

3.8 NATURAL HAZARDS, HAZARDOUS MATERIALS, AND MUNITIONS AND EXPLOSIVES OF CONCERN

3.8.1 Resource Definition

Natural Hazards

A widely accepted definition characterizes natural hazards as “those elements of the physical environment, harmful to man and caused by forces extraneous to him.” More specifically, in this document, the term “natural hazard” refers to all atmospheric, hydrologic, geologic (especially seismic and volcanic), and wildfire phenomena that, because of their location, severity, and frequency, have the potential to adversely affect humans, their structures, or their activities. In Hawai‘i, natural disasters involve, to varying degrees, atmospheric (tropical storms, hurricanes), seismic events with associated tsunamis, geologic (rock falls, landslides), hydrologic (coastal flooding, storm surge), volcanic (gases, lava flows), and wildfires.

Floods

Floods and flooding are basically defined as an overflowing of water onto land that is normally dry. Flooding in Hawai‘i mostly is associated with marine storm surge activity triggered by atmospheric conditions such as tropical storms and by terrestrial river or drainageway flooding triggered by these same types of storm events.

Tsunami, Hurricanes, and Tropical Storms

Tsunami is the modern term for an event that used to be called by the misnomers “tidal wave” or “harbor wave” by English speakers. Tsunamis are a series of waves of very long wavelength (hundreds of miles) and period (tens of minutes to an hour or more) that can travel up to 600+ miles per hour in the open ocean. They are caused by disturbances that displace large volumes of water and are usually generated by seafloor displacement during earthquakes, but they can also be caused by volcanic eruptions, submarine landslides, and oceanic bolide impacts. Tsunamis can impact coasts on either oceanwide, regional, or local scales. In the open ocean, the tsunami wave height may be only a meter or two, but as the wave approaches shallow water it slows down and begins shoaling resulting in dramatic increases in wave height. Damage from a tsunami is caused by inundation (flooding of the land surface), wave impact, and sediment erosion and deposition. In general, the larger the tsunami, the greater the impact. However, tsunami runup height (elevation at the limit of inundation) and inundation from an individual tsunami typically vary greatly over short distances due to complex interactions between the wave and land surface (SOEST 2009).

Hurricanes are giant, spiraling tropical storms that can pack wind speeds of more than 160 miles per hour and unleash more than 2.4 trillion gallons of rain a day. These same tropical

storms are known as cyclones in the northern Indian Ocean and Bay of Bengal, and as typhoons in the western Pacific Ocean. A hurricane is defined as a tropical storm with winds that exceed 64 knots (74 miles per hour) and circulate counter-clockwise about their centers in the Northern Hemisphere and clockwise in the Southern Hemisphere. (University of Illinois 1999).

Earthquakes, Landslides, and Volcanoes

Earthquakes are caused by the sudden release of accumulated strain along these faults, releasing energy in the form of low-frequency sound waves called seismic waves. Although thousands of earthquakes occur each year, most are too weak to be detected except by seismographs, instruments that detect and record vibrations and movements in the earth (Your Dictionary 2012). Earthquakes are frequently associated with landslides, which are rapid downward movement of a mass of rock, earth, or artificial fill on a slope. Liquefaction is the phenomenon where the strength and stiffness of a soil is reduced by earthquake shaking or other rapid loading. Frequently associated with earthquake-prone areas, volcanoes are a naturally occurring opening in the surface of the earth through which molten, gaseous, and solid material is ejected. The Hawaiian Island chain is entirely formed from volcanic activity.

Wildfires

Wildfires are defined as a sweeping and destructive conflagration especially in an area of wilderness (Your Dictionary 2012).

Hazardous Materials

A hazardous material is any item or agent (biological, chemical, physical) that has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors. Hazardous waste is a hazardous material that has one or more of the following special characteristics of ignitability, corrosiveness, reactivity, and toxicity; exposure to such waste may increase mortality rates or cause serious illness. Issues associated with hazardous materials and waste typically center around underground storage tanks (USTs) and aboveground storage tanks (ASTs); and the storage, transport, and use of pesticides, fuels, petroleum, oils, paints, and lubricants. When such resources are improperly used, they can threaten the health and well-being of wildlife species, botanical habitats, air, soil, water resources, and humans.

Munitions and Explosives of Concern

By definition, Munitions and Explosives of Concern (MEC) are military munitions that pose an explosive safety risk. MEC includes unexploded ordnance (UXO) and discarded military munitions. Explosive ordnance is any munitions, weapon delivery system, or ordnance item that contains explosives, propellants, and chemical agents. UXO consists of these same items after

they have been (1) primed, fused, armed, or otherwise prepared for action armed or otherwise prepared for action; (2) launched, placed, fired, or released in a way that they cause hazards; and/or (3) remain unexploded either through malfunction or design. Discarded military munitions (DMM) are military munitions that have been abandoned without proper disposal or removed from storage in a military magazine for the purpose of disposal. As a result of the large military presence in Hawai'i over the past hundred years, the potential exists for encountering MEC on both land and in the ocean (see Figure 3.8-1). This MEC is a threat to public health since it may detonate if disturbed, and may also threaten soil, surface water, and groundwater.

3.8.2 Regulatory Setting

Natural Hazards

Floods

The Federal Emergency Management Agency (FEMA) maintains Flood Insurance Rate Maps (FIRM) that identify varying flood danger zones for the U.S., including Hawai'i. Areas are categorized from 100-year base floods with undetermined elevations to areas determined to be outside the 500-year floodplain. Development within a Special Flood Hazard Area as defined by FEMA must comply with the rules and regulations of the National Flood Insurance Program (Title 44 C.F.R.) and local flood ordinances. Revised Ordinances of Honolulu Section 21-9.10 regulates development within flood hazard areas on the island of O'ahu while Maui County's flood provisions are codified in Maui County Code Title 19, Chapter 19.62.

Tsunami, Hurricanes and Tropical Storms

Locally, the State of Hawai'i's Civil Defense Agency (CDA) maintains tsunami inundation zone maps and evacuation procedures for all coastal areas in Hawai'i. Inundation maps for the state are based on the five most-destructive trans-Pacific tsunamis to hit Hawai'i during the last century and are validated with historical tsunami runup records and evaluation with hypothetical events (Cheung 2010). After the destructive Southeast Asia earthquake and tsunami of 2005, NOAA stepped up efforts at early tsunami warning procedures through the enhancement of the Pacific Ocean wave buoy system. Real-time tsunami monitoring systems are positioned at strategic locations throughout the ocean and play a critical role in tsunami forecasting. Hawai'i's CDA works with the National Weather Service (NWS) to monitor, predict, and track severe weather events such as hurricanes and tropical storms. On O'ahu, the CDA would coordinate emergency notification and response with the Honolulu Department of Emergency Management.

Earthquakes, Landslides, and Volcanoes

Engineers, seismologists, architects, and planners have carefully evaluated seismic hazards related to building construction. They devised a system of classifying seismic hazards on the basis of the expected strength of ground shaking and the probability of the shaking actually occurring within a specified time. The results are included in the Uniform Building Code (UBC) seismic provisions. The UBC seismic provisions contain six seismic zones, ranging from 0 (no chance of severe ground shaking) to 4 (10 percent chance of severe shaking in a 50-year interval). The shaking is quantified in terms of g-force (familiar to race car drivers and astronauts), the earth's gravitational acceleration. O'ahu is listed in Seismic Zone 2A on a scale of 1 to 4 under the UBC of 1997 and the International Building Code (IBC) of 2003. Zone 2A indicates a place that has a lower potential for ground motion created by seismic activity. The islands of Maui County are located in Zone 2B, which indicates a place that has a slighter greater potential for seismic activity (USGS 1997).

Wildfires

Dry vegetation and high winds may combine to cause a potential fire hazard around the landing site areas. Wildfires have numerous causes such as electrical shorts, insufficient equipment maintenance, contact with power lines, lightning, or even lava flows. Wildfires can also be set intentionally or unintentionally by humans. The State of Hawai'i has created Fire Hazard Maps for most major Hawaiian islands. These maps designate wildfire risk areas on a sliding scale between "low" and "high," with some areas undefined. Wildfire management for the state is performed by a range of agencies depending on geographical area. The Honolulu Fire Department manages the primary fire response on O'ahu, while the Maui County Fire Department manages primary fire response on the Maui County islands. On military bases and some federal lands, DoD Fire and Emergency Services or other federal fire departments are first responders. Fire suppression response across the state is enhanced by assistance at various levels by NPS, State Division of Forestry and Wildlife (DOFAW), USFWS, and individual airport firefighting services.

Hazardous Materials

Different hazardous substance waste and materials are regulated in a variety of ways. Hazardous materials are defined and regulated in the U.S. primarily by laws and regulations administered by the U.S. Environmental Protection Agency (USEPA), Occupational Safety and Health Administration (OSHA), the U.S. Department of Transportation (DOT), the U.S. Nuclear Regulatory Commission (NRC), and state governments. Hazardous materials in areas to be developed in support of the project may be present due to improvements and land use on-site and in the project vicinity. Hazardous substances are controlled in the U.S. primarily by laws and regulations administered by USEPA, OSHA, and DOT. Each agency incorporates hazardous substance safeguards according to its unique Congressional mandate.

- USEPA regulations focus on the protection of human health and the environment.
- OSHA regulations primarily protect employee and workplace health and safety.
- DOT regulations promote the safe transportation of hazardous substances used in commerce.

At the state level, HDOH – Solid and Hazardous Waste Branch regulates the generation, transportation, treatment, storage, and disposal of hazardous wastes. This agency also administers USEPA permits, procedures, and regulations for the state. DoD operates various levels of hazardous materials management at its military bases throughout the state. Proper identification of hazardous materials is required for compliance with applicable regulations, to ensure human and environmental health and safety, and to support the design and implementation of mitigation measures. Cleanup efforts are currently underway in various locations in the state and by a wide range of state and federal agencies and stakeholders.

This section describes the regulatory setting for hazardous waste materials that may impact site development activities, including Resource Conservation and Recovery Act (RCRA), Comprehensive Environmental Response Compensation and Liability Act (CERCLA), USTs, pesticides, asbestos, lead based paint (LBP), and polychlorinated biphenyls (PCBs).

Resource Conservation and Recovery Act (RCRA)

RCRA is a federal law that provides, in broad terms, the general guidelines for the federal waste management program. RCRA's primary goals are to protect human health and the environment from the potential hazards of waste disposal, to conserve energy and natural resources, to reduce the amount of waste generated, and to ensure that wastes are managed in an environmentally sound manner. RCRA regulates the management of solid waste (e.g., garbage), hazardous waste, and underground storage tanks holding petroleum products or certain chemicals. It includes a Congressional mandate directing USEPA to develop a comprehensive set of regulations to implement the law. The hazardous waste program, under RCRA Subtitle C, establishes a system for controlling hazardous waste from the time it is generated until its ultimate disposal—in effect, from “cradle to grave.” In any given state, USEPA or the state hazardous waste regulatory agency enforces hazardous waste laws. USEPA encourages states to assume primary responsibility for implementing a hazardous waste program through state adoption, authorization, and implementation of the regulations. HDOH received delegation of its hazardous waste program from the federal government on November 13, 2001. As part of the delegation process, HDOH adopted amendments to the State's hazardous waste rules found in the HAR.

Comprehensive Environmental Response Compensation and Liability Act (CERCLA)

CERCLA, as amended by Superfund Amendments and Reauthorization Act (SARA) in 1986, authorized USEPA to create a list of polluted locations requiring a long-term response to clean up hazardous material contaminations. These locations are known as Superfund sites and are placed on the National Priorities List (NPL). The NPL guides USEPA in “determining which sites warrant further investigation” for environmental remediation. There are presently three Superfund sites on the NPL in Hawai‘i. One further site has been cleaned up and removed from the NPL. No sites are currently proposed for addition. All sites are on the island of O‘ahu (see Figure 3.8-2).

U.S. Occupational Safety and Health Administration (OSHA)

The OSHA requirements are designed to protect workers and prevent workplace accidents, injuries, or illnesses. One such requirement is the Hazard Communication Regulation (Title 29 C.F.R. Part 1910.1200), which defines a hazardous chemical as one that poses a physical or health hazard and requires that workers are trained and notified of specific hazards associated with hazardous workplace substances. The definition includes the following hazards:

- Carcinogens, toxins, toxic agents, irritants, corrosives, and sensitizers
- Agents that act on the hematopoietic system
- Agents that damage the lungs, skin, eyes, or mucous membranes
- Chemicals that are combustible, explosive, flammable, unstable (reactive), or water reactive
- Oxidizers
- Pyrophorics
- Chemicals that in the course of normal handling, use, or storage may produce or release dusts, gases, fumes, vapors, mists, or smoke that may have any of the previously mentioned characteristics
- Workplace exposure to approximately 400 substances, including dusts, mixtures and common materials such as paints, fuels, and solvents, currently regulated by OSHA

U.S. Department of Transportation Regulations

DOT Hazardous Materials Regulation Title 49 C.F.R. Part 171 defines a hazardous material as a substance capable of posing an unreasonable risk to health, safety, and property when transported in commerce. The DOT definition includes hazardous substances, hazardous wastes, and marine pollutants. DOT regulations require the implementation of various protective

and preventative measures designed to promote the safe transportation of hazardous materials in commerce.

Underground Storage Tanks (USTs)

Federal regulations concerning USTs are contained in Title 40 C.F.R. Parts 280 and 281, where information like general operating requirements, release detection, out of service UST systems and closure, purpose, general requirements and scope, general provisions, and others can be found. The Hawai'i State UST regulations require owners and operators to take specific steps to respond to confirmed releases from USTs. These requirements are specified in HAR Title 11 for underground storage tanks (HAR Title 11 Chapter 281-7). Hawai'i does not have any specific AST requirements, although the Hawai'i Water Pollution Control Law prohibits the discharge of any pollutant into state waters without a permit. In addition, the Hawai'i Environmental Response Law requires immediate reporting of any hazardous substance release. Hawai'i also requires that the owner or operator of a tank control air pollutant emissions from each tank.

Pesticides

The registration and use of pesticides are regulated under the Federal Insecticide, Fungicide and Rodenticide Act of 1972 as amended by Title 7 U.S.C. Sections 136–136y. Pesticide management activities are subject to federal regulations contained in Title 40 C.F.R. Parts 162, 166, 170, and 171 (1998), and the Hawai'i Pesticides Law. Hawai'i Code Division 1 Title 11 Chapter 149A, is the State of Hawai'i's law that authorizes the Hawai'i Department of Agriculture (DOA) to make and enforce pesticide rules for Hawai'i.

Asbestos

Asbestos is a mineral fiber that can cause cancer or asbestosis when inhaled; it has the potential to pollute air and water. Asbestos is regulated by USEPA with the authority promulgated by OSHA (Title 29 U.S.C. Sections 669 et seq.). Emissions of asbestos fibers to ambient air are regulated under Section 112 of the CAA. USEPA has banned the use of asbestos in manufacturing or construction; however, asbestos-containing materials may be present in buildings constructed before 1973 based on the type of insulation materials that were used at the time. HAR Title 11 Chapter 501-7 provides standards for demolition and renovation work in Hawai'i with regard to asbestos, and requires surveys and notices to document work in which asbestos-containing building materials may be a concern.

Lead-Based Paint (LBP)

On October 28, 1992, Congress passed the Residential Lead-Based Paint Hazard Reduction Act of 1992 (Title 42 U.S.C. Sections 4851–4856, commonly called Title X). This act along with associated USEPA rules provide for LBP hazard reduction, and worker and resident notification

and protection. LBP may be present in buildings constructed before 1992 based on the type of building materials that were used at the time.

Polychlorinated Biphenyls (PCBs)

The Toxic Substances Control Act became law in 1976. The Act authorized USEPA to secure information on all new and existing chemical substances, as well as to control any substances that were determined to cause unreasonable risk to public health or the environment. Current PCB regulations can be found at Title 40 C.F.R. Part 761. PCBs have been used in a wide variety of materials, including electrical equipment such as transformers.

Munitions and Explosives of Concern

In 1992, the Federal Facility Compliance Act (FFCA) was signed into law. This law required USEPA, in consultation with DoD and the states, to publish regulations that identify when conventional and chemical military munitions become hazardous waste and subject to Subtitle C of RCRA, and that provide for the safe storage and transportation of such waste. These regulations, entitled the Military Munitions Rule (62 Federal Register 6621), that define when military munitions become waste and how these waste military munitions (WMM) will be managed, became effective at the federal level on August 12, 1997. The objective of this law is to minimize health hazards and environmental damage caused by the use or misuse of hazardous material. Military munitions must be stored, transported, used, and maintained to ensure their effective, efficient, and safe employment to protect human health and the environment.

In addition to Military Munitions Rule, there are many policies and guidelines that govern most aspects of military munitions and military munitions citing; cleanup operations and standards; and transportation of UXO, UXO workers, and property transfers. These include DoD and service-specific directives, policies, and guidelines. The service-specific policies usually reiterate the DoD policies and directives, but may also provide additional details and requirements pertinent to that service. Specific services include the U.S. Army, U.S. Navy, and the U.S. Air Force. U.S. Marine Corps ranges tend to follow U.S. Navy guidelines, while Army National Guard Ranges tend to follow U.S. Army policies. Most munitions-related investigations and cleanup are performed by or in conjunction with various DoD agencies. DoD is responsible for all military munitions.

3.8.3 Region of Influence

Natural Hazards

Known natural hazards would be mapped and overlain on the proposed general areas being studied on the various islands. Since all the landing site areas are contiguous to coastal areas

and contain areas at or just above sea level, all are at risk for tsunami, hurricane, tropical storm, and associated flood damage. Remaining natural hazards can occur across the full range of sites in varying degrees based on known risk factors. None of the landing site areas are located on islands with active volcanoes, so there would be no risk from lava flows (see Figure 3.8-1).

Hazardous Materials

The ROI for hazardous materials sites would include the SOEST surveyed areas and the HIREP areas of analysis. Particularly important would be the terrestrial landing site areas to be analyzed for converter station placement, as hazardous materials sites are generally of a greater concern in land areas as opposed to the ocean floor (see Figure 3.8-2 for O'ahu Superfund sites).

Munitions and Explosives of Concern

The ROI for MEC would include SOEST surveyed areas and the terrestrial landing site areas. Possible MEC hazards offshore would be discussed, as their presence would impact where the cable could be routed within the cable corridor. MEC hazards onshore would be discussed, as they relate to possible construction and transportation sites associated with the undersea cable. The landing site areas on O'ahu include two active military facilities, JBPHH and MCBH at Kāne'ohe Bay. Both of these facilities store military munitions and have assigned Explosive Safety Quantity Distance (ESQD) arcs throughout their bases to protect humans from possible sabotage or accidental detonation of stored or active use of explosives and ammunition (see Figure 3.8-3).

3.8.4 Affected Environment

General

For this section, existing conditions are outlined for the human environment (terrestrial); the types of risks that may occur in Hawai'i; and their prevalence, frequency, and intensity in the state. Natural hazards and MEC are also described as they relate to the marine waters along the undersea cable corridors between the project islands.

Natural hazards affecting the marine environment in the areas of analysis would be associated with damage to a potential undersea cable from tsunami, off-shore earthquakes, undersea landslides, or underwater volcanic activity. The greatest potential natural hazard pertaining to the marine environment would be seismic events and associated tsunami. The undersea power cable system could be impacted by the shaking force, underwater landslides, or wave energy generated by these two types of events. Potential damage from natural disasters would depend on the location of the cables; the type of benthic and geological surface upon which cables are laid; terrestrial connection of cables via directional drilling; and cable design, engineering, and

installation. Subsequently, potential damage to an undersea cable could result in a disruption in electric transmission between islands, thereby affecting the human environment. Impacts on marine habitat and species are discussed in Section 3.6 of this document.

Floods

Hawai'i's flood dangers are primarily related to flash flooding of streams and flooding related to storm-generated coastal surges, as discussed in the following section. Those potential landing areas most affected by flooding are those areas located in an official FEMA flood zone.

Tsunami, Hurricanes, and Tropical Storms

Tsunamis can potentially affect all shorelines in Hawai'i. Tsunamis affecting Hawai'i are typically generated in the waters off South America, Japan, Alaska, and the west coast of the U.S. In modern times, local tsunamis have been generated on the island of Hawai'i in both 1946 and 1960, with devastating impacts to the City of Hilo. The Hawaiian Islands are seasonally affected by Pacific hurricanes and tropical storms from the late summer to early winter months when ocean waters around the state are at their warmest. These storms generally travel toward the islands from a southerly or southeasterly direction and can deposit large amounts of rain with high winds on all the islands. The storms generally exacerbate localized stream flooding and coastal storm surges. Landing area sites in tsunami evacuation zones or official FEMA flood zones would be most impacted by these events, although areas outside these zones could be impacted based on severity of the event, elevation, shoreline topography, and nearshore geology.

Earthquakes

In Hawai'i, most earthquakes are related to volcanic activity. Each year, thousands of earthquakes occur in Hawai'i due to volcanic activity. Most of these events are so small as to be detectable by only the most sensitive of seismic instruments. But moderate and disastrous earthquakes have shaken the Hawaiian Islands quite violently in the past. Because O'ahu is an older Hawaiian Island, it is not considered particularly prone to major seismic activity. Generally, the risk and intensity of earthquakes increases moving east along the Hawaiian Island chain, toward younger islands. Violent earthquakes can occur anywhere in the state, along with associated liquefaction events on low-lying and fill areas (Castle and Cooke 2008).

Landslides

Giant landslides over millennia have shaped and formed the Hawaiian Islands. USGS marine scientists have identified more than 15 giant landslides surrounding the Hawaiian Islands. The slides are among the largest known on Earth. The youngest is thought to have occurred only 100,000 years ago, and there is evidence today that large blocks of land on the island of Hawai'i

are beginning to slide, generating large earthquakes in the process. Each slide has resulted in huge land losses to the islands and resulted in large waves that have carried rocks and sediments as high as 1,000 feet above mean sea level (AMSL) (USGS 1997).

Much smaller landslides pose a more immediate and continual concern in Hawai'i today. These smaller landslides are activated by storms, earthquakes, volcanic eruption, and fires. Related to landslides, debris, and mud flows are rivers of rock, earth, and other debris saturated with water. They develop when water rapidly accumulates in the ground during heavy rains. Landslides in Hawai'i, while frequently the result of natural events, can be the result of land mismanagement or dam failure particularly in mountain, canyon, and coastal regions.

Wildfire

Wildfire occurs on all of the major Hawaiian Islands, with human activity as the primary cause. Because Hawai'i's native ecosystems are not adaptive to wildfires, wildfires can result in extinction of native species and increased coverage of nonnative, invasive species. Other results of wildfires include soil erosion, increased runoff, and decreased water quality. Wildfires can occur on all the islands. Generally, dry, windier leeward sides of islands are more prone to risk of wildfire.

Volcanoes

Haleakalā volcano on the island of Maui is considered dormant, since it last erupted sometime between 1500 and 1800, but it is not yet considered extinct (USGS 1997). The islands of O'ahu, Lāna'i, and Moloka'i do not have any active volcanoes. There are numerous active volcanoes on the island of Hawai'i, including Mauna Loa, Mauna Kea, and the offshore, underwater volcano known as Loihi. These volcanoes are associated with seismic activity that can, in turn, affect the site study area. None of the landing site areas are located on islands with active volcanoes, so there would be no risk from lava flows.

Hazardous Materials

Site conditions for potential landing site areas are presented and discussed here in general terms. When the exact locations of land-based facilities within the landing site areas are determined, it may be necessary to perform detailed investigations, including a site-specific Environmental Site Assessment in conformance with the American Society for Testing and Materials (ASTM) Method E 1527-05 (ASTM 2005), which would provide for review of accessible public records and require site inspections to identify classes of land uses and/or hazardous materials that may be present at the project-specific locations and along possible cable alignments.

Munitions and Explosives of Concern

Since the early 1900s, the state and specifically O‘ahu have been home to military bases for all branches of the U.S. military. The largest of these is the military complex of the JBPHH. One of the effects that these military bases have had on the terrestrial environment and the waters surrounding Hawai‘i is the presence of MEC. Several studies, as well as historical anecdotal evidence, substantiate the need for the concern from MEC impacts for this project. This situation poses a concern, as the alignment of the undersea cable and associated landing site areas may intersect areas with a potential for encountering MEC. The landing site areas on O‘ahu would include two active military facilities: JBPHH and MCBH at Kāne‘ohe Bay. Both of these facilities store military munitions and have assigned ESQD arcs throughout the bases to protect humans from possible sabotage or accidental detonation of stored or active use of explosives and ammunition.

Maui County-O‘ahu Routing Specific

For this analysis, natural disasters are identified and measured by their presence and impact on humans and the human environment. The following sections identify the existing terrestrial and nearshore environment in each project location, and outline the various known factors contributing to natural hazard risks in each.

Maui

Maui-Kahului Harbor

The majority of land and all of the shoreline area in the Maui-Kahului Harbor landing site area is located in the 100-year flood zone as noted on FEMA maps. This same area contains significant commercial, industrial, and port facilities, as well as some large institutional uses. The flood zone designation is associated with possible tsunami, storm surge, or hurricane-related waves. The entire eastern half of the landing site area is within a tsunami evacuation zone, while the western half of the tsunami evacuation zone is situated between the shoreline and the larger residential community inland and at a higher elevation (see Figure 3.8-4). There are neither known faults nor active volcanoes in or near the landing site area or offshore. All of Maui County lies in a UBC 2B Seismic Zone. The area sits within a high wildfire risk zone, with a medium risk zone toward the western end. Figure 3.8-5 presents an overview of the geology of this landing site area.

Maui-Kapalua (West Maui)

The Maui-Kapalua landing site area is more topographically diverse than the Maui-Kahului Harbor landing site area, resulting in a smaller 100-year flood zone as demarcated on the FEMA maps. The 100-year flood areas are primarily centered at shoreline areas where streams

connect with the ocean around Mokuleia and Oneloa Bays (see Figure 3.8-6). The tsunami evacuation zone overlays this same general area with an additional large evacuation zone at Lipoa Point. The resort area in the southern portion of the landing site area is generally outside of flood and tsunami evacuation zones. This same resort area is located in a medium wildfire risk area. There are neither known faults nor active volcanoes in or near the landing site area or offshore. All of Maui County lies in a UBC 2B Seismic Zone. Figure 3.8-7 presents an overview of the geology of this landing site area.

Lānaʻi

The Lānaʻi landing site area has a limited tsunami evacuation zone fronting Shipwreck Beach (see Figure 3.8-8). Remaining natural hazards in the project have not been defined or identified, possibly due to the extremely low density of development in the area. All of Maui County lies in a UBC 2B Seismic Zone. Figure 3.8-9 presents an overview of the geology of this landing site area.

Molokaʻi

Molokaʻi-Kaluakoi (West Molokaʻi)

This landing site area contains a FEMA 100-year flood zone at the Kaluakoi resort area near the center of the landing site area (see Figure 3.8-10). The tsunami evacuation zone overlays this flood zone, extending farther inland. The landing site area is mostly in a high-risk wildfire danger zone primarily due to the dry, windy conditions on this side of the island. There are neither known faults nor active volcanoes at the landing site area or offshore. However, a grouping of major fault lines exists approximately 5 to 6 miles to the east of the landing site area. These faults extend in a generally north/south direction. All of Maui County lies in a UBC 2B Seismic Zone. Figure 3.8-11 presents an overview of the geology of this landing site area.

Molokaʻi-Kaunakakai (South Molokaʻi)

This mostly low-lying landing site area is almost all located within a 100-year FEMA flood zone (see Figure 3.8-12). Due to the lack of residents, the area is not within a tsunami evacuation zone. The fire hazard for this area is undetermined. The southern termini of the faults, mentioned in the previous section, are located approximately 2 miles north of this landing site area. A large majority of this landing site area sits on a surficial deposit of silt and mud, possibly increasing the risk of liquefaction during seismic events. All of Maui County lies in a UBC 2B Seismic Zone. Figure 3.8-13 presents an overview of the geology of this landing site area.

O'ahu

O'ahu-MCBH at Kāne'ohe Bay

This windward O'ahu-MCBH at Kāne'ohe Bay landing site area contains a FEMA 100-year flood zone. However, the zone terminates at the base boundary with the residential areas of Kailua and Lanikai outside this 100-year flood zone (see Figure 3.8-14). A tsunami evacuation zone extends the shore length of the landing site area and extends inland encompassing a significant amount of the residential area of Kailua and Lanikai. Because the windward side of O'ahu gets so much rainfall, the risk for wildfire is low, increasing to medium in the higher elevations in the Lanikai neighborhood. There are neither known faults nor active volcanoes in or near the landing site area or offshore. Much of the shoreline area of the Kailua neighborhood consists of "older dune" surficial deposits, leading to a possible increased risk of damage or liquefaction from seismic events. O'ahu lies in a UBC 2A Seismic Zone. Figure 3.8-15 presents an overview of the geology of this landing site area.

O'ahu-Pearl Harbor

This densely developed landing site area consists entirely of a FEMA 100-year flood zone, with a tsunami evacuation zone along the shoreline extending inland at the downtown area, the port facilities, portions of Honolulu International Airport, at the mouth of Pearl Harbor, and the residential communities to the west (see Figure 3.8-16). Due to the high level of dense development and lack of abundant vegetated areas, the wildfire risk is low in the eastern portion of the landing site area and high in the residential area to the west of Pearl Harbor. The fire risk at the naval magazine area of Pearl Harbor is undefined. The downtown/port area, Sand Island Access Road corridor, and much of the airport area is constructed on fill, increasing the risk of liquefaction during seismic events. There are neither known faults nor active volcanoes in or near the landing site area or offshore. O'ahu lies in a UBC 2A Seismic Zone. Figure 3.8-17 presents an overview of the geology of this landing site area.

3.8.5 Potential Impacts of Cable System Implementation

Description of Impact types

Natural Hazards

Terrestrial

While all of Hawai'i is susceptible to some risk of earthquakes, sites in Maui County are located in an earthquake zone that is categorized as a greater risk than that of the O'ahu zone. In general, potential development locations in all of the landing site areas on the various islands would be subject to some degree of flood risk due to the location near the shore and the need

for the undersea cable to connect with terrestrial converter stations on a relatively large, flat site. These locations along shorelines also make them susceptible to tsunamis, hurricanes, and tropical storm damage. Neither construction nor operation of future projects is expected to affect the incidence rate of a natural hazard, with the exception of an increased potential for wildfires associated with use of vehicles and electrical equipment during the construction phase and in future operations in the landing site areas.

Future infrastructure would be designed to resist damage from hazards such as earthquakes, hurricanes, tsunamis, flooding, and potentially wildfires. Construction specifications would be developed and proposed by the construction contractor under DBEDT and other state guidance as applicable, demonstrating how undersea cables and converter station infrastructure would be designed to address, for example, seismic activities, tropical storms, landslides, flooding, and wildfires. Mitigation measures that would be implemented to minimize or avoid impacts relative to natural hazards would also be presented as a part of the design and approval process and specifications incorporated into any environmental/permitting clearances. As with flood zones, any future development in tsunami inundation zones would be required to comply with federal and state regulations.

Marine

Placement of undersea cables would not intensify or increase the frequency of any natural hazards, but placement of an undersea cable in known risk areas would make the undersea structures themselves subject to these risks. Potential damage to an undersea cable could result in a disruption in electric transmission between islands, thereby affecting the human environment.

Hazardous Materials

Hazardous material associated with installation, construction, and support components for the converter station and undersea cable would include fuels, lubricants, and hydraulic fluids contained in or used in ships and construction equipment and vehicles. Impacts from accidental spills, accidental fuel releases, and releases of solid debris would be minor if appropriate management practices are followed. Garbage and sanitary waste generated onboard the vessels and barges would be returned to shore for disposal. Construction equipment and vehicles would contain hazardous materials such as gasoline, diesel, oil, and hydraulic and brake fluids.

Future developments may be proposed in areas of environmental contamination or presently containing either known or unknown hazardous materials. As a result, parcels would be investigated via the review of public records and the performance of site inspections to identify possible hazardous materials that may be present at development locations, including undersea cable alignments. When the locations of land-based facilities are determined, it would be

necessary to perform detailed investigations, including site-specific Environmental Site Assessments in conformance with the ASTM Method E 1527-05 (ASTM 2005), which would provide for review of accessible public records and require site inspections to identify classes of land uses and/or hazardous materials that may be present at the project-specific locations and along possible ocean corridor alignments.

Munitions and Explosives of Concern

A review was performed for accessible public records to evaluate the potential likelihood of encountering MEC within the footprint of the SOEST surveyed areas. The primary study used was the University of Hawai'i's SOEST Interisland Cable Floor Survey (SOEST 2010). This survey provided ocean floor data, including existing ocean floor data and collection and analysis of uncharted bathymetric data; sidescan; seafloor sampling; and video of the targeted seafloor along the possible routes (SOEST 2010).

In addition to the SOEST study, the Hawai'i Undersea Military Munitions Assessment (HUMMA) also provided pertinent data on the areas south of O'ahu. The HUMMA's objective was to assess (bound) and characterize a historic deep-water munitions sea disposal site south of O'ahu to determine the potential impact of the ocean environment on sea disposed munitions and of sea disposed munitions on the ocean environment (UH 2010). Locations and areas of seafloor munitions disposal from these studies were evaluated for their potential to encounter MEC in the proposed undersea cable corridor. The results of this review indicated that potential areas for encountering MEC and areas to be avoided within the footprint of the SOEST surveyed areas are generally contained in the waters off the south shore of O'ahu.

Future developments on land may be proposed in areas of where MEC may be present. These areas would likely be associated with development on military bases. As a result, it would be necessary to investigate parcels via a review of public records and the performance of site inspections to identify possible MEC that may be present. When the locations of land-based facilities are determined, it would be necessary to perform detailed investigations, including a site-specific Environmental Site Assessment in conformance with the ASTM Method E 1527-05 (ASTM 2005). This assessment would also include an evaluation of the presence of MEC at the project-specific locations and along possible ocean corridor alignments.

Maui County –O'ahu Routing Specific Description of Impact Types – Natural Hazards

Maui

Maui-Kahului Harbor

This area is densely developed and serves as the transportation, commerce, and governmental center of Maui County. Due to the slight slopes, there is a minimal chance of landslide. In

addition to structural damage, the presence of fill material around the harbor area may pose a liquefaction risk during a seismic event. Tsunami inundation is a real hazard in this landing site area. The impacts from this threat could be amplified due to the congested roadways in the area, high population density, and limited number of access ways to safety in the interior of the island. The landing site area has a medium to high susceptibility to wildfires, but the dense urban environment, especially near the harbor area, makes this threat less pronounced. In addition, the presence of fire stations and first responders in or near the landing site area would likely make fire suppression efforts more successful than in more rural area. See Section 3.11 for additional information on emergency response capabilities.

Maui-Kapalua (West Maui)

This landing site area is more rural than the Kahului Harbor location, and is also less susceptible to tsunami and flooding risks, with the 100-year flood zone areas limited to natural drainage channels where they connect with the ocean. The risk from tsunami is present contiguous to the shore areas but, due to the sloped topography, this risk does not extend inland beyond about 0.5 mile in most locations. The area has a risk of earthquake, but the lack of artificial fill or significant areas of soft surficial conditions may result in a reduced risk of seismic damage to structures. The risk of wildfire is medium at the residential resort area, with the only escape routes being the main highway north/south (Highway 30) through the area or by ocean.

Lānaʻi

Lānaʻi has limited risk information, likely due to its limited population in the area and on the island in general. As with the rest of Maui County, there is a seismic threat to the area as well as tsunami risk and its associated coastal flooding. This risk is greatly reduced just beyond the shore area, as the topography rises quickly as one moves inland. Wildfire risk may be present to some degree at this landing site area since it is located on the dry, windier side of Lānaʻi, but there is no current information on this risk.

Molokaʻi

Molokaʻi-Kaluakoi (West Molokaʻi)

This low-density area of Molokaʻi is centered at Kepuhi Bay where a smaller resort area is located along the shoreline at Kaluakoi. This resort area is susceptible to tsunami and flooding due to its low elevation. Terrestrial flooding, in the form of flash-flooding events triggered by tropical storms or hurricanes, can occur as on most islands under the same storm conditions. This dry and windy location on the far leeward side of the island results in a high wildfire hazard. The threat from this hazard may be intensified by the rural nature of the community, the limited emergency response capabilities compared to more urbanized locations, and the distance to

emergency response services located at Kaunakakai. Moloka'i is susceptible to some degree of seismic activity but does not contain a risk from active volcanoes.

Moloka'i-Kaunakakai (South Moloka'i)

This landing site area has an undefined fire hazard threat, most likely due to the lack of development in the immediate area. However, in case of wildfire, the fire response facilities are located relatively close to the landing site area at Kaunakakai. The low-lying topography results in a 100-year flood zone, which covers most of the landing site area and extends inland beyond the boundary of the landing site area. While there is no official tsunami evacuation zone, this area may be subject to tsunami damage. A large majority of this landing site area sits on a surficial deposit of silt and mud, possibly increasing the risk of liquefaction during seismic events.

