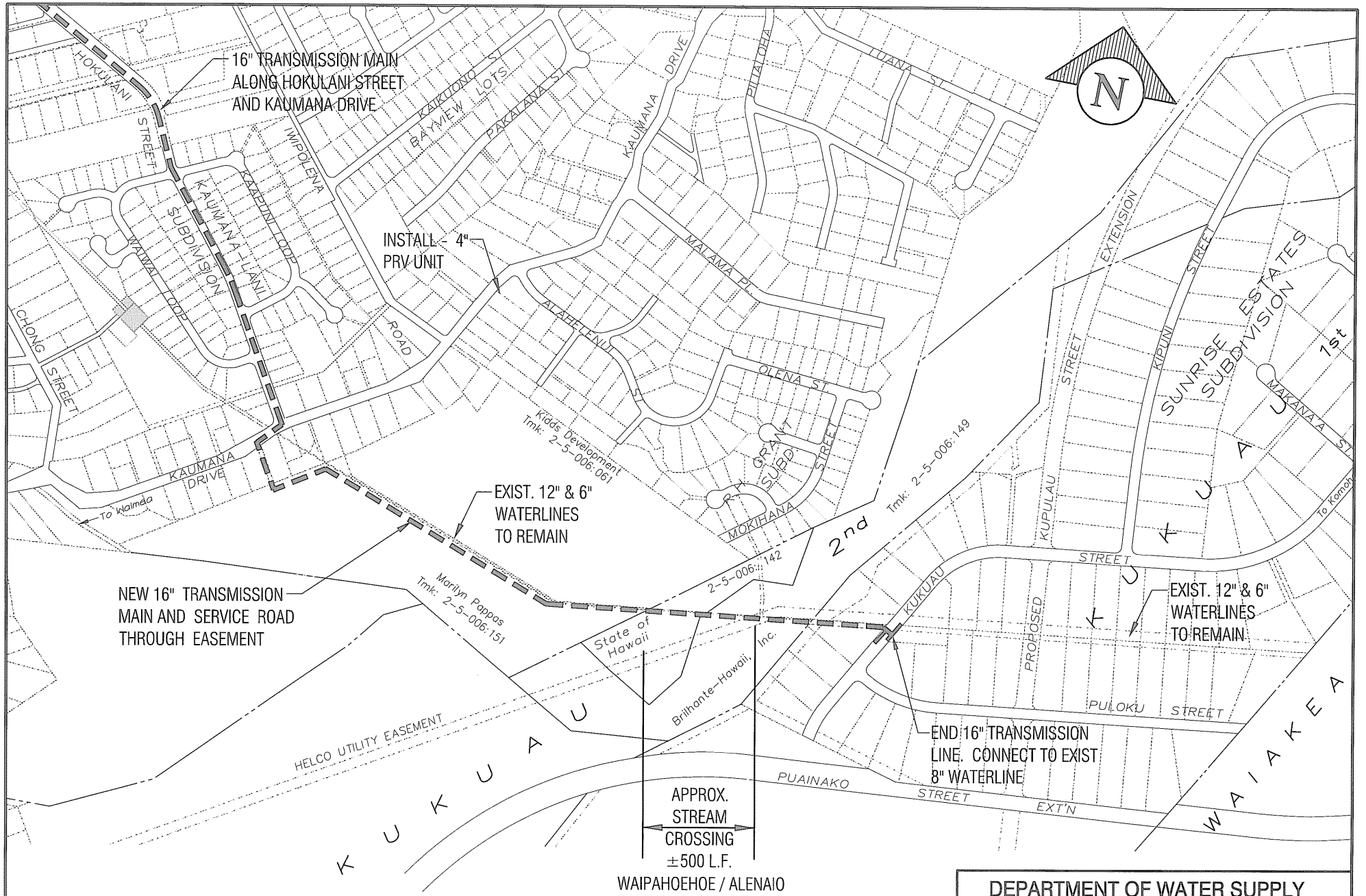
Please be advised that the project may require other agency approvals regarding wetlands, water quality, grading, stockpiling, and floodways. This letter should not be used for other regulatory jurisdictions or used to imply compliance with other federal, state, or county rules.

Please contact Robert Chong of the Stream Protection and Management at 587-0266 if you have any questions or need more information.

Aloha,
Robert

Robert K. Chong, Planner

Commission on Water Resource Management
1151 Punchbowl Street, Room 227
Honolulu, HI 96813
Phone: (808) 587-0266
Fax: (808) 587-0219



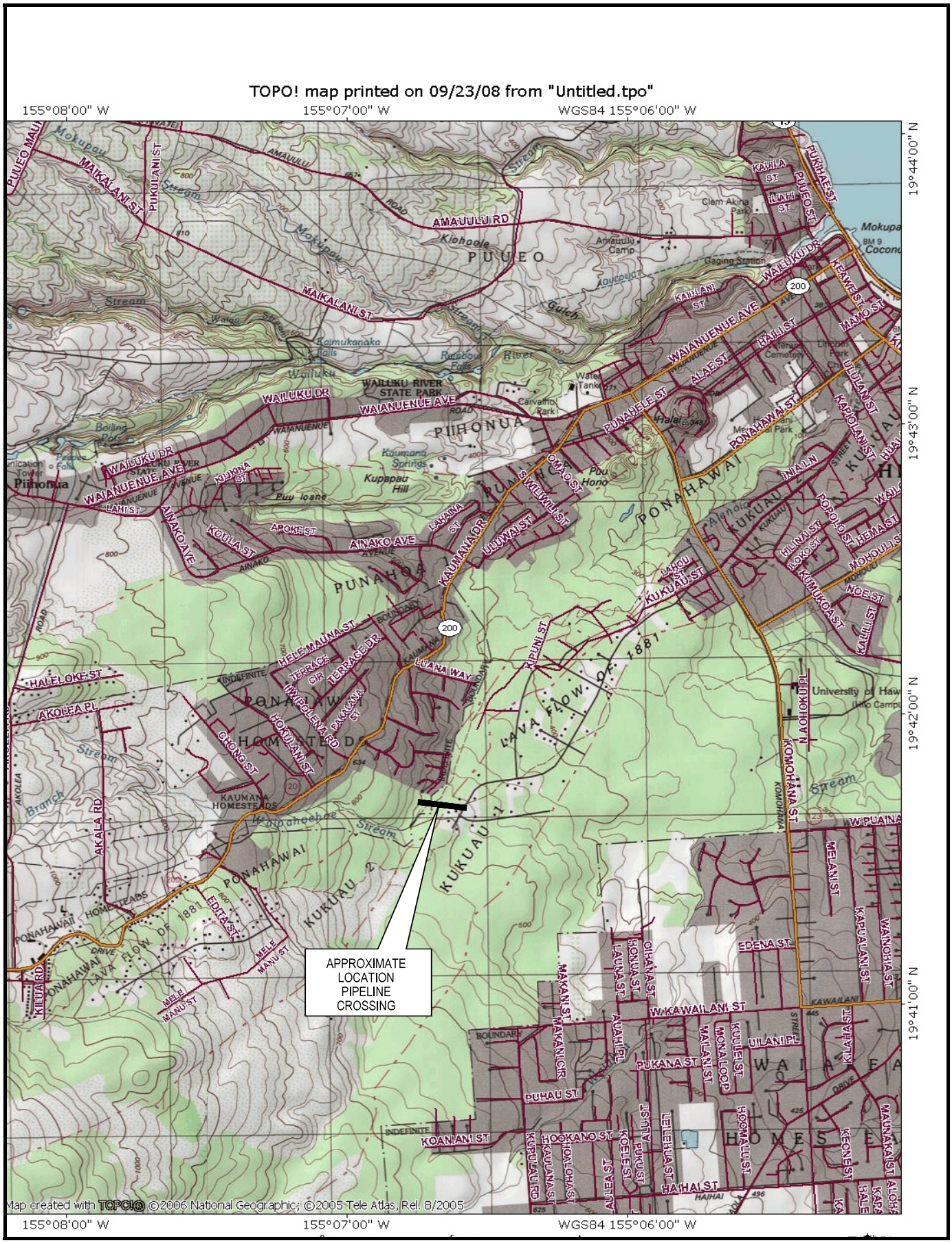
INABA ENGINEERING, INC.
273 WAIANUENUE AVE.
HILO, HAWAII 96720

LOCATION PLAN

NOT TO SCALE

DEPARTMENT OF WATER SUPPLY
COUNTY OF HAWAII

PIIHONUA-KUKUAU RESERVOIR
AND TRANSMISSION IMPROVEMENTS
JOB NO. 94-590


TOPO! map printed on 09/23/08 from "Untitled.tpo"
155°08'00" W
155°07'00" W
WGS84 155°06'00" W
19°44'00" N
19°43'00" N
19°42'00" N
19°41'00" N
APPROXIMATE LOCATION PIPELINE CROSSING
Map created with TOPO!® ©2006 National Geographic; ©2005 Tele Atlas, Rel. 8/2005

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ENVIRONMENTAL ASSESSMENT

PI‘IHONUA-KUKUAU RESERVOIR AND TRANSMISSION IMPROVEMENTS

APPENDIX 1b
Comments to Draft EA and Responses

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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

October 30, 2014

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

Dear Mr. Terry:

Subject: Piihonua-Kukuau Reservoir and Transmission Improvements Island of Hawaii, South Hilo, TMK: (3rd) TMKs: 2-5-065:037; Various county Road Rights-of-way 2-5-060 (Hokulani Street), 2-5-035 (Hokulani Street), and 2-5-011 (Kaumana Drive); Easements Over 2-5-006:061, 142 and 149, and 2-4-075:49

Staff, upon reviewing the provided documents and visiting the proposed site, does not anticipate any significant impact to traffic and/or public safety concerns.

Thank you for allowing us the opportunity to comment.

If you have any questions, please contact Captain Richard Sherlock, Commander of the S. Hilo District, at 961-2214.

Sincerely,

HENRY J. TAVARES, JR.
ASSISTANT POLICE CHIEF
AREA I OPERATIONS BUREAU

RS:lli
0900429

geometrician
ASSOCIATES, LLC
integrating geographic science and planning

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

February 4, 2015

Harry Kubojiri, Chief
Hawai‘i County Police Department
349 Kapiolani Street
Hilo HI 96720

Dear Chief Kubojiri:

Subject: **Comment to Draft Environmental Assessment for Pi‘ihonua-Kukuau Reservoir and Transmission Improvements, South Hilo District, TMKs (3rd.) 7-5-065:037; Various County Road Rights-of-way 2-5-060 (Hokulani Street), 2-5-035 (Hokulani Street), and 2-5-011 (Kaumana Drive); Easements Over 2-5-006:061, 142 and 149, and 2-4-075:49**

Thank you for the comment letter dated October 30, 2014, indicating that upon reviewing the provided documents and visiting the proposed site, your staff does not anticipate any significant impact to traffic and/or public safety concerns.

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 about the project, please contact Larry Beck at 961-8070 Ext. 260.

Sincerely,

Ron Terry

Ron Terry, Principal
Geometrician Associates

Cc: Quirino Antonio, Manager, Hawai‘i County Department of Water Supply

William P. Kenoi
Mayor

Duane Kanuha
Director

Bobby Command
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

October 30, 2014

Ron Terry, Ph.D.
Geometrician Associates
P.O. Box 396
Hilo, HI 96721

Dear Dr. Terry:

Subject: **Request for Comments on Draft Environmental Assessment**
Project: **Pi'ihonua-Kūkūau Reservoir and Transmission Improvements**
TMKs: **(3) 2-5-065:037 (Tank Site),**
(3) 2-5-060 & 035 (Hōkūlani Street ROW),
(3) 2-5-011(Kaūmana Drive ROW),
Easements on (3) 2-5-006:061, 142 & 149, and (3) 2-4-075:049

Thank you for your letter received October 21, 2014, requesting comments from this office regarding the Draft Environmental Assessment (DEA) for the subject project.

The Hawai'i County Department of Water Supply (DWS) is proposing a 2.0 MG reservoir and 6,500 feet of new 16-inch transmission line to service the current and estimated future water demand of developments within the network supplied by the subject transmission main in upper Hilo. Previous DWS plans, inclusive of an Environmental Assessment (1996), considered a smaller 1.0 MG reservoir and an additional 1,900 feet of transmission line, however, the project was never undertaken.

The reservoir is to be sited within the State Land Use (SLU) Agricultural district, with transmission lines traversing SLU Agricultural and Urban districts. County zoning in the project area includes Agricultural (A-1a), Open, and Residential (RS-10 & RS-15) designations. The subject area is designated Rural and Low Density Urban by the Hawai'i County General Plan Land Use Pattern Allocation Guide (LUPAG) map and is outside of the Special Management Area (SMA). Hawai'i County Code, Chapter 25 (Zoning Code), Section 25-4-11(b) states that "*Any substation used by a public utility for the purpose of furnishing telephone, gas, electricity, water, sewer, radio, or television shall be a permitted use in any district provided that the use is not hazardous or dangerous to the surrounding area and the director has issued plan approval for such use.*" Therefore, plan approval will be required for the proposed reservoir.

Given the proximity of the proposed reservoir to the existing single-family dwelling on the adjacent lot to the west, please indicate any planned visual and noise mitigation measures, landscaping or otherwise, that the applicant is proposing to promote a healthy and appropriate buffer between the two uses. Such buffers are supported by the General Plan (GP) goals and policies related to public utilities [GP Goal 11.1.2(c) and GP Policy 11.1.3(a)] and should be addressed in the EA.

We have no further comments to offer at this time. However, please keep us informed and provide our department with a copy of the final EA for our records. If you have any questions or if you need further assistance, please feel free to contact Lucas Mead of this office at (808) 961-8140.

Sincerely,

DUANE KANUHA
Planning Director

LM:cs
P:\wpwin60\Luke\dEA, EA, & EIS Comments\draftea Piihonua-Kukuau Reservoir and Transmission Improvements.doc

cc: Mr. Larry Beck, P.E.
Hawai'i County Department of Water Supply
345 Kekūanaō'a Street, Suite 20
Hilo, Hawai'i 96720

geometrician
ASSOCIATES, LLC
integrating geographic science and planning

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

February 4, 2015

Duane Kanuha, Director
Hawai‘i County Planning Department
101 Pauahi Street, Suite 3
Hilo HI 96720

Dear Mr. Kanuha:

Subject: **Comment to Draft Environmental Assessment for Pi‘ihonua-Kukuau Reservoir and Transmission Improvements, South Hilo District, TMKs (3rd.) 7-5-065:037; Various County Road Rights-of-way 2-5-060 (Hokulani Street), 2-5-035 (Hokulani Street), and 2-5-011 (Kaumana Drive); Easements Over 2-5-006:061, 142 and 149, and 2-4-075:49**

Thank you for the comment letter dated October 30, 2014, on the Draft EA. In answer to your specific comments:

1. *Planned visual and noise mitigation for healthy and appropriate buffer for the existing residence*.

The water tank was placed near the center of the lot, a minimum of 70 feet from the two adjacent residential lot boundaries. Based on the critical imperative to protect the security of the public water supply, DWS typically prefers not to have landscaping screens within the reservoirs' fence enclosures. This keeps the area open and visible and reduces trespassing. However, in consideration of the fact that this reservoir is being constructed adjacent to an existing, long-term residence, DWS will install a row of ‘ōhi‘a trees as landscaping on the resident's side that can soften the visual impact of the tank but not impose inappropriate dense screening. This element has been added to the design plan. In addition, the residents may wish to erect visual barriers or plant vegetation for a visual buffer on their own properties, if they desire an added visual buffer. This information about noise buffers and their relation to GP Goal 11.1.2(c) and Policy 11.1.3(c) has been added to the Final EA.

2. *Planned noise mitigation for healthy and appropriate buffer for the existing residence*: During construction, the contractor will be required to comply with DOH rules concerning noise and obtain a permit if appropriate. The only source of noticeable noise during operation will be the inlet control valves. In response to concerns about potential noise from an adjacent resident, the inlet controls have been relocated to the opposite side of the reservoir. After construction, if there are actual noise complaints from valve operation, a small structure could be placed over the valves to further control sound should there be any. This should effectively buffer noise. This information about noise buffers and their relation to GP Policy Goal 11.1.3(a) has 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 about the project, please contact Larry Beck at 961-8070 Ext. 260.

Sincerely,

Ron Terry

Ron Terry, Principal
Geometrician Associates

Cc: Quirino Antonio, Manager, Hawai‘i County Department of Water Supply

NEIL ABERCROMBIE
GOVERNOR OF HAWAI

LINDA ROSEN, M.D., M.P.H.
DIRECTOR OF HEALTH

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

In reply, please refer to File

EPO 14-231

November 10, 2014

Mr Ron Terry
Geometrician Associates
PO Box 396
Hilo, HI 96720
Via email: rterry@hawaii.rr.com

Dear Mr. Terry:

SUBJECT: DEA Piihonua-Kukuau Reservoir & Transmission Improvements, South Hilo

The Department of Health (DOH), Environmental Planning Office (EPO), acknowledges receipt of your project through the Office of Environmental Quality Control's October 23rd, 2014 "Environmental Notice". Thank you for allowing us to review and comment on the subject document. The document was routed to the Safe Drinking Water Branch on October 24th for their review. They will provide specific comments to you if necessary. EPO recommends that you review the standard comments at: http://health.hawaii.gov/epo/home/landuse-planning-review-program/. You are required to adhere to all applicable standard comments.

We encourage you to examine and utilize the Hawaii Environmental Health Portal. The portal 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. The Portal is continually updated. Please visit it regularly at: https://eha-cloud.doh.hawaii.gov

You may also wish to review the recently revised Water Quality Standards Maps that have been updated for all islands. The new Water Quality Standards Maps can be found at: http://health.hawaii.gov/cwb/site-map/clean-water-branch-home-page/water-quality-standards/.

The EPO suggests that you examine the many sources available on strategies to support the sustainable and healthy design of communities and buildings, including the:
2014 National Climate Change Report - Highlights for Hawaii:
http://ipcc-wg2.gov/AR5/images/uploads/WGIIAR5-Chap29_FGDall.pdf;
U.S. Health and Human Services: www.hhs.gov/about/sustainability;
U.S. Environmental Protection Agency's sustainability programs: www.epa.gov/sustainability;
U.S. Green Building Council's LEED program: www.usgbc.org/leed;
Smart Growth America: www.smartgrowthamerica.org;
International Well Building Standard: http://delosliving.com; and
Intergovernmental Panel on Climate Change (IPCC):
http://ipcc-wg2.gov/AR5/images/uploads/WGIIAR5-Chap29_FGDall.pdf
We request you share all of this information with others to increase community awareness on sustainable, innovative, inspirational, and healthy community design.

Mahalo nui loa,

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

geometrician
ASSOCIATES, LLC
integrating geographic science and planning

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

February 4, 2015

Laura Leialoha McIntyre, Manager
Hawai'i State DOH-EPO
Via email
epo@doh.hawaii.gov

Dear Ms. McIntyre:

Subject: **Comment to Draft Environmental Assessment for Pi'ihonua-Kukuau Reservoir and Transmission Improvements, South Hilo District, TMKs (3rd.) 7-5-065:037; Various County Road Rights-of-way 2-5-060 (Hokulani Street), 2-5-035 (Hokulani Street), and 2-5-011 (Kaumana Drive); Easements Over 2-5-006:061, 142 and 149, and 2-4-075:49**

Thank you for the comment letter dated November 10, 2014, indicating that the EA was routed to the Safe Drinking Water Branch and referring us to websites providing sustainable design principles and strategies. Both the purpose of the project – providing safe drinking water for DWS customers in the most optimum and efficient manner possible – and the construction route, remaining within existing developed areas to the greatest degree feasible – are highly consistent with the principles of sustainability.

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 about the project, please contact Larry Beck at 961-8070 Ext. 260.

Sincerely,

Ron Terry

Ron Terry, Principal
Geometrician Associates

Cc: Quirino Antonio, Manager, Hawai'i County Department of Water Supply

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122
Honolulu, Hawaii 96850

In Reply Refer To:
01EPIF00-2015-TA-0046

NOV 14 2014

Ron Terry
Geometrician Associates
Post Office Box 396
Hilo, Hawaii 96721

Subject: Technical Assistance for the Proposed Piihonua-Kukuau Reservior and Transmission Improvements Project, Hilo, Hawaii

Dear Mr. Terry:

The U.S. Fish and Wildlife Service (Service) received your correspondence on October 22, 2014, requesting comments on a Draft Environment Assessment (Draft EA) for the proposed Piihonua-Kukuau Reservior and Transmission Improvements project in Hilo, Hawaii. The County of Hawaii, Department of Water Supply (DWS) prepared an Environmental Assessment (EA) in 1996 for a water system improvements project in upper Hilo for this same site ("the Project"). One aspect of the Project involved construction of a new 1.0 million-gallon (MG) reservoir with appurtenances on portion of a large parcel of land that was at the time in process of subdivision, but which is now a 46,276 square foot property within Punahoa Mauka Estates subdivision on Haleloke Street, identified as TMK (3) 2-5-065:037. The Project also included minor relocation of an existing water main that cuts diagonally in an easement across the proposed reservoir site, and construction of approximately 8,400 feet of 16-inch transmission main from the reservoir to the Sunrise Estates Subdivision on Kukuau Street along County roads within TMK plats 2-5-060 (Hokulani Street); 2-5-035 (Hokulani Street); 2-5-011 (Kaumana Drive); and on easements within properties 2-5-006:061 (owner: Kidds Development), 142 (State of Hawaii) and 149 (Brilhante Hawaii Inc.,), and 2-4-075:049 (Maxine Pacheco).

The DWS determined on September 9, 1996, that no significant impacts would occur as a result of the project and issued a Finding of No Significant Impact. This allowed the Project to proceed, although it was not built because of delays in transferring the reservoir site lot to DWS due to multiple ownership changes, easement acquisitions and other factors. The DWS is now proposing to upsize the Pihonua-Kukuau Reservior to 2.0 MG in order to meet current and future demand. In addition to the reservoir structure, which will be 25 feet high and about 130 feet in diameter, improvements on the reservoir property include flow control valves and piping for water level control, paving, fencing and appurtenant improvements. The remaining elements of

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the Project are identical or have changed in only minor ways, including a reduction in the overall length of new transmission line to 6,500 feet, as the portion along Haleloke Street was subsequently installed by a private developer.

Based on information you provided and pertinent information in our files, including data compiled by the Hawaii Biodiversity and Mapping Project, there are four listed species in the vicinity of the project area: the endangered Hawaiian hawk (*Buteo solitarius*), Hawaiian hoary bat (*Lasiurus cinereus semotus*) and Hawaiian petrel (*Pterodroma phaeopygia sandwichensis*), and the threatened Newell's shearwater (*Puffinusauricularis newelli*). There is no critical habitat in the vicinity of the project area.

To help you minimize potential impacts to listed species, the Service is providing you the following avoidance and minimization measures. Please note that implementation of these measures does not ensure that impacts to listed species can be avoided, and further coordination with the Service on compliance with the ESA may be required.

Hawaiian hawk

Loud, irregular and unpredictable activities, such as using heavy equipment or building a structure, near an endangered Hawaiian hawk nest may cause nest failure. Harassment of Hawaiian hawk nesting sites can alter feeding and breeding patterns or result in nest or chick abandonment. Nest disturbance can also increase exposure of chicks and juveniles to inclement weather or predators. To avoid impacts to Hawaiian hawks we recommend avoiding brush and tree clearing during their breeding season (March through September). If you must clear the property during the Hawaiian hawk breeding season, we recommend a nest search of the area of the proposed construction site and surrounding area should be conducted by a qualified ornithologist immediately prior to the advent of construction activities. Surveys should ensure that construction activity will not occur within 1,600 feet of any Hawaiian hawk nest.

