CHAPTER 3.0
AFFECTED ENVIRONMENT/POTENTIAL IMPACTS/ CONSERVATION AND CONSTRUCTION MEASURES

For undersea cable routing and potential landing site areas in Hawai‘i, this chapter presents resource-specific discussions of the following:

- Affected environment (existing setting and conditions)
- Environmental consequences
- Conservation and construction measures

A total of 16 different resources are discussed. The specific resources and the order of discussion are as follows:

- Air quality and climate change (Section 3.1)
- Cultural resources (Section 3.2)
- Geology and soils (Section 3.3)
- Land transportation (Section 3.4)
- Land use (Section 3.5)
- Marine transportation (Section 3.6)
- Marine/benthic species and habitat (Section 3.7)
- Natural hazards, hazardous waste, and unexploded ordnance (Section 3.8)
- Noise and vibration (Section 3.9)
- Public health and safety (Section 3.10)
- Public services/infrastructure (Section 3.11)
- Recreation (Section 3.12)
- Socioeconomics and environmental justice (Section 3.13)
- Terrestrial/coastal biological resources, species, and habitat (Section 3.14)
- Visual resources (Section 3.15)
- Water resources (Section 3.16)

Each resource section follows a common outline, including six primary sections:

- Resource definition
- Regulatory setting
- Region of influence
- Affected environment
- Potential impacts cable system implementation
- General siting criteria and conservation and construction measures

For the affected environment, potential impacts, and general siting criteria and construction and conversation measures sections, appropriate discussions are broken down by geographic area relevant to undersea cable routing and identified potential landing site areas as follows:

- General
- Maui County-Oʻahu routing specific
    - Maui
        - Maui-Kahului Harbor
        - Maui-Kapalua (West Maui)
    - Lānaʻi
    - Molokaʻi
        - Molokaʻi-Kaluakoi (West Molokaʻi)
        - Molokaʻi-Kaunakakai (South Molokaʻi)
    - Oʻahu
        - Oʻahu-MCBH at Kāneʻohe Bay
        - Oʻahu-Pearl Harbor
    - Federal waters

Each of the Maui, Lānaʻi, and Oʻahu specific discussions are further subdivided into terrestrial and state water discussions where appropriate.

3.1 AIR QUALITY AND CLIMATE CHANGE

This section identifies air quality and climate conditions within and adjacent to potential landing site areas and marine surveyed areas. This section further evaluates the potential air quality impacts that may result from activities associated with the implementation of an undersea power cable system and identifies the methodologies for evaluating conservation methods to minimize and/or avoid impacts.

3.1.1 Resource Definition

Terrestrial including Shoreline

Air Quality

Air quality is defined as a measurement of pollutants in the air, and the health and safety aspect of those pollutants to humans. Air pollution is a general term that refers to one or more chemical substances that degrade the quality of the atmosphere. Air pollutants are any substances, natural or artificial, capable of being airborne, that in high enough concentration, can potentially harm humans, animals, vegetation or materials. Air pollution is caused by many different man-made and natural sources. There are industrial sources of pollution, such as power plants; mobile sources, such as trucks; agricultural sources, such as cane burning; and natural sources, such as windblown dust and volcanic activity (HDOH 2011).

Air quality in a given location is defined by the concentration of various pollutants in the atmosphere, generally expressed in units of parts per million or micrograms per cubic meter ($\mu g/m^3$). Air quality is determined by the type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions.

Odor is considered an air quality issue, either at the local level (e.g., odor from operations of a stationary source) or at the regional level (e.g., wildfire smoke). An air pollutant means any fume, smoke, particulate matter (PM), vapor, gas, odorous substance, or any combination thereof.

Climate and Climate Change/Greenhouse Gases

Climate refers to the average weather conditions in a region over a long period of time. The climate of a location is affected by its latitude and topography, as well as by the nearby ocean and its currents. Specific climate types can be described based on characteristics such as temperature and rainfall.

Climate change is a long-term change in the statistical distribution of weather patterns over periods of time that range from decades to millions of years. It may be a change in the long-term average weather conditions or a change in the distribution, frequency, or intensity of weather events. Climate change may be limited to a specific region, or may occur across the whole earth. In recent usage, especially in the context of environmental policy, climate change usually refers to changes in modern climate. It may be qualified as anthropogenic climate change, more generally known as global warming or anthropogenic global warming (AGW). The most general definition of climate change is a change in the statistical properties of the climate system when considered over periods of decades or longer, regardless of cause. Accordingly, fluctuations on periods shorter than a few decades, such as El Niño, do not represent climate change.

According to the Fourth Assessment Report by the Intergovernmental Panel on Climate Change (IPCC), global climate change is very likely caused by anthropogenic greenhouse gas (GHG) concentrations (IPCC 2007). GHGs are gases that trap heat in the atmosphere. These emissions occur from natural processes as well as human activities. GHGs play a critical role in the earth's radiation budget by trapping infrared radiation emitted from the earth's surface, which could have otherwise escaped outside the earth's atmosphere. The accumulation of GHGs in the atmosphere regulates, in part, the earth's temperature. Scientific evidence suggests a trend of increasing global temperatures over the past century potentially due to an increase of GHG emissions from human activities. According to the U.S. Environmental Protection Agency (USEPA), the principal anthropogenic GHGs include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Of these gases, CO_2 is recognized by the IPCC as the primary GHG affecting climate change (IPCC 2007). Present atmospheric concentrations of CO_2 are believed to be higher than at any time in at least the last 650,000 years, primarily as a result of combustion of fossil fuels (IPCC 2007). It is also very likely that observed increases in CH_4 are also partially caused by fossil fuel use (IPCC 2007).

Prevention of Signification Deterioration to Class I Areas

In the Clean Air Act Amendments of 1977, Congress specified the initial classification of land for Prevention of Signification Deterioration (PSD) purposes. Certain lands, where existing air quality conditions are considered "good" and are deemed to be of national importance, were designated as Class 1 and may not be reclassified. These mandatory Class I areas include all international parks, national memorial parks larger than 5,000 acres, and national parks larger than 6,000 acres that were in existence when the Amendments were passed. All other areas to which the PSD provisions apply were classified as Class II areas.

3.1.2 Regulatory Setting

Criteria Air Pollutants

Federal Standards

The Clean Air Act (CAA) Title 42 United States Code (U.S.C.) Sections 7401–7671(q), amended in November 1990, stipulates that emissions sources must comply with the air quality standards and regulations that have been established by federal, state, and county regulatory agencies. These standards and regulations focus on 1) the maximum allowable ambient pollutant concentrations, and 2) the maximum allowable emissions from individual sources.

USEPA established the federal standards for the permissible levels of certain pollutants in the atmosphere. The National Ambient Air Quality Standards (NAAQS) have been established for six criteria pollutants: ozone, nitrogen dioxide (NO_2), particulate matter (PM), carbon monoxide (CO), sulfur dioxide (SO_2), and lead (Pb). A criteria pollutant is any air pollutant for which there is an established NAAQS. Particulate matter has been divided into two separate standards: inhalable particulates, equal to or smaller than 10 microns in diameter (PM_{10}); and fine particulates, equal to or smaller than 2.5 microns in diameter ($PM_{2.5}$). Lead is considered in the demolition of older facilities that may contain lead-based paint (LBP). Ozone is a secondary pollutant formed in the atmosphere by photochemical reactions of previously emitted pollutants, or precursors. The ozone precursors are nitrogen oxide (NO_X) and volatile organic compounds (VOCs).

Two types of standards have been established. Primary standards set limits to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, which includes protection against decreased visibility and damage to animals, crops, vegetation, and buildings. Table 3.1-1 contains the current NAAQS for the criteria air pollutants.

USEPA designates all areas of the U.S. as having air quality better than (attainment) or worse than (nonattainment) the NAAQS. The attainment status of an area is determined through an evaluation of available air quality data. Pollutants in an area may be designated as unclassified when there are insufficient ambient air quality data for USEPA to form a basis for an attainment status. The nonattainment classifications for CO and PM_{10} are further divided into moderate and serious categories. Ozone nonattainment is divided into marginal, moderate, serious, severe, and extreme categories.

Hawai‘i Standards

The Hawai‘i Department of Health (HDOH) also regulates air quality and established ambient air quality standards (Hawai‘i Administrative Rules [HAR] 11-59-4) that are as strict or, in some

cases, stricter than the federal NAAQS. In addition to the federal criteria pollutants, the State of Hawai'i has established a state ambient air standard for hydrogen sulfide. The State has also established standards for fugitive dust emissions emanating from construction activities (HAR Chapter 11-60.1-33). These standards prohibit any visible release of fugitive dust from construction sources without taking reasonable precautions. State and federal standards are summarized in Table 3.1-1.

General Conformity Rule

As part of its enforcement responsibilities, USEPA also requires each state with federal nonattainment areas to prepare and submit a State Implementation Plan (SIP) that demonstrates the means to attain the federal standards. The SIP must integrate federal, state, and local plan components and regulations to identify specific measures to reduce pollution, using a combination of performance standards and market-based programs within the timeframe identified in the SIP. The General Conformity Rule (Title 40 Code of Federal Regulations [C.F.R.] Part 93.150-93.160) requires any federal agency responsible for an action in a nonattainment or maintenance area to determine whether that action conforms to the applicable SIP or whether the action is exempt from the conformity rule requirements. The CAA General Conformity applicability analysis would not be required as part of the environmental review associated with the implementation of an undersea power cable system because the State of Hawai'i is in an attainment area for each criteria pollutant (HDOH 2011).

Greenhouse Gas Emissions

Federal Standards

Federal agencies are, on a national scale, addressing emissions of GHGs by reduction mandated in federal laws and Executive Orders (EOs). Most recently, EO 13423 *Strengthening Federal Environmental, Energy, and Transportation Management* and further expanded by EO 13514 *Federal Leadership in Environmental, Energy, and Economic Performance*, were enacted to address GHGs in detail, including GHG emission inventory, reduction, and reporting.

State Standards

State of Hawai'i, Act 234 (Session Laws of Hawai'i 2007) mandated that statewide GHG emissions be reduced to 1990 state levels, or below, by 2020. The law required the establishment of an inventory of all GHG emissions, the designation of a binding cap on emission levels, and the creation of a set of rules that allows HDOH to level fines on companies that violate the emission standards. HRS Chapter 342B-71 adopted the statewide GHG emissions limit to be achieved by 2020 as equal to or below the level of the statewide GHG emissions in 1990, as determined by Section 3 of Act 234, provided that for the purposes of this Act GHG emissions from airplanes shall not be included. HRS Chapter 342B-72 required the

establishment of GHG emission limits, emission reduction measures, and reporting and verification of statewide GHG emissions in accordance with the Work Plan[1] of the Greenhouse Gas Emissions Reduction Task Force. The Work Plan recommended support for the HCEI and recommended against regulations and fees.

Prevention of Signification Deterioration Regulations

As part of the PSD Regulation (Title 40 C.F.R. Part 52.21), the CAA set a long-term goal of improving visibility to achieve natural conditions in selected areas of the U.S. (national parks greater than 6,000 acres or national wilderness areas greater than 5,000 acres). These areas are granted special air quality protections under Section 162(a) of the federal CAA. Under Title 40 C.F.R. Part 51.307, it is required that the operator of any new major stationary source or major modification located within 100 km of a Class I area contact the federal land managers for that area. In 1999, the USEPA promulgated a regional haze regulation that requires states to establish goals and emission reduction strategies to make initial improvements in visibility at their respective Class I areas.

As an attainment area, the entire state of Hawai'i is regulated under the Prevention of Significant Deterioration program authorized by the CAA Part C 160 through 169, which requires that owners and/or operators of new or modified stationary sources obtain a PSD permit prior to construction of a major source situated in attainment or unclassified area. A major source is defined by PSD regulations as being a specific type of stationary source listed by the USEPA that has a potential of emitting 100 tons per year (tpy) or more of a regulated pollutant. A source not listed by the USEPA may also be considered major if it has the potential to emit 250 tpy or more of a regulated pollutant. PSD permitting criteria would be applicable if the potential emissions of a regulated pollutant from the converter stations (as listed types) exceed 100 tpy or total facility emissions exceed 250 tpy. Because the converter station would not be considered a major source as defined by the PSD permitting program, this regulation would not apply to an undersea power cable system.

Toxic Air Contaminants

In addition to the criteria pollutants addressed in the NAAQS, the USEPA regulates air toxics. Air toxics pollutants are those known or suspected to cause cancer or other serious health effects. Toxic air pollutants (air toxics or toxic air contaminants) are often referred to as "noncriteria" air pollutants because ambient air quality standards have not been established for them. The CAA identified 188 hazardous air pollutants (HAPs) that have been associated with adverse environmental and health effects. A subset of 33 HAPs was selected in the USEPA's Urban Air Toxic Strategy as having the greatest impact on the public and environment in urban areas. National monitoring efforts have been directed toward these 33 HAPs. Based on

[1] See http://hawaii.gov/dbedt/main/about/annual/2009-reports/2009-sid-ghgrtf.pdf.

consultation with the USEPA and a review of available methodology and resource limitations; the state of Hawai‘i has focused its monitoring on 17 of these 33 HAPs (HDOH 2011). There are no published ambient air quality standards for air toxics.

3.1.3 Region of Influence

The Region of Influence (ROI) for air quality impacts is dependent on the pollutant and emission sources that are under consideration. The ROI for directly emitted primary pollutants is much more localized because dispersion processes reduce pollutant concentrations as emissions are transported away from the point of emission. For primary pollutants, the ROIs most likely to be affected by air quality impacts would primarily be the immediate landing site areas, associated converter station pads, and the construction transportation routes associated with each. Any air quality impacts would be greatest at the landing site areas with air impacts anticipated to diminish in proportion to increased distance from the site. The ROI for a regional secondary pollutant, such as ozone, generally will be islandwide. Cumulative air quality impacts would occur when multiple emission sources affect the same geographic areas simultaneously or when sequential projects extend the duration of air quality impacts on a given area over a longer period of time.

3.1.4 Affected Environment

General

Air Quality

Air quality in Hawai‘i continues to be one of the best air quality resources in the nation due to the islands’ surface area and traditional trade winds. Criteria pollutant levels remain well below state and federal ambient air quality standards. Air pollution levels in Hawai‘i are generally low due to the small size and isolation of the state. A unique feature affecting Hawai‘i’s air quality is the continued eruption of the Kīlauea volcano and its airborne emissions, which occasionally result in exceedances of NAAQS for some pollutants. The USEPA considers the volcano a natural, uncontrollable event and therefore the state is requesting exclusion of these NAAQS exceedances from attainment/nonattainment determination.