O'ahu

O'ahu-MCBH at Kāne'ohe Bay

As with the Kahului Harbor landing site area on Maui, this area of O'ahu consists of a dense urban development along the shoreline and extending inland beyond the study project boundaries. Major roads extend north/south parallel to the ocean, complicating and possibly slowing evacuation from the shoreline area tsunami evacuation zone. The wildfire threat is low to medium. Emergency response facilities, including fire response capabilities, are relatively abundant and located both in the town of Kailua and at the military base. See Section 3.11 for specific locations for these facilities. Much of the shoreline area of the Kailua neighborhood consists of "older dune" surficial deposits, leading to a possible increased risk of damage or liquefaction from seismic events. The seismic risk is somewhat less than Maui County with O'ahu being located in UBC 2A Seismic Zone.

O'ahu-Pearl Harbor

This area contains some of the most densely developed areas of the state. Much of the landing site area sits on fill material, increasing the risk of damage during a seismic event. The entire area is susceptible to 100-year floods amplified by the artificial channelization of certain sections of streams through the urban core, increasing the quantity and velocity of flood waters. The wildfire risk is low, and the area contains a high capability for emergency response both at the airports and military bases, and within the urban core. This emergency response network is served by an extensive and comprehensive roadway network with major arterial roadways leading inland from the shoreline.

The downtown/port area, Sand Island Access Road corridor, and much of the Honolulu International Airport area is constructed on low-lying fill areas increasing the risk of damage

during hazardous events. These same fill areas contain many of the emergency response facilities, transportation networks, and military facilities that would be needed during emergencies, complicating the emergency response situation.

Maui County – O‘ahu Routing Specific Description of Impact Types – Hazardous Materials

The biggest location-specific hazardous materials concerns are associated with the presence of contaminated soil and/or groundwater sites at the potential landing site area and converter station sites. Two main sources of information were queried to evaluate Hawai‘i Interisland Renewable Energy Program (HIREP) study analysis areas: the USEPA Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) Database (USEPA 2012), and the HDOH Office of Hazard Evaluation and Emergency Response (HEER) Lookup Spreadsheets (HDOH HEER 2012). The CERCLIS Public Access Database contains information on hazardous waste sites, potentially hazardous waste sites, and remedial activities across the nation, including sites that are on the NPL or being considered for the NPL. The HEER Lookup Spreadsheets list Environmental Interests (EIs) that the HEER Office has investigated or may investigate. These EIs may be managed by either the Emergency Preparedness and Response section (EP&R) or the Site Discovery, Assessment and Remediation (SDAR) section. Reviews of these databases were performed to identify sites that could potentially be of environmental concern at each of the HIREP Study Analysis Areas.

Maui

Maui-Kahului Harbor

A review of the CERCLIS Database for the Harbor landing site area identified three sites. All three of these sites are identified as state lead sites. A total of 186 EP&R and 13 SDAR sites were listed in the HEER Lookup Spreadsheets. Should this area be chosen for development, it would be necessary to perform detailed investigations, including a site-specific Environmental Site Assessment in conformance with ASTM Method E 1527-05 (ASTM 2005), which would provide for detailed review of accessible public records and require site inspections to confirm the presence of sites at or near the project specific location.

Maui-Kapalua (West Maui)

A review of the CERCLIS Database for the Maui-Kapalua landing site area did not identify any sites. Four EP&R sites were listed in the HEER Lookup Spreadsheets. Should this area be chosen for development, it would be necessary to perform detailed investigations, including a site-specific Environmental Site Assessment in conformance with ASTM Method E 1527-05 (ASTM 2005), which would provide for detailed review of accessible public records and require site inspections to confirm the presence of sites at or near the project-specific location.

Lānaʻi

A review of the CERCLIS Database for the Lānaʻi landing site area did not identify any sites. A total of 29 EP&R sites were listed in the HEER Lookup Spreadsheets. Should this area be chosen for development, it would be necessary to perform detailed investigations, including a site-specific Environmental Site Assessment in conformance with ASTM Method E 1527-05 (ASTM 2005), which would provide for detailed review of accessible public records and require site inspections to confirm the presence of sites at or near the project-specific location.

Molokaʻi

Molokaʻi-Kaluakoi (West Molokaʻi)

A review of the CERCLIS Database for the Molokaʻi-Kaluakoi landing site area did not identify any sites. Two EP&R and one SDAR sites were listed on the HEER Lookup Spreadsheets. Should this area be chosen for development, it would be necessary to perform detailed investigations including a site-specific Environmental Site Assessment in conformance with ASTM Method E 1527-05 (ASTM 2005), which would provide for detailed review of accessible public records and require site inspections to confirm the presence of sites at or near the project-specific location.

Molokaʻi-Kaunakakai (South Molokaʻi)

A review of the CERCLIS Database for the Molokaʻi-Kaunakakai landing site area identified one site. Assessment of this site has been completed, and awaiting a final decision. A total of 38 EP&R and 12 SDAR sites were listed on the HEER Lookup Spreadsheets. Should this area be chosen for development, it would be necessary to perform detailed investigations, including a site-specific Environmental Site Assessment in conformance with ASTM Method E 1527-05 (ASTM 2005), which would provide for detailed review of accessible public records and require site inspections to confirm the presence of sites at or near the project-specific location.

Oʻahu

Oʻahu-MCBH at Kāneʻohe Bay

A review of the CERCLIS Database for the Kailua area identified three sites. Two of the sites are listed as state lead sites, and one is listed as a removal only site where no site assessment work is needed. A total of 248 EP&R and 17 SDAR sites were listed on the HEER Lookup Spreadsheets.

A review of the CERCLIS Database for the Kāneʻohe area identified three sites. All three sites are listed as state lead sites. A total of 269 EP&R and 70 SDAR sites were listed on the HEER Lookup Spreadsheets.

A review of the CERCLIS Database for the landing site area near Waimanalo identified four sites. Three of the sites are listed as state lead sites, and one is listed as completed and awaiting final decision. A total of 125 EP&R and 42 SDAR sites were listed on the HEER Lookup Spreadsheets. Should this area be chosen for development, it would be necessary to perform detailed investigations including a site-specific Environmental Site Assessment in conformance with ASTM Method E 1527-05 (ASTM 2005), which would provide for detailed review of accessible public records and require site inspections to confirm the presence of sites at or near the project-specific location.

Oʻahu Pearl Harbor

A review of the CERCLIS Database for the Barbers Point area identified one site, which does not qualify for the NPL. A total of 15 EP&R and 30 SDAR sites were listed on the HEER Lookup Spreadsheets. Barbers Point is identified as a State High Priority Contamination Site.

A review of the CERCLIS Database for the Ewa Beach area identified 11 sites. Seven sites do not qualify for the NPL. One site is listed as a state lead site and another as led by a federal facility. One site is listed as referred to removal with further assessment needed. The remaining site is listed as a removal only site with no site assessment work needed. A total of 95 EP&R and 18 SDAR sites were listed on the HEER Lookup Spreadsheets. Ewa Beach is identified as a State High Priority Contamination Site.

A review of the CERCLIS Database for the Honolulu area identified 10 sites. Four of the sites do not qualify for the NPL. A total of 3,762 EP&R and 424 SDAR sites were listed on the HEER Lookup Spreadsheets. Within Honolulu, the areas of Iwilei and Kakaako are identified as State High Priority Contamination Sites. Due to extensive military activities, all of Pearl Harbor is identified as a USEPA CERCLA Superfund Site. A review of the CERCLIS Database for the Pearl Harbor area identified 12 sites. One site is listed as a federal facility lead site. Another is listed as Federal Facility Site Inspection Needed. Both of these locations are within JBPHH. Ten sites are not listed with a Non-NPL Status. A total of 1,362 EP&R and 180 SDAR sites were listed on the HEER Lookup Spreadsheets.

A review of the CERCLIS Database for the Pearl City area identified four sites. Two of the sites are not listed with a Non-NPL Status. One site is listed as not qualifying for the NPL and the remaining site is listed with a SI start needed. A total of 345 EP&R and 46 SDAR sites were listed on the HEER Lookup Spreadsheets. Should this area be chosen for development, it would be necessary to perform detailed investigations including a site-specific Environmental Site Assessment in conformance with ASTM Method E 1527-05 (ASTM 2005), which would provide

for detailed review of accessible public records and require site inspections to confirm the presence of sites at or near the project-specific location.

Maui County–O‘ahu Routing Specific Description of Impact Types – Munitions and Explosives of Concern

The biggest location-specific MEC concerns are associated with the Formerly Used Defense Sites (FUDS) at the potential landing site area and converter station sites. Two main sources of information were queried to evaluate the landing site areas: USACE FUDS Inventory (USACE 2010) and the UXOInfo.com (UXOInfo) UXO Site Database (2010). The USACE FUDS Inventory and UXOInfo Inventory contain information on UXO sites across the nation. Reviews of these databases were performed to identify sites that could potentially be of concern in regard to UXO at each of the HIREP Study Analysis Areas. At the landing site areas that overlap military installations, it is anticipated that UXO will be present, and each installation would be contacted to identify these installation-specific areas.

Maui

Maui-Kahului Harbor

A review of the USACE FUDS Inventory for the Maui-Kahului Harbor landing site area identified two UXO sites. Four UXO sites were identified by UXOInfo.

Maui-Kapalua (West Maui)

A review of the USACE FUDS Inventory for the Maui-Kapalua landing site area identified two UXO sites. No UXO sites were identified by UXOInfo.

Lāna‘i

A review of the USACE FUDS Inventory for Lāna‘i landing site area identified four UXO sites. No UXO sites were identified by UXOInfo.

Moloka‘i

Moloka‘i-Kaluakoi (West Moloka‘i)

A review of the USACE FUDS Inventory for the Moloka‘i-Kaluakoi landing site area identified one UXO site. No UXO sites were identified by UXOInfo.

Moloka'i-Kaunakakai (South Moloka'i)

A review of the USACE FUDS Inventory for Moloka'i-Kaunakakai landing site area identified one UXO site. No UXO sites were identified by UXOInfo.

O'ahu

O'ahu-MCBH at Kāne'ohe Bay

A review of the USACE FUDS Inventory for the MCBH Hawai'i landing site area identified three UXO sites. Four UXO sites were identified by UXOInfo.

O'ahu-Pearl Harbor

A review of the USACE FUDS Inventory for the Pearl Harbor landing site area identified two UXO sites. Two UXO sites were identified.

State and Terrestrial Waters

Since the early 1900s, Hawai'i has been home to military bases for all branches of the U.S. military. During this time, the military has conducted training and combat operations at sea. Prior to 1970, the military also sea-disposed-of excess, obsolete, or unserviceable munitions en route to port or as part of planned disposals. In the 1970s, the military stopped sea disposal of munitions and now only allows it in an emergency (U.S. Army Technical Center for Explosives Safety 2009). As a result of these practices, MEC could potentially be present on the seafloor around the Hawaiian Islands.

In 2009, the DoD, Defense Environmental Programs Annual 120 Report to Congress identified six locations of sea disposal of military munitions in Hawaiian waters (DoD 2009). Of these six locations, only two (HI-02 and HI-05) were located near or within the footprint of the SOEST surveyed areas. Both of HI-02 and HI-05 are located off the south shore of O'ahu. This report indicates that, at location HI-02, tens of thousands of conventional munitions (e.g. projectiles, depth charges, bombs) and more than 25,000 projectiles containing mustard agent were also disposed of, and, at location HI-05, 16,000, 100-lb MK47A2 mustard agent bombs were disposed of.

The SOEST Interisland Cable Floor Survey provided study ocean floor data, including existing ocean floor data, and collection and analysis of uncharted bathymetric data; sidescan; seafloor sampling; and video of the targeted seafloor along the possible routes (SOEST 2010). The HUMMA also provided pertinent data on the areas south of O'ahu. The HUMMA's objective was to assess (bound) and characterize a historic deep-water munitions sea disposal site south of O'ahu to determine the potential impact of the ocean environment on sea disposed munitions

and of sea disposed munitions on the ocean environment (UH 2010). The results of this studies indicated that the areas with the greatest concentrations of munitions are all located in an area extending from the south shore of O‘ahu to approximately 10 miles.

All of these known munitions are located in an area offshore, south of O‘ahu. The possible presence of chemical munitions along cable routes leading into Pearl Harbor would pose serious complications for cable installation and maintenance, suggesting that it may be necessary for cable routes to be detoured around the chemical bomb field. However, the extent of the field along the north/south axis is unknown (Taylor 2010).

Although military munitions could be present on the seafloor throughout the Hawaiian Islands, of the most concern are areas of dense concentrations where it would be difficult for cable installers and maintenance workers to completely avoid the munitions. During cable laying and maintenance activities, bottom-tending gear may catch on or dredge up munitions. Munitions can contain high explosives or chemical agents that can present a serious danger. Munitions that have been lying dormant in the sea may become more sensitive and may detonate more easily than originally designed. The project data suggest the greatest concentration of military munitions is present off the south shore of O‘ahu. Siting the cable route in this area would create significant obstacles to the installation and maintenance of a power cable south of O‘ahu.

Although it has not been determined whether previously identified marine dumping areas as identified in NOAA nautical charts contain non-MEC hazardous materials, for completeness, these marine dumping areas are addressed in this section. Two large marine dumping areas have been identified in the undersea cable corridor. One area extends approximately 3 miles offshore in all directions from Kahului. The other area covers the entire south shore of O‘ahu to a distance of approximately 3 miles offshore. The presence of dumped materials could impact undersea cable alignment, construction, and maintenance.

3.8.6 General Siting Criteria and Special Conservation and Construction Measures

General Level Special Conservation and Construction Measures

All of the following recommended CCMs apply to a landing site area location independent of the landing site area or island. Depending on the specific site chosen, risk and level of risk at the site and the existing conditions at the time of the proposal, various CCMs could be assembled from the range of recommendations below.

Natural Hazards

Floods

- HM-1 Project locations shall be outside of FEMA flood zones, where possible and practicable.
- HM-2 Projects located on O‘ahu shall be required to comply with ROH Section 21-9.10, (“Flood hazard districts”).
- HM-3 Projects located in Maui County shall be required to comply with Maui County Code Title 19 Chapter 19.62.
- HM-4 For any project seeking FEMA flood insurance, the project shall also be required to comply with provisions of FEMA’s National Flood Insurance Program (NFIP) administered by the City and County of Honolulu Department of Planning and Permitting or the Maui County Department of Planning and in conjunction with DLNR under provisions of HRS Chapter 179.
- HM-5 For military sites, future project development shall comply with location, siting, and construction requirements as outlined by the DoD and any applicable provisions of the specific military branch on whose base the project is located.

Tsunami, Hurricanes, and Tropical Storms

- HM-6 Projects shall be located outside of designated tsunami inundation/evacuation zones where possible and practicable.
- HM-7 Projects located on O‘ahu shall be required to comply with ROH Section 21-9.10, (“Flood hazard districts”), and specifically ROH Section 21-9.10.7 (“Coastal high hazard district”).
- HM-8 Projects located in Maui County shall be required to comply with Maui County Code Title 19 Chapter 19.62.
- HM-9 For military sites, future project development shall comply with location, siting and construction requirements as outlined by the DoD and any applicable provisions of the specific military branch on whose base the project is located.

Earthquakes

- HM-10 Projects located on O‘ahu shall be designed to comply with seismic regulations applicable to Zone 2A in the Uniform Building Code (UBC), other applicable seismic regulations as described and required by the City and County of Honolulu Building Code, and any applicable requirements of the ROH currently in effect at the time of the proposed project.
- HM-11 In Maui County, structures shall be designed to comply with seismic regulations applicable to Zone 2B in the UBC, other applicable seismic regulations as described and required by the Maui County Building Code, and any applicable requirements of the Maui County Code currently in effect at the time of the proposed project.
- HM-12 For military sites, future project development shall comply with location, siting, and construction requirements as outlined by the DoD and any applicable provisions of the specific military branch on whose base the project is located.

Landslides

- HM-13 Landing site areas shall be developed in areas with minimal slope and no known geological hazards.
- HM-14 Projects located on O‘ahu shall comply with ROH Sections 14-14.2 and 18-4.1. This section requires that, “If the proposed grading includes modification to an existing slope with a cut greater than 15 feet in height and a grade steeper than 40 percent, an evaluation of slope hazards is required and the findings of the evaluation shall be included in a report. The slope hazard evaluation shall, at a minimum, include an evaluation of hazards posed by potential rock, soil and other slope movement to the proposed development, and an evaluation of the hazard posed to adjacent existing properties or buildings by the proposed grading. The engineering slope hazard report and construction plans shall include mitigative measures to minimize the hazards posed by the potential rock, soil and other slope movement as well as the threat the development poses to properties adjacent to the proposed grading.”
- HM-15 Maui County does not have an ordinance that specifically addresses regulating proposed developments on or nearby steep terrain where there is a potential rock fall or landslide hazard. Projects located in Maui County shall be required to comply with the Maui County Building Code and any applicable requirements of the Maui County Code currently in effect at the time of the proposed project.

HM-16 For military sites, future project development shall comply with location, siting, and construction requirements as outlined by the DoD and any applicable provisions of the specific military branch on whose base the project is located.

Wildfire

HM-17 For locations on O‘ahu, the project developer shall comply with all design, fire safety, and emergency response requirements of the City and County of Honolulu Building Code and the City and County of Honolulu Fire Department.

HM-18 For locations in Maui County, the project developer shall comply with all design, fire safety, and emergency response requirements of the Maui County Building Code and Maui County Fire Department.

HM-19 For locations on military bases, the project developer shall comply with all requirements of the federal, DoD or military fire departments having regulatory and response jurisdiction over the specific landing site area.

HM-20 Once construction is complete, the following practices are recommended to reduce the incidence or impacts from wildfires.

- a) Plant native, fire-resistive vegetation whenever possible.
- b) Create “defensible space” by removing all dry grass, brush, and trees within at least 100 feet from buildings.
- c) Locate fuel tanks at least 30 feet from any structure, maintaining at least 10 feet of clearance around the tank. Be sure the tank vent is positioned away from structures.

Volcanoes

Since no landing site areas are located in active volcano lava flow zones, no special CCMs are recommended for this risk.

Marine

HM-21 Placement of an undersea cable in or near marine areas of known geologic instability, including seismic faults, shall be avoided.

Hazardous Materials

Terrestrial

- HM-22 The biggest location-specific hazardous materials concerns are associated with the development of converter stations. Prior to obtaining property for a development, a comprehensive Phase I Environmental Site Assessment shall be conducted to assess potential properties for any environmental contamination. This would reduce the possibility of encountering sites contaminated with hazardous substances.
- HM-23 Landing site areas would likely require land clearing, possible demolition of existing structures, excavation, drilling, and other related construction activities. These activities would generate construction and demolition waste consisting of wooden beams, asphalt, concrete glass, brick, metal soil, vegetation, and other miscellaneous building and landscaping materials. Potential impacts to landfills accepting these wastes shall be minimized through recycling efforts and resultant diversion of generated wastes. During design and construction phases of the proposed stations, consideration shall be given to development and implementation of a recycling plan. A recycling program shall effectively recover building materials that could contain potentially hazardous substances (e.g., liquid wastes, paints, oil, solvents).
- HM-24 Construction activities may involve use of hazardous materials such as fuels, oils, solvents, and glues during construction. Inadvertent spills could occur during on-site fueling of equipment or by accident (e.g., puncture of a fuel tank through operator error or slope instability). Use of hazardous materials on-site shall be required to comply with developed site-specific BMPs related to fueling; vehicle washing; and handling, use, and storage of chemicals, which would minimize any risk to workers and the public.
- HM-25 Site construction and demolition shall be performed in accordance with a site-specific safety and health plan. The plan shall identify safe working conditions for construction areas. Safety measures shall include proper techniques for personal protective equipment, use of allowable tools, and mechanical measures as appropriate. Potential adverse impacts to construction personnel include possible exposure to both known and unknown hazardous materials and wastes present in existing structures or surrounding environment.
- HM-26 The landing site area on O'ahu includes two active military facilities, JBPHH and MCBH at Kāne'ōhe Bay. If development of converter stations were to occur on these facilities, all work shall be coordinated with proper base authorities.

Marine

- HM-27 It has not been determined whether previous marine dumping areas as identified in NOAA nautical charts contain non-MEC hazardous materials. Two large marine dumping areas have been identified within proposed undersea cable corridors. One area extends approximately 3 miles offshore in all directions from Kahului, Maui. The other area covers the entire south shore of O‘ahu to a distance of approximately 3 miles offshore. The presence of dumped materials could impact undersea cable alignment, construction, and maintenance. The main construction and mitigation measure for the marine dumping areas shall be avoidance. The undersea cable shall be aligned to avoid large debris fields so that during construction activities, the laying of the cable shall not be adversely impacted. Following construction, the undersea cable shall be maintained; if maintenance occurred where large marine debris is present, it could add additional safety hazards.
- HM-28 To minimize the potential for accidental release of these materials into the environment, site-specific mitigation measures, including procedures for hazardous material storage, handling, and staging; spill prevention and response; waste disposal; and good housekeeping shall be developed and implemented by the construction contractor. Any future development shall be subject to applicable federal, state, and local regulations governing the transportation, use, storage, and/or disposal of hazardous material and hazardous wastes during construction. These materials shall be transported off-site for disposal, but impacts could result if the wastes were not properly handled and were released to the environment. No impacts are expected from proper handling of all wastes.

Munitions and Explosives of Concern

Terrestrial

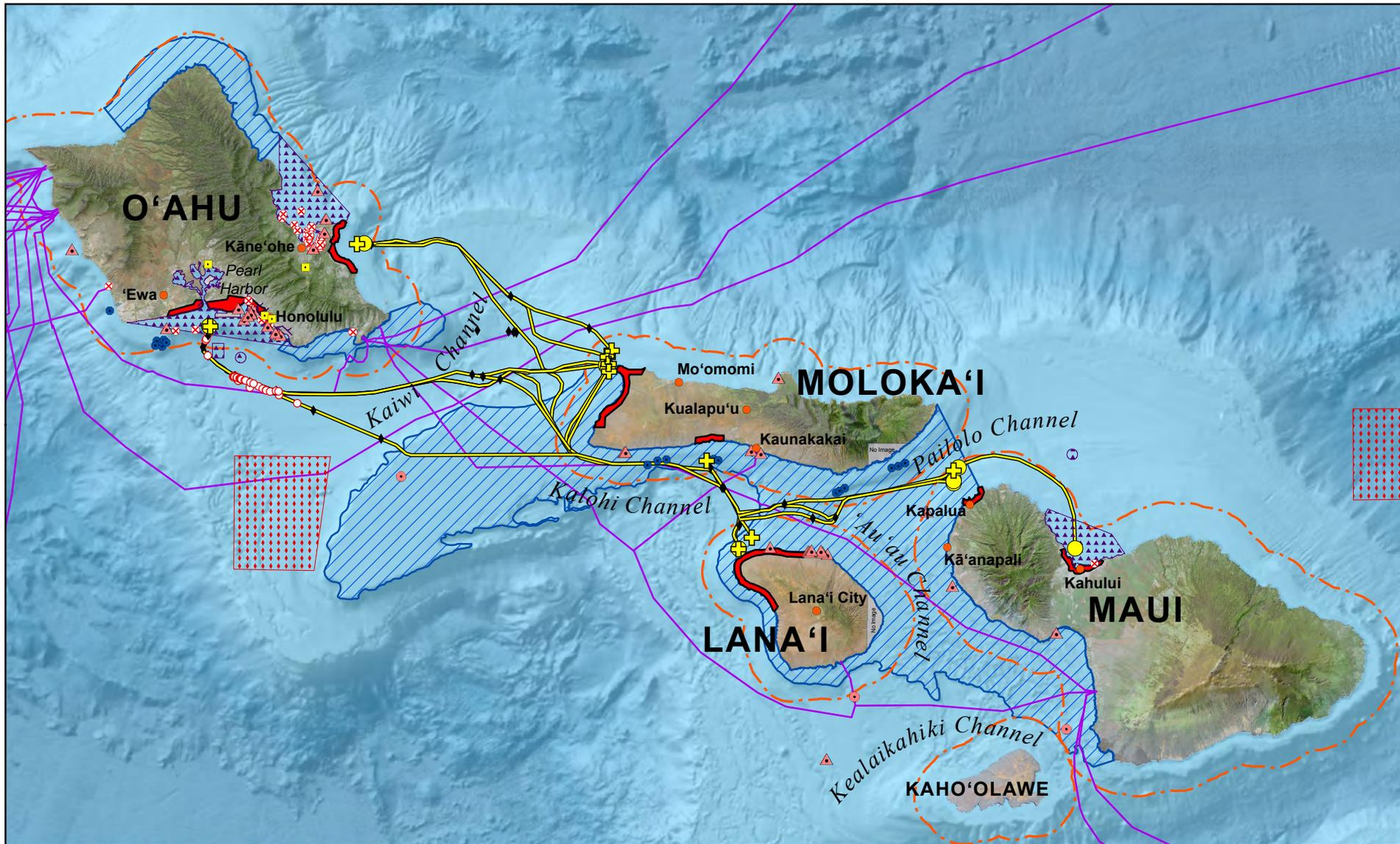
- HM-29 The following general mitigation measures shall be applicable to all construction and operational sites, regardless of location on any of the potential islands.
- HM-30 The biggest location-specific MEC concerns are associated with the development of converter stations. It has been assumed that the footprint of the source stations and receiver stations would be 6 and 12 acres, respectively. Prior to obtaining property for a development of this nature, a comprehensive Phase I Environmental Site Assessment would need to be conducted. This document shall include an assessment of potential properties for any MEC contamination where relevant.

Following the above-listed procedures would minimize the probability that MEC would be encountered during the development of converter stations. However if MEC is discovered during site activities, the following procedures would be followed:

- HM-31 Visually identify the item discovered without disturbance.
- HM-32 Establish its location at the site and retreat from the location.
- HM-33 Contact local authorities to address the item of concern.
- HM-34 The landing site areas on O‘ahu include portions of two active military facilities, JBPHH and MCBH at Kāne‘ohe Bay. If development of converter stations were to occur on these facilities, all work shall be coordinated with proper base authorities. In addition, there is greater likelihood of encountering MEC at military facilities.
- HM-35 Both of these facilities store military munitions and have assigned ESQD arcs throughout the Bases to protect humans from possible sabotage or accidental detonation of stored or active use of explosives and ammunition. Development of converter stations shall not occur within these ESQD arcs.

Marine

- HM-36 Although military munitions could be present on the seafloor throughout the Hawaiian Islands, of the most concern are areas of dense concentrations where it would be difficult for cable installers and maintenance workers to completely avoid the munitions. The project data suggest the greatest concentration of MEC is present off the south shore of O‘ahu. Siting the cable route in this area would create significant obstacles to the installation and maintenance of a power cable south of O‘ahu. The main construction and mitigation measure for the MEC areas shall be avoidance. The undersea cable shall be aligned to avoid the areas where MEC has previously been identified so that, during cable construction and maintenance activities, personnel and equipment would not be adversely impacted and safety hazards would be avoided.



UH-SOEST Surveyed Area Alternatives: Open Ocean MEC and Other Marine Hazards

- | | | | |
|--|--|---------------------------|--|
| Route with camera data * | SOEST Cable Routes | Open Water | Identified MEC Dumping Areas |
| Route without camera data ** | HIREP Study Analysis Area | Marine Obstructions | Identified Marine Dumping Areas |
| Identified O'ahu Substation Locations | Known Existing Underwater Cables | Known Shipwreck Locations | UH-SOEST Identified Objects *** |
| Selected Cities & Communities | State Jurisdictional Waters (3 nautical miles) | Submerged Buoys | Potential MEC |
| Humpback Whale National Marine Sanctuary | Known MEC Locations | Other Objects and Debris | |



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

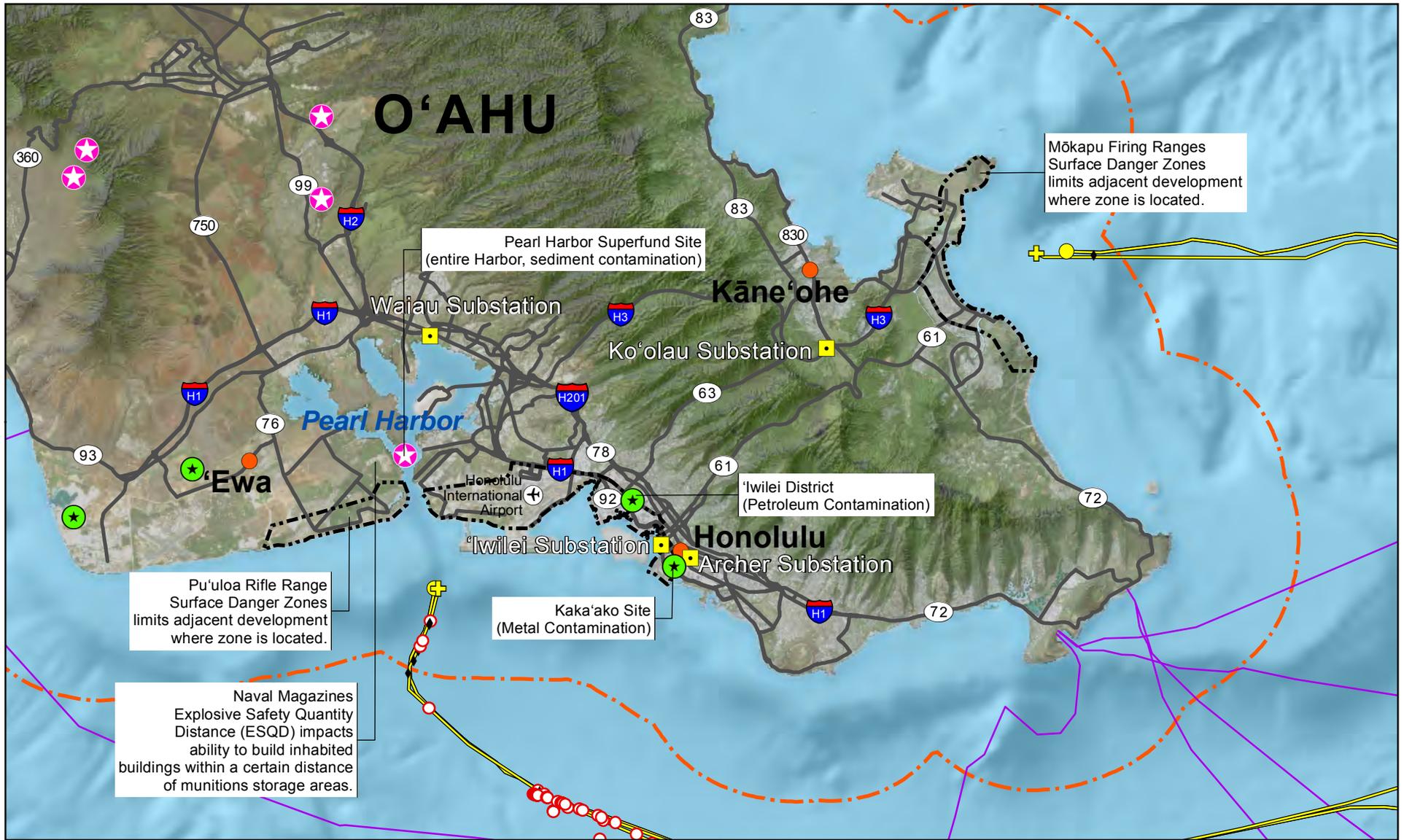
** Symbol denotes shoreward approach of cable route without tow camera data.

*** UH-SOEST identified objects refer to objects observed in the review of ROV and Tow Camera footage and the type and condition of any materials seen is not definitive.

Date: 8/9/2012

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

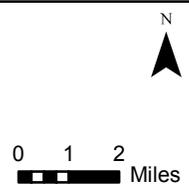
Figure 3.8-1



O'ahu Superfund Sites and Other Hazards

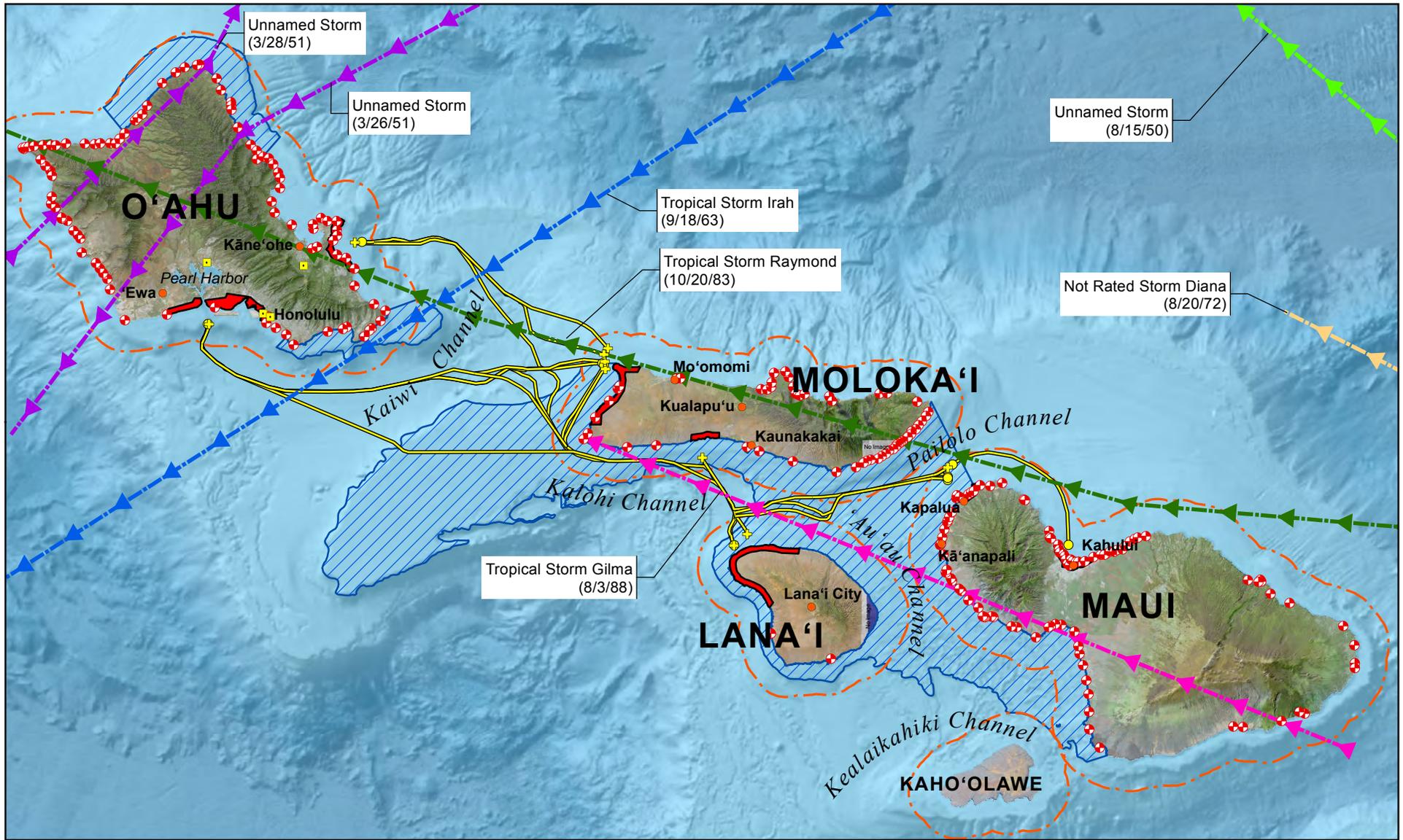
- + Route with camera data *
- Route without camera data **
- Identified O'ahu Substation Locations
- Selected Cities & Communities
- Highways & Major Roads
- Known Existing Underwater Cables
- SOEST Cable Routes
- HIREP Study Analysis Area
- State Jurisdictional Waters (3 nautical miles)
- ★ EPA CERCLA Superfund Site
- ★ State High Priority Contamination Site
- UH-SOEST Identified Objects ***
- Potential MEC
- ◆ Other Objects and Debris
- Open Water

Note: Military ESQD and Surface Danger Zones are not shown on this map for security purposes. Use of this data requires Dept. of Defense approval. Future evaluations should consider establishing data sharing protocols with the Dept. of Defense to be able to access relevant military data.



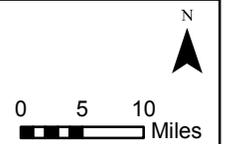
* Symbol denotes shoreward extent of tow camera data for cable route (unless otherwise noted).
 ** Symbol denotes shoreward approach of cable route without tow camera data.

