Ho'olehua Water System | PWS 230 Improvements

Environmental Assessment Listed Under HRS 343, 11 HAR 200

Prepared for:

Department of Hawaiian Home Lands

Prepared by:

PBR HAWAII
& ASSOCIATES, INC.

January 2016

SUMMARY

Project Name:	Ho'olehua Water System PWS 230 Improvements
Location:	The Hawaiian Homestead Communities of Kalama'ula and Ho'olehua on the Island of Moloka'i, County of Maui
Judicial District:	Moloka'i
Tax Map Key (TMK):	portions of the following: 252010003, 252010007, 252008001, 252008002, 252008005, 252008006, 252008046, 252008079, 252008091, 52008102, 252008122, 252008123, 252008999, 252009012, 252009016, 252009018, 252009999, 252010001, 252010004, 252032068, 252033047, 252033048, 252033061, 252007055, 252007090, 252010002, 252012034, 252013021, 252007076, 252007077, 252013020, 252007035, 252007039, 252007040, 252007078, 252007079, 252007080, 252007082, 252007083, 252007084, 252007085, 252002999, 252005999, 252023009, 252024999, 252025999, 252013010, 252012999, 252007029, 252007030, 252006999, 252007999, 252021999
Land Area:	98 acres were evaluated across seven sites in Central Moloka'i[1]
Proposing/Determining Agency:	Department of Hawaiian Home Lands
Landowner:	Department of Hawaiian Home Lands
Existing Use:	The vast majority of the Project area is being utilized by DHHL for the operation of the existing PWS 230, Ho'olehua Water System. The proposed all-weather roadways to Sites 4 and 6 while located within existing roadway corridors are not being utilized by DHHL as roadways at this time and are undeveloped.
Proposed Action:	State of Hawai'i, Department of Hawaiian Home Lands (DHHL) proposes to improve treatment, storage and delivery of potable water supplied by the Ho'olehua Water System (Public Water Supply No. 230) to 2,400 customers including 769 native Hawaiian residential, agriculture, and pastoral homesteads located in Ho'olehua-Pālā'au, Kalama'ula, and Mo'omomi on the island of Moloka'i. The project will improve the health, sanitation and security of the potable water system while reducing energy costs. It will include a one-megawatt photovoltaic energy production farm, the repair and replacement of aging equipment, increase in fire protection capability and water storage capacity. It will also

[1] Ninety-eight acres were evaluated for impacts to provide flexibility to avoid sensitive areas if necessary. Less than 50 acres will be affected during construction and once the improvements are fully operational.

	improve the maintenance yard facilities and storage as well as site accessibility and security.
Current Land Use Designations:	*State Land Use:* Agricultural and Urban *Moloka'i Community Plan:* Agricultural, Rural, Conservation *Special Management Area (SMA)*: Yes *DHHL Land Designation (Moloka'i Island Plan 2005):* Supplemental Agricultural, Subsistence Agricultural, Residential, Pastoral, Community Use, and General Agricultural. DHHL preemption of State Land Use Law and County land use requirements pursuant to HHCA §206
Alternatives Considered:	Three alternatives were considered: • No action • Alternative Supply • Alternative designs
Permits & Approvals:	Building permit, grading permit, NPDES, noise permit, CZM federal consistency review, Special Flood Hazard Area Permit, flammable & combustible tank (fuel AST) installation permit, DOH approval, DAGs approval
Potential Impacts and Mitigation Measures:	The Project will have beneficial impacts to the Ho'olehua and Kalama'ula homestead communities and other PWS230 users. Potential adverse impacts are mitigable through the following measures: • Design measures: o To mitigate storm water impacts resulting from an increase in impervious acreage, project design will incorporate low impact development practices such as vegetated buffer/filter strips, open vegetated channels, and infiltration as well as consider materials of higher permeability. o To inform the State Water Projects Plan update the State DLNR, Engineering Department will be provided with water demands and calculations o To mitigate potential impact to seabirds, the design will specify shielded outdoor lights in conformance with County outdoor lighting requirements o To protect low-flying, foraging bats, no barbed wire will be used for fencing. o As part of the archaeological stewardship responsibilities, construction plans should identify permanent preservation sites with the SIHP identification number and buffer zone.

	• Construction measures: o To mitigate erosion and sedimentation impacts during construction, the grading plans will specify best management practices to include things such as early construction of drainage control features; construction of temporary sediment basins to trap silt; use of temporary berms and cut-off ditches where needed; and use of temporary silt fences or straw bale barriers to trap silt. o Avoid removing or trimming woody plants greater than 15 feet tall during the Hawaiian hoary bat breeding season (June 1 to September 15). o If a bat is present at the Project site, the area will be avoided. If a bat arrives in the construction area after work begins, work will cease until the animal leaves on its own accord. o Nighttime construction during seabird fledging period (September 15 through December 15) will be avoided or USFWS will be consulted for additional minimizations measures. o All work will cease immediately and USFWS will contacted if a nest is discovered within a radius of 100 fe of proposed construction activity, or a previou undiscovered nest is found within said radius after wo begins. Biologist surveys of the area around propos construction sites will be conducted prior to the initiati of any work, or after any subsequent delay of work of thr or more days once foraging/loafing birds have be observed at the Project site. o A survey of trees within 100 meters of the Project site shall be conducted during Hawaiian hawk breeding season (March 1 through September 30) if construction activities will result in noise levels greater than 60 decibels (at 5 feet) and or vegetation clearing is proposed. Work shall be delayed if a hawk nest is found until the nest is no longer occupied. o To mitigate construction noise and dust, construction documents will include standard measures such as ensuring mufflers are in proper operating condition, limiting construction hours, and wetting down exposed surfaces. o The construction documents will include a provision that should historic sites such as walls, platforms, pavements and mounds, or remains such as artifacts,

	burials, concentrations of shell or charcoal or artifacts be inadvertently encountered during construction activities, work will cease immediately in the immediate vicinity of the find and the find will be protected. The contractor will immediately contact State Historic Preservation Division, which will assess the significance of the find and recommend appropriate mitigation measures, if necessary. o An archaeological monitor will be present during grading and ground-disturbing work in Site 2 where required by State Historic Preservation Division. o Temporary disruption of potable water service will occur during construction of some project components. Coordination and notification with affected users will be conducted prior service disruptions. Where possible, construction resulting in the disruption of water service to schools will be conducted during breaks. • Operational measures: o The existing on-site emergency generator will be operated in compliance with HAR §11-60.1-62 (d) (7) o Hazardous material containers/tanks will be secondarily contained. o Use and storage of hazardous material and/or waste will be in compliance with all applicable OSHA, EPCRA,SARA, and RCRA requirements
Determination:	Anticipated Finding of No Significant Impact

Table of Contents

APPENDICES

TABLES

FIGURES
(in Appendix A)

ACRONYMS

A.C.	Asbestos-Cement
ACOE	United States Army Corp of Engineers
AFONSI	Anticipated Finding of No Significant Impact
AIS	Archaeological Inventory Survey
ALISH	Agricultural Lands of Importance to the State of Hawai'i
BMP	Best Management Practices
CIA	Cultural Impact Assessment
CWRM	State of Hawai'i Commission on Water Resource Management
CZM	Coastal Zone Management
DAGS	State of Hawai'i, Department of Accounting and General Services
DBEDT	State of Hawai'i Department of Business, Economic Development, and Tourism
DHHL	State of Hawai'i Department of Hawaiian Home Lands
DHS	State of Hawai'i Department of Human Services
DLNR	State of Hawai'i Department of Land and Natural Resources
DOE	State of Hawai'i Department of Education
DOH	State of Hawai'i Department of Health
DOT	State of Hawai'i Department of Transportation
DPR	County of Hawai'i Department of Parks and Recreation
DWS	County of Hawai'i Department of Water Supply
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
gpd	Gallons per Day
gpm	Gallons per Minute
HAR	Hawai'i Administrative Rules
HHC	Hawaiian Homes commission
HHCA	Hawaiian Homes Commission Act, as amended
Hp	Horse Power
HRS	Hawai'i Revised Statutes
LEED	Leadership in Energy and Environmental Design
LF	Linear feet
LID	Low Impact Development
LSB	Land Study Bureau
LUC	State of Hawai'i Land Use Commission
MECO	Maui Electric Company
MG	Million Gallons
MGD	Million gallons per day
NASA	National Aeronautics and Space Administration

NHRP	National Register of Historic Places
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination Systems
NRCS	Natural Resources Conservation Service
NPS	National Park Service
OEQC	State of Hawai'i Office of Environmental Quality Control
O.F. Elev	Over-flow Elevation
PWS	Public Water Supply
RD	Rural Development
ROW	Right-of-way
SCADA	Supervisory Control and Data Acquisition System
SWCA	SWCA Environmental Consultants
SHPD	State of Hawai'i Historic Preservation Division
SMA	Special Management Area
TMK	Tax map key
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

1 INTRODUCTION

Department of Hawaiian Home Lands (DHHL) works diligently to provide safe, clean drinking water to supplied by the State of Hawai'i, DHHL Ho'olehua Water System Public Water Supply [PWS] No. 230 to native Hawaiian homesteads located in Ho'olehua-Pālā'au (Ho'olehua), Kalama'ula, and Mo'omomi. However, due to the age of the system, as well as the remote location of the island of Moloka'i, system-wide improvements are necessary. This Environmental Assessment is being prepared pursuant to the provisions of the EIS Rules relating to Draft Environmental Assessments (accompanied by an Anticipated Finding of No Significant Impact (AFONSI) (Hawaii Administrative Rules Chapter 11-200, Subchapter 10).

1.1 Landowners

The DHHL is the primary fee simple landowner and is the owner/operator of PWS No. 230. A portion of the existing PWS 230 transmission system traverses across lands owned by Moloka'i Ranch, Kualapu'u Ranch, State of Hawai'i Department of Transportation, and the Cathy Anne Barber Management Trust between Kauluwai and Ho'olehua.

1.2 Proposing/Determining Agency

DHHL is the proposing/determining agency.

Contact: Department of Hawaiian Home Lands
Land Development Division
ATTN: Jeffrey Fujimoto, Project Manager
P.O. Box 1879
Honolulu, HI 96805
Phone: (808) 620-9270 Fax: (808) 620-9299

1.3 Environmental Consultant

PBR HAWAII is the environmental planning consultant.

Contact: PBR HAWAII & Associates, Inc.
ATTN: Malia Cox
1001 Bishop Street, Suite 650
Honolulu, Hawai'i 96813
Telephone: (808) 521-5631
Fax: (808) 523-1402

1.4 Compliance with State of Hawai'i Environmental Laws

Preparation of this document is in accordance with the provisions of Chapter 343, HRS and Title 11, Chapter 200, Hawai'i Administrative Rules (HAR) pertaining to Environmental Impact Statements. Section 343-5, HRS established nine "triggers" that require either an EA or an

Environmental Impact Statement (EIS). The use of State or County lands or funds is one of these "triggers."

1.5 Studies Contributing to this EA

This report incorporates information from the following consultants:

- SWCA- Biological Resource Survey
- Pacific Legacy- Archaeological Inventory Survey
- Pacific Legacy - Cultural Impact Assessment
- Akinaka and Associates- Preliminary Engineering Report

2 PROJECT DESCRIPTION

2.1 Background Information

2.1.1 Location

The DHHL Ho'olehua Water System, Public Water System No. 230 (PWS No. 230) includes source, storage, and conveyance equipment throughout central Moloka'i. Tasks associated with actions designed to improve the water system will occur at seven discontiguous sites located in central Moloka'i. Please refer to Figure 1 (Location Map). Table 2-1 below provides a description of the locations of each Site, along with the corresponding Tax Map Keys (TMKs):

Table 2-1: Site Location Description and TMK

Site No.	Location	TMKs
1	Site #1 *(Well Site Improvements)* is located in the mauka area of the Kalama'ula DHHL lands, near the Waiakala'e Gulch.	252010003 252010007
2	Site #2 *(Kalama'ula Improvements)* is located in Kalama'ula, extending from the mauka area south of Site #1, down to the makai residential areas in 'Umipa'a and along Mauna Loa Highway to Kaunakakai.	252008001 252009012 252008002 252009016 252008005 252009018 252008006 252009999 252008046 252010001 252008079 252010004 252008091 252032068 252008102 252033047 252008122 252033048 252008123 252033061 252008999
3	Site #3 *(Kauluwai Tank and Transmission Improvements)* is located at the existing Kauluwai Tank on Kalae Highway at the northwestern corner of the Kalama'ula DHHL lands, and extends west along a transmission main to the Ho'olehua Tanks.	252007055 252013010 252007090 252012999 252010002 252012034 252013021

Site No.	Location	TMKs
4	Site #4 *(Ho'olehua Tank Site Improvements)* is located at two 3.5 MG tanks in Ho'olehua, approximately 1 km northeast and mauka of Moloka'i High School. The site also extends from the two tanks down to Pālā'au Road through lands owned by Kualapu'u Ranch.	252007076 25201300 252007077 252007029 252013020 252007030
5	Site #5 *(Ho'olehua Transmission and Fire Protection Improvements)* is located in Ho'olehua-Pālā'au, along the Ho'olehua Transmission to Moloka'i Veterans' Cemetery and Lihi Pali Avenue, and also along the Pu'ukapele Avenue Transmission Main.	25007035 252007029 22007039 25207030 252007040 252006999 252007078 252007999 252007079 252021999 252007080 252007082 252007083 252007084 252007085
6	Site #6 *(Ho'olehua Pressure Breaker Tank Facility Improvements)* is located from the intersection of Kūle'a and Mo'omomi Avenue to Farrington Avenue.	252012999
7	Site #7 *(Ho'olehua Maintenance Yard Improvements, and Scattered Valve and Hydrant Replacements)* is located at the site of the current Ho'olehua Maintenance Building, and at scattered locations across Ho'olehua-Pālā'au.	252002999 252006999 252005999 252007999 252023009 252021999 252024999 252025999

2.1.2 Existing Use

Assigned by the State of Hawai'i, Department of Health (DOH) Safe Drinking Water Branch, the DHHL Ho'olehua Water System, Public Water System No. 230 (PWS No. 230) provides water service to the DHHL communities in Ho'olehua and Kalama'ula. PWS No. 230 currently services 769 Native Hawaiian residential, agricultural, and pastoral homesteads. According to DOH, PWS No. 230 services 2,400 customers.

The existing PWS No. 230 water system consists of:

- two wells: Kauluwai Well No.1 (State Well No. 0801-01) and Kauluwai Well No. 2 (State Well No 0801-02),
- a chlorination disinfection system,

- two booster pumps,
- altitude valves,
- six storage tanks located at elevations ranging from 283 feet to 1,412 feet,
- Well Site: 21°08'45.43" N 157°00'58.93" W
- Kalama'ula Tank Site: 21°06'50.52" N 157°02'26.93" W
- Kauluwai Tank Site: 21°09'19.83" N 157°00'44.46" W
- Ho'olehua Tanks Site: 21°10'12.38" N 157°02'24.38" W
  21°10'13.88" N 157°02'24.63" W
- Ho'olehua Pressure Breaker Tank Site: 21°09'28.09" N 157°03'8.78" W
- approximately 460 fire hydrants, and
- approximately 50 miles of pipeline and associated appurtenant equipment (see Figure 2).

History of Existing Facilities

The PWS No. 230 has been providing potable water for many years. Some of the system components have been in operation for 80 years. Soon after its appointment in 1921, the Hawaiian Homes Commission (HHC) visited Moloka'i and decided to start the first Hawaiian homesteading on the coastal flats of Kalama'ula. A second, larger phase of homesteading occurred in 1924, when homesteads were opened for settlement on the upper plateau of Moloka'i, which later became known as Ho'olehua. The development of the Ho'olehua-Pālā'au Homestead area necessitated the need for much larger capital outlays of water which resulted in some of DHHL's current water infrastructure.

As DHHL's water system expanded, additions to the system were not always mapped. Eventually, the layout of the distribution system, as well as how it was interconnected with other water systems, was unknown to the current water system operators and DHHL staff. In 2007, DHHL commissioned Akinaka & Associates, Ltd. to conduct a water study and prepare the following report "Department of Hawaiian Home Lands, Moloka'i Potable Water System, Ho'olehua and Kalama'ula, Moloka'i, Hawai'i", dated June 2007, herein referred to as the "2007 Water Master Plan". The study mapped out the water systems for the PWS No. 230, the general layout of the County of Maui's Department of Water Supply System, the Moloka'i Ranch System and the State of Hawai'i Department of Agriculture's non-potable Moloka'i Irrigation System (MIS). The study also assessed specific components of the water system and recommended improvements required to provide adequate and dependable service to the Ho'olehua and Kalama'ula communities. The recommendations identified in the 2007 Water Master Plan were incorporated into this project.

Condition of Existing Facilities

The Kualapu'u Aquifer supplies water to the Ho'olehua and Kalama'ula communities. DHHL operates two wells pumping water from the Kualapu'u Aquifer (Table 2-1). Water pumped from wells is transported to six storage tanks and then distributed to PWS 230 system users.

i. *Aquifer*

The Kualapu'u Aquifer has an estimated sustainable yield of 5 million gallons per day (mgd). The Commission on Water Resource Management's (CWRM) present allocation for each well is shown below in Table 2-2.

Table 2-2: CWRM Water Permit Allocations

Date	Owner	State Well No.	Well Name	Allocation (MGD)
9/15/1993	**State DHHL**	**0801-01**	**DHHL 1 (Kauluwai #1)**	**0.367 (combined)**
9/15/1993	**State DHHL**	**0801-02**	**DHHL 2 (Kauluwai #2)**	
9/15/1993	Maui DWS	1059-01	Waikalae Tunnel	0.036
3/14/1995	***State DHHL***	***Reservation***		***2.905***
10/20/1995	Maui DWS	0801-03	Kualapu'u Mauka	0.516
12/19/2001	Kaluakoi Land, LLC	0901-01	Well #17	1.018
			Total Allocated	4.842
			Kualapu'u Sustainable Yield	5.000
			Available Allocation	0.158

Drilled in 1948, Kauluwai Well No. 1 has been in use since 1953. Its pump has a capacity of 600 gallons per minute (gpm) and utilizes a 200 horsepower (hp) motor. Kauluwai Well No. 2 was drilled in 1979 and has been in use since 1981, while Well No.2 has a pump capacity of 750 gpm and 300 hp motor. Both wells remain in good condition. The motors and pumps for both wells are replaced on a periodic basis. DHHL's current water allocation from the Kualapu'u Aquifer is 0.367 mgd. This allocation is the total daily amount from both wells combined. However, pumping records show that they are consistently pumping over their allocation to meet water demands based on existing water system storage/transmission configuration. DHHL has a 2.905 mgd reservation in the Kualapu'u Aquifer that has not yet been allocated. To date, the water quality at both the Kauluwai Wells No. 1 & 2 meet all State and Federal drinking water standards. However, rising chloride levels in water produced by the two DHHL wells due to pumping rates above 0.367 mgd have been recorded.

The Kualapu'u aquifer has been identified as a sole source aquifer by the United states Environmental Protection Agency (EPA) as the principal source of drinking water for the area. As such, a minimum of 50% of the drinking water consumed is supplied by the aquifer.

ii. *Treatment*

At the time the 2007 Water Master Plan was prepared, the Moloka'i Water System was utilizing a degraded chlorine gas facility for water treatment. Due to health and safety concerns associated with chlorine gas and the aging of the equipment, chlorine gas is not being utilized for treatment. A Sodium hypochlorite system is currently utilized for disinfection. The Sodium hypochlorite solution is injected into the well pump's discharge line connected to the storage tanks. The existing system appears to be in proper working order. Records indicate that the chlorine residual levels are consistently maintained. The system is in compliance with safe drinking water standards and no other treatments are being applied to the water system.

iii. *Storage*

The DHHL Water System has five storage tanks and one pressure breaker tank as follows:

a. 100,000 gallon (0.1 MG) Well Site Tank (O.F. Elev. = 1029.50')
Serves as storage for the two well water sources to supply water into the distribution system.

b. 1,000,000 gallon (1.0 MG) Kauluwai tank (O.F. Elev. = 1432.0')
Primarily serves as an intermediate pass-through tank to provide water to two 3.5 MG tanks servicing Ho'olehua.

c. Two 3,500,000 gallon (3.5 MG) Ho'olehua tanks (O.F. Elev. 1040.0')
Serves as water storage for users in the Ho'olehua service area.

d. 200,000 gallon (0.2 MG) Kalama'ula tank (O.F. Elev. = 247.60')
The 0.2 MG Kalama'ula tank serves as the water distribution storage tank for the Kalama'ula service area.

e. 19,500 gallon pressure breaker tank (at grade Elev. = 747.0')
The 0.0195 MG pressure breaker tank reduces pressures within the distribution system due to elevation changes.

iv. *Transmission System*

The Transmission and distribution system is comprised of water distribution lines, as well as pumps and valves to assist in movement of water throughout the system and preventing back flow conditions.