Hawaiian hoary bat

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

Seabirds

Hawaiian petrels and Newell's shearwaters (collectively known as seabirds) may transit over the project area when flying between the ocean and upland breeding colonies. Many bird species are known to strike objects, such as antennas or guywires, protruding above surrounding vegetation. In Hawaii, seabirds are attracted to lights and are known to collide with buildings, light poles, wires, and other tall objects. To minimize impacts to seabirds in Hawaii, we recommend shielding outdoor lights so that light is directed downwards.

The Service also recommends that a biosecurity assessment be incorporated in the Final Environmental Assessment to address the potential impacts of invasive species introduction due to the transport of construction-related materials and heavy vehicles in the action area during the construction phase of the proposed project. Accordingly, the Service has provided some guidelines (attached) for invasive species containment and mitigation through Best Management Practices. The biosecurity assessment should detail site-specific measures which will be voluntarily undertaken to limit the impacts of invasive species introduction associated with the proposed action.

Thank you for your efforts to conserve listed species and native habitats. Please contact Fish and Wildlife Biologist Jay Nelson (808-792-9441) if you have any questions or for further guidance.

Sincerely,

Michelle Bogardus
Island Team Leader
Maui Nui and Hawaii Island

Cc: Larry Beck, DWS
Attachment: Best Management Practices Invasive Species

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

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

1) All project construction-related materials and equipment (dredges, backhoes, dump-box trucks, etc.) should be inspected for pollutants including, but not limited to; vegetation debris, fouling organisms, grease, oil, etc., and cleaned to remove pollutants prior to use Project related activities should not result in any debris disposal, non-native species introductions, or attraction of non-native pests to the affected or adjacent areas. Implementing both a litter-control plan and a Hazard Analysis and Critical Control Point plan (HACCP – see http://www.haccp-nrm.org/Wizard/default.asp) can help to prevent attraction and introduction of non-native species.

2) Project related construction materials (fill, rock, pipe, etc.) should not be stockpiled in, or in close proximity to aquatic or marine habitats, and should be protected from erosion (*e.g.*, with filter fabric, etc.), to prevent materials from being carried away by wind or rain.

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

4) All fill materials used in the proposed project should be inspected before arrival on-site, and stabilized as soon as possible with geotextile, filter fabric or native or non invasive vegetation matting, hydro-seeding, etc.

5) All project construction-related debris and sediment containment devices should be removed and disposed of at an approved off-site disposal facility upon the completion of the construction phase of the proposed project.

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February 4, 2015

Michelle Bogardus, Island Team Leader
Pacific Islands Fish and Wildlife Office
USFWS Div. of Ecological Services
P.O. Box 50088
Honolulu HI 96850

Dear Ms. Bogardus:

Subject: **Comment to Draft Environmental Assessment for Pi'ihonua-Kukuau Reservoir and Transmission Improvements, South Hilo District, TMKs (3rd.) 7-5-065:037; Various County Road Rights-of-way 2-5-060 (Hokulani Street), 2-5-035 (Hokulani Street), and 2-5-011 (Kaumana Drive); Easements Over 2-5-006:061, 142 and 149, and 2-4-075:49**

Thank you for the comment letter dated November 14, 2014, providing a variety of avoidance and minimization measures for threatened and endangered species. As indicated in the EA, the great majority of the construction occurs on existing urban lots or within streets, which should minimize impacts. For those activities that occur in overgrown but formerly disturbed agricultural areas, DWS will follow the measures concerning minimizing impacts to Hawaiian Hawks, seabirds and Hawaiian hoary bats. Based on previous communication with your office, these measures were already included in the EA and will be part of contract documents.

Concerning biosecurity guidelines, we would again like to emphasize that this project is occurring mainly within city streets of Hilo, and where outside this, it will occur in old agricultural areas of Hilo that do not contain native forest. The heavy equipment that will be used is already present in Hilo, and there would not be a risk of seeds, vegetative matter, eggs or live organisms being transported into an area in which they were not already present. However, DWS has studied the standard BMPs and believes it is reasonable and prudent to adopt the following, and will add them to project plans for the contractor to implement (also, please consult the project plans that were included in the EA for a number of other measures that were meant to protect the quality of runoff and receiving waters and are functionally equivalent to many of the measures you suggest, which are therefore not included below):

- All project construction-related materials and equipment (dredges, backhoes, dump-box trucks, etc.) to be used near watercourses will be inspected for pollutants including, but not limited to; vegetation debris, fouling organisms, grease, oil, etc., and cleaned to remove pollutants prior to use.
- Project related activities should not result in any debris disposal, nonnative species introductions, or attraction of non-native pests to the affected or adjacent areas.

- Project related construction materials (fill, rock, pipe. etc.) will not be stockpiled in, or in close proximity to aquatic or marine habitats, and will be protected from erosion (e.g., with filter fabric, etc.) to prevent material from being carried away by wind or rain.
- Fueling of project-related vehicles and equipment will take place away from the aquatic or marine environment.
- For the work in the delineated area of the stream, DWS will require that contractor coordinate with the DWS inspector and have the inspector onsite prior to the contractor's men and equipment entering the stream area.
- Other than the actual work within the stream area, there is to be no access through the stream area for the construction on either side of the stream area. Those sections will require the use of other access points on either side of the stream.

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 about the project, please contact Larry Beck at 961-8070 Ext. 260.

Sincerely,

Ron Terry, Principal
Geometrician Associates

Cc: Quirino Antonio, Manager, Hawai‘i County Department of Water Supply

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

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WILLIAM M. TAM
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
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FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

HISTORIC PRESERVATION DIVISION
DEPARTMENT OF LAND AND NATURAL RESOURCES

601 Kamokila Boulevard, Suite 555
Kapolei, HI 96806

November 14, 2014

Ron Terry, Ph.D.
Geometrician Associates
PO Box 396
Hilo, Hawai'i 96721

LOG NO: 2014.04777
DOC NO: 1411SN11
Archaeology

Dear Dr. Terry:

SUBJECT: **Chapter 6E-8 Historic Preservation Review –**
Environmental Assessment (EA) for the Proposed Pi'ihonua-Kukuau Reservoir and Water Transmission Improvements
Ponahawai and Kukuau Ahupua'a, South Hilo District, Island of Hawai'i
TMK (3) 2-5-065:037, (3) 2-5-006:142, 149 and 151

Thank you for the opportunity to review the subject environmental assessment that was received by our office on October 22, 2014. According to the 1996 environmental assessment (EA), the County of Hawai'i, Department of Water Supply (DWS) issued a Finding of No Significant Impact for the planned improvements to the existing reservoir and other improvements to the water system. However, subsequent changes in existing plans required an additional EA to be conducted for a larger reservoir to be installed in the project area.

An archaeological assessment survey for this project was received by our office, and revisions were requested (*Log 2014.04159, Doc 1410SN21*). The requested revisions include the following: the report did not include a field methods section or discussion that provides details regarding the methods employed in the survey, and the extent/percentage of the APE actually walked, pursuant to HAR §13-276-5(c)(3). We request that revisions are made and the report is accepted by SHPD prior to the commencement of project activities

Prior to concurrence with a finding of no significant impact (FONSI), we look forward to the revised report, in order to ensure that the effects of this project on historic properties are adequately considered. Please contact Sean Nāleimaile at (808) 652-1510 or Sean.P.Naleimaile@Hawaii.gov if you have any questions or concerns regarding this letter.

Aloha,

Theresa K. Donham
Archaeology Branch Chief

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

February 4, 2015

Theresa K. Donham, Archaeology Branch Chief
Hawaii State Historic Preservation Division
610 Kamokila Blvd, Suite 555
Kapolei HI 96806

Dear Ms. Donham:

Subject: **Comment to Draft Environmental Assessment for Pi'ihonua-Kukuau Reservoir and Transmission Improvements, South Hilo District, TMKs (3rd.) 7-5-065:037; Various County Road Rights-of-way 2-5-060 (Hokulani Street), 2-5-035 (Hokulani Street), and 2-5-011 (Kaumana Drive); Easements Over 2-5-006:061, 142 and 149, and 2-4-075:49**

Thank you for your comment letter dated November 14, 2014, on the Draft EA, in which you stated that an archaeological assessment survey for this project was received by your office, and revisions were requested (Log 2014.04159, Doc 1410SN21). The request consisted of including a discussion that provides details regarding the methods employed in the survey, and the extent/percentage of the APE actually walked, pursuant to HAR §13-276-5(c)(3). You stated that the revisions would need to be made and the report accepted prior to the commencement of project activities, and also prior to your office being able to concur with a finding of no significant impact (FONSI), in order to ensure that the effects of this project on historic properties are adequately considered.

Please note that archaeological consultants Haun and Associates provided your office with a revised draft on November 21, 2014. The archaeological survey now includes a methods section on Page 5. We look forward a letter from your agency in response to this submittal.

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 about the project, please contact Larry Beck at 961-8070 Ext. 260.

Sincerely,

Ron Terry

Ron Terry, Principal
Geometrician Associates

Cc: Quirino Antonio, Manager, Hawai'i County Department of Water Supply

PHONE (808) 594-1888 FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
560 N. NIMITZ HWY., SUITE 200
HONOLULU, HAWAI'I 96817

HRD14 /7292

November 13, 2014

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

Re: Comments to the Draft Environmental Assessment (DEA) Pi'ihonua-Kūkūau Reservoir and Transmission Improvements
Punahoa 1, Ponahawai, Kūkūau 2 Ahupua'a, Hilo Moku, Hawai'i Island
TMK: (3) 2-5-065:037, (3) 2-5-060, (3) 2-5-035, (3) 2-5-011, (3) 2-5-006:061, 142, 149, (3) 2-4-075:049

Dear Mr. Terry:

The Office of Hawaiian Affairs (OHA) is in receipt of your letter requesting consultation on the DEA for the Pi'ihonua-Kūkūau Reservoir and Transmission improvement project.

OHA is in agreement with the State Historic Preservation Division recommendation that archeological monitoring is appropriate on TMK: (3) 2-5-006:061 and 151 for the initial ground altering disturbance in the undeveloped areas. Furthermore, we request assurances that should iwi kupuna or Native Hawaiian cultural materials be identified during the ground altering activity, all work in the area will immediately cease and appropriate agencies, including OHA will be contacted pursuant to applicable law.

Mahalo for the opportunity to comment. If you have any questions, please contact Jerry B. Norris at 594-0227 or by email at jerryn@oha.org.

'O wau iho nō me ka 'oia 'i'o,

Kamana'opono M. Crabbe, Ph.D.
Ka Pouhana, Chief Executive Officer

KC:jbn

C: Larry Beck, Hawai'i County Department of Water Supply

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

February 4, 2015

Dr. Kamana'opono Crabbe, CEO
Office of Hawaiian Affairs
711 Kapiolani Blvd., Suite 1250
Honolulu HI 96813

Dear Dr. Crabbe:

Subject: **Comment to Draft Environmental Assessment for Pi'ihonua-Kukuau Reservoir and Transmission Improvements, South Hilo District, TMKs (3rd.) 7-5-065:037; Various County Road Rights-of-way 2-5-060 (Hokulani Street), 2-5-035 (Hokulani Street), and 2-5-011 (Kaumana Drive); Easements Over 2-5-006:061, 142 and 149, and 2-4-075:49**

Thank you for your comment letter on the Draft EA dated November 13, 2014, in which you stated that your agency agreement with the State Historic Preservation Division recommendation that archaeological monitoring is appropriate on TMK: (3) 2-5-006:061 and 151 for the initial ground altering disturbance in the undeveloped areas. Please note that if the private properties slated for archaeological monitoring during initial clearing as part of development activities have not already been cleared, with archaeological monitoring, prior to DWS use of the property, DWS will itself incorporate archaeological monitoring on those properties during installation of the pipeline in order to uphold the intent of the mitigation condition.

Furthermore, you requested assurances that should iwi kupuna or Native Hawaiian cultural materials be identified during the ground altering activity in any part of the project, all work in the area will immediately cease and appropriate agencies, including OHA will be contacted pursuant to applicable law. DWS will also assure that this will occur.

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 about the project, please contact Larry Beck at 961-8070 Ext. 260.

Sincerely,

Ron Terry

Ron Terry, Principal
Geometrician Associates

Cc: Quirino Antonio, Manager, Hawai'i County Department of Water Supply

ENVIRONMENTAL ASSESSMENT

PI‘IHONUA-KUKUAU RESERVOIR AND TRANSMISSION IMPROVEMENTS

APPENDIX 2
Plant Species Observed on Project Site

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SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT
PI'IHONUA-KUKUAU RESERVOIR AND TRANSMISSION IMPROVEMENTS

Appendix 2
Plants Observed at Reservoir Site and in Pipeline Corridor

Scientific Name	Family	Common Name	Life Form	Status*
Archontophoenix alexandrae	Arecaceae	Alexandra palm	Tree	A
Ageratum conyzoides	Asteraceae	Billy-goat weed	Herb	A
Ageratum houstonianum	Asteraceae	Bluemink	Herb	A
Ardisia elliptica	Myrsinaceae	Shoebutton ardisia	Tree	A
Arundina graminifolia	Orchidaceae	Bamboo orchid	Herb	A
Axonopus sp.	Poaceae	Carpetgrass	Herb	A
Begonia sp.	Begoniaceae	Begonia	Herb	A
Bidens pilosa	Asteraceae	Beggartick	Herb	A
Blechnum appendiculatum	Blechnaceae	Blechnum	Fern	A
Brachiaria mutica	Poaceae	California grass	Herb	A
Castilleja arvensis	Scrophulariaceae	Indian paintbrush	Herb	A
Casuarina sp.	Casuarinaceae	Ironwood	Tree	A
Cenchrus purpureus	Poaceae	Napier grass	Herb	A
Centella asiatica	Apiaceae	Indian pennywort	Herb	A
Chamaecrista nictitans	Fabaceae	Partridge pea	Herb	A
Christella dentata	Thelypteridaceae	Downy maiden fern	Fern	A
Christella parasitica	Thelypteridaceae	Maiden fern	Fern	A
Clidemia hirta	Melastomataceae	Koster's curse	Herb	A
Clusia rosea	Clusiaceae	Autograph tree	Tree	A
Commelina diffusa	Commelinaceae	Honohono	Herb	A
Coix lachryma-jobi	Poaceae	Job's tears	Herb	A
Conyza sp.	Asteraceae	Fleabane	Herb	A
Cordyline fruticosa	Agavaceae	Ti	Shrub	A
Crotalaria sp.	Fabaceae	Rattlebox	Herb	A
Crotalaria sp.	Fabaceae	Crotalaria	Herb	A
Cuphea carthagenensis	Lythraceae	Tarweed	Herb	A
Cuphea hyssopifolia	Lythraceae	Mexican heather	Herb	A
Cyperus halpan	Cyperaceae	Sharp-edge sedge	Herb	A
Desmodium cajanifolium	Fabaceae	Desmodium	Herb	A
Desmodium incanum	Fabaceae	Spanish clover	Herb	A
Desmodium triflorum	Fabaceae	Creeping tick-trefoil	Herb	A
Dicranopteris linearis	Gleicheniaceae	Uluhe	Fern	I
Diplazium esculentum	Athyriaceae	Warabi	Fern	A
Dissotis rotundifolia	Melastomaceae	Dissotis	Herb	A
Drymaria cordata	Caryophyllaceae	Pipili	Herb	A
Emelia sonchifolia	Asteraceae	Lilac pualele	Herb	A
Emilia fosbergii	Asteraceae	Pualele	Herb	A
Eragrostis brownei	Poaceae	Eragrostis	Herb	A
Eucalyptus sp.	Myrtaceae	Eucalyptus	Tree	A
Falcataria moluccana	Fabaceae	Albizia	Tree	A

Appendix 2, continued				
Scientific Name	**Family**	**Common Name**	**Life Form**	**Status***
Ficus microcarpa	Moraceae	Chinese banyan	Tree	A
Fimbristylis dichotoma	Cyperaceae	Fimbristylis	Herb	A
Hedychium flavescens	Zingiberaceae	Yellow ginger	Herb	A
Hedyotis corymbosa	Poaceae	Hedyotis	Herb	A
Hyptis pectinata	Lamiaceae	Comb hyptis	Herb	A
Ipomoea triloba	Convolvulaceae	Little bell	Vine	A
Juncus tenuis	Juncaceae	Slender rush	Herb	A
Lepisorus thunbergianus	Polypodiaceae	Pleopeltis	Fern	I
Lindernia sp.	Scrophulariaceae	False pimpernel	Herb	A
Ludwigia octovalvis	Onagraceae	Primrose willow	Herb	A
Lygodium japonicum	Schizaeaceae	Japanese climbing fern	Fern	A
Machaerina angustifolia	Cyperaceae	Uki	Herb	I
Megathyrsus maximus	Poaceae	Guinea grass	Herb	A
Melaleuca quinquenervia	Myrtaceae	Paperbark tree	Tree	A
Melastoma candidum	Melastomataceae	Asian melastome	Shrub	A
Melinis minutiflora	Poaceae	Molasses grass	Herb	A
Melochia umbellata	Sterculiaceae	Melochia	Tree	A
Metrosideros polymorpha	Myrtaceae	‘Ohi‘a	Tree	I
Mimosa pudica	Fabaceae	Sensitive plant	Herb	A
Monstera deliciosa	Araceae	Monstera	Shrub	A
Musa sp.	Musaceae	Banana	Shrub	A
Nephrolepis multiflora	Nephrolepidaceae	Sword fern	Fern	A
Oxalis corniculata	Oxalidaceae	Yellow wood sorrel	Herb	A
Paederia foetida	Rubiaceae	Maile pilau	Vine	A
Panicum repens	Poaceae	Torpedo grass	Herb	A
Paspalum conjugatum	Poaceae	Hilo grass	Herb	A
Paspalum sp.	Poaceae	Paspalum	Herb	A
Paspalum urvillei	Poaceae	Vasey grass	Herb	A
Phaius tankarvilleae	Orchidaceae	Chinese ground orchid	Herb	A
Philodendron	Araceae	Philodendron	Vine	A
Phlebodium aureum	Polypodiaceae	Golden polypody	Fern	A
Phyllanthus sp.	Euphorbiaceae	Phyllanthus	Herb	A
Pluchea symphytifolia	Asteraceae	Sourbush	Shrub	A
Pluchea symphytifolia	Asteraceae	Sourbush	Herb	A
Polygala paniculata	Polygalaceae	Milkwort	Herb	A
Psidium cattleianum	Myrtaceae	Wiawi	Tree	A
Psidium guajava	Myrtaceae	Guava	Tree	A
Pycreus polystachyos	Cyperaceae	Manyspike flatsedge	Herb	A
Rhus sandwicensis	Anacardiaceae	Neneleau	Shrub	E
Rhynchospora caduca	Cyperaceae	Anglestem beakrush	Herb	A
Roystonea sp.	Arecaceae	Royal Palm	Tree	A

Appendix 2, continued				
Scientific Name	**Family**	**Common Name**	**Life Form**	**Status***
Rubus rosifolius	Rosaceae	Thimbleberry	Herb	A
Sacciolepis indica	Poaceae	Glenwood grass	Herb	A
Schefflera actinophylla	Araliaceae	Octopus tree	Tree	A
Schizachyrium condensatum	Poaceae	Beardgrass	Herb	A
Scleria testacea	Cyperaceae	Scleria	Herb	I
Setaria gracilis	Poaceae	Foxtail	Herb	A
Setaria palmifolia	Poaceae	Palm grass	Herb	A
Solanum americanum	Solanaceae	Popolo	Herb	A
Spathodea campanulata	Bignoniaceae	African tulip tree	Tree	A
Spathoglottis plicata	Orchidaceae	Malayan ground orchid	Herb	A
Spermacoce sp.	Rubiaceae	Buttonweed	Herb	A
Sphenomeris chinensis	Lindsaeaceae	Pala‘a	Fern	I
Stachytarpheta jamaicensis	Verbenaceae	Jamaica vervain	Herb	A
Syngonium sp.	Araceae	Syngonium	Vine	A
Syzygium jambos	Myrtaceae	Rose apple	Tree	A
Themeda villosa	Poaceae	Lyon’s grass	Herb	A
Torenia asiatica	Scrophulariaceae	Olaa beauty	Herb	A
Trema orientalis	Ulmaceae	Gunpowder tree	Tree	A
Waltheria indica	Sterculiaceae	‘Uhaloa	Herb	I
Wedelia trilobata	Asteraceae	Wedelia	Herb	A
Xyris sp.	Xyridaceae	Yelloweyed grass	Herb	A

A = alien, E = endemic, I = indigenous, E = endemic to Hawaiian Islands

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ENVIRONMENTAL ASSESSMENT

PI‘IHONUA-KUKUAU RESERVOIR AND TRANSMISSION IMPROVEMENTS

APPENDIX 3
Archaeological Report

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830-090414

DRAFT

ARCHAEOLOGICAL ASSESSMENT

PIʻIHONUA-KUKUAU TRANSMISSION MAIN AND RESERVOIR PROJECT, PUNAHOA 1, PONAHAWAI, KUKUAU AHUPUAʻA, SOUTH HILO DISTRICT, HAWAIʻI ISLAND

TMK: (3) 2-5-065:037, 2-5-006: 142, 149, & 151

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

Report 830-090414

DRAFT

Archaeological Assessment

Pi'ihonua-Kukuau Transmission Main and Reservoir Project, Punahoa 1, Ponahawai, Kukuau Ahupua'a, South Hilo District, Hawai'i Island,

TMK: (3) 2-5-065:037, 2-5-006: 142, 149, and 151

Prepared by:

Shawn G. Fackler, M.A.
and
Alan E. Haun, Ph.D.

Prepared for:

Geometrician Associates, LLC
P.O. Box 396
Hilo, HI 96720

September 2014

HAUN & ASSOCIATES
ARCHAEOLOGICAL, CULTURAL, AND HISTORICAL RESOURCE MANAGEMENT SERVICES
73-1168 KAHUNA A'O ROAD, KAILUA-KONA HI 96740
PHONE: 808-325-2402 FAX: 808-325-1520

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Introduction

At the request Geometrician Associates, LLC, Haun & Associates performed a literature review and archaeological field inspection for the subject project. The subject project proposes to build a 2-million-gallon water tank with an 8,400-foot underground 16-inch transmission water main and associated access road. The project is in Punahoa 1, Ponahawai, Kukuau Ahupuáa, South Hilo District, Hawai'i Island (**Figure 1**). The proposed pipeline will replace sections of an existing aboveground 10-inch water line. The water storage and transmission improvements are necessary to increase the storage capacity of the South Hilo water system and facilitate the needs of existing and planned developments.

Under the direction of Dr. Alan Haun, Project Director Shawn Fackler and Field Archaeologist Tammy Gibson performed a field inspection for the proposed project on August 26, 2014. Fieldwork required two person-days to complete. No cultural resources are in the area of potential effects (APE); therefore, the project is documented as an *archaeological assessment* pursuant to HAR §13-284-5(5A). This report describes the APE, previous archaeological research, and results for the archaeological assessment.

Area of Potential Effects

The APE begins at a graded parcel for the proposed water tank in Tax Map Key (TMK): (3) 2-5-065:037 and connects to a 25-foot corridor within existing County street right-of-ways. The corridor expands to 50 feet through TMKs: (3) 2-5-006: 142, 149, and 151 (**Figure 2**). The APE is confined to a disturbed corridor containing two existing water mains, a power line easement, paved roadways, and a previously graded lot (**Figure 3**).