Figure 3.8-2



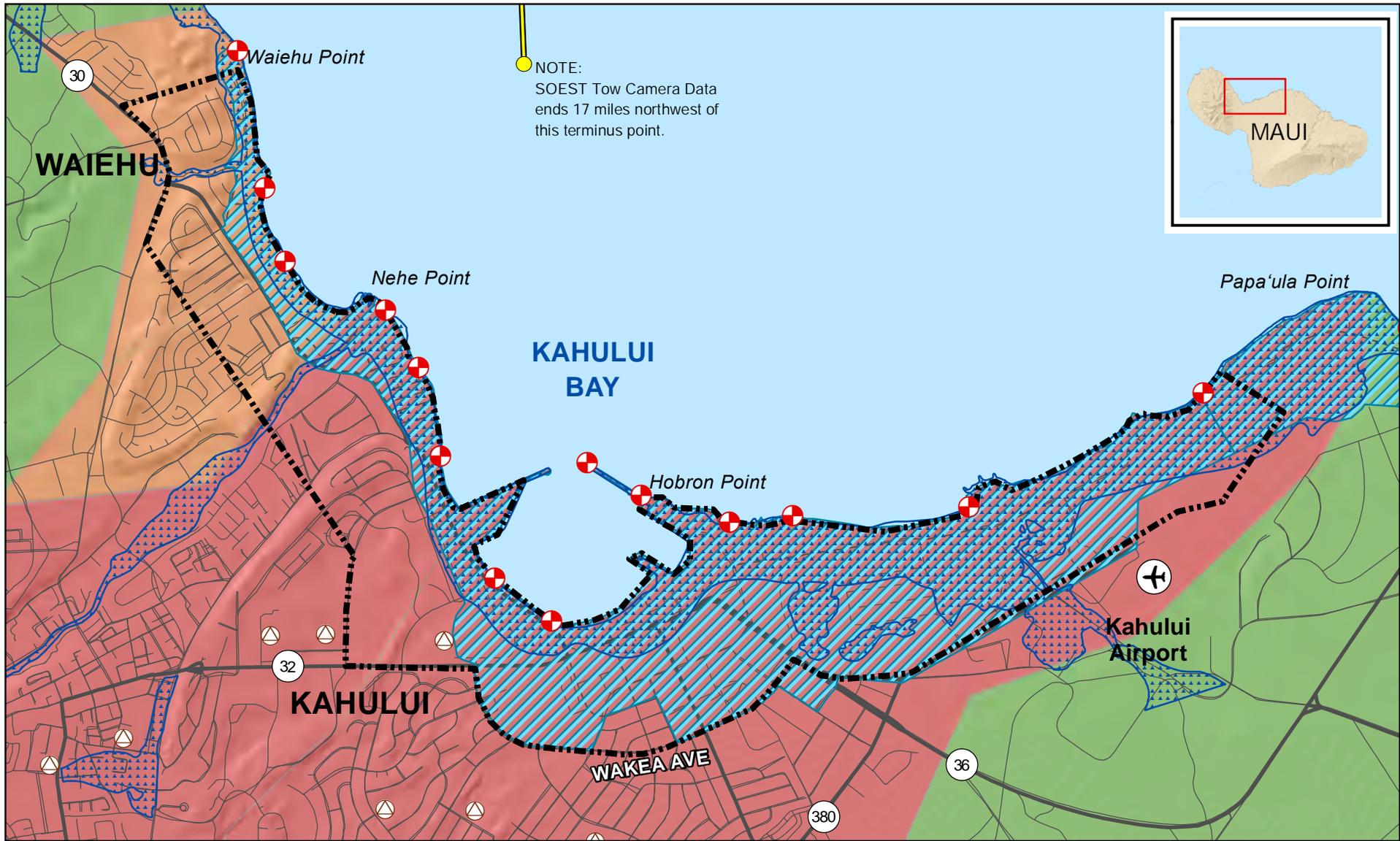
UH-SOEST Surveyed Area Alternatives: Hurricanes, Tsunamis, and Other Natural Hazards

- | | | | |
|---------------------------------------|--|--|-------------------------|
| Route with camera data * | HIREP Study Analysis Area | Tsunami Wave Hits (Historical) | 1963 TS Irah (9/18) |
| Route without camera data ** | State Jurisdictional Waters (3 nautical miles) | Hurricane and Tropical Storm Paths and Direction | 1972 NR Diana (8/20) |
| Identified O'ahu Substation Locations | Humpback Whale National Marine Sanctuary | 1950 NR Unnamed (8/15) | 1983 TS Raymond (10/20) |
| Selected Cities & Communities | Open Water | 1951 NR Unnamed (3/26) | 1988 TS Gilma (8/3) |
| SOEST Cable Routes | | | |



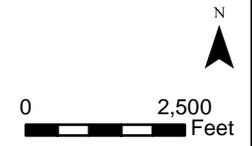
* Symbol denotes shoreward extent of tow camera data for cable route (unless otherwise noted).
 ** Symbol denotes shoreward approach of cable route without tow camera data.

Figure 3.8-3



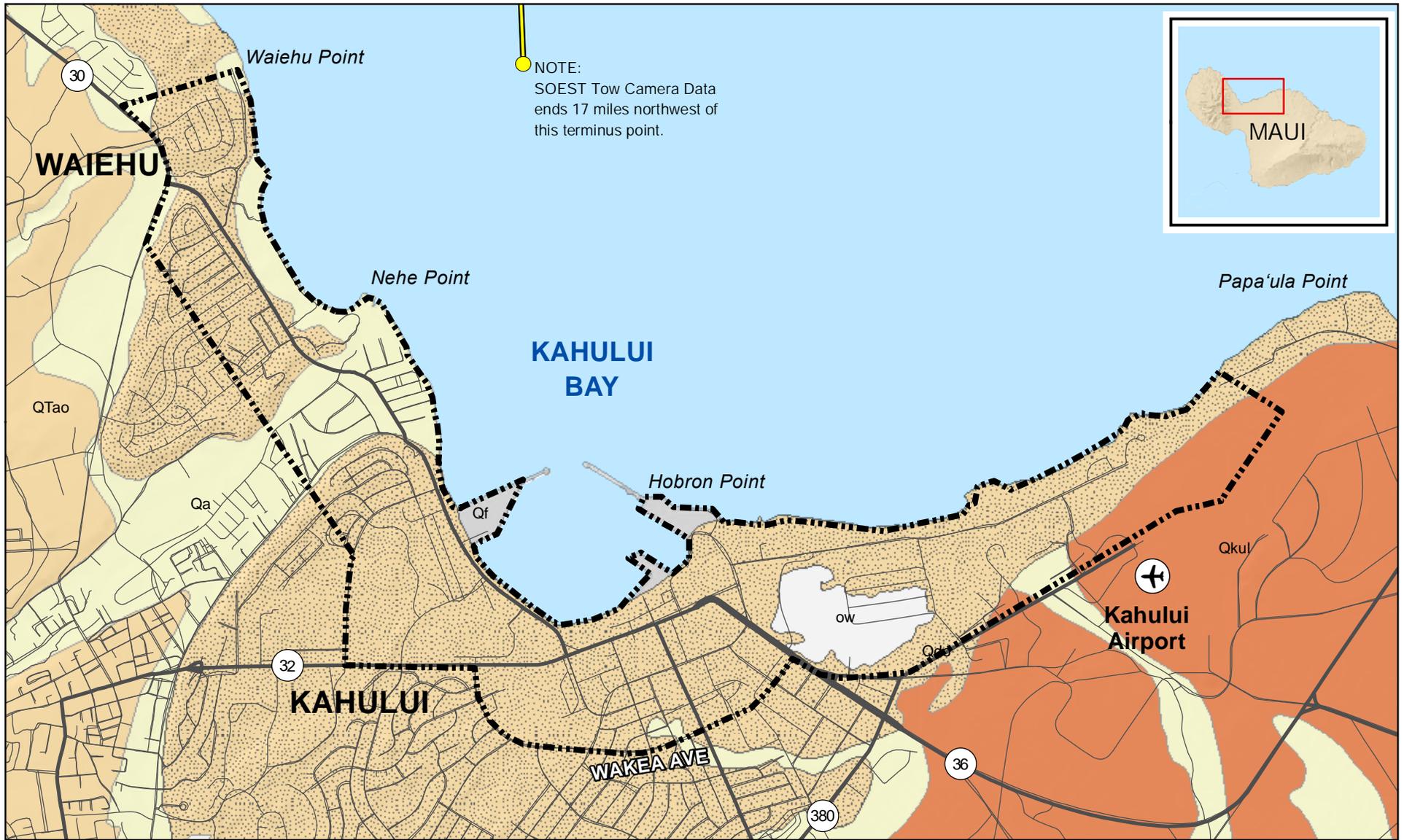
Kahului Maui Landing Site Area: Flood Zones, Tsunamis, Wildfires, and Other Hazards

- | | | | |
|------------------------------|--------------------------------|----------------------------|-----------------------------|
| Route with camera data * | HIREP Study Analysis Area | FEMA - DFIRM (2007) | Wildfire Risk Rating |
| Route without camera data ** | Emergency Shelter Locations | 100 Year Flood Zone | High |
| Highways & Major Roads | Tsunami Wave Hits (Historical) | | Medium |
| Other Roads | Tsunami Evacuation Zones | | Low |
| SOEST Cable Routes | | | Not Applicable/Undefined |
| | | | Open Water |



* 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.

Figure 3.8-4



Kahului Maui Landing Site Area: USGS Geology

- | | | | |
|------------------------------|---------------------------|---------------------------|-----------------------|
| Route with camera data * | HIREP Study Analysis Area | USGS Geology | Kula Volcanics |
| Route without camera data ** | Open Water | Map Unit | Qkul - Lava flows |
| Highways & Major Roads | Open Water | Surficial Deposits | Qf - Fill |
| Other Roads | | Qa - Alluvium | QTao - Older alluvium |
| SOEST Cable Routes | | Qdo - Older dune | |

* 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.

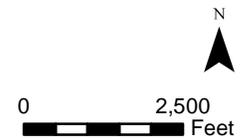
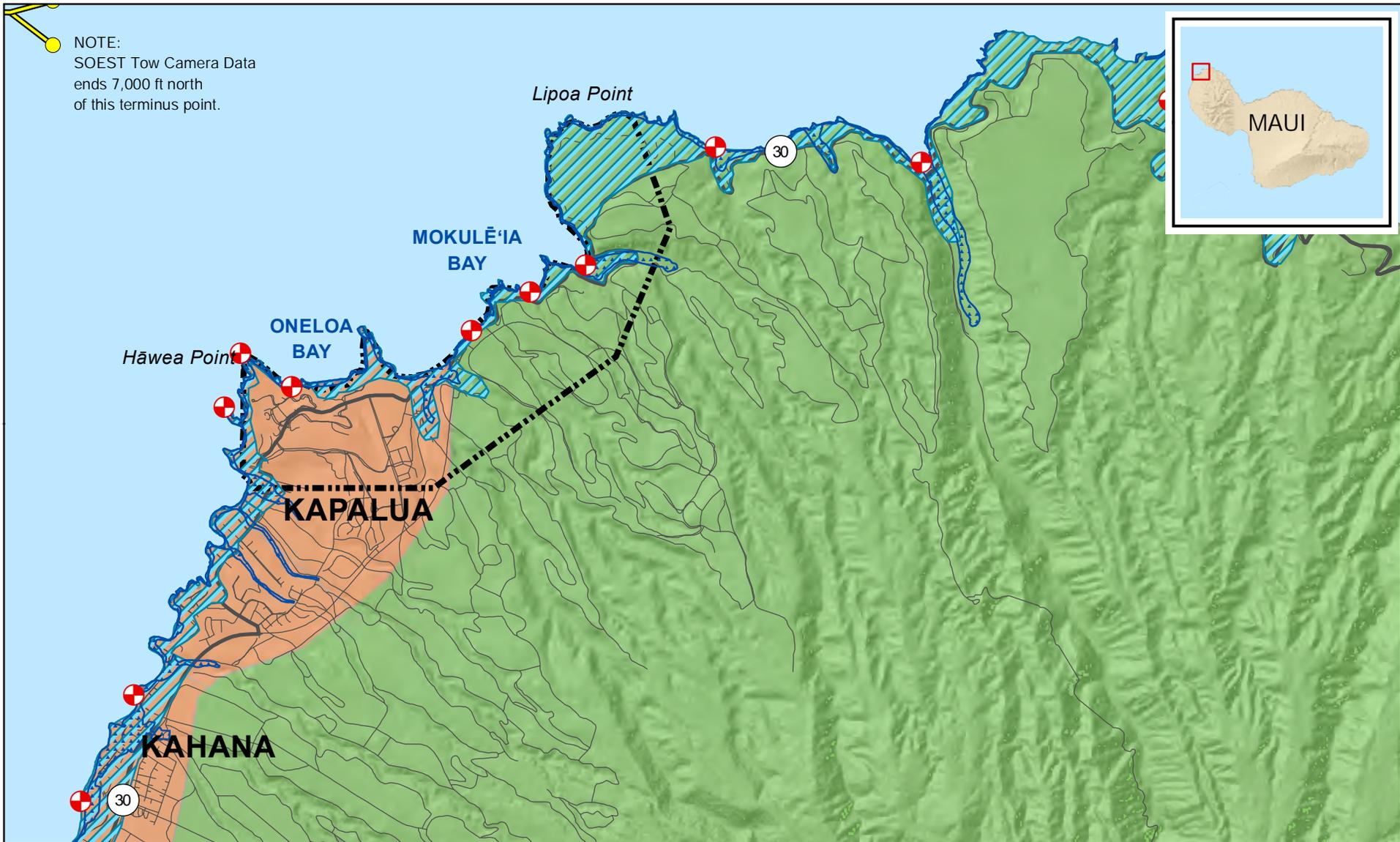


Figure 3.8-5



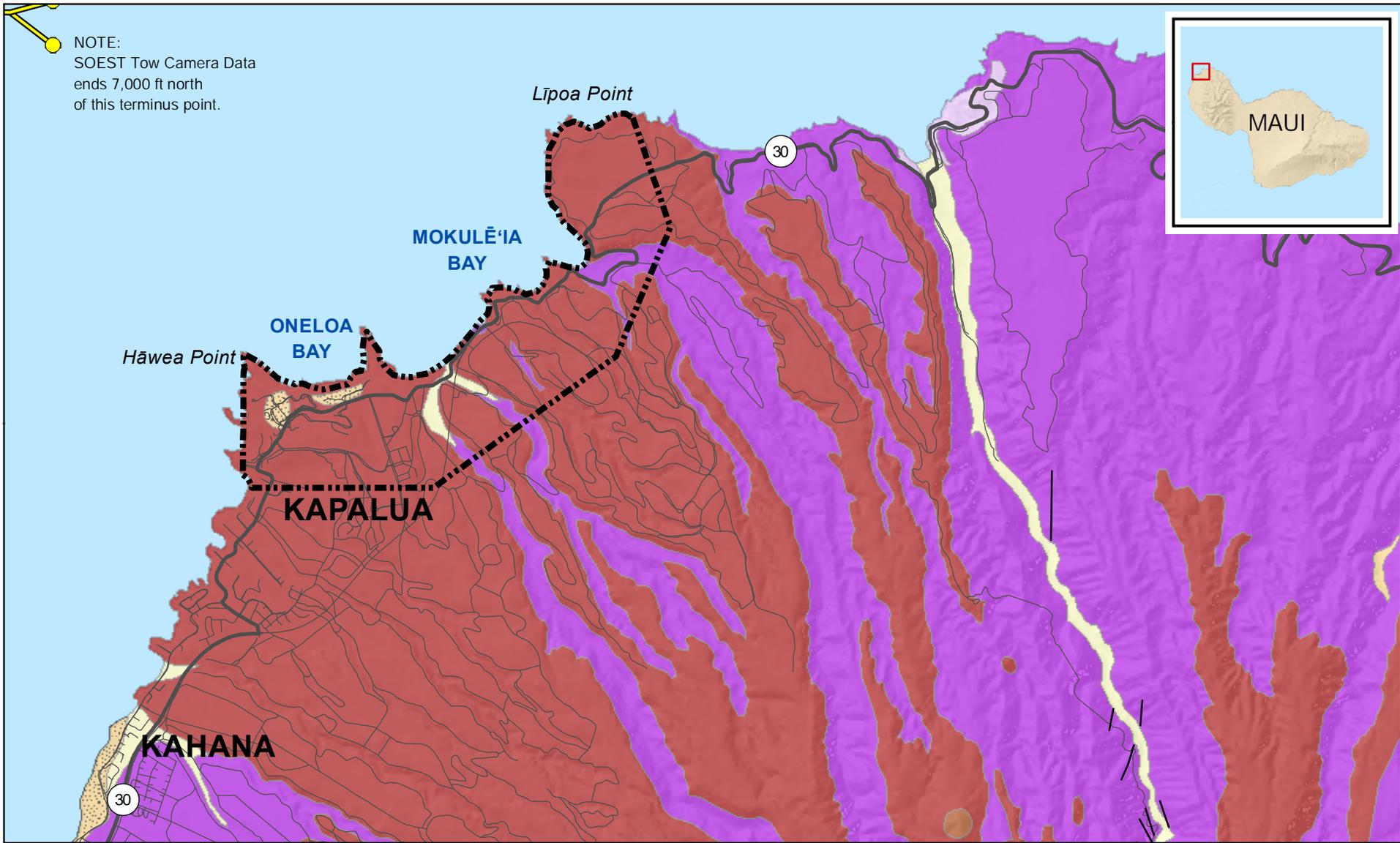
West Maui Landing Site Area: Flood Zones, Tsunamis, Wildfires, and Other Hazards

- | | | |
|------------------------------|--------------------------------|-----------------------------|
| Route with camera data * | HIREP Study Analysis Area | Wildfire Risk Rating |
| Route without camera data ** | Tsunami Wave Hits (Historical) | High |
| Highways & Major Roads | Tsunami Evacuation Zones | Medium |
| Other Roads | FEMA - DFIRM (2007) | Low |
| SOEST Cable Routes | 100 Year Flood Zone | Not Applicable/Undefined |
| | | Open Water |



* 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.

Figure 3.8-6



West Maui Landing Site Area: USGS Geology and Dikes

- | | | | |
|------------------------------|---------------------------|---------------------------|------------------------------------|
| Route with camera data * | HIREP Study Analysis Area | USGS Geology | Wailuku Volcanics |
| Route without camera data ** | Open Water | Surficial Deposits | QTWv - Cinder and spatter |
| Highways & Major Roads | Volcanic Dike | Qf - Fill | QTwl - Lava flows |
| Other Roads | | Qa - Alluvium | Honolua Volcanics |
| SOEST Cable Routes | | QTao - Older alluvium | Qul - Lava flows |
| | | Qdo - Older dune | Qud - Bulbous dome of massive lava |

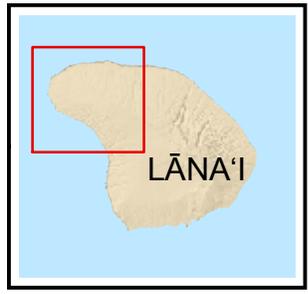


* Symbol denotes shoreward extent of tow camera data for cable route (unless otherwise noted).
 ** Symbol denotes shoreward approach of cable route without tow camera data.

Figure 3.8-7

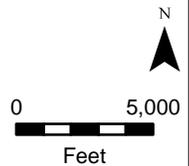


NOTE:
SOEST Tow Camera Data
ends at these two terminus points.



Lāna'i Landing Site Area: Flood Zones, Tsunamis, Wildfires, and Other Hazards ***

- | | | | |
|------------------------------|---------------------------|-----------------------------|--------------------------|
| Route with camera data * | SOEST Cable Routes | Wildfire Risk Rating | Low |
| Route without camera data ** | HIREP Study Analysis Area | High | Not Applicable/Undefined |
| Highways & Major Roads | Tsunami Evacuation Zones | Medium | Open Water |
| Other Roads | | | |



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

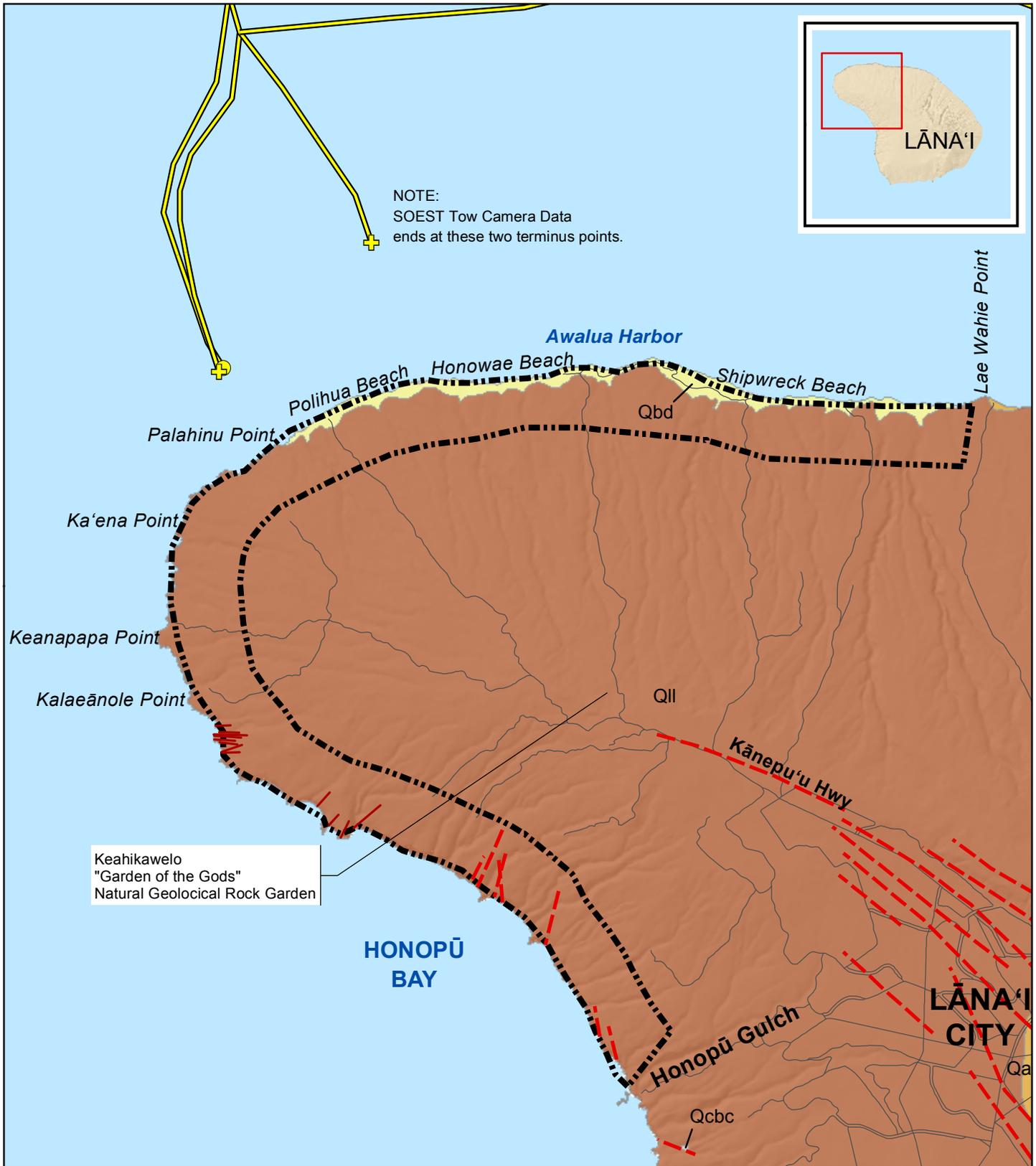
** Symbol denotes shoreward approach of cable route without tow camera data.

***Tsunami, DFIRM Flood data and other natural hazards information used on other landing site figures, does not exist for Lāna'i.

Date: 4/26/2012

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

Figure 3.8-8



NOTE:
SOEST Tow Camera Data
ends at these two terminus points.

Keahikawelo
"Garden of the Gods"
Natural Geological Rock Garden

Lānaʻi Landing Site Area: USGS Geology

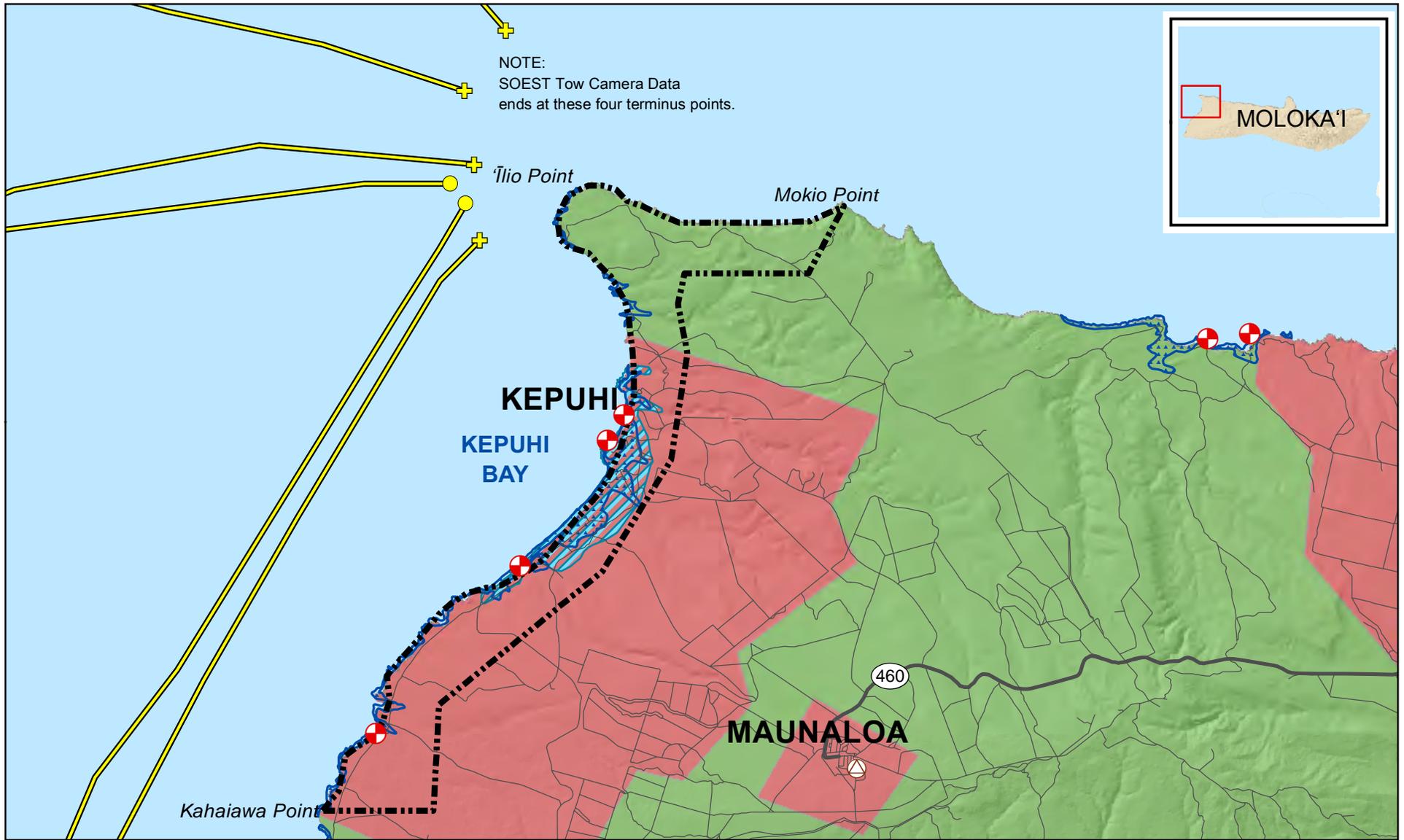
- | | | | |
|------------------------------|---------------------------|----------------------|--|
| Route with camera data * | HIREP Study Analysis Area | USGS Geology | Surficial Deposits |
| Route without camera data ** | Open Water | Lānaʻi Basalt | Qa - Alluvium |
| Highways & Major Roads | Major Fault Line | Qll - Lava Flows | Qbd - Beach deposits |
| Other Roads | Volcanic Dike | | Qcbc - Marine conglomerate and breccia |
| SOEST Cable Routes | | | |



* 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 3.8-9

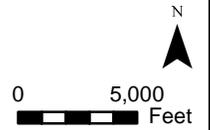


NOTE:
SOEST Tow Camera Data
ends at these four terminus points.



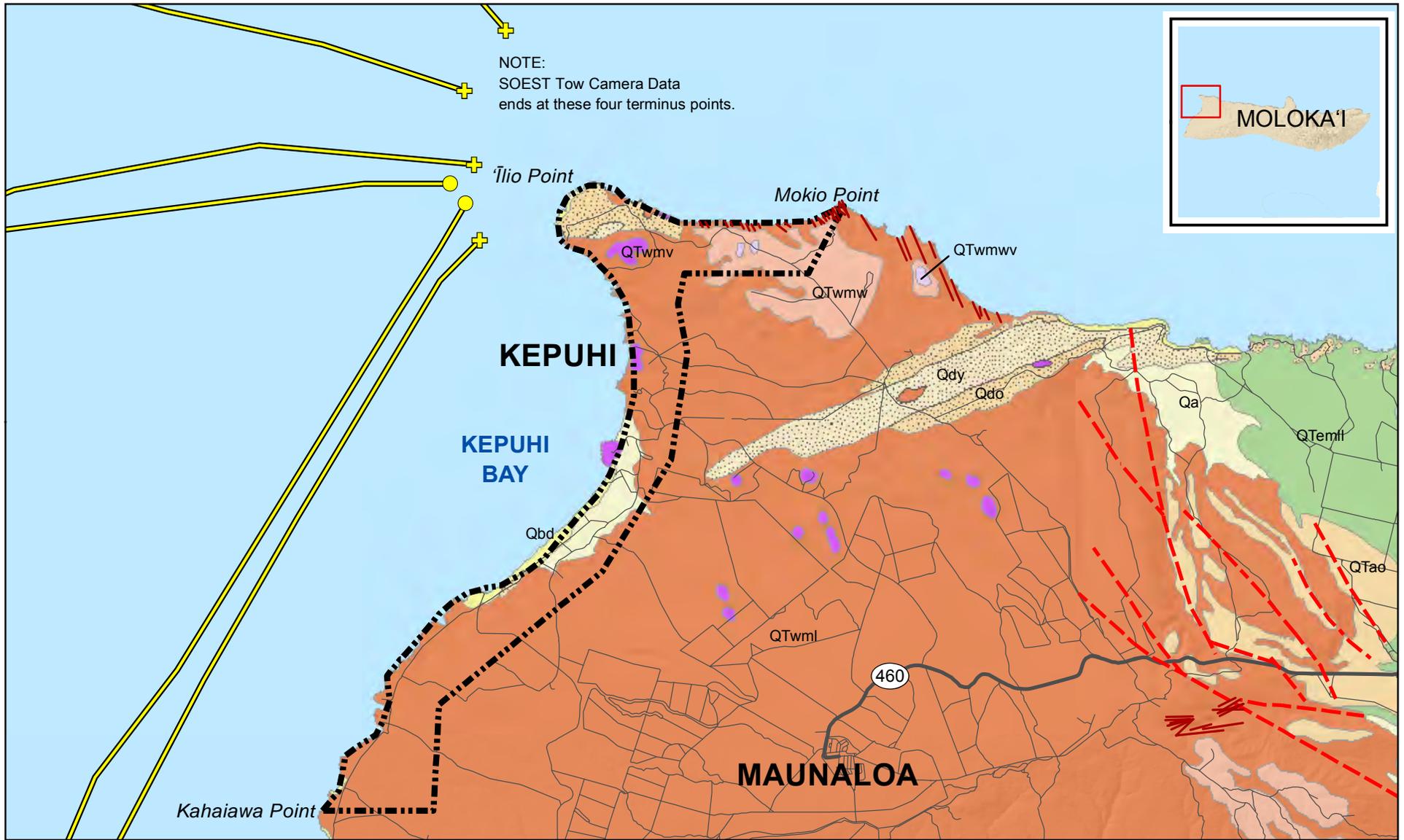
West Moloka'i Landing Site Area: Flood Zones, Tsunamis, Wildfires, and Other Hazards

- | | | | |
|------------------------------|--------------------------------|----------------------------|-----------------------------|
| Route with camera data * | HIREP Study Analysis Area | FEMA - DFIRM (2007) | Wildfire Risk Rating |
| Route without camera data ** | Emergency Shelter Locations | 100 Year Flood Zone | High |
| Highways & Major Roads | Tsunami Wave Hits (Historical) | Tsunami Evacuation Zones | Medium |
| Other Roads | | | Low |
| SOEST Cable Routes | | | Not Applicable/Undefined |
| | | | Open Water |



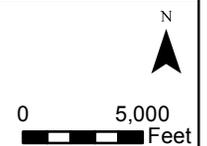
* Symbol denotes shoreward extent of tow camera data for cable route (unless otherwise noted).
** Symbol denotes shoreward approach of cable route without tow camera data.

Figure 3.8-10



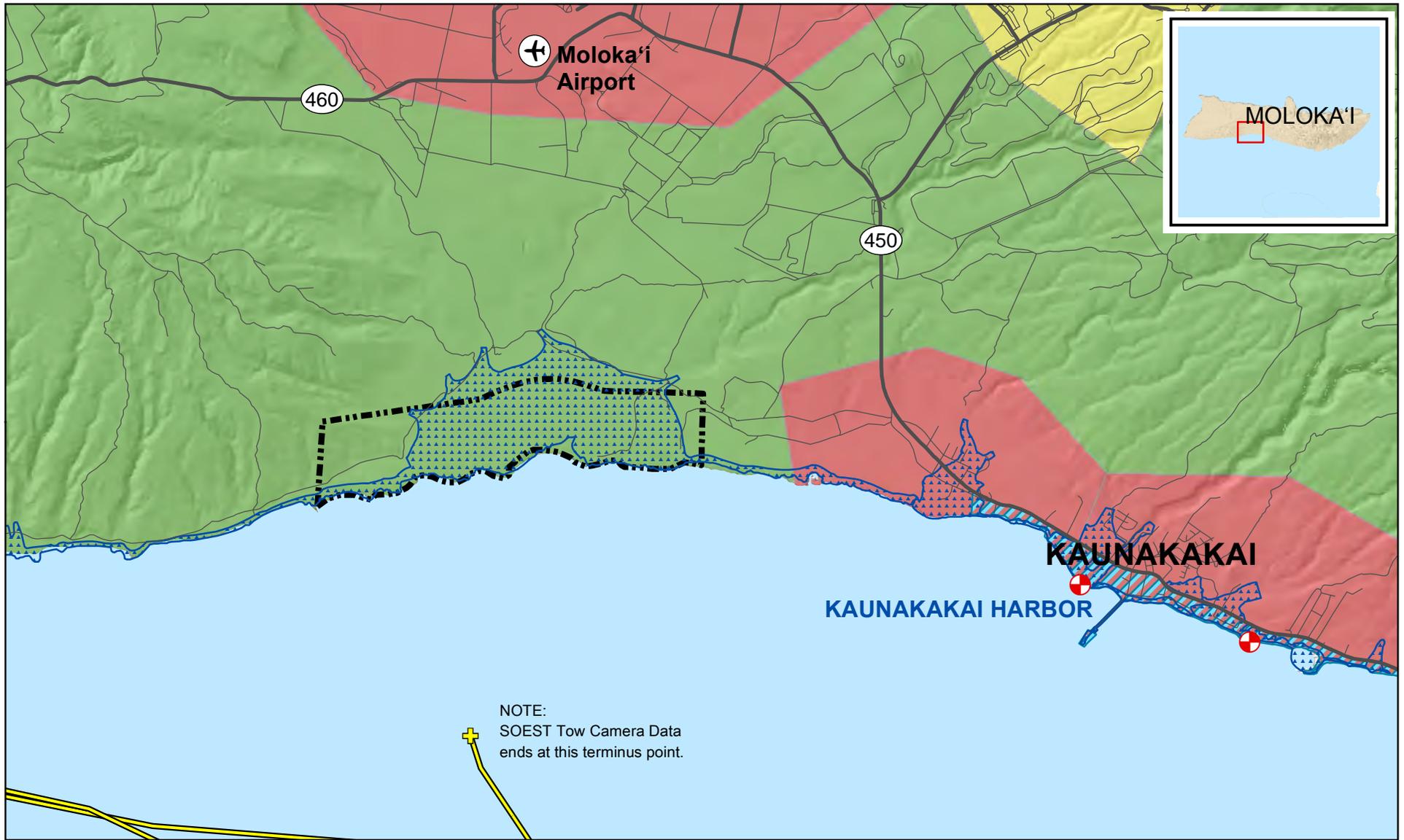
West Moloka'i Landing Site Area: USGS Geology

- | | | | | |
|------------------------------|------------------|--------------------|-------------------------|-----------------------------------|
| Route with camera data * | Open Water | USGS Geology | QTa - Older alluvium | QTwmv - Vent deposits (Waiele) |
| Route without camera data ** | Major Fault Line | Surficial Deposits | Qdy - Younger dune | QTwmw - Lava flows (Waiele) |
| Highways & Major Roads | Volcanic Dike | Qa - Alluvium | West Moloka'i Volcanics | East Moloka'i Volcanics |
| SOEST Cable Routes | | Qbd - Beach | QTwml - Lava flows | QTeml - Lava flows (Lower member) |
| HIREP Study Analysis Area | | Qdo - Older dune | QTwmv - Vent deposits | |



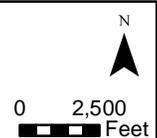
* Symbol denotes shoreward extent of tow camera data for cable route (unless otherwise noted).
** Symbol denotes shoreward approach of cable route without tow camera data.