The following transmission and distribution lines transport water from the 0.1 MG Well Site Tank to the appropriate water tanks:

a. To Kalama'ula – A 12-inch main transports water from the 0.1 MG Well Site Tank down to the 0.2 MG storage tank that serves Kalama'ula. A pressure reducing

valve (PRV) is located along the transmission main near the 720' elevation (upstream pressure =180 psi, downstream pressure = 38 psi).

b. To Kauluwai – An 8-inch cast iron main transports water from the 0.1 MG Well Site Tank up to the 1.0 MG Kauluwai reinforced concrete tank.

c. To Ho'olehua – A 6-inch asbestos cement (A.C.) pipe delivers water from the 1.0 MG Kauluwai tank to the two 3.5 MG Ho'olehua tanks. Water is then conveyed from the 1.0 MG Kauluwai Tank throughout the Ho'olehua area via distribution lines located within the Farrington Avenue right-of-way and intersecting avenues. Service to the Kalama'ula area is provided from the 0.2 MG Kalama'ula Tank via a 12-inch gravity flow pipe. The water system network is shown in Figure 2.

v. *Booster Pumps*
PWS No. 230 utilizes two 100 hp, 500 gpm booster pumps and two altitude valves at the well site to pump water to the reservoirs. The water is then gravity fed into the system.

2.1.3 Surrounding Land Uses

The PWS 230 water facilities are located throughout DHHL's lands in the Kalama'ula and Ho'olehua-Pālā'au, extending from mauka water source at Kauluwai to the central plains and the southern coast of Moloka'i. The land uses in the area are rural, primarily residential and agricultural. There are also schools, parks, community centers, restaurants, and other small businesses located within the Project area. Moloka'i Airport (MKK) is adjacent to DHHL's land holdings in Ho'olehua.

2.2 Purpose and Need

DHHL works diligently to provide safe, clean drinking water to the homesteaders and the other users. However, due to the age of the system, as well as the remote location of the island of Moloka'i, improvements are necessary. In the past five years, there have been several failures that have affected system-wide delivery of water or isolated communities. The Department of Hawaiian Home Lands (DHHL) began its Regional Planning Process in 2007, at which time the community on Moloka'i identified several issues with the potable water system. In 2015, DHHL identified additional improvements that if incorporated into the Project would improve fire protection, reliability, security, health, and sanitation and decrease long-term energy costs. These projects have been incorporated into the proposed improvements to the DHHL Ho'olehua Water System, PWS No. 230, Moloka'i, Hawai'i. Agencies, organizations, and individuals previously consulted are being re-engaged for consultation based on the expanded scope of the Project.

The proposed improvements to the disinfection, storage, and distribution system will be integrated into PWS No. 230. These project actions will improve reliability and functionality, while decreasing operational energy cost of the system.

a) Health, Sanitation, Security, and Access

The proposed Project is designed to improve reliability, reduce potential for contamination and is protective of public health. The following deficiencies that affect the health, sanitation, access and security of the PWS No. 230 have been identified and are anticipated to be corrected as a result of the Project:

- *Limited Water Storage for Kalama'ula Residents*

  The existing 0.1 MG well tank located at the 283-foot elevation limits water service to both the Ho'olehua and Kalama'ula service areas. Both well sources, Kauluwai Wells No 1 and 2, pump into the 0.1 MG Well Site Tank. Water is then distributed to the 0.2 MG Kalama'ula tank and the 1.0 MG Kauluwai tank, with priority going to the 0.2 MG Kalama'ula tank During periods of high demand, the booster pump that serves the 1.0 MG Kauluwai tank could be locked out of additional water due to high demand in Kalama'ula. Additionally, fires that have previously occurred in the Kalama'ula area have been known to affect the water system's ability to supply water. Additionally, there is a risk of low pressure and vacuum conditions in the waterline that could result in contamination to the drinking water system through an increased risk of backflow conditions. The Hawai'i Administrative Rules (HAR), Title 11, Chapter 21 Backflow and Cross-Connection Control regulates the elimination or control of cross-connection and backflow conditions. Installation An additional 0.2 MG tank located at the 1,010-foot elevation would provide additional storage capacity and adequate pressure in the waterline which would help to reduce these risks.

- *Lack of Access to Kalama'ula Storage Tank*

  The existing roadway which traverses over rugged terrain routinely washes out making the 0.2 MG Kalama'ula tank inaccessible. HAR Title 11 Chapter 20§33 requires the right for entry and inspection of all public water systems. An all-weather roadway would improve accessibility of the tank to health officials and water system operators.

- *Limited Back-up Energy Capacity and High Energy Costs*

  Electrical power failures on Moloka'i occur on a fairly regular basis. DHHL installed an emergency back-up power source for use during prolonged power outages which would otherwise keep the wells out of service. This emergency back-up power source has been in operation for a few years and has responded well to prolonged power outages. The current back-up generator has a fuel storage capacity that can operate the well pumps and chlorination system for a

maximum of 24 hours. In the event of a severe electrical power failure, a sanitation crisis could occur after several days without potable water. In those situations, Title 11 HAR 19§5 requires water suppliers to execute an emergency response plan to deal with the consequential drinking water problems. Installation of additional fuel storage capacity would provide extended power for the back-up energy system under emergency situations. In addition to periodic power failures, power supplied by Maui Electric Company (MECO) accounts for more than half the operating expense of PWS230.

- *Water Stagnation*

  The 1.0 MG Kauluwai tank has approximately eight feet of unusable water storage volume as the distribution pipe from the tank is four to eight feet higher than the floor of the tank. This design also increases the potential for the storage of stagnant water in the system. Stagnant water can contribute to elevated disinfection by-products and bacterial growth within the distribution system, potentially affecting the health of water customers. Maximum contaminant levels for disinfection byproducts in community water systems are listed in Title 11 HAR 20§4. Redesign of portions of the piping will eliminate the potential for stagnant water.

- *Maintenance Equipment and Critical Components*

  Title 11 HAR 20 requires ground water systems with a significant deficiency to complete corrective actions or be in compliance with an agreed upon corrective action plan and time schedule within 120 days of receiving a written notice of deficiency. Failure to comply may result in penalties and discontinued service. The storage of critical components on island will address the normally long delivery time. This will provide operators with the materials and equipment necessary to readily maintain the system, thereby minimizing system down times and complying with local regulations.

- *Water System Security*

  Existing fencing does not restrict access to all of storage and booster tanks. The construction of fencing around the two 3.5 MG tanks in Ho'olehua and the new energy and water storage components for the well site (Site 1) are proposed to secure the facilities from unauthorized access.

- *Access*

  Currently the 0.0195MG Pressure Breaker tank, and two 3.5 MG storage tanks (site 4) in located in Ho'olehua are not accessible through DHHL lands. The tanks are accessed through lands owned by private land owners and are subject to their authorization.

In addition, while access to the 0.2MG tank at Kalama'ula is through DHHL lands, the roadway is unpaved and often washes out during heavy rains.

b) Aging Infrastructure without Automation and Limited Fire Protection

Portions of this water system have been in operation since the 1930s and 1940s. Approximately 19,000 LF of decaying pipeline has been identified. The age and subsequent deterioration of the infrastructure has made it increasingly difficult for DHHL to provide adequate water to the residents within the community without substantial upgrades to the system. This has created a high level of concern directly related to safety and water quality.

- *Distribution System Deterioration and Limited Fire Protection*

  Piping containing asbestos concrete (A.C.) is utilized in portions of the distribution system. The decay of the A.C. pipe is the main source of asbestos contamination in drinking water, potentially affecting the health of water customers. Maximum contaminant levels of inorganic chemicals including asbestos for community water systems are listed in Title 11 HAR 20§3. Replacement of the pipe would mitigate asbestos contamination and reduce health risks to the public, and also reduce water losses associated with aging A.C. pipe failures.

  The existing Ho'olehua 6-inch A.C. pipe connecting the 1.0 MG Kauluwai tank to the two 3.5 MG Ho'olehua tanks is aging and may not be able to carry pressures higher than the existing conditions. This has resulted in inadequate fire protection in portions of Ho'olehua.

  The existing waterline in Ho'olehua tanks to the veteran's cemetery and along Lihi Pali Avenue do not provide adequate fire protection and water pressure.

  The distribution system in Kalama'ula Homestead subdivision is a one way feed. As a result, there is inadequate pressure in the upper limits of the subdivision.

  The existing 1-1/4-inch galvanized waterline in Ho'olehua along Pu'ukapele Avenue does not provide adequate fire protection and water pressure.

- *Storage Tank Deterioration*

  The two 3.5 MG Ho'olehua tanks have been in operation since 1934 and several of the valves, ladders, and other appurtenant structures are rusted or non-operational.

- *Manual Operation of Water System*

  The manual operation of pumping and other water distribution activities has resulted in unintentional draining and overfilling of tanks. Connection of system components to the Supervisory Control and Data Acquisition system (SCADA) system will improve overall site security and operation by providing remote monitoring and automation of system components.

c) Reasonable Growth

This report has identified the components of the water system requiring improvement to meet the existing demands of the community. While growth on Moloka'i is relatively slow, additional upgrades to the existing water system are needed to accommodate limited future growth.

Long-range land use planning priorities were developed as part of the Moloka'i Island Plan (MIP) prepared in 2005. With a 20-year planning horizon, the MIP proposes development of 417 new residential lots on the island Moloka'i with the majority of the properties located outside the existing water systems service area. Homestead development projects within the water system service area were identified as lower priority with the exception of the 58 previously awarded Nā'iwa agriculture lots located within Ho'olehua.

The HHC recently lifted its moratorium on subdivision of agriculture and pastoral lots. Lessees residing in eligible Kalama'ula and Ho'olehua homesteads now have permission to subdivide their lots. This could potentially impact the water system by increasing water service to newly subdivided lots and residences. The project as proposed will not accommodate increased demand for water service that may be required as a result of agriculture and pastoral lot subdivisions.

d) Other Actions Proposed for PWS 230

The State of Hawai'i Department of Education has proposed two separate actions to improve distinct components of the PWS 230 system that affect Kualapu'u Public Charter School and Moloka'i High School that are not included in this document. Construction on these projects are imminent to address hydraulic issues that periodically result transient and unpredictable water loss at Kualapu'u PCS and provide adequate fire protection supply.

2.3 Project Description

A description of the tasks and activities proposed for each of the seven locations is described below:

Site #1 Well Site Improvements

1-A 200,000 Gallon Storage Tank: This task includes the installation of 200,000-gallon storage tank and ancillary equipment to connect to the existing system, excavation, and disposal of overburden/construction debris. The new tank will be located adjacent to the existing 100,000-gallon tank on a hillside at the well site. The proposed storage tank is necessary to ensure uninterrupted supply of water to Kalama'ula residents. This tank will augment, not replace existing storage facilities.

1-B Above-Ground Fuel Storage Tank (fuel AST): Currently, the water system has an emergency generator to supply electricity for pump operation when grid supplied energy is not available. The generator has fuel storage capacity to operate the generator for a maximum of 24-hours. A fuel AST would augment the existing capacity, increasing operational time of the generator during emergencies. Tasks associated with this action include the installation of a fuel AST at the well site, fuel lines connecting the tank to existing generator system, automation equipment, security fencing, excavation, and disposal of overburden/construction debris.

1-C Well Site Compound Modifications: The existing well site compound does not have adequate space to accommodate a new 200,000 gallon storage tank, chlorination facility, a fuel AST, and ancillary equipment associated with the solar energy system. Activities associated with this task include the redesign and construction of a roadway system and fencing for security and access, excavation, disposal of overburden/construction debris.

1-D Booster Pump Replacement: The existing booster pumps have reached their estimated useful life. Pump failure is a concern. This task requires the replacement of the existing booster pumps and ancillary equipment. It is anticipated that activities associated with the task will include grading, excavation, disposal of construction debris, demolition debris and overburden, as well as installation of a concrete pad, connection to the supervisory control and data acquisition (SCADA) and electrical systems as well as the existing water system. Reuse of existing site preparations such as a pre-existing concrete pad will be implemented if possible.

1-E Energy System Modifications: A one-megawatt solar system will be built on approximately seven acres within a 25-acre area at the well site identified for solar production by DHHL. This system would be comprised of approximately 3,500 to 4,000 fixed ground-mounted solar panels (depending on panel efficiency). An inverter bank will convert the DC output of the solar panels into AC that can be used to drive the existing pumps. The system will include an energy storage system to allow for pump operation at night or on cloudy days. The system will be connected to the Maui Electric Company grid for redundancy as well as to the existing diesel backup generators located at the well site. It is anticipated that the system will not export electricity to the Maui Electric Company grid. The existing electrical panels are nearing the end of their expected useful life. They

will be replaced to meet existing requirements and modified as necessary to accommodate additional solar requirements.

Site #2- Kalama'ula Improvements

2-A All-Weather Roadway to Kalama'ula Tank: The access road to the existing 200,000 gallon tank in Kalama'ula is unpaved and severely eroded, hampering access for maintenance and operations. This task will modify the existing dirt roadway with the installation of a 3,000 linear feet (LF) of all-weather roadway from Hā'ena Street to the reservoir. The new roadway will follow the existing road corridor. Tasks included in this action will include roadway excavation, disposal of overburden/construction debris in addition to construction of the asphalt concrete roadway.

2-B Kalama'ula Transmission Main and Lateral Replacements: The conveyance system in Kalama'ula is not a looping system, occasionally resulting in lower pressure, and water sitting in pipes for a longer than optimal period of time. Additionally, portions of the existing galvanized transmission lines are over 30 years old and have reached the end of their useable life. This task will include the installation of new larger capacity mains and 15 laterals along approximately 5,600 LF in Kalama'ula. Activities associated with this task will also include trench excavation, disposal of construction debris and overburden, as well as connection to the existing water transmission mains and laterals.

2-C Valves Replacement: Three Pressure Relief Valves (PRV), 20 Gate Valves (GV), 9 Air Relief Valves ARV) and associated ancillary equipment in Kalama'ula have reached the end of their useful life due in part to the harsh environmental conditions. This task will include replacing PRV, GV, and ARV valves and realigning manholes as necessary. This project will also require limited excavation at each valve site and debris disposal.

2-D Fire Hydrants: Harsh environmental conditions have reduced the life expectancy of most fire hydrants in the coastal are of Kalama'ula. Replacement of the deteriorated hydrants will improve fire protection capabilities in the areas. This task will include the replacement of approximately 30 fire hydrants.

Site #3- Kauluwai Tank and Transmission Improvements

3-A Kauluwai Tank Transmission Main: A section of the 6-inch main transmission line at the existing 1.0 MG Kauluwai tank is approximately 12 feet above the lowest portion of the tank. As a result, the water stored at the base of the tank cannot be utilized. This task would redesign and replace the lower main increasing the useable storage capacity to the tank design capacity. Some excavation and associated disposal of debris is also anticipated. It is anticipated that completion of this tank will reduce water stagnation in the bottom of the tank.

3-B Kauluwai to Ho'olehua Transmission Main: The existing main was constructed utilizing a 6-inch A.C. pipe. Integrity of the existing pipe is a concern. This task requires the replacement of 11,000 LF of piping. Activities associated with this task will also include trench excavation, disposal of construction debris and overburden, as well as connection to the existing water transmission mains and laterals.

Site #4- Ho'olehua Tank Site Improvements

4-A Ho'olehua Tank Improvements: The tanks should be modified to improve safety and automation. This task, 4-A has been subdivided into four subtasks as described below. In addition to the subtasks described, this task will include site preparation, installation of ancillary equipment and disposal of construction debris/overburden.

4-A-1 Automation of Level and Flow Control Valves: Water flow from 1.0 MG reservoir to the two 3.5 MG tanks located in Ho'olehua requires manual operation of a gate valve. Changes in demand require manual adjustments. This subtask would connect these tanks to the SCADA system and allow for automated adjustments providing more consistent water delivery. The sub-task will include construction of a new control valve vault, installation and connection of control equipment to existing system and ancillary equipment. The sub-task will also include construction of a new control valve vault, installation and connection of control equipment to existing system and ancillary equipment.

4-A-2 Replacement of Exposed Vertical Piping and Valves: Some of the exposed pipes and valves are corroded. This sub-task would assess and replace corroded ancillary equipment.

4-A-3 Exterior Ladder: The exterior ladder is unsafe. This sub-task would replace or repair the existing ladder and safety railing system to meet OSHA safety requirements.

4-A-4 Tank Repair: There are two 3.5 MG tanks located at Site #4 that were placed in operation approximately 80 years ago. While the tanks are still operational, the concrete is showing signs of wear and is crumbling in some areas. Rebar supports show substantial rusting. This sub-task would repair the tanks.

4-B All-Weather Roadway to 3.5 MG tanks: The existing access road to the 3.5MG tanks in Ho'olehua is unpaved and located on non-DHHL lands owned by Kualapu'u Ranch and subject to their authorization. This task will develop a new road within DHHL landholdings. The new roadway will extend from Pālā'au Road approximately 5,280 LF to the 3.5 MG tanks. Tasks included in this action will include grubbing, grading, roadway excavation, disposal of overburden/construction debris in addition to construction of the asphalt concrete roadway.

4-C Fencing: Existing fencing does not completely restrict access to the area surrounding the tanks. Additionally, the large grassy areas surrounding the 3.5 MG tanks can limits the capability of a standard six-foot high fence from restricting deer. Security as well as health and sanitation of water stored at the tank may be compromised with unauthorized access by trespassers and/or deer to the areas in and around the tanks. This task will include the removal of the existing fences, excavation, installation of minimum 8 foot tall deer deterrent fencing, and disposal of overburden/construction debris.

Site #5- Ho'olehua Transmission and Fire Protection Improvements

5-A Ho'olehua to Veterans' Cemetery to Lihi Pali Avenue Transmission Main: The existing water transmission main is comprised of a mix of one to three inch pipes of various materials. It does not extend to the Veterans' Cemetery, nor does it provide service to several homesteads along the northern extent of Lihi Pali Avenue. This task would include the replacement of the existing main and extend service to Veterans' cemetery and then on to Lihi Pali Avenue with approximately 11,000 LF of 8-inch main. Activities associated with this task will also include trench excavation, disposal of construction debris and overburden, as well as connection to the existing water transmission mains and laterals.

5-B Fire Protection: The Veterans' Cemetery as well as the homesteads in this section of Ho'olehua do not have fire protection. This task would improve brush fire protection as well as provide fire protection for existing homes in the vicinity through the installation of 17 fire hydrants between Ho'olehua and the Veterans' Cemetery. Tasks included in this action will include excavation, disposal of overburden/construction debris in addition to the installation of fire hydrants.

5-C Pu'ukapele Transmission Main: The existing 1.25 inch galvanized transmission line is over 30 years old and has reached its useable life. Main breaks interrupt service to the areas. This task includes the replacement of approximately 3,350 LF of transmission main and laterals, and the installation of two new fire hydrants. Activities associated with this task will also include trench excavation, disposal of construction debris and overburden, as well as connection to the existing water transmission mains and laterals not being replaced.

Site #6- Ho'olehua Pressure Breaker Tank Facility Improvements

6-A All-Weather Roadway to the Pressure Breaker Tank: The existing access road to the 19,500 gallon pressure reducer tank in Ho'olehua is unpaved and inaccessible during heavy rains. This task will modify an existing dirt roadway. Approximately 7,920 linear feet (LF) of all-weather roadway will be installed from the intersection of Kūle'a and Mo'omomi Avenue to Farrington Avenue. The new roadway will follow an existing, overgrown road corridor. Tasks included in this action will include grubbing, grading, roadway excavation, disposal of overburden/construction debris in addition to construction of the asphalt concrete roadway.

6-B Ancillary Equipment Improvements: Several of the equipment located at the Pressure Breaker Tank Facility such as the butterfly valves have reached the end of their useful life. This task will replace equipment in kind. This project may include limited excavation, disposal of demolition/construction debris and replacement of equipment.

Site #7- Ho'olehua Maintenance Yard Improvements, and Scattered Valve and Hydrant Replacements

7-A Valve and Hydrant Replacement: Seven Pressure Relief Valve (PRV), seven Gate Valves (GV), five In-line Valves (IV)11 Air Relief Valves (ARV), up to five fire hydrants and associated ancillary equipment in Ho'olehua have reached the end of their useful life. This task will include replacing hydrants, PRV, GV, IV, ARV valves and realigning manholes as necessary. This project will also require limited excavation at each valve site and debris disposal.

7-B Maintenance Yard Improvements: The Maintenance Building, built in 1969 is not large enough to house necessary equipment and materials needed to maintain the water system. Based on an evaluation of the existing structure, the deterioration of support structures dictated building replacement rather than expansion of the existing. This task will include the demolition of the existing structure, re-use of the existing concrete pad and expanding it to accommodate a 4,800 square foot warehouse type facility. A fire hydrant and water meter will be installed to provide fire protection for the building and surrounding DHHL lands. An additional concrete pad, up to 2,400 square feet, will be constructed to accommodate outside storage, loading, unloading, and parking. Tasks included in this action will include grubbing, grading, excavation, disposal of demolition, overburden, and construction debris as well as the installation of fire hydrant and ancillary equipment and construction of the building and concrete pad. The purchase and storage of supplies and equipment necessary to maintain PWS230 are also included within this project task.

2.4 Development Timetable and Preliminary Costs

A total design and construction cost is estimated at $25,203,865. The estimated cost to design and construct the proposed Project follows in Table 2-3. The design of the Project is expected to take approximately 12 to 18 months after entitlement process is completed. Construction can be completed within 2 years provided work at all seven sites are done concurrently or within 10 years if construction at each Site is done consecutively. The actual phasing of the project has not been determined. The phasing plan will be developed during Project design to maximize efficiency and economies of scale. Coordination with major water users will be conducted during the Project design.

Table 2-3: Preliminary Cost Estimate and Annual Operation/Maintenance Costs

Site	Preliminary Estimated Costs	
	Design	Construction
1	$668,000.00	$6,472,500.00
2	189,750.00$	$2,813,550.00
3	$423,000.00	$3,635,000.00
4	$170,200.00	$1,212,100.00
5	$230,000.00	$5,293,000.00
6	$145,000.00	$1,056,150.00
7	$70,350.00	$2,825,265.00
Total Sites 1-7	*$1,896,300*	*23,307,565*
Total Design and Construction Cost		***$25,203,865.00***

3 DESCRIPTION OF THE NATURAL ENVIRONMENT, POTENTIAL IMPACTS, AND MITIGATION MEASURES

This section describes existing conditions of the natural environment, potential impacts related to the improvements to the Ho'olehua Water System (PWS 230), and mitigation measures to minimize impacts.