HDOH Clean Air Branch (HDOH-CAB) collects ambient air quality data from a network of monitors located throughout the state for various gaseous and particulate air pollutants. The network is designed to provide data representative of pollutant concentrations over large areas and also to determine concentrations in areas where they are expected to be the highest. The primary purpose of the statewide monitoring network is to measure ambient air concentrations of these pollutants and ensure that air quality standards are met. Most commercial, industrial, and transportation activities and their associated air quality effects occur on O‘ahu, where 5 of the 14 stations are located. The monitoring on Maui is mainly to measure the air quality impacts

from agricultural activities. The majority of the stations are located on the island of Hawai‘i to measure air quality impacts associated with volcano and geothermal energy production. The entire state of Hawai‘i continues to be in attainment of all federal NAAQS (HDOH 2011 and USEPA 2012), with the exception of the exceedances because of the volcano and fireworks (HDOH 2011); the State requested exclusion for these exceedances from attainment/ nonattainment determinations.

Climate and Climate Change

Hawai‘i’s climate is characterized by two seasons: summer (May through September) and winter (October through April). In general, the islands have relatively mild temperatures and moderate humidity throughout the year (except at high elevations), with persistent northeasterly trade winds and infrequent severe storms. However, summer is typically warmer and drier, with minimal storm events. The trade winds are prevalent 80 to 95 percent of the time during the summer months, when high-pressure systems tend to be located north and east of Hawai‘i. For limited days during the year, the northeasterly trade wind process is interrupted and reversed by a “Kona” wind system, resulting in southwesterly, warm winds blowing across the state. This weak system can result in an amplification of volcanic smog (or “vog”) throughout the state with its associated deterioration of air quality. During the winter months, the high-pressure systems are located farther to the south, decreasing the prevalence of the trade winds to about 50 to 80 percent of the time. Despite the strong marine influence resulting from Hawai‘i’s insularity, some mountainous areas exhibit semicontinental conditions. Combined with the rugged and irregular topography, the result is diverse climatic conditions across the various regions of the state, including significant geographic differences in rainfall amounts, which range from 20 inches to 300 inches annually (WRCC 2010).

Climate change associated with global warming is predicted to produce negative environmental, economic, and social consequences across the globe. Recent observations of changes include shrinking glaciers, thawing permafrost, a lengthened growing season, and shifts in plant and animal ranges (IPCC 2007). Predictions of long-term negative environmental impacts due to global warming include sea level rise, changing weather patterns with increases in the severity of storms and droughts, changes to local and regional ecosystems including the potential loss of species, and a significant reduction in winter snow pack accumulations. Island communities are especially vulnerable to a warming and more energetic climate system. Climate vulnerabilities exist at three tiers: exposure, sensitivity, and adaptive capacity. The former, exposure, is determined by climate forecasting based on sound science while the latter two are determined by the strength of the existing policy and planning infrastructure. As the only U.S. state located in the tropics, and the only one surrounded entirely by water, scientists expect climate change to affect the Hawaiian Islands in ways unlike anywhere else in the country. Some key vulnerabilities for Hawai‘i due to climate change include availability of fresh water, exposure to coastal hazards including sea level inundation, and negative impacts of climate change to coastal and marine ecosystems (UH 2010).

Prevention of Signification Deterioration Regulations

As discussed above, some national parks and wilderness areas are designated as Class 1 areas where appreciable deterioration of air quality is considered significant. The only Class 1 area within the HIREP study area is Haleakalā National Park, Maui. The maximum allowable pollutant concentration increase under PSD regulations for a Class 1 area is defined by 40 C.F.R. Parts 51 and 52.

Maui County-O‘ahu Routing Specific

Maui

Maui-Kahului Harbor

Terrestrial

Local air quality conditions at the Maui-Kahului Harbor landing site area are inferred largely from the nearest HDOH-CAB monitoring station in Kihei. The Kihei station monitors $PM_{2.5}$ pollutants for source impact (cane burning) and is located in a residential community park, next to agricultural land. $PM_{2.5}$ pollutant levels for Kihei remain below state and federal ambient air quality standards (HDOH 2011). In addition, criteria pollutant levels within the ROI are expected to be less than or comparable to levels reported at air monitoring stations on O‘ahu, as these air monitoring stations are generally placed near city centers where there are mixed commercial, industrial, and residential land uses. Therefore, it is reasoned that the existing air quality within the ROI is assumed to be in compliance with federal and state air quality standards.

As discussed above, Haleakalā National Park, Maui, approximately 15 miles southeast of the landing site area, is designated as a Class 1 area. The maximum allowable pollutant concentration increase under PSD regulations for a Class 1 area is defined by Title 40 C.F.R. Parts 51 and 52.

Maui-Kapalua (West Maui)

Terrestrial

Local air quality conditions at the Maui-Kapalua landing site area are inferred from the nearest HDOH-CAB monitoring station in Kihei. The Kihei station monitors $PM_{2.5}$ pollutants for source impact (cane burning) located in a residential community park, next to agricultural land. Criteria pollutant levels for Kihei remain below state and federal ambient air quality standards. In addition, criteria pollutant levels for the much more urbanized O‘ahu also remain below NAAQS. Therefore, it is reasoned that the existing air quality within the ROI is assumed to be in compliance with federal and state air quality standards.

Lānaʻi

Terrestrial

Local air quality conditions at the Lānaʻi landing site area are not monitored by the HDOH-CAB, as there is no air quality monitoring station on the island of Lānaʻi. Nevertheless, monitoring stations have been positioned elsewhere in the state of Hawaiʻi (Oʻahu, Maui, and Hawaiʻi) to monitor criteria pollutants in a wide variety of categories (population exposure, source impacts, and maximum concentrations), which often border on the extreme of their respective scenario. It is deduced that the Lānaʻi landing site area remains below state and federal ambient air quality standards as there are no criteria air pollutant scenarios on Lānaʻi comparable to that of other islands.

Molokaʻi

Molokaʻi-Kaluakoi (West Molokaʻi)

Terrestrial

No HDOH-CAB air quality monitoring stations are located on the island of Molokaʻi. It is deduced that the Molokaʻi-Kaluakoi landing site area remains below state and federal ambient air quality standards as there are no criteria air pollutant scenarios in Molokaʻi comparable to that of other islands.

Molokaʻi-Kaunakakai (South Molokaʻi)

Terrestrial

No HDOH-CAB air quality monitoring stations are located on the island of Molokaʻi. It is deduced that the Molokaʻi-Kaunakakai landing area site remains below state and federal ambient air quality standards as there are no criteria air pollutant scenarios in Molokaʻi comparable to that of other islands.

Oʻahu

Oʻahu-MCBH at Kāneʻohe Bay

Terrestrial

Local air quality conditions at Marine Corps Base Hawaiʻi (MCBH) at Kāneʻohe Bay landing site area are to be inferred from a comparable HDOH-CAB monitoring station as no such station exists in Kāneʻohe. An analysis of all Oʻahu stations shows that no stations are located within an

environment comparable area to Kāne'ohe's. As that all O'ahu stations (such as the Honolulu station, which is located in a busy commercial, business, and governmental district monitoring population exposure) remain below state and federal ambient air quality standards, it is assumed that Kāne'ohe also remains below NAAQS.

O'ahu-Pearl Harbor

Terrestrial

Local air quality conditions at the Pearl Harbor landing site area are inferred from the nearest HDOH-CAB monitoring station located in Pearl City, approximately 4.34 miles from the north edge of the Pearl Harbor landing site area. The Pearl City monitoring station monitors PM_{10}, $PM_{2.5}$, and air toxics population exposure from a location on the roof of the Leeward Health Center in a commercial, residential, and light industrial area approximately 1.5 miles northwest of the Waiau power plant, near the Pearl Harbor Navy Complex. Criteria pollutant levels for this area remain below state and federal ambient air quality standards (HDOH 2011).

3.1.5 Potential Impacts of Cable System Implementation

Description of Impact Types

The nature and magnitude of potential impacts on ambient air quality associated with construction and operation of an undersea cable power system depends on many factors, such as location, scope and scale of project, type and capacity of equipment, and schedule of the construction phase. No detailed information on the site- and project-specific factors is available at this time. In addition, no equipment emission estimates are available, and no air quality modeling or emissions estimates can be completed.

The impact methodology common to each landing site area is to estimate the anticipated annual emissions from the converter station, compare the emissions to the NAAQS, and determine if mitigation is required. The converter station(s) would generate air pollutant emissions primarily from the construction of the facilities, and to a lesser degree, the operation and maintenance of the constructed facilities. Following is a discussion of the potential impacts, and related measures to reduce those impacts, for the construction and operation phases of the implementation of an undersea power cable system.

Terrestrial Impacts

General Construction Terrestrial Impacts

Construction-related emissions are described as "short-term" or temporary in duration and have the potential to represent a significant impact with respect to air quality. Potential short-term

construction-related impacts to local air quality are expected to be primarily from fugitive dust associated with clearing and grading of the land, and construction vehicles traveling on unpaved surfaces at the construction site. In addition, during construction, mobile emissions sources such as construction vehicles and equipment, and private autos used to access the work area could contribute to air pollution.

Emissions of fugitive particulate matter dust (e.g., PM_{10} and $PM_{2.5}$) are associated primarily with ground disturbance activities during site preparation (e.g., grading) and vary as a function of such parameters as soil silt content, soil moisture, wind speed, acreage of disturbance area, and vehicle miles traveled (VMT) on-site and off-site. Exhaust emissions from diesel equipment and worker commute trips also contribute to short-term increases in total PM emissions, but to a much lesser extent. Emissions of ozone precursors are primarily associated with off-road (e.g., gas and diesel) construction equipment exhaust. Construction vehicles traveling to and from the landing site areas and other on-site construction-related activities (e.g., painting) may also contribute to local air pollution. These sources would be combined with existing emissions from local traffic.

General Operation Terrestrial Impacts

Operation of a converter station would generate minor, permanent exhaust emissions from operation and maintenance of constructed facilities. The facilities would result in stationary-source emissions (converter equipment) and mobile-source emissions (operation and maintenance vehicle trips).

Major factors considered in determining whether a undersea power cable system (e.g., operation of converter station[s]) would have a significant impact on air quality include the following:

- The amount of net increase in annual emissions of criteria pollutants on a given island (the 100 tpy CAA conformity de minimis threshold does not apply to Hawai‘i because it is an attainment area, but it can be used as a basis of comparison in analyzing air quality impacts);
- Whether dispersion modeling analysis indicated a potential for violation of federal and state PM_{10} standards at off-site locations;
- Whether relatively high emissions would occur on a continuing basis for periods of longer than the time frame of relevant ambient air quality standards (e.g., 8-hour periods for precursors for ozone, 3-hour and 24-hour periods for sulfur oxides, 24-hour periods for PM_{10});
- Whether emissions of precursors to ozone or other secondary pollutants would occur in such quantities and at such locations as to have a reasonable potential to cause or contribute to a violation of federal or state air quality standards;

- Whether the operation of the converter station would expose sensitive receptors to substantial pollutant concentrations; or
- Whether the operations of the converter station would create objectionable odors affecting a substantial number of people.

Emission levels associated with converter stations are assumed to be very low, and similar to those associated with construction, would not be expected to significantly affect air quality. The determination of specific impacts, and the location and degree of severity of those impacts, however, would await location-specific analysis that would be undertaken at the time of environmental review of an undersea cable power system project. Air quality modeling can be conducted to determine the impact from operation of the converter stations on ambient air quality. Current background concentration of criteria pollutants and worst-case dispersion conditions should be used to determine the worst-case ground-level impacts. The results of the modeling are then compared to the federal and state standards to determine if a significant impact is anticipated.

HAR Title 11, Chapter 60.1 (Air Pollution Control) states that "no person, including any public body, shall engage in any activity which causes air pollution or causes or allows the emission of any regulated or hazardous air pollutant without first securing approval in writing from the director." An Air Pollution Control Permit is required before constructing, reconstructing, modifying, or operating a stationary air pollution source. Certain air pollution sources are exempt from these requirements including vehicles, trucks, cranes, graders, and loaders (HAR Title 11-60.1-62d). Stationary sources with potential emissions of less than 1.0 ton per year for each air pollutant are also exempt from Air Pollution Control Permit requirements.

The HDOH requires permits for covered sources as defined in HAR Title 11-60.1. Covered source permitting would be applicable if an undersea power cable system project would be any of the following:

- A "major source," which HAR Title 11-60.1 further defines as a stationary source emitting at least 100 tpy of criteria pollutant, 10 tpy of any single hazardous air pollutant (HAP), or 25 tpy of all HAPs;
- A source subject to a new source performance standard (NSPS) or other requirement under CAA Part A-111;
- A source subject to a national emissions standard for hazardous air pollutants or other requirement pursuant to CAA Part A-112, with the exception of those sources solely subject to regulations or requirements pursuant to CAA Part A-112; and
- A source subject to the rules for PSD of air quality.

Converter stations by their nature emit little to zero air emissions; therefore, the stations would not be considered a major source as defined by the HDOH and would not require air pollution control permits for operation.

General Marine Impacts

Potential air quality impacts associated with undersea cables occur during the construction phase and in connection with maintenance or repair. The construction activities considered include installation of new support structures and cables, and trenching and backfilling. Air quality impacts may result from operation of vessels or machinery during the cable-laying process, but are temporary impacts. Emissions from construction of the converter stations can be estimated with air quality modeling once equipment and duration of construction are scheduled. Air quality impacts from the cable itself are not anticipated postconstruction unless periodic maintenance and inspection are required.

Greenhouse Gas Emissions and Climate Change

General Construction Impacts

In general, construction of the converter station(s) is not anticipated to affect local weather conditions, such as temperature, rainfall, and humidity. Construction of an undersea cable power system would result in the generation of GHG emissions. GHG emissions would originate from the tailpipe exhaust emissions from construction equipment, employee vehicles, and delivery trucks. GHG emissions from construction of the converter stations can be estimated with air quality modeling once equipment and duration of construction are scheduled.

General Operation Impacts

Operation of the cable system would not affect local weather conditions. Relative to global climate change, operation of the cable system would have a beneficial effect by providing renewable energy to be used in place of fossil fuel-generated energy, thereby reducing emissions of GHGs.

3.1.6 General Siting Criteria and Special Conservation and Construction Measures

General Level Special Conservation and Construction Measures

Construction Measures

Construction activities will be conducted in accordance with State of Hawai‘i air pollution control regulations (HAR Title 11 Chapter 60.1, specifically Title 11 Chapter 60.1-33 regarding fugitive dust and the prohibition of visible dust emissions at property boundaries) and employ the proper

administrative and engineered controls to reduce air emissions. All construction activities must comply with the provisions of HAR Title 11 Chapter 60.1-33 on Fugitive Dust, which specifies that the best practical operation or treatment be implemented such that there is no discharge of visible fugitive dust beyond the property lot line.

To comply with these requirements and to minimize any other adverse effects of air quality, Conservation and Construction Measures (CCMs) would be implemented during construction. Dust control measures, such as a dust control (watering) program and covering of soil stockpiles during transport or storage, will be developed and implemented by the construction contractor. Construction vehicles would either remain on-site or be scheduled to arrive and depart the landing site area during nonpeak traffic hours, to reduce vehicle emissions.