Figure 3.8-11



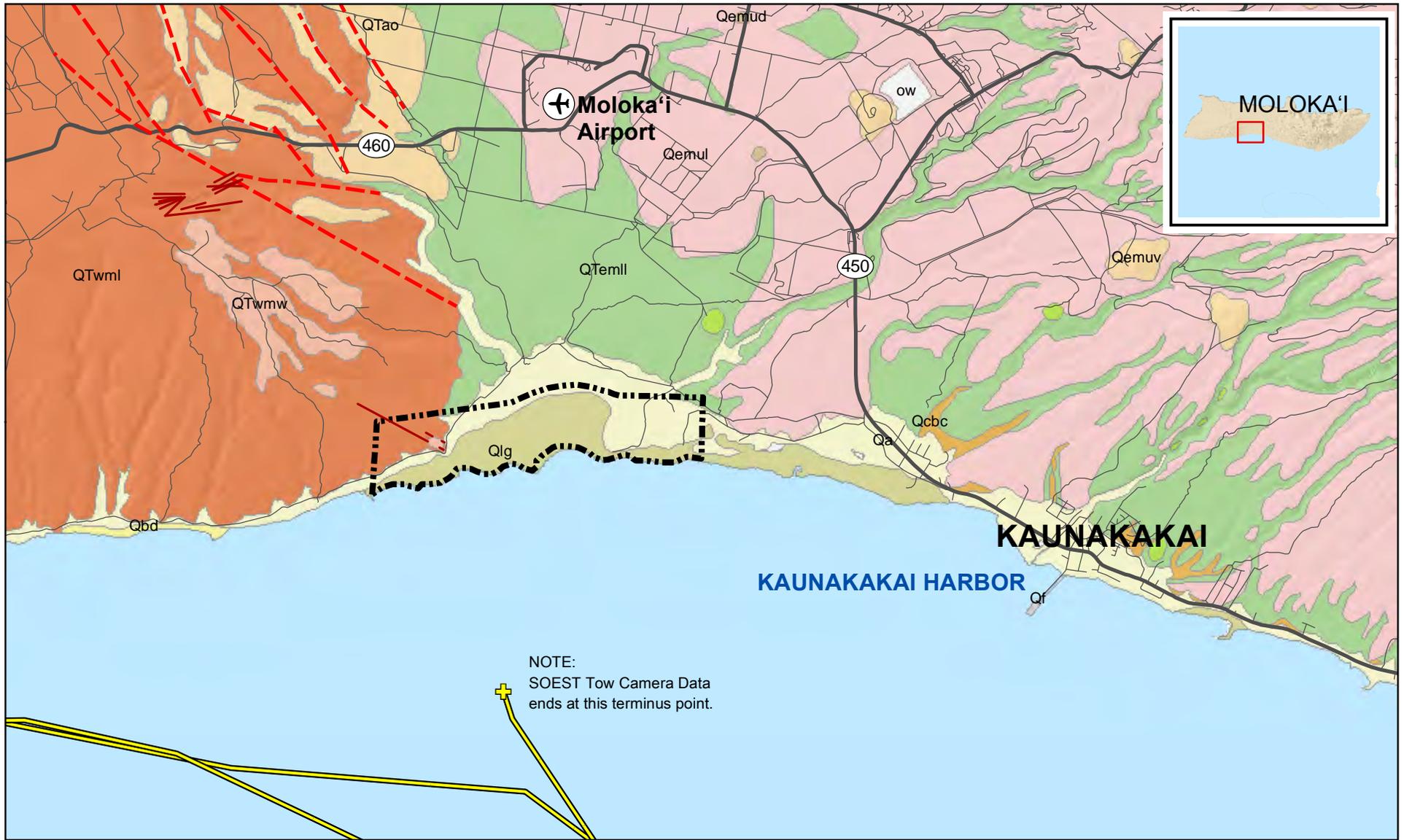
South Moloka'i Landing Site Area: Flood Zones, Tsunamis, Wildfires, and Other Hazards

- Route with camera data *
- Route without camera data **
- Highways & Major Roads
- Other Roads
- SOEST Cable Routes
- HIREP Study Analysis Area
- Tsunami Wave Hits (Historical)
- Tsunami Evacuation Zones
- FEMA - DFIRM (2007)**
- 100 Year Flood Zone
- Wildfire Risk Rating**
- High
- Medium
- Low
- Not Applicable/Undefined
- Open Water



* 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.

Figure 3.8-12

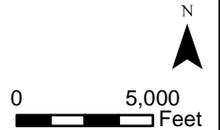


South Moloka'i Landing Site Area: USGS Geology

- + Route with camera data *
- Route without camera data **
- Highways & Major Roads
- SOEST Cable Routes
- HIREP Study Analysis Area
- Open Water
- Major Fault Line
- Volcanic Dike

- USGS Geology**
- Map Units**
- Open Water
 - Qlg - Silt and mud
 - Qf - Manmade fill
 - Qqbc - Fossiliferous breccia
 - Qa - Alluvium
 - Qbd - Beach
 - QTao - Older alluvium
 - Qemul - Lava flows (Upper member)
 - QTemll - Lava flows (Lower member)
 - Qemuv - Vent deposits (Upper member)

- West Molokai Volcanics**
- QTemlv - Vent deposits (Lower member)
 - Qemud - Domes (Upper member)
 - QTwmv - Lava flows (Waiale)



* 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.

Figure 3.8-13



NOTE:
SOEST Tow Camera Data ends 5,000 ft to the east of this terminus point.

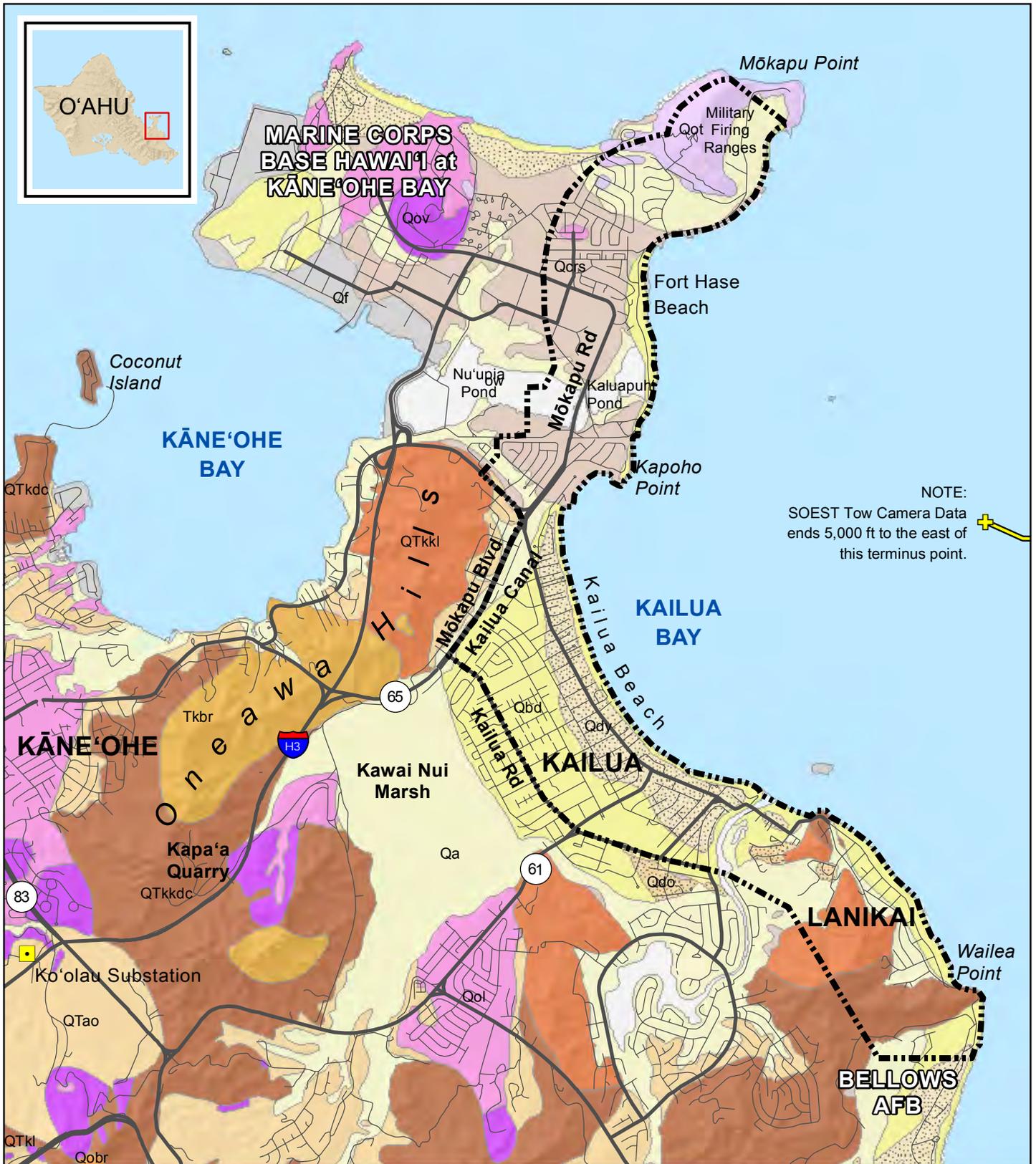
Kāneʻohe Landing Site Area: Flood Zones, Tsunamis, Wildfires, and Other Hazards

Route with camera data *	HIREP Study Analysis Area	Tsunami Wave Hits (Historical)	Wildfire Risk Rating
Route without camera data **	SOEST Cable Routes	Tsunami Evacuation Zones	High
Identified Oʻahu Substation Location	Federally Owned Lands	FEMA - DFIRM (2007)	Medium
Highways & Major Roads	Emergency Shelter Locations	100 Year Flood Zone	Low
Other Roads			Not Applicable/Undefined
			Open Water

* 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: 4/27/2012
Data Sources: HI-DBEDT, CCH, UH-SOEST, AECOM, 2012

Figure 3.8-14

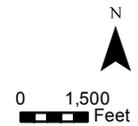


NOTE:
SOEST Tow Camera Data ends 5,000 ft to the east of this terminus point.

Kāneʻohe Landing Site Area: USGS Geology

- Route with camera data *
- SOEST Cable Routes
- Route without camera data **
- HIREP Study Analysis Area
- Identified Oʻahu Substation
- Highways & Major Roads

USGS Geology	Qdy - Younger dune	Qov - Vent
Map Unit	Qdo - Older dune	Qot - Tuff
Open Water	Qcra - Lagoon and reef	Koʻolau Basalt
Surficial Deposits	QTao - Older alluvium	QTKI - Lava flows
Qf - Fill	Honolulu Volcanics	QTkbr - Breccia
Qbd - Beach	Qol - Lava flows	QTkdc - Dike complex
Qa - Alluvium	Qobr - Breccia	



* 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, USGS, CCH, UH-SOEST, AECOM, 2012

Figure 3.8-15

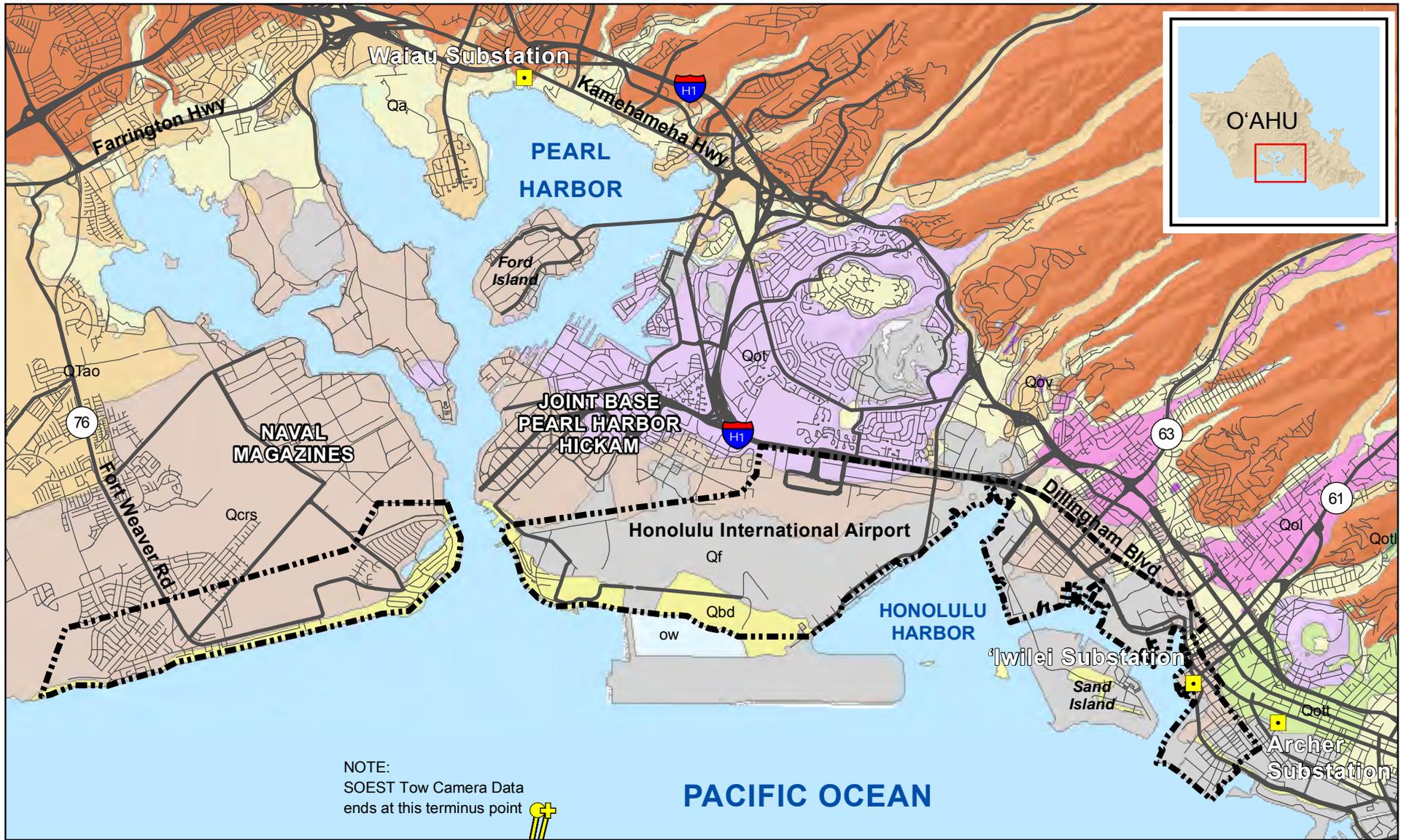


Pearl Harbor Landing Site Area: Flood Zones, Tsunamis, Wildfires, and Other Hazards

- | | | | |
|---|--|--|---|
| <ul style="list-style-type: none"> Route with camera data * Route without camera data ** Identified O'ahu Substation Locations Highways & Major Roads Other Roads | <ul style="list-style-type: none"> SOEST Cable Routes HIREP Study Analysis Area Federally Owned Land | <ul style="list-style-type: none"> Emergency Shelter Locations Tsunami Wave Hits (Historical) Tsunami Evacuation Zones FEMA - DFIRM (2007) 100 Year Flood Zone | <ul style="list-style-type: none"> Wildfire Risk Rating High Medium Low Not Applicable/Undefined Open Water |
|---|--|--|---|

* 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.

Figure 3.8-16



Pearl Harbor Landing Site Area: USGS Geology

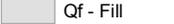
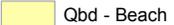
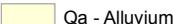
-  Route with camera data *
-  Route without camera data **
-  Identified O'ahu Substation Locations
-  Highways & Major Roads
-  Other Roads
-  SOEST Cable Routes
-  HIREP Study Analysis Area

USGS Geology

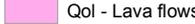
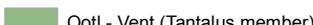
Map Unit

-  Open Water
-  Ko'olau Basalt
-  QTkl - Lava flows

Surficial Deposits

-  Qf - Fill
-  Qbd - Beach
-  Qa - Alluvium
-  QTao - Older alluvium
-  Qcrs - Lagoon and reef

Honolulu Volcanics

-  Qol - Lava flows
-  Qov - Vent
-  Qott - Lava flows (Tantalus member)
-  Qotl - Vent (Tantalus member)
-  Qot - Tuff



* 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.

Figure 3.8-17

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3.9 NOISE AND VIBRATION

3.9.1 Resource Definition

Noise is often defined as unwanted sound and is one of the most common environmental issues of concern to the public. A number of factors affect sound, as it is perceived by the human ear. These include the actual level of the sound (or noise), the frequencies involved, the period of exposure to the noise, and changes or fluctuations in the noise levels during exposure. According to HAR Title 11 Chapter 46, *Community Noise Control*, “noise” means any sound that may produce adverse physiological effects or interfere with individual or group activities, including, but not limited to, communication, work, rest, recreation or sleep. The accepted unit of measure for noise levels is the decibel (dB) because it reflects the way humans perceive changes in sound amplitude. The term “A-weighted” (dBA) refers to a filtering of the noise signal to emphasize frequencies in the middle of the audible spectrum and to deemphasize low and high frequencies in a manner corresponding to the way the human ear perceives sound. “Noise pollution” means noise emitted from any excessive noise source in excess of the maximum permissible sound levels. Sound levels are easily measured, but human response and perception of the wide variability in sound amplitude is subjective (AECOM 2009).

Vibration consists of waves transmitted through solid material and may be composed of a single pulse, a series of pulses, or a continuous oscillatory motion. Ground vibration propagates from the source through the ground to adjacent buildings by surface waves. The normal frequency range of most groundborne vibration that can be felt generally starts from a low frequency of less than 1 hertz (Hz) to a high of about 200 Hz. Perceptible groundborne vibration is generally limited to areas within a few hundred feet of certain types of industrial operations, and construction activities, especially pile driving. Road vehicles rarely create enough groundborne vibration to be perceptible to humans unless the road surface is poorly maintained and there are potholes or bumps. If traffic, typically heavy trucks, does induce perceptible vibration in buildings such as window rattling or shaking of small loose items, then it is most likely an effect of low-frequency airborne noise or ground characteristics. Construction activities can also produce varying degrees of ground vibration, depending on the equipment and methods employed. Ground vibrations from construction activities very rarely reach levels high enough to cause damage to structures, although special consideration must be made in cases where fragile historical buildings are near the construction site. The construction activities that typically generate the highest levels of vibration are blasting and impact pile driving (URS 2006).

3.9.2 Regulatory Setting

Occupational Noise

At the federal level, the Occupational Safety and Health Act (OSHA) of 1970 was established to “assure the safe and healthy working conditions for working men and women.” Under provisions of Title 29 C.F.R. Part 1910.95, OSHA noise standards consist of a two-stage program:

- A hearing conservation program must be implemented when employees are exposed to 85 dB or more in an 8-hour day. These programs include annual audiometric testing and require hearing protection devices, such as earplugs.
- Engineering or administrative noise controls are required when exposure exceeds 90 dB. Engineering controls include redesigning the space to reduce machinery noise, replacing machinery with quieter equipment, enclosing the noise source or enclosing the noise receiver.

The State of Hawai‘i, under an agreement with OSHA, operates an occupational safety and health program in accordance with Section 18 of the Act. The designated agency for the administration of this program is the Department of Labor and Industrial Relations (DLIR). Within the DLIR, the Hawai‘i Occupational Safety and Health Division (HIOSH) is responsible for both enforcement and consultation programs under provisions of HAR Title 12 Chapter 200.1 *Occupational Noise Exposure*. The Hawai‘i noise regulations apply to all private and public sector places of employment in the state, with the exception of federal employees, the U.S. Postal Service (USPS), private sector maritime, and land that is exclusively federal and subject to federal OSHA jurisdiction.

OSHA-Hawai‘i permissible noise exposures in the workplace are outlined in Table 3.9-1.

Environmental Noise

The Noise Pollution and Abatement Act of 1970 (Title IV of the CAA, Title 42 U.S.C. Section 7627) established an Office of Noise Abatement and Control within USEPA. USEPA was directed to investigate and identify the effects of noise levels on public health and welfare, including psychological and physiological effects on humans; effects of sporadic extreme noise as compared with constant noise; effects on wildlife and property; effects of sonic booms on property; and such other matters as may be of interest in the public welfare. Title IV of the Clean Air Act also requires other federal agencies and departments to consult with USEPA regarding methods for abating objectionable or nuisance condition noise impacts that result from activities they carry out or sponsor (Tetra Tech, Inc. 2004).

In passing the Noise Control Act of 1972, (Title 42 U.S.C. Section 4901–4918) Congress hoped to “promote an environment for all Americans free from noise that jeopardizes health or

welfare.” The Office of Noise Abatement and Control (ONAC) of USEPA was charged with overseeing noise-abatement activities and coordinating its programs with those of other federal agencies that play an important role in noise control. The Noise Control Act was amended by the Quiet Communities Act of 1978 to promote the development of effective state and local noise control programs, to provide funds for noise research, and to produce and disseminate educational materials to the public on the harmful effects of noise and ways to effectively control it. (USEPA 2012).

For general environmental noise and the public’s exposure to it, the HDOH Indoor and Radiological Health (IRH) Branch is the regulatory authority tasked with enforcing, monitoring and issuing permits and variances related to public noise issues. The State of Hawai’i regulates noise exposure in the following statutes and rules; (HRS Chapter 342F *Noise Pollution* and HAR Title 11-46 *Community Noise Control* The IRH Branch’s role is to: Respond to all regulated excessive noise complaints and seek resolution to noise problems.

- Provide technical assistance to government agencies (e.g., County Liquor Commission, Department of Accounting and General Services) and develop partnership with other regulatory agencies involved in noise control.
- Develop partnership with nonregulatory agencies. Work with project proponents to promote consideration of noise emissions prior to developing plans for building structures and business operations.

The IRH Branch monitors noise and the Director can issue noise permits when excessive noise levels are expected. The Director can also issue variances when noises may exceed the maximum permissible sound levels codified in the regulations. Permitted noise maximums vary based on classification of zoning districts. Under provisions of HAR Title 11 Chapter 46-3 the various classes of land use classifications are described below:

- Class A zoning districts include all areas equivalent to lands zoned residential, conservation, preservation, public space, open space or similar type.
- Class B zoning districts include all areas equivalent to lands zoned for multi-family dwellings, apartment, business, commercial, hotel, resort or similar type.
- Class C zoning districts include all areas equivalent to lands zoned agriculture, country, industrial or similar type.

Per HAR Title 11 Chapter 46-4, the maximum daytime permissible sound levels are shown in Table 3.9-2.

Construction activities may not exceed the maximum permissible sound levels for more than 10 percent of the time within any twenty minute period, except by permit or variance issued. In

addition, no noise permit shall allow any construction activities which emit noise in excess of the maximum permissible sound levels for the hours:

- Before 7:00 a.m. and after 6:00 p.m. of the same day, Monday through Friday
- Before 9:00 a.m. and 6:00 p.m. on Saturdays
- Any time on Sundays or holidays

3.9.3 Region of Influence

The regions most likely to be impacted by noise would be the proposed landing site areas and associated converter station pads. The greatest noise generators would likely be during the construction phase with assembly of construction materials, earth movement, transportation of equipment and material to the site, clearing, grubbing, and construction of actual facilities at the site. Once operational, noise generation would be greatest at the proposed facilities with noise anticipated to diminish in proportion to increased distance from the operation. For calculation purposes, operational noise decibel levels would be measured from the property line in order to determine compliance with noise regulations. Noise from the cable itself is not anticipated, postconstruction.

3.9.4 Affected Environment

General

Terrestrial

“Sensitive noise receptors” are generally considered persons who occupy areas where noise is an important attribute of the environment for activities that require quiet, including sleeping, convalescing, and studying. In Hawai‘i, these areas include residential dwellings, hotels/motels, hospitals, nursing homes, educational facilities, and libraries. Typical ambient noise levels and typical noise emission levels for construction equipment are summarized in Tables 3.9-3 and 3.9-4, respectively.

Some construction activities generate vibrations with effects that can range from annoyance to structural damage. The strength of a vibration is the maximum rate of particle movement and is referred to as the “peak particle velocity,” typically measured in inches per second (cm/second). Subsurface geological conditions and distance affect vibration levels; vibration levels decrease with increasing distance. Vibration levels above 0.10 inches/second (0.25 cm/second) are distinctly perceptible and levels above 0.5 inches/second (1.3 cm/second) have the potential to cause architectural damage to normal dwellings (DOE 2007).

Marine

Noise and vibration in the marine environment may occur during construction and would be temporary in nature. The initial placement of the undersea cable on the sea floor, its maintenance, replacement, and eventual decommissioning may generate certain levels of temporary noise and vibration. While marine noise and vibration may be generated by future undersea cable projects, there is no affected environment to be impacted by these occurrences in the marine area of analysis.

Maui County-O'ahu Routing Specific

Maui

Maui-Kahului Harbor

In the landing site area centered at Kahului Harbor, and as shown in the Wailuku-Kahului Community Plan of 1987, land uses consist of Open Space, Park, Airport, Single Family Residential, Commercial and Industrial uses; all relatively large noise generators. The Kahului area of Maui encompasses an array of zones reflecting its urbanized context and the proximity of Kahului Harbor, the airport, large commercial centers and the County seat of government at nearby Wailuku. Noise receptors would likely be most sensitized in the residential areas on the west side of the landing site area and least sensitized, moving toward the airport. Numerous larger community noise facilities are located just outside this landing site area with noise receptors consisting of the Wailuku Health Center and the Maui Memorial Hospital inland and to the south.

Maui-Kapalua (West Maui)

In the environs of the landing site area, land uses consist of agriculture, conservation, and open space including park areas along the coastline as reflected in the West Maui Community Plan of 1996. The southern portion of the landing site area includes the Kapalua Urban Growth area. This area contains the Kapalua resorts and medium-density residential developments interspersed with limited retail-commercial uses. The vast majority of lands along the coast in the landing site area are designated for Preservation (conservation) as shown in the Draft Maui Island Plan of 2009. Inland areas from the coast contain open space and golf courses. The residential developments and the hotel/vacation rental facilities would likely be most impacted by a proposed converter station development with more intense impacts during the construction phase. There are no institutional noise receptors in the landing site area such as hospitals or libraries or nursing homes.

Lānaʻi

The entire proposed landing site area has a state land use designation of “Conservation” and is zoned as “Open Space” as described in the Lānaʻi Community Plan of 1998. Due to the lack of significant development of residences in the landing site area, the noise receptor impacts in this area would likely be minimal, postconstruction. During construction, it is likely equipment and vehicles would need to travel between the port area and the landing site area. To do so would require traversing through the center of Lānaʻi City to get to the landing site area. While this potential construction impact would be temporary, it would impact the main population center of the island at Lānaʻi City. This landing site area contains no public facilities to act as noise receptors.

Molokaʻi

Molokaʻi-Kaluakoi (West Molokaʻi)

The land in the potential landing site area from Kahaiawa Point in the south to Moku Point is primarily zoned “Conservation” and “Agriculture” per the Molokaʻi Community Plan of 2001. Near the center of the landing site area, there is an urban development location consisting of a range of designations associated with resort development such as Hotel, Multi-Family, Single Family, Rural, and Business Commercial. State land use designations in the landing site area include “Conservation” along the coast with the majority of the remainder of the landing site area zoned “Agricultural.” The area centered at the Kepuhi has a state land use designation of “Urban” and overlays the aforementioned resort area described in the Community Plan. There is an area zoned “Rural” lands just inland of this urban-designated area. Noise receptors would be concentrated at the resort development near the beach and extending inland at Kaluakoi. Bringing equipment to the site from the port during the construction phase would entail traveling through and near larger population centers such as Kaunakakai and some low-density residential areas near the airport, but no public facility noise receptors.

Molokaʻi-Kaunakakai (South Molokaʻi)

The majority of the land in the potential Molokaʻi-Kaunakakai landing site area is zoned as “Agriculture” with some limited areas along the coast with a designation of Conservation, as described in the Molokaʻi Community Plan of 2001. The area has a state land use designation of “Agriculture.” This area is rural in nature and is relatively close to the port through which construction equipment may be routed. The noise receptors would be few in quantity; post construction. This landing site area contains no public facilities to act as noise receptors.

O'ahu

O'ahu-MCBH at Kāne'ōhe Bay

The zoning designations in this landing site area are more complex than the neighbor islands due to the high population density of the island in general, intensity of uses, and, specifically, the presence of a large military base. The landing site area extends from Mokapu Point at MCBH at Kāne'ōhe Bay in the north to the residential neighborhood of Lanikai in the south and contiguous to Bellows Air Force Base just south of Lanikai. Outside of MCBH at Kāne'ōhe Bay, the shoreline area consists mostly of single-family residential areas punctuated by beach access and public beach park areas. A preservation-open space district divides the neighborhoods of Kailua and Lanikai. A commercial zone radiates outward from the intersection of Kailua Road and Highway 61. Noise receptors, especially housing and businesses close to major streets such as Mokapu Boulevard, Kailua Road, and Highway 61, may be impacted by the construction process. The Straub Family Health Care Center and Clinic is located inland and outside the landing site area. The Kailua library facility is located near other community services near the Kailua District Park and within the landing site area at 239 Kuulei Road approximately 2 miles inland from the shoreline.

O'ahu-Pearl Harbor

The zoning and land uses in this area include industrial, federal, mixed use, limited open space-park areas, the special planned district of Kakaako and residential areas west of Pearl Harbor. The Pearl Harbor landing site area is located in the most urbanized area of the state and can be subjected to a range of significant noise impacts. Extending from the Kakaako neighborhood west to Ewa Beach, this area includes two major air fields, JBPHH and Honolulu International Airport; Honolulu Harbor and port facilities; Pearl Harbor military facilities, including housing areas, and the downtown central business district, all interspersed with residential areas. This is the only landing site area being considered that contains an electrical substation (Iwilei). During the construction phase, equipment may travel from the port to locations in the landing site area using large arterial roadways, freeways, and industrial accessways. The range and variety of roadways in the landing site area would allow a range of alternative routes allowing avoidance of residential areas. There are five fire stations and the main Honolulu police station in the landing site area that currently generate noise impacts of their own. In addition, ambulance service occurs on a frequent and regular basis at the state's primary trauma hospital—The Queen's Medical Center, located just inland of the landing site area. A full range of residential facilities are provided in the landing site area including nursing homes, senior citizen housing, numerous schools, a junior college, and the state's main library.

3.9.5 Potential Impacts of Cable System Implementation

Description of Impact Types

Terrestrial

Noise criteria would be applied consistently regardless of island or island area. However, noise limit standards do vary based on proximity to certain land uses and land use designations. Intermittent elevated noise levels from certain types of construction activities are inevitable. However, they are expected to be short term and minor and would coincide with the construction phase both on land with the converter station and in the ocean and shore-side with the cable laying. The noises generated from the construction equipment would need to comply with HIOSH regulations for temporary construction. Once the facility is operational, noise levels at the property line would need to comply with HRS Chapter 342F *Noise Pollution*, HAR Title 11 Chapter 46 *Community Noise Control*, and HAR Title 12 Chapter 200.1 *Occupational Noise Exposure*.

Marine

Potential noise impacts associated with undersea cables would 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. Noise impact may arise from operation of vessels or machinery during the cable-laying process, but those noise impacts would be temporary. If High Voltage Alternate Current (HVAC) cables are used as part of future developments, possible long-term vibration and noise emission from the cable would be taken into account (OSPAR 2009). Potential impacts from HVAC cables on marine habitats and species are discussed in Section 3.7 of this document.

3.9.6 General Siting Criteria and Special Conservation and Construction Measures

General Level Special Conservation and Construction Measures

The following general recommendations would be applicable to all construction and operational sites, regardless of location on any of the potential islands (Earth Tech, Inc. 2007). Special conservation and construction measures may include:

- NV-1 Provide timely public notice to each affected community of the upcoming construction phasing and activities.
- NV-2 Mandate that all construction equipment with an internal combustion engine be equipped with a properly maintained muffler.

- NV-3 Utilize new construction equipment as much as possible since new equipment is generally quieter than older equipment.
- NV-4 Eliminate or minimize impact pile driving operations where possible.
- NV-5 Produce a construction emissions mitigation plan with recommendations for appropriate mitigation measures related to noise control.
- NV-6 Once operational, ensure that all mechanical equipment is in optimal working condition consistent with manufacturer's specifications.
- NV-7 All construction work would be scheduled in accordance with HRS Chapter 342-F-1.
- NV-8 All construction work, operations, and maintenance work shall be in compliance with HAR Title 11 Chapter 46, HRS Chapter 342F, and HAR Title 12 Chapter 200.1 and any applicable OSHA regulations related to compliance with workplace noise regulations.
- NV-9 Monitor vibration levels during initial HDD operations and during any pipe ramming.
- NV-10 Conduct preconstruction and postconstruction structural surveys of adjacent and nearby structures to determine if structural damage has occurred due to pipe ramming vibrations.

Table 3.9-1. Permissible Noise Exposures in the Workplace

Duration per day, in hours	Sound level in dB* – Decibel level
8	90
6	92
4	95
3	97
2	100
1.5	102
1	105
0.5	110
0.25 or less	115

*When measured on the A scale of a standard sound level meter at slow response.
Source: Title 29 C.F.R. Part 1910.95

Table 3.9-2. Maximum Permissible Sounds Levels in dBA

Zoning (Land Use) District	Daytime (7 am – 10 pm)	Nighttime (10 pm – 7 am)
Class A	55	45
Class B	60	50
Class C	70	70

Source: HAR, Title 11, Chapter 46

Table 3.9-3. Typical Ambient Noise Levels

Source	dBA
Discomfort Level	Above 80
Heavy Traffic	80
Automobile at 20 meters	70
Vacuum Cleaner	65
Conversational Speech at 1 meter	60
Quiet Business Office	50
Residential Area at Night	40
Whisper, Rustle of Trees	20
Rustle of Leaves	10
Threshold of Audibility	0

**Table 3.9-4. Typical Noise Emission Levels
for Construction Equipment**

Type of Equipment	Noise Level at 50 feet dBA
Air Compressor	81
Asphalt Spreader (paver)	89
Backhoe	80
Bulldozer	82
Chain Saw	85
Compactor	82
Concrete Pumps	82
Concrete/Grout Pumps	82
Crawler Service Crane (100-Ton)	83
Dump Truck	88
Drill Rigs	88
Excavator	85
Front End Loader	80
Generator	81
Jackhammer (Compressed Air)	85
Lift Booms	85
Pick-Up Trucks	55
Power-Actuated Hammers	88
Roller	74
Street Cleaner	85
Tractor Trailer	84
Water Pump	76
Water Truck	55

Source: FHWA 2009

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3.10 PUBLIC HEALTH AND SAFETY

3.10.1 Resource Definition

Terrestrial

The assessment of safety and health considers activities, occurrences, or operations that have the potential to affect the short-term and long-term safety and health of workers, the public, or both. Activities that expose workers to health-threatening situations (such as handling asbestos; exposure to noise or lead dust, exposure to electromagnetic radiation (EMR), fire, and the operation of heavy equipment) must comply with various requirements and operational standards.

The construction and operation of an undersea cable and land-based converter stations could result in the exposure of the general public to these same health and safety concerns as well as possible long-term exposure to EMR. EMR is defined as energy propagated through free space or through a material medium in the form of electromagnetic waves. Electromagnetism can be generated from both natural and man-made sources. Examples include radio waves, infrared radiation, visible light, ultraviolet radiation, X-rays, and gamma rays.

In addition to the well-known health and safety issues discussed above, power plants and electric grid infrastructure have become a focus of national security. After the terrorist attacks of 2001 and with increasing demand for electricity, power grid infrastructure is considered vulnerable to both domestic and international sabotage attempts. Increasingly, electrical grid facilities are being treated as high-security installations with tightly controlled access, more hardened construction, and cyber security features (Security 2012).

Marine

Aside from the initial construction phase of the cable laying, there are no known human marine-related safety and health issues associated with the operation of the undersea cable. A discussion of possible marine species and habitat impacts associated with exposure to EMR/EMF can be found in Section 3.7 of this document while a discussion of possible marine hazardous materials/UXO within the ocean cable study corridors is found in Section 3.8 of this document.

3.10.2 Regulatory Setting

Occupational Safety and Health Act

For workers, Occupational Safety and Health Act (OSHA) regulations Title 29 C.F.R. Parts 1910 and 1926 set forth safety and health requirements that extend to all U.S. employers and

employees. OSHA standards are rules that describe the methods that employers must use to protect their employees from occupational hazards. There are OSHA standards for construction work, maritime operations, and general industry. These standards limit the amount of hazardous chemicals workers can be exposed to, require the use of certain safe practices and equipment, mandate special training and certifications, and require employers to monitor hazards and keep records of workplace injuries and illnesses. Examples of OSHA standards include requirements to provide fall protection, prevent trenching cave-ins, prevent infectious diseases, ensure that workers safely enter confined spaces, prevent exposure to harmful substances like asbestos, put guards on machines, provide respirators or other safety equipment, and provide training for certain dangerous jobs (OSHA 2012a). Much of OSHA's regulation for electrical hazards defaults to National Fire Protection Association's (NFPA) Standard for Electrical Safety in the Workplace – Standard 70E. Worker exposure to hazardous materials is discussed in detail in Section 3.8 of this document.

Hawai'i Regulations

The State of Hawai'i has occupational safety regulations associated with various activities, locations, processes, and operations. Under an agreement with OSHA, the State operates a safety and health program in accordance with OSHA Section 18 (OSHA 2012b). The designated agency for the administration of this program is the Department of Labor and Industrial Relations (DLIR). Within the DLIR, the Hawai'i Occupational Safety and Health Division (HIOSH) is responsible for both enforcement and consultation programs. Depending on the safety issue, either HDOH or HIOSH administers and enforces the various provisions of state and federal health and safety regulations under its authority in HAR Title 12 Chapter 50.