3.1 Climate

The Project consists of seven discontiguous sites located at native Hawaiian homesteads in Ho'olehua-Pālā'au (Ho'olehua), Kalama'ula, and Mo'omomi, in central Moloka'i. Average monthly temperatures range from 71°-78° Fahrenheit in the makai areas of Kalama'ula, and 68°-75° F in the mauka areas of Ho'olehua. The area receives its comfortable temperatures from prevailing trade winds from the northeasterly direction, which are present approximately 70% of the time (Fletcher III, Grossman, Richmond, & Gibbs, 2002). During Kona weather conditions, the winds blow from a southerly direction. Rainfall averages approximately 15" annually in the makai areas of Kalama'ula, and 35" annually in the mauka areas of Ho'olehua. Most precipitation occurs from October to April (Giambelluca, et al., 2014).

POTENTIAL IMPACTS AND MITIGATION MEASURES

No negative impacts are anticipated. The project will however have a positive impact on the State of Hawai'i's climate change mitigation efforts. PWS 230 is one of the largest MECO energy consumers on Moloka'i. By converting from MECO supplied power (utilizing diesel fuel) to solar power, the Project will reduce fossil fuel consumption on Moloka'i. The proposed 1MW solar field will replace MECO as the primary energy source utilized to operate the water pumps at the well site (Site 1). This will improve DHHL's energy efficiency, self-sufficiency, and significantly reduce carbon emissions[2] associated with PWS 230's operations.

3.2 Geology and Topography

The Project's seven sites are located within central Moloka'i on the western and southwestern slopes of Wailau, the East Moloka'i Volcano, an extinct shield volcano that last erupted 1.3 million years ago. Flows from Wailau make up the eastern two-thirds of the island of Moloka'i. The seven sites can be broken into two areas with Site 1 and 2 in Kalama'ula and the remaining sites (3-7) in Ho'olehua--Pālā'au. The seven sites are located at various elevations, ranging from sea level at Site 2 to approximately 1,400 feet at Site 3.

Sites 1 and 2, located in Kalama'ula, span an area mauka to makai on a south-southwest axis through gulches and hilly terrain.

[2] Under current conditions, a majority of the emissions from energy consumed for PWS230 operations occur at the MECO power plant, not at Site 1, the well site. The requirement for MECO supplied energy will be reduced, by this project thereby reducing that portion of MECO emissions.

Sites 3 through 7 are located in an area that slopes in a westerly direction from mauka down into Ho'olehua-Pālā'au on the relatively flat and gently sloping terrain of the Ho'olehua Saddle[3] (University of Hawai'i at Mānoa, School of Ocean and Earth Science and Technology, 2015).

POTENTIAL IMPACTS AND MITIGATION MEASURES

The Project will include grading to achieve a level area for the installation of a new 200,000 gallon water tank at Site 1 and will affect the topography within the immediate area of the well site. It is not anticipated to have any negative impacts on the stability of the region's geology. The overall topography of the Project surrounding areas will remain the same.

This is a mitigable impact. All grading will be in conformance with the Maui County Grading Ordinance. The hill cut associated with the installation of the 200,000 gallon water tank at Site 1 will be designed by civil engineers in a manner to ensure the long term stability of the slope. To minimize potential impacts, grading will be segmented and exposed areas will be immediately grassed or landscaped before commencement of grading in the next phase.

3.3 Soils

Three soil suitability studies prepared for lands in Hawai'i describe the physical attributes of land and the relative productivity of different land types for agricultural production; these are: 1) the U.S. Department of Agriculture Natural Resource Conservation Services (NRCS) Soil Survey; 2) the University of Hawai'i Land Study Bureau (LSB) Detailed Land Classification; and 3) the State Department of Agriculture's Agricultural Lands of Importance to the State of Hawai'i (ALISH) system.

Natural Resource Conservation Service Soil Survey

The U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) identifies a range of soil classifications within the seven Sites (see Figure 2). Table 3-1 provides a more detailed description of the soil series identified with the Project.

Site 1 consists of soils from the Oli (OME), Naiwa (NAC3), and Rough Broken Land (rRR) series, and has erosion potentials that are moderate to severe.

The mauka areas of Site 2 are on Rock Land (rRK), Very Stony Land (rVT2), Moloka'i series (MuB, MuC, MvD3), and Holomua series (HvB3, HvC3), which have moderate to severe erosion potentials. Meanwhile, the makai areas of Site 2 are on soils in the Mala (MmA, MmB), Jaucas (JaC), Kealia (KMW), and Marsh (MZ) series, which have slight to moderate erosion potentials.

[3] The Ho'olehua Saddle is a broad isthmus between the Wailau and Maunaloa Volcanoes.

Site 3 primarily runs through soils in the Naiwa (NAC) and Rough Broken Land (rRR) series, but also runs through soils belonging to the Hoolehua (HzA), Kalae (KcB, KcC3), and Kawaihapai (KlcB) series. The erosion hazard on these soils ranges from slight to severe.

Site 4 is located on Kalae (KcB) series soils, while Site 5 consists of soils in the Kalae (KcB, KcC) Lahaina (LaB, LaC), Hoolehua (HzB), and Moloka'i (MuB) series, which all have moderate erosion potentials.

Site 6 runs through soils in the Hoolehua (HzA, HzC), Kalae (KcB, KcC3, KcD3), Kawaihapai (KlcB), Lahaina (LaA, LaB, LaD3), and Moloka'i (MuB, MuC, MuD3) series, which have slight to severe erosion potentials.

Site 7 is located on soils in the Hoolehua (HzA), Kalae (KcB, KcD3), Lahaina (LaA, LaB, LaC), and Moloka'i (MuA, MuB, MuC, MuC3, MvD3) series. The erosion potential of these soils ranges from slight to severe. A more detailed description of each of the soil series is provided in Table 3-1: Soil Series Description.

Aside from the Rough Broken Land, Very Stony Land, and Rock Land, most of the soils on these sites are well-draining with moderate to moderately rapid permeability. Storm water runoff ranges from slow to medium. The surface layer generally consists of strong to medium acid soils that are dark reddish-brown silty clay and are typically around 15 inches thick.

Areas with these soils primary uses are wildlife habitat and woodlands, as well as pastures, sugarcane and pineapple production.

Table 3-1: Soil Series Description

Series	Series Description
Holomua Silt Loam	Consists of deep, well drained soils that formed in material weathered from basic igneous rock influenced by volcanic ash. Occurs at elevations between 100 and 1,000 feet, with mean annual rainfall of approximately 18 inches.
Hoolehua Silty Clay	Present in depressions and drainage-ways, developed in old alluvium. The subsoil is subangular blocky silty clay and silty clay loam and is 45 to 57+ inches thick.
Jaucas Sand	Consists of very deep, excessively drained, very rapidly permeable soils on vegetated beach areas along the sea coast. Formed in calcareous sand deposits, in sand-sized fragments of coral and sea shells.
Kalae Silty Clay	Upland soils, developed from material weathered from igneous rock. Upper part of subsoil, about 26 inches thick, is subangular blocky silty clay compact in place. Lower part of subsoil, about 21 inches thick, is silt loam. Substratum is silt loam and soft weathered rock. In many places, gravelly, relatively soft rock fragments have been brought in the surface layer through cultivation and erosion.

Series	Series Description
Kawaihapai Silty Clay Loam	Soils in drainage-ways and on alluvial fans along coastal plains, formed in alluvium derived from basic igneous rock in humid uplands. Occurs at 750 to 1,750 feet, and annual rainfall amounts to 40-55 inches.
Kealia Silt Loam	Consists of deep, poorly drained soils that formed in alluvium, and are characterized by slow to very slow runoff and moderately rapid permeability. Found on low coastal plains, with mean annual rainfall of approximately 20 inches.
Lahaina Silty Clay	Upland soils, developed in material weathered from basic igneous rock. Some areas underlain by consolidated sand at a depth below 30 inches. Cobblestones are common in the surface in a few places, while in some places near the coastal plains, the profile contains fragments of coral, stones, gravel, or sand. The subsoil is subangular blocky silty clay and silty clay loam about 45 inches thick over soft, weathered basic igneous rock.
Mala Silty Clay	Consists of well drained soils that formed in recent alluvium. Found on bottoms of drainage-ways and on alluvial fans on coastal plains. Underlain by coral sand or weathered rock at depths of more than 40 inches. Pebbles and stones are found throughout the soil, which is highly stratified. Mean annual rainfall is about 15 inches.
Marsh	Consists of very poorly drained soils found in marshes at elevations of up to 800 feet. Top layers of mucky peat to depths of 0 to 60 inches, with frequent flooding.
Moloka'i Silty Clay Loam	Consists of very deep, well drained soils that formed in material weathered from basic igneous rock. Found on uplands at elevations from near sea level to 1,500 feet, with mean annual rainfall at about 25 inches.
Naiwa Silty Clay Loam	Upland soils, developed in volcanic ash and material weathered from basic igneous rock. Surface layer is dusky-red silty clay loam about 11 inches thick. The subsoil, about 30 inches thick, is subangular blocky silt loam and loam over a weathered basic igneous rock. In areas of severely erosion, 75% of the original surface layer and in some places part of the subsoil have been removed.
Oli Silty Loam	Moderately deep to deep upland soils, developed in volcanic ash deposited over basic igneous rock. The surface layer, about 13 inches thick, is dark-brown silt loam and loam. The substratum is slightly weathered hard rock.

Series	Series Description
	The soils are easily eroded because it is very friable and powdery.
Rock Land	Consists of pahoehoe lava flows, occurring on mountain sides. Runoff is rapid, and erosion hazard is very severe. Soils are 0-8 inches deep over lithic bedrock of basalt parent material.
Rough Broken Land	Steep land broken by numerous intermittent drainage channels, occurring in gulches and mountain sides. Runoff is rapid, and geologic erosion is active. Soils are 20 to 60+ inches deep over soft, weathered rock. Some weathered rock fragments are mixed with the soil material. Small areas of rock outcrop, stones, and soil slips are common.
Very Stony Land, Eroded	Large areas of severely eroded soils. About 50 to 75% of the surface is covered with stones and boulders. In most places, it is less than 24 inches deep to bedrock, but deeper in a few low-lying areas.

Source: (Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture, 2015)

Land Study Bureau Detailed Land Classification

The University of Hawai'i Land Study Bureau (LSB) developed maps and publications to provide an analysis of lands and their suitability for agricultural production. A range of factors including soils, geology, topography, climate, and water resources were analyzed, and a rating scheme for assessing overall agricultural productivity was developed. Lands are classified from "A" to "E" according to their agricultural suitability with "A" indicating a master productivity rating of "Very Good," and "E" indicating a rating of "Very Poor" for agricultural uses. The State Land Use Law (HRS Chapter 205) considers Class A and B soils to be prime farmland.

The soils of Site 1 are classified as D and E ("Poor" and "Very Poor"). The mauka areas of Site 2 are also on soils classified as D and E, while the makai areas are rated A ("Very Good") and E. The remaining sites (Sites 3-7) are located on lands with C ("Fair"), D, and E soils. Land classification of project lands are identified in Figure 4.

Agricultural Lands of Importance to the State of Hawai'i (ALISH)

ALISH maps were prepared by the State Department of Agriculture in 1977 to determine the agricultural importance of agricultural property within the State of Hawai'i. There are three ALISH designations: Prime, Unique, or Other Agricultural Land. Prime Agricultural Land is defined as "land best suited for the production of food, feed, forage, and fiber crops." This class of land has the soil quality, growing season, and moisture supply needed to economically

produce sustained high yields of crops when treated and managed (including water management) according to modern farming methods. Prime Agricultural Land produces the highest yields with the lowest inputs of energy or money, and with the least damage to the environment. Lands designated as Unique or Other Agricultural Land are successively less productive soils. Lands that do not meet the criteria for the designations, Prime, Unique or Other Agriculture Land are not considered to have important agricultural properties.

A majority of the lands located within Sites 1 and 2 are in areas without ALISH designations. However, portions of both Sites 1 and 2 meet the ALISH designation Other. Site 3 includes lands designated as Prime and Other by ALISH as well as undesignated lands. Sites 4 and 5 are located entirely on lands designated as Prime. Site 6 includes Prime, Other and undesignated lands based on the ALISH criteria. Site 7 is located primarily on Prime ALISH lands, but also includes Other ALISH and lands not designated by ALISH. The location of ALISH lands within the Project boundaries are shown on Figure 5 and summarized on Table 3-2.

Table 3-2: ALISH Designations by Site

	Prime	Unique	Other	No Designation
Site 1			●	●
Site 2			●	●
Site 3	●		●	●
Site 4	●			
Site 5	●			
Site 6	●		●	●
Site 7	●		●	●

POTENTIAL IMPACTS AND MITIGATION MEASURES

No impact is anticipated. Based on soil suitability, the majority of the Sites are on lands that are not considered prime agricultural land. The LSB ratings of C, D, and E for most of the Sites correspond to the NRCS rating of "not prime farmland", irrespective of ALISH's ratings.

The proposed tasks within Sites 3 and 5 designated as prime are replacing existing water transmission mains. These areas are not currently in agriculture production[4] and are overgrown

[4] Lands in Ho'olehua were once used for pineapple production; however a majority of commercial pineapple production in the area ended by 1983.

primarily with naturalized non-native vegetation. Upon completion of tasks, Site 3 will be allowed to re-vegetate. In addition to water transmission main replacement, Site 5 will include the installation of 17 fire hydrants. A small area including and surrounding each fire hydrant (approximately 20 ft^2/hydrant) will not be re-vegetated. Wild fire is a natural hazard due to the brush on Site 5 (see Figure 6). The hydrants are necessary to provide fire protection for the homesteads and the surrounding area.

The Project as proposed will allow DHHL to provide to eligible native Hawaiians a clean and safe environment with the improvements, including water and fire protection, installed in conformance with appropriate State and County standards.

There will be an estimated loss of approximately 340 ft^2 (0.008 acres) of lands identified as "Prime." Mitigation measures are not required for the installation of fire hydrants required for fire protection of houses and agricultural activities in the area.

3.4 Hydrology

The project sites are located in six different watersheds: the Kaunakakai, Kalama'ula, Manawainui, Kāluape'elua, Mane'opapa, and Mo'omomi Watersheds. A watershed area captures rainfall and atmospheric moisture from the air and allows the water to percolate into underground aquifers or enter stream channels, eventually draining to the ocean. The Kaunakakai, Kalama'ula, Manawainui, and Kāluape'elua Watersheds all drain to the south shore of central Moloka'i, while the Mane'opapa, and Mo'omomi Watersheds drain towards the north. None of the affected watersheds contain perennial streams (Hawai'i Institute of Marine Biology, 2015).

Site 1 is located in the Manawainui Watershed. Site 2 is located primarily in the Kalama'ula Watershed, and also crosses into the Manawainui and Kaunakakai Watersheds. Site 2 is located entirely in the Kalama'ula ahupua'a. Site 3 crosses the Manawainui, Kāluape'elua, and Mane'opapa Watersheds (and the Kahanui, Nā'iwa, Pālā'au, and Ho'olehua ahupua'a). Site 4 is located in the Mane'opapa Watershed and the Ho'olehua ahupua'a. Site 5 is located entirely in the Mane'opapa Watershed, and crosses from the Ho'olehua ahupua'a into Pālā'au. Site 6 is located in the Mane'opapa and Kāluape'elua Watersheds, and the Pālā'au and Ho'olehua ahupua'a. Site 7 is located primarily in the Mane'opapa Watershed, but with additional locations in the Kāluape'elua and Mo'omomi Watersheds, as well. Site 7 is located in the Ho'olehua and Pālā'au ahupua'a. Table 3-3 identifies the watershed(s) where each of the Project Sites is located.

Table 3-3: Watersheds

	Kaunakakai	Kalama'ula	Manawainui	Kāluape'elua	Mane'opapa	Mo'omomi
Area of watershed:	9.27 sq. mi.	9.12 sq. mi.	14.03 sq. mi.	14.21 sq. mi.	13.76 sq. mi.	11.45 sq. mi.
Site 1						
Site 2						
Site 3						
Site 4						
Site 5						
Site 6						
Site 7						

Source: (Hawai'i Institute of Marine Biology, 2015)

Surface Water

Hardened access roads and other improvements are anticipated to increase impervious areas within Sites 1, 2, 4, 6, and 7. It is anticipated that actions will increase the impervious surface area in central Moloka'i by approximately 4.8 acres.

At Site 1 a new access road is proposed with a footprint of approximately 0.1 acres (440 linear feet x 12-ft wide). Additional impervious surfaces proposed at Site 1 include fuel AST (approximately 0.009 acres) and a 0.2 MG reservoir (approximately 0.054 acres), with an overall impervious area of approximately 0.2 acres.

Site 2 currently has a compacted dirt access roads leading to the Kalama'ula Tank. Due to the steep terrain and compaction, the existing road is semi-pervious. Runoff typically sheet flows downhill towards the ocean, rather than being absorbed within the compacted dirt road. Approximately 3,000 LF of roadway is proposed to be replaced by a 12-ft roadway made of asphaltic concrete, resulting in approximately 0.8 acres of impervious surface.

At Site 4 will include an asphaltic concrete access road approximately 5,280 LF long, 12-ft wide is proposed, resulting in approximately 1.5 acres of impervious surface.

Site 5 will include the installation of 17 new fire hydrants. Each hydrant and appurtenant stabilization pad will cover up to 20 ft^2 with an overall impervious surface area of 0.008 acres.

At Site 6, an asphaltic concrete access road approximately 7,920 LF long, 12-ft wide is proposed, resulting in approximately 2.2 acres of impervious surface.

Site 7 will include the replacement of the existing storage building with a new building 2,400 square feet larger than the existing. In addition, a 2,400 concrete pad is also being proposed. These improvements are anticipated to increase the impervious surface area by 0.1 acres.

The remainder of the tasks described in Section 2.3, Project Description, are located underground, or within existing hardened areas and will not result in a net increase to the impervious surface area.

Wetlands

Pursuant to the Section 404 of the Clean Water Act, a permit from the U.S. Army Corps of Engineers is required whenever material is dredged or discharged in "Waters of the United States." A wetlands map, using U.S. Fish and Wildlife Service (USFWS) data, does not indicate any wetland features within Sites 1 through 7. However, two freshwater emergent wetlands are indicated to be within 500 feet and down-gradient of Sites 3, 4, and 5.

Sites 2, 3, and 6 cross multiple riverine non-perennial stream channels. Makai portions of Site 2 are located within 100 feet of estuarine/marine wetland and freshwater forested/shrub wetland, and within 700 feet of freshwater emergent wetland. Maps of the National Wetlands Inventory are depicted in Figure 6.

Ground Water

The project area overlies the Moloka'i Aquifer[5], a designated sole source aquifer. In addition, the Project will make substantial modifications to an existing public water system. For most of the soils at the sites, the depth to groundwater is more than 80 inches according to the soil survey (Natural Resources Conservation Service, United States Department of Agriculture, Accessed September 2015). However, at the makai portions of Site 2, the depth to groundwater for the Kealia soil is about 12 to 42 inches, and about 0 inches for the Marsh soil.

POTENTIAL IMPACTS AND MITIGATION MEASURES

Surface Water

Site work includes earthwork activities that will expose soil creating opportunities for runoff and erosion. Trenching, grading, and stockpiling of soil will be performed in accordance with erosion control ordinances of the County, as well as approved grading plans.

The project will result in an increase impervious surface areas affecting draining and percolation.

[5] The Kualapu'u Aquifer is also been referred to as Molokai Aquifer, primarily by the US EPA.

In the short-term, there may be a slight increase in the impermeable surface area due to construction. Upon completion of the Project, a majority of the new facilities will be located underground or within existing road rights of way. The above ground facilities are anticipated to decrease permeability on 4.8 acres within the Project boundaries. Any increase in runoff will be accommodated by infiltration on DHHL property. During the design phase of the Project, a drainage plan will be developed to ensure that run-off quality and quantity are not impacted by the new roadways (Sites 2, 4, and 6), well site (Site 1) configuration, and new fire hydrants (site 5).

Best Management Practices (BMPs) for erosion and drainage control during and after construction will be prepared for review and approval by the County Department of Public Works. In addition, this project will disturb greater than one acre; therefore, a National Pollution Discharge Elimination System (NPDES) General Permit for construction activities will be required.

No other mitigation measures are required.

Wetlands

No wetlands are located within the Project sites. The task proposed will not result in the filling, dredging, or discharging into wetlands.

Storm water runoff has the potential to increase non-point source pollutant load of down-gradient wetlands and waterways. None of these wetlands have been listed as impaired in the Hawaii Water Quality Monitoring and Assessment Report[6] a report identifying 303(d) listed water bodies. The project is not expected to result in adverse impacts.

On March 30, 2012 and again on October 30, 2015, DHHL submitted letters to USFWS indicating that no wetlands or riparian areas identified on the National Wetlands Inventory Mapper were located within the Project boundaries. DHHL requested a response within 30 days. As of January 6, 2016 USFWS has not provided any comments regarding wetlands.