Required CCMs may include:

- Plan the different phases on construction, focusing on minimizing the amount of dust-generating materials and activities, centralizing on-site vehicular traffic routes, and locating potential dust-generating equipment in areas of least impacts to the surrounding properties.
- Provide an adequate water resource at the site prior to start-up of the construction activities.
- Provide landscaping and rapid covering of bare areas, including slopes, starting for the initial grading phase.
- Minimize dust from shoulders and access roads.
- Provide adequate dust control measures during weekends, after hours, and prior to daily start-up of construction activities.
- Control dust from debris being hauled away from the landing site area.
- Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent surface streets.
- Maintain all construction equipment in proper working order according to manufacturer's specifications.
- Fuel all off-road and portable diesel powered equipment, including but not limited to bulldozers, graders, cranes, loaders, scrapers, backhoes, generator sets, and compressors, with motor vehicle diesel fuel.
- Maximize to the extent feasible the use of diesel construction equipment meeting the latest certification standard for off-road heavy-duty diesel engines.
- Minimize the extent of disturbed area where possible.

- Use water trucks or sprinkler systems (with no chemical additives) in sufficient quantities to minimize the amount of airborne dust leaving the site.
- Cover or continuously wet dirt stockpile areas (water with no chemical additives) containing more than 100 yards^3 (76.5 m^3) of material.
- Implement permanent dust control measures identified in the project landscape plans as soon as possible following completion of any soil disturbing activities.
- Stabilize all disturbed soil areas not subject to revegetation, paving, or development using approved chemical soil binders, jute netting, or other methods.
- Lay building pads and foundations as soon as possible after grading unless seeding or soil binders are used.
- Limit vehicle speed for all construction vehicles moving on any unpaved surface at the construction site to 15 miles per hour (24 kilometers per hour) or less.
- Cover all trucks hauling dirt, sand, soil, or other loose materials.

It is anticipated that USEPA and HDOH AAQS would not be exceeded during construction activities by implementing dust control measures. Because emissions during construction would be temporary and relatively small, and would be minimized through implementation of CCMs (examples listed above), it would not be anticipated that construction of the cable system would significantly affect air quality.

Operation Conservation Measures

Converter stations by their nature emit little to zero air emissions; therefore, no operation conservation measures are recommended at this time.

The CCMs listed above are common across all the landing site areas; however, the frequency and schedule of the installation or use of each CCM is dependent on site conditions (e.g., current wind speeds, time of year, rainfall amounts, or total disturbed area). The specific CCM plan/schedule would await a location-specific analysis that would be undertaken at the time of environmental review of an undersea power cable system. In addition, the CCM plan may need to be adjusted (e.g., frequency of dust control measures) throughout the duration of construction to correspond with changing site conditions in order to comply with State of Hawai‘i air pollution control regulations.

Table 3.1-1. State and Federal Ambient Air Quality Standards

Air Pollutant	Averaging Time	Standards		
		Hawai'i State Standard	Federal Primary Standard	Federal Secondary Standard
Carbon Monoxide (CO)				
	1-hour	9 ppm	35 ppm	None
	8-hour	4.4 ppm	9 ppm	——
Nitrogen Dioxide (NO_2)				
	1-hour	——	0.100 ppm	——
	Annual	0.04 ppm	0.053 ppm	0.053 ppm
PM_{10}				
	24-hour	150 µg/m^3	150 µg/m^3	150 µg/m^3
	Annual	50 µg/m^3	——	——
$PM_{2.5}$				
	24-hour	——	35 µg/m^3	35 µg/m^3
	Annual	——	15 µg/m^3	15 µg/m^3
Ozone (O_3)				
	8-hour	0.08 ppm	0.075 ppm	0.075 ppm
Sulfur Dioxide (SO_2)				
	1-hour	——	0.075 ppm	——
	3-hour	0.5 ppm	——	0.5 ppm
	24-hour	0.14 ppm	0.14 ppm	——
	Annual	0.03 ppm	0.03 ppm	——
Lead (Pb)				
	Rolling 3 month average	1.5 µg/m^3	0.15 µg/m^3	0.15 µg/m^3
Hydrogen Sulfide (H_2S)				
	1-hour	0.025 ppm	None	None

Source: State standards HAR Title 11 Chapter 59; Federal Standards Title 40 C.F.R. Part 50 USEPA, National Ambient Air Quality Standards

3.2 CULTURAL RESOURCES

This section will provide a cultural framework to understanding what a cultural resource is and the fundamental Hawaiian cultural and natural resource management principles that form the basis for why these valued resources are so significant to the Hawaiian community. It is this cultural perspective or orientation that provides the context to appreciate the intense emotional connection that Hawaiians have to protection and preservation of the cultural and natural resources.

Overview

The goals of the HCEI to promote alternative renewable energy projects in an effort to lessen Hawai'i's reliance on fossil fuels are broadly supported by the Hawaiian communities and the greater population. However, the challenge that arises when planning for commercial-scale renewable energy projects is that they generally require large tracts of undeveloped land, which usually contain an abundance of both cultural and natural resources. Hawaiian and rural communities that reside in these remote locations rely on these resources for sustenance. Their subsistence lifestyles rely on continued access to these resources. Moreover, these tracts of land also hold the resources used by many cultural practitioners who rely on them to continue to exercise traditional and customary practices.

To successfully navigate the challenges of fulfilling the HCEI goals, a balance must be struck between accommodating renewable energy projects and honoring and respecting the cultural resources and cultural uses of natural resources within these communities. Ultimately, this requires a dialogue between the affected communities and regulatory agencies so that both parties understand the concerns and interests of the other.

This cultural resources section seeks to provide a better understanding of what a cultural resource is; why it is so important; what the potential impacts could be to these resources by the proposed projects; and what potential mitigation or conservation and construction measures could be employed to avoid or lessen those impacts. Section 3.2.1 will provide an overview or cultural orientation into cultural resources: (1) defining cultural resources, traditional cultural properties, and offshore cultural resources; and (2) what are the Hawaiian cultural values and principles that form the foundation for the traditional and customary practices entitled to constitutional protections. Section 3.2.2 provides a brief description of the applicable federal and state laws and regulations as well as legal interpretations that relate to cultural and natural resources. Section 3.2.3 describes the approach of focusing on large cultural landscapes rather than site-specific footprints in identifying cultural and natural resources that may exist in the landing site areas. This section will also provide brief descriptions of types of cultural and natural resources and practices that Hawaiians continue to practice. Figures 3.2-1 through 3.2-7 are maps of the cultural and historic sites for each of the seven landing site areas. Section 3.2.4 provides an overview of general impacts to cultural and relevant natural resources from

proposed renewable energy projects and ancillary activities related to those projects. Section 3.2.5 describes generic conservation and construction measures that should be adopted to first avoid impacts to cultural and relevant natural resources or, if avoidance is not possible, mitigation measures. Finally, Section 3.2.6 is a synopsis of cultural resource evaluation for each of the landing site areas prepared by Cultural Surveys Hawai'i (CSH), which is included in its entirety as Appendix B.

The State of Hawai'i recognizes that the landing site areas are living cultural resources to the community, in particular the Hawaiian community. Many residents in rural communities continue to fish, hunt, and gather as a necessary way of life. With this recognition comes the obligation to preserve and protect these constitutionally guaranteed rights.

The Hawai'i Supreme Court in its decision in *Ka Pa'akai O Ka 'Āina v. Land Use Commission*, 94. Hawai'i 31, 7 P.3d 1068 (2000) (*Ka Pa'akai*) provides government agencies an analytical framework to ensure the protection and preservation of traditional and customary native Hawaiian rights by preserving valued cultural, historical, and natural resources while reasonably accommodating competing private development interests. This cultural resources section addresses this requirement through the following process:

1. First, this section identifies, in general, the valued cultural, historical, and natural resources (Section 3.2.3), and traditional and customary practices that may be exercised within the landing site areas. This identification is based upon comprehensive archaeological literature review of as many prior archaeological and cultural studies as could be identified in holdings of the State Historic Preservation Division (SHPD) and CSH library for each of the landing site areas (see Appendix B). These include both traditional and customary practices, e.g., identification of numerous *heiau* that was used for traditional religious practices and the more contemporary use of fishponds on Moloka'i for subsistence.
2. Second, this section will describe the general threats or impacts to these valued resources by proposed alternative renewable energy projects and ancillary activities, including converter stations, within the landing site areas (Section 3.2.4), as the specific impacts cannot be determined until the site-specific projects undergo their independent environmental and cultural review and consultation.
3. The third step of the *Ka Pa'akai* analysis is the "feasible actions" or, in this case, conservation and construction measures recommended to be taken by the regulatory agencies as conditions on project-specific activities to reasonably protect these valued resources. (Section 3.2.5).

While this cultural resources section is not a Cultural Impact Assessment (CIA as defined under HRS, Chapter 343-5 or Act 50, Hawai'i Session Laws 2000), the information contained in this

section could provide useful information and guidance for future state or federal environmental reviews.

3.2.1 Definition of Cultural Resource

A “cultural resource” can be broadly defined as the natural environment or the physical manifestation of human practices, values, and traditions. In an effort to preserve, restore, and maintain cultural resources, the HRS Chapter 6E (Historic Preservation) defines these resources as “any building, structure, object, district, area, or site which is more than fifty years old” (HRS Chapter 6E-2).

Cultural resources may include archaeological sites as well as historic structures and features that are protected under the National Historic Preservation Act (NHPA, as amended (P.L. 89-665). Cultural resources refer to both man-made and natural physical features associated with human activity and, in most cases, are finite, unique, fragile, and nonrenewable.

Because of this, measures have been taken to ensure the consideration of these resources in the planning of development projects. If the cultural resource meets the eligibility criteria for listing in the National Register of Historic Places (NRHP, it is considered a “significant” resource and must be taken into consideration during the planning of any federal and state projects.

Traditional Cultural Properties

Traditional cultural properties are historic properties that are eligible for listing in the NRHP, which contains a wide range of historic property types that reflect the diversity of America’s history and culture. The sites included in the NRHP reflect many kinds of significance in architecture, history, engineering, and culture. In this setting, the word “culture” is understood to mean the traditions, beliefs, practices, life ways, arts, crafts, and social institutions of any community. Traditional cultural significance is one type of property that can make a resource eligible for inclusion in the NRHP. In this sense, “traditional” refers to a belief, custom, or practice that has been passed down through generations, usually orally or through practice, by the members of a living community. The significance of a traditional cultural property lies in the role it plays in a community’s historically rooted beliefs, customs, and practices. Cultural properties are important in the role they play in the community’s past, and continuation of cultural properties is important in maintaining the cultural identity of the community.

Traditional cultural properties can be very difficult to recognize. Because their significance is rooted in the history of a community, these sites or practices may be overlooked as mere geographical locations (e.g., a series of fishponds, a *pu‘u* or mountainside, or a visual corridor connecting two islands) when instead they are areas where important cultural, economic, or historic events took place. Because of this, these sites are difficult to distinguish through archaeological inventory surveys (AISs). Mostly, the sites are only identifiable through

ethnographic interviews with knowledgeable users in the community. The subtlety with which the significance of these resources and locations may be expressed makes them easy to ignore, but it also makes them difficult to distinguish from locations whose claimed significance is not culturally based. Thus, intimate knowledge of the community, its members, and their cultural practices is needed in order to understand the true significance of these traditional cultural properties.

Offshore Cultural Resources

Offshore cultural resources include shipwrecks, submerged prehistoric archaeological sites, and Hawaiian cultural sites, including *koʻa lawaiʻa*. Hawaiian *koʻa lawaiʻa* are shrines dedicated to fishing. Often, the shrine was merely a flat rock, on which offerings were made to ensure bountiful harvests of fish. These offerings usually consisted of the first fish caught of each variety. These were placed on the left side of the altar for the gods. Prayers were offered at every point of the fishing process: in preparing the fishing line, in setting the fishing hook, and as Hawaiians fished.

Koʻa lawaiʻa also refers to dedicated fishing grounds. To fix the location of a fishing ground, Hawaiians used multiple landmarks. They aligned points onshore and points on the hill or mountainside with points on either side of their canoe to ensure that they returned to the same fishing spot. This practice inspired the old Hawaiian phrase, *"Aia ka iʻa i ka ʻāina"* which means the fish are on the land. Although fish were found offshore, their location could be found again by looking for markers on land. Fishermen returned to the same fishing grounds not only to fish, but to tend to, care for, and feed the schools of fish in the area.

Shipwrecks are a federally protected cultural resource. In Hawaiʻi, many of these wrecks are military vessels that fall under the jurisdiction of the U.S. government. Figures 3.2-1 and 3.2-5 identify known shipwrecks within the Pearl Harbor landing site area and Lānaʻi landing site area. No shipwrecks are known within the other 5 landing site areas.

Traditional Hawaiian Cultural Practices and Resources

The quality and abundance of natural resources within a Hawaiian community can be attributed to the persistence of *ʻohana* (family) values and practices in the conduct of subsistence activities. Davianna Pomaikaʻi McGregor describes the significance of these values and their foundation in resource management:

> An inherent aspect of these *ʻohana* values is the practice of conservation to ensure availability of natural resources for present and future generations. These rules of behavior are tied to cultural beliefs and values regarding respect of the *ʻāina*, the virtue of sharing and not taking too much, and holistic perspective of organisms and ecosystems that emphasizes balance and coexistence. The

> Hawaiian outlook that shapes these customs and practices is *lōkahi* or maintaining spiritual, cultural and natural balance with the elemental life forces of nature (McGregor 1996).

These values along with ancestral knowledge about the land and its resources are currently reinforced through continued subsistence practices. Today's practitioners stay alert to the condition of the landscape and its resources. They pay attention to both seasonal and life cycle changes in these resources and rely on these observations to preserve the natural and cultural landscape of their area. Unlike Western practice, the land is not a commodity to Hawaiians. Instead, it is the foundation of their identity, both spiritually and culturally, as evidenced by how closely linked their values are to the land and its resources. "They proudly trace their lineage to the lands in their region as being originally settled by their ancestors. The land is a part of their *ʻohana* and they care for it as they do the other living members of their families" (McGregor 1996).

Principles of Hawaiian Cultural Resource Management

Five basic principles (discussed below) of Hawaiian cultural resource management must be consulted when considering resources in a given area. An awareness of these principles allows for a better understanding of those in Hawaiian subsistence communities. These principles form their conception of resource management and provide the basis for their perspective.