Public Exposure and Safety

Concerning health and safety impacts to the general public, any construction operations would need to comply with fugitive dust-air quality regulations as discussed in Section 3.1 of this document, as well as noise regulations discussed in Section 3.9 of this document. When addressing the public's exposure to, and possible impacts from, EMF/EMR, there is no formal state safety guidance or codified regulatory protocol. HDOH recommends a "prudent avoidance" policy for EMF. "Prudent avoidance" means that reasonable, practical, simple, and relatively inexpensive actions should be considered to reduce exposure (to EMF) (HECO 2012).

Intentional Destructive Acts

The analysis of the vulnerability of the electrical network/grid to sabotage and possible impacts to surrounding populated areas is a newer discipline of study and, as such, agencies' roles and responsibilities in the matter are not fully codified. Agencies and entities such as the Federal Energy Regulatory Commission (FERC), the National Institute of Science and Technology (NIST), and the Department of Homeland Security (DHS) are spearheading efforts to ensure

electrical grid security, mostly via efforts to address cyber-security (Energy 2012). Locally, HECO would ultimately be responsible for physical security at any proposed HECO facilities while the DoD would be responsible should facilities be built within DoD properties (military bases).

3.10.3 Region of Influence

Terrestrial

Potential future projects most likely to involve possible occupational health and safety issues would be grading, clearing and preparation for any proposed landing site areas, converter station construction, routing of an undersea cable and its connection to the converter station, and the use of construction transportation routes associated with each of these activities. The ROI for workers includes proposed facility sites with their associated staging, loading, transporting, and construction/assembly operations. The ROI for the general public includes the areas contiguous or proximate to the construction or operation site, and roads used for transportation during construction, operation, and/or for future decommissioning of the facilities.

Marine

The marine cable-laying process may expose workers to health and safety issues during the construction phase or during any cable maintenance, decommissioning, or removal operations. Once the cable is in place on the ocean floor and operated and maintained as designed, the risks to workers or the public would likely be minimal.

3.10.4 Affected Environment

General

Worker health-safety concerns, and standards addressing each, would not differ among the various landing site locations or islands. Types and levels of concern for public safety would depend on the proximity of future projects to existing development in the immediate area, especially residential areas, public institutions such as schools, military bases, and other facilities and institutions where large numbers of people congregate. The land use discussion in Section 3.5 of this document provides complete descriptions of land uses and land use designations on the site study area and in the specific landing site areas on each island. Section 3.11 of this document describes and locates public services and facilities tasked with ensuring public safety and emergency response. In general and postconstruction, the landing site areas on the rural islands of Lānaʻi and Molokaʻi would be less susceptible to public safety impacts as these locations lack significant developments and populations within, or adjacent to, their boundaries with the possible exception of the Molokaʻi Kaluakoi resort complex. Future marine undersea cable corridors would not be subject to public health and safety impacts. Potential

cable corridors would not have personnel stationed at the sites other than for temporary work during construction and maintenance.

3.10.5 Potential Impacts of Cable System Implementation

Description of Impact Types

Once operational, the public's exposure to various risks may increase in proportion to geographical proximity to the landing site area/converter station site(s). Any public health risks from future projects in the various landing site areas may be amplified in proportion to the mix of surrounding land uses and the density and sensitivity of those uses. The following potential impacts could apply to any location in the site study area regardless of landing site, or specific individual project scope being considered.

Construction and Transportation Accidents

Members of the public as well as workers could be impacted by activities associated with construction, transportation, maintenance, operation, and decommissioning of future developments.

Fire, Chemical and Electrical Hazards

The presence of electrical generating equipment and electrical cables, along with various oils (lubricating, cooling, and hydraulic), does create the potential for fire. Other possible future specific project activities could create the potential for a fire or medical emergency because of the storage and use of diesel fuels, lubricating oils, and hydraulic fluids. Storage and use of these substances may occur at the converter station, at the cable landing site areas, and during the construction phase.

Electromagnetic Fields

EMF fields may be generated from various aspects of a future project. Power lines, like the energized components of electrical motors, home wiring, lighting, and all other electrical appliances, produce EMF or EMR.

Electric fields around transmission power lines are produced by electrical charges on the energized conductor. Safety considerations in the immediate vicinity of electric power lines include the potential for electric shock, the clearance of the power lines aboveground, measures to prevent unauthorized climbing of the poles, and the proximity of the transmission lines to other utilities such as oil wells and pipelines. The electric field created by a high-voltage transmission line extends from the energized conductors to other conducting objects such as

the ground, towers, vegetation, buildings, vehicles, and persons. Magnetic field strength increases as current flow increases and diminishes as one moves farther from the conductors.

Magnetic field exposure has been the subject of a number of studies, primarily on exposure to AC magnetic fields, because AC fields induce currents into objects unlike DC fields. Because DC fields do not induce currents into objects, exposures are not considered a health risk. Under current known technology, the converter station would convert DC electrical power from the undersea cable, to AC electrical power for delivery into the land-based power grid.

Exposures to extremely low-frequency (ELF) EMF from natural and anthropogenic sources are so ubiquitous that there has been concern about potential adverse health effects from residential and occupational exposures. Because EMF are generated by distribution lines, EMF would be present in the vicinity of the proposed converter station infrastructure where it provides a connection to the electrical grid. A number of reviews of epidemiological and biological research studies have generally concluded that there is no scientific basis to support a finding of adverse human health effects from EMF although others have found that there may be an association between EMF and certain diseases.

The National Institute of Environmental Health Sciences (NIEHS) conducted a 6-year research project specifically addressing health effects of exposure to ELF-range fields from power lines. The NIEHS concluded that “the scientific evidence suggesting that ELF-EMF exposure pose any health risk is weak.” The report states that laboratory research studies have not been able to consistently support the epidemiological findings, which weakens but does not discount them. However, the report also states that ELF-EMF exposure cannot be considered entirely safe because of the relatively consistent results of epidemiological studies that show a small increased risk of chronic lymphocytic and childhood leukemia with increasing EMF exposure. The difficulty of accounting for confounding factors in assessing EMF exposure supports the need for additional research (BLM 2005).

Intentional Destructive Acts

With Hawai'i's smaller-scale stand-alone electrical network (which currently does not connect the various islands into one statewide electrical grid) it is unlikely that the Hawai'i electrical grid network would be a primary target of an organized sabotage effort. Development of an undersea cable landing site area and converter station on or near military installations may result in its increased threat of targeting for sabotage. Conversely, a facility's presence at a secured, hardened, and publicly inaccessible military location may lessen its vulnerability to sabotage success. Possible security issues associated with locating of a converter station near strategic and/or populous centers would be analyzed as part of selecting a project location.

3.10.6 General Siting Criteria and Special Conservation and Construction Measures

General Level Special Conservation and Construction Measures

Public health and safety issues are consistent at landing site areas regardless of location, island, or landing site area. These measures should be implemented for whatever safety issue is anticipated regardless of site chosen.

- PH-1 A health and safety program should be developed to protect workers during construction, operation, and decommissioning of a project. The program should identify all applicable federal and state occupational safety standards; establish safe work practices for each task (e.g., requirements for personal protective equipment and safety harnesses, OSHA standard practices for safe use of explosives and blasting agents, and measures for reducing occupational EMF exposures); establish fire safety evacuation procedures; and define safety performance standards (e.g., electrical system standards and lighting protection standards). The program should include a training program to identify hazard training requirements for workers for each task and establish procedures for providing required training to all workers. This plan should include fire safety measures to be employed during construction.
- PH-2 All construction, operation, and decommissioning activities should be conducted in compliance with applicable federal and state occupational safety and health standards (e.g., OSHA's Occupational Health and Safety Standards, Title 29 C.F.R. Parts 1910 and 1926, respectively).
- PH-3 Provide documentation of training and a mechanism for reporting serious accidents to appropriate agencies should be established.
- PH-4 Electrical systems should be designed to meet all applicable safety standards (e.g., National Electrical Code [NEC] and International Electrical Code [IEC] or other applicable codes.
- PH-5 For the mitigation of explosive hazards, workers should be required to comply with the OSHA standard (1910.109) for the safe use of explosives and blasting agents. (See Section 3.8 for additional recommendations for the handling of hazardous waste and materials.)
- PH-6 Appropriate security measures and setbacks should be incorporated to minimize risks to the public.
- PH-7 Operators should consult with local planning authorities regarding increased traffic during the construction phase, including an assessment of the number of vehicles

per day, and their size and type. Specific issues of concern (e.g., location of school bus routes, transit stops, permitting for oversize loads, bridge weight limits) should be identified and addressed in a traffic management plan.

- PH-8 The project should be planned to comply with FAA regulations, including lighting requirements, height limits in flight corridors, occupancy standards, and any other potential safety issues associated with proximity to airports, military bases, training areas, or landing strips.
- PH-9 If located on a military base, implement appropriate military installation security measures to restrict or limit public access to the landing site areas and associated equipment.
- PH-10 Where necessary and appropriate, provide fencing or a wall at the property line(s) to limit access from adjoining lands.
- PH-11 The project should be planned to minimize electromagnetic interference (EMI) (e.g., impacts to radar, microwave, television, and radio transmissions) and comply with FCC regulations. Signal strength studies should be conducted when proposed locations have the potential to impact communications transmission, especially where a converter station and transmission lines would travel on or near a military base. Potential interference with public safety communication systems (e.g., radio traffic related to emergency activities) should be avoided. In the event an installed development project results in EMI, the operator should work with the owner of the impacted communications system to resolve the problem.
- PH-12 If applicable, measures should be considered to reduce occupational EMF exposures, such as backing the converter station with iron to block EMF, shutting down the converter station when working in the vicinity, and/or limiting exposure time while the generator is running.
- PH-13 To minimize potential impacts from EMF, it should be ensured that the submarine cable is designed with the proper electrical shielding and burial (as appropriate) in the ocean floor.

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3.11 PUBLIC SERVICES AND INFRASTRUCTURE

3.11.1 Resource Definition

Terrestrial including Shoreline

Public services and infrastructure are provided to a community by public and/or private companies or agencies. Included are utilities, such as electricity, potable water, wastewater systems, and natural gas supplies; fire and police protection; and health care facilities. Public services are provided to all citizens, regardless of income. Infrastructure refers to the basic framework necessary for a society or community to operate and function. It includes physical and organizational structures and facilities, such as buildings, roads, and power supplies. This section will discuss existing public services and utilities infrastructure, including the following:

- Police
- Fire
- Medical
- Electrical
- Potable water
- Wastewater systems
- Telecommunications
- Gas supplies
- Solid waste

3.11.2 Regulatory Setting

There are no blanket regulatory provisions specifically applicable to public service and utilities infrastructure. Various companies/agencies (private and public) across the islands are set up and tasked with managing and regulating the multitude of utility systems across the island chain (HECO, Board of Water Supply, etc.). Police and fire protection are provided by local governments and health care facilities are privatized.

Both the City and County of Honolulu and the County of Maui have adopted various county and community plans that include long-range objectives involving the social, economic, environmental, and design objectives for the general welfare and well-being of the island residents (City and County of Honolulu 2002).

3.11.3 Region of Influence

The ROI for public services/infrastructure effects is the landing site area, and lands that support public utilities servicing those landing site areas.

Maui

The ROI for public services and infrastructure effects is the landing site area, and lands that support public utilities servicing those landing site areas.

Maui-Kahului Harbor

Terrestrial

The ROI for public services (police, fire, medical) in the landing site area includes Kahului Harbor and the communities of Wailuku-Kahului and Paia.

State Waters

This section is not applicable as no infrastructure or public services are provided in state waters.

Maui-Kapalua (West Maui)

Terrestrial

The ROI for public services (police, fire, medical) in the landing site area includes the communities of Kapalua, Napili, Kaanapali, and Lahaina.

State Waters

This section is not applicable as no infrastructure or public services are provided in state waters.

Lānaʻi

The ROI for public services and infrastructure effects is the entire island of Lānaʻi.

Molokaʻi

The ROI for public services and infrastructure effects is the entire island of Molokaʻi.

Oʻahu

The ROI for public services and infrastructure effects is the landing site area, and lands that support public utilities servicing those landing site areas.

O'ahu-MCBH at Kāne'ōhe Bay

Terrestrial

The ROI for public services (police, fire, medical) in the landing site area includes the communities of Kāne'ōhe, Kailua, and Lanikai and MCBH at Kāne'ōhe Bay.

State Waters

This section is not applicable as no infrastructure or public services are provided in state waters.

O'ahu-Pearl Harbor

Terrestrial

The ROI for public services (police, fire, medical) in the landing site area includes the communities of Honolulu Downtown/Chinatown, Kalihi, Moanalua, Aiea, Pearl City, Ewa Beach, and JBPHH.

State Waters

This section is not applicable as no infrastructure or public services are provided in state waters.

3.11.4 Affected Environment

General

Police

The Sheriff Division is operated by the State of Hawai'i Department of Public Safety. It carries out law enforcement services statewide. Sheriffs serve various types of safety control businesses including assisting the Department of Transportation Harbor Division with the security of waterways and harbors (Hawai'i State Department of Public Safety 2012).

Fire

The fire controls and operations in Hawai'i are operated by City and County of Honolulu, County of Maui, County of Hawai'i, and County of Kauai on O'ahu, Maui, island of Hawai'i, and Kauai respectively (Department of Planning and Permitting 2004; County of Maui 2010; County of Kauai Fire Department 2007).

Medical

The services provided by hospitals are segmented by the type of medical specialty required. All medical services provided in the state of Hawai'i must be licensed by HDOH, State Health Planning and Development Agency (SHPDA) (R.M. Towill 2007). HDOH also leads Hawai'i's medical and public health response to emergencies and works closely with state and community agencies.

Electrical

HECO is the primary energy provider in the state of Hawai'i. HECO supplies power to 95 percent of the residents on O'ahu, Maui, Hawai'i, Lāna'i, and Moloka'i. HECO has two subsidiary companies: Maui Electric Company, Ltd. (MECO), which serves Maui, Lāna'i, and Moloka'i; and Hawaiian Electric Light Company, Inc. (HELCO), which serves the island of Hawai'i. The Kauai Island Utility Cooperative (KIUC) is the primary energy provider for the island of Kauai (HECO 2012).

HECO's system is a stand-alone power-generating system, rather than a system of interconnected transmission lines. Each island is on an independent, self-contained grid, thus having to be more reliable and self-reliant than with other utilities. HECO owns approximately 3,000 miles of electrical transmission and distribution lines, 40 percent of which are underground (HECO 2008a–b).

HECO uses 138,000-volt (kV) transmission lines and transports electricity to transmission substations. Substations reduce the power (46 kV), which then goes to local area distribution substations where voltage is further reduced (12 kV or 4 kV) (HECO 2009). Lines are then connected to businesses and homes.

Hawai'i utilities (electric, phone, streetlights) together own 55,000 poles, of which HECO owns about 15,000 poles. The thinner wires highest on the utility poles are the electric lines. The thicker wires lower down on poles are phone or cable TV company lines (HECO 2008a).

Potable Water

The Islands' potable water sources come from groundwater aquifers and surface water that are supplied by the large amounts of rainfall on the islands. The State, City, and County, as well as private entities, manage the potable water supply across Hawai'i.

See Section 3.16 for more detailed information on water resources of the Hawaiian Islands.

Wastewater Systems

Wastewater is defined as “water-carried wastes from dwellings, commercial establishments, institutions and industrial plant, and may include groundwater, surface water and storm water not intentionally admitted” (County of Maui 2010). Wastewater management is critical to protecting Maui’s groundwater as it is the main source of potable water on the island. Wastewater systems are County owned and operated across the island chain.

Telecommunications

Hawaiian Telcom is Hawai’i’s main provider of communication services. Hawaiian Telcom provides telephone service, high-speed internet, long distance services, next generation Internet Protocol (IP)-based network services, customer premise equipment, data solutions, billing and collection, and pay telephone services. Hawaiian Telcom has 86 central offices serving an area of approximately 6,263 square miles throughout O’ahu, Maui, Hawai’i, Kauai, Moloka’i, and Lāna’i and owns the state’s most extensive local telecommunications network (Hawaiian Telcom 2012).

Hawaiian Telcom has a telecommunications system that consists of both microwave and fiber optics. A fiber-optic network was installed in 1994 between Kauai, O’ahu, Maui, and the Island of Hawai’i. Fiber-optic cables connect the islands through interisland cables, and the cables run across various parts of the islands (Hawaiian Telcom 2012).

Gas Supplies

The Gas Company is a subsidiary of Macquarie Infrastructure Company and serves O’ahu, Maui, Hawai’i, Kauai, Moloka’i, and Lāna’i. The network consists of 1,100 miles of pipeline (The Gas Company 2009).

Mini-utility pipeline networks are created to serve clusters of customers where possible. Other customers are served by delivery of liquefied petroleum gas (LPG) to on-site tanks. LPG is supplied to 40,000 commercial and residential utility and nonutility customers (The Gas Company 2009).

Solid Waste

All solid waste generated across the Hawaiian Island chain is managed within each island. Across the islands, various city and county landfills, transfer stations, and privately owned solid waste operations exist to manage the ever-growing production of solid waste.

Maui County-O'ahu Routing Specific

Maui

Police

The Maui Police Department (MPD) is responsible for providing police service to the entire County of Maui, which also includes the islands of Moloka'i and Lāna'i. For operational purposes, the MPD divides the county into six police districts (County of Maui 2010).

The Sheriff Division is operated under the Hawai'i State Department of Public Safety. It provides security services to the Maui Memorial Hospital (State of Hawai'i Department of Public Safety 2012).

Fire

The fire and rescue operation on Maui is provided by the Maui County Department of Fire and Public Safety. There are 10 fire stations on the island of Maui. It is Maui County's first responder to public safety incidents and is often involved with land and water rescue.

Medical

Maui Memorial Medical Center is owned and operated by the State of Hawai'i, Hawai'i Health Systems Corporation (R.M. Towill 2007).

Electrical

MECO serves the island of Maui. MECO is a private organization regulated by the Public Utilities Commission (PUC). Electrical demand is divided into various categories based on daily cycle of electricity usage—on-peak demand (7:00 a.m.–9:00 p.m.), which is subdivided into shoulder peak demand and priority peak demand, and off-peak demand (9:00 p.m.–7:00 a.m.). In 2000, Maui's baseload demand was around 73 MW (COMIAU 2003).

The installed generating capacity for Maui is 212.90 MW, which is split between two generating stations. The Maalaea Generating Station has a reserve capacity of 175.30 MW (COMIAU 2003). The Kahului Generating Station has a reserve capacity of 37.60 MW (COMIAU 2003). Two power plants with 26 generating units, and one substation supply this capacity. Hawaiian Commercial and Sugar from Puunene Mill supplements MECO's total capacity (approximately 8 MW) (COMIAU 2003).

MECO has installed an additional 100 MW of generating capacity through the use of a combustion turbine (M-19) to meet growth demand. This is currently only used for peak

demand. Including the capacity from M-19, MECO's total capacity on Maui equals 250.1 MW (COMIAU 2003).

MECO has 68 substations on Maui and four additional substations are planned for construction (as of 2003) (COMIAU 2003).

The transmission grid at Maalaea power plant consists of:

- Seven 69-kV transmission lines, including:
 - three lines that service the West Maui/Lahaina area
 - two lines that service the Wailuku/Kahului area
 - one line that services the Kihei/Wailea area, upcountry Kula to Pukalani, and then back to Kahului
 - one line that services Haleakalā, which is a break-off of the Kula line
- Four 23-kV lines at Kahului power plant that service:
 - Wailuku/Kahului
 - Haiku/Makawao
 - East Maui (COMIAU 2003)

Potable Water

The majority of Maui's potable water supply comes from the island's groundwater. Due to the island's geology of permeable basalt and the high amount of rainfall, Maui has large underground reservoirs of freshwater. The two main watersheds on the island are referred to as West Maui and East Maui. East Maui is the larger water producer. Surface water is also a source of potable water to a lesser degree than groundwater as most of the streams are located on the windward side of the island and it is more expensive to purify surface water than groundwater (COMIAU 2003).

The Maui County Department of Water Supply is charged with the development, operation, maintenance, and protection of the island's water system and supply. Nine public water systems are located on the island of Maui and serve four districts—Central Maui, West Maui, Upcountry, and Hana (COMIAU 2003).

Maui County currently does not maintain an approved policy of water system standards. However, statewide standards do exist, which have a basis from national utility standards such as redundancy, aquifer sustainable yield, peak demand, drought, and equipment malfunctions. The Board of Water Supply and the County Council Water Resources Committee are charged with making decisions concerning Maui's freshwater. Groundwater and surface water must meet the Federal Safe Drinking Water Act quality standards (Hart 2007a).

Wastewater Systems

Three wastewater management and reclamation systems, Wailuku-Kahului, Kihei, and Lahania, are located on Maui and managed by the Maui County Department of Environmental Management, Wastewater Reclamation Division (WWRD) (County of Maui 2009). The WWRD is responsible for the development, operation, and maintenance of the municipal wastewater system (Hart 2007a).

Telecommunications

Telephone service providers in Maui County include Hawaiian Telcom, Pacific LightNet, Inc., Time Warner Telecom, Inc., Sandwich Isles Communications, Inc., AT&T, MCI, Sprint Hawai'i, and Oceanic Time Warner Cable. Telephone service utilizes power poles to transmit; the thicker wires lower down on pole are either phone or cable TV company lines (Hart 2007b).

Gas Supplies

The Gas Company serves Maui.

Solid Waste

County of Maui Department of Environmental Management's Solid Waste Division is in charge of planning, operation, and maintenance of the County landfills. In addition to landfills, Maui manages solid waste by source reduction, recycling, and composting (County of Maui 2012).

The main solid waste facilities on Maui include:

- Central Maui Landfill – owned and operated by the County. Accepts municipal solid waste. Serves the entire island of Maui.
- Hana Landfill – 35-acre facility that serves the Hana community plan area. Accepts residential, commercial, and green waste.
- Olowalu Convenience Center – self-haul residential waste that is transferred to the Central Maui landfill.
- Maui Demolition and Construction Landfill – privately owned. Accepts construction waste (County of Maui 2012).

Maui-Kahului Harbor

Terrestrial

POLICE

The Wailuku District, served by the Wailuku (Central) Police Station, is located in proximity of the Maui-Kahului Harbor landing site area.

In addition to Maui County Police Department, the Hawai'i State Sheriff Division has been assisting the Department of Transportation Harbors Division with security and law enforcement functions along waterways and harbors (Department of Public Safety Sheriff Division 2012).

FIRE

Three fire and rescue operations are in proximity of the proposed Maui-Kahului Harbor landing site area (Wailuku Fire Station, Kahului Fire Station, and Paia Fire Station).

Based on the Residential District Standard of a 2-road-mile service radius, areas around Waihee, Waiehu, and Waikapu located in the landing site area do not have adequate protection (Hart 2007a).

MEDICAL

Maui Memorial Medical Center is one of the five primary licensed hospitals in Maui County (R.M. Towill 2007) and is located adjacent to the Maui-Kahului Harbor landing site area.

Refer to Figure 3.11-1 for locations of police, fire, and medical services available in the Maui-Kahului Harbor area.

ELECTRICAL

The Maui-Kahului Harbor landing site area is serviced by the Maalaea power plant and the Kahului power plant operated by MECO. Transmission lines from both power plants supply electricity to the landing site area and adjacent areas. Grid maps showing specific locations of substations and underground lines within or adjacent to the landing site area are not readily available (COMIAU 2003).

The only areas on Maui where MECO transmission lines are not present include Waiehu around the northern West Maui Mountains to Napili, and from Hana around the eastern base of Haleakalā to Wailea (COMIAU 2003).

POTABLE WATER

Kahului is located in the Central Maui district and serviced by the Central Public Water System. The majority of the water in the Central Maui district is supplied from the Iao Aquifer, which is located near Iao and Waiehu Streams. A smaller percentage (~25 percent) of the water in the Central Maui district is supplied by the Waihee Aquifer (County of Maui 2010).

In 2005, the demand on the Central Maui system was 21.39 million gallons per day (mgd), while the supply is averaged at 26 mgd. Projections indicate that the demand will increase beyond supply before 2020 (County of Maui 2010).

WASTEWATER SYSTEMS

Kahului is serviced by the Wailuku-Kahului wastewater system. This system has a design capacity of 7.9 mgd. This system is projected to withstand the island's population growth as projected to 2030, which includes a projected demand of 7.3 mgd. (Hart 2007a) Numerous wastewater pump stations and two wastewater reclamation facilities are located within the landing site area (COMIAU 2003).

TELECOMMUNICATIONS

Telephone service is available widely throughout Maui County, and all the above-listed providers serve the Maui-Kahului Harbor landing site area.

GAS SUPPLIES

The Gas Company serves the Maui-Kahului Harbor landing site area.

SOLID WASTE

Central Maui Landfill serves the Maui-Kahului Harbor landing site area. Central Maui Landfill is located adjacent to the specified landing site area—approximately 3 miles from Kahului Airport. Central Maui Landfill accepts an average of 500 tons of waste per day (County of Maui 2010). Its existing capacity is 11.6 million cubic yards (mcy) (County of Maui 2010). The projected demand of 2030 is 12.4 mcy. Therefore, a shortage of 0.8 mcy will occur if additional space is not created (County of Maui 2010).

Maui Construction and Demolition Landfill could also serve the landing site area depending on the type of waste to be disposed. Maui County landfills do not accept construction and/or demolition solid waste. Maui Construction and Demolition Landfill is located near Ma'alaea and is privately owned. Ma'alaea is about 10 miles from the landing site area. Maui Construction and

Demolition Landfill has a capacity of 872,000 cubic yards of waste. Currently, it accepts approximately 3,000–5,000 tons of waste per month (Hart 2007a).

State Waters

This section is not applicable as no infrastructure or public services are provided in state waters.

Maui-Kapalua (West Maui)

Terrestrial

POLICE

The Lahaina Station serves the Lahaina Community Plan Region and its vicinity, including the area in Kapalua. The Lahaina District has a large coverage from the Olowalu Tunnel along the Honoapiilani Highway to the end of the road past Kapalua, northeast of the landing site area (R.M. Towill 2007).

FIRE

The Napili Fire and Ambulance Station is located near the landing site area, as well as the Honokowai, Kapalua, and Napili districts.

MEDICAL

No licensed hospital is in the proximity of the Maui-Kapalua landing site area. Only urgent care clinics such as Maui Medical Group Lahaina Office and Minit-Medical Urgent Care Clinic are located nearby.

Refer to Figure 3.11-2 for locations of police, fire, and medical services available in the Maui-Kapalua landing site area.

ELECTRICAL

The Maui-Kapalua landing site area is serviced by the Maalaea power plant operated by MECO (COMIAU 2003). Transmission lines from this power plant supply energy to the landing site area and surrounding area.

POTABLE WATER

Kapalua is located in the West Maui District and its drinking water is provided by the Lahania Public Water System. The demand on this system is 5.17 mgd, while the supply is averaged at

8 mgd (County of Maui 2010). Projections indicate that the demand in 2030 will be 6.56 mgd (County of Maui 2010). The West Maui District water system is fed from both groundwater and surface water sources (County of Maui 2010).

WASTEWATER SYSTEMS

The Kapalua area is serviced by the Lahaina wastewater system, which has a capacity of 9 mgd (COMIAU 2003). Average flow in 2005 was approximately 5 mgd. Projections indicate that this system should be able to meet the demands in 2030 (COMIAU 2003). Numerous wastewater pump stations are located within the landing site area (COMIAU 2003).

TELECOMMUNICATIONS

Telephone service is widely available throughout Maui County, and all the above-listed providers serve the Maui-Kapalua landing site area (Hart 2007b).

GAS SUPPLIES

The Gas Company serves the Maui-Kapalua landing site area.

SOLID WASTE

Central Maui Landfill serves the Maui-Kapalua landing site area. Waste, depending on the sort, could be hauled from the landing site area to the Olowalu Convenience Center, but all waste is then transferred to Central Maui Landfill for permanent disposal. Central Maui Landfill accepts an average of 500 tons of waste per day (County of Maui 2010). Its existing capacity is 11.6 mcy (County of Maui 2010). The projected demand of 2030 is 12.4 mcy. Therefore, a shortage of 0.8 mcy will occur if additional space is not created (County of Maui 2010).

Maui Construction and Demolition Landfill could also serve the landing site area depending on the type of waste to be disposed (Hart 2007a).

State Waters

This section is not applicable as no infrastructure or public services are provided in state waters.

Lānaʻi

Police

Refer to specific landing site area below for information.

Fire

Refer to specific landing site area below for information.

Medical

Refer to specific landing site area below for information.

Electrical

MECO serves the island of Lānaʻi.

Potable Water

Lānaʻi Utilities oversees management of water resources on Lānaʻi. Lānaʻi Utilities operates Lānaʻi Holdings, Lānaʻi Water Company, Koele Water Reclamation Facility, and Manele Water Resources. No County water systems service Lānaʻi. Lānaʻi has a single high-level aquifer, and potable water comes from ground water wells (Lānaʻi Water Company 2012).

Six wells tap into the aquifers in the central section of Lānaʻi. In 2001, the six wells pumped 1.84 mgd. The water services Lānaʻi City, Koele, Manele Resort area, and Kaumalapau. Lānaʻi has a sustainable yield of 6.0 mgd but generally uses 4.3 mgd as a baseline (COMIAU 2003).

Wastewater Systems

One County-owned wastewater system services the existing development on the island of Lānaʻi. The wastewater is treated at the Lānaʻi Wastewater Reclamation Facility. The wastewater system includes 11 miles of gravity sewers, with mostly 8-inch-diameter sewer lines made of vitrified clay pipe (VCP) or polyvinyl chloride (PVC). A small percentage (7 percent) of the system is made up of 10- to 12-inch-diameter pipe, and 4 percent of the pipes are larger than 12 inches. The Lānaʻi Wastewater Reclamation Facility has a design capacity of 0.5 mgd, and 0.325 mgd is currently used (COMIAU 2003).

Telecommunications

Telephone services are available on Lānaʻi through Hawaiian Telcom.

Gas Supplies

The Gas Company serves the island of Lānaʻi.

Solid Waste

Lānaʻi Landfill serves the island of Lānaʻi and is located 4 miles west of Lānaʻi City. Lānaʻi Landfill accepts commercial and residential waste. The landfill has a disposal capacity of 178,000 cubic yards. (GBB 2009). Annually, the landfill has a capacity usage of 13,400 cubic yards, and disposes of 5,127 tons of waste. Per operating day (Tuesday through Saturday), 19.7 tons of waste is disposed at the landfill. Lānaʻi Landfill has 178,000 cubic yards of remaining capacity and is projected to reach capacity in 2020 (GBB 2009).

Terrestrial

POLICE

There is a single police station in Lānaʻi City operated by the Maui County Department of Police.

FIRE

The fire and rescue operation on Lānaʻi is provided by the Maui County Department of Fire and Public Safety. There is a fire station located in Lānaʻi City.

MEDICAL

Lānaʻi Community Hospital, owned and operated by State of Hawaiʻi, Hawaiʻi Health Systems Corporation, is located in Lānaʻi City. The hospital is one of the five primary licensed hospitals in Maui County. Services provided include long-term care, outpatient care, urgent care, and 24-hour emergency services.

Refer to Figure 3.11-3 for locations of police, fire, and medical services available in the Lānaʻi area.

ELECTRICAL

The Lānaʻi landing site area is serviced by the MECO. Grid maps showing specific locations of substations and underground lines within or adjacent to the landing site area are not available as HECO considers that information to be confidential.

POTABLE WATER

The landing site area is not served by the Lānaʻi Utilities water system. Based on available research, the landing site area is not served by a wastewater system or by a private entity.

WASTEWATER SYSTEMS

The Lānaʻi wastewater system does not serve the landing site area. Based on available research, the landing site area is not served by a wastewater system or by a private entity.

TELECOMMUNICATIONS

Telephone service is available throughout Maui County, and all the above-listed providers serve the Lānaʻi landing site area (Hart 2007b).

GAS SUPPLIES

The Gas Company does not serve the Lānaʻi landing site area. Based on available research, the area of analysis is not served by a private gas entity.

SOLID WASTE

Lānaʻi Landfill serves the landing site area.

State Waters

This section is not applicable as no infrastructure or public services are provided in state waters.

Molokaʻi

Police

Refer to specific landing site area below for information.

Fire

Refer to specific landing site area below for information.

Medical

Refer to specific landing site area below for information.

Electrical

MECO serves the island of Molokaʻi.

Potable Water

Potable water is supplied by the Moloka'i Public Water System, under the Department of Water Supply. Moloka'i water district subareas include Kawela-Kaunakakai, Ualapue, Kalae, and Halawa on the east side of the island. The Hawaiian Homestead lands have their water supply from the Department of Hawaiian Home Lands system, and the Moloka'i Irrigation System and the Department of Agriculture serve agricultural lands. Areas that have independent water systems include Kaluakoi, Moloka'i Ranch, and Alpha, Inc. (west Moloka'i) (COMIAU 2003).

The majority of water comes from wells from the basal reservoirs. Aquifer systems on Moloka'i generally have a low amount of potable water yield. The island's total sustainable yield is 81 mgd (COMIAU 2003).

The Department of Water Supply demand was 0.93 mgd in 2001. This number is projected to increase to 1.53 mgd by 2020 (COMIAU 2003).

Wastewater Systems

The County of Maui provides wastewater service on Moloka'i to Kaunakakai town and the Kualapuu subdivision (COMIAU 2003).

Telecommunications

Telephone, wireless telephone, and internet services are available on Moloka'i through Hawaiian Telcom. See "Maui County-O'ahu Routing Specific" for information regarding Maui County services and providers.

Gas Supplies

The Gas Company serves the island.

Solid Waste

The County-operated Moloka'i Landfill (also called Naiwa Landfill) serves the island of Moloka'i. It accepts municipal solid waste and recycling wastes from commercial and residential customers. The landfill accepts 17.6 tons of trash per day (GBB 2009). Annually, 6,570 tons of trash is disposed of at the landfill (GBB 2009). Moloka'i Landfill has a design capacity of 387,000 cubic yards; 166,400 cubic yards of capacity currently remains (GBB 2009). The landfill is projected to be filled to capacity in 2015 (GBB 2009).

Moloka'i-Kaluakoi (West Moloka'i)

Terrestrial

POLICE

The one police station on Moloka'i is operated by the County of Maui and is located in Kaunakakai.

FIRE

Two fire stations are located on Moloka'i near the identified landing site areas. Hoolehua Fire Station (north) and Kaunakakai Fire Station (north) are located on the central spine of Moloka'i approximately 15 miles away from the landing site area. According to the Public Facilities Assessment Update, Moloka'i's linear shape makes response from a central location challenging.

MEDICAL

Moloka'i General Hospital is located in Kaunakakai, and is owned and operated by The Queen's Health Systems. It is one of the five primary licensed hospitals in Maui County. Services focus on long-term care and acute care, and 24-hour emergency services are provided.

An emergency shelter is located in Maunaloa Village near the Moloka'i-Kaluakoi landing site area. It can provide first aid and temporary acute care.

Refer to Figure 3.11-4 for locations of police, fire, and medical services available in the Moloka'i-Kaluakoi landing site area.

ELECTRICAL

The Moloka'i-Kaluakoi landing site area is serviced by MECO.

POTABLE WATER

The Moloka'i-Kaluakoi landing site area is serviced by independent water entities and not DWS.

WASTEWATER SYSTEMS

The Moloka'i-Kaluakoi landing site area is not serviced by the County wastewater system. According to available resources, the area is serviced by independent wastewater entities.

TELECOMMUNICATIONS

Telephone service is available throughout the landing site area (Hart 2007b).

GAS SUPPLIES

The landing site area is not serviced by The Gas Company. It is unknown if the area is serviced by an independent gas company.

SOLID WASTE

Moloka'i Landfill serves the landing site area.

State Waters

This section is not applicable as no infrastructure or public services are provided in state waters.

Moloka'i-Kaunakakai (South Moloka'i)

Terrestrial

POLICE

A single police station under the operation of Maui County Department of Police is located in Kaunakakai. It is the only police station on Moloka'i.

FIRE

Kaunakakai Fire Station is located in Kaunakakai approximately 5 miles from the landing site area.

MEDICAL

Moloka'i General Hospital in Kaunakakai provides the only emergency room and urgent care clinic on Moloka'i. Moloka'i General Hospital is owned and operated by The Queen's Health Systems.

Refer to Figure 3.11-5 for locations of police, fire, and medical services available in the Moloka'i-Kaunakakai area.

ELECTRICAL

The Moloka'i-Kaunakakai landing site area is serviced by MECO. Grid maps showing specific locations of substations and underground lines within or adjacent to the area are not available.

POTABLE WATER

The Moloka'i-Kaunakakai landing site area is serviced by the Department of Water Supply potable water system.