On September 16 2015, DHHL submitted a letter to the U.S. Army Corp of Engineers (ACOE) requesting a review of the Project area to determine if wetlands would be affected. A response was received from ACOE dated, October 28, 2015. It stated the following:

> *"Based on our initial review of the information provided, it appears there may be waters of the U.S. on the project site....Depending on the circumstance of your project, a permit may be required from this office prior to commencing proposed work. Accordingly, we recommend the landowner or the authorized agent continue coordination of the development of this project with our office."*

[6] The latest report (released as a draft in April 2014) has been submitted, but not yet approved as final by the US EPA but was utilized as it contains the most current data.

As part of the NPDES permit requirements, best management practices will be imposed during construction to ensure down-gradient wetlands are not impacted. DHHL will continue to work with ACOE for further clarification regarding waters that may be located within the Project area. Coordination with the ACOE will continue through design and construction to ensure all required permits are obtained and compliance is maintained. No other mitigation measures are required.

Ground Water

The project includes improvements to the storage and distribution system of an existing public water system. Information required by the Ground Water Office, EPA region IX under provisions to the Safe Drinking Water Act (SDWA), Section 1424(e) was submitted on March 30, 2012. At the request of the EPA, additional information regarding the above ground storage tank was submitted on April 26, 2012. In an email dated May 8, 2012, the Ground Water Office stated, "It does not appear that the proposed project will adversely affect the Moloka'i aquifer." Correspondence pertaining to SDWA Section 14249(e) is included in Section 5, Correspondence. On October 30, 2015, the groundwater office was contacting again to provide a project update. No additional response was provided.

The DOH-Safe Drinking Water Branch (SDWB) was provided with information regarding the proposed improvements in 2012 and 2015. In a letter dated April 10, 2012, SDWB indicated that the Project will include substantial modifications to an existing public water system; therefore, approval from the Director of Health is required. In a subsequent response letter dated October 29, 2015, SDWB requested construction plans be submitted for review.

The County Department of Public Works (DPW) was provided with information regarding the proposed improvements. In a letter dated April 17, 2012 DPW recommended coordination with the County Department of Water Supply (DWS). DPW indicated they had no additional comments in their October 5, 2015 letter.

The State of Hawai'i, Department of Human Services (DHS) was also provided information regarding the proposed improvements in 2015. In a letter dated October 1, 2015, DHS stated, "...there may be registered child care homes that may be impacted by the repair and replacement of the water mains and tanks...."

DHHL will submit construction plans for review and approval by DOH-SDWB prior to construction and will comply with Hawaii Administrative Rules, particularly Section 11-20-30 regarding "New and modified public water systems."

DHHL will also coordinate with DWS and advise system users in advance of system outages relating to construction activities. Coordination may allow the County system to temporarily support the Ho'olehua Water System, PWS No. 230 project when the system is down or under repair. It will also help with timing system repairs so that at least one of the systems in online.

No other mitigation measures are expected.

3.5 Natural Hazards

Moloka'i is susceptible to potential natural hazards, such as flooding, tsunami inundation, hurricanes, earthquakes, and wildfires. The State of Hawai'i Department of Defense, Office of Civil Defense in cooperation with the Maui Civil Defense Agency administer various civil defense programs and warning systems that alert the public of emergencies and natural hazards, particularly tsunamis and hurricanes and provide post disaster recovery.

Since 1982, Hawai'i has been affected twice by devastating hurricanes, 'Iwa in 1982 and 'Iniki in 1992. Earthquakes in the Hawaiian Islands are associated with volcanic eruption or tectonic movement. Moloka'i is periodically subject to episodes of seismic activity of varying intensity due to its location in the Moloka'i Seismic Zone and proximity to the active volcanoes on Hawai'i island. Each year, thousands of earthquakes occur within the State however the vast majority are detectable only with highly sensitive instruments. Moderate earthquakes occasionally occur in the islands; however most cause little or no damage.

Moloka'i has also experienced tsunamis caused by earthquakes from around the Pacific Rim and from the Island of Hawai'i. The travel time of tsunamis from distant sources can be over ten hours, while those originating on Hawai'i Island can arrive within minutes. The last four tsunamis that had a damaging effect on either Moloka'i or neighboring Lana'i occurred during the period 1924 to 1960. During this time, a damaging tsunami occurred once every 9 years. However, since 1960, no damaging tsunamis have affected either island (Fletcher III, Grossman, Richmond, & Gibbs, 2002).

Flood hazards are primarily identified by the Flood Insurance Rate Map (FIRM) prepared by the Federal Emergency Management Agency (FEMA) (Figure 8). Most of the sites are located within Zone X, areas outside the 500-year floodplain. However, approximately 3.3 acres of makai portions of Site 2 are located in identified flood hazard areas. This includes 1.6 acres in Zone AE Floodway; 0.6 acres in Zone A (100-year flood with no base flood elevations); 0.9 acres in Zone AE (100-year flood with BFE); and 0.2 acres in Zone XS (500-year flood).

The .Hawaiian Islands are also vulnerable to wildland fires (especially during the summer months, prolonged drought and/or high winds). The greatest danger of fire is where wildland (trees and brush) border urbanized areas. A great majority of wildfires are human-caused (intentionally caused or by negligence) and often start along roadsides. Wildfires can and do also occur naturally. The dry climate in Kalama'ula makes it particularly susceptible to wildfires.

POTENTIAL IMPACTS AND MITIGATION MEASURES

No impact is anticipated. Most of the Project sites are located inland, away from potential coastal hazards. However, some proposed actions within the makai portion of Site 2 are located in the tsunami evacuation zone. None of these actions are being constructed for human occupation. With the exception of the replacement of fire hydrants, all Site 2 activities are either at or below grade.

As portions of the Project are located in Flood Hazard Zones, compliance with rules and regulations of Title 44 of the Code of Federal Regulations (CFR) and Maui County Code is necessary. The proposed actions located in these flood hazard areas (replacement of existing transmission pipes, in-line valves, and fire hydrants) will replace aging equipment, reducing potential for leaks that can exacerbate naturally occurring flooding.

The proposed construction activities include excavation and grading; consequently, Special Flood Hazard Permit requirements apply, as specified by Chapter 19.62 of the Maui County Code for Flood Hazard Areas and 44 CFR 59.1.

3.6 Flora and Fauna

Biological surveys were conducted by SWCA Environmental Consultants (SWCA) in November 2011 and September 2015 (see Appendix C)

The vegetation types and species identified during the surveys are not threatened, endangered, or candidate species. In all, 126 plant species were recorded during the 2015 survey, and 94 plant species were recorded in the 2011 survey. Of these, eight species are native to the Hawaiian Islands: 'ākia (*Wikstroemia oahuensis* var. *oahuensis*), kou (*Cordia subcordata*), naupaka (*Scaevola taccada*), 'ilima (*Sida fallax*), 'a'ali'i (*Dodonaea viscosa*), hau (*Hibisicus tiliaceus*), milo (*Thespesia populnea*), and 'uhaloa (*Waltheria indica*). None of these species are considered rare. In addition, four Polynesian-introduced species were recorded: kukui (*Aleurites moluccana*), 'ihi'ai (*Oxalis corniculata*), coconut or niu (*Cocos nucifera*), and ti (*Cordyline fruticosa*). Three main vegetation types were identified in the survey area: 1) mixed non-native forest, 2) ruderal, and 3) ornamental landscaping. Host plants favored by the Blackburn's sphinx moth (*Manduca blackburni*) lava were not observed during either survey.

The fauna in the survey site areas are predominantly non-native birds and mammals common throughout Moloka'i and the main Hawaiian Islands. The only state or federally listed animal species detected by SWCA was the endangered Hawaiian hoary bat *(Lasiurus cinereus semotus*), which was detected with an ultrasonic bat detector at Site 3 (Kauluwai Tank and Transmission Improvements), in the vicinity of the pipeline replacement near the Ho'olehua tanks, during the 2011 survey. No evidence of bat roosting was observed within the Project area.

Besides the endangered Hawaiian hoary bat, the only native vertebrate species recorded by SWCA during the surveys is the Pacific golden plover (*Pluvialis fulva*), which is abundant throughout Hawai'i and uses a variety of habitats including mudflats, lawns, and rooftops. This species does not nest in Hawai'i.

The project area falls within the breeding range of the endangered Hawaiian goose (*Branta sandvicensis*), and although this species was not observed during the survey, it may be present in the vicinity of the proposed project area. Other avian species that were not detected or observed during the surveys but may be found in the area include the threatened Newell's

Shearwater (*Puffinus auricularis newelli*) and the endangered Hawaiian Petrel (*Pterodroma phaeopygia sandwichensis*), Hawaiian Coot (*Fulica alai*), and Hawaiian Hawk (*Buteo solitaries*).

POTENTIAL IMPACTS AND MITIGATION MEASURES

The proposed project is not expected to have a significant adverse impact on any state or federally listed candidate, threatened, or endangered plant or animal species; species of concern; and/or rare plants or animals (see Figure 9).

To avoid the unintentional introduction or transport of new terrestrial invasive plant species to Moloka'i during this project, all construction equipment and vehicles arriving from outside of Moloka'i should be washed and inspected, and, when possible, raw materials (e.g., gravel, rock, and soil) should be purchased from a local supplier on Moloka'i to avoid introducing non-native plant species not present on the island.

Applicable mitigation measures based on USFWS recommendations will be incorporated into the construction documents to mitigate impacts to fauna during construction, including:

- To mitigate impacts to the endangered Hawaiian hoary bat, trimming or removing woody plants greater than 15-feet tall will be avoided during the breeding season (between June 1 and September 15). In addition, because Hawaiian hoary bats forage for insects from as low as three feet to higher than 500 feet above the ground, barbed wire fencing will not be utilized.
- To mitigate impacts to the endangered Hawaiian goose, if the bird is observed within the Project area during the breeding season, which is from December through April, a qualified biologist will survey the area prior to the start of construction activities. This survey will be repeated any time construction work is halted for a period of at least three days, during which the birds may attempt to nest. Should any Hawaiian goose nest be discovered within a 100 foot radius of proposed construction activities, work in this area will be halted and the USFWS will be contacted for further guidance.
- To mitigate impacts to threatened seabirds and other threatened avian species, outdoor lights associated with the Project sites will be shielded so that the bulbs can be seen only from below, and night-time construction will be avoided.

4 DESCRIPTION OF THE HUMAN ENVIRONMENT, POTENTIAL IMPACTS, AND MITIGATION MEASURES

This section describes the existing conditions of the human environment, preliminary potential impacts of the Project, and preliminary mitigation measures to minimize any impacts.

4.1 Archaeological and Historic Resources

A National Register of Historic Places (NHRP) contains a listing of districts, sites, buildings structures and objects significant in American history, architecture, archaeology, engineering and culture as authorized by the National Historic Preservation Act of 1966 (as amended). Properties are eligible for listing in the NRHP if they meet the criteria for evaluation as defined in 36 CFR §60.4:

> *The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, building, structures and objects that possess integrity of location, design, setting ,materials, workmanship, feeling, and association, and*
>
> *(a) That are associated with events that have made a significant contribution to the broad patterns of our history; or*
> *(b) That are associated with the lives of persons significant in our past; or*
> *(c) That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or*
> *(d) That have yielded or may be likely to yield, information important to prehistory or history.*

The State of Hawai'i recognizes these four criteria and an additional criteria under HRS §13-275-6 that is included in the evaluation process.

> *(e) That have an important value to the Native Hawaiian people or to another ethnic group of the State due to associations with cultural practices once carried out or still carried out, at the property due to associations with traditional beliefs, events or oral accounts- these associations being important to the group's history and cultural identity.*

Field work was conducted by Pacific Legacy, Inc., in 2011/2012 to determine if any area, met the significance criteria described above. In 2015 supplemental investigations in 2015 were conducted expanding boundaries in several areas previously investigated as well as examining two new areas not included in the 2011/2012 investigations. (see Appendix D) The investigation indicated that pineapple cultivation had impacted large areas and reducing the number and quality of archaeological resources identified within the Project boundaries. A total of six new archaeological sites (2516-2521) were identified and three previously documented sites (Sites 50-80-06-800 – 802) were identified within the Project boundaries in spite of the impacts of

modern agricultural practices during the 2011/2012 investigations. The supplemental archaeological investigations conducted in 2015 yielded a total of eight newly identified archaeological sites (T-001 through T-008). A majority of the sites identified during the 2011/2012, and 2015 investigation are located within Kalama'ula, in the vicinity of Project Sites 1 and 2, outside the areas of former pineapple cultivation. Table 4-1 provides additional information regarding the sites identified during the 2011/2012, and 2015 surveys and their significance if it has been determined at the time of this publication.

POTENTIAL IMPACTS AND MITIGATION MEASURES

No impact is anticipated. Four new archaeological sites were identified as significant and require preservation during the 2011/2012 investigations, three in Site 2, and one in Site 5. Eight new sites were identified during 2015, six in Site 2 and two in Site 1. Significance and treatment for the archaeological sites identified during the 2015 investigation have not yet been determined. Three archaeological sites in Site 2 were identified during investigations associated other projects. All 15 archaeological sites can be avoided during construction. Information regarding all archaeological sites requiring preservation (new and previously identified sites) will be incorporated in to the design to ensure avoidance.

Continued coordination with the State Historic Preservation Division (SHPD) is proposed. It is recommended that an archaeological monitor be present during grading and sub-surface construction activities based on State Historic Preservation Division recommendations.

For inadvertent finds during construction, the construction documents will include a provision that should remains such as artifacts, burials, or concentrations of shell or charcoal be encountered during construction activities, work will cease immediately in the immediate vicinity of the find, and the find will be protected. The contractor will immediately contact the State Historic Preservation Division, which will assess the significance of the find and recommend appropriate mitigation measures, if necessary.

Table 4-1: Newly Identified Archaeological Resources

Project Site Number	Arch ID Number*	Survey Date	Period	Type/*Details*/***Treatment*** †	Significance
Site 1	T-001	2015	Early Historic	Complex/ *Terrace Complex- possible pre-contact to early post contact habitation feature/* ***Pending***	Not yet finalized
Site 1	T-008	2015	Traditional	Surface Artifact Scatter/ *Cultural deposits extended below surface included dateable material undergoing additional analysis/* ***Pending***	Not yet finalized
Site 2	2516	2011	Traditional	Platform/ *Residential structure/* ***No Further Work (NFW), Preserve***	d & e
Site 2	2517	2011	Modern	Modified outcrop enclosure/ *Determined to be modern structure/* ***NFW***	Not Significant
Site 2	2518	2011	Traditional	Mound/ *likely clearing mound in fair condition with no artifacts, midden or human remains /* ***NFW, Preserve***	d
Site 2	2519	2011	Traditional	Mounds (3)/ *likely clearing mounds in poor condition with no artifacts, midden or human remains /* ***NFW, Preserve***	d
Site 2	T-002	2015	Historic / Agriculture	Terrace ***Pending***	Not yet finalized
Site 2	T-003	2015	Traditional	Modified Outcrop ***Pending***	Not yet finalized
Site 2	T-004	2015	Traditional	Alignment ***Pending***	Not yet finalized
Site 2	T-005	2015	Historic / Military	Complex ***Pending***	Not yet finalized
Site 2	T-006	2015	Historic / Ranching	Concrete Slab ***Pending***	Not yet finalized

Site 2	T-007	2015	Historic / Ranching	Concrete Foundations ***Pending***	Not yet finalized
Site 3	2520	2011	Historic / Ranching	Concrete Water Trough/ *Estimated age mid-1900/* ***NFW***	d
Site 5	2521	2011	Historic / Water Resources	Concrete Tank Stands/ *Supports for wooden water tanks/* ***NFW, preserve***	C & d

** Arch ID Number refers to the archaeological site number assigned to the archaeological identified during the 2011/2012 and 2015 investigations.*

† Some sites required additional investigation, including subsurface investigation. Additional details are provided for those sites. For sites that the significance criterion has not yet been established, treatment recommendations are pending.

4.2 Cultural Resources

The seven Project sites are located in central Moloka'i within DHHL residential and agricultural homestead communities, as well as ranchlands that are in private ownership. The pre-contact history for the entire central region of Moloka'i is limited, though there is a fair amount history in regards to the early ranching days of the mid-1800s with the advent of commercial ranching and agriculture. The settlement patterns of the island of Moloka'i have been greatly influenced by this ecological diversity. It was especially influenced by an uneven distribution of water resources, from pre-contact times through the present day. The arid central parts of Moloka'i were, until modern times, quite marginal and mostly uninhabited. The pre-contact subsistence economy of the general area likely revolved around the cultivation of *'uala* (sweet potato, *Ipomoea batatas*).

The Kalaniana'ole homestead (in Kalama'ula), the very first Hawaiian homestead, was developed in 1922 for agriculture and residential homesteading following the passage of the Hawaiian Homes Commission Act of 1920. By 1930, the lands in Kalama'ula were deemed unsuitable for agriculture. Lessees with agricultural leases exchanged them for agriculture leases in Ho'olehua. Ho'olehua was the second area to receive Hawaiian homesteads awards. Thirteen homesteaders settled in Ho'olehua in February of 1923. Tomatoes, corn, watermelons, sweet potato and cucumbers were some of the first crops to be cultivated in the area. Although livestock were sometimes kept, agriculture was the focus of homesteading. The livestock never contributed as much to the economy as crops, especially the primary cash crop, pineapple.

The lands between Ho'olehua and Kalama'ula have been utilized for ranching and sugar cane production post contact.

A literature review was prepared for all of DHHL's land holdings on Moloka'i in an effort to consolidate information regarding cultural resources identified during previous archaeological work into a single document. Two of DHHL's consultants (PBR HAWAII and Pacific Legacy) attempted to gather information and discuss the project as it relates to cultural resources and

wahi pana (celebrated and/or storied place) with knowledgeable individuals both on and off Moloka'i. All Native Hawaiian Organizations (NHO) listed on the U.S. Department of Interior's NHO list in September 2015. Letter recipients were invited to schedule one-on-one meetings to discuss cultural resources. A copy of the information/request packet is included in Appendix B. All DHHL homestead association leadership on Moloka'i received a copy of the letter packet mailed to the DOI NHO list and were provided an opportunity to meet and discuss cultural resources and the project. Meetings were held on December 1, 2011, and December 9, 2011, and October 1, 2015. Attendees were asked to provide their mana'o regarding cultural resources and wahi pana within the Project area and/or those outside the Project area that may otherwise be affected. Attendees were also asked to refer individuals with information regarding resources to the DHHL Planning Office, or PBR Hawaii Staff.

The following Cultural sites and resources have been identified through literature review are located within the Kalama'ula Homestead include Kapuāiwa Grove, 'Ōhi'apili Fishpond, 'Ōpae'ula heiau, Pu'upāpa'i heiau, Kalama'ula heiau, and Pu'uomo'o heiau. Coastal cultural resources within the Ho'olehua-Pālā'au Homestead include the 921-acre Mo'omomi Preserve, which is home to 22 native Hawaiian plant species, as well as native birds such as the pueo (Hawaiian owl) and 'iwa (great frigate). Discussions with individuals and meeting attendees also identified Kapuāiwa Grove and the pōhaku (stone) mauka of the intersection of Kalaniana'ole and Likelike Avenues in Kalama'ula, and the Mo'omomi Preserve and Nā'iwa Makahiki grounds in Ho'olehua as culturally sensitive sites near the proposed Project.

POTENTIAL IMPACTS AND MITIGATION MEASURES

No impact is anticipated. The pōhaku in Kalama'ula is located in the middle of the roadway. Many years ago construction workers attempted to remove it to build Kalaniana'ole Avenue. They were unsuccessful and build the road around the stone. While construction is not proposed near the rock, increased traffic can be expected on the roadway. Contractors will be advised to avoid the pōhaku.

The cultural sites and resources identified will not be adversely impacted by the proposed Project. Consultation with DHHL homestead association NHO will continue throughout the development of this project through the DHHL Beneficiary Consultation Process. Gathering of information regarding cultural resources is also on-going and will be incorporated into a Cultural Impact Assessment.

4.3 Roadways and Traffic

Maunaloa Highway provides the primary access to the Kalama'ula Homestead. The local neighborhood access consists of both paved and unpaved light-duty roads and unimproved roads.

Pu'upe'elua Avenue and the Airport Loop are both important roads within DHHL's Ho'olehua-Pālā'au tract, while Maunaloa Highway provides access from Ho'olehua to either the northeast or southwest areas of the island.

The proposed Project includes improvements to access roadways to Sites 2, 4, and 6. None of these access roadways are utilized by the public. In addition to access roadway improvements installation and or replacement of fire hydrants and valves will be made along several existing roads and Right-of-Ways. Table 4-2 identifies roadways that will be affected and the type of improvement proposed.

Table 4-2: Improvements Along Roads

Activity	Locations	Site
Transmission lines	Lihi Pali Road	5
	Pu'u Kapele	5
	unnamed Road to Lihi Pali Road	5
	Ho'olehua to Kalama'ula	3
	Kahiwa Street	2
Fire hydrant	Pu'upe'elua (install)	7
	Pu'u Kāpele (install)	5
	unnamed Road to Lihi Pali (install)	5
	Kapuaiwa Road (replace)	2
	Likelike Avenue (replace)	2
	Maunaloa Hwy (replace)	2
Valve Replacement	Farrington Highway	7
	Mo'omomi Avenue	7
	Kōlea Avenue	7
	Lihi Pali Avenue	7
	Pu'u Kāpele Avenue	7
	Kūle'a	4,6
	Kalama'ula valve (min 2 roads)	2
Roadway	Kūle'a	4, 6
	Kahanu	2

POTENTIAL IMPACTS AND MITIGATION MEASURES

Construction within the road right-of-ways identified in Table 4-2 is anticipated to interrupt traffic. This may cause longer travel times, and generally inconvenience motorists. These impacts cannot be avoided. Construction of the Project will be designed and scheduled to minimize traffic interruption. Temporary road closures may be required during construction when the proposed activity occurs within a road right-of-way.