First, the *ahupuaʻa* is the basic unit of Hawaiian cultural resource management. The *ahupuaʻa* was the central unit of land division under ancient Hawaiʻi land tenure. It consisted of a pie-shaped parcel that ran from the mountaintops down ridges and valleys and spread out at the base along the shoreline. The land parcel could range in size from 100 to 100,000 acres, but its range always afforded its residents access to resources from each of the various environments (e.g., ocean, shoreline, midland, valley, forest, mountain). This allowed the community within each *ahupuaʻa* to be economically self-sufficient. The chief of each *ahupuaʻa* was charged with ensuring the productivity of the land. Unlike a mere landowner, that chief was a trustee or steward responsible for the management of the people and natural resources on behalf of the Hawaiian gods. The *makaʻāinana*, or common people, of the *ahupuaʻa* were given liberal rights within their land parcel to use the resources from the land. These included the right to hunt, gather wild herbs and plants, fish offshore, and use parcels of land for taro cultivation together with sufficient water for irrigation.

The *ahupuaʻa* and its influence on Hawaiian cultural values made it simple for Hawaiians to exist in a subsistence economy. However, Western influence has made this traditional system far less viable. Still, many Hawaiians continue to practice a subsistence lifestyle, and far more continue to adhere to the values and cultural traditions established from that lifestyle.

The second cultural resource management principle that must be consulted is the interdependence of natural elements—land, air, water, and ocean. Hawaiians regard the natural elements in a harmonious manner. Because of their reliance on these elements for continued sustenance in their subsistence lifestyle, they understood the way in which these elements interact. They knew that changes to one element would effect change in the others. To Hawaiians, the ocean and the land were integrally united.

Third, of all the natural elements, freshwater is the most important for life and must be considered in every aspect of land use and planning. The true importance of freshwater in the minds of Hawaiians can be seen in the Hawaiian language. The Hawaiian word for freshwater is *wai*, and the word *waiwai* means valuable, worthy, wealthy, or important. Because of its traditional importance to Hawaiians, freshwater is a significant consideration.

The fourth principle requires the understanding that Hawaiian ancestors studied the land and the natural elements and became very familiar with their features and assets. Ancestral knowledge of the land was recorded and passed down through place names, legends, and chants, which name the winds, rains, and distinctive features of a particular district. Hawaiians applied their extensive knowledge of the natural environment in every facet of life: the construction of their homes and temples, the cultivation of agricultural products, the development of complex irrigation networks, and the hunting of fish and animals. It is, therefore, important to consult Hawaiians within the community to learn about the cultural and natural resources in a particular district. In many cases, this may be the only way to secure a complete understanding of the area's resources (McGregor 1996).

Finally, Hawaiian stewardship and use of cultural and natural resources are centered on the practices of *mālama ʻāina* and *lōkahi*. *Mālama ʻāina*, or respect and conservation of the land, was an important principle for Hawaiians that ensured the sustainability of their resources. This principle was tied to the virtue of taking only what was needed and nicely complemented the holistic perspective of organisms and ecosystems that allowed Hawaiians to live in balance with their environment. Hawaiians refer to this balance as *lōkahi*, the maintenance of a spiritual, cultural, and natural balance with the elemental life forces of nature.

Taken together, these principles describe the perspective of Hawaiians regarding stewardship of resources and must be considered in understanding the subsistence lifestyles that Hawaiians continue to practice.

Cultural Land Use Practices

Although the methods and techniques of accessing, acquiring, or utilizing traditional and natural resources may have changed over time, the ways in which these resources are used and prepared for Hawaiian custom and practice remain the same. The methods and resources themselves continue to play an important role in the lives of many Hawaiian families, especially

those living a subsistent or partly subsistent lifestyle, and these lifestyles are still rooted in honor and respect for traditional *ʻohana* values.

Some examples of these values are as follows. One should only take as much of the resource as is needed. Natural resources should not be wasted; therefore, taking beyond what is needed is prohibited. By maintaining this balance and restraint, the proper respect is shown to the resource. Additionally, the *kūpuna*, or elderly, should be consulted with first. It is through their knowledge and experience that the resource continues to be cultivated. These compose some of the basic practices of cultural land use (McGregor 1996).

Sources of Information about Cultural Practices

Traditionally, cultural knowledge was remembered and passed down through oral tradition in chants, legends, myths, genealogies, and place names. Therefore, these sources provide a valuable area to explore initially. However, the living culture is constantly undergoing growth and change. There is still a wealth of knowledge that is sustained and practiced by present-day Hawaiian families, as well as those who continue to receive traditional training as *kumu hula* (hula instructors) and *kahuna lāʻau lapaʻau* (medicinal healers). Therefore, any effort to understand and document the natural and cultural resources of an area must include consultation with the Hawaiian *ʻohana*, *kumu*, and cultural groups who live in the area and take responsibility for the cultural and natural resources of the area (McGregor 1996).

3.2.2 Regulatory Setting

The previous section provides a cultural foundation for understanding and appreciating from a Hawaiian perspective the significance of the cultural and natural resources and the need to protect and preserve those resources. This section summarizes applicable federal and state laws and regulations as well as relevant legal interpretation (under *Ka Paʻakai*) that relate to the protection and preservation of cultural and natural resources.

Federal Regulations

National Historic Preservation Act (NHPA)

Cultural resources include archaeological sites and historic structures and features that are addressed under NHPA, as amended (P.L. 89-665). NHPA establishes the framework within which cultural resources are managed in the U.S. The law requires each state to appoint a State Historic Preservation Officer (SHPO to direct and conduct a comprehensive statewide survey of historic properties and to maintain an ongoing inventory of those properties. Section 106 of the NHPA defines the process for identifying and evaluating cultural resources. Cultural resources that meet the eligibility criteria for listing in the NRHP are formally referred to as historic properties. These resources are set aside due to the quality of its significance to history,

archaeology, engineering, and culture, and can be present in sites, buildings, structures and objects. The criteria for reference as a historic property includes: association with significant historical events; association with significant people in the culture's past; embodiment of distinctive characteristics of a type, period, or method of construction; embodiment of the work of a master, or one that possesses high artistic value; and potential to yield information important to the culture's history. Federal agencies must take into consideration the effects on historic properties of any undertakings under their direct or indirect jurisdiction before they approve expenditures or issue permits, ROWs, or other land use authorizations.

National Register of Historic Places (NRHP)

The NRHP (Title 36 C.F.R. Part 60) is the official list of districts, sites, buildings, structures, and objects deemed worthy of preservation in the U.S. The NRHP was established by NHPA in 1966.

National Environmental Policy Act (NEPA)

NEPA is the basic national charter for protection of the environment. It establishes policy, sets goals (in Section 101), and provides means (in Section 102) for carrying out the policy. Section 102(2) contains "action-forcing" provisions to ensure that federal agencies follow the letter and spirit of the Act. For major federal actions significantly affecting the quality of the human environment, Section 102(2)(C) of NEPA requires federal agencies to prepare a detailed statement (referred to as an environmental impact statement [EIS]) that includes the environmental impacts of the proposed action and other specified information.

American Indian Religious Freedom Act (AIRFA)

Federal agencies are also required to consider the effects of their actions on sites, areas, and other resources that are of religious significance to Native Americans, including native Hawaiians. This requirement is established under AIRFA of 1978 (P.L. 95-341). AIRFA protects the rights of Native Americans to have access to their sacred places, to worship through ceremonial and traditional rights, and to use and possess all objects considered sacred. It requires consultation with Native American organizations if an agency action will affect a sacred site on federal lands.

Archaeological Resources Protection Act (ARPA)

ARPA of 1979, as amended (P.L. 96-95) establishes both civil and criminal penalties for the destruction or alteration of cultural resources. It governs the excavation and archaeological practices of all sites in the U.S. In addition, it establishes protocols for the removal and disposition of archaeological collections from these sites. Professional standards of excavation were established through ARPA.

Native American Graves Protection and Repatriation Act (NAGPRA)

NAGPRA of 1990 (P.L. 101-601) requires federal agencies to consult with the appropriate Native American tribes, including Native Hawaiian organizations (NHOs like the Office of Hawaiian Affairs (OHA, Hui Mālama I Nā Iwi Kūpuna o Hawai'i Nei, prior to the intentional excavation of human remains and funerary objects. The law also extends to cultural items such as sacred objects and objects of cultural patrimony. It requires the repatriation of human remains found on federal and tribal lands and museums and establishes a program of federal grants to assist in the repatriation process. NAGPRA is considered one of the strongest pieces of federal legislation pertaining to aboriginal remains and artifacts.

Archaeological and Historic Preservation Act (AHPA)

AHPA of 1974 (Title 16 U.S.C. Section 469) directly addresses impacts to cultural resources resulting from federal activities that would significantly alter the landscape. The law focuses on activities such as the creation of dams and the impacts resulting from flooding, worker housing, creation of access roads, etc.; however, its requirements are applicable to any federal action. AHPA aims to protect the recovery of data and the salvage of scientific, historic, and archaeological resources that may otherwise be irreparably damaged by those activities.

Executive Order (EO) 11593

EO 11593 is the Protection and Enhancement of Cultural Environments, which requires federal agencies to inventory their cultural resources and to record, to professional standards, any cultural resources that may be altered or destroyed.

American Folklife Preservation Act (AFPA)

AFPA of 1976 (Title 20 U.S.C. Section 2101) is the only piece of Congressional legislation that signifies a national commitment to cultural diversity. The act establishes, in the Library of Congress, an American Folklife Center that helps to preserve and present America's different groups and cultures. The center encourages research; fosters awareness; and promotes performances, festivals, exhibits, and workshops to these purposes. The American Folklife Center is meant to represent the country's commitment to preserve, support, revitalize, and disseminate all American Folklife in order to keep the individuality and identity of a culturally diverse nation.

Antiquities Act

The Antiquities Act of 1906 (Title 16 U.S.C. Section 431) makes it illegal to remove cultural resources from federal land without permission. This law establishes a permitting process for conducting archaeological fieldwork on federal lands. It also allows the U.S. President to

establish historical monuments and landmarks with the aim of protecting these sites from excavation or destruction of the antiquities they hold.

Abandoned Shipwreck Act

To discourage treasure hunters and others from damaging and looting abandoned shipwrecks, the Abandoned Shipwreck Act of 1987 (Title 43 U.S.C. Section 2101) was passed. The law specifies that any wreck embedded within a state's submerged lands is the property of that state and subject to its laws and jurisdictions provided the shipwreck is determined to be abandoned.

State Laws

Article XII, Section 7, of the Hawai'i State Constitution

The State reaffirms and shall protect all rights customarily and traditionally exercised for subsistence, cultural, and religious purposes and possessed by *ahupua'a* tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the rights of the State to regulate such rights.

Section 1-1, Common law of State; exceptions, Hawai'i Revised Statute (HRS)

The common law of England, as ascertained by English and American decisions, is declared to be the common law of the State of Hawai'i in all cases, except as otherwise expressly provided by the Constitution or laws of the U.S., or by the laws of the State, or fixed by Hawaiian judicial precedent, or established by Hawaiian usage; provided that no person shall be subject to criminal proceedings except as provided by the written laws of the U.S. or of the State. [L 1892, c 57-5; am L 1903, c 32-2; RL 1925-1; RL 1935-1; RL 1945-1; RL 1955-1-1; HRS Section 1-1]

Section 7-1, Building materials, water, etc.; landlords' titles subject to tenants' use, HRS

Where the landlords have obtained, or may hereafter obtain, allodia titles to their lands, the people on each of their lands shall not be deprived of the right to take firewood, house-timber, *aho* cord, thatch, or *kī* leaf, from the land on which they live, for their own private use, but they shall not have a right to take such articles to sell for profit. The people shall also have a right to drinking water, and running water, and the right of way. The springs of water, running water and roads shall be free to all, on all lands granted in fee simple; provided that this shall not be applicable to wells and watercourses, which individuals have made for their own use. [CC 1859-1477; RL 1925-576; RL 1935-1694; RL 1945-12901; RL 1955-14-1; HRS Section 7-1]

Act 50, Session Laws of Hawai‘i (SLH) 2000 and *Ka Pa‘akai* Analysis

TheState Constitution, other state laws, and the courts of the state require government agencies to protect and preserve cultural beliefs, practices, and resources of Hawaiians and other ethnic groups. To assist decision makers in the protection of cultural resources, HRS Chapter 343, and HAR Title 11 Chapter 200, rules for the EIS process require project proponents to assess proposed projects for their potential impacts to cultural properties, practices, and beliefs. This process was clarified by the Hawai‘i State Legislature in Act 50, SLH 2000. Act 50 recognized the importance of protecting Hawaiian cultural resources and specifically required that EISs include the disclosure of the effects of a proposed project on the cultural practices of the community, and in particular the Hawaiian community. Specifically, the Environmental Council suggested the CIAs should include information relating to practices and beliefs of a particular cultural or ethnic group or groups. Such information may be obtained through public scoping, community meetings, ethnographic interviews, and oral histories.

The State and its agencies have an affirmative obligation to preserve and protect the reasonable exercise of customarily and traditionally exercised rights of Hawaiians to the extent feasible, *Ka Pa‘akai*. The Court in *Ka Pa‘akai* has described the analytical framework to fulfill this obligation as the following:

- First, to identify the scope of valued cultural, historical, or natural resources in the landing site areas, including the extent to which traditional and customary Hawaiian rights are exercised in the area;
- Next, to ascertain the extent to which those resources—including traditional and customary Hawaiian rights—will be affected or impaired by the cable system implementation; and
- Finally, to propose feasible action, if any, that should be taken to reasonably protect Hawaiian rights if they are found to exist.

Since cultural landscapes will be reviewed to identify and assess the cultural and natural resources for cable landing site areas, the following steps are proposed as a method to programmatically comply with the framework established in *Ka Pa‘akai*:

First – Identification of valued cultural, historical, and natural resources through the following:

- Document review is performed of prior archaeological and cultural studies as could be identified in the holdings of the SHPD and CSH library for each of the landing site areas;
- The document review includes research of previous cultural resources studies for each of the landing site areas and then identifies to the extent possible the known cultural resources for each landing site area.

- Based upon the document review, the known cultural and natural resources are plotted on a Geographic Information System (GIS) map to locate the resources in relationship to the landing site areas.

Second – Develop a Sensitivity Rating for the landing site areas through the following:

- CSH has prepared a sensitivity map for each of the landing site areas. The sensitivity criteria (low, medium, high) are described in Appendix B, Section 2.3.
- The sensitivity maps inform future decisions as to potential threats or impacts that a proposed project may have on these valued cultural resources.

Third – Develop Conservation and Construction Measures to reasonably protect Hawaiian traditional and customary rights through the following:

- As a programmatic evaluation, this section provides broad policies and conservation and construction measures that should be taken into consideration, as site-specific projects and ancillary facilities are evaluated. The sensitivity maps and conservation and construction measures are intended to provide relevant information to avoid or mitigate potential adverse effects to cultural and natural resources in order to reasonably protect traditional and customary rights if they are found to exist.
- At the project-specific level, the community should be consulted, especially NHOs, SHPD, OHA, and families with lineal or cultural connections to the landing site areas in the development of culturally appropriate mitigation measures (e.g., avoid known burial sites, avoid impacting *ko'a lawai'a*, use of cultural monitors, etc.).
- Subsequent environmental review could develop specific CCMs that would be a condition for possible future tiered off, site-specific projects.