WASTEWATER SYSTEMS

The Moloka'i-Kaunakakai landing site area is serviced by the Kaunakakai Wastewater System. This is a secondary treatment facility and wastewater from this system is treated and then reused as recycled irrigation water. Any additional sewage is disposed of through the use of injection wells. The Kaunakakai Wastewater Reclamation Facility is located adjacent to the area near Kaunakakai Harbor. It has a design capacity of 0.3 mgd and uses 0.289 mgd (COMIAU 2003). Most lines in this system (85 percent) are 8-inch-diameter VCP or PVC; 6 percent of the lines are 6 inches in diameter, and 9 percent are 8 inches in diameter (COMIAU 2003).

TELECOMMUNICATIONS

Telephone service is available throughout Maui County, and all the above-listed providers serve the Moloka'i-Kaunakakai landing site area (Hart 2007b).

GAS SUPPLIES

The Gas Company serves the Moloka'i-Kaunakakai area of analysis.

SOLID WASTE

Moloka'i Landfill serves the Moloka'i-Kaunakakai landing site area.

State Waters

This section is not applicable as no infrastructure or public services are provided in state waters.

O'ahu

Police

The Honolulu Police Department is operated by the City and County of Honolulu.

Fire

The Honolulu Fire Department is assigned by the City Charter of the City and County of Honolulu to operate fire stations in different locations.

Medical

Medical services and emergency responses on O'ahu are operated and coordinated by HDOH. Emergency Medical Services is maintained and operated by the Emergency Medical Services System Branch (HDOH 2012).

Electrical

HECO serves the island of O'ahu. Electrical infrastructure across the island consists of power poles, underground transmission lines, and transformers.

Honolulu Program of Waste to Energy Recovery (H-POWER) is another source of energy on O'ahu.

H-POWER converts 2,000 tons of solid waste to electricity per day. H-POWER is responsible for producing 7 percent of O'ahu's electricity (Department of Environmental Services 2005).

Potable Water

The majority of potable water on O'ahu comes from groundwater aquifers. The island has two main aquifers, Koolau Basalt and Waianae Volcanics, and is divided into seven major groundwater areas: Kahuku, Koolau rift zone, southeastern O'ahu, southern O'ahu, Waianae rift zone, north-central O'ahu, and Scholfield. There are also 16 reservoirs on O'ahu. For more information on O'ahu's water resources see Section 3.16.

O'ahu's municipal water resources and distribution system is operated by the Board of Water Supply. The Board of Water Supply is a City agency with a board of directors of seven people. The Board of Water Supply serves every community on O'ahu equaling one million customers on O'ahu with 150 million gallons of water per day (Board of Water Supply 2004).

The Board of Water Supply system has 94 active potable water sources, 90 booster pump stations, 170 reservoirs, and 2,000 miles of pipeline (Board of Water Supply 2004).

Wastewater Systems

The City and County of Honolulu own and operate nine wastewater treatment plants across O'ahu: Honouliuli, Kahuku, Kailua, Laie, Paalaa Kai, Sand Island, Wahiawa, Waianae, and

Waimanalo. There are 2,100 miles of pipeline across O'ahu and 105 to 110 mgd of wastewater are collected on O'ahu (Department of Environmental Services 2011).

Telecommunications

The telecommunications system infrastructure and providers for the island of O'ahu are the same as for the island of Maui. Please see the Maui General section above for details.

Gas Supplies

The Gas Company services O'ahu.

Solid Waste

O'ahu generates 1.5 million tons of trash per year (Department of Environmental Services 2005). O'ahu has two landfills: Waimanalo Gulch Sanitary Landfill (WGSL) and Nanakuli Landfill. Nanakuli Landfill is privately owned and accepts construction and demolition waste only, while WGSL accepts municipal solid waste (Waste Management 2007).

WGSL is owned by the City and County of Honolulu and is operated by Waste Management of Hawai'i. The landfill covers 200 acres and accepts 400,000 tons of waste annually (Waste Management 2007).

H-POWER converts 2,000 tons of solid waste to electricity per day. H-Power is responsible for reducing solid waste in the island's landfills and also for producing 7 percent of O'ahu's electricity (Department of Environmental Services 2005).

O'ahu-MCBH at Kāne'ōhe Bay

Terrestrial

Infrastructure and utility information is virtually unavailable for military bases on O'ahu. As such, it is not possible to fully assess or determine the full significance of potential impacts of the cable system implementation on DoD land.

POLICE

The landing site area is located in District 4, Sector 2 of the Honolulu Police Department. One public station and two substations are located in District 4. The Kailua substation is also located within the landing site area.

At MCBH at Kāneʻohe Bay, police protection is provided by the Military Police Department. Its responsibility includes operations and administrative matters relating to the safety, security, and law enforcement for MCBH at Kāneʻohe Bay. The Military Police Department on MCBH at Kāneʻohe Bay also coordinates with local, state, federal, and military agencies, including working with the Honolulu Police Department.

FIRE

Two fire stations are located near the landing site area (Kāneʻohe Station and Kailua Station). In addition, the military maintains a fire station on-base to provide adequate response time to incidents on the base.

Outside ambulances are allowed to enter the military base, but with a military police patrol car escort.

MEDICAL

Castle Medical Center in Kailua is located outside of the landing site area. It provides urgent care and 24-hour emergency responses for the service area, which includes the landing site area.

Refer to Figure 3.11-6 for locations of police, fire, and medical services available in the Kāneʻohe/Kailua areas.

ELECTRICAL

The MCBH at Kāneʻohe Bay landing site area is serviced by HECO. No substations are located in the area.

POTABLE WATER

The landing site area is serviced by the city's municipal water system. The MCBH at Kāneʻohe Bay landing site area is located in the Koolau rift zone groundwater area.

WASTEWATER SYSTEMS

The MCBH at Kāneʻohe Bay landing site area is served by the Kailua Regional WWTP. This plant processes 11.49 mgd of wastewater (Department of Environmental Services 2011). Wastewater comes to the plant via 26 pump stations and two preliminary treatment facilities. The wastewater receives secondary treatment and UV disinfection. Mokapu Outfall, a deep and open outfall 5,083 feet offshore and 110 feet deep, is used for the Kailua Plant (Department of Environmental Services 2011).

TELECOMMUNICATIONS

Telephone service is available across O'ahu, and all the above-listed providers serve the MCBH at Kāne'ōhe Bay landing site area.

GAS SUPPLIES

The Gas Company serves the MCBH at Kāne'ōhe Bay landing site area.

SOLID WASTE

WGSL and Nanakuli Landfills serve the MCBH at Kāne'ōhe Bay landing site area depending on the types of waste to be disposed.

State Waters

This section is not applicable as no infrastructure or public services are provided in state waters.

O'ahu-Pearl Harbor

Terrestrial

Infrastructure and utility information is virtually unavailable for military bases on O'ahu. As such, it is not possible to fully assess or determine the full significance of potential impacts of cable system implementation on Pearl Harbor.

POLICE

The landing site area is served by five police stations across metropolitan Honolulu and Ewa Beach: Alapai Police Headquarters, Downtown Substation, Kalihi Station, Kapolei Station, and Pearl City Station.

Security and Law Enforcement operations throughout JBPHH are provided by the Joint Base Security Department (JB2), which is composed of Air Force and Navy civilians, contractors, and military members working together to keep the JBPHH community safe and secure (CNIC//JBPHH 2012).

The Sheriff Division under the State Department of Public Safety provides services at Honolulu International Airport. The Sheriff Division also works closely with the HDOT Harbor Division regarding harbor/waterways security and law enforcement functions.

FIRE

The Honolulu Fire Department serves the Honolulu primary urban center from 21 fire stations. Ambulance service, provided by the City's Emergency Medical Services Division, is currently delivered from each of the fire stations (Primary Urban Center Development Plan 2004).

The Federal Fire Department provides fire protection and emergency medical services to all DoD military installations on O'ahu, including JBPHH.

MEDICAL

Licensed hospitals within the landing site area include The Queen's Medical Center, Tripler Army Medical Center, Kuakini Hospital, and Kaiser Permanente Moanalua Medical Center and Clinic.

Refer to Figure 3.11-7 for locations regarding police, fire, and medical services available in and adjacent to the Pearl Harbor landing site area.

ELECTRICAL

The Pearl Harbor landing site area is serviced by HECO. The Iwilei substation is located within the area, and the Archer substation is located directly adjacent to the eastern landing site area boundary.

POTABLE WATER

The landing site area is located in in the Southern O'ahu groundwater area and served by the city's municipal water system.

WASTEWATER SYSTEMS

The landing site area is served by the Sand Island WWTP. Sand Island WWTP treats wastewater from metropolitan Honolulu, which generates 60 percent of the island's wastewater (Department of Environmental Services 2011). This plant processes 60 mgd of wastewater and has a design average flow of 82 mgd. It is designed to handle a peak of 200 mgd during wet weather flow (Department of Environmental Services 2011). It provides primary treatment and UV disinfection to wastewater that is eventually discharged through a 78-inch-diameter pipe to an ocean outfall located 1.7 miles offshore at 240 feet deep (Department of Environmental Services 2011).

TELECOMMUNICATIONS

Telephone service is available across O'ahu, and all the above-listed providers serve the Pearl Harbor landing site area.

GAS SUPPLIES

The Gas Company serves the Pearl Harbor landing site area.

SOLID WASTE

WGSL and Nanakuli Landfill both serve the Pearl Harbor landing site area depending on the types of waste to be disposed.

State Waters

This section is not applicable as no infrastructure or public services are provided in state waters.

Federal Waters

BOEM Jurisdiction

Public service and utility infrastructure do not exist in the marine setting.

NOAA Jurisdiction

Public service and utility infrastructure do not exist in the marine setting.

3.11.5 Potential Impacts of Cable System Implementation

Description of Impact Types

Police, Fire, Medical

Accidents or incidents during the construction or operational period may occur that require police, fire, or medical attention. If the uniformed police or fire police are not able to provide immediate responses, the protection needs of the community and the project may not be met. This would be a potential impact to the existing public services. Similarly, an impact would occur if a project is located so far from a service area that, while tending to the needs of the project, services cannot be made available to the residents.

Electrical

Interruption of Service

Electrical transmission, distribution lines, and transmission substations are established throughout the islands both aboveground and underground. Installation of HDD could interrupt electrical service across the islands. These short-term impacts are anticipated only during the construction phase, as service interruption issues would not be of concern during the operation phase.

Exceeds Capacity

The operation of a converter station and ancillary features could create long-term capacity increases on the electrical infrastructure and could possibly exceed capacity of the existing grid and require possible improvements or upgrades.

Service Unavailable

Electrical infrastructure could be required in areas where service (transmission lines, substations, etc.) is currently unavailable.

Potable Water

Interruption of Service

Potable water systems and distribution lines are established throughout the islands. Installation of HDD could interrupt potable water service across the islands. These short-term impacts are anticipated only during the construction phase, as service interruption issues would not be of concern during the operation phase.

Also of concern are the possible impacts that HDD installation could have on the potable water sources, specifically island aquifers. Aquifers and other groundwater sources could be compromised during HDD activities.

Exceeds Capacity

During the construction phase, increased pressure on aquifers may cause an exceedance of capacity, especially for aquifers currently at or near their sustainable yield.

Once construction is complete, operation of the converter stations and other usage could create long-term impacts such as additional pressure on aquifers due to increased usage.

Service Unavailable

Potable water infrastructure could be required in areas where service (water lines, wells, etc.) is currently unavailable or does not exist.

Wastewater Systems*Interruption of Service*

Wastewater sewer lines, pump stations, and reclamation facilities distribution lines are established across the islands. HDD installation and the construction of converter stations could interrupt service of the established wastewater system (e.g., force mains) across the islands. These short-term impacts are only anticipated during the construction phase, as service interruption issues would not be of concern during the operation phase.

Ocean outfalls are also present for various wastewater systems across the state to discharge treated wastewater. Cable laying could interrupt service of the ocean outfall pipes and thus compromise the integrity of the pipes.

Service Unavailable

Wastewater infrastructure could be required in areas where service is currently unavailable or does not exist.

Telecommunications*Interruption of Service*

Telecommunication lines are established throughout the islands both aboveground (power poles) and underground. HDD installation could interrupt telecommunication service across the islands.

These short-term impacts are anticipated only during the construction phase, as service interruption issues would not be of concern during the operation phase.

Service Unavailable

Telecommunication infrastructure could be required where service is currently unavailable or does not exist.

Gas Supplies

Interruption of Service

Gas supply lines are established throughout the islands. HDD installation could interrupt service of currently installed gas infrastructure across the islands.

Service Unavailable

Gas infrastructure could be required where service is currently unavailable.

Solid Waste

Interruption of Service

Landfills and solid waste disposal services are established on each island. HDD installation and the establishment of converter stations could interrupt service of the existing solid waste infrastructure and compromise the landfill integrity, such as causing impacts to the landfill liner. These short-term impacts are anticipated only during the construction phase, as service interruption issues would not be of concern during the operation phase.

Exceeds Capacity

The construction phase could generate large amounts of construction debris that would need to be disposed of at appropriate solid waste disposal sites. This increased usage could create long-term increased demands on the solid waste infrastructure and possibly exceed capacity of the existing facilities.

Maui County-O'ahu Routing Specific Description of Impact Types

Maui

Maui-Kahului Harbor

Terrestrial

POLICE

The Kahului Police Station is centrally located in the landing site area and can provide immediate response.

FIRE

The Kahului Fire Station and Wailuku Fire Station are located adjacent to the landing site area. These two stations are both near central Kahului and can provide immediate responses to potential fire during the construction or operational period.

MEDICAL

Maui Memorial Hospital is the only hospital located adjacent to the Maui-Kahului Harbor landing site area that provides 24-hour emergency services. Due to its location in the urban center, an area with high demands for emergency medical services, sufficient medical support may be unavailable if severe emergencies were to occur during construction period.

ELECTRICAL

Impacts would be similar to those described previously under the general Description of Impact Types.

POTABLE WATER

Impacts would be similar to those described previously under the general Description of Impact Types.

WASTEWATER SYSTEMS

Interruption of Service. Several wastewater pump stations and two wastewater reclamation facilities are located within the area of analysis; therefore, the probability for service interruption impacts is increased in this area.

TELECOMMUNICATIONS

Impacts would be similar to those described previously under the general Description of Impact Types.

GAS SUPPLIES

Impacts would be similar to those described previously under the general Description of Impact Types.

SOLID WASTE

Exceeds Capacity. The only landfill on the island of Maui that accepts construction debris is the privately owned Maui Demolition and Construction Landfill. Depending on the existing capacity,

capacity exceedance issues could result due to the volume of debris created during the construction process.

Impacts would be similar to those described under Description of Impact Types.

State Waters

This section is not applicable as no infrastructure or public services are provided in state waters.

Maui-Kapalua (West Maui)

Terrestrial

POLICE

The Lahaina Station may not be able to provide immediate support at the landing site area due to distance and remoteness of police services and operation.

FIRE

The Napili Fire Station is the only station adjacent to the landing site area. It is responsible for the Honokowai, Napili, and Kapalua districts that are primary locations of residential housing, vacation homes, and golf resorts. The landing site area is largely occupied by residential and privately owned recreational uses; the streets were not designed for high-volume traffic movement and the road width may not be adequate for fire rescue. Additionally, the Napili Fire Station may not have sufficient manpower and engines should needs arise during construction and operation. The Lahaina Fire Station in Lahaina town may provide alternate support but the distance and travel time may delay fire rescue efficiency.

MEDICAL

No licensed hospital is in proximity of the landing site area. There are only urgent care clinics in the area that are not capable of dealing with the high pressure of emergencies. Additionally, no 24-hour emergency service is provided. The nearest emergency service is located in Kahului and is provided by Maui Memorial Medical Center. The lack of medical facilities in the landing site area may be an impact during the construction period.

ELECTRICAL

Impacts would be similar to those described previously under the general Description of Impact Types.

POTABLE WATER

Impacts would be similar to those described previously under the general Description of Impact Types.

WASTEWATER SYSTEMS

Impacts would be similar to those described previously under the general Description of Impact Types.

TELECOMMUNICATIONS

Impacts would be similar to those described previously under the general Description of Impact Types.

GAS SUPPLIES

Impacts would be similar to those described previously under the general Description of Impact Types.

SOLID WASTE

Impacts would be similar to those described under Maui-Kahului.

State Waters

This section is not applicable as no infrastructure or public services are provided in state waters.

Lānaʻi

Terrestrial

Police

There is only one police station in the center of Lānaʻi City, which is located far from the Lānaʻi landing site area. The landing site area is remotely located and the distance (approximately 10 miles) from the existing police station in Lānaʻi City is likely to result in delayed response.

Fire

During construction and operation, current capability of fire rescue on Lānaʻi may not be able to meet response needs due to the remoteness of the landing site area from Lānaʻi City (approximately 10 miles).

Medical

The only hospital in Lānaʻi City may not have the staff or facility capacity to respond to medical emergencies. Medical needs would need to be transferred to Maui or Oʻahu.

Electrical

Impacts would be similar to those described previously under the general Description of Impact Types.

SERVICE UNAVAILABLE

As grid maps are unavailable from HECO, it is unknown if the landing site area has established electrical infrastructure. However, the area is located in a remote portion of the island away from the center of the existing infrastructure and populated area. It is assumed that electricity service is unavailable in the area and would need to be established before construction and operation could begin.

Potable Water

Impacts would be similar to those described previously under the general Description of Impact Types.

SERVICE UNAVAILABLE

The potable water system on Lānaʻi is managed by the privately owned Lānaʻi Utilities that serves the existing development. Potable water service is currently unavailable in the landing site area and would need to be established before construction and operation could begin.

Wastewater Systems

Impacts would be similar to those described previously under the general Description of Impact Types.

SERVICE UNAVAILABLE

The County-owned wastewater system on Lānaʻi serves the existing development. Wastewater service is unavailable in the landing site area and would need to be established before construction and operation could begin.

Telecommunications

Impacts would be similar to those described previously under the general Description of Impact Types.

SERVICE UNAVAILABLE

Due to the remote location of the landing site area, additional telecommunication infrastructure may be necessary for the area to be fully connected via various telecommunication requirements.

Gas Supplies

Impacts would be similar to those described previously under the general Description of Impact Types.

SERVICE UNAVAILABLE

Gas service is unavailable in the landing site area and would need to be established before construction and operation could begin.

Solid Waste

Impacts would be similar to those described previously under the general Description of Impact Types.

State Waters

This section is not applicable as no infrastructure or public services are provided in state waters.

Moloka'i

Moloka'i-Kaluakoi (West Moloka'i)

Terrestrial

POLICE

Due to the remoteness of the landing site area (approximately 16 miles), police needs may not be met in a timely manner.

FIRE

There is no fire station in or adjacent to the Moloka'i-Kaluakoi landing site area. Therefore, no immediate emergency responses are provided in the west end. Due to the remoteness of the landing site area (approximately 16 miles), fire control needs may not be met in a timely manner.

MEDICAL

Moloka'i General Hospital is located in Kaunakakai, at a great distance from the landing site area. Additionally, Moloka'i General Hospital is primarily a long-term care hospital that may not be able to provide sufficient 24-hour emergency services. The remoteness of the landing site area and insufficient medical facilities may result in not meeting medical needs.

ELECTRICAL

Impacts would be similar to those described previously under the general Description of Impact Types.

POTABLE WATER

Impacts would be similar to those described previously under the general Description of Impact Types.

WASTEWATER SYSTEMS

Impacts would be similar to those described previously under the general Description of Impact Types.

Service Unavailable. The County-owned wastewater system does not serve the Moloka'i-Kaluakoi landing site area. Wastewater service is unavailable in the landing site area and would need to be established before construction and operation could begin.

TELECOMMUNICATIONS

Impacts would be similar to those described previously under the general Description of Impact Types.

GAS SUPPLIES

Impacts would be similar to those described previously under the general Description of Impact Types.

Service Unavailable. Gas supply service is unavailable in the landing site area and would need to be established before construction and operation could begin.

SOLID WASTE

Impacts would be similar to those described previously under the general Description of Impact Types.

State Waters

This section is not applicable as no infrastructure or public services are provided in state waters.

Moloka'i-Kaunakakai (South Moloka'i)

Terrestrial

POLICE

The Kaunakakai Police Station is located near distance the landing site area. Response may be slightly delayed due to the condition of some roads in the landing site area.

FIRE

Kaunakakai Fire Station is located adjacent to the landing site area and can provide immediate responses to fire response services. Current roads to the landing site area may not be adequate to support emergency fire trucks as some existing access roads are unpaved (see Section 3.4.4 in Land Transportation). Additionally, several areas in the landing site area are not accessible by vehicles. This may result in a delay of the fire rescue progress.

MEDICAL

In addition to the impact scenario discussed under Moloka'i-Kaluakoi, the current roadway condition may delay the emergency response time.

ELECTRICAL

Impacts would be similar to those described previously under the general Description of Impact Types.

POTABLE WATER

Impacts would be similar to those described previously under the general Description of Impact Types.

WASTEWATER SYSTEMS

Interruption of Service. The Kaunakakai Wastewater Reclamation Facility is located within the landing site area. As wastewater infrastructure systems are in this area, the probability for service interruption impacts is increased.

TELECOMMUNICATIONS

Impacts would be similar to those described previously under the general Description of Impact Types.

GAS SUPPLIES

Impacts would be similar to those described previously under the general Description of Impact Types.

SOLID WASTE

Impacts would be similar to those described previously under the general Description of Impact Types.

State Waters

This section is not applicable as no infrastructure or public services are provided in state waters.

O'ahu

Police

Impacts would be similar to those described previously under the general Description of Impact Types.

Fire

Impacts would be similar to those described previously under the general Description of Impact Types.

Medical

Impacts would be similar to those described previously under the general Description of Impact Types.

Electrical

Impacts would be similar to those described previously under the general Description of Impact Types.

Potable Water

Impacts would be similar to those described previously under the general Description of Impact Types.

Wastewater Systems

Impacts would be similar to those described previously under the general Description of Impact Types.

Telecommunications

Impacts would be similar to those described previously under the general Description of Impact Types.

Gas Supplies

Impacts would be similar to those described previously under the general Description of Impact Types.

Solid Waste

In addition to landfills, O'ahu also employs H-POWER to discard solid waste. A reduced capacity impact to O'ahu landfill solid waste facilities could occur as additional types of solid waste facilities would be available to handle debris in addition to landfills.

O'ahu-MCBH at Kāne'ōhe Bay

Terrestrial

POLICE

Three police substations are located in District 4, which includes the Kāne'ōhe, Kailua, and Kahuku stations. The Kailua police substation is located in the MCBH at Kāne'ōhe Bay landing site area. The Kailua substation currently provides adequate staffing and facilities for police services within the Kailua town. The Kāne'ōhe substation, which is located adjacent to the MCBH at Kāne'ōhe Bay landing site area, also provides sufficient support to the police operations in the area. The landing site area is adequately staffed with police support through the Honolulu Police Department and MCBH at Kāne'ōhe Bay military police.

FIRE

Kailua Fire Station is located in the MCBH at Kāne'ōhe Bay landing site area. It provides adequate response time throughout the region. MCBH at Kāne'ōhe Bay also retains a fire station on-base that provides sufficient staffing and facilities for fire/ambulance operations. In addition to Kailua Fire Station and the military fire station in the landing site area, the Honolulu Fire Department also operates fire stations adjacent to the landing site area in Kāne'ōhe and Waimanalo. The landing site area staffing is believed to be sufficient to meet potential future project-specific increases in demand without compromising service capacity.

MEDICAL

Although Castle Medical Center is located in the landing site area, it provides primarily local emergency responses. The hospital may not be able to handle large numbers of severe urgent care requests. Patients may need to be transferred to hospitals located in Honolulu urban centers. Impacts may result due to the travel time to a major hospital in Honolulu.

ELECTRICAL

Impacts would be similar to those described previously under the general Description of Impact Types.

POTABLE WATER

Impacts would be similar to those described previously under the general Description of Impact Types.

WASTEWATER SYSTEMS

Impacts would be similar to those described previously under the general Description of Impact Types.

Interruption of Service. The Mokapu Outfall is located 5,083 feet offshore of Kailua at 110 feet deep. Cable laying could interrupt service of the established ocean outfall pipes, thus compromising the system.

TELECOMMUNICATIONS

Impacts would be similar to those described previously under the general Description of Impact Types.

GAS SUPPLIES

Impacts would be similar to those described previously under the general Description of Impact Types.

SOLID WASTE

Impacts would be similar to those described previously under the general Description of Impact Types.

State Waters

This section is not applicable as no infrastructure or public services are provided in state waters.

O'ahu-Pearl Harbor

Terrestrial

POLICE

Adequate staffing and facilities are provided in and adjacent to the Pearl Harbor landing site area. In addition, military police services are also available to support on-base police protection for the portion of the base in the landing site area.

FIRE

The Honolulu Fire Department provides adequate staffing and facilities for fire protection services adjacent to the landing site area. Fire stations are distributed in downtown Honolulu, Kalihi, Moanalua, Honolulu International Airport, Aiea, Pearl City, and Mokulele, where are all within immediate response distance.

The Federal Fire Department provides fire protection and emergency services to JBPHH.

MEDICAL

Hospitals located in proximity of the landing site area include The Queen's Medical Center, Kuakini Hospital, Tripler Army Medical Center, Kaiser Permanente Moanalua Medical Center. These hospitals provide 24-hour emergency services and facilities to support severe incidents should needs arise.

ELECTRICAL

Impacts would be similar to those described previously under the general Description of Impact Types.

POTABLE WATER

Impacts would be similar to those described previously under the general Description of Impact Types.

WASTEWATER SYSTEMS

Impacts would be similar to those described previously under the general Description of Impact Types.

Interruption of Service. An ocean outfall is located 1.7 miles offshore of Sand Island at 240 feet deep. Cable laying could interrupt service of the established ocean outfall pipes, thus compromising the system.

TELECOMMUNICATIONS

Impacts would be similar to those described previously under the general Description of Impact Types.

GAS SUPPLIES

Impacts would be similar to those described previously under the general Description of Impact Types.

SOLID WASTE

Impacts would be similar to those described previously under the general Description of Impact Types.

State Waters

This section is not applicable as no infrastructure or public services are provided in state waters.

Federal Waters

BOEM Jurisdiction

Public services and utility infrastructure do not exist in the marine setting.

NOAA Jurisdiction

Public services and utility infrastructure do not exist in the marine setting.

3.11.6 General Siting Criteria and Special Conservation and Construction Measures

General Level Special Conservation and Construction Measures

Siting Criteria – Public Services

Public safety facilities and services (police, fire, hospital) are essential elements of supporting emergency events during the construction and operation period. Inadequate facilities in the vicinity of a landing site area may cause delayed response and severe incidents, and result in environmental and economic impacts in and surrounding the site. To that extent, siting criteria are suggested as follows.

- The selection of the site should be near the existing public safety facilities (police, fire, hospital).
- If public safety facilities are inadequate or unavailable, recommend increasing the number of relevant facilities.

Siting Criteria - Infrastructure

- Locate landing site areas and converter stations a safe and reasonable distance from all existing utility infrastructure to avoid encroachment.
- Site utilities where existing utility infrastructure currently exists and can be utilized. If this is not possible or desirable, recommend that necessary infrastructure be established.

Conservation and Construction Measures – Public Services

Public Facilities Assessment Update (R.M. Towill 2007) describes public facilities and services as below:

- **Police:** The effectiveness of police operation is based on the number of police officers provided, the area being covered, and the resources available to the adjacent police department from a landing site area.
- **Fire Control:** An adequate fire protection service, within proximity to all populated areas, is necessary to protect life and property.
- **Hospitals:** One of the most critical public health facilities is the hospital.

Based on above statements, the following CCMs are suggested:

- PS-1 During construction and operation, the consultant/contractor should coordinate with the government agencies including city, county, state, and federal in regard to safety and emergency supports.
- PS-2 Conduct a public facilities assessment prior to the beginning of the construction. Identify facilities and services adequacy regarding police, fire control, hospital, and emergency medical response.
- PS-3 Increase the quantity and the quality of the public services if necessary. No construction should be operated prior to the confirmation of adequate staffing and facilities.
- If adequate facilities are determined not to be available, the contractor should provide his own services for the duration of construction.
- PS-4 Ensure the availability of hospitals and emergency medical services within vicinity of the landing site area. Evaluate adequate supplies and capability of handling severe emergencies, and associated support within reasonable hours.
- If adequate facilities are determined not to be available, the contractor should provide his own services for the duration of construction.

- PS-5 Coordinate with local police department regarding traffic management and necessary escort of the equipment delivery vehicles during construction and operation. Refer to Section 3.4.6 for the description of a TMP.

Conservation and Construction Measures – Infrastructure

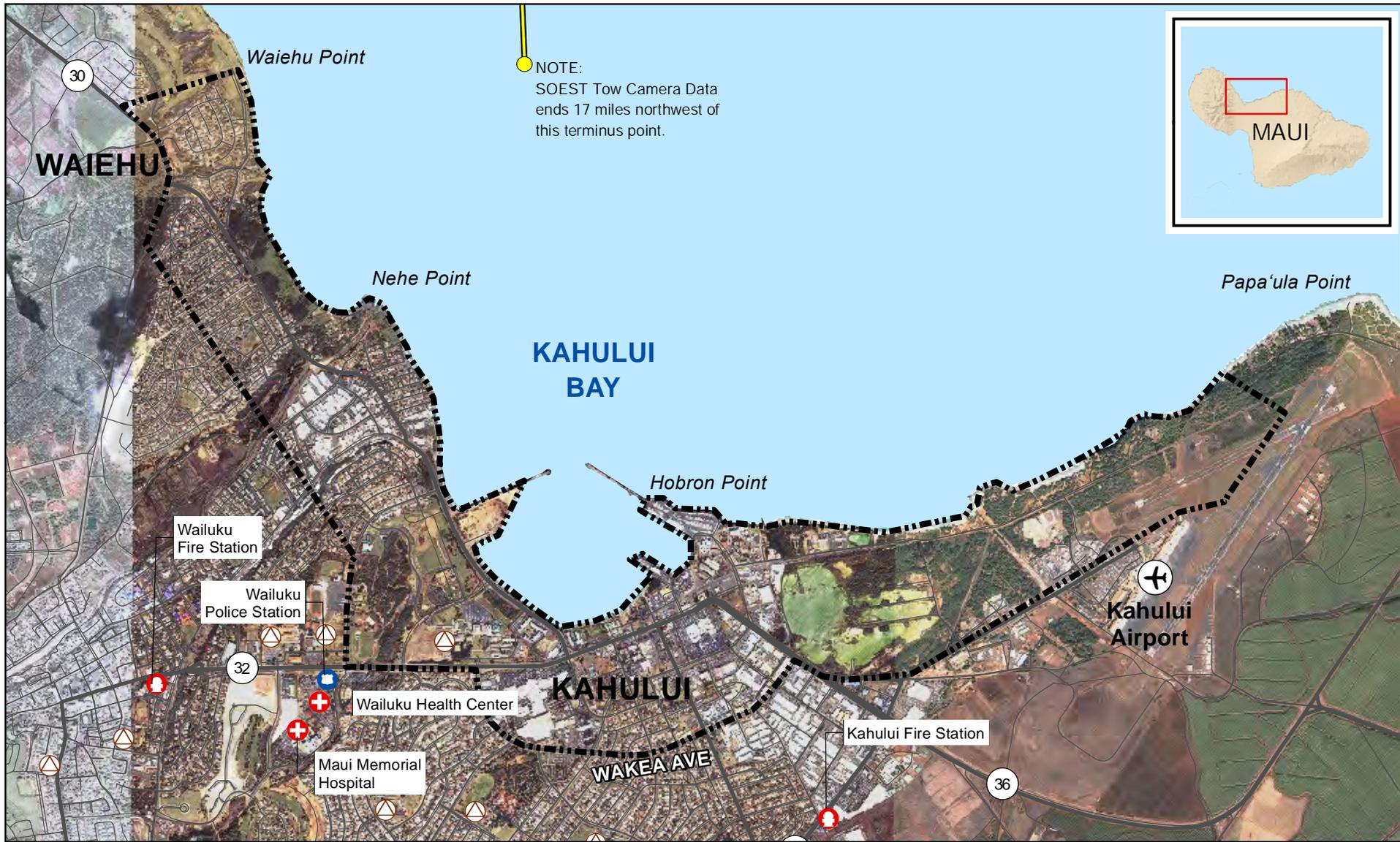
- PS-6 Consult and coordinate with city, county, state, and private utility entities to minimize and avoid conflicts with existing utility infrastructure. Acquire necessary easements for construction near existing utilities. Survey the area of analysis before construction and identify and mark all underground utilities. Map all aboveground and underground utilities to ensure proper avoidance of existing utilities during construction. Call Hawai'i One Call Center prior to starting construction.
- PS-7 Implementation of an undersea power cable system should comply with Hawai'i State Plans HRS Chapter 226-14 Objectives and policies for facility systems—in general. (a) Planning for the State's facility systems in general shall be directed towards achievement of the objective of water, transportation, waste disposal, and energy and telecommunication systems that support statewide social, economic, and physical objectives. (b) To achieve the general facility systems objective, it shall be the policy of this State to: (1) Accommodate the needs of Hawai'i's people through coordination of facility system and capital improvement priorities in consonance with state and county plans. (2) Encourage flexibility in the design and development of facility systems to promote prudent use of resources and accommodate changing public demands and priorities. (3) Ensure that required facility system can be supported within resource capacities and at reasonable cost to the user. (4) Pursue alternative methods of financing programs and projects and cost-saving techniques in the planning, construction, and maintenance of facility systems.
- PS-8 Implementation of an undersea power cable system should comply with Hawai'i State Plans HRS Chapter 226-15 Objectives and policies for facility systems—solid and liquid wastes. (a) Planning for the State's facility systems with regard to solid and liquid wastes shall be directed towards the achievement of the following objectives: (1) Maintenance of basic public health and sanitation standards relating to treatment and disposal of solid and liquid wastes. (2) Provision of adequate sewerage facilities for physical and economic activities that alleviate problem in housing, employment, mobility, and other areas. (b) To achieve solid and liquid waste objectives, it shall be the policy of this State to: (1) Encourage the adequate development of sewerage facilities that complement: planned growth. (2) Promote re-use and recycling to reduce solid and liquid wastes and employ a conservation ethic. (3) Promote research to development efficient and economical treatment and disposal of solid and liquid wastes.

- PS-9 Implementation of an undersea power cable system should comply with Hawai'i State Plans HRS Chapter 226-18.5 Objectives and policies for facility systems—telecommunications. (a) Planning for the State's telecommunications facility systems shall be directed towards the achievement of dependable, efficient, and economical statewide telecommunications systems capable of supporting the needs of the people. (b) To achieve the telecommunications objective, it shall be the policy of this State to ensure the provision of adequate, reasonably priced, and dependable telecommunications services to accommodate demand. (c) To further achieve the telecommunications objective, it shall be the policy of this State to: (1) Facilitate research and development of telecommunications systems and resources; (2) Encourage public and private sector efforts to develop means for adequate, ongoing telecommunications planning; (3) promote efficient management and use of existing telecommunications systems and services; and (4) Facilitate the development of education and training of telecommunications personnel.
- PS-10 Implementation of an undersea power cable system should comply with Hawai'i State Plans HRS Chapter 226-16 Objective and policies for facility systems—water. (a) Planning for the State's facility systems with regard to water shall be directed towards achievement of the objective of the provision of water to adequately accommodate domestic, agricultural, commercial, industrial, recreational, and other needs within resource capacities. (b) To achieve the facility systems water objective, it shall be the policy of this State to: (1) Coordinate development of land use activities with existing and potential water supply. (2) Support research and development of alternative methods to meet future water requirements well in advance of anticipated needs. (3) Reclaim and encourage the productive use of runoff water and wastewater discharges. (4) Assist in improving the quality, efficiency, service, and storage capabilities of water system; for domestic and agriculture use. (5) Support water supply services to areas experiencing critical water problem. (6) Support water conservation programs and practices in government, private industry, and the general public to help ensure adequate water to meet long-term needs.
- PS-11 Implementation of an undersea power cable system should comply with Hawai'i State Plans HRS Chapter 226-18 Objective and policies for facility systems—energy. (a) Planning for the State's facility systems with regard to energy shall be directed toward the achievement of the following objectives, giving due consideration to all: (1) Dependable, efficient, and economical statewide energy systems capable of supporting the needs of the people; (2) Increased energy self-sufficiency where the ratio of indigenous to imported energy use is increased; (3) Greater energy security and diversification in the face of threats to Hawai'i's energy supplies and systems; and (4) Reduction, avoidance, or sequestration of greenhouse gas emissions from energy supply and use. (b) To achieve the energy objectives, it shall be the policy of this State to ensure the short- and long-term provision of adequate, reasonably

priced, and dependable energy services to accommodate demand. (c) To further achieve the energy objectives, it shall be the policy of this State to: (1) Support research and development as well as promote the use of renewable energy sources; (2) Ensure that the combination of energy supplies and energy-saving systems is sufficient to support the demands of growth; (3) Base decisions of least-cost supply-side and demand-side energy resource options on a comparison of their total costs and benefits when a least-cost is determined by a reasonably comprehensive, quantitative, and qualitative accounting of their long-term, direct and indirect economic, environmental, social, cultural, and public health costs and benefits; (4) Promote all cost-effective conservation of power and fuel supplies through measures, including: (A) Development of cost-effective demand-side management programs; (B) Education; and (C) Adoption of energy-efficient practices and technologies; (5) Ensure, to the extent that new supply-side resources are needed, that the development or expansion of energy systems uses the least-cost energy supply option and maximizes efficient technologies; (6) Support research, development, demonstration, and use of energy efficiency, load management, and other demand-side management programs, practices, and technologies; (7) Promote alternate fuels and transportation energy efficiency; (8) Support actions that reduce, avoid, or sequester greenhouse gases in utility, transportation, and industrial sector applications; (9) Support actions that reduce, avoid, or sequester Hawai'i's greenhouse gas emissions through agriculture and forestry initiatives; and (10) Provide priority handling and processing for all state and county permits required for renewable energy projects.