The majority of the proposed APE is within asphalt-paved right-of-ways that include Haleloke Street, Hokulani Street, and a portion of Kaumana Drive. The remaining portion follows existing utility easements in undeveloped areas. The Waipahoehoe Stream drainage meanders through the central portion of the APE.

Portions of the undeveloped area have been impacted by historic agricultural activity. This is indicated by various introduced crop species such as coffee (*Coffea arabica* L.), mango (*Mangifera indica* L.), tangerine (*Citrus reticulata*) and star fruit (*Averrhoa carambola* L.); and secondary growth vegetation dominated by invasive taxa including guava (*Psidium guajava* L.), strawberry guava (*Psidium cattleianum* [Sabine]), eucalyptus (*Eucalyptus* spp.), autograph tree (*Clusia rosea*) and African tulip (*Spathodea campanulata*). Native plants consist of false staghorn fern (*Dicranopterias linearis*, ohia trees (*Metrosideros collina*), ti (*Cordyline fruticosa* L.) and other ferns and grasses.

The soil throughout the undeveloped area is comprised of Keaukaha extremely rocky muck on 6–20 percent slopes, characterized by a dark brown muck surface layer over *pahoehoe* bedrock, with rock outcrops occupying 25 percent of the ground surface (Sato et al. 1973). This soil evidences a rapid permeability, a medium runoff and a slight erosional hazard. Most of this soil type is in native forest, although cleared areas are used for pasture. The area south of Waipahoehoe Stream consists of a *pahoehoe* lava flow deposited in 1880-81. The portion of this lava flow near the APE is covered primarily in strawberry guava.

The APE in undeveloped area is affected by the periodic flooding of Waipahoehoe Stream. Modern debris deposited during flooding episodes is present along both sides of the stream. The U.S. Army Corps of Engineers (USACE), Honolulu District authorized the proposed project to cross Waipahoehoe Stream under Nationwide Permit #12, Utility Line Activities without the need for an archaeological monitor (USACE letter to County of Hawaii; **Appendix A**).

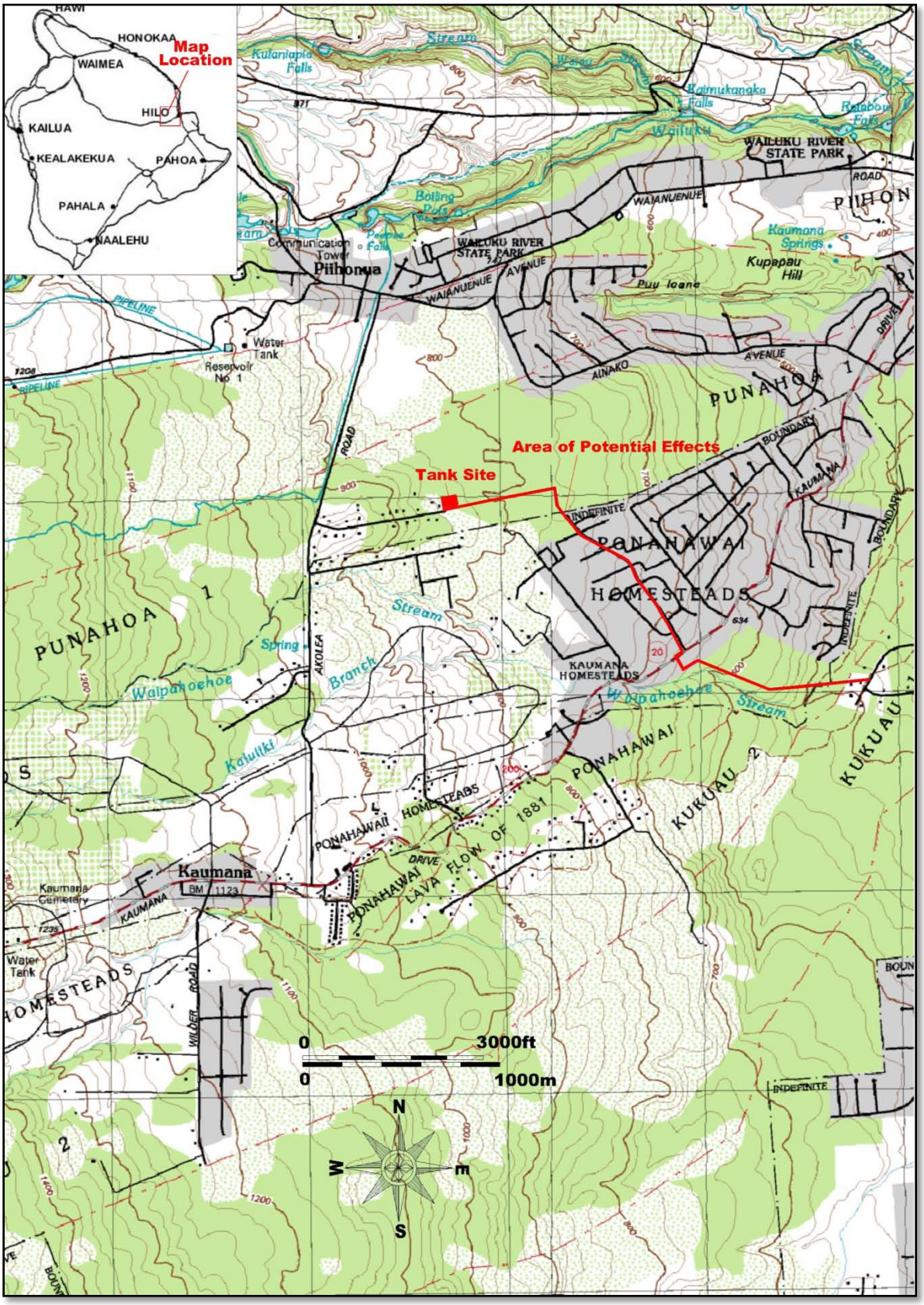

Figure 1. Portion of USGS 7.5-minute 1996 Hilo quadrangle depicting Area of Potential Effects.

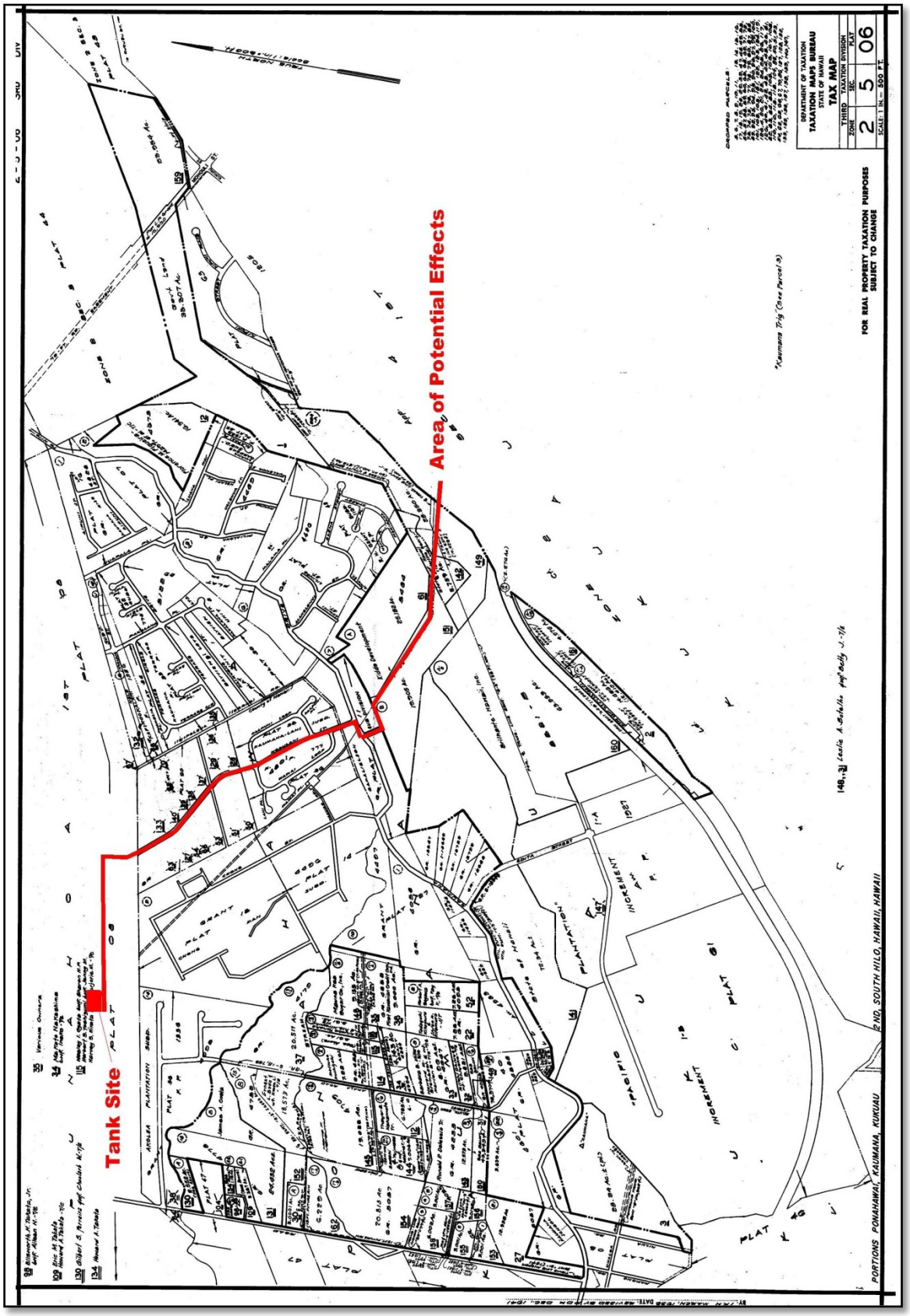

Figure 2. Area of Potential Effects in TMK: (3) 2-5-06.

Figure 3. Google Earth satellite imagery depicting APE.

Previous Archaeological Research

Archaeological Consultants of the Pacific, Inc. (ACP) originally performed an archaeological reconnaissance survey and assessment for the proposed project (Latkins and Kennedy 1996). No cultural resources were encountered in the APE; however, archaeological features were observed between the existing main and nearby Waipahoehoe Stream to the south in TMK: (3) 2-5-006:151. ACP recommended an additional survey because the proposed transmission alignment passes close to the archaeological features. The State Historic Preservation Division (SHPD) determined a "no effect on historic properties" in a letter because the proposed alignment avoids the cultural resources (LOG NO: 17891, DOC NO: 9608MVPM13; **Appendix B**).

Haun & Associates performed an archaeological inventory survey (Haun and Henry 2011) during a separate undertaking that included the proposed APE that passes through undeveloped areas in TMK: (3) 2-5-006: 061 and 151 (**Figure 4**). The survey documented six sites with 18 features interpreted as historic clearing mounds associated with plantation-era sugar cane cultivation; however, no sites were encountered in the proposed APE. The sites were likely created during sugar cane cultivation beginning in the first decade of the 20th Century and the area was probably abandoned as mechanized equipment gradually replaced manual cultivation methods between the mid-1930s to mid-1940s because it was too rocky (Haun and Henry 2011:31).

The nearby sites were assessed as solely significant for their information content and have yielded information important for understanding historic plantation agriculture in the project area (Haun and Henry 2011:32). The describing, mapping, and photographing the six sites adequately documented them. No preservation or data recovery was recommended for the sites; however, SHPD requested archaeological monitoring as a treatment measure (LOG NO: 2011.0722, DOC NO: 1209MV03; **Appendix C**).

Results

The archaeological field inspection did not identify any new cultural resources or natural lava formations in the APE. Moreover, no cultural resources were encountered in the APE during previous archaeological investigations (Latkins and Kennedy 1996; Haun and Henry 2011). Proposed construction activities will be confined to previously disturbed areas (**Figures 5–8**). A large portion of the APE is in undeveloped area that has been previously disturbed and is overgrown with strawberry guava (*Psidium cattleianum* sp.) saplings and other invasive species (**Figures 9** and **10**).

In accordance with the previous the SHPD request (LOG NO: 2011.0722, DOC NO: 1209MV03), Haun & Associates recommends archaeological monitoring for initial ground altering disturbance in undeveloped areas of TMK: (3) 2-5-006: 061 and 151. If previously undocumented sites are inadvertently discovered in other areas, SHPD should be contacted immediately and advised of the circumstances of the find, its location, and the presence or absence of associated cultural resources.

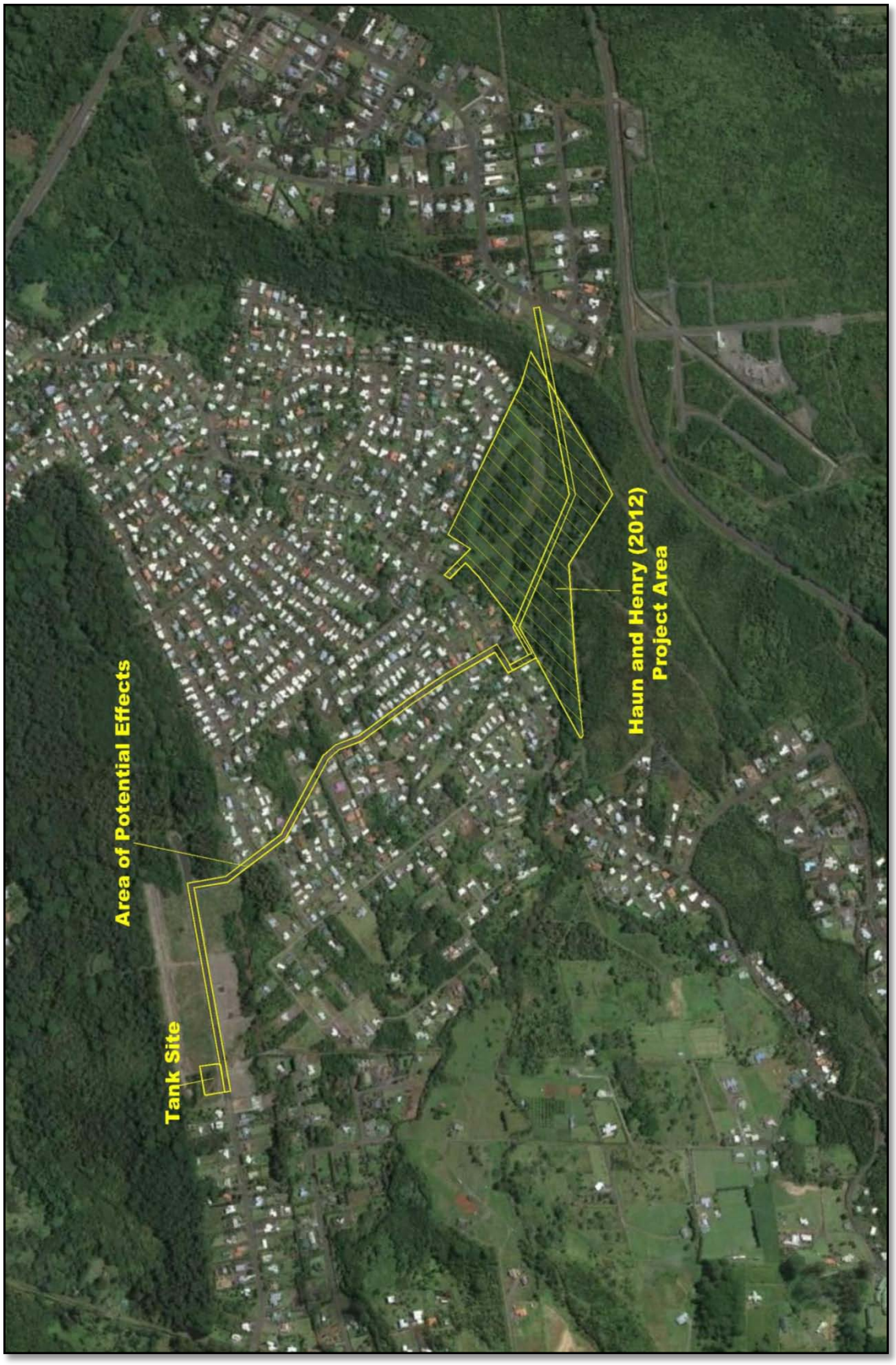

Figure 4. Haun and Henry 2011 project area and APE.

Figure 5. Overview of proposed water tank parcel, facing north.

Figure 6. Overview of Haleloke Street extension, facing west.

Figure 7. Overview of Hokulani Street, facing north.

Figure 8. Overview of existing pipelines in Sunrise Estates subdivision segment, facing northwest.

Figure 9. Overview of existing 16-inch waterline, facing east.

Figure 10. Overview of existing power line easement, facing east.

References

Haun, A.E. and D. Henry
2011 *Archaeological Inventory Survey, TMK: (3) 2-5-06:61 and 151, Land of Ponahawai, South Hilo District, Island of Hawai'i*. Report 769-101512. Haun & Associates, Kailua-Kona.

Latkins, D.L. and J. Kennedy
1996 *Archaeological Reconnaissance Survey and Assessment of the Piihonua-Kukuau Transmission Main & Reservoir, Punahoa 1, Ponahawai Homsteads, Kukuau 1, South Hilo District, Island of Hawai'i*. Archaeological Consultants of the Pacific, Inc., Haleiwa.

Sato, H.H., E.W. Ikeda, R. Paeth, R. Smythe and M. Takehiro Jr.
1973 *Soil Survey of the Island of Hawaii*. U.S. Dept. of Agriculture: Soil Conservation Service and University of Hawaii Agricultural Experiment Station. Government Printing Office, Washington D.C.

Appendix A - USACE Letter to County of Hawaii

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

January 17, 2014

Regulatory Office

File No. POH-2008-00268

RECEIVED
JAN 24 2014
INABA ENGINEERING, INC.

Mr. Quirino Antonio, P.E.
Dept. of Water Supply
County of Hawaii
345 Kekuanaoa Street, Suite 20
Hilo, HI 96720

Nationwide Permit #12 PROVISIONAL Verification

Dear Mr. Antonio:

We have reviewed your application to install a new 16-inch diameter water transmission main across Waipahoehoe Stream as part of the Piihonua-Kukuau Reservoir and Transmission Improvements located in Hilo, Island of Hawaii, Hawaii. Based on the information you provided to us, Nationwide Permit #12, Utility Line Activities (Federal Register, February 21, 2012 Vol. 77, No. 34), authorizes your proposal as depicted on the enclosed drawings and described by the proposed best management practices received with your application on November 19, 2013. In order for this NWP authorization to be valid, you must ensure that the work is performed in accordance with the enclosed *Nationwide Permit National General Conditions*, the *Honolulu District Regional Conditions* and the following special conditions:

For compliance with **Section 401 of the Clean Water Act**:

- **Before** you may proceed with the work authorized by this NWP, you **must** receive Water Quality Certification (WQC) from the State of Hawaii Department of Health -- Clean Water Branch and submit a copy to the Corps of Engineers. You must implement and abide by the terms and conditions of the WQC.

For compliance with **Section 106 of the National Historic Preservation Act**:

- Permittees must immediately stop work and notify the District Engineer within 24 hours if, during the course of conducting authorized work, human burials, cultural resources, or historic properties, as identified by the National Historic Preservation Act, are discovered and may be affected by the work. Failure to stop work in the area of discovery until the Corps can comply with the provisions of 33 CFR 325 Appendix C, the National Historic Preservation Act, and other

pertinent laws and regulations could result in a violation of state and federal laws. Violators are subject to civil and criminal penalties.

Specifically, this verification provisionally authorizes the following work:

The project involves the installation of a new 16-inch diameter water transmission main across Waipahoehoe Stream as part of the Piihonua-Kukuau Reservoir and Transmission Improvements. The transmission main will be installed along an existing easement that contains an existing 12-inch water line (above ground on concrete piers over the crossings of the two branches of the stream bed) and a 6-inch water line (buried and concrete jacketed at the crossings). The new line will be installed in an excavated trench with a minimum 3-foot backfill cover per DWS standards. The trenches would be backfilled to existing grades, to include a new concrete service road over the waterline to aid maintenance and prevent washout of the pipeline. The total volumes of excavation (and fill) are each estimated to be 30 cubic yards (CY), with a total area of 0.023 acres. The total duration of the work is estimated to be 10 days.

Our verification of this NWP authorization is valid for 2 years from the date of this letter unless the NWP is modified, reissued, or revoked prior to that date. If the authorized work has not been completed by that date, please contact us to discuss the status of your authorization. Failure to comply with all terms and conditions of this NWP verification invalidates this authorization and could result in a violation of Section 404 of the Clean Water Act and/or Section 10 of the 1899 Rivers and Harbors Act. Also, you must obtain all State and local permits that apply to this project.

Upon completing the authorized work, you must fill out and return the enclosed *Compliance Certificate with Department of the Army Permit* form. Thank you for your cooperation during the permit process. We are interested in your experience with our Regulatory Program and encourage you to complete a customer service survey form. This form is available at http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey.

A copy of this letter with enclosures will be furnished to Mr. Jason Inaba, Inaba Engineering, Inc., 273 Waianuenue Ave., Hilo, HI 96720. Should you have any questions, please contact Ms. Emilee Stevens of my staff at (808) 835-4310, by facsimile at (808) 835-4126, or by Email at emilee.r.stevens2@usace.army.mil.

Sincerely,

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

Enclosures

- 2 -

Appendix B – SHPD LOG NO: 17891, DOC NO: 9608PM13

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

MICHAEL D. WILSON, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTY
GILBERT COLOMA-AGARAN

AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND ENVIRONMENTAL AFFAIRS
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION DIVISION
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

COPY

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

August 22, 1996

Mr. Joseph Kennedy
Archaeological Consultants of Hawaii
59-624 Pupukea Road
Haleiwa, Hawaii 96712

LOG NO: 17891 ✓
DOC NO: 9608PM13

Dear Mr. Kennedy:

SUBJECT: ***"Archaeological Reconnaissance Survey and Assessment of the Piihonua-Kukuau Transmission Main & Reservoir"***
(Lantinis and Kennedy 1996)
Punahoa 1, Ponahawai, and Kukuau 1, South Hilo, Hawaii Island
TMK: 2-5-08; 2-5-60; 2-5-35; 2-5-11: 04; 2-5-06: 61, 142, 149; 2-4-75

Thank you for your letter of August 15, 1996, the one copy of the subject report, and a copy of the August 14 letter from Roy Takemoto.

As you know, we do not review reconnaissance survey reports because they do not meet minimal standards of our office for archaeological surveys. The survey, which was undertaken in response to our initial review of the proposed project (letter dated June 25, 1996 from Hibbard to Uchida), does appear to have been successful in determining the presence/absence of historic sites in different sectors of the proposed transmission main. It is our understanding that no evidence of historic sites was found in either of the two alternative alignments of Sections 1 and 2, but that there are some stone mounds/platforms in Section 3. According to the letter from Mr. Takemoto, the Hawaii County Department of Water Supply will ensure that the selected alignment avoids the historic remains in Section 3. This avoidance would result in this project having "no effect" on significant historic sites. If realignment is not possible, then impacts to sites seem likely to occur, and we would require an archaeological inventory survey of Section 3.

Though we have already said that we do not review reconnaissance survey reports, a State site number should have been assigned to what you found and described. Since all of the remains are clustered in one area we think you could use just one site number. Please contact our office to get a number. Minimally, use of this site number would require an errata sheet be sent to our office and to your client to go with the report. Ideally, the report could undergo some minor revisions in the text and illustrations to include this number. We would suggest the latter

J. Kennedy
Page 2

approach for ease of your client. When you submit the errata sheet or revised report would you also please send a second copy to Marc Smith for our Hilo office library.