3.2.3 General Description of Valued Cultural Resources and Practices

In considering programmatic impacts to cultural and natural resources from potential renewable energy projects and ancillary facilities, it became apparent that an alternative approach needed to be considered because the landing site areas were so geographically large and potential renewable energy projects were unknown at the programmatic level. Thus, the alternative approach focuses on cultural landscapes rather than project-specific footprints.[2] This section will introduce the concept of cultural landscapes as a culturally appropriate methodology to consider large tracks of land in assessing impacts of proposed projects on the cultural and natural

[2] The concept of utilizing cultural landscape analysis and sensitivity mappings to ensure protection and preservation of traditional and customary rights was reviewed by an independent Cultural Advisory Group (CAG) established by DBEDT for the HIREP environmental review process. The CAG consisted of three well-respected cultural practitioners who are also professional planners or consultants that supported the proposed approach as appropriate and consistent with the spirit of *Ka Pa'akai* for a programmatic cultural analysis.

resources. Further, this section will also identify some of the specific types of cultural and natural resources or practices that may exist within the landing site areas.

Cultural Landscapes

A cultural landscape is composed of physical elements that manifest the technological and cultural basis of human use of the land through time. There are several important components when considering the Hawaiian cultural landscape.

Wahi pana compose a large portion of the cultural landscape. They include all sites considered sacred by the Hawaiian people. These may take the form of *heiau* (religious temples), shrines, burial caves, graves, etc. that were built for religious or cultural purposes. Additionally, physical and geographic features associated with Hawaiian deities compose *wahi pana* and may include the sites of significant natural, cultural, spiritual, or historic phenomenon or events. Ed Kanahele offers a description of the large range of places that can be described as *wahi pana* in *Ancient Sites of O'ahu* by Van James (1991):

> The gods and their disciples' specified places that were sacred. The inventory of sacred places in Hawai'i includes the dwelling places of the gods, the dwelling places of venerable disciples, temples, shrines, as well as selected observations points, cliffs, mounds, mountains, weather phenomena, forests, and volcanoes.

Domains of *'aumakua*, or ancestral deities, add another component to the cultural landscape. Access to a family's *'aumakua* provided a way for Hawaiians to renew their ties to their ancestors. Within the domain of the *'aumakua*, Hawaiians could experience *hō'ailona*, or natural signs and phenomena that would facilitate this reconnection. Thus, these areas are also a critical component to the Hawaiian cultural landscape.

Finally, trails and roads are part of the cultural landscape because they provide access to cultural and natural resources that are used in all activity. By providing access to them, these trails and roads gain added importance as well (McGregor 1996).

Each natural environment also contributes to the cultural landscape of the area. Streams and springs provide freshwater sources that are vital as habitats for native species and marine life, for taro and agricultural cultivation, and for domestic use. The importance of freshwater in the Hawaiian culture also elevates the importance of streams and springs.

The shoreline, coral reefs, and ocean, both nearshore and offshore, provide another important element of the cultural landscape. By providing a place to gather food and medicine as well as an important setting for cultural and spiritual customs, the shoreline garners added importance.

Finally, the forest and mountain areas are also part of the cultural landscape. Again, the area provides a place in which many Hawaiians gathered plants used for medicine, food, ceremonial adornment, and ritual offerings. It also provided a setting for Hawaiians to hunt pigs and other animals. Additionally, many spiritual customs were performed in the forest.

A vast array of components can be included in the Hawaiian cultural landscape: areas of cultivation, circulation networks, buildings, structures, facilities, irrigation systems, roads, tunnels, archaeological and historical sites, viewing points, and cultural resource and use areas. Only by talking to community members and cultural practitioners are the truly important elements of these landscapes illuminated.

Specific Types of Cultural Resources and Practices

While the cultural and natural resource analysis will focus on cultural landscapes, the following is a description of some of the specific types of cultural and natural resources and practices that may form the cultural landscape. The actual identification of cultural and natural resources in each of the landing site areas will not be known until specific projects are proposed.

Fishing

Fish was the main source of protein for Hawaiians. Although pigs, birds, and dogs were eaten, Hawaiians more commonly went to the ocean for fish, eel, and squid. Because of this, fishermen were honored and revered in the Hawaiian community for their ability to consistently feed the people in their *ahupua'a*. Especially good fishermen were believed to possess *mana kupua* (supernatural powers) that attracted fish at will or allowed them to multiply within a certain fishing ground. Many *mo'olelo* (stories) tell of great fishermen who brought in extraordinary catches and won battles over supernatural eels, octopuses, and sharks.

The tools used by fishermen were also held in high regard. Hooks were made of bone, shell, or whale ivory and shaped using coral or small stone. Lures were made using cowry shells, and small stones were used to make sinkers that could reach depths of 120 feet. Camouflaging the hook in cloth bags and using live bait such as shrimp or crab, Hawaiians regularly hooked *he'e* or octopus and squid. Spears were used to catch medium-sized fish in both the open ocean and near the shore. Attaching a bone or stone point to the end of wooden poles, Hawaiians were able to spear fish that were not quick enough to get away. Fishing nets were another important fishing tool. Made by twisting and knotting fibers of the *olonā* vine, these nets were set and gathered later in the day. These fishing implements were prized and passed down through the generations of a fishing family.

Hawaiians fished in a variety of ways. With spears, they dove down to the reef from canoes to get small to medium-sized fish. They also used spears from the shoreline, either by wading out into shallow water or by standing on a rocky outcrop that allowed clear vision of the fish

swimming below. At night, fishermen tied *kukui* nuts wrapped in *kī* leaves to a pole to make a torch. The fire attracted fish in shallow waters and made them vulnerable to spearing.

With nets, Hawaiians fished using the method of throw netting and gill netting. Standing in nearshore shallow waters, fishermen could cast their nets and immediately haul them in by hand to catch fish in the area. For larger catches, it was common for fishermen to set the nets across a large fishing ground. Hours later, they would return, sometimes with many members of the community, to help pull in the net by hand. Regularly, these nets would haul in hundreds of pounds of fish that were wedged in the mesh of the net, caught and tangled by their gills, teeth, or fins.

Additionally, Hawaiians used basket traps to catch fish. Using seaweed to entice fish into the basket, the woven trap then restricted its exit. These traps, called *hīnaʻi*, were also made of *olonā* fiber.

Hawaiians also caught crabs along the shoreline and gathered *limu* (seaweed), *ʻopihi* (shellfish), and various seashells.

Fishponds, or *loko iʻa*, also helped Hawaiians secure seafood. Typically, shallow reef areas surrounded by a wall of lava rock, these fishponds were similar to grazing areas for cattle. Fishermen cultivated algae to feed and grow fish, such as mullet. The lava rock wall allows fresh seawater in to replenish the nutrients in the pond, but does not allow the fish to escape the area.

Figures 3.2-1 through 3.2-7 are maps of cultural and historic sites found within each of the landing site areas. These maps identify fishing resources, including spear fishing, gill netting, throw netting, torch fishing, and pole and line fishing. The maps also identify known fishponds within each of the landing site areas.

Figures 3.2-1 and 3.2-7 identify known areas for gathering seaweed or *limu*, *ʻopihi*, and crabbing in the Pearl Harbor landing site area and Maui-Kahului Harbor landing site area, respectively.

Gathering

Hawaiians used the natural resources around them for many things; therefore, one important cultural practice was the gathering of these materials. Plants were gathered for use as building material, clothing, medicine, and for cultural and religious ceremonies.

Kahuna laʻau lapaʻau often went into the forest in the low mountain regions to collect plants for their various medicines. Plants, herbs, flowers, and fruit were mashed and combined to make remedies for such ailments as high blood pressure, constipation, thrush, anemia, muscle pain, headaches, fever, etc.

Plant materials were also gathered for cultural practices such as *hula* (dancing) and the making of Hawaiian crafts (e.g., *kapa* cloth, baskets, mats, toys, etc.).

Gatherers followed protocols when taking resources for their different needs. Like many other practices in Hawaiian culture, the gathering process starts with a *pule* (prayer). The gatherer will then offer a gift of some kind; normally this is an *oli* (chant) or offering of a *lei* (flower wreath). An *oli* will usually ask the resource for permission to enter the space and gather the materials needed.

Canoe Paddling

Canoe paddling, or *hoe waʻa*, was a main component of Hawaiian culture. Hawaiians explored vast stretches of the Pacific Ocean using both single- and double-hulled canoes as well as large voyaging canoes. The original settlers of Hawaiʻi used canoes to fish, surf, and traverse the areas around the Hawaiian Islands.

Kālai waʻa, or canoe carvers, were one of the most highly honored members of early Hawaiian society. With knowledge of all the complex plans for building a canoe, the canoe carver had the power to supply a community with vessels to fish as well as vessels for war.

Canoe racing and canoe surfing were both popular Hawaiian sporting events. In the last several decades, canoe racing has become especially popular. State championships are now held each year, and many clubs and high schools sport teams for competition. These contests include both short and long distances.

Figures 3.2-1 and 3.2-6 identify known coastal areas used for canoe paddling in the Oʻahu-Pearl Harbor landing site area and Maui-Kapalua landing site area, respectively.

Trails and Access

Ancient trails were the lifeline that connected the various *ahupuaʻa* and the entire island. Today, these trails provide access for Hawaiians to gather cultural and natural resources to exercise their traditional and customary practices, e.g., fishing, gathering of medicinal plants and salt from the near shore salt ponds. The ancient coastal trails or *Ala Kahakai* that traversed around each island still exist in many areas, especially on Hawaiʻi Island and remote rural communities. There are also *moʻolelo* (stories) describing ancient trail systems or *ala hele* (trails).

Hiking trails represent a cultural resource that provides visual access to scenic views and access to natural resources.

Figures 3.2-2 and 3.2-4 identify known *Nā Ala Hele* trails on the MCBH at Kāneʻohe Bay landing site area and South Molokaʻi landing site area, respectively.

Burial Practices

For Hawaiians, *nā iwi* (bones) are the essential physical material of a person and the *'uhane* is the psyche. The two are necessary for the makeup of a complete person. Moreover, the manifestation of immortality was in *nā iwi.* Only *nā iwi* survive and remained the lasting embodiment of an individual. As a result, the link between *kūpuna* (ancestors) and the eventual mortality of living Hawaiians is symbolized by *nā iwi*. *Nā iwi* are placed in the ground to eventually become part of *Haumea* (Earth), thereby ensuring a place for the bones forever. More importantly, *nā iwi* impart *mana* (power) of the deceased to that ground, to that *ahupua'a* and eventually to the island. Thus, the entire area therefore becomes sacred with *mana.* In mourning of the deceased, Hawaiians would weep loudly, chant eulogies, and often self-inflict pain on their own bodies. Death and ceremonies surrounding death played significant roles in Hawaiian culture.

Kanu 'Ana (burial sites) were chosen for symbolic purposes. The western side of each island, symbolizing the sunset of life (death), was most desirable. Burial sites were chosen as places of safekeeping for *nā iwi.* Some bones were hidden in caves, cliffs, sand dunes or deposited in the ocean. *'Ohana* members were often buried near the home, to be near the family so proper care and participation in family affairs could continue. Thus, in many instances, where Hawaiians lived or where they were awarded *kuleana* land or Land Commission Awards, may indicate the potential of subsurface Hawaiian burials.

Appendix B, the Cultural Resource Evaluation, describes in detail known burials sites in each of the landing site areas.

3.2.4 Potential Impacts on Cultural and Natural Resources, in General

This section will describe the potential adverse impacts to cultural and relevant natural resources that could occur during each phase of a project (e.g., site monitoring and testing, construction, operation, and decommissioning) if effective conservation and construction measures are not implemented. The following is a description of general impacts to cultural and natural resources from potential projects and their ancillary related activities, including converter stations.

While all of the landing site areas have been dramatically altered since Western contact, many of the areas in remote rural communities are largely undeveloped. As such, it can be reasonably expected that there may be significant surface and subsurface archaeological and historic features. These features are likely connected to each other through past and possibly current cultural practices and should be seen not only as discrete archaeological features but as integral parts of larger cultural landscapes. Given the scale of potential projects and the rural nature of the areas for which they are proposed, it is anticipated that direct and indirect impacts will occur to cultural and natural resources that will likely be significant.

Significant cultural resources, including historic properties listed or eligible for listing in the NRHP, could be affected by potential project developments regardless of the type and technology employed. The potential for impacts on cultural resources from the vast array of potential projects, including the ancillary facilities, such as access roads and transmission lines, is directly related to the amount of land disturbance and the location of the projects. Indirect effects, such as impacts on the cultural landscape resulting from the erosion of disturbed land surfaces and from increased accessibility to possible site locations, should also be considered.

Cultural resources are nonrenewable and, once damaged or destroyed, are not recoverable. Therefore, if a cultural resource is damaged or destroyed during development, the particular cultural location, resource, or object would be irretrievable. For cultural resources that are significant for their scientific value, data recovery is one way in which some information can be salvaged should a cultural resource site be adversely affected by development activity. Certain contextual data would be invariably lost, but new cultural resources would be available to the scientific community. However, loss of value for education, heritage, or traditional uses is less easily mitigated.

Specific Impacts on Cultural and Relevant Natural Resources

- Complete destruction of historic properties could result from the clearing, grading, and excavation of the landing site area and from construction of the facilities and associated infrastructure if archaeological sites, historic structures, or traditional cultural properties are located within the footprint of the project.
- Degradation and/or destruction of historic properties could result from the alteration of topography, alteration of hydrologic patterns, removal of soils, erosion of soils, runoff into and sedimentation of adjacent areas, and oil or other contaminant spills if sites are located on or near the landing site area. Such degradation could occur both within the project footprint and in areas downslope or downstream. While the erosion of soils could negatively affect historic properties downstream of the project by potentially eroding materials and portions of the downstream archaeological sites, erosion can also destabilize historic structures.
- Increases of human access and subsequent disturbance of cultural resources could result from the establishment of corridors or facilities in otherwise intact and inaccessible areas. Increased human access exposes archaeological sites and historic structures and features to greater probability of impacts from a variety of stressors. The collection of artifacts by workers or amateur collectors accessing areas that may have been previously inaccessible to the public would be another possible impact. Increased access might also increase the potential for vandalism. Although the activities that occur during the monitoring and testing phase are generally characterized as temporary actions, cultural resources are mostly nonrenewable and, once impacted (i.e., removed or damaged), are not likely to be recovered or returned to their proper context.