The schools near the Project area may be affected by the project. These schools are a source of increased transient traffic in the region particularly during the morning and in the afternoon as students are dropped off and picked up.

Prior to construction, DHHL's project management team will coordinate with the State Department of Transportation, Highways Division, County of Maui Departments of Planning, and Transportation, and police regarding closure requirements and property access. The contractor will implement measures to provide access past work sites and to minimize the inconvenience to the community. Such measures could include

- Traffic cones and other directional devices
- Backfilling/covering all trenches at the end of the work day.
- Posting safety devices and signs for the duration of construction.
- Scheduling construction and material deliveries during non-peak traffic hours.
- Coordinating driveway crossings with homeowners and business occupants/ customers/ clients.
- Scheduling construction activities that require closures after 8:30 AM.

Conducting trench work in the evenings could potentially minimize the traffic impact to the community. However, this will be balanced against the needs of the nearby residential community for noise control particularly between 10:00 PM and 7:00 AM. In addition, operations will be designed to ensure total road closure is avoided. In the long term, no additional vehicles will be added to the Moloka'i roadways as a result of this Project. It will not increase in traffic volumes or congestion.

In the long-term the improvements to access roadways at Sites 2, 4, and 6 may have a slight positive impact on the roadway system. The amount of debris transported by DHHL vehicles entering back on to the existing roadways and deposited will be reduced once access roads are paved, when compared to current operations, particularly during rainy/muddy conditions.

4.4 Noise

Ambient noise in the area is moderate and can be attributed to vehicular traffic along the roadways, air traffic of flights to and from Moloka'i Airport, noise produced by strong winds, as well as agricultural activities.

The proposed Project is anticipated to produce increased noise levels during construction. Several public schools may be affected by noise generated during project construction. The public schools located nearest to Sites 1, 3, 4, 5, 6, and 7 are Kualapu'u Elementary Public Charter School and Moloka'i Middle/High School in Ho'olehua. Portions of Sites 6 and 7 are located near or directly adjacent to the middle/high school. The closest public schools to Site 2 are Kaunakakai Elementary School and the Maui Community College-Moloka'i Education Center located in Kaunakakai.

There are two airports within 10 miles of the seven Sites. Site 7 is the nearest to an active runway at approximately 0.5 miles north of Moloka'i Airport (See Figure 9).

Upon completion of construction activities, it is anticipated that noise levels will be reduced back to pre-construction levels.

POTENTIAL IMPACTS AND MITIGATION MEASURES

Construction noise cannot be avoided. Residential properties are considered noise sensitive areas and construction noise will clearly be audible when construction work takes place. Exposure to noise will vary by construction phase, the duration of each phase, and the type of equipment used during the different phases. Maximum sound levels in the range of 82-96 decibels-weighted [dB(A)] measured at 50 feet from the source would be generated by heavy machinery and pneumatic impact equipment during the site work phase. After site work is completed, reductions in sound levels, frequency, and duration can be expected during actual installation of the pipeline.

Hawai'i Administrative Rules, Title 11, Chapter 46, Community Noise Control regulations establish maximum permissible sound levels for construction activities occurring within "acoustical" zoning districts. Based on the agriculture zoning of the area, the Project is considered to be located in the Class C zoning district for noise control purposes. The maximum permissible daytime sound level in the district is 70 dB(A) all day.

In general, construction activities cannot exceed the permissible noise levels for more than ten percent of the time within any twenty minute period except by permit or variance. Any noise source that emits noise levels in excess of the maximum permissible sound levels cannot be operated without first obtaining a noise permit from the DOH. Although the permit does not attenuate noise per se, it regulates the hours during which excessive noise is allowed.

The general contractor will be responsible for obtaining the permit and complying with conditions attached to the permit. Work will be scheduled for normal working hours (8:00 AM to 3:30 PM) Mondays through Fridays. The contractor will also ensure that construction equipment with motors are properly equipped with mufflers in good operating condition.

Long-term noise levels are not expected to increase, therefore post-construction noise mitigation measures are not required

4.5 Air Quality

Regional and local climate, together with the amount and type of activity generally dictate the air quality of a given location. In the vicinity of the site, winds are predominantly trade winds. During winter, storms may generate strong winds for brief periods.

Generally, air quality in the vicinity is good and meets State and Federal Air Quality Standards. According to the EPA, there are no "non-attainment" areas on the island of Moloka'i (See

Section 6, Exhibit S). A non-attainment area is defined as a locality where air pollution levels persistently exceed National Ambient Air Quality Standards (NAAQS). During the Pre-Assessment Consultation process, the Hawai'i State Department of Health (DOH) Clean Air Branch (CAB) confirmed that the Project is located within an "attainment" area and conforms to the State Implementation Plan, and that the State of Hawai'i is in attainment with the National Ambient Air Quality Standards.

Most of the existing airborne pollutants near the Project sites can be attributed to vehicle-generated exhaust from the region's roadways, fugitive dust and equipment emissions generated by agricultural machinery and activities. Agriculture activities in the area may include the use of fertilizers and/or pesticides. There are several stationary industrial point sources of air pollution in central Moloka'i. These include power generation station, landfill, concrete batch plant, grain and seed processing facilities, and a fuel tank farm. However, the prevailing trade winds carry air pollutants from the island. These winds primarily come from the northeast, although they tend to bend at the eastern end of the island and run parallel to the south shore.

POTENTIAL IMPACTS AND MITIGATION MEASURES

In the long term The Project as proposed is not expected to increase the concentration or location of diesel exhaust emissions generated on site by the existing stationary emergency generator. Currently the generator can only operate for 24 hours before running out of fuel. The quantity of exhaust generated may increase over the status quo during emergency conditions where the generator is required to operate for longer than 24 hours without refueling.

In the short term emissions derived from operation of construction equipment and other vehicles involved in construction activities may temporarily affect the ambient air quality in the immediate vicinity. However, these effects will be minimized through proper maintenance of construction equipment and vehicles. In addition, there may be a temporary adverse impact on air quality attributable to dust generated during the Project construction, particularly earthmoving activity, including clearing and grubbing, excavating, trenching, and filling.

The DOH-Environmental Management Division (EMD) was provided with information regarding this project. In a response letter dated May 10, 2012, DOH-EMD identified construction as well as the removal of A.C. piping as potential sources of fugitive dust and asbestos containing material (ACM).

Air Emissions from Emergency Generator Mitigation Measures Not Required

The DOH Clean Air Branch was contacted as part of the pre consultation process. In a phone conversation on November 6, 2016, a permit engineer on duty confirmed that emissions generated by an emergency generator regardless of the duration of the emergency are exempt from permit requirements based on HAR §11-60.1-62 (d) (7). Additionally, exercise of the generator for non-emergency, maintenance and testing are also exempted in the same section.

Fugitive Dust Mitigation: Frequent water sprinkling may be the most effective dust control measure given the size of the sites and the type and scale of proposed improvements. The Contractor, however, may choose to implement other measures based on their experience with similar projects and job sites. Additional measures could include:

- Landscaping and rapid covering of bare areas;
- Disturbing only the areas of construction that are in the immediate zone of construction to limit the amount of time that the areas will be subject to erosion;
- Provisions for adequate dust control measures during weekends, after hours, and before daily start of construction activities;
- Installation of appropriate structural controls in areas of disturbance; and/or
- Siting of staging areas on impervious surface when possible.

The Contractor will be responsible for general housekeeping of the sites and for keeping adjacent areas free of mud, sediment, and construction litter and debris. Pollution control measures will comply with Hawai'i Administrative Rules, Title 11, Chapter 60.1, Air Pollution Control regulations of the DOH.

ACM Mitigation: Certified contractors will be involved in the inspection, project design, and abatement of ACM. The Asbestos Abatement Office of the DOH-Indoor and Radiological Health Branch will be kept apprised of the Project and will be engaged as necessary once the Project reaches the design phase.

This project is anticipated to have a long-term positive impact on air quality by reducing diesel emissions on Moloka'i. Electricity is provided to Moloka'i consumers by a MECO operated diesel power plant. DHHL's proposed installation of a 1 MW solar system will supply power to PWS230, (the largest power consumer on Moloka'i), reducing the MECO output requirements and thereby, diesel emissions, including carbon dioxide.

Because the island of Moloka'i is in attainment, no additional mitigation measures are required for compliance with NAAQS.

4.6 Visual Resources

The project proposes the installation of a new 0.2 MG potable water tank, and 1,000 gallon above-ground fuel tank at Site 1 (Well Site Improvements). These tanks will result in a permanent modification of the view plane. The new equipment is of similar height and mass to the existing well and reservoir site facilities and is not expected to significantly change the views.

POTENTIAL IMPACTS AND MITIGATION MEASURES

The proposed project involves improvements both above and below grade. The waterlines and related infrastructure will be contained underground. As such, there are no anticipated impacts to the visual resources of the surrounding environment resulting from the below grade improvements.

Meanwhile, the fire hydrants, access roads, fencing, water storage tanks, storage and maintenance facilities, above-ground fuel storage tank, and solar energy system will be located above grade. As these are improvements to the existing infrastructure, there are no anticipated negative impacts to the visual resources of the surrounding environment. Moreover, as these improvements will effectively replace or repair the aging system, there may in fact be beneficial impacts to the visual resources.

Some initial impact to visual character may occur on a localized scale due to construction activities and the creation of paved surfaces. However, the Project is not anticipated to affect substantially the long-term scenic character of these areas.

4.7 Infrastructure and Utilities

4.7.1 Water System

Department of Hawaiian Home Lands (DHHL) works diligently to provide safe, clean drinking water supplied by the State of Hawai'i, DHHL Ho'olehua Water System Public Water Supply [PWS] No. 230 to native Hawaiian homesteads located in Ho'olehua-Pālā'au (Ho'olehua), Kalama'ula, and Mo'omomi. However, due to the age of the system, as well as the remote location of the island of Moloka'i, system-wide improvements are necessary.

According to the 2009 Preliminary Engineering Report for Kualapu'u School Waterline, prepared for the State of Hawai'i Department of Education by Ronald M. Fukumoto Engineering, Inc., water service problems include inconsistent water pressure and lack of fire protection water service, and loss of service. Other difficulties include lack of easements across private land for existing waterlines, undocumented locations of these waterlines, and overgrown maintenance trails.

Ho'olehua is the only homestead with a dedicated irrigation water system, the Moloka'i Irrigation System (MIS), in which homesteaders have prior rights to two-thirds of this water as mandated in the Hawaiian Homes Act. The Moloka'i Irrigation System is owned and operated by the State of Hawai'i, Department of Agriculture, and is regulated under Chapter 4-152 of the Hawai'i Administrative Rules (HAR). The MIS is a non-potable water supply and is separate from the PWS No. 230 system.

POTENTIAL IMPACTS AND MITIGATION MEASURES

The Project is anticipated to have a positive impact. The project will improve treatment, storage, and delivery of potable water supplied by the Ho'olehua Water System (Public Water Supply No. 230) to 2,400 customers. It will include a one-megawatt photovoltaic energy production farm, the repair and replacement of aging equipment, and increased fire protection and water storage capacity. It will also improve the maintenance yard facilities, storage, and well site accessibility and security.

Appropriate water resource management strategies will be utilized. Where appropriate, water efficient fixtures will be installed and water efficient practices implemented throughout the development in order to reduce the increased demand on the area's freshwater resources.

As the proposed project is designed to develop improvements to the existing potable water system, PWS 230, use of the existing water sources (potable water wells numbered 0801-01 and 0801-02) is necessary.

During the Pre-Assessment Consultation process, the Hawai'i State Department of Land and Natural Resources (DLNR) Commission on Water Resource Management (CWRM) commented that the system sometimes exceeds the over-pumping rate allocation on its water use permit. Although the PWS230 system occasionally exceeds it pumping rate, the quantity of water pumped is significantly below DHHL's water allocation. The proposed Project is anticipated to improve transmission, storage, and disinfection of the water supply, not increase the pumping rate of the water sources for PWS No. 230. Additionally, the connection of the SCADA system (and new storage tank, energy supply) is expected to improve the efficiency of the system. Currently the system requires operators to visually inspect tanks and manually operate pumps to ensure tanks are full over the weekend. The proposed improvements are expected to automate pumping based on the drop in water levels rather than by visual inspection, evening out pumping rate. It is anticipated that this will reduce spikes in pumping rates that result in the current occasional rate exceedence.

Water demands and calculations will be provided to the DLNR Engineering Division for inclusion in the State Water Projects Plan Update during the design/construction phase of the Project.

Prior to the start of construction, construction plans for the proposed water system improvements will be provided to the Hawai'i State Department of Health (Safe Drinking Water Branch) for review and approval as required by Hawai'i Administrative Rules (HAR) Chapter 11-20-30.

As the proposed improvements to Sites 2, 4, 5, 6, and 7 are in close proximity to the Moloka'i Irrigation System (MIS), the Hawai'i State Department of Agriculture will continue to be included in the EA review process.

4.7.2 Wastewater System

On the island of Moloka'i, wastewater service is provided by Maui County in Kaunakakai Town and the Kualapu'u subdivision. Wastewater from the Kaunakakai system is conveyed to the County-owned Kaunakakai Wastewater Reclamation Facility for treatment and reuse. Wastewater from the Kualapu'u system is conveyed to a private wastewater treatment facility owned and operated by Moloka'i Ranch.

Wastewater in Kalama'ula and Ho'olehua-Pālā'au Homesteads is collected and treated by Individual Wastewater Systems (IWS). Although Kalama'ula is in close proximity to the County wastewater system in Kaunakakai Town, it is cost prohibitive to connect the area to the existing system. As Ho'olehua-Pālā'au is located even farther away, it is similarly not feasible to connect Ho'olehua to the County wastewater system.

POTENTIAL IMPACTS AND MITIGATION MEASURES

No impact is anticipated. The proposed improvements to the PWS No. 230 potable water system are not anticipated to have any impacts on the Individual Wastewater Systems (IWS) in the area, nor on the Kaunakakai and Kualapu'u systems.

4.7.3 Drainage System

Drainage problems on Moloka'i from runoff during periodic rain and storm events have caused damage to homes and businesses for years. The resulting flooding threatens public health and safety for residents and visitors. A combination of natural and manmade factors contribute to the problem including poorly drained soils in low-lying areas and flat terrain as well as inadequate, incomplete, or poorly maintained drainage systems in Kaunakakai Town (County of Maui Department of Planning, 2015).

Existing drainage systems on Moloka'i were designed to convey, divert, or retain runoff generated within the vicinity. However, many of these systems are regionally inadequate, and many of the downstream systems (ditches and roadway culverts) are incapable of accommodating the runoff generated from developed conditions upstream (County of Maui Department of Planning, 2015).

In Kalama'ula, most of the land makai of Maunaloa Highway is subject to flooding. A flood area also extends into the center of the Kalaniana'ole Colony where several runoff streams converge. Both Kalama'ula and Ho'olehua Homesteads generally lack storm water drainage infrastructure.

POTENTIAL IMPACTS AND MITIGATION MEASURES

As mentioned in Section 3.4 (Hydrology) above, site work includes earthwork activities that will expose soil creating opportunities for runoff and erosion. Trenching, grading, and stockpiling of soil will be performed in accordance with erosion control ordinances of the County, as well as approved grading plans.

In the short-term, there may be a slight increase in the impermeable surface area due to construction. Upon completion of the Project, a majority of the new facilities will be located underground or within existing road rights of way. The above ground facilities are anticipated to decrease permeability on 3.2 acres within the Project boundaries. During the design phase of the Project, a drainage plan will be developed to ensure that run-off quality and quantity are not impacted by the new roadways (Sites 2 and 5) and well site (Site 1) configuration.

Best Management Practices (BMPs) for erosion and drainage control during and after construction will be prepared for review and approval by the County Department of Public Works. In addition, this project will disturb greater than one acre; therefore, a National Pollution Discharge Elimination System (NPDES) General Permit for construction activities will be required.

The Project will also have a positive impact by reducing non-storm water discharges from leaks and catastrophic failures of deteriorating water transmission mains and laterals. Discrepancies between water pumped versus water distributed have been identified. Replacement of deteriorating pipes will reduce system water loss and impact on storm water.

No other mitigation measures are required.

4.7.4 Utilities

The Maui Electric Company, Inc. (MECO) supplies electricity for the County of Maui and the Island of Moloka'i. On Moloka'i, the power plant is located in Pālā'au, with a substation at Pu'unānā. Main transmission voltage is 34.5 kV. Electricity is supplied via overhead transmission lines.

Telephone service is provided to DHHL's lands by Sandwich Isles Communications, and to non-DHHL lands by Hawaiian Telcom.

Cable television service is provided by Oceanic Time Warner Cable.

POTENTIAL IMPACTS AND MITIGATION MEASURES

The project will reduce energy load on MECO's power generation facility. Currently standard operations require the PWS 230 system operators to notify MECO when the existing pumps at the well site are switched on due to the high energy demand required at pump start up. The proposed improvements at site 1 including the installation of a one-megawatt solar system with an energy storage component and the replacement of the pumps with new more efficient pumps designed to modulate the initial energy demand will reduce the fluctuating demand

requirements placed on MECO's power generation. This is anticipated to have a positive impact by stabilizing demand.

However, PWS230 is one of MECO's largest customers on Moloka'i averaging 3,590.7 kilowatt hours per day between July 24, 2014 and July 24, 2015. The proposed the installation of a one-megawatt solar system with an energy storage component will reduce need for energy supplied by MECO. DHHL is proposing to maintain connection to MECO for redundancy should the solar system, energy storage system, and emergency generator fail. MECO was contacted as part of the pre-consultation, but did not comment. It is not known what if any impact the elimination of the PWS230 account will have on MECO operations

In order to provide electricity for the existing water pumps at Site 1, a will be built on approximately seven acres within a 25-acre area at the well site identified for solar production by DHHL. d

4.7.5 Solid Waste

The County of Maui Department of Environmental Management (DEM) provides weekly garbage pick-up for a fee and disposes at the County landfill at Pālā'au and the Moloka'i-Nā'iwa Landfill & Recycling Center, located in Maunaloa.

POTENTIAL IMPACTS AND MITIGATION MEASURES

Mitigable impact. In the short-term solid waste generated at the Sites during the construction phase will increase over current conditions. Waste is expected to include materials from construction and grading activities. Efforts will be made to reduce the waste generated during the construction phase and when possible materials/structures will be re-used and/or recycled, in order to minimize the amount of materials that end up in the landfill. In the long-term after the construction phase, the Project will not result in increased generation of solid waste, and is thus not anticipated to adversely impact existing solid waste services on Moloka'i.

4.8 Hazardous Materials

The proposed Project will include the installation of an AST that will contain diesel fuel once constructed. The AST is necessary to ensure adequate fuel is available to operate the backup generator.

The following hazards are associated with diesel fuel:

Physical Hazards:	Class II Combustible Liquid
Health Hazards:	Fatal if Swallowed Skin Irritant Suspected Carcinogen Specific Organ toxicity following repeated exposure (Blood,

	Thymus, Liver)
Environmental Hazards	Toxic to aquatic life

The exhaust generated through diesel combustion is also a health hazard. It is a mixture of gases and particulates. Exposed individuals risk health effects including irritation, headaches, nausea, respiratory disease and cancer.

POTENTIAL IMPACTS AND MITIGATION MEASURES

The installation of an AST containing diesel increases risk of diesel spills at the well site (Site 1).

The quantity of diesel exhaust may increase however the concentration and location of the exhaust generated on site by the existing generator are expected to remain constant. Currently the generator can only operate for 24 hours before running out of fuel. The quantity of exhaust generated is expected to increase over the status quo during emergency conditions where the generator is required to operate for longer than 24 hours without refueling.

Long-term mitigable impacts are anticipated.

Accidental Release of Diesel

The diesel fuel tank will be installed with an integrated secondary containment vault system with leak detection to minimize the risk of releasing diesel fuel into the environment and/or exposing workers to direct contact with the fuel. Security fencing will be constructed to limit access by the public. Based on preliminary engineering the tank system is proposed meet the following requirements:

> A primary tank shall be constructed above ground of "3/16" and enclosed non-metallic insulated secondary containment with a manual leak detection tube with 6" reinforced 5000 psi concrete protection, tested for 2 hour fire, ballistics, vehicle impact and corrosion. The tank system will at a minimum meets U.L. 142, U.L. 2085 insulated secondary containment protected type vented by way of construction, UFC 79-7, NFPA, 30 & 30A, CARB, G-70-116.

Storage, use and disposal will follow the requirements established under the U.S. Emergency Planning and Community Right-to-Know Act (EPCRA), the Superfund Amendments and Reauthorization Act (SARA), and Resource Conservation and Recovery Act (RCRA), and Occupational Safety and Health Administration (OSHA). Secondary containment will be monitored for releases based on manufacturer recommendations and EPCRA requirements.

Diesel Exhaust

Proper ventilation as well as routine maintenance of the generator can substantially reduce worker exposure to diesel exhaust. Site 1 improvements shall be designed to limit the channeling of emissions from the generator to the workers breathing zone caused construction of new equipment, work areas, etc. DHHL shall ensure that the generator maintenance schedule follows the manufacturer's guidelines.