If you have any questions please contact Patrick McCoy (587-0006).

Aloha,

DON HIBBARD, Administrator
State Historic Preservation Division

PM:amk

c. Roy Takemoto

Appendix C - SHPD Review Letter LOG NO: 2011.0722, DOC NO:1209MV03

HA 769 Rec'd 10/10/12

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

PAUL J. CONROY
INTERIM FIRST DEPUTY

WILLIAM M. TAM
DEPUTY DIRECTOR - WATER

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

September 19, 2012

Alan Haun, Ph. D., Principal Investigator
Haun and Associates
73-1168 Kahuna A'o Road
Kailua Kona, Hawai'i 96740

LOG NO: 2011.0722
DOC NO: 1209MV03
Archaeology

SUBJECT: **Chapter 6E-42 Historic Preservation Review –**
An Archaeological Inventory Survey Report for 45.087 Acres
Ponahawai Ahupua'a, South Hilo District, Island of Hawai'i
TMK: (3) 2-5-006:061 and :151

Thank you for submitting the draft report titled *Archaeological Inventory Survey TMK (3) 2-5-006:061 and 151 land of Ponahawai , South Hilo District, Island of Hawaii* (A. Haun and D. Henry, March , 2011). This document was received on March 9, 2011. We apologize for the extremely delayed review and thank you for your patience. The survey area described in the report is consists of 45.087 acres. The fieldwork portion of this survey included a 100% pedestrian survey that utilized 5-7 meter transects. In addition, limited subsurface testing was undertaken at two locations for a total of 2 square meters. One previously identified site (SIHP50-10-35-21145), and five newly identified sites were recorded as a result of this survey. These 6 archaeological sites are comprised of 18 component features. The newly identified sites are interpreted as historic sugarcane clearing mounds (SIHP -28677 through -28681). All sites likely date to the historic period, and are assessed as significant under criterion D only and recommended for no further work. SHPD agrees with the significance assessments for these sites, but we believe that project impacts to these sites should be monitored by a qualified archaeologist. Because this review is over a year past the allotted time deadline we will not request any substantial revisions or additional field work. However, we believe that some relatively minor issues that we believe are in need of revision prior to acceptance. These revisions are:

1. Pg. 25, no representative plan maps were included for sites -28677 through -28681 as required by 13-276-5(d) (4) (F). If these maps are available please include them in the revised draft. However, if they are unavailable, no additional field work is necessary, and the photographs and project area maps will suffice.
2. Please include a table that presents the sites with their state number, formal type, and possible function pursuant to HAR 13-276-5(f)(3).
3. Pg. 32, please revise the treatment recommendations to include archaeological monitoring.
4. Because of the moderate vegetation that covers this project area and the presence of lava tubes and lava blisters on and in the immediate vicinity of this project area we believe that the initial ground disturbance in this project area should be monitored by a qualified archaeologist, and we request the opportunity to review an archaeological monitoring plan prepared pursuant to HAR 13-279.

We look forward to receiving a revised draft of this report. To aid in a rapid review of the subsequent submittal, please submit a cover letter that specifies the changes made to this document and their page numbers. Please contact Mike Vitousek at (808) 652-1510 or Michael.Vitousek@Hawaii.gov if you have any questions or concerns regarding this letter.

Aloha,

Mike Vitousek

Michael Vitousek,
Lead Archaeologist Hawaii Island Section
Historic Preservation Division

ENVIRONMENTAL ASSESSMENT

PI‘IHONUA-KUKUAU RESERVOIR AND TRANSMISSION IMPROVEMENTS

APPENDIX 4
Site Plan Construction/BMP Notes and Plans and Profiles of Selected Locations

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TRUE NORTH

KAPAA ST.

KOULA ST.

KOKEA ST.

AINAKO AVE.

AINAKO AVE.

1st

PUNAHOA

HELE MAUNA ST.

TERRACE CIRCLE

PIKAKE

PONI MOI DRIVE

PAKALANA

KAIKUONO ST.

PAKALANA ST.

IWIPOLENA ST.

TO HILO

PILIALOHA ST.

KAUMANA DRIVE

MALAMA PL.

ALAHELENUI ST.

OLENA ST.

MANU

HONI PL.

NOKUHANA

2nd

KUKUAU ST.

SUNRISE ESTATES SUBD.

PULOKU ST.

1st

6" PRV UNIT
ALONG KAUMANA DRIVE
ELEVATION = ±621
SEE SHEET CT-20

6" PRV UNIT
SEE SHT CT-10

16" TRANSMISSION MAIN
HOKULANI STREET & KAUMANA DRIVE

16" TRANSMISSION MAIN EASEMENT
WATERLINE

SHEET CT-9

TO KOMOHANA ST.

HOKULANI PL.

HOKULANI

KAAPUNI LP.

STREET

SHEET CT-4

SHEET CT-5

WAWAI LP.

SHEET CT-6

SHEET CT-7

SHEET CT-8

2.0 M.G.
RESERVOIR SITE
SHEETS CR-XX

HALELOKE STREET EXTENSION

CHONG ST.

DRIVE

KAUMANA

DEMOLITION-RESTORATION
KAUMANA RESERVOIR SITE
SEE SHEET

POWER LINE EASEMENT

PUAINAKO ST. EXTN

TO WAIKOLOA

KUKUAU

HILO HEIGHTS SUBDIVISION

HALELOKE ST.

AKOLEA PLANTATION SUBDIVISION

AKOLEA PLACE

AKALA RD.

AKOLEA

ROAD

EDITA ROAD

TO WAIKOLOA

GRAPHIC SCALE
300 0 150 300 600 1200
(IN FEET)

JASON K. IMADA
LICENSED PROFESSIONAL ENGINEER
NO. 6188-C
PRELIMINARY
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.

EJ# FB#

DEPARTMENT OF WATER SUPPLY
COUNTY OF HAWAII

PROJECT: PIIHONUA - KUKUAU RESERVOIR AND TRANSMISSION IMPROVEMENTS

DWG. NO. G-2

GENERAL PLAN
SHEET INDEX

SHEET NO. 2 OF SHEETS

JOB NO. 94-590

NOTES FOR WORK WITHIN COUNTY RIGHT-OF-WAY

1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE COUNTY OF HAWAII, DEPARTMENT OF PUBLIC WORKS (DPW), "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION," DATED SEPTEMBER 1986 AND STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION," DATED SEPTEMBER 1984, AND THE "HAWAII STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND PUBLIC WORKS CONSTRUCTION," DATED 1994, AS REQUIRED.
2. THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING UTILITIES, WHETHER SHOWN ON THE PLANS OR NOT, AND SHALL BE RESPONSIBLE FOR THE REPAIR OR REPLACEMENT OF SAME IN THE EVENT OF DAMAGES DUE TO HIS CONSTRUCTION PRACTICES. THE CONTRACTOR SHALL COORDINATE HIS WORK WITH THE RESPECTIVE UTILITY COMPANIES.
3. THE CONTRACTOR SHALL PROVIDE AND INSTALL ALL TRAFFIC CONTROL DEVICES IN CONFORMANCE WITH THE CURRENT EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS," AND AS DIRECTED BY THE DEPARTMENT OF PUBLIC WORKS.
4. THE CONTRACTOR SHALL NOTIFY THE DEPARTMENT OF PUBLIC WORKS 48 HOURS BEFORE THE COMMENCEMENT OF ANY UTILITY LINE WORK TO SCHEDULE A FIELD REVIEW AND SECURE APPROVAL OF THE PROPOSED UTILITY LINE LOCATION WITHIN THE COUNTY RIGHT-OF-WAY.
5. THE PROPOSED UTILITY LINE LOCATION SHALL BE LAID OUT IN THE FIELD PRIOR TO THE CONDUCTING OF THE FIELD REVIEW BY THE DEPARTMENT OF PUBLIC WORKS.
6. FIELD ADJUSTMENTS SHALL BE MADE AS DIRECTED BY THE DEPARTMENT OF PUBLIC WORKS PRIOR TO THE COMMENCEMENT OF ANY UTILITY LINE WORK
7. THE REQUIRED PERMIT, UNDER CHAPTER 22, ARTICLE 4, DIVISION 1 OF THE HAWAII COUNTY CODE, SHALL BE OBTAINED FROM THE DPW BY THE CONTRACTOR FOR WORK WITHIN THE COUNTY RIGHT-OF-WAY.
8. THE CONTRACTOR SHALL PROVIDE AT LEAST ONE (1) LANE FOR TRAFFIC MOVEMENT AT ALL TIMES. TWO (2) LANES FOR TRAFFIC MOVEMENT SHALL BE PROVIDED BETWEEN THE HOURS OF 3:30 P.M TO 8:00 A.M.
9. THE EXISTING PAVEMENT SHALL BE SAW-CUT BEFORE COMMENCEMENT OF ANY TRENCHING WORK.
10. ANY PAVEMENT OUTSIDE THE CONTRACT ZONE LIMITS DAMAGED AS A RESULT OF CONSTRUCTION OPERATIONS BY THE CONTRACTOR SHALL BE RESTORED TO ITS ORIGINAL CONDITION, OR BETTER, AS DIRECTED BY THE DPW AT NO COST TO THE COUNTY OF HAWAII.
11. A TEMPORARY COLD MIX AC PATCH SHALL BE APPLIED IMMEDIATELY UPON COMPLETION OF THE BACKFILLING OPERATION AND SHALL BE MAINTAINED BY THE CONTRACTOR UNTIL A PERMANENT PATCH IS AUTHORIZED BY THE DPW.
12. NO MATERIAL, EXCEPT THE TRENCH EXCAVATED MATERIAL, SHALL BE STOCKPILED CLOSER THAN SIX (6) FEET FROM THE EXISTING EDGE OF PAVEMENT.
13. NO CONSTRUCTION EQUIPMENT SHALL BE PARKED WITHIN THE ROAD RIGHT-OF-WAY IN SUCH A MANNER THAT THE EQUIPMENT WILL OBSTRUCT THE NORMAL MOVEMENT AND SIGHT DISTANCE OF THE DRIVING MOTORIST, EXCEPT DURING ACTUAL WORKING HOURS.
14. EXCEPT DURING ACTUAL WORKING HOURS, ALL SIGNS THAT DO NOT PERTAIN TO THE CONSTRUCTION ACTIVITY, SUCH AS "MEN WORKING" AND "FLAGMAN AHEAD" SHALL BE COVERED OR LAID DOWN. HOWEVER, ALL SIGNS NECESSARY FOR THE SAFETY OF THE PUBLIC SHALL BE MAINTAINED.
15. ANY PAVEMENT MARKINGS, STRUCTURES, AND APPURTENANCES (WITHIN OR OUTSIDE OF THE CONTRACT ZONE LIMITS) DAMAGED AND/OR WORN AWAY UNDER THE PERMIT SHALL BE REPAINTED OR RECONSTRUCTED AS DIRECTED BY THE DEPARTMENT OF PUBLIC WORKS.
16. NO TRENCHING SHALL BE LEFT OPEN FOR MORE THAN FIVE (5) WORKING DAYS.
17. THE PERMITTEE SHALL MAINTAIN, TO THE SATISFACTION OF THE DEPARTMENT OF PUBLIC WORKS, THE AREA WORKED WITHIN THE GOVERNMENT RIGHT-OF-WAY INCLUDING ANY REPAIRS TO PAVEMENT AND SHOULDER DAMAGED AS A RESULT OF THE INSTALLATION WORK, FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF FINAL INSPECTION. THE PERMITTEE SHALL UNDERTAKE REPAIRS EXPEDITIOUSLY, WHENEVER DIRECTED BY THE DEPARTMENT OF PUBLIC WORKS DURING THE MAINTENANCE PERIOD.
18. ANY ENCROACHMENT OR OBSTRUCTION WITHIN THE COUNTY RIGHT-OF-WAY REMOVED IN CONJUNCTION WITH THIS PROJECT SHALL NOT BE REPLACED, AND THE AFFECTED AREA SHALL BE RESTORED TO A CONDITION MEETING WITH THE APPROVAL OF THE DPW.
19. WHERE THE EXISTING DRIVEWAY IS CONCRETE, 4" MIN. THICK CONCRETE REINFORCED WITH 6X6-10/10 WWF ON 4" MIN. THICK COMPACTED BASE COURSE SHALL BE USED.
20. WHERE AN EXISTING DRIVEWAY IS UNPAVED, THE DRIVEWAY SHALL BE RESTORED TO A CONDITION EQUAL TO OR BETTER THAN THE EXISTING DRIVEWAY CONDITION.
21. THE CONTRACTOR SHALL NOTIFY THE OWNER OF THE DRIVEWAY AT LEAST 48 HOURS BEFORE THE COMMENCEMENT OF ANY WORK.
22. THE CONTRACTOR SHALL PROVIDE TEMPORARY SAFE PEDESTRIAN PASSAGE WAYS AROUND THE VARIOUS CONSTRUCTION SITES WHICH SHALL BE ADAAG COMPLIANT AND MEET WITH THE APPROVAL OF THE DPW. THE COSTS TO PROVIDE TEMPORARY PASSAGE WAYS AROUND WORK AREAS SHALL NOT BE PAID FOR SEPARATELY, BUT SHALL BE CONSIDERED INCIDENTAL TO THE VARIOUS BID ITEMS OF WORK. ACCESS SHALL ALSO BE PROVIDED TO TEMPORARY BUILDINGS AND FACILITIES THAT ARE NOT OF PERMANENT CONSTRUCTION BUT ARE EXTENSIVELY USED OR ARE ESSENTIAL FOR PUBLIC USE FOR A PERIOD OF TIME. FOR EXAMPLE: REVIEWING STANDS, BLEACHER AREAS, EXHIBIT AREAS, TEMPORARY BANKING FACILITIES, TEMPORARY HEALTH SCREENING SERVICES, ETC.

DPW 7/05

CONSTRUCTION NOTES

1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE COUNTY OF HAWAII DEPARTMENT OF PUBLIC WORKS "STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION," DATED SEPTEMBER 1984, AND THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION," DATED SEPTEMBER 1986, AND APPLICABLE SECTIONS OF THE "HAWAII STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND PUBLIC WORKS CONSTRUCTION," DATED 1994, AS AMENDED.
2. THE CONTRACOR SHALL PROVIDE SMOOTH-RIDING CONNECTIONS, AND ADAAG COMPLIANT CONNECTIONS WHERE APPLICABLE, TO ALL EXISTING STREETS, ROADWAYS, SIDEWALKS, DRIVEWAYS AND OTHER FACILITIES AS NECESSARY, AND AS MAY BE DIRECTED BY THE ENGINEER.
3. THE CONTRACTOR SHALL KEEP AT LEAST ONE LANE OPEN TO TRAFFIC AT ALL TIMES BETWEEN 8:30 AM AND 3:30 PM. BOTH LANES SHALL BE KEPT OPEN TO TRAFFIC DURING OTHER HOURS.
4. EXISTING CATCH BASIN GRATES THAT ARE REPLACED SHALL BE SALVAGED, CLEANED AND DELIVERED TO THE COUNTY OF HAWAII, HIGHWAY MAINTENANCE DIVISION BASEYARD.
5. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND DETAILS SHOWN ON THE DRAWING PRIOR TO STARTING CONSTRUCTION, AND ANY DISCREPANCIES FOUND SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE ENGINEER.
6. THE ENGINEER RESERVES THE RIGHT TO MAKE CHANGES TO THE DRAINAGE SYSTEM AS SUCH CHANGES ARE FOUND TO BE NECESSARY AS THE WORK PROGRESSES AND AND EROSION CONTROL CONSTRUCTION PROGRESSES.
7. THE CONTRACTOR SHALL NOTIFY THE ENGINEER SUFFICIENTLY IN ADVANCE OF OPENING ANY OR UTILIZING EXISTING BORROW PITS OR ON SITE BORROW, SO THAT A DETERMINATION CAN BE MADE AS TO THE SUITABILITY OF THE BORROW MATERIAL TO BE INCORPORATED INTO THE ROAD CONSTRUCTION.
8. THE CONTRACTOR SHALL CONDUCT TESTS AS REQUESTED BY THE ENGINEER AND BE RESPONSIBLE FOR ALL EXPENSES INCURRED IN CONDUCTING THESE TESTS.
9. THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING UTILITIES, WHETHER SHOWN ON THE PLAN OR NOT, AND SHALL BE RESPONSIBLE FOR THE REPAIR OR REPLACEMENT OF SAME IN THE EVENT OF DAMAGES DUE TO HIS CONSTRUCTION PRACTICES. THE CONTRACTOR SHALL COORDINATE HIS WORK WITH THE RESPECTIVE UTILITY COMPANIES.
10. THE CONTRACTOR SHALL COORDINATE HIS WORK WITH ALL AFFECTED UTILITY COMPANIES, PROPERTY OWNERS, POLICE, RESIDENCES, BUSINESSES, HILO DOWNTOWN IMPROVEMENT ASSOCIATION, AND THE HAWAII REDEVELOPMENT AGENCY AS MAY BE NECESSARY. THE CONTRACTOR SHALL PROVIDE REASONABLE ACCESS TO PROPERTIES AND/OR BUSINESSES ADACENT TO HIS WORK.
11. ALL VEGETATION, INCUDING TREES, SHRUBS, AND DELETERIOUS MATERIALS SHALL BE REMOVED FROM WITHIN THE ENTIRE GRADED ROADWAY RIGHT-OF-WAY. ALL OVERHANGING AND ENCROACHING VEGETATION INTO THE RIGHT-OF-WAY SHALL ALSO BE REMOVED AND/OR TRIMMED OR CUT BACK.
12. THE CONTRACTOR SHALL TONE THE WORK AREAS PRIOR TO ALL EXCAVATION AND TRENCHING TO VERIFY THE LCOATION OF ALL EXISTING UTILITIES AND SHALL BE RESPONSIBLE FOR THE REPAIR OR REPLACEMENT OF SAME IN THE EVENT OF DAMAGES DUE TO HIS CONSTRUCTION PRACTICES. WHENEVER UTILITY CONNECTIONS ARE REQUIRED, THE CONTRACTOR SHALL EXPOSE THE EXISTING LINES AT THE PROPOSED CONNECTION TO VERIFY THE LOCATION AND DEPTH AND TO ASSURE CONNECTION CAN BE MADE PRIOR TO EXCAVATION FOR THE NEW LINES.
13. SHOULD THE CONTRACTOR DISCOVER ANY ARTIFACT OR REMAINS OF POSSIBLE HISTORIC VALUE, HE SHALL IMMEDIATELY CEASE WORK AND CONTACT THE STATE HISTORIC PRESERVATION DIVISION (SHPD) AND THE HAWAII ISLAND BURIAL COUNCIL.
13. SHOULD RUNOFF BACK-UP ALONG CONCRETE WALKS THE CONTRACTOR SHALL INSTALL SIDEWALK CULVERT AS PER D.P.W. STANDARD DETAIL "D-32"

GENERAL FILL AND BERM NOTES

1. ALL VEGETATION, UNSUITABLE, AND DELETERIOUS MATERIALS ENCOUNTERED WITHIN THE FILL AREAS SHALL BE CLEARED AWAY AND DISPOSED OF OFF-SITE.
2. MATERIAL FOR FILL SHALL CONSIST OF APPROVED ON-SITE MATERIALS OR APPROVED IMPORT MATERIAL. FILL MATERIAL SHALL CONTAIN LESS THAN FIVE PERCENT (5%) ORGANIC MATTER AND OTHER DELETERIOUS MATERIALS AND SHALL NOT CONTAIN ROCKS OR LUMPS IN EXCESS OF TWELVE (12) INCHES IN DIAMETER.
3. FILL SHALL BE PLACED IN HORIZONTAL LAYERS, WHICH BEFORE COMPACTION SHALL NOT EXCEED EIGHTEEN INCHES (18") IN LOOSE LIFT THICKNESS.
4. ALL FILL SHALL BE COMPACTED TO A MINIMUM OF NINETY PERCENT (90%) OF THE MAXIMUM DRY DENSITY PER ASTM TEST METHOD D-1557-78, UNLESS OTHERWISE NOTED IN THE PLANS AND SPECIFICATIONS.
5. THE CONTRACTOR SHALL BE REQUIRED TO OBTAIN THE SPECIFIED LEVELS OF COMPACTION OUT TO THE FINISH GRADES OF FILL SLOPES. THIS MAY BE ACHIEVED BY EITHER OVERBUILDING THE SLOPE AND CUTTING BACK TO THE COMPACTED CORE OR BY DIRECT COMPACTION OF THE SLOPE FACE. SPECIFIED COMPACTION VALUES MUST BE ACHIEVED OUT TO THE LINES AND GRADES INDICATED ON THE PLANS AND SPECIFICATIONS.
6. THE CONTRACTOR WILL BE REQUIRED TO PROVIDE PERIODIC CERTIFIED COMPACTION TEST RESULTS TO THE OWNER AND/OR ENGINEER AS NECESSARY. THE COMPACTION TESTING AND REPORTS SHALL BE PERFORMED AND PROVIDED BY A TESTING LAB CERTIFIED AND LICENSED TO DO BUSINESS IN THE STATE OF HAWAII.