- Visual degradation of settings associated with significant cultural resources and cultural landscapes could result from the presence of a utility-scale renewable energy development and associated land disturbances and ancillary facilities. This could affect the significant cultural resources for which visual integrity is a component of the site's significance, such as sacred sites and landscapes (e.g., visual cultural corridor between Moloka'i and Lāna'i), historic structures, trails, and historic landscape.
- Noise degradation of settings associated with significant cultural resources and landscapes could also result from the presence of the utility-scale renewable energy projects and associated land disturbances of ancillary facilities. This could affect the pristine nature and sacredness of a *wahi pana* or culturally significant location.
- Impacts to cultural resources can occur during all phases of offshore development where there is the potential for seafloor disturbance in previously undisturbed areas. Seafloor disturbance can be either a direct or indirect result of construction activities, such as excavation for offshore turbine installation, wave energy equipment, offshore drilling, or offshore cable laying. Direct impacts are the result of direct destruction or removal of cultural resources from their primary context.

Specific Impacts from Various Related Activities

Technology-Specific Impacts

- The technology-specific renewable energy project (wind, solar, geothermal, Ocean Thermal Energy Conversion [OTEC], etc.) could have different impacts on cultural resources dependent on the land requirements (e.g., large acreage vs. concentrated location). Thus, the magnitude or level of impact would depend on whether the specific location of a proposed project contained significant cultural resources, regardless of the overall size of the facility. However, those technologies that can be adjusted to avoid specific areas are less likely to result in an adverse effect on historic properties.
- The different technologies also result in different view planes based on facility height differences. For cultural resources with a visual component, e.g., cultural corridor connecting islands of wind resources, or line of sight for religious sites, where integrity of setting is an important aspect of the resource's significance, technological choice could be a factor in determining whether a resource is adversely affected.
- Differences in water requirements (e.g., water use and discharge) among the technologies could have impacts on cultural resources (e.g., runoff into near shore waters could adversely impact fishing and *limu* gathering). However, these resources would be addressed at the site specific project analysis.

Site Construction Impacts

- The construction of the infrastructure necessary for renewable energy projects has the greatest potential to impact cultural and natural resources because of the increased ground disturbance during this phase. The amount of area disturbed could be considerable and would destroy or permanently alter the cultural landscape and resources present in the area.
- An indirect effect of this ground disturbance would be soil erosion, which could also impact cultural resources outside the construction footprint.
- The development of associated access roads would provide access to areas that might have been previously inaccessible.
- Any increase in the presence of humans in an uncontrolled and unmonitored environment containing significant cultural resources increases the potential for adverse impacts caused by looting (unauthorized collection of artifacts), vandalism, and inadvertent destruction of resources.
- In addition, visual impacts on cultural resources and landscapes could occur during the construction phase. Large areas of exposed ground surface; the increase of dust and debris; and the presence of large-scale machinery, equipment, and vehicles could contribute to an adverse impact on cultural resources and landscapes.
- Also, access to traditional and customary cultural resources during construction can be limited when areas are temporarily closed for safety purposes.
- Site construction impacts may also occur in the ocean. Disturbance to the seafloor (e.g., trenching, dredging, or horizontal directional drilling) could disrupt shipwrecks, buried prehistoric offshore archaeological sites, cultural resources including fishing *koʻa lawaiʻa*, and access to fishing and ocean resources. The level of impact could range from negligible to moderate depending on the location of the project, the level of seafloor disturbance that has previously occurred in that location, the number of significant sites present in that location, the feasibility of moving portions of the development project to avoid important cultural resources, and the expected efficacy of mitigation/data recovery in the event that impact to some significant sites is unavoidable.

Site Operation Impacts

- Fewer impacts on cultural resources are likely to occur from the operation of a renewable energy project than from its construction. Impacts associated with operation are possible because of improved access to the area and the additional presence of the public and project employees.
- Human presence potentially increases the likelihood of unauthorized collection of artifacts and vandalism, as well as inadvertent destruction of cultural resources.

- Additionally, the operation of a renewable energy project may have a visual impact on the cultural resources and landscapes.

Site Decommissioning Impacts

- Although it is generally anticipated that fewer impacts on cultural resources would occur from the decommissioning of any given specific project, these resources still suffer negative effects. Cultural resources are either removed prior to construction or disturbed and altered during construction. Decommissioning a project at any point may reduce the effects on these resources, but the impacts remain for those resources removed or initially disturbed. Because most cultural resources are nonrenewable, these are lasting effects.
- The visual impact on cultural resources would be mostly removed following decommissioning, as long as the site was restored to its preconstruction state. Again, however, despite the physical removal of equipment, the impact of a scarred environment would likely remain and greatly affect Hawaiians who revered it.

3.2.5 Potential Conservation and Construction Measures

This section will discuss possible conservation and construction measures that could be applied to all future renewable energy projects and ancillary related facilities, including converter stations to establish culturally appropriate measures to first avoid impacts to cultural resources or if avoidance is not possible, then mitigation measures. This section describes generic conservation and construction measures for renewable energy projects and ancillary related activities or facilities, including converter stations. The conservation and construction measures would be adopted as required conditions to site-specific project analysis.

Description of Generic Conservation and Construction Measures

- Site-specific NEPA analyses and a Section 106 consultation process would be conducted on individual proposed projects. A Programmatic Agreement prepared pursuant to Section 106 would require the completion of comprehensive identification (e.g., an AIS), evaluation, and mitigation of adverse effects. If significant cultural resources are present in a given project location or if a specific project is being proposed in a high sensitivity area or there is a high potential for a given landing site area to contain significant cultural resources that could be adversely affected, a formalized agreement may be required to address management and mitigation options i.e., avoidance, data recovery, monitoring, education. The Programmatic Agreement should be developed in consultation with SHPD, OHA, NHOs, and potential lineal and cultural descendants that may ascribe traditional religious, cultural importance, or genealogical connection to the proposed landing site areas.

- Individual project proponents should consult with SHPD, NHOs, and potential lineal and cultural descendants early in the planning process to identify culturally sensitive sites and resources. Such consultation is required by NHPA and other authorities and is necessary to determine whether construction and operation of the project are likely to disturb cultural resources, impede access to traditional and customary gathering rights and important cultural locations, disrupt traditional cultural practices, or visually affect culturally important landscapes.
- Individual project proponents should conduct a comprehensive archival archaeological literature review (including research of published and unpublished literature, including land commission awards) of the affected area and *ahupua'a* to identify culturally sensitive sites and potential lineal and cultural descendants from the proposed landing site area.
- If cultural resources are present at a given proposed project site or specific project components would be located in areas of high sensitivity, or where a high potential to contain cultural material has been identified, a cultural resources management plan (CRMP) would be developed. This plan would address mitigation activities to be taken for cultural resources found at the site. Avoidance of the area is always the preferred mitigation option. If an area exhibits a high potential, but no artifacts were observed during an AIS, monitoring by a qualified archaeologist could be required during all excavation and earthmoving in the high sensitive area. A report would be prepared documenting these activities. The CRMP would also (1) establish a monitoring program, (2) identify measures to prevent potential looting/vandalism or erosion impacts, and (3) address the education of workers and the public to make them aware of the consequences of unauthorized collection of artifacts and destruction of property on public land.
- Data recovery is a common option for addressing adverse effects but does not eliminate the adverse effect. Mitigation of adverse effects can include many other options, such as monitoring and surveillance to protect sites from looting or vandalism; education and interpretative programs, including the use of community volunteers; and funding of historic preservation efforts proportionate to the anticipated effects.
- To protect sacred sites and portions of historic trails or access routes that are potentially eligible for listing in the NRHP or have been identified by cultural practitioners from visual intrusion and to maintain the integrity of the historic cultural setting, the SHPD or NHOs could require that surface disturbance be restricted or prohibited within the view plane of a sacred site.
- Mitigation for the demolition of historic structures typically entails detailed architectural records and historic documentation; for the impacts on settings of historic structures, measures such as those for historic buildings are appropriate. Ultimately, mitigation strategies would be determined during project-specific consultation.

Description of Specific Conservation and Construction Measures

Siting and Design

- Culturally significant waters resources, including freshwater springs, fishponds, or near shore resources should be avoided whenever possible.
- The use of previously disturbed lands, rather than pristine undeveloped lands, should be encouraged.
- Projects should consolidate infrastructure requirements (e.g., transmission lines or roads) and temporary construction areas (e.g., use the same crane pads or staging/laydown areas at a landing site area for multiple uses) for efficient use of the land.
- The area disturbed by installation of meteorological towers or other testing facilities would be kept to a minimum.
- Existing roads would be used to the maximum extent feasible. If new roads are necessary, they would be designed and constructed to the appropriate standard. The project would be planned to utilize existing roads and utility corridors to the maximum extent feasible, and to minimize the number and length/size of the new roads and proposed construction sites.
- Meteorological towers and other testing facilities would not be located in sensitive habitats or in areas where ecological resources known to be sensitive to human activities are present. Installation of test sites or monitoring activities would be scheduled to avoid disruption of wildlife reproductive activities or other important behavior (e.g., spawning of nearshore fish resources).
- Meteorological towers or other testing facilities installed for site monitoring and testing would be inspected periodically for structural integrity.
- The presence of archaeological sites and historic properties in the area of potential effects would be determined on the basis of archival research based upon recorded sites and properties in the area and/or AISs and CIAs. Archaeological sites and historic properties present in the area of potential effects would be reviewed to determine whether they meet the criteria of eligibility for listing in the NRHP.

Construction and Operation

- An archaeological monitoring plan (AMP) with provisions for addressing burial treatment would be developed in consultation with NHOs, SHPD, OHA, and potential lineal and cultural descendants for all construction-related activities. The AMP would be prepared by a qualified archaeologist, meeting the Secretary of Interior's Professional Qualifications Standards for Archaeology (FR, Vol. 48, No. 190, page 44738-9). Specific

levels of archaeological monitoring would be determined based upon the appropriate sensitivity rating; for areas of high and moderate sensitivity there would be on-site monitoring, and for areas of low sensitivity there would be on-call monitoring. The AMP would set forth the provisions and procedures to be implemented during the course of the undertaking. Monitoring reports would document the location and description of any human burial remains discovered during the course of any undertaking and the precise location would remain confidential.

- Inadvertent discovery of historic sites, including human burial remains during construction, would comply with applicable laws, including NAGPRA or the State Burial Laws, in the case of Hawaiian burials discovered on nonfederal lands. Work would be immediately halted in the vicinity of the inadvertent find to avoid further disturbance to the historic resource, including human burial remains, until consultation and compliance with applicable laws and appropriate mitigation measures are being developed. The area of the find should be protected to ensure that resources are not removed, handled, altered, or damaged while they are being evaluated and to ensure that appropriate mitigation measures are being developed.

- Any human burial remains inadvertently encountered on Department of Hawaiian Home Lands will be treated in accordance with NAGPRA and its implementing regulations (Title 43 C.F.R. Part 10).

- In cases where there is a probability of encountering cultural resources, especially Hawaiian burials, during construction in areas of high sensitivity, the project proponent should consider the use of cultural monitors to monitor ground-disturbing activities in addition to the use of archaeological monitors. Cultural monitors should be chosen from a list of available cultural monitors generated by Hawaiians from the area of concern. The cultural monitor will be utilized to provide additional assurances to Hawaiians that properties of traditional, religious, and cultural importance are being properly treated. A cultural monitor will act as an independent observer who is both knowledgeable and sensitive to Hawaiian site management and who has the trust of members of the community. The cultural monitor will work closely with the archaeologist to provide a liaison with Hawaiians when properties of traditional, religious, and cultural importance are discovered or inadvertently impacted, and will also assist in the identification and treatment of such sites. Development of an approved AMP will be required.

- If construction, maintenance, or operational activities must occur in proximity to culturally sensitive water resources, including freshwater springs, fishponds, and nearshore cultural resources, then appropriate measures should be taken to prevent silt from degrading water sources. The effectiveness of these mitigating barriers should be monitored. Particular mitigation measures should be developed in consultation with NHOs, OHA, and potential lineal and cultural descendants.

- Culturally important plant species should be avoided when possible. When it is not possible to avoid these plant resources, consultations should be undertaken with NHOs,

OHA, and potential lineal and cultural descendants. If the species is available elsewhere on government lands, guaranteeing access may be an appropriate mitigation measure, but this must be done in consultation with NHOs, OHA, and potential lineal and cultural descendants. For rare or less common species, establishing or transplanting an equal amount of the plant resource elsewhere on government lands accessible to the affected community may be considered.

- Culturally important wildlife species (e.g., pigs) and their habitats should be avoided. When it is not possible to avoid these habitats, renewable energy facilities should be designed to minimize impacts on these culturally important resources, especially in rural subsistence communities.
- The use of cultural orientations or cultural training/education programs for construction workers, contractors, and consultants should be implemented to reduce occurrence of human-related disturbances to nearby cultural sites and to ensure sensitivity to the community's cultural concerns. The cultural orientation should be developed in consultation with NHOs, OHA, and potential lineal and cultural descendants.

Decommissioning

- Prior to termination of the renewable energy facility, a decommissioning plan would be developed and approved by the government and applicable agencies. The decommissioning plan would include a site reclamation plan and monitoring program. All surface structures would be removed from the site and the site would be fully restored.
- All management plans, conservation and construction measures, and stipulations developed for the construction phase would be applied to similar activities during the decommissioning phase.
- Topsoil from all decommissioning activities would be salvaged and reapplied during final reclamation.
- All areas of disturbed soil would be reclaimed using weed-free native plants.
- The vegetation cover, composition, and diversity would be restored to values to commensurate with the ecological setting.