In the short-term, construction will necessitate the use of materials of various toxicities. Adhesives, paints, oils, and fuel for equipment are the primary materials that have the potential to be accidentally spilled. The contractor will provide adequate training on topics such as spill prevention and clean up. Certified contractors will address the clean-up of any releases of hazardous materials in compliance with all State and Federal laws.

4.9 Socio-Economic Characteristics

Population on Moloka'i Island declined slightly to 7,345 persons in 2010, from 7,404 in 2000, with the majority of the decline occurring in the Kalaupapa settlement. Besides Lāna'i Island, Moloka'i was the only other island with a decline in population (-0.8%) between 2000 and 2010. The majority of the people on Moloka'i are Native Hawaiians and Other Pacific Islanders. Population with mixed races accounted for 41.1% of the total population in 2010 and was the highest among all islands in the state. The housing vacancy rate was the highest among the islands at 30.5% in 2010, which was an increase of 6.5 percentage points from 2000 (24.0%).

The two Census Designate Places (CDPs) affected by the Project are the Kualapu'u CDP (which includes Ho'olehua-Pālā'au and Mo'omomi) and Kaunakakai CDP (which includes Kalama'ula). According to the 2006-2010 American Community Survey 5-Year Estimates, the total population of Kualapu'u CDP was 1,757, with a median household income of $36,938 and unemployment rate of 6.4%. Meanwhile, the total population of Kaunakakai CDP was 3,797, with a median household income of $52,049 and unemployment rate of 8.4%. Kualapu'u and Kaunakakai represent the two main population centers of Moloka'i.

The 2010 U.S. Census documented a population of 1,292 people in Ho'olehua and 300 people in Kalama'ula. In these communities, the percentage of the population that is Native Hawaiian is 43.0% and 41.3% respectively. The percentage of Native Hawaiian residents in both communities is significantly higher than rate of Native Hawaiians residents within Maui County and statewide.

The development of 58 of the 417 new residential lots proposed in the MIP are located within the PWS 230 service area. Additionally, the HHC recently lifted its moratorium on subdividing agriculture and pastoral lots, allowing families residing in Kalama'ula and Ho'olehua to subdivide their lots.

The proposed the installation of a one-megawatt solar system with an energy storage component is designed to eliminate the need for energy supplied by MECO except in emergency situations.

POTENTIAL IMPACTS AND MITIGATION MEASURES

The proposed Project is not a population generator. Consequently, there are no anticipated long-term impacts on the socio-economic characteristics of the general population. It is

anticipated that improved water service to the community will a beneficial impact on the quality of life for the existing population.

The PWS 230 account generated an average of $1,136.51 daily between July 24, 2014 and July 24, 2015 for MECO. The proposed installation of a one-megawatt solar system with an energy storage component is designed to eliminate the need for energy supplied by MECO except in emergency situations. Therefore the income generated by MECO will be reduced. It is not known what if any impact the elimination of a majority of the income generated on the PWS 230 account will have on MECO personnel requirements on Molokai. MECO was contacted as part of the pre-consultation, but did not comment. The reduction energy cost will have a positive impact on DHHL finances allowing money previously earmarked for energy to be spent on its primary mission of providing homesteading opportunities to native Hawaiians.

The removal of the moratorium is anticipated to impact the PWS 230 water system by increasing the quantity of water needed to service to newly subdivided lots and residences. The Project as proposed will not increase the pumping rate, nor does it include the advancing of a new well. Impacts associated with source development or other options to meet the increased demand resulting from agriculture and pastoral lot subdivisions will need to be explored separately.

4.10 Public Services and Facilities

4.10.1 Schools

The public schools located nearest to Sites 1, 3, 4, 5, 6, and 7 are Kualapu'u Elementary Public Charter School and Moloka'i Middle-High School in Ho'olehua. Portions of Sites 6 and 7 are located near or directly adjacent to the middle-high school. There are no public schools within one mile of Site 2. The closest public schools to Site 2 are Kaunakakai Elementary School and the Maui Community College – Moloka'i Education Center located in Kaunakakai.

POTENTIAL IMPACTS AND MITIGATION MEASURES

The proposed project is anticipated to produce increased noise levels during construction. The schools noted above may be affected by noise generated during project construction. Measures to mitigate noise impacts during construction are detailed in Section 4.4 ("Noise") above. Upon completion of construction activities, it is anticipated that noise levels will be reduced back to pre-construction levels.

In the long term, the Project is anticipated to have a beneficial impact on nearby schools, as it will provide improved infrastructure and service of safe, clean drinking water for students and the broader community. Several PWS230 improvement projects directly impacting the public schools in Ho'olehua have been evaluated separately from the proposed Project by the DOE.

During the Pre-Assessment Consultation process, the Hawai'i State Department of Human Services commented that there may be registered child care homes that may be affected by construction activities as part of the proposed project. DHHL will work with the contractors selected for construction to ensure adequate notification of users, including schools and registered child care homes, and will make every effort to minimize service disruptions. In the long term, by improving the reliability of equipment and service, the proposed water system improvements are anticipated to minimize future unscheduled repairs (and associated service disruption) due to equipment failure.

4.10.2 Police, Fire and Medical Services

Police Protection

The Island of Moloka'i is served by Maui County Police Department officers assigned to the Moloka'i Police Station, located in Kaunakakai, at 110 Ainoa Street.

Fire Protection

Fire protection services for Moloka'i are provided by the Maui Fire Department's Ho'olehua and Kaunakakai stations. The Ho'olehua station is located at 2190 Farrington Avenue by Moloka'i High School, near project Sites 4, 6, and 7. Meanwhile, the Kaunakakai station is situated at 130 Ainoa Street, approximately one mile east of the nearest segment of project Site 2. The Project's facilities will meet fire code requirements; moreover, additional fire hydrants will be installed.

Medical Services

Moloka'i General Hospital (MGH), which is part of The Queen's Health Systems, is located in Kaunakakai, at 280 Home Olu Place. MGH is a critical access hospital as defined by Medicare, furnishing 24-hour emergency services seven days a week. The hospital also provides various other medical services.

POTENTIAL IMPACTS AND MITIGATION MEASURES

A positive impact in anticipated. Improvements such as the installation of new fire hydrants and replacement of deteriorating fire hydrants will enhance Fire Department services, resulting in increased public safety.

The installation of a fuel containing AST is a mitigable impact. The AST proposed for installation at Site 1 requires a permit through the Maui County Fire Department's Fire Prevention Bureau. The flammable and combustible tank installation permit will be obtained prior to installation.

4.10.3 Recreational Facilities

County parks in central Moloka'i include Kualapu'u Park and Recreational Center in Kualapu'u (near project Sites 3, 4, and 6), as well as six parks in Kaunakakai: Pu'u Hauole Park, Kaunakakai Lighthouse/Malama Park, Mitchell Pauole Community Center, Cooke Memorial Pool, Kaunakakai Ball Park, and the Duke Maliu Regional Park. In addition, Pālā'au State Park is located northeast of Kualapu'u.

Kualapu'u Park is within 0.5 miles of a segment of project Site 3, and approximately 0.6 miles from Site 6. Pu'u Hauole Park and the Kaunakakai Lighthouse/Malama Park are both within 0.5 miles of project Site 2. See Figure 11.

POTENTIAL IMPACTS AND MITIGATION MEASURES

No impact. The project is not anticipated to adversely impact the existing recreational facilities in the area.

5 LAND USE CONFORMANCE

State of Hawai'i and Maui County land use plans, policies, and ordinances relevant to the Project are described below.

5.1 State of Hawai'i

5.1.1 State Land Use Law, Chapter 205, Hawai'i Revised Statutes

The State Land Use Law (Chapter 205, HRS), establishes the State Land Use Commission (LUC) and authorizes this body to designate all lands in the State into one of four Districts: Urban, Rural, Agricultural, or Conservation.

All of the Project sites are located within the State Agricultural District with the exception of portions of Site 2 (improved water facilities and water lines). Portions of Site 2 are located within the State Rural and Conservation Districts in Kalama'ula/'Umipa'a. Pursuant to the Hawaiian Homes Commission Act (HHCA) §206, Hawaiian home lands are not subject to land use controls by the State or County. Notwithstanding, the Project is a permitted use within the State Rural, Agricultural and Conservation Districts as public utility facilities (HRS §205-4.5(a)(7)). See Figure 12.

5.1.2 DHHL Planning System and Land Use Designations

DHHL has developed a three-tiered planning system to guide planning of its land holdings and policies for resource management, for the benefit of current and future beneficiaries. The planning system includes an over-arching General Plan, followed by Strategic Program Plans and Island Plans in the second tier and Regional and Development Plans in the third tier. Specific goals, objectives, policies, and implementing actions of DHHL planning system applicable to the proposed Project are discussed below

5.1.2.1 General Plan

The General Plan, approved by the HHC in February 2002 is a statewide plan with a long-term perspective that established seven categories of goals and objectives to meet DHHL's mission. The seven categories are: Land Use Planning, Residential Uses, Agricultural and Pastoral Uses, Water Resource, Land Resource Management; Economic Development,; and Building Healthy Communities. The following water resource goals and relevant to the Project

> *Provide Access to quality water in the most cost effective and efficient manner*
>
> *Land and Resource Management*
>
> *Be responsible, long-term stewards of the Trust's lands and the natural, historic and community resources located on these lands.*

5.1.2.2 Strategic Program Plans

The Strategic Program Plans provide strategic direction, implementing actions, and budgets for major program areas based on the goals and objectives of the General Plan. They provide specific objectives and work tasks for the near-term 3-5 year period. Strategic Program Plans exist or are in development for four program areas: native Hawaiian development, energy, water and agriculture. Two of the four strategic program areas, energy and water are applicable to the development of the proposed Project.

Ho'omaluō Energy Policy Plan
In 2009, Ho'omaluō, DHHL's energy policy was adopted. It was created to facilitate native Hawaiians and the broader community in working together to lead Hawai'i's effort to achieve energy self-sufficiency and sustainability. The following energy policy objectives are relevant to the proposed Project.

Mālama 'āina (Respect and protect our native home lands)

Ko'o (Facilitate the use of diverse renewable energy resources)

Water Policy Plan
The Water Policy Plan was adopted in 2014. It provides policy direction for DHHL and the Hawaiian Homes Commission on all water-related matters based on the vision, mission and set of values adopted by the Commission. DHHL has distinct water rights based on the HHCA, the State Constitution, State statutes and case law. The main water responsibilities are to develop sources, to manage systems, to plan for water requirements and advocate for rights. The Water Policy Plan guides the HHC and DHHL in making both short and long term decisions. The following water policy goal is relevant to the proposed Project.

Manage water Systems

5.1.2.3 Moloka'i Island Plan

The Moloka'i Island Plans was developed to provide recommendations for the use of 25,899 acres with homestead development identified as the top priority. This plan has a long-term perspective (around 20 years with an update at 10 years). It established land use goals and objectives based on the General Plan, developed land use designations to meet the needs of DHHL that also ensure proper stewardship of the 'āina.

Land Use Designations

DHHL is not subject to the County of Maui, nor the State Land Use Commission guidelines, zoning regulations, or other land use designations when developing lands for homesteading or other uses. Being exempt from these regulations provides DHHL with the opportunity as well as the responsibilty to ensure that DHHL's designated land uses are appropriate and meet the tenets of the HHA.

DHHL landholdings are categorized into ten different land use designations. These land uses are summarized in Table 5-1. There are four homesteading designations: Residential, Subsistence Agriculture and Supplemental Agriculture and Pastoral. The remaining six are non-homesteading designations. The non-homesteading designations are General Agriculture, Special District, Community Use, Conservation, Commercial and Industrial. While the latter two designations are utilized primarily to generate revenue in support of DHHL, all non-homesteading designations can provide income generation. Project actions are proposed on lands designated Residential, Subsistence Agriculture, Supplemental Agriculture, General Agriculture, Special District, Community Use and Commercial (See Figure 13). Utility improvements are allowed within in all 10 Land Use designations.

5.1.2.4 Moloka'i Regional Plan

The Regional Plans are developed through a series of meetings with beneficiaries and stakeholders to identify issues and opportunities that affect that region. By proactively engaging the community on regional issues and developing priorities through beneficiary consensus, DHHL is able to affect development rather than reacting to actions by other organizations. The Moloka'i Regional Plan, updated in 2010, has a short-term focus. Five regional priority projects were identified in 2010. Two priority projects are applicable to the Project.

Alternative Energy Initiative

Conduct Water Pressure Testing in Kalama'ula

Discussion: The Project is designed to improve the existing PWS230 water system and supports goals, objectives, and priorities developed as part of the DHHL Planning System. The improvements to the SCADA system are designed to increase efficiency in automation while the installation of the 1 MW solar energy systems improves cost efficiency. New transmission lines in Kalama'ula are proposed to address water pressure. The replacement of deteriorating lines, valves and hydrants improves DHHL's ability to effectively deliver potable water and increase safety and security. These improvements support the goals of the DHHL General Plan, the Water Policy's management goal, the Ko'o objective of the Energy policy, appropriate land use as designated in the Island Plan , and the water pressure and renewable energy priority projects identified in the Island of Moloka'i Regional Plan.

Table 5-1: DHHL Land Use Designations

Land Use Designation	Setting, Intent, Purpose†	Lot Size	Minimum Infrastructure
HOMESTEADING USES			
Residential	Residential lot subdivisions built to County standards in areas close to existing infrastructure. Residential waiting list.	1 acre or less	Water (potable), all utilities, road access (paved), County standards
Subsistence Agriculture	Small lot agriculture. Close proximity to existing infrastructure. Lifestyle areas intended to allow for home consumption of agricultural products.	5 acres or less *(min. 10,000 sq. ft.)*	Water (catchment, potable or surface); road access (unpaved)
Supplemental Agriculture	Large lot agriculture. Intended to provide opportunities for agricultural production for supplemental income and home use. Agriculture waiting list.	40 acres or less	Water (catchment or surface); road access (unpaved)
Pastoral	Large lot agriculture specifically for pastoral uses. Ranch plan and fencing required. Pastoral waiting list.	1,000 acres or less	Water (for livestock) and road access (unpaved)
NON-HOMESTEADING USES			
General Agriculture	Intensive or extensive farming or ranching allowed. May serve as an interim use until opportunities for higher and better uses become available.	To be determined	N/A
Special District	Areas requiring special attention because of unusual opportunities and/or constraints, e.g. natural hazard areas, open spaces, cultural resources, raw lands far from infrastructure, mixed use areas, and greenways.	To be determined	To be determined
Community Use	Common areas for community uses and public facilities. Includes space for parks and recreation, cultural activities, community based economic development, utilities, and other public facilities and amenities.	To be determined	County Standards
Conservation	Environmentally sensitive areas. Lands with watersheds, endangered species, critical habitats, sensitive historic and cultural sites, other environmental factors. Very limited uses.	To be determined	N/A
Commercial	Lands suitable for retail, business, and commercial activities.	To be determined	County Standards
Industrial	Lands suitable for processing, construction, manufacturing, transportation, wholesale, warehousing, and other industrial activities.	To be determined	County Standards

† Land Use Designations are utilized Statewide.

5.1.3 Coastal Zone Management Act, Chapter 205A, Hawai'i Revised Statutes

Portions of Site 2 of the Project are located within the Special Management Area (SMA) (see Figure 14). Moreover, since the entire state is defined to be within the Coastal Zone Management Area, pursuant to Hawai'i Revised Statutes (HRS) 205A-1, a discussion of the Project's ability to meet the objectives and policies set forth in HRS 205A-2, is provided below.

5.1.3.1 Recreational Resources

Objective: *Provide coastal recreational opportunities accessible to the public.*

Policies

(A) Improve coordination and funding of coastal recreational planning and management; and

(B) Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:

(i) Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;

(ii) Requiring replacement of coastal resources having significant recreational value including, but not limited to surfing sites, fishponds, and sand beaches, when such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the State for recreation when replacement is not feasible or desirable;

(iii) Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;

(iv) Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;

(v) Ensuring public recreational uses of County, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources;

(vi) Adopting water quality standards and regulating point and nonpoint sources of pollution to protect, and where feasible, restore the recreational value of coastal waters;

(vii) Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing; and

(viii) Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, and County authorities; and crediting such dedication against the requirements of section 46-6;

Discussion: As public utility infrastructure, the proposed project does not provide recreational resources, and is not located directly on the coastline; therefore, policies regarding shoreline recreation resources are not applicable; however, to protect marine resources for purposes

including recreation, the State of Hawai'i has adopted water quality standards. Generally, these standards will require the submittal and adherence to a National Pollution Discharge Elimination System (NPDES) permit. This permit requires compliance with best management practices during construction to minimize soil erosion into adjacent waterways. The NPDES permit will also include requirements to maintain water quality during operation. A NPDES permit will be required for the proposed project.

5.1.3.2 Historic Resources

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

Policies

(A) Identify and analyze significant archaeological resources;

(B) Maximize information retention through preservation of remains and artifacts or salvage operations; and

(C) Support state goals for protection, restoration, interpretation, and display of historic resources;

Discussion: Efforts will be made to protect, preserve, and, where desirable, restore natural and manmade historic and prehistoric resources in the Project sites that are significant in Hawaiian and American history and culture. Preservation has been proposed for sites and is detailed in Section 4.1, Archaeological and Historical Resources. A portion of project located within Site 2 includes the replacement of transmission line within a roadway adjacent to Kapuaiwa coconut grove. It is considered a sacred-storied place as the grove of trees was planted by and for Kamehameha IV, (Kapuaiwa). Kapuaiwa is actively managed by DHHL. Access into the historic wahi pana is not required for this Project, nor will the proposed actions affect access to Kapuaiwa. Neither short-term construction nor long term maintenance of the transmission line will affect Kapuaiwa.

5.1.3.3 Scenic and Open Space Resources

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

Policies

(A) Identify valued scenic resources in the coastal zone management area;

(B) Ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;

(C) Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources; and

(D) Encourage those developments that are not coastal dependent to locate in inland areas;

Discussion: Since the majority of the proposed project sites are located inland, away from the shoreline, there will be no effect on the quality of the coastal open space and scenic resources. The proposed improvements to segments of Site 2 that are located near the shore will involve the replacement of existing underground valves, transmission mains and laterals with underground valves, transmission mains and laterals. The above ground fire hydrants proposed in Site 2 will replace existing hydrants and will be of similar scale and weight to the existing. No long-term impacts to coastal open space and scenic resources are anticipated.

5.1.3.4 Coastal Ecosystems

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

Policy A: Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;

Policy C: Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;

Policy D: Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and

Policy E: Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.

Discussion: Construction will require earth moving activities, however no actions are proposed within existing streams or waterways. Project actions are not anticipated to meet requirements for the application of either State stream channel alteration permit or ACOE 404 permits. NPDES and grading permits will be obtained and requirements followed during construction to mitigate potential nonpoint source runoff during construction and Low Impact Design (LID) drainage measures will promote infiltration over runoff through swales and other means (see section 4.7.3). A major component of this water system improvement project is the replacement of existing deteriorating water transmission mains and laterals. Large release of any liquid, including potable water can disrupt the delicate balance of the coastal ecosystem by changing salinity, temperature and chemical composition. The replacement of pipes (particularly those within Site 2) some of which contain asbestos cement will control on-going releases at unknown locations occurring through deteriorating pipe walls (non-point source). It also reduces the potential for catastrophic pipe failure (point-source pollution) of deteriorating pipes that could result in a large influx of non-saline water to the coastal environment supporting this objective.

5.1.3.5 Economic Uses

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

Policy A: Concentrate coastal dependent development in appropriate areas;

Policy B: Ensure that coastal dependent development such as harbors and ports, and coastal related development such as visitor industry facilities and energy generating facilities, are located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area; and

Policy C: Direct the location and expansion of coastal dependent developments to areas presently designated and used for such developments and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:

(i) Use of presently designated locations is not feasible;

(ii) Adverse environmental effects are minimized; and

(iii) The development is important to the State's economy.

Discussion: The proposed project provides improvements to public utility facilities and supports the conversion to clean energy. Both actions are important to the State's economy, thereby supporting this objective.

5.1.3.6 Coastal Hazards

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

Policy A: Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and non-point source pollution hazards;

Policy B: Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and non-point source pollution hazards;

Policy C: Ensure that developments comply with requirements of the Federal Flood Insurance Program; and

Policy D: Prevent coastal flooding from inland projects.

Discussion: Most of the Project sites are located inland, away from potential coastal hazards. However, segments of the makai portion of Site 2 are located in the tsunami evacuation zone.

As portions of the Project are located in Flood Hazard Zones, compliance with rules and regulations of Title 44 of the Code of Federal Regulations (CFR) and Maui County Code is necessary. The proposed actions located in these flood hazard areas (replacement of existing

transmission pipes, in-line valves, and fire hydrants) will replace aging equipment, reducing potential for leaks that can exacerbate naturally occurring flooding.

The project's impact in relationship to natural hazards is discussed in section 3.5.

5.1.3.7 Managing Development

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

Policy A: Use, implement, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development;

Policy B: Facilitate timely processing of applications for development permits and resolve overlapping or conflicting permit requirements; and

Policy C: Communicate the potential short and long-term impacts of proposed significant coastal developments early in their life cycle and in terms understandable to the public to facilitate public participation in the planning and review process.

Discussion: Opportunity for public input was provided through this environmental assessment process. Pre-assessment consultation was conducted (comments and responses reproduced in Appendix B). In addition, this EA discusses potential impacts and mitigation measures of the proposed project and will provide an opportunity for input during the Draft EA Public Comment period

5.1.3.8 Public Participation

Objective: Stimulate public awareness, education, and participation in coastal management.

Policy A: Promote public involvement in coastal zone management processes;

Policy B: Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal issues, developments, and government activities; and

Policy C: Organize workshops, policy dialogues, and site- specific mediations to respond to coastal issues and conflicts.