GRADING NOTES

1. ALL GRADING WORK SHALL CONFORM TO CHAPTER 10 OF THE HAWAII COUNTY CODE. SHOULD A GRADING PERMIT BE REQUIRED, NO WORK SHALL COMMENCE UNTIL THE DEPARTMENT OF PUBLIC WORKS (DPW) APPROVES A GRADING PERMIT.
2. THE CONTRACTOR SHALL REMOVE ALL SILT AND DEBRIS DEPOSITED IN DRAINAGE FACILITIES, ROADWAYS AND OTHER AREAS RESULTING FROM HIS WORK. THE COSTS INCURRED FOR ANY NECESSARY REMEDIAL ACTION BY THE DPW SHALL BE PAYABLE BY THE CONTRACTOR.
3. THE CONTRACTOR, AT HIS OWN EXPENSE, SHALL KEEP THE PROJECT AND SURROUNDING AREAS FREE FROM DUST NUISANCES. THE WORK SHALL BE IN CONFORMANCE WITH THE AIR POLLUTION CONTROL AND CHAPTER 54, WATER QUALITY STANDARDS, AND TO THE EROSION AND SEDIMENTATION CONTROL STANDARDS AND GUIDELINES OF THE DEPARTMENT OF PUBLIC WORKS, COUNTY OF HAWAII.
4. ALL GRADING OPERATIONS SHALL BE PERFORMED IN CONFORMANCE WITH THE APPLICABLE PROVISIIONS OF THE HAWAII ADMINISTRATIVE RULES, TITLE 11, CHAPTER 55, WATER POLLUTION CONTROL AND CHAPTER 54, WATER QUALITY STANDARDS, AND TO THE EROSION AND SEDIMENTATION CONTROL STANDARDS AND GUIDELINES OF THE DEPARTMENT OF PUBLIC WORKS, COUNTY OF HAWAII.
5. THE CONTRACTOR SHALL SOD OR PLANT ALL SLOPES AND EXPOSED AREAS IMMEDIATELY AFTER THE GRADING WORK HAS BEEN COMPLETED.
6. FILLS ON SLOPES STEEPER THAN 5:1 SHALL BE KEYED.
7. THE CONTRACTOR SHALL INFORM THE DPW OF THE LOCATION OF THE DISPOSAL AND/OR BORROW SITE(S) REQUIRED FOR THIS PROJECT WHEN AN APPLICATION FOR A GRADING PERMIT IS MADE. THE DISPOSAL AND/OR BORROW SITE(S) MUST ALSO FULFILL THE REQUIREMENTS OF THE GRADING ORDINANCE.
8. NO GRADING WORK SHALL BE DONE ON SATURDAYS, SUNDAYS AND HOLIDAYS ANYTIME WITHOUT PRIOR APPROVAL FROM THE DEPARTMENT OF PUBLIC WORKS. GRADING WORK ON NORMAL WORKING DAYS SHALL BE BETWEEN THE HOURS OF 7:00 A.M. TO 3:30 P.M.
9. FILLS SHALL BE COMPACTED TO 90 PERCENT (90%) OF MAXIMUM DENSITY PER ASTM D-1557 TEST.
10. THE CONTRACTOR SHALL REMOVE ALL VEGETATION BEFORE PLACING FILLS ON NATURAL GROUND SURFACE.
11. ALL FILL SHALL BE LAID IN LIFTS NOT MORE THAN ONE (1) FOOT THICK, WATERED, ROLLED AND COMPACTED BEFORE THE NEXT ONE (1) FOOT LIFT IS LAID.
12. FILL MATERIAL UNDER CONCRETE SLABS AND ASPHALT CONCRETE PAVEMENT SHALL BE SELECT MATERIAL LAID IN ONE (1) FOOT LAYERS AND EACH LAYER SHALL BE COMPACTED UNTIL A DENSITY OF NOT LESS THAN NINETY FIVE PERCENT (95%) OF MAXIMUM DENSITY IS ACHIEVED.
13. ALL TREE STUMPS AND ROOT SYSTEMS LOCATED WITHIN TWO (2) FEET OF THE EXISTING GRADES SHALL BE DUG OUT, REMOVED, AND PROPERLY DISPOSED OF.
14. IF REQUIRED, THE CONTRACTOR SHALL ASSUME ALL COSTS TO RETAIN A QUALIFIED INDEPENDENT TESTING LABORATORY TO PERFORM SOILS AND COMPACTION TESTING, AND TO SUBMIT CERTIFIED TEST RESULTS TO THE ENGINEER, AS REQUESTED.
15. APPROXIMATE EARTHWORK QUANTITIES: AREA GRADED: XX SF
    EXCAVATION: XXCY
    EMBANKMENT: XCY

APPROXIMATE DISTURBED AREA = XXX ACS.

ENVIRONMENTAL PROTECTION

UNDER THE PROVISIONS OF CHAPTER 342, HAWAII REVISED STATUTES, ENVIRONMENTAL QUALITY, CHAPTER 37-A, WATER QUALITY STANDARDS, SPECIFICALLY, SECTION 6.A.5, AND CHAPTER 43, SPECIFICALLY, CHAPTER 10, THE FOLLOWING GENERAL REQUIREMENTS SHALL BE COMPLIED WITH FOR POLLUTION CONTROL IN PERFORMING THE CONSTRUCTION ACTIVITIES.

1. THE CONTRACTOR SHALL REMOVE ALL SILT AND DEBRIS RESULTING FROM HIS WORK AND DEPOSITED IN DRAINAGE FACILITIES, ROADWAYS AND OTHER AREAS. THE COST INCURRED FOR REMEDIAL ACTION BY THE DIRECTOR, DEPARTMENT OF PUBLIC WORKS OR OWNER, SHALL BE PAYABLE BY THE CONTRACTOR.
2. THE CONTRACTOR, AT HIS OWN EXPENSE, SHALL KEEP THE PROJECT AREA AND SURROUNDING AREA FREE FROM DUST NUISANCE. THE WORK SHALL BE IN CONFORMANCE WITH THE AIR POLLUTION CONTROL STANDARDS AND REGULATIONS OF THE STATE DEPARTMENT OF HEALTH.
3. THE GRADING OPERATIONS SHALL BE PERFORMED IN CONFORMANCE WITH THE APPLICABLE PROVISIONS OF THE WATER POLLUTION CONTROL AND WATER QUALITY STANDARDS CONTAINED IN THE PUBLIC HEALTH REGULATIONS, STATE DEPARTMENT OF HEALTH, ON WATER POLLUTION CONTROL AND WATER QUALITY STANDARDS.
4. SHOULD EROSION BE A PROBLEM, ALL AFFECTED SLOPES AND EXPOSED AREAS SHALL BE SODDED OR PLANTED IMMEDIATELY AFTER THE GRADING WORK HAS BEEN COMPLETED.

SOLID WASTE NOTES

1. UNLESS OTHERWISE SPECIFIED, THE CONTRACTOR IS RESPONSIBLE FOR THE PROPER HANDLING, STORAGE AND/OR DISPOSAL OF ALL WASTE GENERATED BY THIS CONSTRUCTION INCLUDING GRUBBING AND EXCESS EXCAVATED MATERIAL. ANY MATERIAL BROUGHT TO THE COUNTY LANDFILLS WILL BE SUBJECTED TO THE INSTITUTED TIPPING FEE SYSTEM WITH NO EXCEPTIONS OR EXEMPTIONS.
2. ALL WASTES GENERATED BY CONSTRUCTION, INCLUDING GRUBBING, DEMOLITION AND EXCESS EXCAVATION MATERIAL MAY BE BROUGHT TO THE WEST HAWAII OR THE HILO LANDFILL. THE CONTRACTOR SHALL CHECK WITH THE SOLID WASTE DIVISION FOR DISCLOSURE OF THE CURRENT LANDFILL TIPPING FEE AND CONSIDERATION OF THAT FEE SHALL BE INCLUDED IN THE CONTRACTOR'S BID SUM.
3. CONSTRUCTION, DEMOLITION, AND GRUBBING MATERIAL SHALL NOT BE DEPOSITED AT ANY OF THE COUNTY OF HAWAII TRANSFER STATIONS, BUT SHALL BE TRANSPORTED FOR DISPOSAL TO EITHER THE WEST HAWAII OR HILO LANDFILL.
4. ASBESTOS MATERIAL MUST BE SEPARATED OUT, DOUBLE BAGGED AND LANDFILLED IN ACCORDANCE WITH REGULATIONS OF THE DEPARTMENT OF ENVIRONMENTAL MANAGEMENT, COUNTY OF HAWAII. INFORMATION MAY BE OBTAINED BY CALLING THE DEPARTMENT AT 808-961-8339 BETWEEN 7:00 AM AND 4:00 P.M. MONDAY THROUGH FRIDAY.

LEGEND:

AC	Asphalt Concrete	T	Top
ADAAG	Americans With Disabilities Act Accessibility Guidelines	TB	Top of Bank
		TBM	Temporary Bench Mark
BB	Bottom of Bank	TC	Top of Curb or Cover
BC	Bottom of Curb	TF	Top of Fill
BF	Bottom of Fill	TMK	Tax Map Key
BLDG	Building	T/P	Telephone Pole
BW	Bottom of Wall	TS	Topo Shot
CMP	Corrugated Metal Pipe	TSB	Traffic Signal Pullbox
COTG	Clean Out to Grade	TW	Top of Wall
Conc.	Concrete	U/P	Utility Pole
CRM	Concrete Rubble Masonry	VCP	Vitrified Clay Pipe
DDS	Double Solid Stripe	WVB	Water Valve Box
DS	Down Spout	WM	Water Meter
DWY	Driveway	△	Control Point
ELEV.	Elevation		
E/P	Electric Pole		
EP	Edge of Pavement		
EPS	Edge of Pavement Stripe	—o	Utility Pole w/Anchor
fd	Found	o—☼	Utility Pole w/Street Light
fps	Feet Per Second	—E—	Overhead Electric
Ft.	Foot, Feet	—T—	Overhead Telephone
GRL	Guardrail	—W_E—	Existing Waterline
GTR	Gutter	—S_E—	Existing Sewerline
GV	Gas Valve Box	—E/T—	Overhead Electric & Telephone Service
HTCO	Hawaii Telephone Co.		
INV.	Invert	—w—	Drainage flow direction
mgd	Million Gallons per Day		
MGN	Magnetic Nail		Hedge
NPBX	Newspaper Box		Stonewall
PPB	Pedestrian Push Button		TREE NAME/TYPE H=approx. height S=approx. spread C=approx. trunk circumference
POL	Point on Line		
PVC	Polyvinyl Chloride	22	Contour Elevation
RM-1	Reflective Marker		R.O.W. or Grant Line
R.O.W.	Right of Way		
RR SPK.	Railroad Spike		
SDMH	Storm Drain Manhole		
S/P	Service Pole		
SMH	Sewer Manhole		
S. SPK.	Ship Spike		
STA.	Station		

COUNTY TRAVERSE CONTROL

1. THE CONTRACTOR SHALL VERIFY WITH THE COUNTY OF HAWAII, DEPARTMENT OF PUBLIC WORKS (D.P.W.), THE LOCATIONS OF ALL TRAVERSE, REFERENCE CONTROL POINTS, AND STREET MONUMENTS ALONG STREETS, ROADWAYS AND THE SURROUNDING WORK AREA.
2. THE CONTRACTOR SHALL LOCATE AND PRESERVE THE CONTROL POINTS. ANY POINTS THAT ARE AFFECTED BY THE IMPROVEMENTS SHALL BE PROPERLY REFERENCED AND THEN RE-ESTABLISHED AT THE CONTRACTOR'S EXPENSE, TO THE SATISFACTION OF THE D.P.W.
3. THE CONTRACTOR SHALL ALSO USE CARE TO PRESERVE BOUNDARY MARKERS/PINS. ANY BOUNDARY MARKERS THAT ARE DISTURBED OR DAMAGED BY THE CONTRACTOR'S ACTIVITIES SHALL BE REPLACED AND/OR RE-ESTABLISHED AT THE CONTRACTOR'S EXPENSE, TO THE SATISFACTION OF THE D.P.W.
4. REFERENCING AND RE-ESTABLISHING OF CONTROL POINTS AND BOUNDARY MARKERS SHALL BE DONE BY A HAWAII LICENSED LAND SURVEYOR.

HAWAII ONE CALL CENTER

1. THE CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY AND LOCATE UNDERGROUND UTILITIES PRIOR TO BEGINNING EXCAVATION TO PREVENT DAMAGES.
2. THE CONTRACTOR SHALL UTILIZE THE "HAWAII ONE CALL CENTER" TO VERIFY LOCATIONS OF UTILITIES PRIOR TO EXCAVATION. TO CALL FOR A LOCATE REQUEST, DIAL "811" OR (866) 423-7287.
3. ONLINE SERVICE TICKET REQUESTS ARE ALSO AVAILABLE AROUND THE CLOCK AT "WWW.CALLBEFOREYOUDIG.ORG".

JASON K. INABA — LICENSED PROFESSIONAL ENGINEER No. 6188-C — HAWAII, USA

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.

REJ# FB#

DEPARTMENT OF WATER SUPPLY
COUNTY OF HAWAII

PROJECT: PIIHONUA - KUKUAU RESERVOIR AND TRANSMISSION IMPROVEMENTS

DWG. NO. G-3

MISC. CONSTRUCTION NOTES LEGEND

SHEET NO. 3 OF SHEETS

JOB NO. 94-590

WATERLINE NOTES

1. ALL WORK SHALL BE DONE ACCORDING TO THE **WATER SYSTEM STANDARDS**, STATE OF HAWAII, DATED 2002, AS AMENDED.

2. ALL EXISTING WATERLINES, WATERLINE APPURTENANCES AND OTHER UTILITY **LOCATIONS SHOWN ON THE PLANS** ARE OBTAINED FROM THE LATEST RELIABLE SOURCES. THE CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY THE EXACT LOCATION OF ALL UTILITIES IN THE FIELD AND SHALL BEAR ALL COSTS FOR DAMAGES DONE DURING THE CONTRACT PERIOD.

3. THE **CONTRACTOR SHALL INFORM** THE D.W.S. ENGINEER 72 HOURS PRIOR TO THE BEGINNING OF ANY WATERLINE WORK AND TWO WEEKS PRIOR TO ANY CONNECTION, CHLORINATION, SHUTOFF OR RELOCATION WORK.

4. ALL **CONNECTIONS** TO THE EXISTING WATER SYSTEM SHALL BE DONE BY THE D.W.S. THE CONTRACTOR SHALL PERFORM ALL EXCAVATION, BACKFILL, ROAD REPAIR, TRAFFIC CONTROL, AND PROVIDE EQUIPMENT AND MATERIALS NECESSARY TO COMPLETE THE CONNECTION.

5. THE CONTRACTOR SHALL PAY FOR ALL WORK, EQUIPMENT AND MATERIAL **FURNISHED BY THE D.W.S.**

6. WHERE **WATER SHUTOFF** OF MORE THAN 3-HOURS BECOMES NECESSARY, THE CONTRACTOR, AT HIS OWN EXPENSE, SHALL PROVIDE A TEMPORARY BYPASS LINE, SIZE OF WHICH SHALL BE DETERMINED BY THE D.W.S. ENGINEER. THE D.W.S. ENGINEER ALSO RESERVES THE RIGHT TO REQUIRE BYPASS LINES, REGARDLESS OF THE WATER SHUTOFF PERIOD, IF DEEMED NECESSARY.

7. PROJECTS REQUIRING **TEMPORARY CONSTRUCTION WATER SERVICE** SHALL BE METERED AND PAID FOR BY THE CONTRACTOR.

8. **OUTSIDE OF STATE ROAD RIGHT-OF-WAYS:** MINIMUM COVER ON WATER SYSTEM PIPELINES 4-INCH THROUGH 8-INCH TO BE 2.0 FEET. MINIMUM COVER ON 12-INCH PIPELINES TO BE 2.5 FEET. MINIMUM COVER ON PIPELINES GREATER THAN 12-INCH TO BE 3.0 FEET. MAXIMUM COVER ON PIPELINES NOT OT EXCEED 5-FEET UNLESS APPROVED BY THE MANAGER OF D.W.S. **WITHIN STATE ROAD RIGHT-OF-WAYS:** MINIMUM COVER ON ALL SIZES OF WATERLINES TO BE 3.0 FEET.

9. ALL NEWLY INSTALLED WATERLINES SHALL HAVE A 4 MIL THICK, 6-INCH WIDE, NON METALLIC BLUE **WARNING** TAPE OVER CENTERLINE OF PIPE LABELED "CAUTION - WATERLINE BURIED BELOW" PLACED 12 INCHES BELOW FINISHED GRADE ALONG THE ENTIRE LENGTH OF THE TRENCH.

10. **MINIMUM VERTICAL CLEARANCE** BETWEEN WATERLINES AND OTHER UTILITIES SHALL BE 12-INCHES PROVIDED THE OTHER UTILITY IS CONCRETE JACKETED, AND 18-INCHES IF NO CONCRETE JACKETS ARE USED. IN ALL APPLICABLE INSTANCES, THE WATERLINES SHALL BE AT A GRADE HIGHER THAN OTHER UTILITIES. UTILIZE PERPENDICULAR CROSSING WHERE PRACTICABLE. FOR WATERLINES, CENTER FULL PIPE LENGTHS AT UTILITY CROSSINGS WHENEVER POSSIBLE.

11. **MINIMUM HORIZONTAL CLEARANCE** BETWEEN WATERLINES AND OTHER UTILITIES SHALL BE 8-FEET (CLEAR SPACE - NOT CENTERLINE TO CENTERLINE) FOR ROAD RIGHT-OF-WAYS OF 50 FEET OR LESS, AND 10-FEET FOR ROAD RIGHT-OF-WAYS OF MORE THAN 50 FEET.

12. WHEN WATERLINE IS WITHIN 6-FEET OF A PRESSURIZED **SEWER** LINE OR WITHIN 18-INCHES OF A GRAVITY SEWER LINE, THE SEWER MAIN SHALL BE REINFORCED CONCRETE JACKETED. WHENEVER A WATER MAIN CROSSES UNDER A SEWER MAIN, THE SEWER MAIN SHALL HAVE REINFORCED CONCRETE JACKET ON BOTH SIDES OF CROSSING TO A DISTANCE OF 5 FEET FROM THE WATERLINE (MEASURED PERPENDICULAR TO WATERLINE). STANDARD CONCRETE JACKET DETAILS FOR SEWER LINES, AS SPECIFIED BY THE DEPARTMENT OF PUBLIC WORKS STANDARDS SHALL BE FOLLOWED. PLASTIC PIPES SHALL NOT BE JACKETED. DUCTILE IRON OR CONCRETE CYLINDER PIPE SHALL BE USED FOR THE PORTION TO BE JACKETED.

13. ALL WATER SYSTEM PIPELINES, 4-INCHES OR LARGER IN DIAMETER, SHALL BE **DUCTILE IRON**, PUSH ON JOINTS, CLASS 52, AND ALL PIPELINES SMALLER THAN 4-INCHES IN DIAMETER SHALL BE SOFT **COPPER**, TYPE "K", UNLESS OTHERWISE SPECIFIED.

14. SOLDER (1/8-INCH DIA.) AND FLUX USED SHALL NOT CONTAIN MORE THAN 0.2% LEAD.

15. ALL **FITTINGS** (MINIMUM CLASS 250) AND GATE VALVES (RESILIENT TYPE, CLASS 200) SHALL BE DUCTILE IRON, WITH MECHANICAL JOINTS UNLESS OTHERWISE SPECIFIED. BUTTERFLY VALVES (MJ) SHALL BE CLASS 250 WITH FUSION EPOXY COATED INTERIOR UNLESS OTHERWISE SPECIFIED. SLOPE OF PIPE INVERT AT VALVE LOCATIONS SHALL NOT EXCEED 6% - ADJUSTED PIPE AS APPROPRIATE PER STANDARDS.

16. PIPE **JOINT RESTRAINTS** FOR MECHANICAL JOINT (MJ) FITTINGS AND MJ VALVES SHALL BE "MEGALUG" SERIES AS MANUFACTURED BY EBAA IRON, INC., OR AN APPROVED EQUAL (WEDGE TYPE), WHERE EVER CALLED FOR ON THE PLANS AND SPECIFICATIONS.

17. FIRE **HYDRANT** ASSEMBLIES SHALL UTILIZE EBAA "MEGALUGS" (OR APPROVED EQUAL) AT ALL MJ CONNECTIONS.

18. 4'x4'x4" REINFORCED CONCRETE **SLAB** FOR FIRE HYDRANT SHALL BE REINFORCED WITH 6x6 x 10/10 WELDED WIRE FABRIC. SLAB TO SLOPE AWAY FROM HYDRANT AT 2% IN ALL DIRECTIONS.

19. THE WATERLINE SHALL BE **TESTED** AT A MINIMUM OT 225 PSI OR ONE-AND-ONE- HALF TIMES THE STATIC PRESSURE AT THE LOW POINT (WHICHEVER IS GREATER), UNDER D.W.S. SUPERVISION. THE TESTING SHALL BE DONE JUST PRIOR TO PAVING WHENEVER APPLICABLE.

20. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE **CHLORINATION** OF THE WATER SYSTEM PER THE MOST CURRENT STANDARDS OF GOVERNING AGENCIES AND SHALL BEAR ALL COST(S). THE PERSON(S) ENGAGED TO DO THE CHLORINATION WORK MUST HAVE THE APPROPRIATE VALID LICENSE TO PERFORM THE WORK IN THE STATE OF HAWAII.

21. EXISTING VALVES, FIRE HYDRANT UNITS, VALVE BOXES, FRAMES AND COVERS DESIGNATED **"REMOVE AND SALVAGE"** SHALL BE CLEANED OF ALL DIRT, SCABS, AND CONCRETE AND DELIVERED TO THE RESPECTIVE D.W.S. BASEYARD. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THE VARIOUS BID ITEMS, UNLESS OTHERWISE SPECIFIED.

22. EXISTING WATERLINES, VALVES, FITTINGS AND APPURTENANCES NOT DESIGNATED **"REMOVE AND SALVAGE"** SHALL BE ABANDONED IN PLACE. ALL EXPOSED VALVE BOXES, VALVES, PIPES AND APPURTENANCES SHALL BE REMOVED AND DISPOSED OF PROPERLY AT NO COST TO THE D.W.S.

23. REMOVAL OF EXISTING FIRE HYDRANT UNITS AS FOLLOWS: FOR MECHANICAL JOINT FITTINGS - PLUG TEE AT THE MAIN; FOR LEAD JOINT FITTINGS - CUT TEE FROM MAIN AND INSTALL PIPE NIPPLE USING TWO TRANSITION COUPLINGS.

24. **METER BOXES** FOR 5/8-INCH METERS PLACED OUTSIDE OF PAVEMENT TO BE TYPE "B" PER STANDARD DETAILS M1 & M2. METER BOXES FOR 1-INCH METERS OR FOR 5/8-INCH METERS LOCATED WITHIN PAVEMENT TO BE TYPE "X" PER STANDARD DETAIL M3.

25. **RELOCATION** OF EXISTING METERS SHALL BE DONE UNDER D.W.S. SUPERVISION. RELOCATIONS OF CUSTOMER SERVICE LINES TO BE RELOCATED METERS SHALL BE COPPER (TYPE "K") AND DONE BY THE CONTRACTOR. ALL WORK AND MATERIALS SHALL BE PROVIDED BY THE CONTRACTOR AND CONSIDERED INCIDENTAL TO THE RELOCATION WORK. EXISTING METER BOXES DAMAGED BY THE CONTRACTOR SHALL BE REPLACED AT THE CONTRACTOR'S COST. WHEN APPLICABLE, A DIELECTRIC UNION SHALL BE USED TO CONNECT THE COPPER PIPE TO THE CUSTOMER'S GALVANIZED IRON (G.I.) PIPE.

26. SERVICES LATERALS TO BE ABANDONED SHALL BE **CUT AND PLUGGED** AT THE WATER MAIN. METER BOXES TO BE ABANDONED SHALL BE REMOVED AND GROUND SHALL BE RESTORED TO A CONDITION BETTER OR EQUAL TO SURROUNDING AREAS.

27. **WHEN COMPACTION** TEST ARE REQUIRED, THE CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE THE D.W.S. WITH PROCTOR RESULTS OF MATERIALS TO BE USED FOR THAT PORTION OF THE WORK REQUIRING COMPACTION. THESE RESULTS SHALL BE CERTIFIED AND SHALL BE FURNISHED TO D.W.S. ONE WEEK PRIOR TO COMMENCEMENT OF WORK. COST FOR COMPACTION TESTS SHALL BE INCIDENTAL TO PIPELINE INSTALLATION.

28. THE CONTRACTOR SHALL BE RESPONSIBLE TO MAINTAIN AND CERTIFY THE **RECORD DRAWINGS** (AS-BUILT DRAWINGS) AS TO ACCURACY AND AS-BUILT CONDITION, AND A LICENSED ENGINEER HIRED BY THE CONTRACTOR SHALL THEN STAMP THE CERTIFIED DRAWINGS. THE CONTRACTOR SHALL THEN SUBMIT THE RECORD DRAWINGS AND AS-BUILT TRACINGS TO THE D.W.S.

29. LOTS REQUIRING A DEPARTMENT OF WATER SUPPLY APPROVED **BACKFLOW PREVENTION ASSEMBLY** SHALL HAVE ONE. BACKFLOW DEVICE INSTALLATION MAY NOT BE REQUIRED FOR FINAL SUBDIVISION APPROVAL BUT MUST BE INSTALLED, WHERE REQUIRED, BEFORE WATER SERVICE IS ALLOWED. IT MUST BE INSTALLED ON PRIVATE PROPERTY IN ACCORDANCE WITH D.W.S. STANDARD DETAIL NO. V9 AND DEPARTMENTAL STAFF MUST APPROVE THE INSTALLATION BEFORE WATER SERVICE CAN BE STARTED.