3.2.6 Cultural Resources Evaluations for the Landing Site Areas

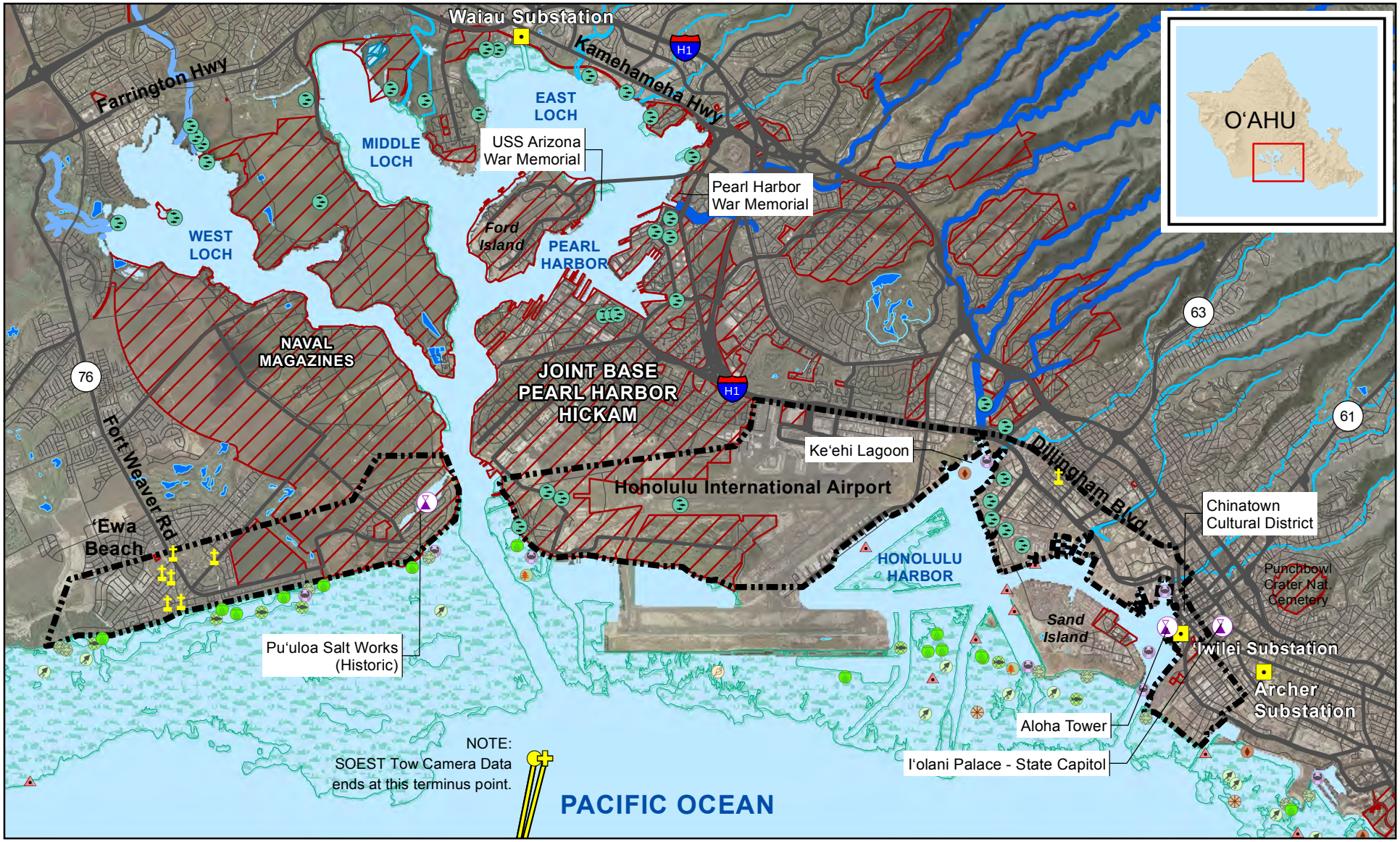
A detailed Cultural Resources Evaluation for each of the seven landing site areas is contained in Appendix B. In collecting information to identify potential cultural and natural resources, CSH relied primarily upon archival archaeological literature research, including a review of previous cultural resource studies in the landing site areas and subsequent identification of known specific cultural resources. The actual cultural and natural resources within each landing site area cannot be confirmed until an actual AIS, including a thorough cultural assessment, is

conducted during site-specific project analysis or when actual construction activities occur. Besides the preparation of an AIS, a comprehensive consultation process involving cultural practitioners, *kūpuna*, NHOs, and lineal and cultural families that may have a connection to areas must be conducted to thoroughly identify and assess the valued cultural and natural resources within the cultural landscape areas. Only then can the presence of significant cultural and natural resources in the area be definitively confirmed.

The cultural and historic sensitivity maps included in the cultural resources evaluation are based on the potential of subsurface deposits being discovered given the archival research. The sensitivity ratings include the following:

- Low – Indicates a low potential for subsurface deposits. This assessment is based upon previous cultural resource studies. These are areas where potential for discovery of cultural resources, including Hawaiian burials, are less probable.
- Medium – Indicates an area of known cultural activity, but based on other factors, the probability of encountering cultural resources is only moderate. These are areas where potential for discovery of cultural resources, including Hawaiian burials, is possible, and the area may be considered for potential development subject to completion of an AIS and consultation with NHOs, SHPD, OHA, and potential lineal and cultural descendants.
- High – Indicates an area that contains known cultural resources. The probability of encountering cultural resources, including Hawaiian burials, is high and thus the areas should be avoided.

Clearly, much more research can be and should be completed during the Section 106, NHPA consultation process itself. However, the research conducted to date, including the community engagement process, and the cultural resources evaluation included in this section provide a firm foundation for identifying the valued cultural, historic, and natural resources as required under ***Ka Pa‘akai*** for any future environmental review.



Pearl Harbor Landing Site Area: Cultural and Historic Sites

- Route with camera data *
- Route without camera data **
- Identified O'ahu Substation Locations
- Highways & Major Roads
- Other Roads
- SOEST Cable Routes
- HIREP Study Analysis Area
- Federally Owned Land
- Community Religious Facilities
- Fish Ponds (Historic & Active)
- Cultural Landmark

Coastal Resource Activities (with Cultural Significance)

- Spear Fishing
- Gill Netting
- Throw Netting
- Torch Fishing
- Opihi
- Crabbing
- Trapping
- Seaweed
- Shell Collecting
- Canoe Paddling

Streams (1990 Cultural Sensitivity Rating)

- Very High
- High
- Medium
- Low
- Unknown
- Freshwater Lake or Pond
- Nearshore Coral Reefs
- Open Water

N

0 5,000 Feet

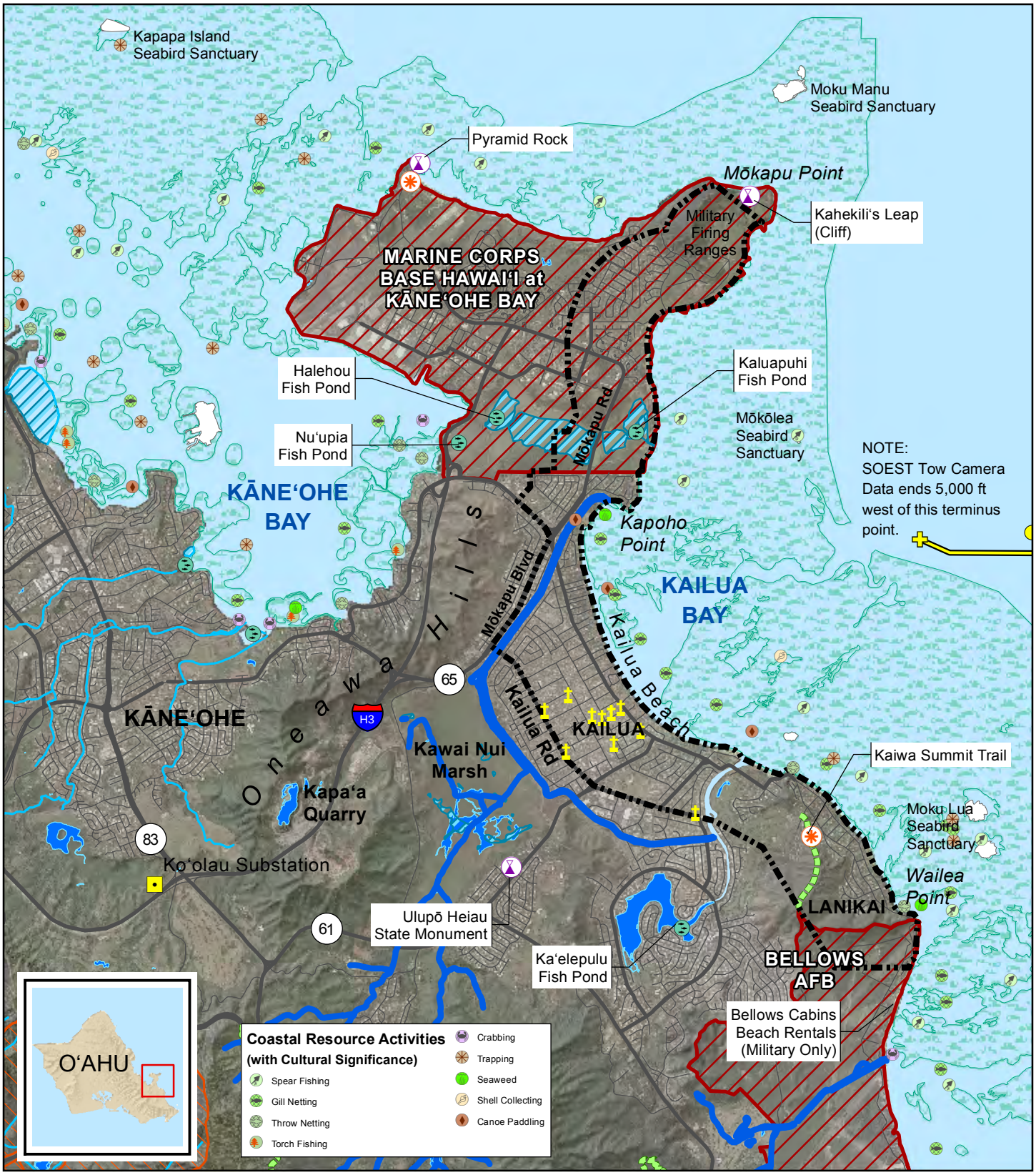
* Symbol denotes shoreward extent of tow camera data for cable route (unless otherwise noted).

** Symbol denotes shoreward approach of cable route without tow camera data.

Date: 4/26/2012

Data Sources: HI-DBEDT, USGS, CCH, UH-SOEST, AECOM, 2012

Figure 3.2-1



Kāne'ohe Landing Site Area: Cultural and Historic Sites

- Route with camera data *
- Route without camera data **
- Identified O'ahu Substation Location
- Highways & Major Roads
- Other Roads
- SOEST Cable Routes
- HIREP Study Analysis Area
- Federally Owned Lands
- Cultural Landmark
- Scenic Overlook
- Fish Ponds (Historic & Active)
- Community Religious Facilities
- Na Ala Hele (Recreational) Trails
- Public Hunting Areas
- Fish Ponds (Areas)
- Freshwater Lake or Pond
- Nearshore Coral Reefs

Streams (1990 Cultural Sensitivity)

- Very High
- High
- Medium
- Low
- Unknown
- Open Water

N

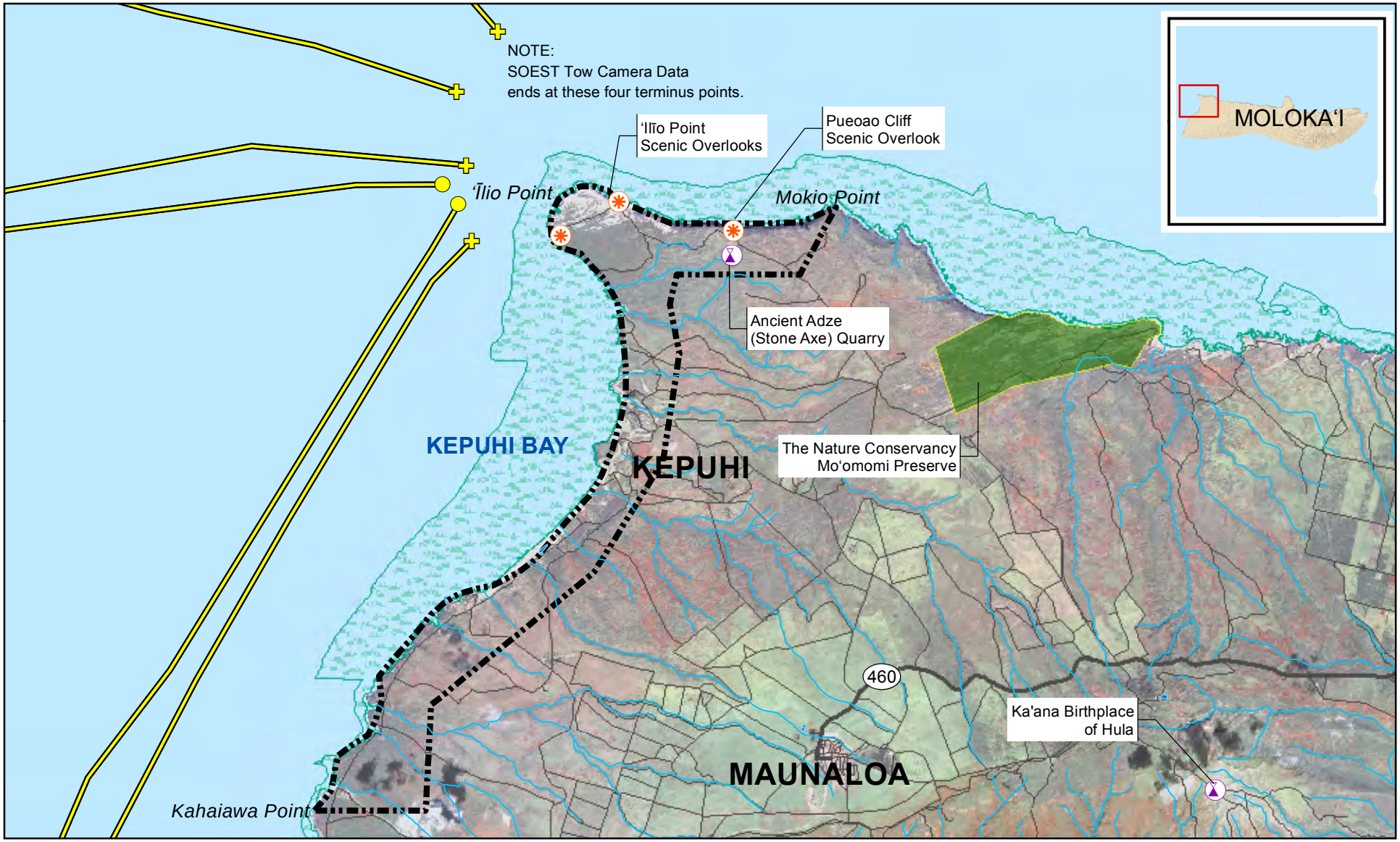
0 2,500 Feet

* Symbol denotes shoreward extent of tow camera data for cable route (unless otherwise noted).
** Symbol denotes shoreward approach of cable route without tow camera data.