Discussion: Opportunity for public input was provided during the environmental assessment process, as discussed in the preceding section.

5.1.3.9 Beach Protection

Objective: Protect beaches for public use and recreation.

Policy A: Locate new structures inland from the shoreline setback to conserve open space, minimize interference with natural shoreline processes, and minimize loss of improvements due to erosion;

Policy B: Prohibit construction of private erosion-protection structures seaward of the shoreline, except when they result in improved aesthetic and engineering solutions to erosion at the sites and do not interfere with existing recreational and waterline activities; and

Policy C: Minimize the construction of public erosion-protection structures seaward of the shoreline.

Discussion: The majority of the proposed project sites are located inland, away from the shoreline. The proposed improvements to segments of Site 2 near the shore will be located inland from the shoreline setback, and will not involve any structures seaward of the shoreline. As such, the proposed project supports this objective to protect beaches for public use and recreation.

5.1.3.10 Marine Resources

Objective: Promote the protection, use, and development of marine and coastal resources to assure their sustainability.

Policy A: Ensure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;

Policy B: Coordinate the management of marine and coastal resources and activities to improve effectiveness and efficiency;

Policy C: Assert and articulate the interests of the State as a partner with Federal agencies in the sound management of ocean resources within the United States exclusive economic zone;

Policy D: Promote research, study, and understanding of ocean processes, marine life, and other ocean resources in order to acquire and inventory information necessary to understand how ocean development activities relate to and impact upon ocean and coastal resources; and

Policy E: Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.

Discussion: To protect marine water quality, the Project will be designed and built in compliance with all applicable Federal, State, and County regulations pertaining to storm water management (see section 4.7.3).

5.1.4 Hawai'i State Plan

The Hawai'i State Plan (Chapter 226, HRS), establishes a set of goals, objectives and policies that serve as long-range guidelines for the growth and development of the State. Objectives and policies pertinent to the proposed project are as follows:

§226-13 Objectives and policies for physical environment – land, air, and water quality.

Objectives: *(1) Maintenance and pursuit of improved quality in Hawaii's land, air, and water resources. (2) Greater public awareness and appreciation of Hawaii's environmental resources.*

Policies related to land, air, and water quality:

(1) Foster educational activities that promote a better understanding of Hawaii's limited environmental resources.
(2) Promote the proper management of Hawaii's land and water resources.
(3) Promote effective measures to achieve desired quality in Hawaii's surface, ground, and coastal waters.
(4) Encourage actions to maintain or improve aural and air quality levels to enhance the health and well-being of Hawaii's people.
(5) Reduce the threat to life and property from erosion, flooding, tsunamis, hurricanes, earthquakes, volcanic eruptions, and other natural or man-induced hazards and disasters.
(6) Encourage design and construction practices that enhance the physical qualities of Hawaii's communities.
(7) Encourage urban developments in close proximity to existing services and facilities.
(8) Foster recognition of the importance and value of the land, air, and water resources to Hawaii's people, their cultures and visitors.

Discussion: The Project is consistent with and implements the objectives and policies related to water quality. The purpose of this project is to improve treatment, storage, and delivery of potable water supplied by the DHHL's Ho'olehua Water System (Public Water Supply [PWS] No. 230) to native Hawaiian homesteads and the broader community of Moloka'i. As such, the proposed project helps maintain and improve water quality, while also promoting the proper management of Moloka'i's water resources. To protect marine water quality, the Project will be designed and built in compliance with all applicable Federal, State, and County regulations pertaining to storm water management and hazardous material storage. NPDES and grading permits will mitigate potential nonpoint source runoff during construction and Low Impact Design (LID) drainage measures will be incorporated into the Project design particularly at Site 1, the maintenance yard improvements in Site 7, and the roadways proposed for Sites 2, 4, and 6.

§226-16 Objective and policies for facility systems – water

Objective: *Planning for the State's facility systems with regard to water shall be directed towards achievement of the objective of the provision of water to adequately accommodate domestic, agricultural, commercial, industrial, recreational, and other needs within resource capacities.*

Policies related to water facility systems:

(1) Coordinate development of land use activities with existing and potential water supply.
(2) Support research and development of alternative methods to meet future water requirements well in advance of anticipated needs.
(3) Reclaim and encourage the productive use of runoff water and wastewater discharges.

(4) Assist in improving the quality, efficiency, service, and storage capabilities of water systems for domestic and agricultural use.
(5) Support water supply services to areas experiencing critical water problems.
(6) Promote water conservation programs and practices in government, private industry, and the general public to help ensure adequate water to meet long-term needs.

Discussion: The Project is consistent with and implements the objective and policies related to water facility systems. The proposed project assists in improving the quality, efficiency, service, and storage capabilities of water systems for domestic use within native Hawaiian homesteads in the PWS 230 service area and the broader community of Moloka'i. The Project also supports water supply services to areas experiencing critical water problems by replacing critical system components that have exceeded the recommended estimated useful life.

5.2 County of Maui

County-specific land use plans and ordinances pertaining to the Project include the County of Maui 2030 General Plan – Countywide Policy Plan (2010), Moloka'i Community Plan (2001), and zoning code (Maui County Code Title 19). Pursuant to the Hawaiian Homes Commission Act (HHCA) §206, Hawaiian home lands are not subject to land use controls by the State or County.

5.2.1 General Plan

As required by the County of Maui Charter, the General Plan sets forth the desired sequence, patterns, and characteristics of future development. This is accomplished through long-range objectives focusing on the social, economic, and environmental effects of development coupled with specific policies designed to implement the objectives. The Countywide Policy Plan, adopted in 2010 as part of the update to the 1990 General Plan, presents a comprehensive policy plan for the islands of Maui County to the year 2030, and provides broad goals, objectives, policies, and implementing actions – organized around core themes – that portray the desired direction of the County's future.

Specific objectives and policies applicable to the proposed Ho'olehua water system improvements are discussed below.

Core Theme I: Improve Physical Infrastructure

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

Objective 1: *Improve water systems to assure access to sustainable, clean, reliable, and affordable sources of water.*

Policies:

b) Develop and fund improved water-delivery systems.

e) Retain and expand public control and ownership of water resources and delivery systems.
f) Improve the management of water systems so that surface-water and groundwater resources are not degraded by overuse or pollution.

Discussion: The Project is consistent with and implements the objective and policies related to water systems. The proposed project assists in improving the quality, efficiency, service, delivery, storage capabilities as well as overall management of the PWS 230 water system for domestic use.

Objective 3: *Significantly increase the use of renewable and green technologies to promote energy efficiency and energy self-sufficiency.*

Policies:

a) Promote the use of locally renewable energy sources, and reward energy efficiency.
d) Encourage small-scale energy generation that utilizes wind, sun, water, biowaste, and other renewable sources of energy.
e) Expand renewable-energy production.
i) Promote the retrofitting of existing buildings and new development to incorporate energy-saving design concepts and devices.
j) Encourage green footprint practices.
k) Reduce Maui County's dependence on fossil fuels and energy imports.
l) Support green building practices such as the construction of buildings that aim to minimize carbon dioxide production, produce renewable energy, and recycle water.
m) Promote and support environmentally friendly practices in all energy sectors.

Discussion:

The Project includes modifications to the energy system at Site 1, with the proposed installation of a one-megawatt solar system including an energy storage component. The system will be comprised of approximately 3,500 to 4,000 fixed ground-mounted solar panels built on approximately 7-10 acres. The new, more efficient solar system will replace MECO as the primary energy supplier to the pumps at the site. The 1-MW system will provide renewable electricity that reduces carbon dioxide emissions generated on Moloka'i. This is consistent with the objective and policies related to renewable and green technologies to promote energy efficiency and self-sufficiency.

Objective 4: *Direct growth in a way that makes efficient use of existing infrastructure and to areas where there is available infrastructure capacity.*

Policies:

a) Capitalize on existing infrastructure capacity as a priority over infrastructure expansion.
c) Utilize appropriate infrastructure technologies in the appropriate locations.

Discussion: The project is consistent with the objective and policies regarding capitalizing on and utilizing existing infrastructure capacity. The project repairs and augments the existing, aging water infrastructure, and utilizes appropriate infrastructure technologies in the appropriate locations, in order to improve the quality, efficiency, and delivery of water service to the community.

Objective 5: *Improve the planning and management of infrastructure systems.*

Policies:

a) Provide a reliable and sufficient level of funding to enhance and maintain infrastructure systems.
d) Maintain inventories of infrastructure capacity, and project future infrastructure needs.
e) Require social-justice and –equity issues to be considered during the infrastructure-planning process.
f) Discourage the development of critical infrastructure systems within hazard zones and the tsunami-inundation zone to the extent practical.
h) Ensure that basic infrastructure needs can be met during a disaster.
j) Promote the undergrounding of utility and other distribution lines for health, safety, and aesthetic reasons.

Discussion: The project is consistent with the objective and policies regarding improving the planning and management of water infrastructure systems. The project would provide a reliable and sufficient level of funding to enhance and maintain water infrastructure systems while considering present capacity and future infrastructure needs.

Social-justice and social-equity issues have been taken into consideration throughout the infrastructure-planning process, as the communities was identified in the 2010 census as having higher than statewide averages of Native Hawaiians and multiple criteria for low income communities, including high poverty and unemployment rates. The project would help to alleviate inequities in access by providing reliable, quality potable water, and improving fire protection in areas previously lacking access to one or both.

The majority of the Project sites are not located within hazard zones or tsunami-inundation zones. Although portions of Site 2 are located within areas designated as Flood Zones A, AE (1% annual chance flood), or XS (0.2% annual chance flood), the improvements will enhance the resilience of the water system and its ability to ensure that basic infrastructure needs can be met in the event of a disaster. The majority of the actions within Site 2 are located below grade and will not be impacted tsunami inundation or flooding.

5.2.2 Moloka'i Community Plan

The *Moloka'i Community Plan* (County of Maui 2001) is one of nine community plans for Maui County. It reflects current and anticipated conditions for the Moloka'i planning region and advances planning goals, objectives, policies, and implementation considerations as a decision-making guide in the region through the year 2010. The *Moloka'i Community Plan* provides specific recommendations addressing the goals, objectives, and policies contained in the *General Plan*, while still recognizing the values and unique attributes of Moloka'i enhancing the region's overall living environment. Specific goals, objectives, policies, and implementing actions of the *Moloka'i Community Plan* applicable to the proposed Project are discussed below (see Figure 15).

Infrastructure

Goal: *Culturally and environmentally sensitive infrastructure systems, developed and maintained in a timely fashion, which protect and preserve the safety and health of Moloka'i's residents and visitors.*

Objectives and Policies (Water):

1) *Future water allocations for agriculture/aquaculture and Hawaiian Home Lands use should be given first priority and then consideration should be given to other viable economic development initiatives.*
2) *Provide adequate and competitively priced irrigation water to agricultural lands without altering or endangering fresh water streams.*
3) *Improve current water quality and distribution system and develop new water sources for the Moloka'i Community Plan area without taking water from Pelekunu and Wailau Valleys.*
4) *Develop improved transmission and/or storage systems to provide better fire protection.*
5) *Promote programs for water conservation as well as ground water and wellhead protection.*
6) *Recognize Hawaiian water rights.*
7) *Establish a Moloka'i Water Advisory Committee to the Commission of Water Resource Management to better address Moloka'i water issues on Moloka'i.*

Implementing Actions:

1) *Amend building code requirements to require the installation of water conservation devices (i.e., irrigation systems, toilets, shower and faucet heads, etc.)*
2) *Update and revise the current Moloka'i Water Use and Development Plan to include the recommendations of the 1993 Moloka'i Working Group Report.*

Discussion: The project is consistent with the community plan objectives and policies regarding water infrastructure systems. In particular, the Project will improve the current water quality and distribution system for the community, and will also improve the provision of fire protection in areas with deteriorated fire hydrants, or without any fire protection at all.

Department of Hawaiian Home Lands

Goal: *The timely implementation of programs and settlement of Native Hawaiians on Department of Hawaiian Home Lands.*

Objectives and Policies:

1) *Encourage and support planning and implementation of Department of Hawaiian Home Lands projects that benefit native Hawaiians.*
2) *Ensure a water supply which will support the development of Department of Hawaiian Home Lands projects.*
3) *Recognize and support the "first call" allocation of water resources for Department of Hawaiian Home Lands projects.*
4) *Encourage cooperative planning programs with the native Hawaiian community in order to foster a desired lifestyle and perpetuate the culture.*
5) *Encourage the development of cooperative planning programs between the County and the Department of Hawaiian Home Lands to ensure that infrastructure and public service needs adequately address the needs of the entire Moloka'i community.*
6) *Encourage the development of cooperative agricultural development programs between the County and the Department of Hawaiian Home Lands to support diversified agricultural pursuits (i.e., programs, for example, which may identify opportunities for creating efficiencies in scale which will benefit all Moloka'i farmers).*
7) *Support educational facilities and programs development by the Department of Hawaiian Home Lands.*

Implementing Actions:

1) *Create a Department of Hawaiian Home Lands – County Task Force to study and identify opportunities for developing cooperative programs and projects.*
2) *Support the development of alternate subdivision standards for infrastructure which insures the health, safety and welfare but also is consistent with the desired lifestyle of the Native Hawaiian community and the reduction of construction costs.*

Discussion: The project is consistent with and implements the community plan objectives and policies regarding Department of Hawaiian Home Lands programs and homestead. The project will ensure a water supply which is supportive of DHHL projects that benefit not only native Hawaiians, but also the broader Moloka'i community.

5.2.3 Zoning

Title 19 of the Maui County Code provides the zoning provisions for all of Maui County, including the District of Moloka'i. However, pursuant to HHCA §206, Hawaiian home lands are not subject to zoning or other land use controls by the County.

5.3 Approvals and Permits

The table below lists the anticipated permits and approvals required for the Project:

Table 5-2: Anticipated Approvals and Permits

Permit/Approval	Responsible Agency
NEPA Compliance	U.S. Department of Agriculture and U.S. Housing and Urban Development
Chapter 343, HRS Compliance	State Department of Hawaiian Home Lands Office of Environmental Quality Control
Historic Preservation, Section 106	State Historic Preservation Division
Chapter 6E, HRS Compliance	
National Pollutant Discharge Elimination System (NPDES) Permit	State Department of Health
Noise Permit	
Construction Plan Review/Approval	
ADA Compliance	
Grubbing, Grading, and Stockpiling Permits	Maui Department of Public Works
Plan Approval, Building Permits (including electrical, plumbing, civil, and demolition)	
Road Closure Approval	
Occupancy	
Sole Source Aquifer Review	U.S. Environmental Protection Agency
CZM Federal Consistency Review	State, Office of Planning
Special Flood Hazard Area Permit	Maui Department of Planning
Flammable & Combustible Tank (Fuel AST) Installation Permit	Maui County Fire Department
Road Closure approval	State of Hawai'i, Department of Transportation

(This page left blank intentionally.)

6 ALTERNATIVES

This section identifies and evaluates a range of alternatives that could meet the purpose and need and possibly avoid, reduce, or minimize adverse environmental effects. The reference point to compare alternatives is the "no action" alternative.

6.1 No Action Alternative

The "no action" alternative will not require any construction activities or new improvements. PWS would continue to deteriorate and system failures would be repaired as they occur.

The existing generator has a limited fuel supply. Hurricanes, tsunamis, and other less catastrophic events can and have caused extended power outages. During extended power outages which periodically occur, the system is unable to supply water to the community without additional fuel or alternate sources of energy. The water system would likely continue to experience water outages during high flows and would be unable to meet the required fire flows under the no action alternative. Additionally, the distribution system and pumps would continue to deteriorate resulting in water losses via leaks and loss of service due to pump failure.

6.2 Water Supply Alternatives

Connecting to an additional water supply source was considered as an alternative to improving the existing system. However, the PWS No. 230 is already connected to all adjacent water systems, which already have taxed capacities. During water shortages or outages, the interconnected water systems rely on each other for support. In order to address PWS No. 230's capacity requirements, the adjacent water systems would need to be substantially upgraded. Due to the complexity of connecting to other water systems, time, coordination, project planning, and costs this option was considered technically infeasible.

Dedicating the entire water system to the County DWS was also considered; however, the HHCA prohibits this action without an act of the U.S. Congress. Additionally, the County DWS would need to accept the DHHL water system and they typically only accept water systems that meet all county water standards and are in new condition. Due to the complexity of transferring the water system to the County DWS, the time, coordination, Act of Congress, project planning, and costs associated with this option, this option was also determined to be technically infeasible.

6.3 Alternative Design, Full Build-out

This alternative proposes improvements that would provide the infrastructure necessary to support full build-out of the Ho'olehua and Kamama'ula communities as well meeting the increased demand resulting from agriculture and pastoral lot subdivisions. In addition to improvements proposed in the preferred alternative, the following would also be included. To accommodate future demand on the system, exploration and development of new water

sources and wells within the Kualapu'u Aquifer would be necessary. At a minimum a third well should be developed to provide additional capacity. An emergency generator and 1,000 gallon above ground fuel storage tank would be installed at the new well site to provide back up power should the primary power supply fail. An upgraded treatment facility with adequate space for storage of disinfection chemicals and safety improvements would be integrated into the design. Additional storage would be necessary to meet water demand in Kalama'ula. Full buildout would require an increase in existing storage capacity by a minimum of 800,000 MG. The proposed full buildout alternative would vastly improve the existing water system at a design and construction cost of $39,000,000. DHHL must balance the needs of existing lessees on Moloka'i with the needs of lessess on the other islands, the pool of nearly 40,000 applicants awaiting leases as well as managing over 200,00 acres of land. While DHHL is securing various funding sources to offset the cost of improvement so PWS 230, it cannot allocate such a large portion of trust resources over the next five to six years to the benefit of just the lessees and other users in Ho'olehua and Kalama'ula.

7 FINDINGS AND DETERMINATION

To determine whether the proposed improvements to the DHHL Ho'olehua Water System, Public Water System No. 230 (PWS No. 230) may have a significant impact on the physical and human environment, all phases and expected consequences of the Project have been evaluated, including potential primary, secondary, short-range, long-range, and cumulative impacts. Based on this evaluation, the Proposing Agency (Department of Hawaiian Home Lands) anticipates issuing a Finding of No Significant Impact (FONSI). The supporting rationale for this finding is presented in this chapter.

7.1 Significance Criteria

The discussion below evaluates the significance of the Project's impacts based upon the significance criteria set forth in Hawai'i Administrative Rules section 11-200-12. An action shall be determined to have a significant impact on the environment if it meets any one of the following criteria:

(1) Involves an irrevocable commitment to loss or destruction of any natural or cultural resource;

Discussion: The proposed Project will improve the existing potable water system. Project components will primarily replace existing infrastructure and road right-of-ways. New fire protection, will be located along existing utility lines. The new solar energy system and tanks are proposed adjacent to the existing built area surrounding the well site. The proposed Project is not anticipated to involve any construction activity that may lead to a loss or destruction of any natural or cultural resource. Site investigations revealed the absence of any resources potentially subject to irrevocable loss as a result of construction. The 7 Sites have been the subject of flora/fauna and archaeological investigations. As discussed in Section 3 of this report, the proposed Project is not expected to have a significant adverse impact on any state or federally listed plant or animal species. As discussed in Section 4 of this report, the proposed Project is not expected to have a significant impact on archaeological resources. During the design phase, plans will be developed to ensure archaeological resources identified in Site 2 are avoided. Additional on-site monitoring will ensure that any identified archaeological sites are not affected by construction activity.

(2) Curtails the range of beneficial uses of the environment;

Discussion: The proposed water infrastructure improvements will not curtail the range of beneficial uses of the environment. Rather, the improvements will allow for more efficient use of water resources. The current use of the Sites will not change as a result of this project.

(3) Conflicts with the State's long term environmental policies or goals and guidelines as expressed in Chapter 344, HRS; and any revisions thereof and amendments thereto, court decisions, or executive orders;

Discussion: The proposed Project conforms to the environmental goals and policies set forth in HRS Chapter 344. Improvements to the water system are particularly supportive of the State's Environmental Policy to conserve natural resources, promote the general welfare, and maintain conditions under which humanity and nature can co-exist [§344-3(1)].

(4) Substantially affects the economic or social welfare of the community or State;

Discussion: The proposed Project provides economic and social welfare benefits to the surrounding community by providing an essential public utility while substantially reducing energy cost required for delivery.

(5) Substantially affects public health;

Discussion: The proposed Project will improve the health, sanitation and security of the potable water system, thereby enhancing public health. There will be temporary impacts to noise and air quality levels during the construction phase of the Project; however, these potential impacts will be short-term and are not expected to substantially affect public health. All construction activities will comply with applicable regulations and will implement appropriate mitigation measures. After construction, the development should have minimal impact on ambient noise levels or air and water quality.

(6) Involves substantial secondary impacts, such as population changes or effects on public facilities;

Discussion: The proposed Project will not result in substantial secondary impacts such as population changes, nor will it place additional infrastructure demands on existing roads, wastewater, or drainage systems. The proposed Project will enhance and improve potable water system service for the community.

(7) Involves a substantial degradation of environmental quality;

Discussion: As discussed in Chapter 3, the proposed Project is not anticipated to have significant adverse impacts on the region's geology, surrounding topography, soil quality, or hydrology. The proposed project will allow DHHL to provide to eligible native Hawaiians a clean and safe environment with the improvements, including water and fire protection, installed in conformance with appropriate State and County environmental standards.