30. WHEN NECESSARY PER D.W.S. STANDARDS OR CROSS CONNECTION CONTROL REQUIREMENTS, INSTALL D.W.S. APPROVED REDUCED PRESSURE PRINCIPLE TYPE **BACKFLOW PREVENTION ASSEMBLY**, ABOVE GROUND AND IMMEDIATELY AFTER METER ON CUSTOMER'S PROPERTY, PER D.W.S. STANDARD V9. NO TAPS OR CONNECTIONS ARE ALLOWED BETWEEN THE METER AND THE APPROVED BACKFLOW PREVENTER. IF THE DISTANCE BETWEEN THE METER AND THE BACKFLOW PREVENTER IS GREATER THAN 5 FEET, THEN THE LINE BETWEEN THEM SHALL BE CONCRETE JACKETED. CONCRETE JACKET ENCASEMENT SHALL BE A MINIMUM OF 3-INCHES ALL AROUND PIPE. INSPECTION BY D.W.S. CROSS-CONNECTION PERSONNEL REQUIRED AT THE TIME OF CONCRETE PLACEMENT. ASSEMBLY TESTING REQUIREMENTS ARE 1X PER YEAR. THE OWNER SHALL MAKE THEIR OWN PROVISIONS FOR THOSE TIMES WHEN THE BACKFLOW PREVENTION ASSEMBLY IS BEING TESTED.

31. **PRESSURES AT ALL LOCATIONS** WITHIN THE WATER SYSTEM IMPROVEMENTS SHALL NOT BE LESS THAN 40 PSI STATIC OR GREATER THAN 125 PSI STATIC. PRESSURES AT ALL LOCATIONS WITHIN THE WATER SYSTEM SHALL NOT FALL BELOW 20 PSI RESIDUAL DURING MAXIMUM DAY FLOW PLUS FIRE FLOW FROM ANY FIRE HYDRANTS WITHIN THE WATER SYSTEM IMPROVEMENTS SHOWN.

32. **FOR COUNTY WATER SYSTEMS:** THE D.W.S. WILL NO ASSUME OWNERSHIP OR GRANT ANY WATER SERVICE UNTIL THE WATER SYSTEM IS DEDICATED TO THE D.W.S. ALONG WITH ALL NECESSARY EASEMENTS AND DOCUMENTS.

33. **FOR PRIVATE WATER SYSTEMS:** THE DEPARTMENT OF WATER SUPPLY (D.W.S) IS PROVIDING ITS REVIEW AND INSPECTION FOR THE SUBJECT WATER SYSTEM IMPROVEMENTS ONLY. THIS REVIEW IS BASED ON THE INFORMATION AND CERTIFICATION PROVIDED TO THE D.W.S. BY THE DEVELOPER, LICENSED ARCHITECT OR ENGINEER, AND THE OWNER OF THE WATER COMPANY/UTILITY AND SUCCESSORS OR ASSIGNS, AND IS FOR GENERAL CONFORMANCE TO THE CURRENT WATER SYSTEM STANDARDS AND D.W.S. RULES AND REGULATIONS

34. **WATER SYSTEM APPROVED ON CONFORMANCE TO WATER SYSTEM STANDARDS ONLY.** PLAN APPROVAL AND SIGNATURE BY THE MANGER, DEPARTMENT OF WATER SUPPLY ONLY INDICATES THAT THE WATER SYSTEM IMPROVEMENTS SHOWN ON THE PLANS GENERALLY CONFORM TO WATER SYSTEM STANDARDS FOR THE COUNTY OF HAWAII. THEY ARE NOT GUARANTEES OF WATER AVAILABILITY OR OF A WATER COMMITMENT FOR THE SUBJECT PROJECT WHICH ARE HANDLED SEPARATELY FROM PLAN REVIEW.

TANK DISINFECTION PROCEDURES

PERMANENT TANKS:

1. DISINFECTION OF THE PERMANENT TANK SHALL ONLY PROCEED WHEN THE TANK HAS SUCCESSFULLY PASSED THE REQUIRED LEAKAGE TESTS.
2. REMOVE ALL SCAFFOLDING, PLANKS, TOOLS, RAGS, AND OTHER MATERIALS NOT PART OF THE OPERATION OF THE TANK,
3. CLEAN ALL SURFACES OF THE WALLS, FLOORS, AND OPERATING FACILITIES OF THE TANK, WHICH WERE REPAIRED BY SWEEPING, VACUUMING, SCRUBBING, OR EQUALLY EFFECTIVE MEANS.
4. ALL WATER, DIRT AND FOREIGN MATERIAL ACCUMULATED IN THIS CLEANING OPERATION SHALL BE PROPERLY DISCHARGED FROM THE TANK(S) OR OTHERWISE REMOVED.
5. ANY MATERIALS AND APPURTENANCES REQUIRED TO BE INSIDE THE OPERATING TANK AFTER THE TANK HAS BEEN CLEANED SHALL BE CLEAN AND SANITARY WHEN PLACED IN THE FACILITY. CARE SHALL BE TAKEN TO MINIMIZE THE INTRODUCTION OF DIRT OR OTHER FOREIGN MATERIAL INTO THE CLEAN TANK.
6. A SOLUTION OF 200 PPM (MG/L) CHLORINE CONCENTRATION SHALL THEN BE APPLIED DIRECTLY TO THE SURFACES OF ALL PARTS OF THE TANK THAT WERE REPAIRED. SEE TABLE BELOW.

VOLUME OF WATER (GALLONS)	DESIRED CHLORINE CONCENTRATION (MG/L=PPM)	SODIUM HYPOCHLORITE REQUIRED (5% AVAILABLE CHLORINE)	CALCIUM HYPOCHLORITE REQUIRED (65% AVAILABLE CHLORINE)
100	200	0.4 GALLONS	0.3 LBS.

7. THE SOLUTION SHALL BE APPLIED WITH SUITABLE BRUSHES OR SPRAY EQUIPMENT.
8. THE SOLUTION SHALL THOROUGHLY COAT ALL SURFACES, INCLUDING INLET AND OUTLET PIPING, AND SHALL BE APPLIED TO ANY SEPARATE DRAIN PIPING.
9. THE DISINFECTED SURFACES SHALL REMAIN IN CONTACT WITH THE CHLORINE SOLUTION FOR 30-MINUTES, AFTER WHICH POTABLE WATER SHALL BE ADMITTED INTO THE TANK AND HELD IN THE TANK. THIS CHLORINATED WATER SHOULD NOT BE ALLOWED TO DISCHARGE INTO THE DISTRUBUTION SYSTEM OR ATMOSPHERE WITHOUT PROPER DE-CHLORINATION.
10. DWS SHALL THEN COLLECT SAMPLES FROM THE TANK TO ENSURE THE FREE CHLORINE RESIDUAL OF THE TANK WATER IS NOT LESS THAN 10 PPM. AT THE SAME TIME, DWS WILL COLLECT A BACTERIOLOGICAL SAMPLE. THE CONTRACTOR SHALL PROVIDE DWS AT LEAST 5 DAYS ADVANCE NOTICE OF THIS REQUIRED SAMPLING.
11. IF FREE CHLORINE RESIDUAL IS LESS THAN 10 PPM AT THE END OF THE 30-MINUTE HOLD PERIOD, THE DISINFECTING PROCEDURE SHALL BE REPEATED UNTIL THE MINIMUM FREE CHLORINE RESIDUAL IS ACHIEVED.
12. DWS SHALL ADVISE THE CONTRACTOR WHEN BOTH A SATISFACTORY BACTERIOLOGICAL TEST RESULT AND AN ACCEPTABLE FREE CHLORINE RESIDUAL IS MET.
13. AFTER BOTH THE SATISFACTORY BACTERIOLOGICAL RESULT AND ACCEPTABLE FREE CHLORINE RESIDUAL IS ACHIEVED THE TANK SHALL BE DRAINED. THE CONTRACTOR SHALL PROPERLY DE-CHLORINATE THE CHLORINATED WATER PRIOR TO DRAINING THE TANK. THE CONTRACTOR SHALL PREPARE AND OBTAIN THE NECESSARY PERMITS TO DISCHARGE DE-CHLORINATED WATER.
14. AFTER DRAINING THE TANK, THE CONTRACTOR SHALL REFILL THE TANK WITH POTABLE WATER FROM THE DWS DISTRIBUTION SYSTEM.

ADJUSTMENT OF EXISTING UTILITY STRUCTURES TO FINISHED GRADE

THE CONTRACTOR SHALL VERIFY THE LOCATIONS OF ALL EXISTING VALVE BOXES, UTILITY MANHOLES, DRAINAGE GRATINGS, ELECTRIC BOXES, CENTERLINE MONUMENTS AND ETC. AND SHALL ADJUST THEM TO MEET NEW FINISH GRADES.

A. MATERIALS

1. ALL MATERIALS USED IN THE ADJUSTMENT SHALL MEET THE SPECIFICATIONS UNDER THE RESPECTIVE SECTIONS FOR CONCRETE AND MORTAR, BRICKS, MANHOLES, FRAMES AND COVERS, AND OTHER CASTINGS.
2. ALL FRAMES AND COVERS AND CASTINGS SHALL BE SALVAGED, CLEANED AND RE-USED UNLESS DIRECTED OTHERWISE BY THE ENGINEER.

B. CONSTRUCTION REQUIREMENTS

1. THE EXISTING STRUCTURES SHALL NOT BE ADJUSTED UNTIL THE RESURFACING IS COMPLETED.
2. THE NEWLY RESURFACED PAVEMENT SHALL BE NEATLY CUT IN STRAIGHT LINES OR CIRCLES.
3. FRAMES AND COVERS OR OTHER CASTINGS SHALL BE CAREFULLY REMOVED AND CLEANED.
4. UNDERGROUND STRUCTURE WALLS SHALL BE CLEANED AND BUILT-UP TO THE REQUIRED ELEVATIONS TO RECEIVE THE COVER FRAMES OR CASTINGS.
5. BACKFILL SHALL BE CONSTRUCTED WITH AGGREGATE BASE COURSE AND SHALL BE THOROUGHLY COMPACTED TO NOT LESS THAN 95% OF ITS MAXIMUM DENSITY.
6. THE FINISHED SURFACE OVER THE COMPACTED BACKFILL SHALL BE CONSTRUCTED OF ASPHALT CONCRETE WITH A MINIMUM COMPACTED THICKNESS OF 2 1/2 INCHES.
7. UPON COMPLETION OF INSTALLATION, ALL FRAMES AND COVERS SHALL BE CLEANED AND PAINTED WITH ONE COAT OF APPROVED ASPHALTUM PAINT.

CONSTRUCTION NOTES

1. THE CONTRACTOR SHALL RESTORE ALL DRIVEWAYS AND SHOULDERS AFFECTED BY HIS CONSTRUCTION OPERATIONS TO ORIGINAL OR BETTER CONDITION AS DIRECTED BY THE DWS AND/OR DPW ENGINEER.
2. THE CONTRACTOR SHALL RESTORE ALL MAILBOXES AND NEWSPAPER BOXES AFFECTED BY HIS CONSTRUCTION OPERATIONS TO ORIGINAL OR BETTER CONDITION AS DIRECTED BY THE DWS ENGINEER.
3. CONTRACTOR SHALL PROVIDE GRADE STAKES SHOWING FINISH GRADES FOR ALL GRADING WORK.

STANDARD TRAFFIC NOTES (2008)

1. ALL TRAFFIC SIGNS AND PAVEMENT MARKINGS SHALL CONFORM TO THE LATEST EDITION OF THE **"MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES"**, AND AS AMENDED, APPLICABLE SECTIONS OF PART 5 OF THE **"STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION,"** DATED SEPTEMBER, 1984, AND THE **"HAWAII STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, 2005 EDITION"**, AND AS AMENDED, UNLESS OTHERWISE SPECIFIED ON THE PLANS, SPECIFICATIONS, OR THE STANDARD TRAFFIC NOTES.
2. THE CONTRACTOR SHALL INSTALL PERMANENT OR TEMPORARY PAVEMENT MARKERS, STRIPING AND MARKINGS AS REQUIRED BY SECTION(S) 629 AND 755.05 OF THE **"HAWAII STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, 2005 EDITION,"** AND AS AMENDED. TO INSURE PROPER LANE WIDTHS AND THE SAFE FLOW OF TRAFFIC, TEMPORARY STRIPING SHALL BE INSTALLED AS CLOSELY AS POSSIBLE TO THE FINAL STRIPING PLAN, BUT NOT IN A MANNER THAT WOULD OBSTRUCT PERMANENT STRIPING LAYOUT OPERATIONS.

   THE CONTRACTOR SHALL COORDINATE AND HIRE SPECIAL DUTY POLICE OFFICER(S) AS NEEDED TO PROVIDE TRAFFIC CONTROL WHILE WORKING WITHIN THE COUNTY RIGHT OF WAY.
3. THE CONTRACTOR SHALL INFORM THE TRAFFIC DIVISION AT LEAST SIX (6) WORKING DAYS PRIOR TO ANY WORK ON PAVEMENT MARKINGS OPERATIONS AND/OR SIGN INSTALLATIONS TO SCHEDULE A REVIEW AND APPROVAL OF THE STRIPING AND/OR SIGNING PLANS.
4. THE APPROVED STRIPING PLAN SHALL BE LAYED OUT USING THINNED-OUT PAINT OR OTHER APPROVED METHODS. FIELD ADJUSTMENT SHALL BE MADE AS DIRECTED BY THE ENGINEER BEFORE THE FINAL MARKINGS ARE APPLIED.
5. ALL PAVEMENT MARKINGS THAT BECOME INAPPLICABLE SHALL BE REMOVED BY THE CONTRACTOR AT HIS OWN EXPENSE. REMOVAL SHALL BE BY ERADICATION OR BY OTHER METHODS APPROVED BY THE ENGINEER BEFORE THE NEW PAVEMENT MARKINGS ARE APPLIED. EXCESSIVE GOUGING OF THE PAVEMENT IS NOT ACCEPTABLE AND SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
6. ALL PAVEMENT STRIPING SHALL BE WITH ALKYD REFLECTIVE THERMOPLASTIC COMPOUND PAVEMENT MARKING AS SPECIFIED IN SECTION(S) 629 AND 755.05 OF THE **"HAWAII STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, 2005 EDITION,"** AND AS AMENDED, ON ALL ROADWAYS. THE CONTRACTOR SHALL SUBMIT CERTIFICATE OF COMPLIANCE CERTIFYING THAT THE THERMOPLASTIC MATERIALS TO BE USED MEET THE CURRENT AASHTO M-247 AND AASHTO M-249 SPECIFICATIONS.
7. ON CONCRETE PAVEMENTS, PRE-STRIPE APPLICATION AREA WITH BINDER MATERIAL, PRIMER, OR PRIME SEAL COAT RECOMMENDED BY PAVEMENT MANUFACTURER.
8. HEAT APPLIED PRE-FORMED THERMOPLASTIC PAVEMENT MARKING TAPE WITH VISIBLE TEMPERATURE INDICATORS, OR AN EQUAL PAVEMENT MARKING TAPE THAT IS APPROVED BY THE TRAFFIC DIVISION MAY BE USED FOR CROSSWALKS, STOPLINES, PAVEMENT ARROWS, ALPHABETS, & SYMBOLS IN LIEU OF THERMOPLASTIC COMPOUND.

   REFLECTORIZED RAISED PAVEMENT MARKERS SHALL BE THE REGULAR SIZED MARKERS WITH APPROXIMATE DIMENSIONS OF 4" BY 4" BY 0.7". THE CONTRACTOR SHALL SUBMIT CERTIFICATE OF COMPLIANCE CERTIFYING THAT THE RAISED PAVEMENT MARKERS TO BE USED MEETS AND/OR EXCEEDS THE CURRENT STATE OF HAWAII, DEPARTMENT OF TRANSPORTATION SPECIFICATIONS.
9. ALL TRAFFIC SIGNS AND POSTS SHALL MEET THE REQUIREMENTS OF THE COUNTY OF HAWAII STANDARD DETAIL T-1 **EXCEPT THAT FLANGED CHANNEL POSTS AND OCTAGONAL POSTS WILL NOT BE ACCEPTABLE.** SIGNS SHALL BE ON ALUMINUM SHEETING OF 0.080-INCH MINIMUM THICKNESS. SIGNPOST SHALL BE 2" SQUARE TELESPAR TUBING NO. 20 F 12 OR EQUIVALENT WITH 2¼" SQUARE TELESPAR ANCHOR POST.
10. ALL TRAFFIC SIGNS SHALL BE COMPLETELY REFLECTORIZED WITH TYPE III OR TYPE IV HIGH INTENSITY RETROREFLECTIVE SHEETING. OVERHEAD STREET NAME SIGNS SHALL BE HIGH INTENSITY.
11. THE 2¼" SQUARE ANCHOR POST FOR SIGNS SHALL BE DRIVEN INTO THE GROUND, A.C. PAVEMENT, OR CONCRETE SIDEWALK IN ACCORDANCE WITH THE PLANS. ALL DAMAGES TO THE SURROUNDING AREA SHALL BE REPAIRED TO ITS ORIGINAL CONDITION OR BETTER. BEFORE DRIVING INTO CONCRETE, A NEAT HOLE OF APPROXIMATELY 3 INCH DIAMETER SHALL BE DRILLED THROUGH THE CONCRETE PRIOR TO THE INSTALLATION OF THE ANCHOR POST. IF DRIVING INTO THE CONCRETE OR A.C. PAVEMENT IS NOT POSSIBLE WITHOUT DAMAGE TO THE SURROUNDING CONCRETE OR A.C. PAVEMENT, A 12" BY 12" SQUARE SHALL BE SAW-CUT AND REMOVED PRIOR TO THE INSTALLATION OF THE ANCHOR POST AND THEN PATCHED WITH HOT MIX TO MATCH THE EXISTING A.C. PAVEMENT, OR CONCRETE TO MATCH THE EXISTING CONCRETE SIDEWALK.
12. UPON COMPLETION OF ALL CONSTRUCTION WORK, INCLUDING; BUT NOT LIMITED TO THE FINAL PAVING OF THE ENTIRE PROJECT AREA AND OFF-SITE CONSTRUCTION, THE CONTRACTOR SHALL RE-STRIPE ALL PAVEMENT MARKINGS WITHIN THE CONSTRUCTION AREA AND ADJACENT ROADWAY PAVEMENTS UP TO 300 FEET BEYOND THE CONSTRUCTION LIMITS IN ACCORDANCE WITH ITEM 6 OF THE CURRENT STANDARD TRAFFIC NOTES. THE CONTRACTOR SHALL MAINTAIN ALL TEMPORARY PAVEMENT MARKINGS, PERMANENT PAVEMENT MARKINGS AND ALL TRAFFIC SIGNS AND POSTS UNTIL SUCH TIME THE PROJECT IS ACCEPTED BY THE COUNTY OF HAWAII.
13. ALL TRAFFIC SIGNS AND POSTS WITHIN THE CONSTRUCTION LIMITS AND ADJACENT AREAS THAT HAVE BEEN DAMAGED, REMOVED, OR ADVERSELY AFFECTED BY THE CONSTRUCTION WORK SHALL BE REPLACED BY THE CONTRACTOR ACCORDING TO ITEM(S) 10, 11 AND 12 OF THE CURRENT STANDARD TRAFFIC NOTES AT NO COST TO THE COUNTY.
14. ALL DEDICATED STREETS MUST HAVE STREET NAMES WHICH HAVE BEEN APPROVED BY RESOLUTION BEFORE ACCEPTANCE OF THE STREET BY THE COUNTY OF HAWAII.
15. INSTALL **PRIVATE ROAD** SIGN(S) ON ALL PRIVATE ROAD(S). SIGN SHALL BE ON 18" WIDE BY 12" HIGH ALUMINUM PLATE WITH 4" BLACK LETTERING ON WHITE REFLECTORIZED SHEETING WITH BORDER.
16. ALL SIGNS AND MARKINGS FOR PRIVATE ROADWAYS SHALL BE MAINTAINED BY THE PRIVATE OWNERS.

JASON K. INABA — LICENSED PROFESSIONAL ENGINEER No. 6188-C — HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.

EDJ# FB#

DEPARTMENT OF WATER SUPPLY
COUNTY OF HAWAII

PROJECT: PIIHONUA - KUKUAU RESERVOIR AND TRANSMISSION IMPROVEMENTS

DWG. NO. G-4

MISC. CONSTRUCTION NOTES

SHEET NO. 4 OF SHEETS

JOB NO. 94-590

NOTES
WATER POLLUTION AND EROSION CONTROL
BEST MANAGEMENT PRACTICES (BMP)

1. THE CONTRACTOR SHALL INSTALL DEVICES AND UTILIZE BEST MANAGEMENT PRACTICES (BMP) APPROPRIATE FOR THE PROJECT. THE CONTRACTOR SHALL REFERENCE THE CITY AND COUNTY OF HONOLULU'S BEST MANAGEMENT PRACTICES MANUAL FOR CONSTRUCTION SITES IN HONOLULU, AND RULES RELATING TO SOIL EROSION STANDARDS AND GUIDELINES. A COPY OF EACH OF THESE DOCUMENTS AND PLANS SHALL BE KEPT ON THE PROJECT SITE AT ALL TIMES, AND SHALL BE PRODUCED UPON REQUEST OF THE DISTRICT ENGINEER OR HIS DESIGNATED REPRESENTATIVE. THESE DOCUMENTS SHALL SERVE AS GUIDELINES ONLY, AND IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT SAFETY RELATIVE TO TRAFFIC, PONDING PROBLEMS, ETC. ARE CONSIDERED AND ADDRESSED. THIS WORK SHALL BE CONSIDERED PART OF THE PROJECT, AND WILL NOT BE PAID FOR BY THE STATE.

2. THE CONTRACTOR SHALL CONSIDER AND INSTALL BMP MEASURES WHICH TAKE INTO ACCOUNT HIGH INTENSITY AND PROLONGED RAINFALL, AND TO ADDRESS THE POTENTIAL PROBLEMS THAT MAY RESULT BEFORE THE START OF ANY EXCAVATION OR EMBANKMENT WORK.

3. THE STATE RESERVES THE RIGHT TO DETERMINE THE APPROPRIATENESS AND ADEQUACY OF PROPOSED AND/OR IMPLEMENTED BMP'S. ADDITIONAL BMP MEASURES REQUIRED BY THE STATE SHALL NOT BE PAID FOR BY THE STATE.

4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DAMAGES, INJURIES AND/OR CLAIMS RESULTING FROM HIS BMP'S.

5. THE CONTRACTOR SHALL DESIGNATE AT LEAST ONE (1) PERSON WHO WILL BE RESPONSIBLE FOR INSPECTION, MAINTENANCE, AND REPAIR ACTIVITIES. PERSONNEL SELECTED FOR THE INSPECTION AND MAINTENANCE RESPONSIBILITIES SHALL RECEIVE TRAINING FROM THE CONTRACTOR, AT THE CONTRACTOR'S EXPENSE. TRAINING SHALL INCLUDE INSPECTION AND MAINTENANCE PRACTICES NECESSARY FOR MINIMIZING EROSION AND SEDIMENT AND FOR RETAINING SEDIMENT ON-SITE.