Date: 4/26/2012

Data Sources: HI-DBEDT,NOAA CCH, UH-SOEST, AECOM, 2012

Figure 3.2-2



West Moloka'i Landing Site Area: Cultural and Historic Sites

- Route with camera data *
- Route without camera data **
- Highways & Major Roads
- Other Roads
- SOEST Cable Routes
- HIREP Study Analysis Area
- Drainages, Rivers and Streams
- Cultural Landmark
- Scenic Overlook
- Nature Conservancy Preserve
- Nearshore Coral Reefs
- Open Water

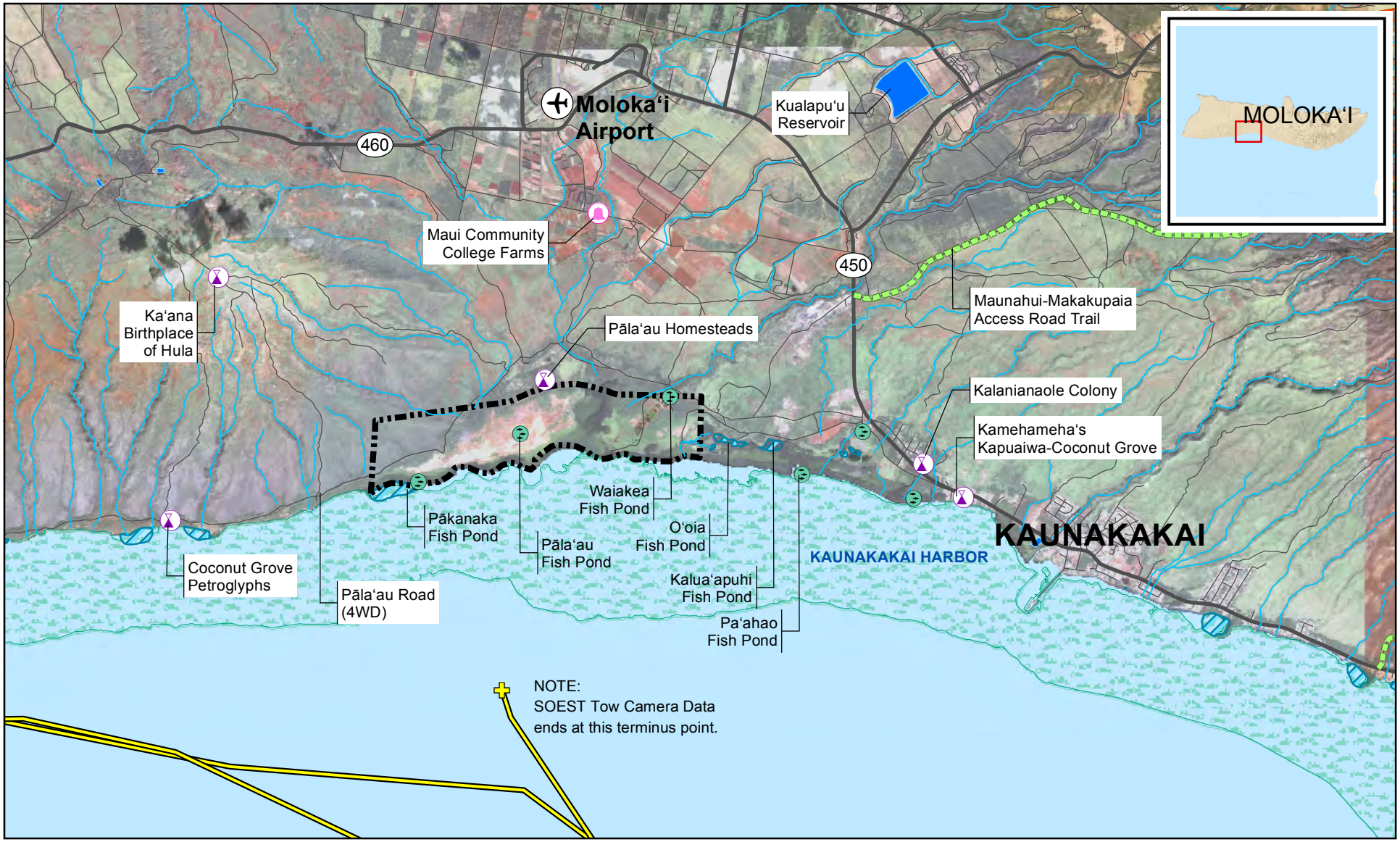
N

0 5,000 Feet

* Symbol denotes shoreward extent of tow camera data for cable route (unless otherwise noted).
** Symbol denotes shoreward approach of cable route without tow camera data.

Date: 4/29/2012
Data Sources: HI-DBEDT, USGS, UH-SOEST, AECOM, 2012

Figure 3.2-3



South Moloka‘i Landing Site Area: Cultural and Historic Sites

- Route with camera data *
- Route without camera data **
- Highways & Major Roads
- Other Roads
- SOEST Cable Routes
- HIREP Study Analysis Area
- Drainages, Rivers and Streams
- Cultural Landmark
- Cultural Education
- Na Ala Hele (Recreational) Trails
- Fish Ponds (Historic & Active)
- Fish Ponds (Areas)
- Freshwater Lake or Pond
- Nearshore Coral Reefs *
- Open Water

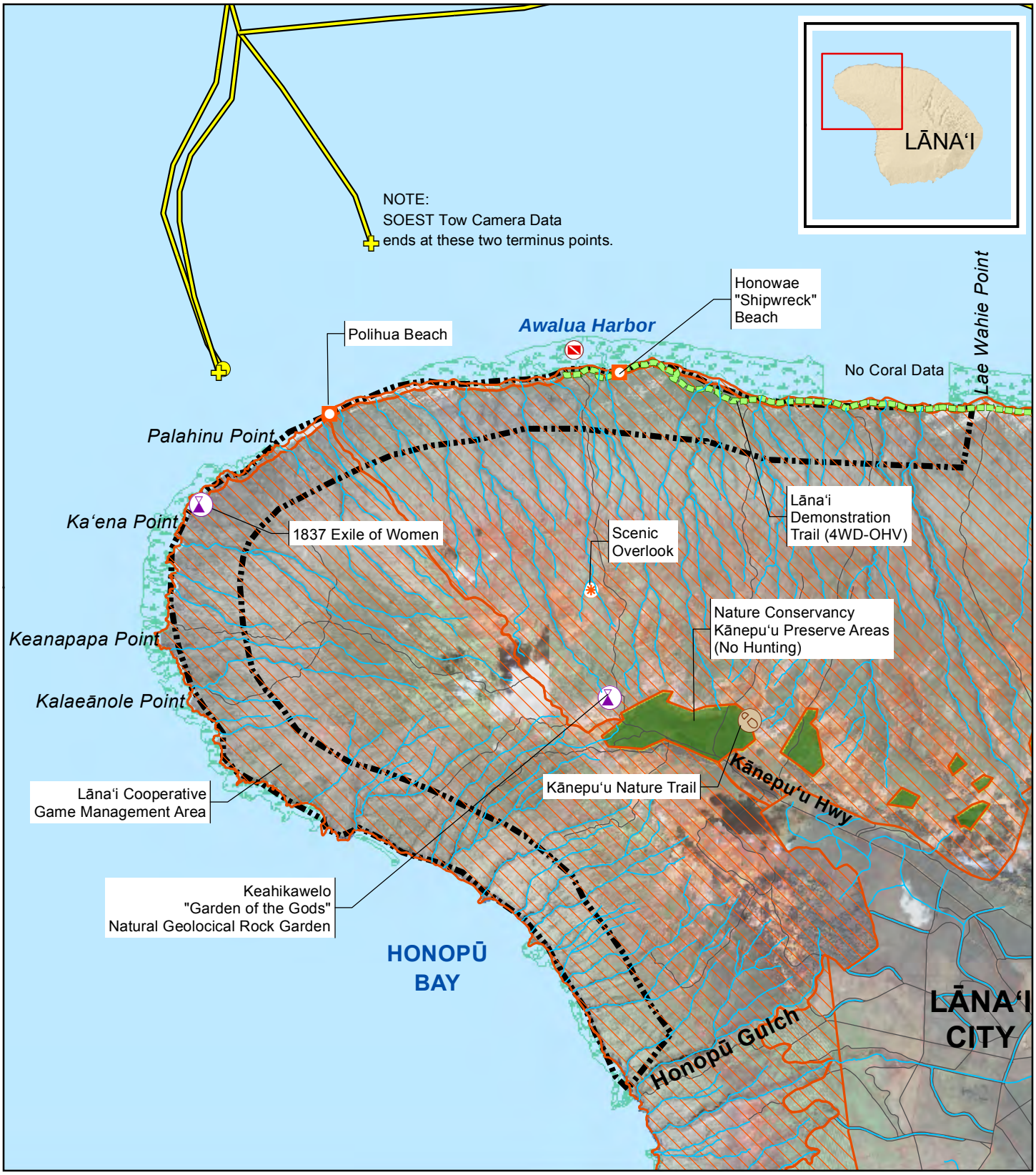
N

0 5,000 Feet

* Symbol denotes shoreward extent of tow camera data for cable route (unless otherwise noted).
** Symbol denotes shoreward approach of cable route without tow camera data.

Date: 4/26/2012
Data Sources: HI-DBEDT, USGS, UH-SOEST, AECOM, 2012

Figure 3.2-4



Lāna'i Landing Site Area: Cultural and Historic Sites

- Route with camera data *
- Route without camera data **
- Highways & Major Roads
- Other Roads
- SOEST Cable Routes
- HIREP Study Analysis Area
- Drainages, Rivers and Streams
- Public Hunting Areas
- Nature Conservancy Preserve
- Na Ala Hele (Recreational) Trails

Recreational Features ***

- Park
- Hiking Trail
- Sports Diving
- Cultural Landmark
- Recreational Beach
- Scenic Overlook
- Nearshore Coral Reefs
- Open Water

N

0 5,000

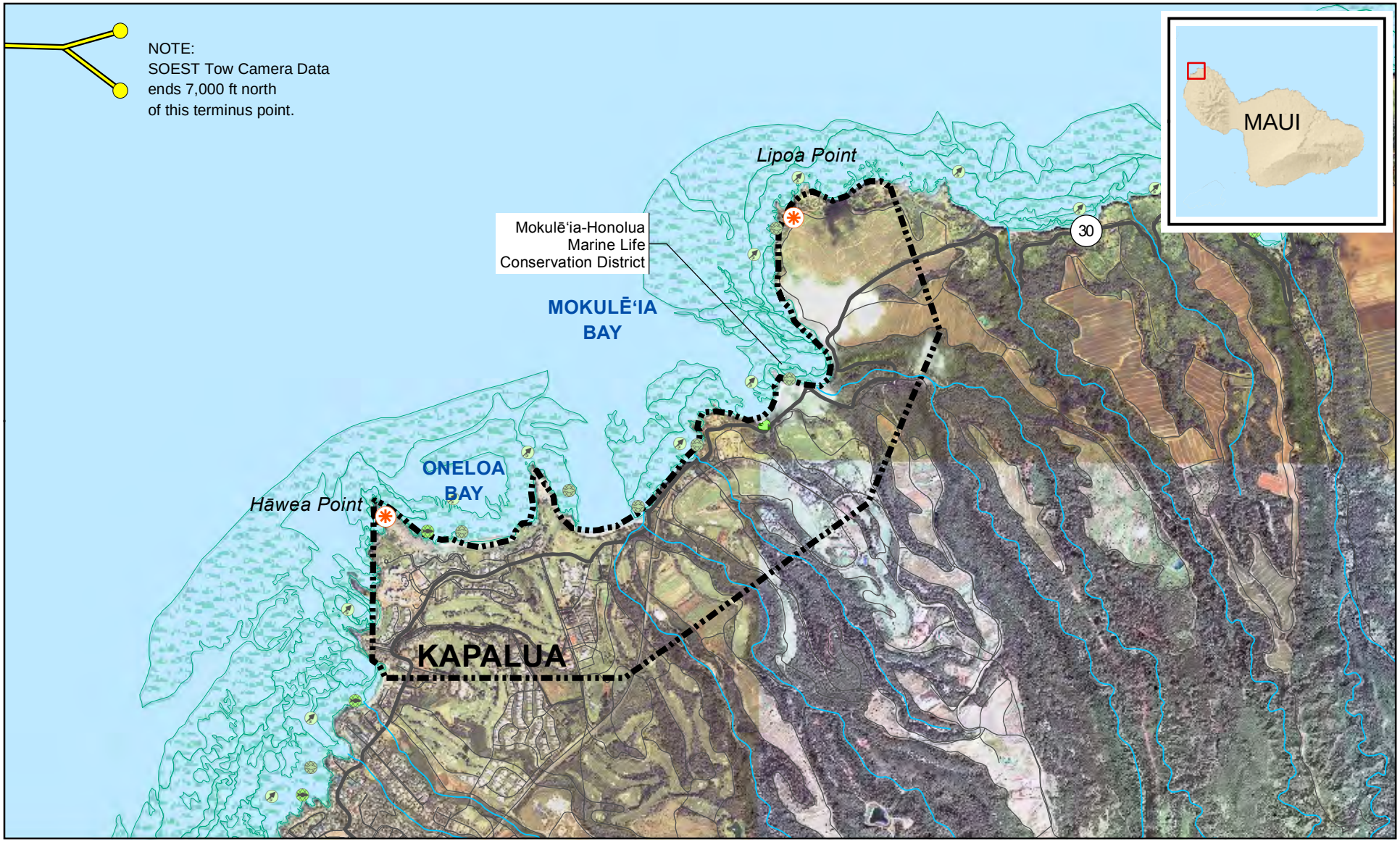
Feet

* Symbol denotes shoreward extent of tow camera data for cable route (unless otherwise noted).
** Symbol denotes shoreward approach of cable route without tow camera data.
*** Coastal Resources Acitivitesl data does not exist for Lāna'i. Any activities shown have been mapped from other data sources.

Date: 4/26/2012

Data Sources: HI-DBEDT, NOAA, USGS, UH-SOEST, AECOM, 2012

Figure 3.2-5



West Maui Landing Site Area: Cultural and Historic Sites

- Route with camera data *
- Route without camera data **
- Highways & Major Roads
- Other Roads
- SOEST Cable Routes
- HIREP Study Analysis Area
- Cultural Landmark
- Scenic Overlook

Coastal Resource Activities (with Cultural Significance)

- Spear Fishing
- Gill Netting
- Throw Netting
- Canoe Paddling

- Drainages, Rivers and Streams
- Nearshore Coral Reefs
- Open Water

N

0 2,500 Feet

* Symbol denotes shoreward extent of tow camera data for cable route (unless otherwise noted).
** Symbol denotes shoreward approach of cable route without tow camera data.

Date: 4/26/2012
Data Sources: HI-DBEDT, USGS, UH-SOEST, AECOM, 2012

Figure 3.2-6

Kahului Maui Landing Site Area: Cultural and Historic Sites

- Route with camera data *
- Route without camera data **
- Highways & Major Roads
- Other Roads
- SOEST Cable Routes
- HIREP Study Analysis Area
- Cultural Landmark
- Community Religious Facilities
- Fish Ponds (Historic & Active)

Coastal Resource Activities (with Cultural Significance)

- Spear Fishing
- Gill Netting
- Throw Netting
- Torch Fishing
- Pole and Line Fishing
- Opihi
- Crabbing
- Seaweed

Streams (1990 Cultural Sensitivity)

- Very High
- High
- Medium
- Low
- Unknown

- Fish Ponds (Areas)
- Freshwater Lake or Pond
- Nearshore Coral Reefs
- Open Water

N

0 2,500 Feet

* Symbol denotes shoreward extent of tow camera data for cable route (unless otherwise noted).
** Symbol denotes shoreward approach of cable route without tow camera data.

Date: 4/26/2012
Data Sources: HI-DBEDT, CCH, UH-SOEST, AECOM, 2012

Figure 3.2-7

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