Maui County-O'ahu Routing Specific Special Conservation and Construction Measures

In all routing cases and locations, for both terrestrial areas and in coastal and marine waters, the general measures described above should be implemented. In remote locations where services are not available or provision of services would be prohibitive for public entities, the contractor should provide services for the duration of the construction period, and the facility owner should provide services after operation commences.



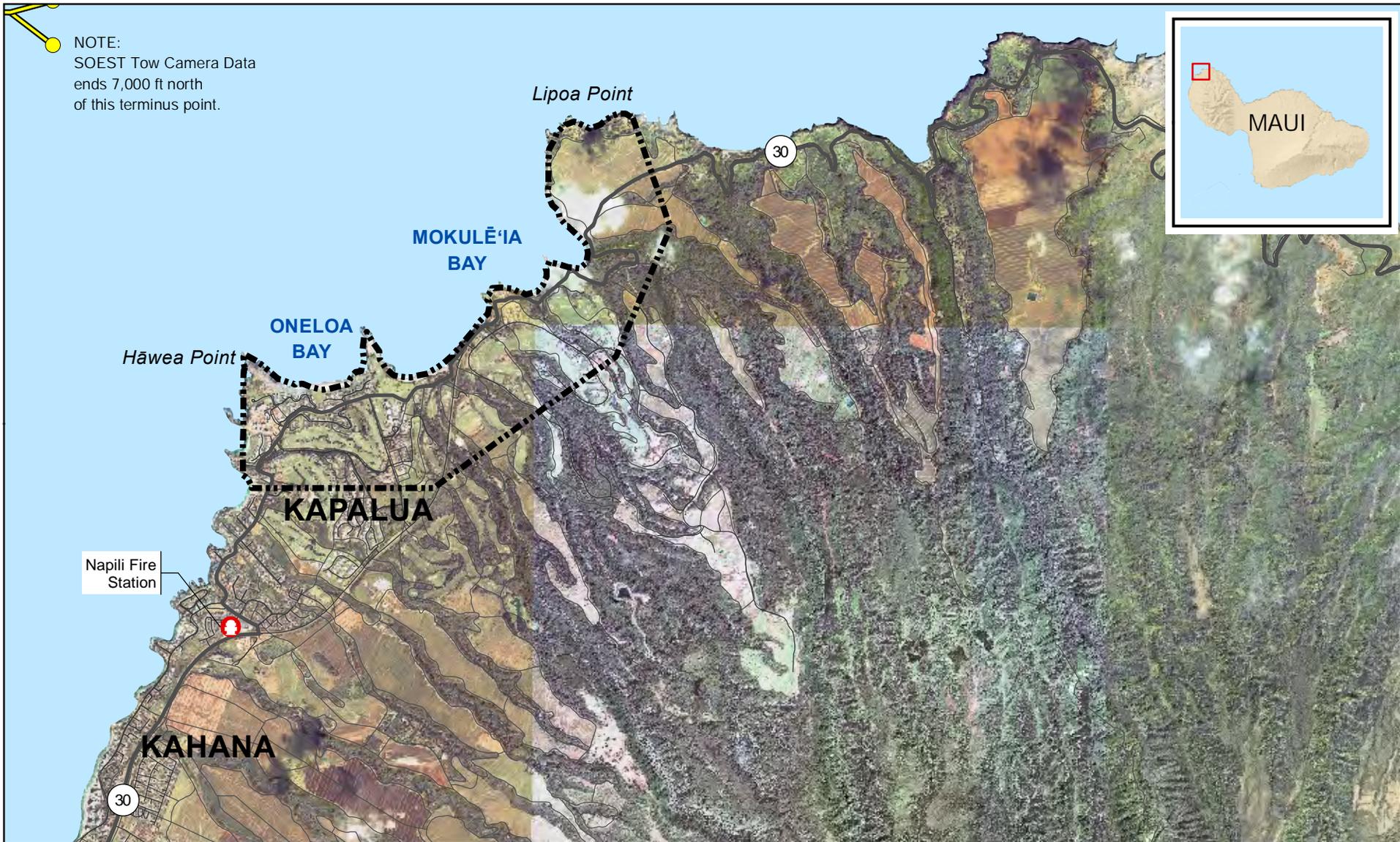
Kahului Maui Landing Site Area: Public Emergency Services

- | | | |
|------------------------------|-----------------------------|------------|
| Route with camera data * | Emergency Shelter Locations | Open Water |
| Route without camera data ** | Police Station | |
| Highways & Major Roads | Fire Station | |
| Other Roads | Hospitals and Clinics | |
| SOEST Cable Routes | | |
| HIREP Study Analysis Area | | |

* 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.



Figure 3.11-1



NOTE:
SOEST Tow Camera Data
ends 7,000 ft north
of this terminus point.

West Maui Landing Site Area: Public Emergency Services ***

- + Route with camera data *
- Route without camera data **
- Highways & Major Roads
- Other Roads
- SOEST Cable Routes
- HIREP Study Analysis Area
- Fire Stations
- Open Water



0 2,500
Feet

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

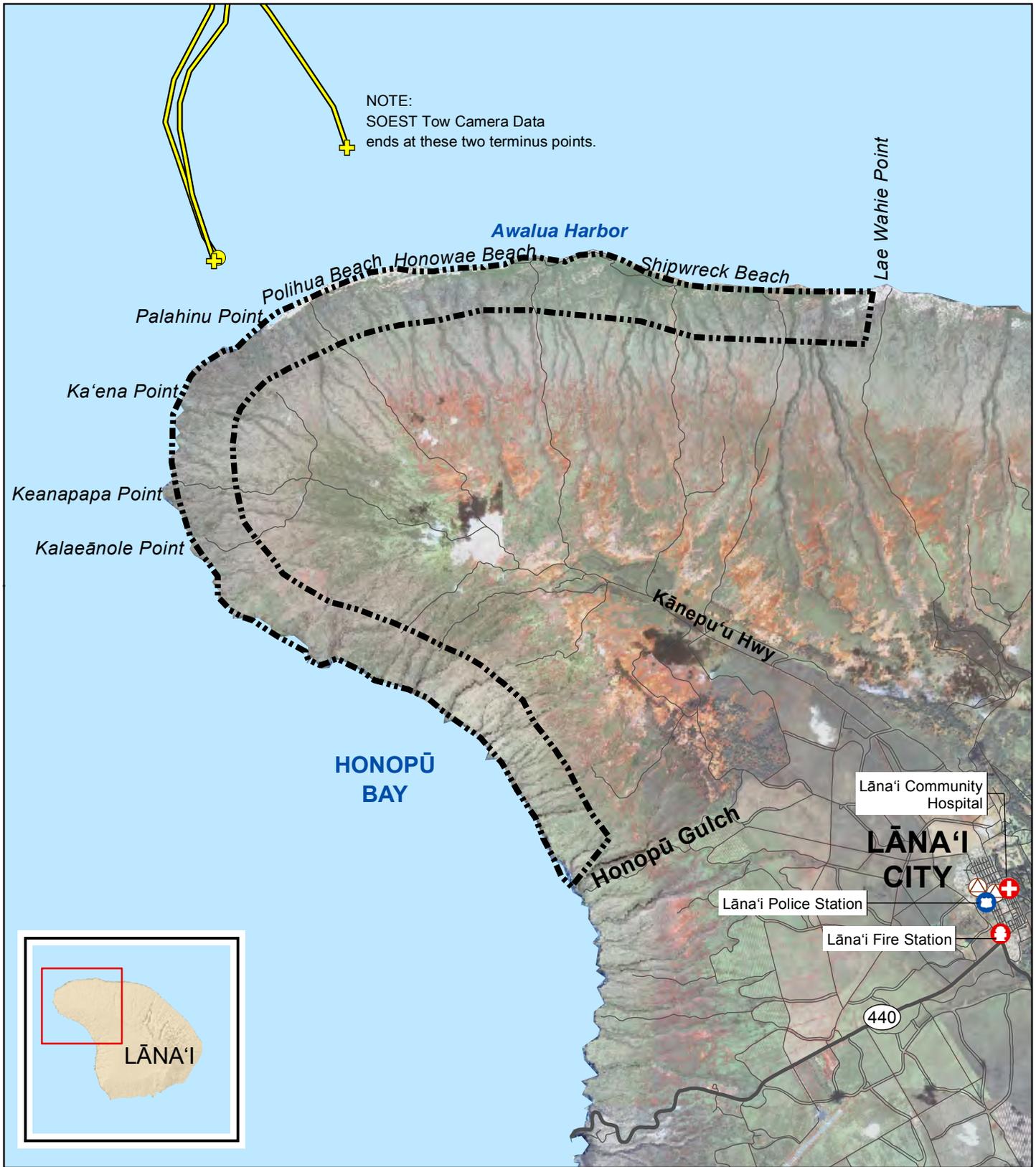
** Symbol denotes shoreward approach of cable route without tow camera data.

*** There are no identified police stations or hospitals located in this part of Maui.

Date: 4/26/2012

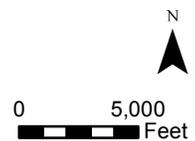
Data Sources: HI-DBEDT, USGS, UH-SOEST, AECOM, 2012

Figure 3.11-2



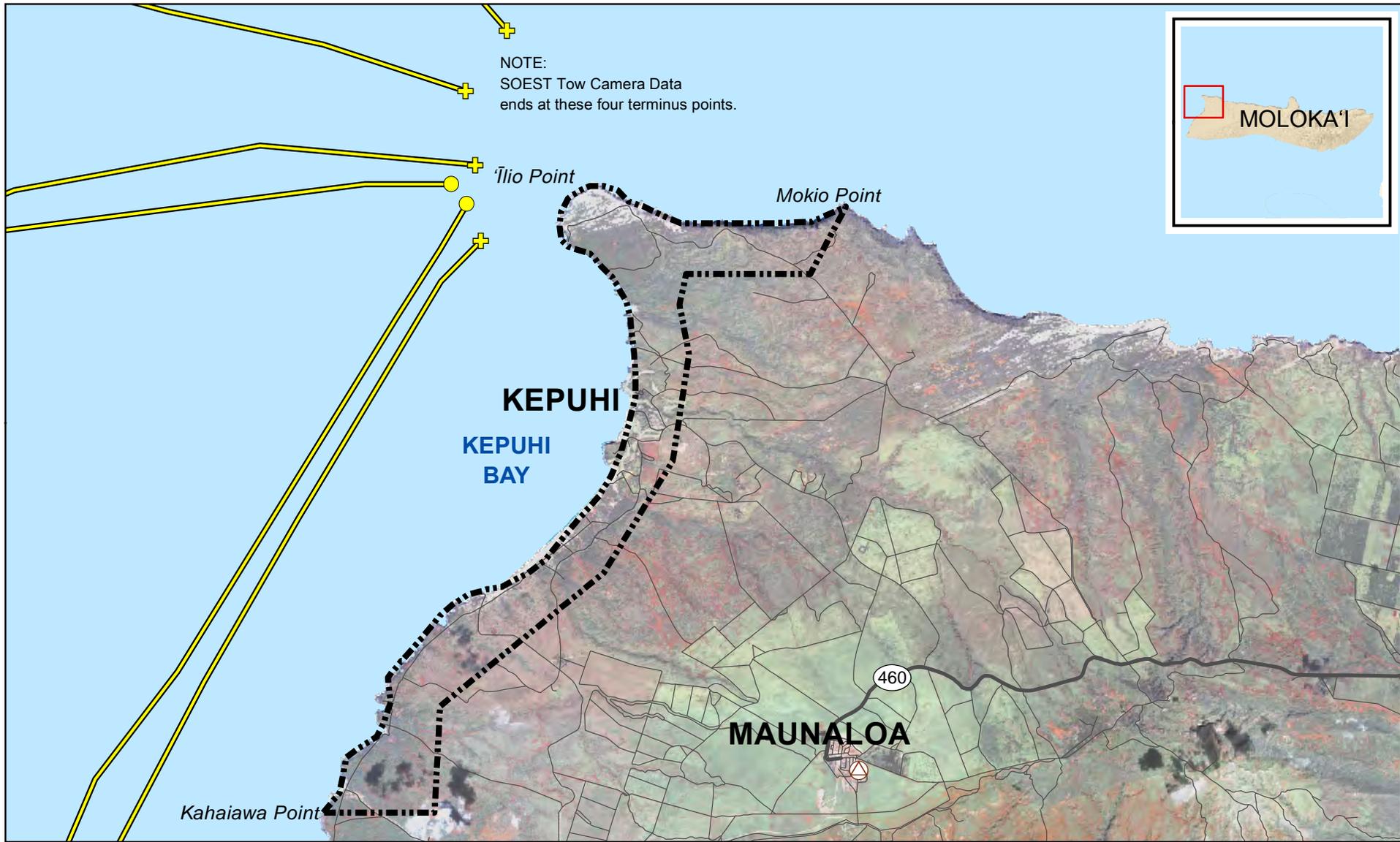
Lānaʻi Landing Site Area: Public Emergency Services

-



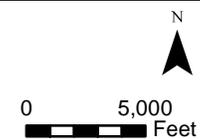
* Symbol denotes shoreward extent of tow camera data for cable route (unless otherwise noted).
 ** Symbol denotes shoreward approach of cable route without tow camera data.
 Date: 4/26/2012
 Data Sources: HI-DBEDT, USGS, UH-SOEST, AECOM, 2012

Figure 3.11-3



West Moloka'i Landing Site Area: Public Emergency Services ***

- + Route with camera data *
- Route without camera data **
- Highways & Major Roads
- Other Roads
- HIREP Study Analysis Area
- Emergency Shelter Locations
- Open Water

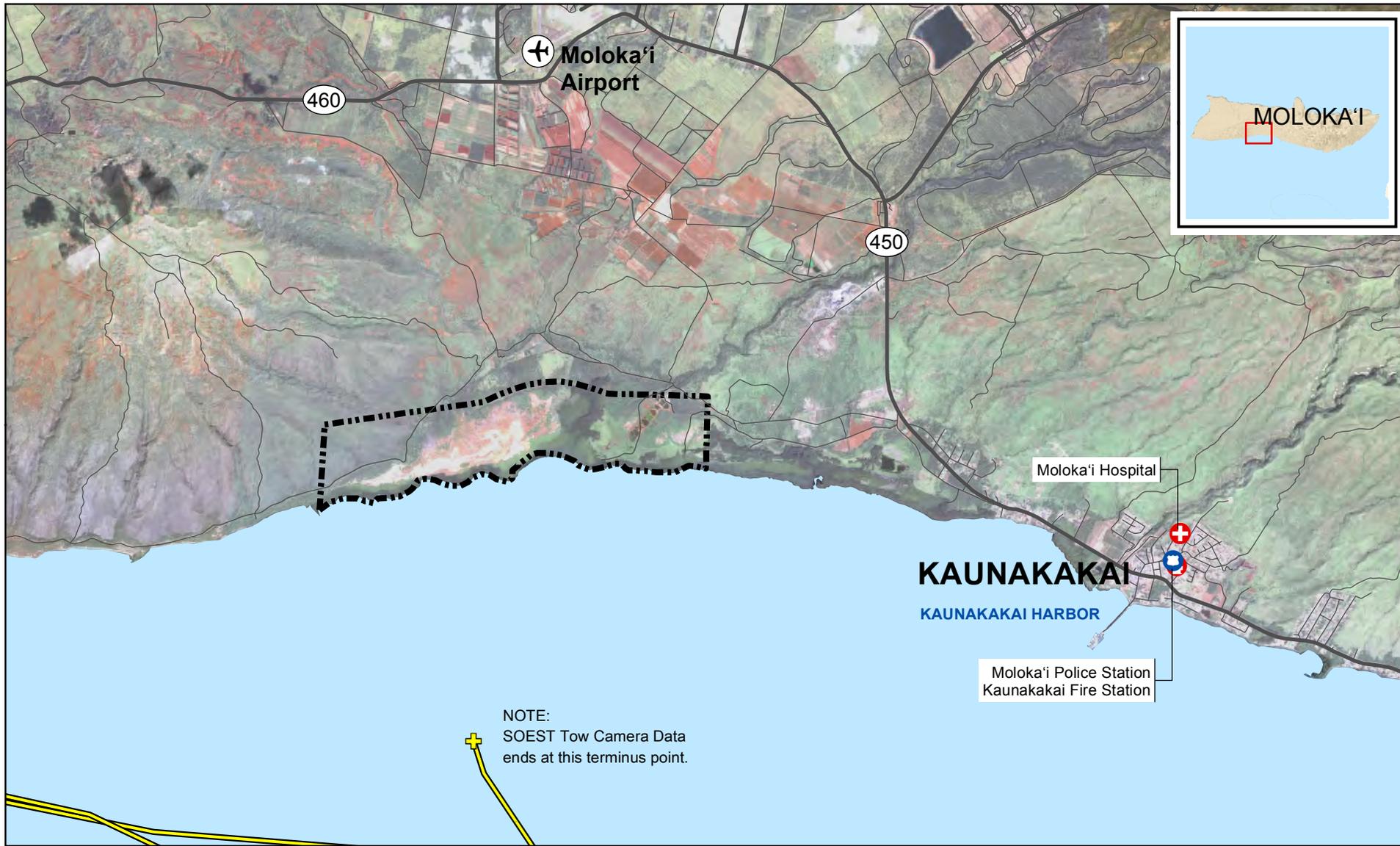


* Symbol denotes shoreward extent of tow camera data for cable route (unless otherwise noted).

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

*** There are no known fire stations, police stations, or hospitals located on this side of Moloka'i.

Figure 3.11-4



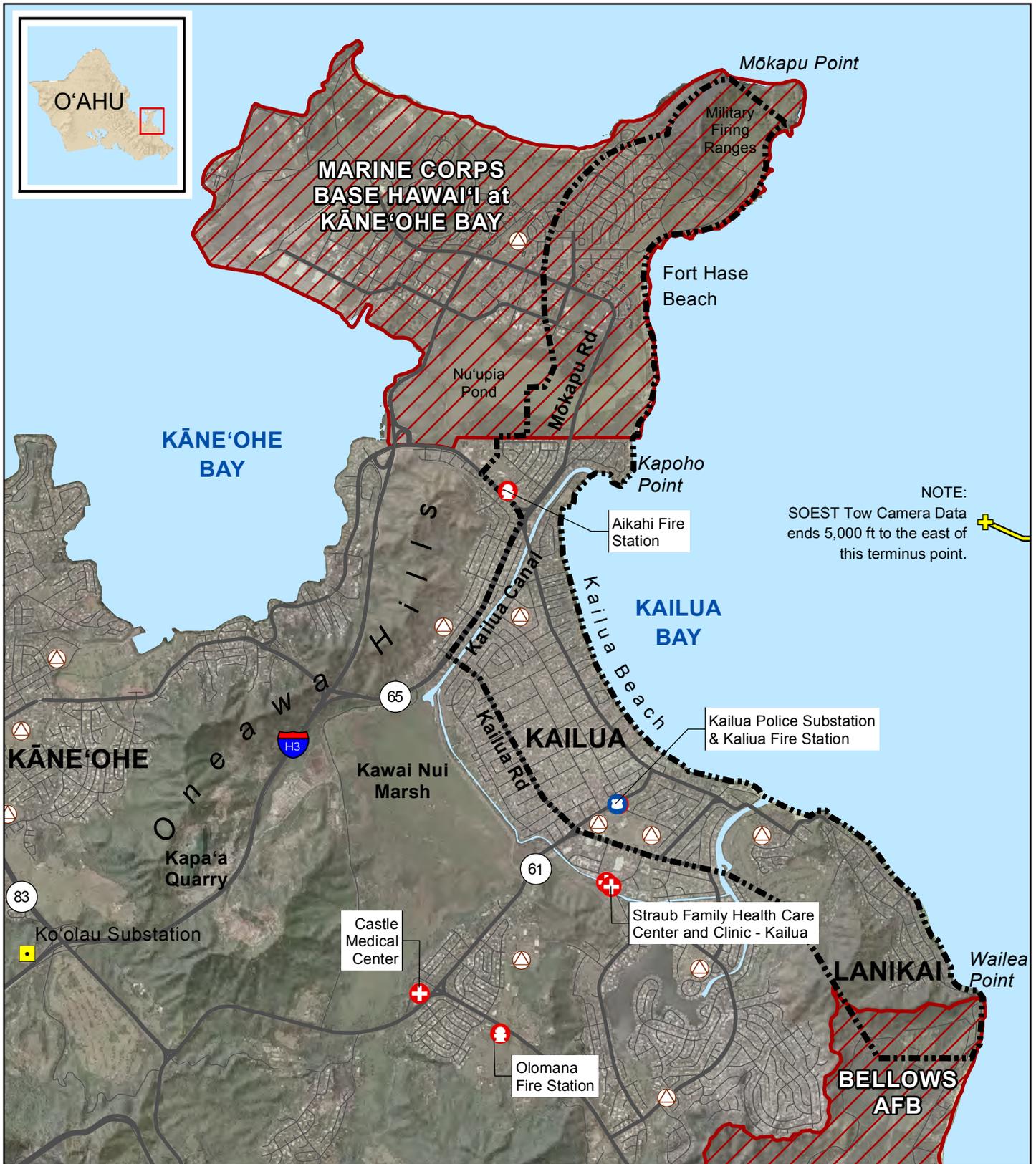
South Moloka'i Landing Site Area: Public Emergency Services

- + Route with camera data *
- SOEST Cable Routes
- HIREP Study Analysis Area
- Emergency Shelter Locations
- Open Water
- + Route without camera data **
- + Police Station
- + Fire Station
- + Hospitals and Clinics
- Highways & Major Roads
- Other Roads



* 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.

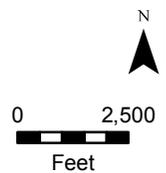
Figure 3.11-5



NOTE:
SOEST Tow Camera Data ends 5,000 ft to the east of this terminus point.

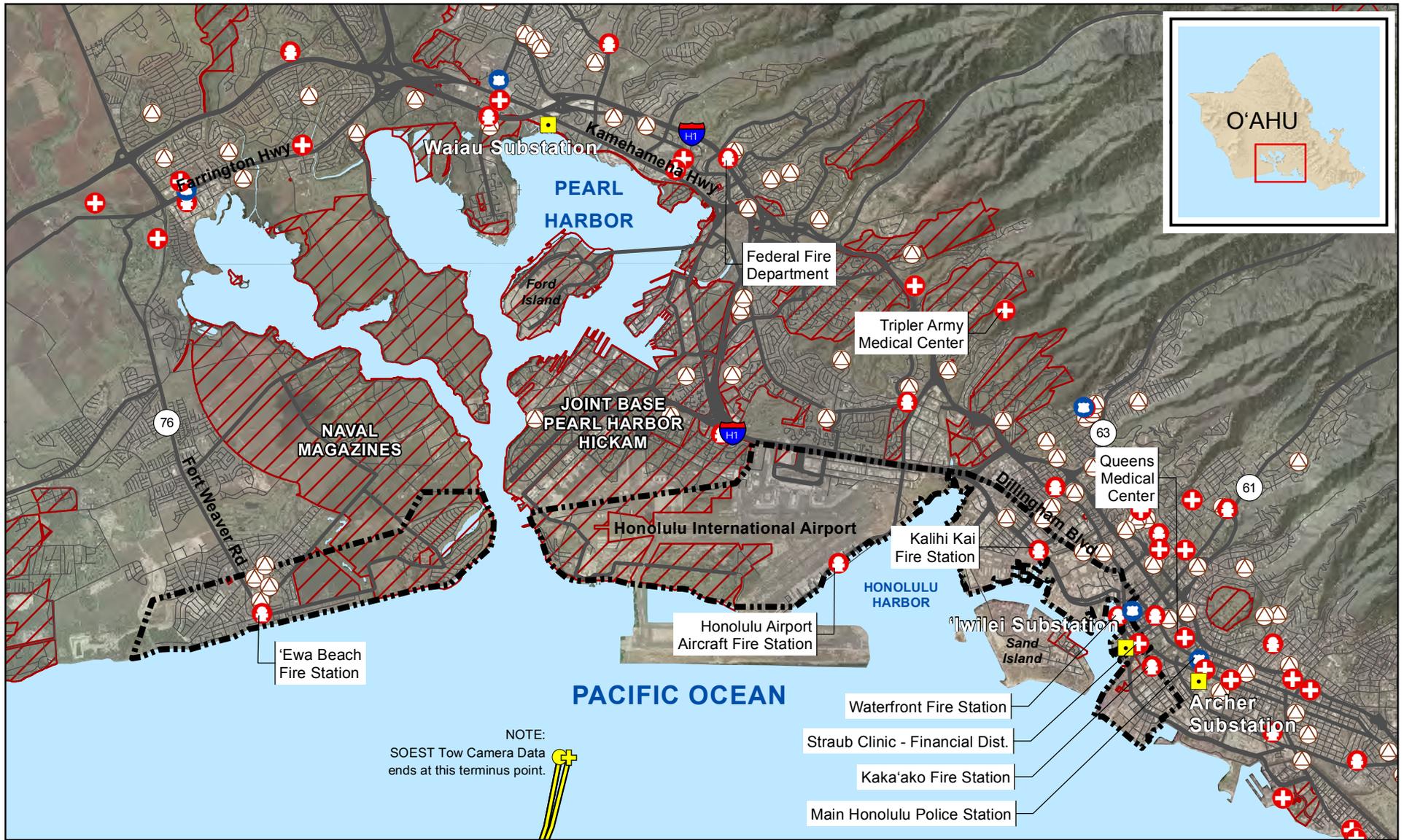
Kāneʻohe Landing Site Area: Public Emergency Services

- | | | | |
|--------------------------------------|---------------------------|-----------------------------|------------|
| Route with camera data * | SOEST Cable Routes | Emergency Shelter Locations | Open Water |
| Route without camera data ** | HIREP Study Analysis Area | Hospitals and Clinics | |
| Identified Oʻahu Substation Location | Federally Owned Lands | Police Stations | |
| Highways & Major Roads | | Fire Stations | |
| Other Roads | | | |



* 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.

Figure 3.11-6



* 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.

Figure 3.11-7

3.12 RECREATION

3.12.1 Resource Definition

Recreation refers to the occasion of a person to participate in a specific activity in a particular outdoor setting in order to enjoy a desired recreational experience. According to the National Association of Recreation Resource Planners, recreational resources are those features in a setting that define a person's experience, such as the natural and cultural resources, special values attached to an area, facilities, infrastructure, personnel, and management regulations and actions (National Association of Recreational Resource Planners 2001-2012). Recreational resources generally involve various types of water and terrain activities, in natural, seminatural, or built settings.

Hawai'i's recreational resources are provided and managed by various agencies. Providers and operators of recreational resources include the federal government; State of Hawai'i; counties of Hawai'i, Kauai, Honolulu, and Maui; and private entities. Recreational resources provided by the federal, state, and county governments are open to the general public. Access and use of the resources within DoD lands are limited to installation personnel and their guests.

Some recreational resources are situated in resource management areas. The types of management areas include wildlife sanctuary, forest reserve, preserve, artificial reef, marine managed areas, forest reserve, fisheries management area, wildlife refuge/sanctuary, natural area reserve, marine life conservation district, hunting area, camping facilities, and hiking trails and walking paths.

This report addresses potential access and use impairment to the recreational resources in the landing site areas. Due to the broad look at the regions being considered for planning purposes, this report does not address the issue of carrying capacity (i.e., the prescribed number, or supply, of available visitor opportunities to be accommodated at a specific location and time) of recreational resources.

Existing recreational resources are inventoried and categorized in the manner found in the *State Comprehensive Outdoor Recreation Plan (SCORP) 2008 Update* (DLNR 2009). As a recipient of Land and Water Conservation Fund assistance through DOI NPS, each state is required to prepare a SCORP every 5 years. In Hawai'i, the responsibility has been delegated to DNLNR. While recognizing the possibility that informal recreational resources (e.g., picking *opihī* [limpet] or swimming in tide pools) may not have been captured in the 2008 SCORP, the report is relied on for information and organization because of its updated inventories and evaluation of the supply and demand of public outdoor recreation resources.

The recreational resources are inventoried according to each landing site area. *Recreational resource* is used to indicate the source of recreation. An example is a beach park. *Recreational*

activity is used to indicate recreational activity(ies) available at the/through the use of a *recreational resource*. For example, surfing/bodyboarding, fishing (shore), swimming (ocean) are *recreational activities* available at a beach park, a *recreational resource*. *Recreational resource* and *recreational activities* are then grouped according to *environmental settings*, which include (1) water-related recreation; (2) land-based nature recreation; (3) developed land setting; (4) sports activities; and (5) interpretive. The following is from the 2008 SCORP:

- Water-related recreation includes boating (motor), boating (sailing), kayaking, paddling/canoeing, jet-skiing, scuba diving, snorkeling, surfing/bodyboarding, windsurfing/kiteboarding, swimming (ocean), swimming (pool), fishing (shore), fishing (boat), and beach activities.
- Land-based nature activities include hiking, horseback riding, mountain biking, off-roading/ATV activities, hunting, campsites, renting cabins, and wilderness camping.
- Developed land setting includes bicycling, skateboarding, playgrounds, picnicking, BBQs, pavilion/clubhouse, walking/jogging, concessions/lease, and dog park.
- Sports activities include baseball/softball, football, basketball, volleyball, soccer, tennis, and archery/shooting.
- Interpretive includes nature park, botanical garden, scenic lookout, historic/cultural site, and educational/interpretive display.

Following the 2008 SCORP, information is presented in the following manner for each landing site area:

Terrestrial/State Water Recreational Resources in a Landing Site Area

Recreational Resource	Recreational Activity Groups	Recreational Activity
Waihee Beach Park	Water-related recreation	Fishing (shore) Surfing/bodyboarding

Terrestrial including Shoreline

Recreational resources in a terrestrial including shoreline setting is used to indicate recreational resources with point of entry (access) found in a terrestrial, including shoreline, setting. Most recreational resources discussed in this report are found in this setting.

Marine

Marine recreational resources are used to indicate recreational resources that have a point of entry beyond the shoreline.

3.12.2 Regulatory Setting

Proposed projects must be found in compliance with the recreational resource and access elements found in the following statutes:

- Coastal Zone Management Plan (CZMP) (HRS Chapter 205A-2.b);
- Hawai'i State Plan, Objectives and policies for socio-cultural advancement-leisure (HRS Chapter 226-23b.10);
- Special Management Area (SMA) Guidelines (HRS Chapter 205A-26);
- General Plans; and
- Community Plans.

3.12.3 Region of Influence

The ROI includes the landing site area.

3.12.4 Affected Environment

General

Hawai'i's perennial tropical climate and diverse landscapes make recreational resources accessible any time of the day, by residents and visitors alike. Recreational activities are a way of life in Hawai'i and an important driver of tourism industry; visitors come to the Hawaiian Islands to experience and enjoy the same recreational activities readily accessible to the residents. Recreational resources can be found from mountains to shorelines. Popular activities include, but are not limited to, hiking, fishing (shore, boat), surfing/bodyboarding, paddling, snorkeling/diving, swimming, sailing (motor, boat), kayaking, and many more. Most recreational resources are open to the public and are pursued daily by local and visiting users.

Maui County-O'ahu Routing Specific

Maui

Maui is separated into five distinct regions: West Maui, South Maui, Central Maui, Upcountry Maui, and East Maui. Throughout Hawai'i, islands are generally drier on the leeward (western) side and wetter on the windward (eastern) side. Most Maui resorts can be found along the leeward side of West Maui and South Maui, whereas, along the windward side, wetter climate and lush vegetation can be found on the drive to Hana in East Maui. A notable feature is the Haleakalā volcano in the southeastern region.

Maui-Kahului Harbor

The Maui-Kahului Harbor landing site area is situated in Central Maui. This is where visitors to the island first encounter the island, as they arrive at the Kahului Airport. Kahului is the center of the island's commerce and industrial activities, and other parts of the landing site area, which also includes Wailuku and contains the civic center. The Maui-Kahului Harbor landing site area contains numerous historic features. Among the more recognizable features of Central Maui is the Iao Needle, a 1,200-foot-tall rock cropping at Iao Valley State Park. The landing site area contains a rich list of recreational resources, many of which are found along areas of Waihee-Waiehu, Wailuku, and Kahului (County of Maui 2009). To the east part of the landing site area is a wildlife refuge/sanctuary (Kanaha Pond State Wildlife Sanctuary). See Figure 3.12-1 for terrestrial and marine recreational resources in the Maui-Kahului Harbor landing site area.

Terrestrial

Terrestrial recreational resources in the Maui-Kahului Harbor landing site area are shown in Table 3.12-1.

State Waters

Recreational resources in state waters in the Maui-Kahului Harbor landing site area are shown in Table 3.12-2.

Maui-Kapalua (West Maui)

Kapalua is located in West Maui at the foot of Kahaalawai, or West Maui Mountains. Located in Kapalua are primarily resorts and vacation homes, as well as championship golf courses, shops, and restaurants. Its shoreline contains five bays and three white sand beaches, which attract many water-related recreational activities. See Figure 3.12-2 for terrestrial and marine recreational resources in the Maui-Kapalua landing site area.

Terrestrial

Table 3.12-3 shows terrestrial recreational resources, activities, and activity groups available in the Maui-Kapalua landing site area.

State Waters

Recreational resources in state waters in the Kapalua landing site area are shown in Table 3.12-4.

Lānaʻi

The ROI encompasses the entire island. Changes in Lānaʻi's plantation economy have taken place with the openings of two Four Seasons resorts and two golf courses. The closing of pineapple operations on the island marked the transition of Lānaʻi's economy away from agriculture into tourism (Maui County Planning Department 1998). Only 30 miles of Lānaʻi's roads are paved; recreational resources outside of Lānaʻi City and the reaches of the two Four Seasons resorts in Manele Bay and the Lodge at Koele are accessible using a four-wheel drive. Notable recreational resources include Keahiakawelo (Garden of the Gods), Polihua Beach, Munro Trail, and Puu Pehe (Sweetheart Rock).

Terrestrial

The entire landing site area is located in the Lānaʻi Cooperative Game Management Area where hunting is permitted. Hunting and fishing (shore) are recreational activities as well as a means to gathering subsistence. Much of Lānaʻi's unpaved roads are in north Lānaʻi and recreational resources can only be accessed using a four-wheel drive. See Figure 3.12-3 for terrestrial and marine recreational resources in the Lānaʻi landing site area.

Table 3.12-5 shows terrestrial recreational resources in the Lānaʻi landing site area.

State Waters

Whale watching is available seasonally.

Molokaʻi

Molokaʻi is separated into three regions: Central Molokaʻi, the West End, and the East End. Located in Central Molokaʻi is the town of Kaunakakai, Molokaʻi's urban center. There are several resorts along the coast of Central Molokaʻi. The island's residential areas include Maunaloa and Kualapuu.

Existing recreation areas/facilities on the island of Molokaʻi include Halawa, Kaunakakai, and Onealii Beach Parks; Papohaku Beach and Camp Grounds; Cooke Memorial Pool; Moanui Park; Palaau State Park; and Halawa Valley. Resource management areas include the Olokui and Puu Alii Natural Area Reserves. The Nature Conservancy of Hawaiʻi leads hiking trips through the Moomomi and Kamakou Preserves (Maui County Planning Department 2001).

Moloka'i-Kaluakoi (West Moloka'i)

The West End is on the leeward side of the island and tends to be dryer, flatter, and more arid than the East End, which is on the windward side and tends to be rugged and lush. Condominiums and cottage rentals are available at the site of a former resort in Kaluakoi.

Terrestrial

Papohaku Beach on the West End is one of the largest white sand beaches in Hawai'i, measuring approximately 3 miles long and 100 yards wide. North of Papohaku Beach, once a year, "Moloka'i Hoe," the men's Moloka'i to O'ahu canoe race, launches off of Kawakiu Bay on the West End (Moloka'i Hoe 2011). See Figure 3.12-4 for terrestrial and marine recreational resources in the Moloka'i-Kaluakoi landing site area.

Table 3.12-6 shows recreational resources, activities, and activity groups found in the Moloka'i-West landing site area.

State Waters

Recreational resources in state waters in the Moloka'i-Kaluakoi landing site area are shown in Table 3.12-7.

Moloka'i-Kaunakakai (South Moloka'i)

The landing site area is located west of Kaunakakai. This area can be accessed on Ulili Street off of State Route 460 (Mauna Loa Highway). A prominent feature in the area is the Moloka'i Sea Farms, a broodstock supplier. No known recreational resources are located within the landing site area.

Terrestrial

No recreational resources were identified.

State Waters

Whale watching is available seasonally.