6. DISCHARGES INTO STATE WATERS DUE TO DEWATERING AND/OR HYDROTESTING ACTIVITIES REQUIRE SEPARATE NPDES PERMIT(S) FROM THE STATE DEPARTMENT OF HEALTH (DOH). IF THE CONTRACTOR CHOOSES TO DISCHARGE DEWATERING AND/OR HYDROTESTING EFFLUENT INTO STATE WATERS, HE SHALL OBTAIN THE NECESSARY PERMIT(S) FROM THE DOH, AND SHALL SUBMIT A COMPLETE SET OF THE PERMIT TO THE DEPARTMENT OF TRANSPORTATION, HIGHWAYS DIVISION, HAWAII DISTRICT (HWY-H) PRIOR TO COMMENCING THE PERMITTED ACTIVITY. NO DEWATERING AND/OR HYDROTESTING ACTIVITIES WILL BE AUTHORIZED UNTIL THE RECEIPT OF THE NPDES PERMIT(S) FROM THE DOH.

7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY CITATIONS OR FINES THAT MAY BE LEVIED AS RELATED TO THE NPDES PROGRAM ON THIS PERMIT, WHETHER DIRECTLY LEVIED AGAINST THE CONTRACTOR OR THE DEPARTMENT OF TRANSPORTATION.

8. THE CONTRACTOR MAY DISCUSS PROPOSED AND IMPLEMENTED BMP MEASURES AND THE ADEQUACY OF THEM, WITH THE DISTRICT ENGINEER.

STRUCTURAL BEST MANAGEMENT PRACTICES

EXAMPLES OF STRUCTURAL BMP'S INCLUDE, BUT ARE NOT LIMITED TO:

- SILT FENCES
- INLET PROTECTION
- COVERINGS
- HYDROMULCHING
- SEDIMENT TRAPS
- STABILIZED CONSTRUCTION ENTRANCES
- DIVERSION DITCHES
- VEGETATIVE STABILIZATION
- FILTER BERMS
- SEDIMENT BASINS

1. THE CONTRACTOR SHALL INSPECT EROSION AND SEDIMENT CONTROL MEASURES TWICE DAILY AND AFTER 0.5 INCHES OF RAINFALL.

2. IF REPAIRS TO OR MAINTENANCE OF THE CONTRACTOR'S EROSION CONTROL MEASURES ARE NECESSARY, THE CONTRACTOR SHALL INITIATE THE REPAIRS OR MAINTENANCE WITHIN TWENTY-FOUR (24) HOURS AFTER INSPECTION AND NOTING OF THE DEFICIENCY.

REPAIRS AND MAINTENANCE MAY INCLUDE THE FOLLOWING:

a. REPLACING SILT FENCE FABRIC WHEN TEARS ARE FOUND, AND ENSURING THAT THE FABRIC IS SECURELY ATTACHED TO THE FENCE POSTS AND FIRMLY IN THE GROUND.
b. REMOVING AND DISPOSING OF SEDIMENT MATERIAL WHEN SEDIMENT BUILD-UP REACHES ONE-THIRD (1/3) THE HEIGHT OF A SILT FENCE.
c. REMOVING AND DISPOSING OF SEDIMENT MATERIAL WHEN THE DEPTH IN A SEDIMENT BASIN REACHES TEN PERCENT (10%) OF THE DESIGN CAPACITY.
d. RESTORING BARE SPOTS AND WASHOUTS, AND ENSURING HEALTHY PLANT GROWTH IN BOTH TEMPORARY AND PERMANENT SEEDED AND PLANTED AREAS.

3. THE CONTRACTOR SHALL 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.

NON-STRUCTURAL BEST MANAGEMENT PRACTICES

A. WASTE DISPOSAL:
1. WASTE MATERIALS
All waste materials shall be collected and stored in a securely lidded, leak proof metal dumpster. The dumpster shall meet all County and State solid waste management regulations. All dumpsters at the project site shall be emptied a minimum of once per week, and more often, if necessary. No construction waste materials shall be buried on-site. The Contractor, at his expense, shall train supervisory personnel in the correct procedures for waste disposal.
2. HAZARDOUS WASTE
All hazardous waste materials shall be disposed of in the manner specified by local or State or Federal regulations.
3. SANITARY WASTE
All sanitary waste shall be collected from the portable restroom facilities a minimum of once per week, and more often, as necessary.

B. EROSION AND SEDIMENT CONTROL
INSPECTION AND MAINTENANCE PRACTICES:
1. All erosion and sediment control measures shall be inspected daily prior to and after each day's construction.
2. All control measures, per approved NPDES plan, shall be maintained in good working order. If a repair is necessary, it shall be initiated within twenty four (24) hours of the problem being discovered.
3. Any revisions to approved NPDES plans shall be submitted to the District Engineer for review and approval before any field adjustments are made.

C. SPILL PREVENTION:
1. The following material management practices shall be followed to reduce the risk of spills or other accidental exposure of material and substances to storm water runoff and discharge.
a. GOOD HOUSEKEEPING
-Store only enough products and material required to perform the job.
-Materials that may become potential pollutants that are stored in a neat and orderly manner in their original containers, and if possible, covered or enclosed.
-Products shall be kept in their original containers, with the original manufacturer's labeling.
-Products shall not be mixed, except as recommended or allowed by the manufacturers.
-Appropriate products shall have secondary containment.
-Whenever possible, use up all of a product prior to disposing of the container.
-Manufacturer's directions for proper use and disposal shall be followed.
-Material shall be disposed of in a manner permitted by local, State or Federal regulations.
-Contractor shall conduct daily inspections to ensure proper use and disposal of material.
-Litter shall be picked up on a daily basis and disposed of properly.
-Dust shall be controlled by wetting or by the application of a soil binder.

b. HAZARDOUS PRODUCTS
-Products shall be kept in their original containers with the original manufacturer's labeling.
-Material safety data sheets (MSDS) shall be retained and available for review by users.
-Manufacturer's directions for proper use and disposal shall be followed.
-All hazardous waste material shall be disposed of in a manner permitted by local, State or Federal regulations.

2. PRODUCT SPECIFIC PRACTICES
The following practices shall be followed on-site:

a. VEHICLES
All on-site vehicles shall be monitored for leaks and shall be subject to regular preventive maintenance to reduce the chance of leaks occurring. Leaks that cannot be repaired immediately shall be contained in spill pans or other appropriate containers.

b. PETROLEUM PRODUCTS
Petroleum products shall be stored in tightly sealed containers that shall be clearly labeled. Asphalt-containing materials (such as tack and prime coats) used on-site shall be applied according to manufacturers' directions.

c. CONCRETE TRUCKS
Concrete trucks shall discharge drum wash water only at designated sites. Wash water shall not be discharged to the storm drain system. The Contractor shall contain the discharged drum wash water at the designated site, and shall remove concrete and other residue as required by the Engineer.

3. SPILL CONTROL PRACTICES
In addition to good housekeeping and material management practices, the following spill prevention and cleanup practices shall be observed.

- Manufacturers' recommendations for spill cleanup shall be clearly posted, and site personnel shall be made aware of the procedures and location of cleanup supplies.
- Materials and equipment necessary for spill cleanup shall be kept in the material storage area on-site.
- All spills shall be cleaned up immediately after discovery.
- All spill areas shall be kept well ventilated, and cleanup personnel shall wear appropriate clothing and equipment.
- Toxic or hazardous material spills, regardless of size, shall be reported to the appropriate governmental agencies. A report shall be prepared to include measures to prevent this type of spill in the future, and how to cleanup such a spill. A description of the spill, the cause, and the cleanup measure undertaken shall also be included in the report.
- The Contractor shall be responsible for spill prevention and cleanup. He shall designate at least one on-site personnel to receive spill prevention and cleanup training. The Contractor, at his expense shall do training. The name of this person shall be posted in the material storage area and in the on-site office trailer.

8/15/01

N.P.D.E.S. PERMIT COMPLIANCE

1. THE GENERAL CONTRACTOR SHALL FILE THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) GENERAL PERMIT NOTICE OF INTENT (NOI) WITH THE CLEAN WATER BRANCH, ENVIRONMENTAL MANAGEMENT DIVISION, STATE OF HAWAII DEPARTMENT OF HEALTH.

2. ALL FEES AND COSTS ASSOCIATED WITH FILING THE NPDES, NOI PERMIT FORM AND SUBSEQUENT REQUIREMENTS SHALL BE PAID FOR THE CONTRACTOR. PAYMENT FOR FILING THE NPDES PERMIT SHALL BE PAID FOR BY BID ITEM IN THE PROPOSAL.

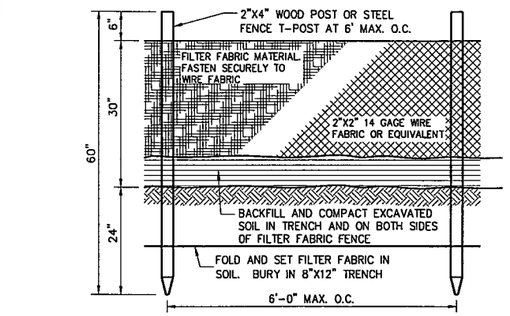
3. UNLESS OTHERWISE SPECIFIED IN THE PLANS AND SPECIFICATIONS, ALL COSTS ASSOCIATED WITH FIELD COMPLIANCE OF THE REQUIREMENTS AND REGULATIONS OF THE GENERAL PERMIT COVERAGE SHALL BE PAID FOR BY THE CONTRACTOR. THESE COSTS SHALL NOT BE PAID FOR SEPARATELY, BUT SHALL BE CONSIDERED INCIDENTAL TO, AND INCLUDED IN, THE VARIOUS BID ITEMS OF WORK.

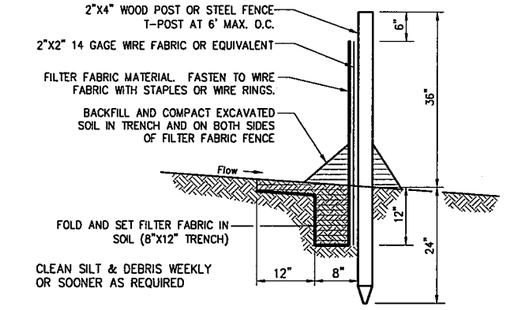
4. THE FIELD WORK MAY INCLUDE AND NOT BE LIMITED TO; EROSION CONTROL MEASURES, SILT FENCES, SILTING PONDS, SILT ROLLS, ETC., AND COMPLIANCE TO A SITE SPECIFIC BEST MANAGEMENT PRACTICES PLAN DEVELOPED AND IMPLEMENTED BY THE CONTRACTOR AND OTHER CONTROLS OR MEASURES INDICATED ON THE PLANS AND SPECIFICATIONS. THIS INCLUDES ALL PERIODIC CLEANING, MAINTENANCE OF THE FACILITIES, RECORD KEEPING, ETC. FOR THE DURATION OF THE PROJECT.

TRAFFIC SAFETY

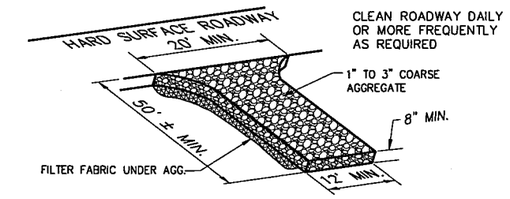
1. THE CONTRACTOR SHALL PROVIDE NECESSARY TRAFFIC SAFETY CONTROL DEVICES SUCH AS REFLECTIVE CONES, DELINEATORS, BARRIERS, ETC AROUND ALL BMP MEASURES TO ENSURE THE SAFETY OR ROADWAY TRAFFIC AND USERS.

2. TRAFFIC SAFETY DEVICES SHALL BE EFFECTIVE IN DAY OR NIGHT AND IN ALL WEATHER CONDITIONS, TO WARN AND PROTECT MOTORISTS, BIKERS, BICYCLISTS, PEDESTRIANS AND ANY OTHER USERS OF THE ROADWAY WHILE BMP MEASURES ARE IN USE FOR THE DURATION OF THE PROJECT.

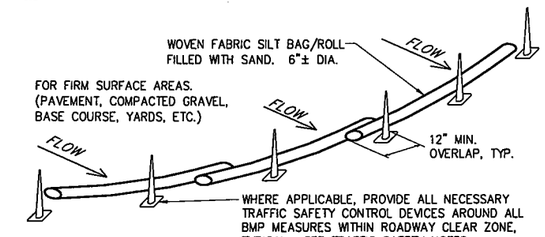




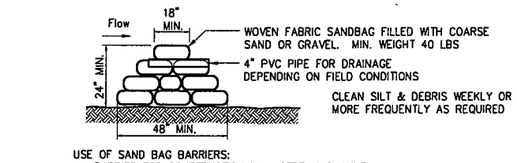
A SILT FENCE DETAIL
N. T. S.



B STABILIZED CONSTRUCTION ENTRANCE
N. T. S.

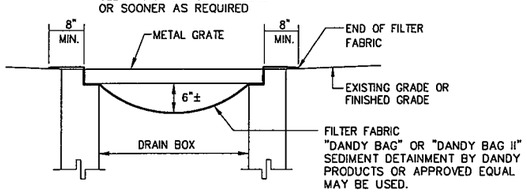


C SILT BAG/ROLL BARRIER
N. T. S.

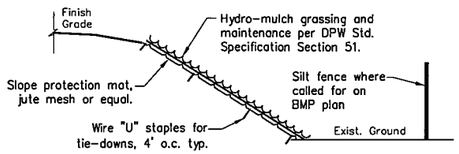


USE OF SAND BAG BARRIERS:
- BARRIER FOR CONSTRUCTION IN A STREAM CHANNEL
- DIVERSION DIKE
- EMBANKMENT FOR TEMPORARY SEDIMENT OR RETENTION BASIN
- SEDIMENT BARRIER NEAR TOE OF SLOPES
- AT CONSTRUCTION PERIMETER

E SAND BAG BARRIER
N. T. S.

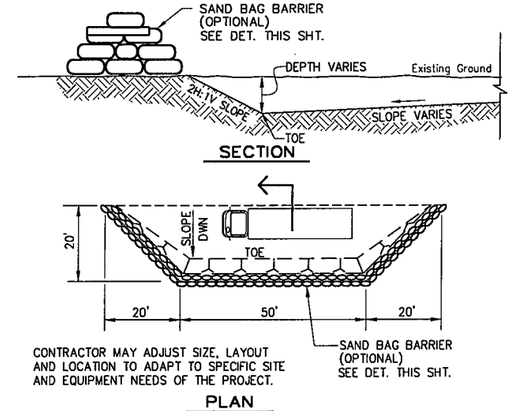


D GRATED INLET FILTER DETAIL
N. T. S.



- HYDRO-MULCH WITH GRASS SEED FOR SLOPES SUBJECT TO EROSION. AT SOIL OR ROCK & SOIL EXCAVATION OR EMBANKMENT CONDITION.
- FOR SLOPES GREATER THAN 2:1, PROVIDE SLOPE PROTECTION MATTING, JUTE MESH OR EQUAL, PRIOR TO HYDRO MULCH.
- EROSION STABILIZATION NOT REQUIRED FOR ROCK EXCAVATION.
- GRASSING SHALL BE INSTALLED AND MAINTAINED AS SOON AS PRACTICABLE TO PREVENT SOIL EROSION.

G SLOPE STABILIZATION
N. T. S.



H CONTAINMENT AREA DETAIL
NOT TO SCALE

NOTE: USE DETAILS WHERE APPLICABLE

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DEPARTMENT OF WATER SUPPLY
COUNTY OF HAWAII

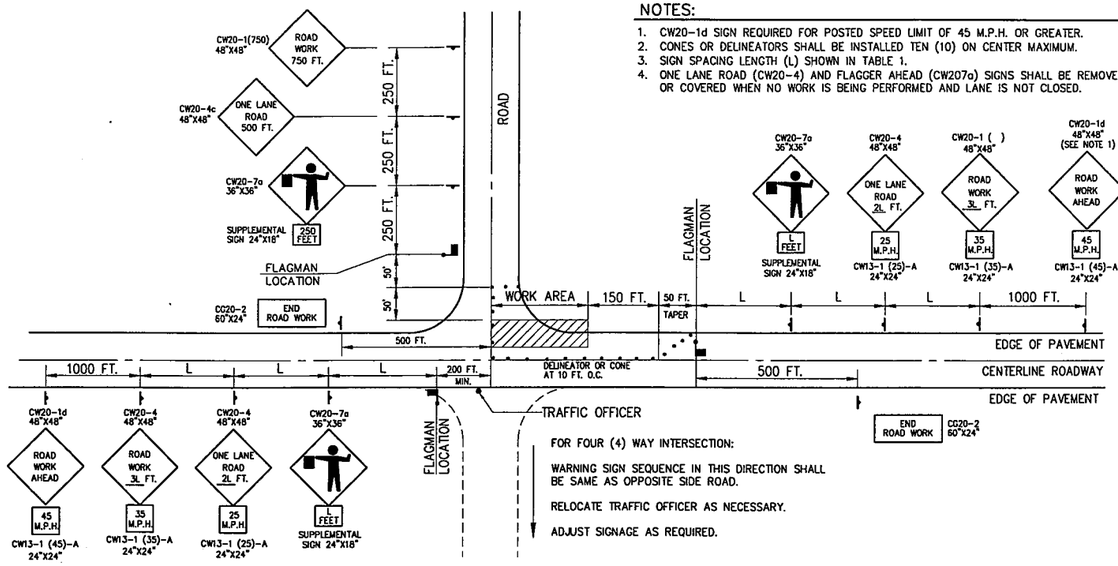
PROJECT: PIIHONUA - KUKUAU RESERVOIR AND TRANSMISSION IMPROVEMENTS

DWG. NO. G-5

WATER POLLUTION AND EROSION CONTROL NOTES, TYPICAL DETAILS

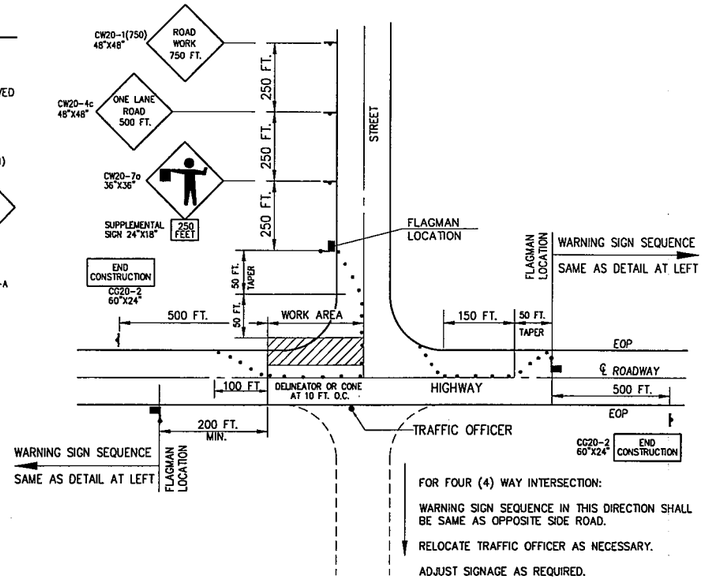
SHEET NO. 5 OF SHEETS

JOB NO. 94-590



NOTES:

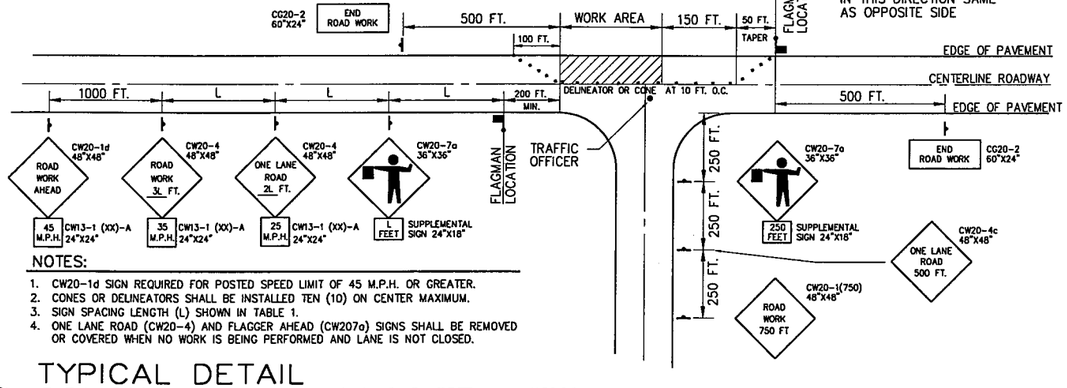
1. CW20-1d SIGN REQUIRED FOR POSTED SPEED LIMIT OF 45 M.P.H. OR GREATER.
2. CONES OR DELINEATORS SHALL BE INSTALLED TEN (10) ON CENTER MAXIMUM.
3. SIGN SPACING LENGTH (L) SHOWN IN TABLE 1.
4. ONE LANE ROAD (CW20-4) AND FLAGGER AHEAD (CW207a) SIGNS SHALL BE REMOVED OR COVERED WHEN NO WORK IS BEING PERFORMED AND LANE IS NOT CLOSED.



A TYPICAL DETAIL CONSTRUCTION SAME SIDE AS INTERSECTING ROAD

(USE WHERE APPLICABLE)

NOT TO SCALE



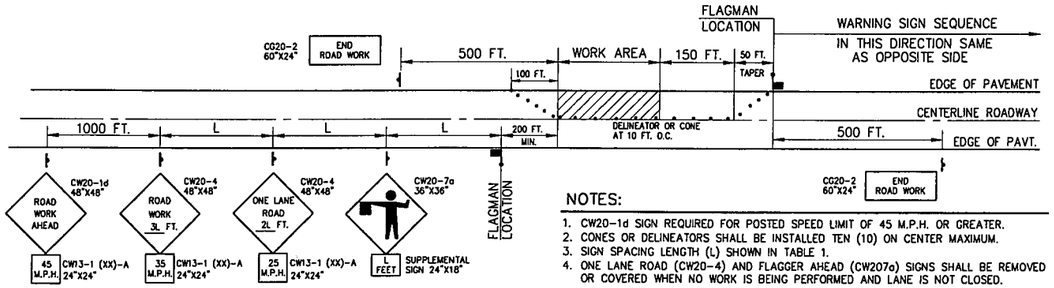
NOTES:

1. CW20-1d SIGN REQUIRED FOR POSTED SPEED LIMIT OF 45 M.P.H. OR GREATER.
2. CONES OR DELINEATORS SHALL BE INSTALLED TEN (10) ON CENTER MAXIMUM.
3. SIGN SPACING LENGTH (L) SHOWN IN TABLE 1.
4. ONE LANE ROAD (CW20-4) AND FLAGGER AHEAD (CW207a) SIGNS SHALL BE REMOVED OR COVERED WHEN NO WORK IS BEING PERFORMED AND LANE IS NOT CLOSED.

B TYPICAL DETAIL CONSTRUCTION OPPOSITE INTERSECTING ROAD

(USE WHERE APPLICABLE) (WORKING HOURS ONLY – SEE NOTE 11 & 16)

NOT TO SCALE



NOTES:

1. CW20-1d SIGN REQUIRED FOR POSTED SPEED LIMIT OF 45 M.P.H. OR GREATER.
2. CONES OR DELINEATORS SHALL BE INSTALLED TEN (10) ON CENTER MAXIMUM.
3. SIGN SPACING LENGTH (L) SHOWN IN TABLE 1.
4. ONE LANE ROAD (CW20-4) AND FLAGGER AHEAD (CW207a) SIGNS SHALL BE REMOVED OR COVERED WHEN NO WORK IS BEING PERFORMED AND LANE IS NOT CLOSED.