(8) Is individually limited but cumulatively has considerable effect on the environment, or involves a commitment for larger actions;

Discussion: The proposed Project is to improve the existing water system The Project is not part of a larger project, nor does it commit the State to any other larger actions, and will not generate any additional actions having a cumulative effect on the environment..

(9) Substantially affects a rare, threatened or endangered species or its habitat;

Discussion: As discussed in Chapter 3, the proposed Project is not anticipated to have an adverse effect on threatened or endangered species. During construction, the project will follow precautionary mitigation measures set forth by USFWS.

(10) Detrimentally affects air or water quality or ambient noise levels;

Discussion: No State or Federal air quality standards will be violated as a result of the improvements during or after the construction of the Project. The anticipated issues related to air quality are anticipated during construction only. Long-term negative impacts related to air quality are not expected. There will be a slight decrease in carbon emissions generated on Moloka'i as a result of the proposed installation of a 1 MW solar energy generation and storage system replacing energy supplied by the MECO diesel power generation plant having a positive effect on air quality. The storage of diesel fuel at the well site is not anticipated to increase air emissions as the generator operations are not expected to increase.

No State or Federal water quality standards will be violated as a result of the improvements during or after the construction of the Project. The Project will comply with nonpoint source prevention measures through the NPDES permit. While the Project will result in an increase in impervious surface area, over the site's former vacant use; any increase in runoff will be accommodated by infiltration on DHHL property. There is a slight increased probability of a release due to tank failure over the status quo that could affect water quality. However, the proposed AST is being designed with secondary containment with leak detection. In 2012 the EPA evaluated the proposed design and concurred that the proposed would not negatively affect the underlying aquifer. Operation of the existing generator will not increase as a result of the construction of the fuel storage tank. The storage tank installation may reduce the number of trips fuel vehicles need to make to the well site. By reducing the number of manual generator fills, the probability of a spill due to human error will likely decrease.

The project will not result in long term detrimental effect on ambient noise levels. The storage tank installation may reduce the number of trips fuel vehicles need to make to the well site. This will have a positive impact on noise by reducing total number of fuel tank trips required. Construction activities however will inevitably create temporary noise impacts. If necessary, contractors will employ mitigation measures to minimize those temporary noise impacts including the use of mufflers and implementing construction curfew periods. Pursuant to Chapter 11-46, Hawai'i Administrative Rules, all construction activities must comply with all community noise controls. Upon completion of construction activities, noise impacts are expected to return to preconstruction levels.

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

Discussion: The Project will not affect any environmentally sensitive areas. As portions of the Project are located in tsunami and flood hazard zones, compliance with rules and regulations of

Title 44 of the Code of Federal Regulations (CFR) and Maui County Code is necessary. The proposed actions located in these flood hazard areas (replacement of existing transmission pipes, in-line valves, and fire hydrants) will replace aging equipment, reducing potential for leaks that can exacerbate naturally occurring flooding.

(12) Substantially affects scenic vistas and view planes identified in County or State plans or studies; or,

Discussion: As the proposed Project involves improvements to the existing infrastructure, most of which is underground, there are no anticipated negative impacts to the visual resources of the surrounding environment. The proposed water tank at the Site 1 is not anticipated to have a negative impact on view shed due to its location next to the existing water tank at the well site. Moreover, as a majority of the improvements will effectively replace or repair the aging equipment and facilities, there may in fact be beneficial impacts to the visual resources.

(13) Requires substantial energy consumption.

Discussion: The Project improvements will not require energy consumption substantially greater than what is presently required. Electricity for pumping and disinfection at Site 1 will be provided primarily by the proposed on-site one-megawatt solar energy generation and storage system instead of by MECOs off-site diesel power plant. Conversion to a renewable energy source is a positive impact when compared to the status quo.

7.2 Anticipated Determination

Pursuant to Chapter 343, HRS, the determining agency, the Department of Hawaiian Home Lands anticipates issuing a Finding of No Significant Impact (FONSI) for this environmental assessment based on the impacts and mitigation measures examined in this document, comments received during the pre-assessment consultation, public comment received during the public review period, and analyzed under the above criteria.

8 CONSULTATION

8.1 Consultation Overview

During DHHL's Regional Planning Process that began in 2007, the community identified several issues with the potable water system. The Department of Health also identified several issues that while not eminent hazards would improve the safety, security, and reliability of the water system. DHHL, in consultation with USDA-RD, developed a list of improvements to be included in an application request for federal funds. Consultation with agencies, Native Hawaiian Organizations (NHO), and individuals began in 2011 based on the preliminary project list. In 2015 DHHL identified additional improvements that if incorporated into the Project would improve fire protection, reliability, security, health, and sanitation and decrease long-term energy costs. These projects were incorporated into the proposed improvements. Agencies, organizations, and individuals previously consulted were then re-engaged for consultation based on the expanded scope of the Project.

8.2 Pre-Assessment Consultation

Prior to preparation of the Draft EA, the agencies, organizations and individuals listed in Table 8-1 were sent pre-assessment consultation letters in 2011/2012. The purpose of the pre-assessment consultation was to identify environmental issues and concerns to be addressed in the Draft EA. In 2015, additional actions were added, expanding the Project scope. A second pre-assessment consultation was mailed to agencies and individuals in 2015 (Table 8-2). This list includes Native Hawaiian Organizations that were also contacted for invitation to participate in the consultative process required under Section 106 of the National Historic Preservation Act. Copies of the written comments and responses from both pre-assessment consultations are reproduced in Appendix B.

Table 8-1: Pre-Assessment Consultation Mailing List, 2011/2012

Jurisdiction	Agency	Division (as applicable)
Federal	U.S. Army- Corp of Engineer	District, Honolulu
Federal	U.S. Fish and Wildlife Service	
Federal	U.S. Department of Agriculture-	Natural Resources Conservation Service Pacific Islands Area State Office
Federal	U.S Environmental Protection Agency Region IX	Ground Water Office
State of Hawai'i	Office of Environmental Quality Control	
State of Hawai'i	Land Use Commission	
State of Hawai'i	Department of Agriculture	
State of Hawai'i	Department of Business Economic Development and Tourism,	State Office of Planning
State of Hawai'i	Department of Health	

State of Hawai'i	Department of Health	Maui District Health Office
State of Hawai'i	Department of Health	Clean Air Branch
State of Hawai'i	Department of Health	Environmental Planning Office
State of Hawai'i	Department of Health	Hazard Evaluation and Emergency Response Office
State of Hawai'i	Department of Health	Clean Water Branch
State of Hawai'i	Department of Health	Safe Drinking Water Branch
State of Hawai'i	Department of Land and Natural Resources	
State of Hawai'i	Department of Land and Natural Resources	State Historic Preservation Division
State of Hawai'i	Department of Land and Natural Resources	State Historic Preservation Division ,Maui Office Annex
State of Hawai'i	Department of Transportation	
State of Hawai'i	Department of Transportation	Maui District Office
State of Hawai'i	Office of Hawaiian Affairs	
State of Hawai'i	Department of Health	Indoor and Radiological Health Branch, Asbestos Abatement Office
	State Representative (13th District)	
	State Senator (6th District)	
County of Maui	Civil Defense Agency	
County of Maui	Department of Planning	
County of Maui	Department of Fire and Public Safety	
County of Maui	Department of Public Works	
County of Maui	Department of Environmental Management	
County of Maui	Department of Transportation	
County of Maui	Department of Water Supply	
County of Maui	Office of the Mayor	
County of Maui	County Council Chair	
County of Maui	County Council Vice Chair	
	Maui/Lanai Islands Burial Council	
	Ahupua'a o Moloka'i	
	Kalama'ula Hawaiian Homestead Association	

Table 8-2: Pre-Assessment Consultation List, 2015

STATE OF HAWAI'I	
Department of Accounting and General Services	DOH-Clean Air Branch
Department of Business, Economic Development & Tourism	DOH-Environmental Planning Office
DBEDT - Energy Division	DOH-Clean Water Branch
DBEDT - Office of Planning	DLNR - Historic Preservation Division
Department of Defense	DLNR - Historic Preservation Division-Maui Lead Archaeologist
Department of Education	DLNR - Historic Preservation Division-Maui Lead Archaeologist
Department of Health	Office of Hawaiian Affairs
Department of Human Services	DOH-Maui District Health Office
Department of Labor and Industrial Relations	DOH-Maui District Health Office
Department of Land and Natural Resources	DOH-Hazard Evaluation and Emergency Response Office
Department of Transportation	DOH-Hazard Evaluation and Emergency Response Office
DOT- Maui District Office	DOH-Safe Drinking Water Branch
Department of Agriculture	UH Water Resources Research Center
FEDERAL	
U.S. Army Corps of Engineers	U.S. Department of Agriculture, Natural Resources Conservation Service
U.S. EPA Region 9	U.S. Department of Agriculture, Natural Resources Conservation Service
U.S. Fish and Wildlife Service	Federal Emergency Management Agency

COUNTY OF MAUI	
Department of Fire and Public Safety	Police Department
Maui Planning Department	LIBRARIES
Department of Environmental Management	NEWS MEDIA
Department of Housing and Human Concerns	Honolulu Start Advertiser
Department of Parks and Recreation	The Maui News
Department of Public Works	Moloka'i Dispatch
Department of Transportation	Ka Wai Ola
Department of Water Supply	
ELECTED OFFICIALS	
State Senator (District 7)	State Representative (District 13)
OHA Trustee	Maui County, Office of the Mayor
County Council Chair	County Council Vice Chair
County Council- Moloka'i	Moloka'i Burial Council
Moloka'i Burial Council	Moloka'i Burial Council
Moloka'i Burial Council	
CITIZEN GROUPS/INDIVIDUALS, CONSULTED PARTIES	
Hawaiian Telcom	The Nature Conservancy
Maui Electric Company, Ltd	Sierra Club Maui Group
'Aha Kāne	Hawaiian Community Assets, Inc.
Aha Kukaniloko Koa Mana mea ola kanaka mauli	Ho Ohana
Aha Moku O Kahikinui	Ho'okano Family Land Trust

Aha Moku o Maui Inc.	Hui Ho'oniho
Aha Wahine	Hui Huliau
'Ahahui Siwila Hawai'i O Kapōlei	Hui Kaleleiki Ohana
Ahupua'a o Moloka'i	Hui Mālama Ola Nā 'Ōiwi
Aloha First	Kaha I Ka Panoa Kaleponi Hawaiian Civic Club
Association of Hawaiian Civic Clubs	Kāko'o 'Ōiwi
Association of Hawaiians for Homestead Lands	Kalaeloa Heritage and Legacy Foundation
Au Puni O Hawaii	Kalama'ula Mauka Homestead Association
Brian Kaniela Nae'ole Naauao	Kalama'ula Mauka Homestead Association
Charles Pelenui Mahi Ohana	Kalihi Palama Hawaiian Civic Club
Council for Native Hawaiian Advancement	Kamealoha
Friends of 'Iolani Palace	Kamehameha Schools - Community Relations and Communications Group, Government Relations
Friends of Moku'ula, Inc.	Kamiloloa One Alii Homestead Association
George K. Cypher 'Ohana	Kanu o ka 'Āina Learning 'Ohana
God's Country Waimanalo	Kapolei Community Development Corporation
Hau'ouiwi Homestead Association on Lāna'i	Kauwahi 'Anaina Hawai'i Hawaiian Civic Club
Hawaiian Civic Club of Hilo	Kawaihapai Ohana
Hawaiian Civic Club of Wahiawa	Kingdom of Hawai'i
Ko'olau Foundation	Nānākuli Housing Corporation
Ko'olaupoko Hawaiian Civic Club	Native Hawaiian Church
Koa Ike	Native Hawaiian Economic Alliance
La'i 'Ōpua 2020	Native Hawaiian Education Council

Lahui Kaka'ikahi	Nekaifes Ohana
Ma'a 'Ohana c/o Lani Ma'a Lapilio	Office of Hawaiian Affairs
Machado-Akana -Aona-Namakaeha Ohana	Order of Kamehameha I
Mahu Ohana	Pacific Agricultural Land Management Systems
Mainland Council Association of Hawaiian Civic Clubs	Pacific Justice & Reconciliation Center
Mākaha Hawaiian Civic Club	Papa Ola Lōkahi
Maku'u Farmers Association	Papakōlea Community Development Corporation
Malu'ōhai Residents Association	Partners in Development Foundation
Marae Ha'a Koa	Paukukalo Hawaiian Homes Community Association
Meleana Kawaiaea, LLC	Peahi Ohana
Menehune Foundation	Piihonua Hawaiian Homestead Community Association
Moku o Kaupo	Royal Hawaiian Academy of Traditional Arts
Na Aikane O Maui	The Friends of Hokule'a and Hawai'iloa
Na Koa Ikaika Ka Lahui Hawaii	The I Mua Group
Na Ku'auhau 'o Kahiwakaneikopolei	Wai'anae Hawaiian Civic Club
Nā Kuleana o Kānaka 'Ōiwi	Waiehu Kou Phase 3 Association
Na Ohana o Puaoi a me Hanawahine	Waimānalo Hawaiian Homes Association

8.3 Consultation Meetings

In addition to written correspondence, meetings to satisfy the consultation requirements for Section 106 of the National Historic Preservation Act were held. All DHHL homestead association leadership on Moloka'i were provided an opportunity to meet and discuss cultural resources and the project. On-island meetings were held with homestead leadership on

December 1, 2011 and October 1, 2015. A follow-up teleconference meeting was held on December 9 2011 to continue discussions, and to engage leadership unable to attend December 9 2011 meeting. All NHO listed on DOI's September 2015 NHO list were provided an opportunity to schedule a one-on-one meeting on Moloka'i island on October 1-2, 2015, however no requests were made.

(This page left blank intentionally.)

9 REFERENCES

Akinaka and Associates. (2007). *Molokai Water Systems.* Prepared for Department of Hawaiian Home Lands.

Baker, H.L. et al. (1965). *Detailed Land Classification, Island of Hawai'i.* L.S. Land Study Bureau, University of Hawai'i.

Cooper, C & Daws, C. (1985). *Land and Power in Hawai'i.* University of Hawai'i Press.

County of Maui - Department of Planning. (2015). *Moloka'i Community Plan Update - Planning Department/CPAC Draft.* Maui: County of Maui.

Environmental Protection Agency. (2015) *Diesel Particulate Matter.* Retrieved from http://www3.epa.gov/region1/eco/airtox/diesel.html.

Fletcher III, C. H., Grossman, E. E., Richmond, B. M., & Gibbs, A. E. (2002). *Atlas of Natural Hazards in the Hawaiian Coastal Zone.* Denver, CO: United States Geological Survey Information Services.

Giambelluca, T. W., Shuai, X., Barnes, M. L., Alliss, R. J., Longman, R. J., Miura, T., Businger, A. D. (2014). *Evapotranspiration of Hawai'i. Final report submitted to the U.S. Army Corps of Engineers - Honolulu District, and the Commission on Water Resource Management, State of Hawai'i.* Retrieved from Climate of Hawai'i: http://climate.geography.hawaii.edu/

Group 70 International. (2005). *Moloka'i Island Plan.* Prepared for Department of Hawaiian Home Lands

Hawai'i Institute of Marine Biology. (2015, September 25). *Watersheds in the Moloka'i Region.* Retrieved from Hawai'i Coral Reef Assessment and Monitoring Program: http://cramp.wcc.hawaii.edu/Watershed_Files/Molokai/WS_Molokai_molokai.htm

Juvik & Juvik. 1998. *Atlas of Hawai'i. Third Edition.* University of Hawai'i Press, Honolulu, Hawai'i.

Macdonald, Abbott & Peterson. 1983. *Volcanoes in the Sea.* University of Hawai'i Press, Honolulu, Hawai'i.

National Fire Protection Agency. (2015). *NFPA 30 FAQs.* Retrieved from https://www.nfpa.org/Assets/files/AboutTheCodes/30/30_FAQs.pdf.

Natural Resources Conservation Service, United States Department of Agriculture. (Accessed September 2015). *Web Soil Survey*. Retrieved from http://websoilsurvey.nrcs.usda.gov/

Occupational Safety and Health Administration. (2015). *Safety and Health Topics, Diesel Exhaust.* Retrieved from https://www.osha.gov/SLTC/dieselexhaust/index.html

Pacific Legacy, Inc. (2011). *Literature Review of Previous Archaeological Work Within 8,955 Acres Owned by the Department of Hawaiian Home Lands on the Island of Moloka'i.* Prepared for Department of Hawaiian Home Lands.

PBR HAWAII. (2007). *Moloka'i Regional Plan.* Prepared for Department of Hawaiian Home Lands

PBR HAWAII. (2010). *Moloka'i Regional Plan.* Prepared for Department of Hawaiian Home Lands

PBR HAWAII. (2014). *O'ahu Island Plan,* "DHHL Planning System." Prepared for Department of Hawaiian Home Lands

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. (2015, September 24). *Official Soil Series Descriptions (OSDs).* Retrieved from USDA Natural Resources Conservation Service Soils: http://www.nrcs.usda.gov

State of Hawai'i Commission on Water Resource Management (2008) *Report of Molokai Water Working Group*

State of Hawaii, Department of Business, Economic Development & Tourism. 2010 State of Hawai'i Data Book. Accessed 12/29/11, Retrieved from http://hawaii.gov/dbedt/info/economic/databook/db2010/index_html

State of Hawaii, Department of Health. (2014). *2014 State of Hawaii Water Quality Monitoring and Assessment Report.* Retrieved from http://health.hawaii.gov/cwb/files/2013/05/2014_Draft-Integrated-Report_public-comment.pdf

State of Hawai'i Department of Health. Hawaii Administrative Rules, Title 11, Chapter 46 (1981, revised 1996). "Community Noise Control"

State of Hawai'i Department of Health. Land Use Review Program accessed June 14, 2012.Retrieved from www.hawaii.gov/health/envrionmental/env-planning/landuse/landuse.html

State of Hawai'i, Department of Health. (2008). *2006 State of Hawai'i Water Quality Monitoring and Assessment Report: Integrated Report to the US Environmental Protection Agency and the US Congress Pursuant to Sections 303(D) and 305(B), Clean Water Act (PL 97-117).* Retrieved from http://hawaii.gov/health/environmental/env-planning/wqm/wqm.html/

State of Hawai'i, Department of Health, Solid and Hazardous Waste Branch, Underground Storage Tank Section. 2010. Retrieved from http://hawaii.gov/health/environmental/waste/ust /ust/data.html

State of Hawai'i, Department of Health, Hazard Evaluation and Emergency Response Office. *HEER Emergency Response Lookup Spreadsheet.* Retrieved from http:// hawaii.gov/health/environmental/ hazard/docs/heerreleases013112.xlsx

State of Hawai'i, Department of Health, Hazard Evaluation and Emergency Response Office. *HEER Sites of Interest Lookup Spreadsheet.* Retrieved from http://health.hawaii.gov/about/links-to-doh-program-information/environmental-health-administration/#HEERO

State of Hawai'i, Department of Labor and Industrial Relations. Unemployment Rate and Labor Force. (2015). Retrieved from https://www.hiwi.org/admin/gsipub/htmlarea/uploads/LFR_LAUS_Urate_current.pdf

State of Hawai'i, Department of Land and Natural Resources, Commission on Water Resource Management. (2003). *State Water Projects Plan, Hawaii Water Plan*

State of Hawai'i Department of Land and Natural Resources, Parks and Recreation Division. (2008). State Comprehensive Outdoor Recreation Plan.

United States Census Bureau, American Fact Finder. Accessed 12/29/11 http://factfinder2.census.gov.

United States Department of Agriculture, Natural Resource Conservation Service. Hawai'i Soils. Website: http:// http://www.ctahr.hawaii.edu/soilsurvey/soils.htm.

United States Department of Agriculture Soil Conservation Service. Soil Survey of Islands of Kauai, Oahu, Maui, Moloka'i , and Lanai, State of Hawai'i. 1972. http://soils.usda.gov/survey/online_surveys/hawaii/HI950-990/Five_islands_SS.pdf

United States Department of Agriculture, Engineering and Environmental Staff, Rural Utilities Service. (2008). *RUS Bulletin 1794A-602, version 1.2,* "Guide for Preparing the Environmental Report for Water and Environmental Program Proposals" Website: http://www.usda.gov/rus/water/ees/bulletin.htm.

United States Environmental Protection Agency. National Ambient Air Quality Standards (NAAQS), (40 CFR50). Website: at http://www.epa.gov/air/criteria.html

United States Environmental Protection Agency, Region IX Sole Source Aquifer. Accessed January 9, 2012. Website: http://www.epa.gov/region9/water/groundwater/ssa.html.

United States Environmental Protection Agency, Envirofacts & CERCLIS Website: http://www.epa.gov/enviro/index.html

University of Hawai'i, Coral Reef Assessment and Monitoring Program Hawai'i, Hawai'i Institute of Marine Biology. Accessed June 14, 2012.Website: http://cramp.wcc.hawaii.edu/Watershed_Files/Molokai/WS_Molokai_molokai_SouthMolokai.htm

University of Hawai'i at Mānoa, School of Ocean and Earth Science and Technology. (2015, September). *Moloka'i.* Retrieved from Coastal Geology Group: http://www.soest.hawaii.edu/coasts/publications/hawaiiCoastline/molokai.html

Wagner, W.L., D.R. Herbst, & S.H. Sohmer. (1990). Manual of the flowering plants of. Hawai'i. 2 vols. Univ. of Hawaii Press & Bishop Museum Press, Honolulu.

Western Regional Climate Center. Accessed June 14, 2012.
Website: http://www.wrcc.dri.edu/htmlfiles/westwinddir.html#HAWAII