C TYPICAL DETAIL CONSTRUCTION ACROSS ROADWAY

(USE WHERE APPLICABLE) (WORKING HOURS ONLY – SEE NOTE 11 & 16)

NOT TO SCALE

TABLE I FOR TRAFFIC CONTROL PLAN

POSTED SPEED LIMIT (M.P.H.)	SIGN SPACING (L) (FEET)	TAPER LENGTH (T) (FEET)		SPACING OF CONES OR DELINEATORS (FEET) ③		
		W=12' OR LESS ②	W=GREATER THAN 12' ②	TAPER	TANGENT	WORK AREA
20	250	200	W X 17	20	20	10
25	250	200	W X 17	25	25	10
30	250	250	W X 20	30	30	10
35	250	250	W X 20	35	35	10
40	500	350	W X 30	40	40	10
45	500	550	W X 45	45	45	10
50	1000	600	W X 50	50	50	10
55	1000	700	W X 55	55	55	10

→ INDICATES POSTED SPEED LIMIT

② W = WIDTH OF LANE OR OFFSET

③ NOT APPLICABLE FOR TWO-LANE HIGHWAYS

NOTE:

THE CONTRACTOR SHALL VERIFY THE POSTED SPEED LIMIT AT EACH INTERSECTION WORK AREA AND SET UP SIGNAGE AS REQUIRED.

THE CONTRACTOR SHALL ADAPT THE TYPICAL TRAFFIC CONTROL PLANS SHOWN TO EACH INDIVIDUAL WORK SITE BASED ON THE CONTRACTOR'S CONSTRUCTION WORK METHOD, SEQUENCE AND SCHEDULE.

TRAFFIC CONTROL NOTES

1. THE PERMITTEE SHALL MAKE MINOR ADJUSTMENTS AT INTERSECTIONS, DRIVEWAYS, BRIDGES, STRUCTURES, ETC. TO FIT ACTUAL FIELD CONDITIONS.
2. CONES OR DELINEATORS SHALL BE EXTENDED TO A POINT WHERE THEY ARE VISIBLE TO APPROACHING TRAFFIC.
3. TRAFFIC CONTROL DEVICES SHALL BE INSTALLED SUCH THAT THE SIGN OR DEVICE FARTHEST FROM THE WORK AREA SHALL BE PLACED FIRST. THE OTHERS SHALL THEN BE PLACED PROGRESSIVELY TOWARD THE WORK AREA.
4. REGULATORY AND WARNING SIGNS WITHIN THE CONSTRUCTION ZONE THAT ARE IN CONFLICT WITH THE TRAFFIC CONTROL PLANS SHALL BE REMOVED OR COVERED. ALL SIGNS SHALL BE RESTORED UPON COMPLETION OF WORK
5. FLAGGERS AND/OR POLICE OFFICERS SHALL BE IN SIGHT OF EACH OTHER OR BE IN DIRECT COMMUNICATION AT ALL TIMES.
6. WHEN REQUIRED BY THE ISSUING OFFICER, THE PERMITTEE SHALL INSTALL A FLASHING ARROW SIGNAL AS SHOWN ON THE TRAFFIC CONTROL PLANS OR AS DESIGNATED BY THE DEPARTMENT OF PUBLIC WORKS.
7. SIGN SPACINGS (L), TAPER LENGTHS (T), AND SPACINGS OF CONES OR DELINEATORS SHALL BE AS SHOWN IN TABLE 1, UNLESS OTHERWISE NOTED ON THE TRAFFIC CONTROL PLANS.
8. ALL TRAFFIC LANES SHALL BE A MINIMUM OF TEN (10) FEET WIDE.
9. ALL CONSTRUCTION WARNING SIGNS SHALL BE PROMPTLY REMOVED OR COVERED WHENEVER THE MESSAGE IS NOT APPLICABLE OR NOT IN USE.
10. THE BACKS OF ALL SIGNS USED FOR TRAFFIC CONTROL SHALL BE APPROPRIATELY COVERED TO PRECLUDE THE DISPLAY OF INAPPLICABLE SIGN MESSAGE. (I.E. WHEN SIGNS HAVE MESSAGES ON BOTH SIDES.)
11. AT THE END OF EACH DAYS WORK OR AS SOON AS THE WORK IS COMPLETED, THE PERMITTEE SHALL REMOVE ALL TRAFFIC CONTROL DEVICES NO LONGER NEEDED TO PERMIT FREE AND SAFE PASSAGE OF PUBLIC TRAFFIC. REMOVAL SHALL BE IN THE REVERSE ORDER OF INSTALLATION.
12. REPLACE PERMANENT PAVEMENT MARKINGS AND TRAFFIC SIGNS UPON COMPLETION OF EACH PHASE OF THE WORK.
13. ALL TRAFFIC MOVEMENT AT INTERSECTION DETOURS SHALL BE PROVIDED AND CONTROLLED BY POLICE OFFICER OR APPROPRIATE FLAGMAN.
14. THE CONTRACTOR SHALL PROVIDE "PUBLIC NOTICE" IN ONE ISLAND-WIDE NEWSPAPER FOR ANY LANE CLOSURES, INCLUDING TRAFFIC CONTROL PLANS SHOWN ON THIS SHEET. THE NOTICE SHALL BE SUBMITTED TO THE DEPARTMENT OF PUBLIC WORKS FOR REVIEW AND APPROVAL A MINIMUM OF THREE WEEKS PRIOR TO PUBLICATION. THE NOTICE SHALL BE PUBLISHED A MINIMUM OF ONE (1) TIME PRIOR TO LANE CLOSURE.
15. THE CONTRACTOR SHALL PROTECT PEDESTRIAN, BICYCLIST, AND MOTOR VEHICLE TRAFFIC FROM TRENCH WORK AT ALL TIMES. FREE PASSAGE OF PEDESTRIAN OR BICYCLIST TRAFFIC SHALL BE ACCOMODATED AT ALL TIMES AND THE CONTRACTOR SHALL PROVIDE THE APPROPRIATE NOTICES AND SIGNAGE TO THE PUBLIC WHICH MEETS THE APPROVAL OF THE DEPARTMENT OF PUBLIC WORKS.
16. THE CONTRACTOR SHALL RESTORE THE SHOULDERS TO SMOOTH RIDING CONDITION DURING ALL NON-WORKING HOURS, TO THE SATISFACTION OF THE DEPARTMENT OF PUBLIC WORKS, AND TO ACCOMODATE MOTOR VEHICLE, PEDESTRIAN, AND BICYCLIST TRAFFIC. OTHERWISE, THE CONTRACTOR SHALL PROVIDE A TRAFFIC CONTROL PLAN FOR NON-WORKING HOURS TO BE APPROVED BY THE DEPARTMENT OF PUBLIC WORKS.
17. TRAFFIC CONTROL, DEVICES, AND SIGNS SHALL BE IN ACCORDANCE WITH THE U.S. DEPT. OF TRANSPORTATION "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), AND SHALL BE CONSIDERED INCIDENTAL TO THE VARIOUS BID ITEMS OF WORK.
18. THE QUALITY OF DEVICES AND SIGNS SHALL BE IN ACCORDANCE WITH AMERICAN TRAFFIC SAFETY SERVICES ASSOCIATION (ATSSA) "QUALITY STANDARDS FOR WORK ZONE TRAFFIC CONTROL DEVICES."
19. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING THE ROAD CLOSURE PERMIT. ACCESS TO PROPERTIES SHALL BE MAINTAINED UNLESS AN ALTERNATE ROUTE IS AVAILABLE OR PERMISSION IS OBTAINED FROM THE PROPERTY OWNER OR LOCAL TRAFFIC.

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DEPARTMENT OF WATER SUPPLY
COUNTY OF HAWAII

PROJECT: PIIHONUA - KUKUAU RESERVOIR AND TRANSMISSION IMPROVEMENTS

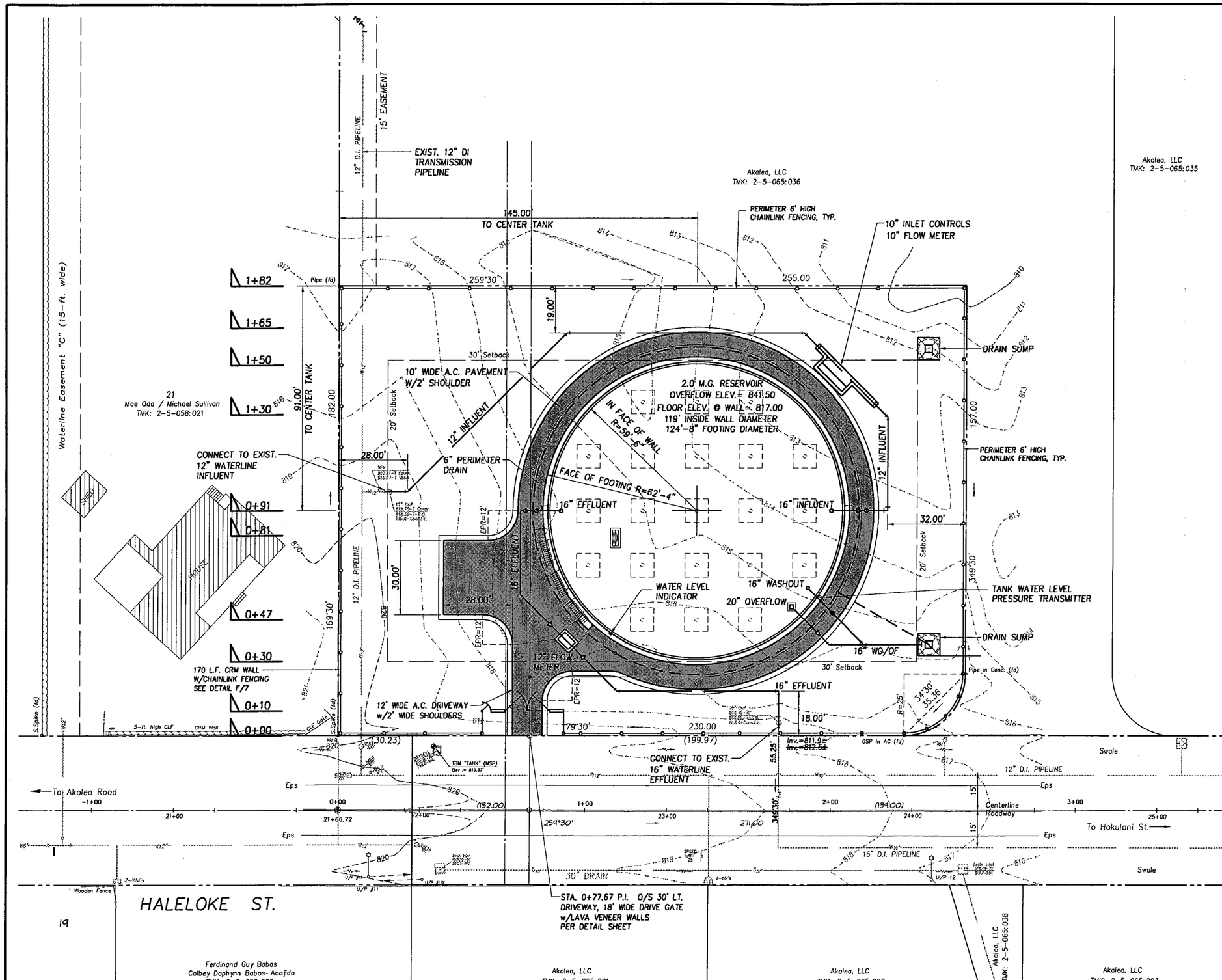
DWG. NO. G-6

TYPICAL TRAFFIC CONTROL PLANS
TRAFFIC CONTROL NOTES

SHEET NO.

OF SHEETS

JOB NO. 94-590



RESERVOIR SITE

SCALE: 1"=20'

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DEPARTMENT OF WATER SUPPLY
COUNTY OF HAWAII

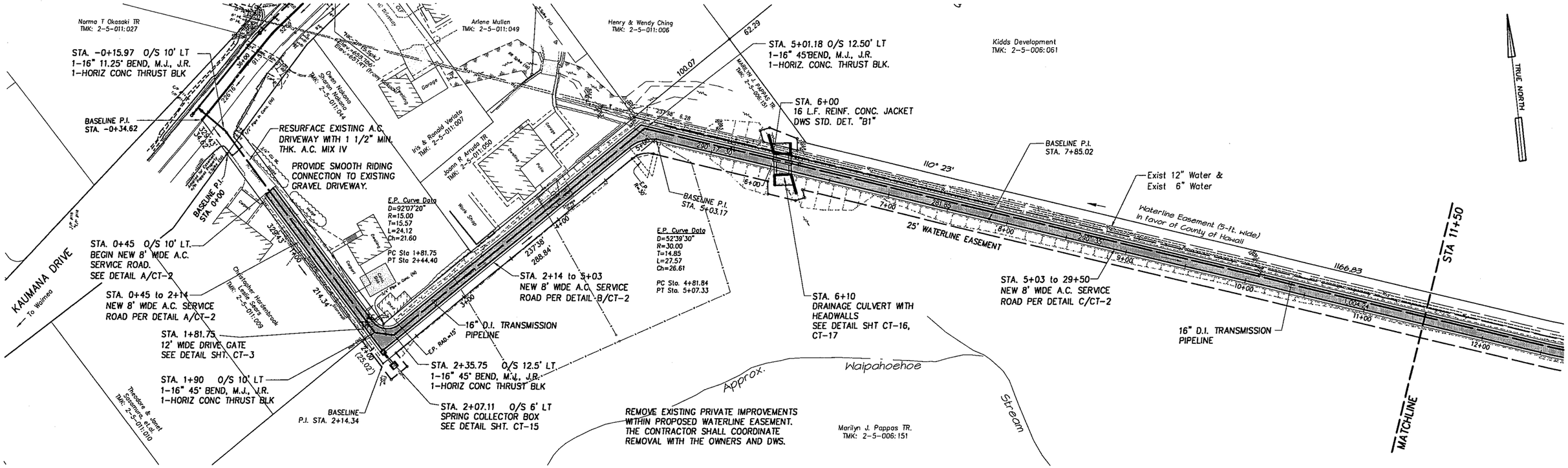
PROJECT: PIIHONUA - KUKUAU RESERVOIR AND TRANSMISSION IMPROVEMENTS

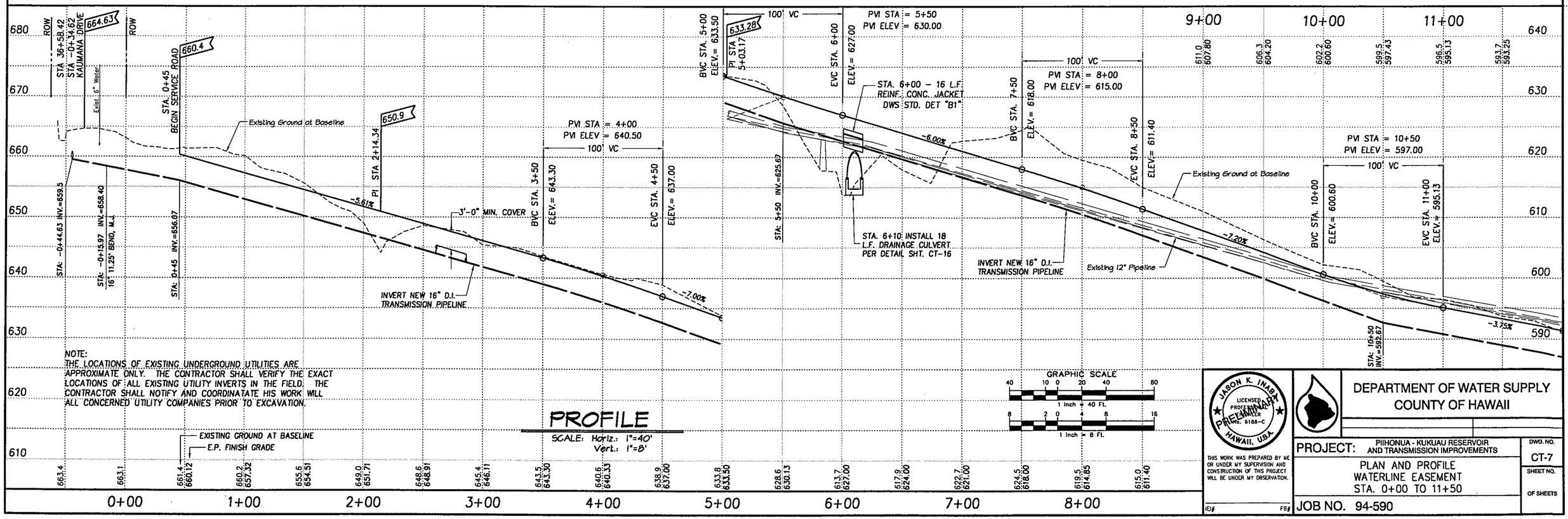
RESERVOIR SITE LAYOUT PLAN

JOB NO. 94-590

DWG. NO. CR-1

SHEET NO. OF SHEETS





NOTE:
THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATIONS OF ALL EXISTING UTILITY INVERTS IN THE FIELD. THE CONTRACTOR SHALL NOTIFY AND COORDINATE HIS WORK WILL ALL CONCERNED UTILITY COMPANIES PRIOR TO EXCAVATION.

EXISTING GROUND AT BASELINE
E.P. FINISH GRADE

PROFILE

SCALE: Horiz.: 1"=40'
Vert.: 1"=8'

GRAPHIC SCALE
40 10 0 20 40 80
1 Inch = 40 Ft.
8 2 0 4 8 16
1 Inch = 8 Ft.

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DEPARTMENT OF WATER SUPPLY
COUNTY OF HAWAII

PROJECT: PIIHONUA - KUKUAU RESERVOIR AND TRANSMISSION IMPROVEMENTS

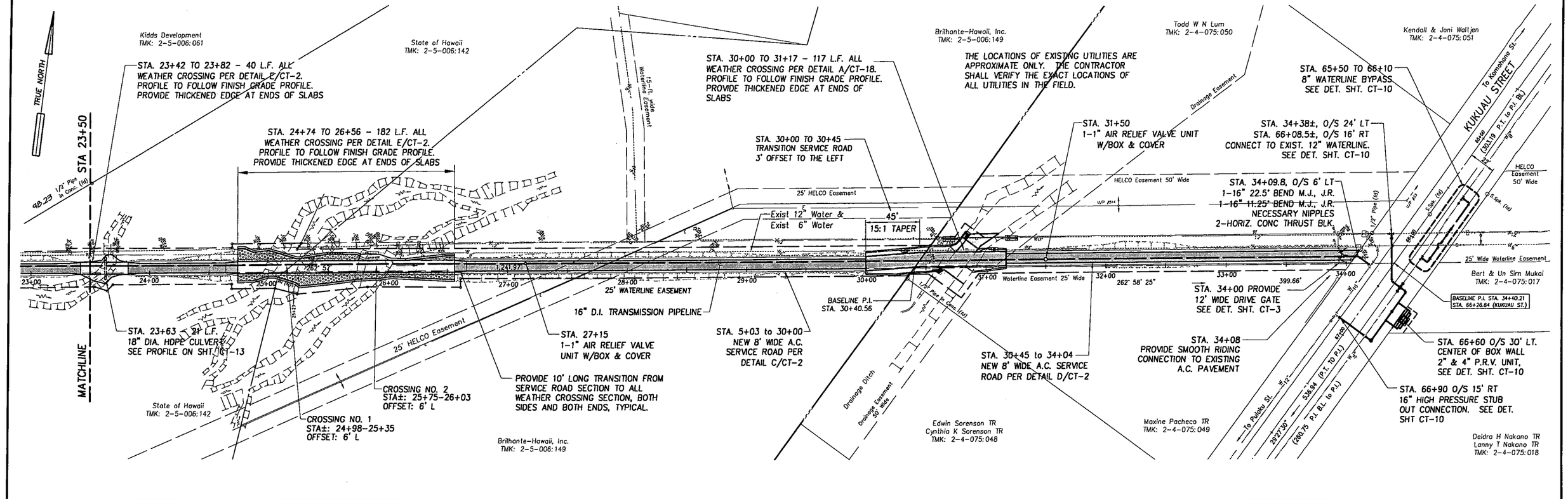
DWG. NO. CT-7

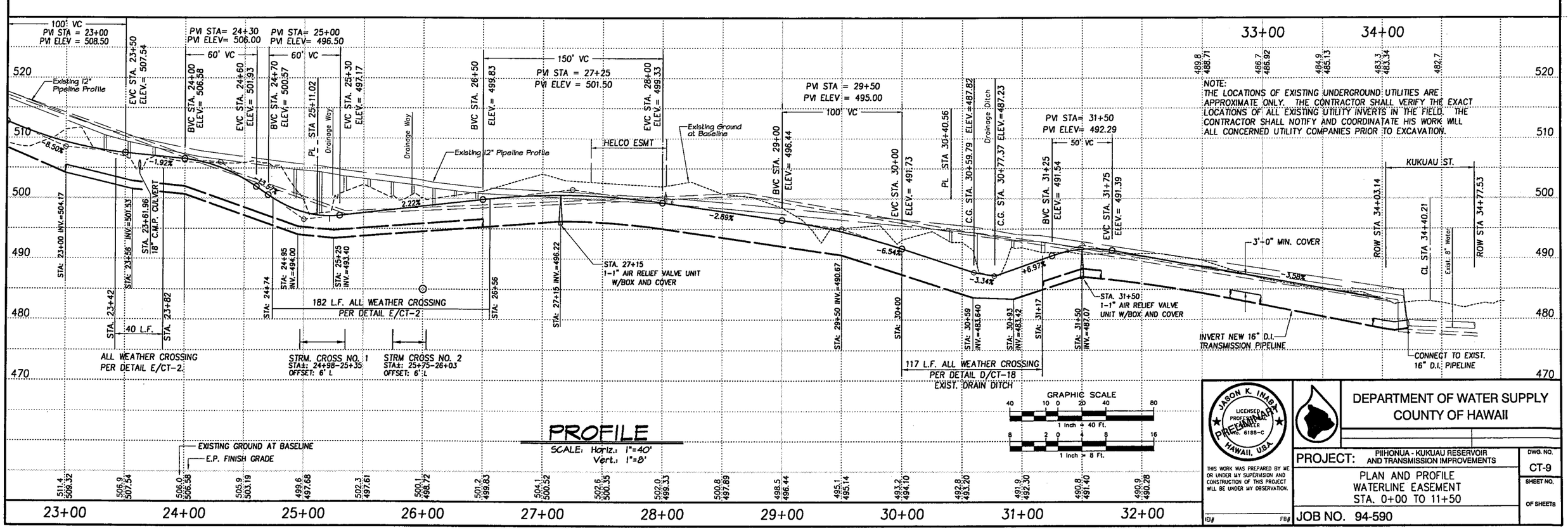
PLAN AND PROFILE
WATERLINE EASEMENT
STA. 0+00 TO 11+50

SHEET NO.

OF SHEETS

JOB NO. 94-590





PROFILE

SCALE: Horiz.: 1"=40'
Vert.: 1"=8'

GRAPHIC SCALE
40 10 0 20 40 80
1 Inch = 40 Ft.
8 2 0 4 8 16
1 Inch = 8 Ft.

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DEPARTMENT OF WATER SUPPLY
COUNTY OF HAWAII

PROJECT: PIIHONUA - KUKUAU RESERVOIR AND TRANSMISSION IMPROVEMENTS

PLAN AND PROFILE
WATERLINE EASEMENT
STA. 0+00 TO 11+50

DWG. NO. CT-9
SHEET NO.
OF SHEETS

JOB NO. 94-590

IE# FB#