O'ahu

The island of O'ahu is the most densely populated Hawaiian island, home to almost 900,000 of the total 1,200,000 residents in the state. The combination of a dense population, substantial employment related to the government sector, and an industry dedicated to tourism, results in

heavy use of the island's shorelines.⁵ O'ahu is separated into eight regions: Primary Urban Center (PUC [metropolitan Honolulu]), East Honolulu, Koolau Poko, Koolau Loa, Central O'ahu, North Shore, Waianae, and Ewa (City and County of Honolulu 2012). The landing site areas are in the PUC and Koolau Poko.

O'ahu-MCBH at Kāne'ōhe Bay

Generally wetter and greener than other parts of O'ahu, the windward side receives most of the island's rain due to the orographic clouds remaining stationary along the Koolau Mountain Ranges. The precipitous Koolau Ranges form a spine along the northeast side of the island and serve as dramatic backdrops to MCBH at Kāne'ōhe Bay as well as the residential areas spanning from Kahaluu to Waimanalo. The area is rich with recreational resources, from trails along the Koolaus that offer a dramatic view of the waters off of the windward side, to water-related recreation along the miles of shoreline from Kailua to Waimanalo.

Outside of the base are the communities of Kailua and Lanikai, well-developed residential areas. These communities front the Kailua Bay, and recreational resources, especially water-related resources, are accessible reach to most residents. Amenities such as beach parking and street parking accommodate visitors to the area as well. See Figure 3.12-5 for terrestrial and marine recreational resources in the MCBH at Kāne'ōhe Bay landing site area.

Terrestrial

Table 3.12-8 shows terrestrial recreational resources in the MCBH at Kāne'ōhe Bay landing site area.

State Waters

Recreational resources in state waters in the MCBH at Kāne'ōhe Bay landing site area are shown in Table 3.12-9.

O'ahu-Pearl Harbor

The landing site area includes the coastal portions of Ewa Beach, BPHH, Honolulu International Airport, Honolulu Harbor, and Kakaako Makai ("seaward") in the combined districts of Honolulu and Ewa Beach. The landing site area is situated in the central valley between O'ahu's two mountain ranges—the Koolau Ranges on the windward side and the Waianae Mountains on the leeward side.

The main basin at Pearl Harbor is divided by two peninsulas and an island into four smaller basins: West Loch, Middle Loch, East Loch, and Southeast Loch. Most of Pearl Harbor's

⁵ Hawai'i's Coastal Geology, SOEST, Hawai'i Coastline, O'ahu. 2011.

facilities are located on East Loch and Southeast Loch. Middle Loch is used primarily as a Reserve Fleet Anchorage. The Naval Magazine maintains berths at the approximate mid-point of West Loch. Named for the pearl oysters once harvested there, it is the largest natural harbor in Hawai'i. Much of the harbor and surrounding lands is a U.S. deep-water naval base.

On-base recreational resources at Pearl Harbor are found along the East Loch, outside of the landing site area. Outside of the base, a diverse group of recreational resources can be found along the coastal areas as well as inland. Most of the year, the south shore surf breaks fronting Kakaako Makai area are crowded with residents and visitors alike. Recreational resources inland, such as parks that serve communities' needs, are frequently used by the resident population. See Figure 3.12-6 for terrestrial and marine recreational resources in the Pearl Harbor landing site area.

Terrestrial

Table 3.12-10 shows terrestrial recreational resources in the Pearl Harbor landing site area.

State Waters

Recreational resources in state waters in the Pearl Harbor landing site area are shown in Table 3.12-11.

Federal Waters

BOEM Jurisdiction

No recreational resources were identified.

NOAA Jurisdiction

No recreational resources were identified.

3.12.5 Potential Impacts of Cable System Implementation

Description of Impact Types

Generally speaking, short-term impacts would be related to construction activities (e.g., HDD, cable lay, converter station construction); long-term impacts would be those associated with the operations of a project (e.g., energy transmission via cables and converter station operation).

Two criteria would be applied to determine if a project would have a significant impact on recreational resources:

- (1) Would the project impede access to recreational resources?
- (2) Would the project displace recreational resources or users?

The following assumptions are applied: almost all recreational resources discussed in the report are under the stewardship of a government (county, state, or federal) for the public; access to these resources is already provided and would likely be on public property. During construction, it is possible that related equipment may be staged in an area that may cause users to take detours to a recreational resource. It is possible that construction activities could block access to the resource; during the operational period, no impact would occur to access of recreational resources.

The following can be applied to existing recreational resources:

Land-based nature recreation. Using the two criteria, it is not believed that construction and operation associated with laying undersea cables and converter station would have an adverse impact on land-based nature recreation.

Developed land setting recreation. Nonstationary activities, such as walking/jogging, may need to be rerouted (displacement) if construction activities affect public ROW. Impacts would cease once construction ends.

Sports activities. Using the two criteria, it is not believed that construction and operation of undersea cables and/or converter stations would have an adverse impact on sports activities.

Interpretive. Using the two criteria, it is not believed that construction and operation of undersea cables and/or converter stations would have an adverse impact on interpretive recreational resources. Scenic lookouts may have impaired views due to the presence of construction equipment/activities (refer to Section 3.15 for additional information on potential view impacts from project components).

Water-related recreation. Impacts from directional drilling activities may occur undersea cable installation activities. For instance, an area set up to accommodate HDD activities may be on or near a popular surfing spot. At least during the duration of the construction activities, recreational users would be displaced. Drilling activities may result in temporary displacement of the activities/users. Depending on the location of the drilling activity, one or more activities may be affected. Impacts would cease once construction ends.

Maui County-O'ahu Routing Specific Description of Impact Types

Maui

Maui-Kahului Harbor

Terrestrial

Interpretive. A permanent (significant) impact to scenic lookouts may result if a converter station is sited in a view corridor (refer to Section 3.15 for additional analysis).

State Waters

During construction, incremental HDD activities taking place in the waters may disrupt ocean recreational activities. The degree of impact depends on the actual location of HDD activities, but the amount of area inaccessible to the public due to construction would likely remain constant. Probable impacts include rerouting (e.g., snorkeling or steering the boat around the construction area). Displacement of recreational activities is not likely.

Maui-Kapalua (West Maui)

Terrestrial

Developed land setting. The impacts would be similar to those described under General Impacts.

Sports activities. The impacts would be similar to those described under General Impacts.

Water-related recreation. The impacts would be similar to those described under General Impacts. However, because Kapalua consists of primarily resorts and vacation rental properties (i.e., no residential community), visitor-recreational activities use is expected to be disproportionately higher than resident-recreational activities use. Prolonged construction activities may indirectly impact the region's tourism activities.

State Waters

The impacts would be similar to those described under Maui-Kahului Harbor State Waters. Additionally, whale watching/boating activities may be rerouted temporarily during construction period, depending on where a cable route is established.

Lānaʻi

Terrestrial

Land-based. The impacts would be similar to those described under General Impacts. During operations, because most of the area under consideration is a hunting area, siting of a converter station would likely result in a permanent (significant) impact to hunting activities.

Developed land setting. No recreational resources were identified.

Sports activities. No recreational resources were identified.

Interpretive. No recreational resources were identified.

Water-related. The impacts would be similar to those described under General Impacts.

State Waters

The impacts would be similar to those described under General Impacts. Whale watching/boating activities may be rerouted temporarily during construction, depending on where a cable route is established.

Molokaʻi

Molokaʻi-Kaluakoi (Molokaʻi-West)

Terrestrial

Land-based. The impacts would be similar to those described under General Impacts. If project components are ultimately sited along Papohaku Beach, the degree of impact may be insignificant regardless of project siting because the beach is over 3 miles long and 100 yards wide.

Developed-land setting. The impacts would be similar to those described under General Impacts.

Sports activities. No recreational resources were identified.

Interpretive. No recreational resources were identified.

Water-related. The impacts would be similar to those described under General Impacts.

State Waters

The impacts would be similar to those described under Lānaʻi, State Waters.

Molokaʻi-Kaunakakai (Molokaʻi-South)

Terrestrial

No recreational resources were identified.

State Waters

The impacts would be similar to those described under Lānaʻi, State Waters.

Oʻahu

Oʻahu-MCBH at Kāneʻohe Bay

Terrestrial

On-base. Impacts would be similar to those described under General Impacts. Additionally, visitor accessibility to existing recreational resources may be altered at the discretion of Base Commander.

Off-base. Land-based nature recreation. No recreational resources were found. The criterion does not apply.

Off-base. Developed land setting. Impacts would be similar to those described under General Impacts.

Off-base. Sports activities. Impacts would be similar to those described under General Impacts.

Off-base. Interpretive. Impacts would be similar to those described under General Impacts.

Off-base. Water-related. Although impacts would be similar to those described under General Impacts, the beaches in the landing site area—Kailua Beach Park and Lanikai Beach—are enjoyed by the residents and visitors alike and often reach full capacity. Consequently, the degree of impact may be greater if construction activities are prolonged. Operational activities would not impact the activities at the beaches.

State Waters

Impacts would be similar to those described under O'ahu-MCBH at Kāne'ōhe Bay.

O'ahu-Pearl Harbor

Terrestrial

On-base. No recreational resources were found. The criterion does not apply.

Off-base. Land-based nature recreation. Impacts would be similar to those described under General Impacts.

Off-base. Developed land setting. Although impacts would be similar to those described under General Impacts, many of the recreational resources are provided as community amenities and serve the purpose of meeting neighborhood-level recreation needs. The degree of impact may be greater if construction activities are prolonged in a particularly dense part of a landing site area, such as parts of Honolulu inland of the Honolulu Harbor and Ewa Beach community.

Off-base. Sports activities. Impacts would be similar to those described above, under O'ahu-Pearl Harbor.

Off-base. Interpretive. Impacts would be similar to those described under General Impacts.

Off-base. Water-related. Impacts would be similar to those described under General Impacts.

State Waters

Although impacts would be similar to those described under General Impacts, the degree of impacts may be greater in parts of the landing site area, such as Kakaako. The waters off of Kakaako and adjoining Kewalo Basin are highly popular among the residents who pursue surfing and bodyboarding year-round. Prolonged construction activities may create an adverse impact for the users. Operational activities of the project components would not impact the activities, however.

Federal Waters

BOEM Jurisdiction

No impacts are anticipated in deepwater areas.

NOAA Jurisdiction

Construction activities may affect whale watching activities temporarily during construction, depending on where the cable routes are ultimately sited.

3.12.6 General Siting Criteria and Special Conservation and Construction Measures

The following siting criteria are suggested to avoid or minimize potential impacts on access and use of existing recreational resources associated with the cable system implementation:

1. Project should not be sited on properties that contain existing recreational resources.
2. Project should not be sited on or near an existing access to a recreational resource.

General Level Special Conservation and Construction Measures

To reduce effects associated with design and construction for the cable system implementation, the following special CCMs are recommended for the existing recreational resources:

- RR-1 Ensure adequate continuous access to significant natural and cultural resources in public ownership (State Plans, HRS Chapter 226-23b.10, Objective and policies for socio-cultural advancement—leisure).
- RR-2 Provide coastal recreational opportunities available to the public (CZMP; objectives and policies, HRS Chapter 205A-2b.1.a).
- RR-3 Protect public beaches for public use and recreation (CZMP; objectives and policies, HRS Chapter 205A-2.b.9.a).
- RR-4 All development in the special management area shall be subject to reasonable terms and conditions set by the authority in order to ensure:
- a. Adequate access, by dedication or other means, to publicly owned or used beaches, recreation areas, and natural reserves is provided to the extent consistent with sound conservation principles;
 - b. Adequate and properly located public recreation areas and wildlife preserves are reserved;
 - d. Alterations to existing land forms and vegetation, except crops, and construction of structures shall cause minimum adverse effect to water resources and scenic and recreational amenities and minimum danger of floods, wind damage, storm surge, landslides, erosion, siltation, or failure in the event of earthquake (SMA guidelines, HRS Chapter 205A-26.1.a, b, d).

- RR-5 The authority shall seek to minimize, where reasonable:
- b. Any development which would reduce the size of any beach or other area usable for public recreation;
 - c. Any development which would reduce or impose restrictions upon public access to tidal and submerged lands, beaches, portions of rivers and streams within the special management areas and the mean high tide line where there is no beach (SMA guidelines, HRS Chapter 205A-26.3.b, c).

Maui County-O'ahu Routing Specific Special Conservation and Construction Measures

In all routing cases and locations, for both terrestrial areas and in coastal and marine waters, the general measures described above should be implemented.

Table 3.12-1. Terrestrial Recreational Resources in the Maui-Kahului Harbor Landing Site Area

Recreational Resource	Recreational Activity Groups	Recreational Activity
Waihee Beach Park	Water-related recreation Developed land setting	Fishing (shore) Picnicking
Waiehu Golf Course	Developed land setting	Golfing
Waiehu Beach Park	Water-related recreation Developed land setting	Fishing (shore) Picnicking/BBQs
Waiehu Heights Park	Developed land setting Sports activities	Picnicking Pavilion/clubhouse Baseball/softball
Halekii-Pihana Heiau State Historic Site	Interpretive	Historic/cultural site Educational/interpretive display
Kahului Harbor Park	Water-related recreation Developed land setting	Fishing (shore) Picnicking
Kahului Pool	Water-related recreation	Swimming (pool)
Paukakalo Park	Developed land setting Sports activities	Baseball/softball
Waiehu Terrace Park ¹	Developed land setting Sports activities	Basketball Open field for assorted activities Walking/jogging
Maui Zoological and Botanical Gardens	Developed land setting Interpretive	Playgrounds Picnicking BBQs Botanical garden
War Memorial Complex and Keopuolani Regional Park	Water-related recreation Developed land setting Sports activities	Swimming (pool) Playgrounds Walking/jogging Baseball/softball Soccer
Lihikai Park	Developed land setting Sports activities	Baseball/softball Basketball Soccer
Kanaha Beach Park	Water-related recreation Land based nature recreation Developed land setting	Fishing (shore) Campsites Bicycling Bicycling Picnicking BBQs
Kanaha Pond State Wildlife Sanctuary	Interpretive	Scenic lookout

¹County of Maui, Facilities Page 2012
Source: SCORP 2008

Table 3.12-2. State Waters Recreational Resources in the Maui-Kahului Harbor Landing Site Area

Recreational Resource	Recreational Activity Groups	Recreational Activity
Waihee Beach Park	Water-related recreation	Scuba diving Surfing/bodyboarding
Waiehu Beach Park	Water-related recreation	Scuba diving
Kahului Harbor Park	Water-related recreation	Fishing (boat)
Kahului Ramp	Water-related recreation	Boating (motor) Boating (sail) Fishing (boat)
Hoaloha Park	Water-related recreation	Paddling/canoe
Kanaha Beach Park	Water-related recreation	Paddling/canoeing Surfing/bodyboarding Windsurfing/kiteboarding Swimming (ocean)

Source: SCORP 2008

Table 3.12-3. Terrestrial Recreational Resources in the Maui-Kapalua Landing Site Area

Recreational Resource	Recreational Activity Groups	Recreational Activity
D.T. Fleming Park	Water-related recreation Developed land setting	Fishing (shore) Beach activities Picnicking BBQs

Source: SCORP 2008

Table 3.12-4. State Waters Recreational Resources in the Maui-Kapalua Landing Site Area

Recreational Resource	Recreational Activity Groups	Recreational Activity
D.T. Fleming Park	Water-related recreation	Scuba diving Snorkeling Surfing/bodyboarding Swimming (ocean) Kayaking
Waters off of West Maui		Whale watching

Source: SCORP 2008

Table 3.12-5. Terrestrial Recreational Resources in the Lānaʻi Landing Site Area

Recreational Resource	Recreational Activity Groups	Recreational Activity
Lānaʻi Cooperative Game Management Area	Land-based nature recreation	Hunting
Trail	Land-based nature recreation	Hiking
Coastline along the planning area	Water-related recreation	Fishing (shore) Swimming (ocean) Beach activities

Source: SCORP 2008

Table 3.12-6. Terrestrial Recreational Resources in the Moloka'i-Kaluakoi Landing Site Area

Recreational Resource	Recreational Activity Groups	Recreational Activity
Papohaku Beach Park	Water-related recreation Land-based nature recreation Developed land setting	Campground Swimming (ocean) Fishing (shore) Fishing (boat) Picnicking
Kawakui Bay		Primitive campsite (private)

Source: SCORP 2008

Table 3.12-7. State Waters Recreational Resources in the Moloka'i-Kaluakoi Landing Site Area

Recreational Resource	Recreational Activity Groups	Recreational Activity
Papohaku Beach Park	Water-related recreation	Swimming (ocean) Fishing (boat)
Kawakui Bay	Water-related recreation	Moloka'i Hoe (annual canoe race)
Waters off of West Moloka'i		Whale watching

Source: SCORP 2008

Table 3.12-8. Terrestrial Recreational Resources in the MCBH Kāneʻohe Bay Landing Site Area

Recreational Resource	Recreational Activity Groups	Recreational Activity
Aikahi Community Park	Developed land setting Sports activities	Playgrounds Picnicking Baseball/softball Basketball Volleyball
Kalaheo Neighborhood Park	Developed land setting Sports activities	Playgrounds Pavilion/clubhouse Basketball Volleyball
Kalama Beach Park	Water-related recreation Developed land setting	Swimming (ocean) Fishing (shore) Beach activities Pavilion/clubhouse
Kailua Boat Ramp		
Kailua District Park	Water-related recreation Developed land setting Sports activities	Swimming (pool) Playgrounds Baseball/softball Football Basketball Volleyball Soccer Tennis
Kailua Beach Park	Water-related recreation Developed land setting Sports activities	Swimming (ocean) Fishing (shore) Beach activities Bicycling Picnicking Pavilion/clubhouse Concessions/lease Volleyball Historic/cultural site
Kaelepulu Mini Park	Developed land setting Sports activities	Playgrounds Picnicking Baseball/softball

Source: SCORP 2008

Table 3.12-9. State Waters Recreational Resources in the MCBH Kāneʻohe Bay Landing Site Area

Recreational Resource	Recreational Activity Groups	Recreational Activity
Kailua Beach Park	Water-related recreation	Boating (motor) Boating (sail) Kayaking Paddling/canoeing Windsurfing/kiteboarding

Source: SCORP 2008

Table 3.12-10. Terrestrial Recreational Resources in the Pearl Harbor Landing Site Area

Recreational Resource	Recreational Activity Groups	Recreational Activity
Keehi Lagoon Park	Water-related recreation Developed land setting Sports activities	Fishing (shore) Bicycling Playgrounds Picnicking BBQs Walking/jogging Baseball/softball Soccer Tennis
Aala Park	Water-related recreation Developed land setting Sports activities	Fishing (shore) Skateboarding Playgrounds Picnicking Baseball/softball Basketball Volleyball
Sand Island State Recreation Area	Water-related recreation Land-based nature recreation Developed land setting Interpretive	Fishing (shore) Campsites Playgrounds Picnicking Historic/cultural site Educational/interpretive display
Kakaako Waterfront Park	Water-related recreation Developed land setting	Fishing (shore) Picnicking Walking/jogging
Mother Waldron Neighborhood Park	Developed land setting Sports activities	Playgrounds Dog park Basketball Volleyball
Oneula Beach Park	Water-related recreation Developed land setting Sports activities	Fishing (shore) Picnicking Baseball/softball
Ewa Beach Community Park	Developed land setting Sports activities	Skateboarding Basketball Volleyball Tennis

Source: SCORP 2008

Table 3.12-11. State Waters Recreational Resources in the Pearl Harbor Landing Site Area

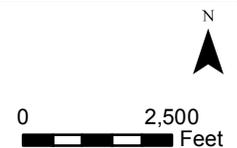
Recreational Resource	Recreational Activity Groups	Recreational Activity
Keehi Small Boat Harbor	Water-related recreation	Boating (motor)
Sand Island Ramp	Water-related recreation	Boating (motor) Boating (sail) Fishing (boat)
Sand Island State Recreation Area	Water-related recreation	Surfing/bodyboarding
Kakaako Waterfront Park	Water-related recreation	Surfing/bodyboarding
Kewalo Basin	Water-related recreation	Boating (motor) Surfing/bodyboarding Fishing (boat)
Oneula Beach Park	Water-related recreation	Surfing/bodyboarding Swimming (ocean) Fishing (boat)

Source: SCORP 2008



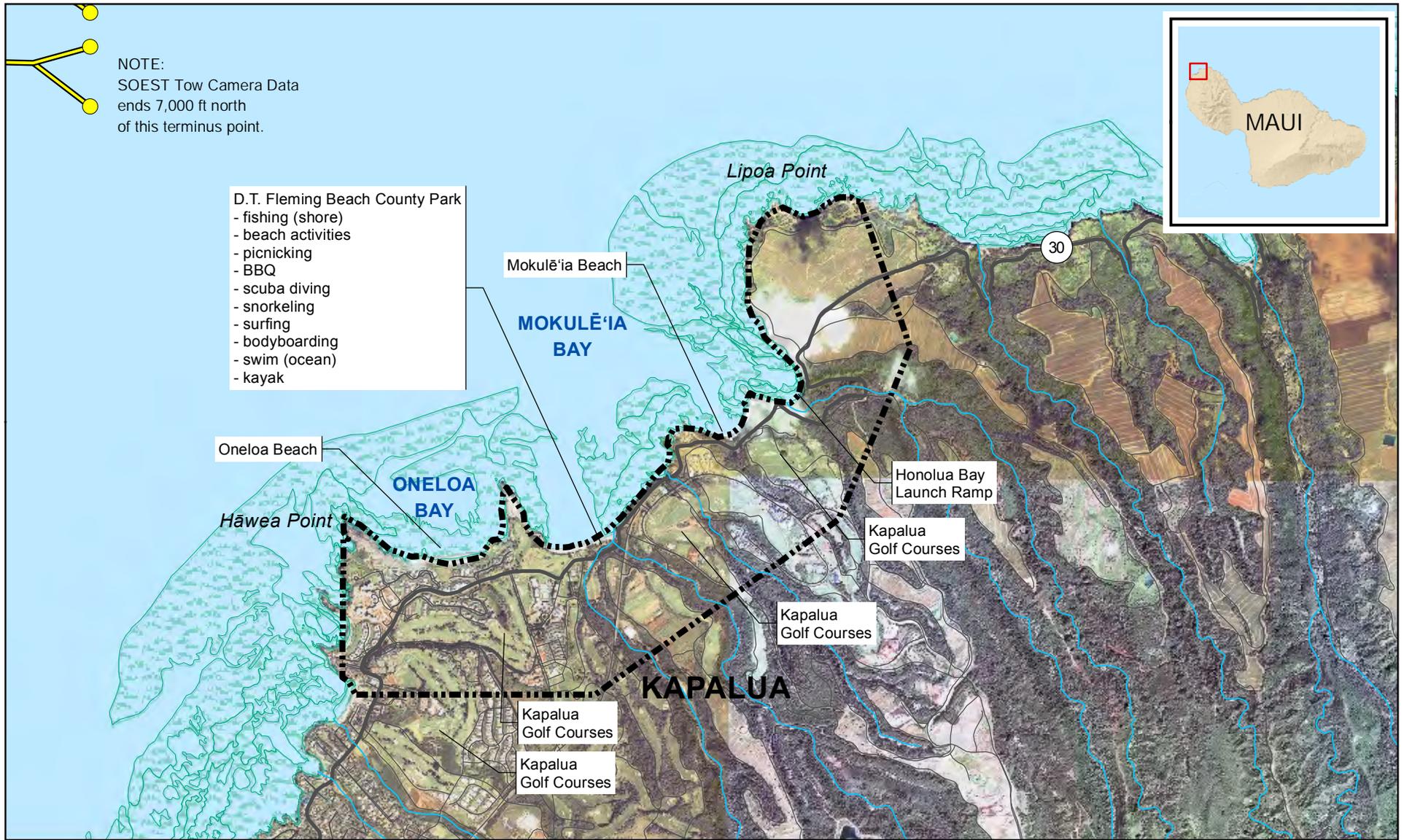
Kahului Maui Landing Site Area: Terrestrial and Marine Recreational Resources

- | | | | |
|------------------------------|---------------------------|-------------------------------|--------------------------------|
| Route with camera data * | SOEST Cable Routes | Drainages, Rivers and Streams | Parks |
| Route without camera data ** | HIREP Study Analysis Area | Freshwater Lake or Pond | Kahanā Pond Wildlife Sanctuary |
| Highways & Major Roads | Nearshore Coral Reefs | Open Water | |
| Other Roads | | | |



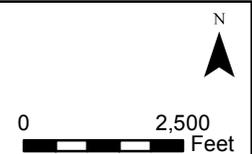
* Symbol denotes shoreward extent of tow camera data for cable route (unless otherwise noted).
 ** Symbol denotes shoreward approach of cable route without tow camera data.

Figure 3.12-1



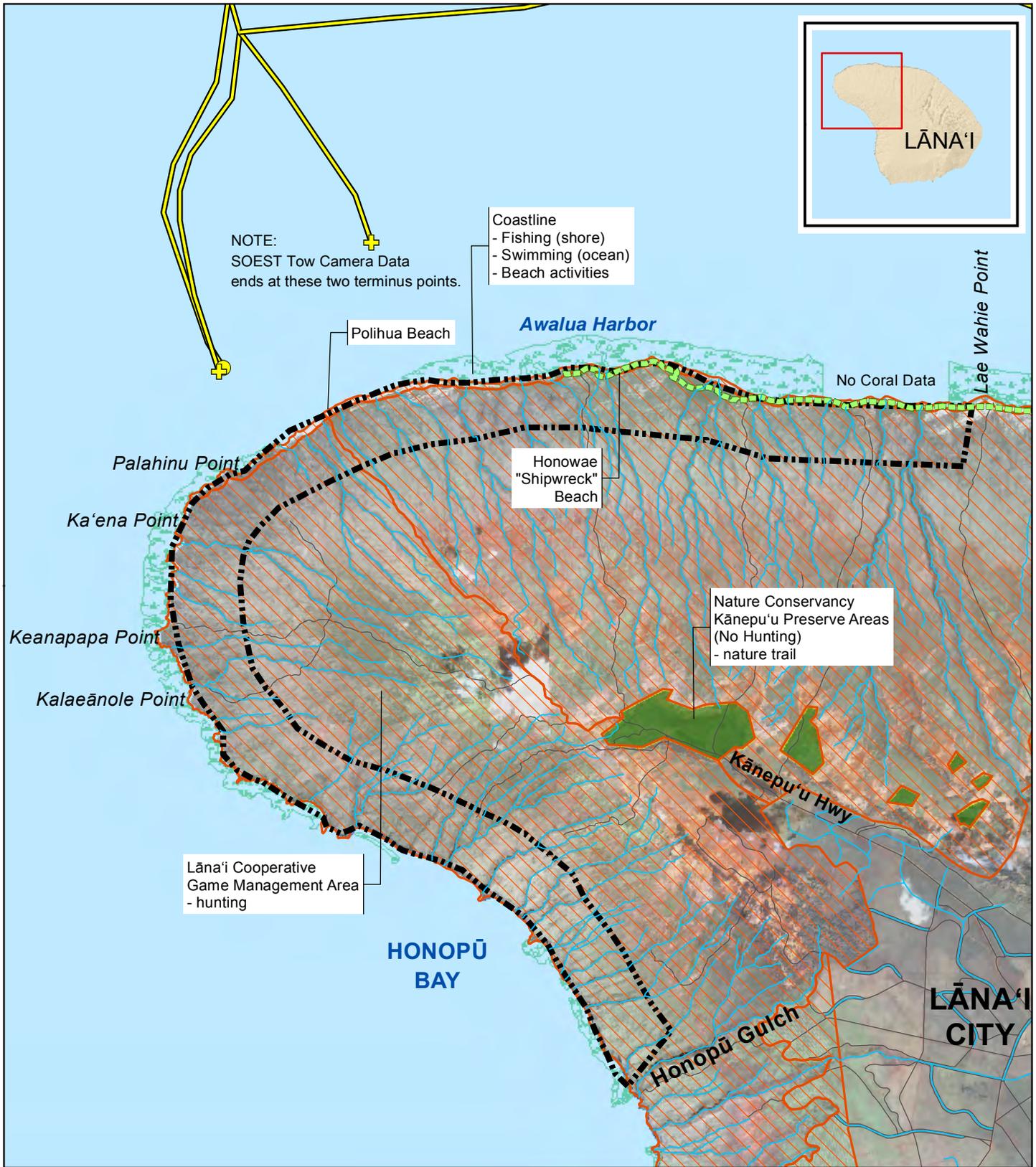
West Maui Landing Site Area: Terrestrial and Marine Recreational Resources

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



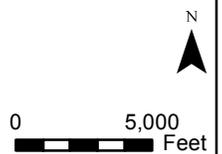
* Symbol denotes shoreward extent of tow camera data for cable route (unless otherwise noted).
** Symbol denotes shoreward approach of cable route without tow camera data.

Figure 3.12-2



Lāna'i Landing Site Area: Terrestrial and Marine Recreational Resources

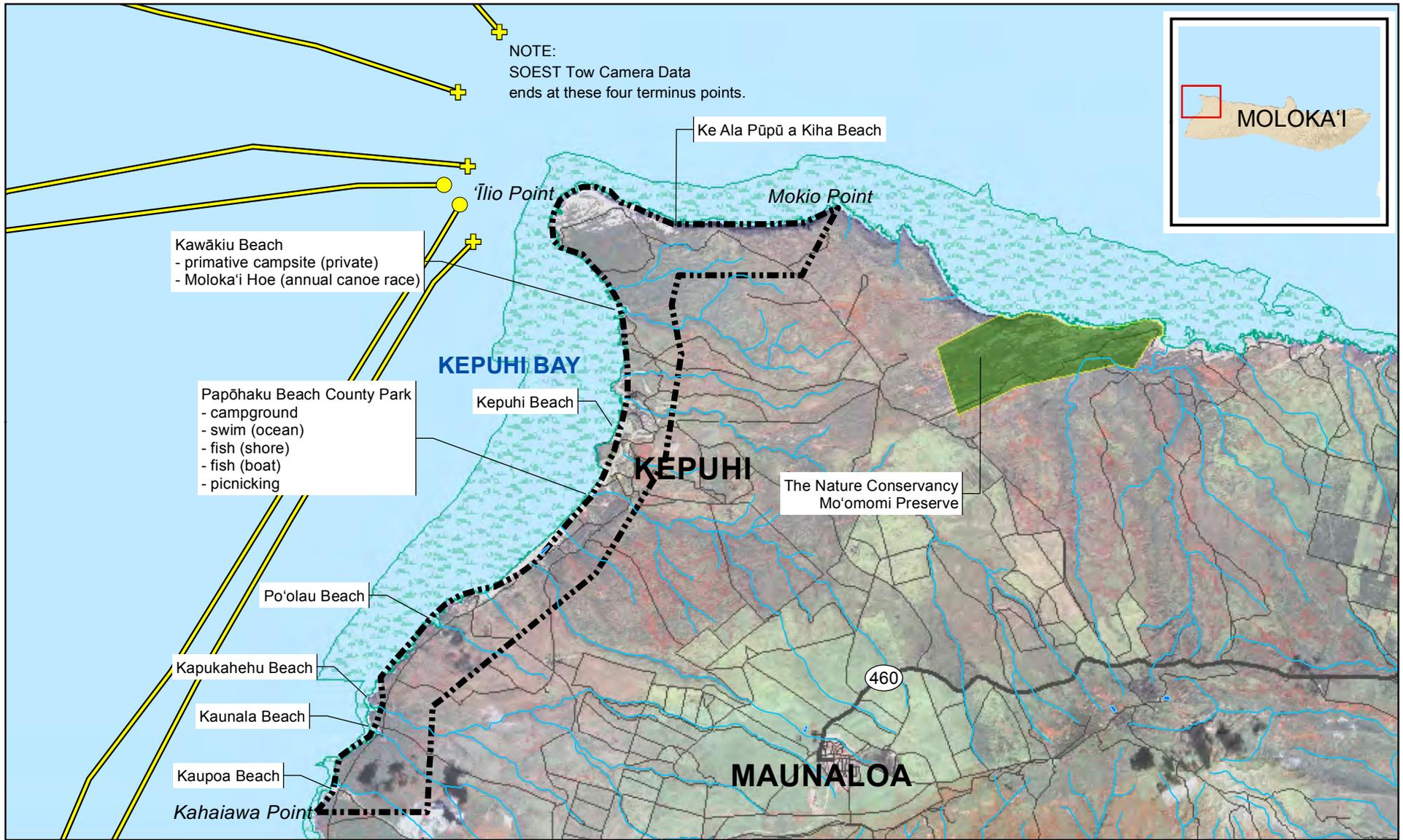
- Route with camera data *
- Route without camera data **
- Highways & Major Roads
- Other Roads
- SOEST Cable Routes
- HIREP Study Analysis Area
- Drainages, Rivers and Streams
- Nearshore Coral Reefs
- Open Water
- Na Ala Hele (Recreational) Trails
- Public Hunting Areas
- Nature Conservancy Preserve



* 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.

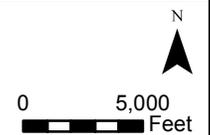
Date: 4/26/2012
Data Sources: HI-DBEDT, NOAA, CCH, UH-SOEST, AECOM, 2012

Figure 3.12-3



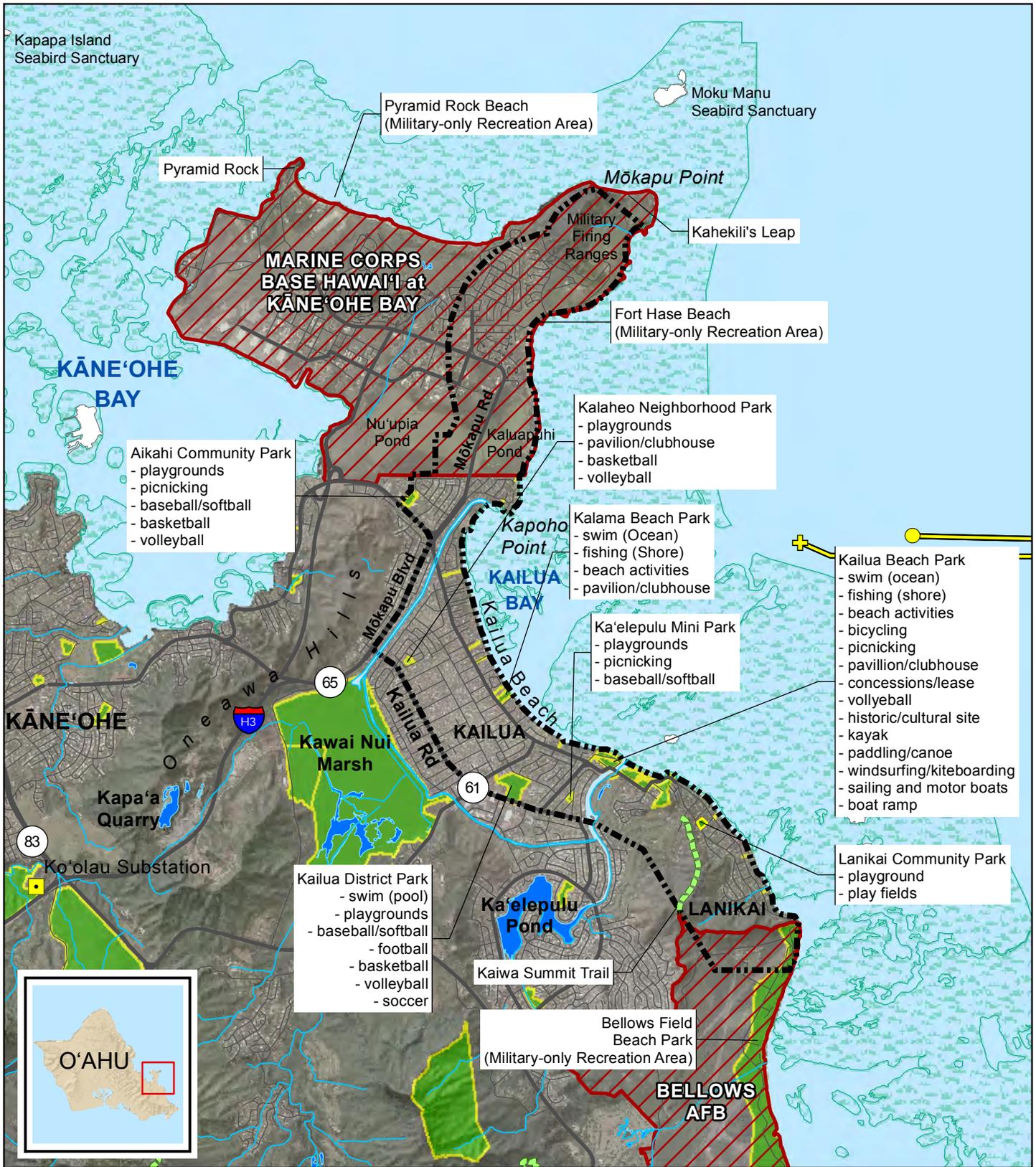
West Moloka'i Landing Site Area: Terrestrial and Marine Recreational Resources

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

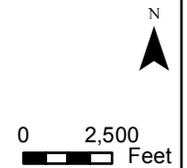


* Symbol denotes shoreward extent of tow camera data for cable route (unless otherwise noted).
** Symbol denotes shoreward approach of cable route without tow camera data.

Figure 3.12-4

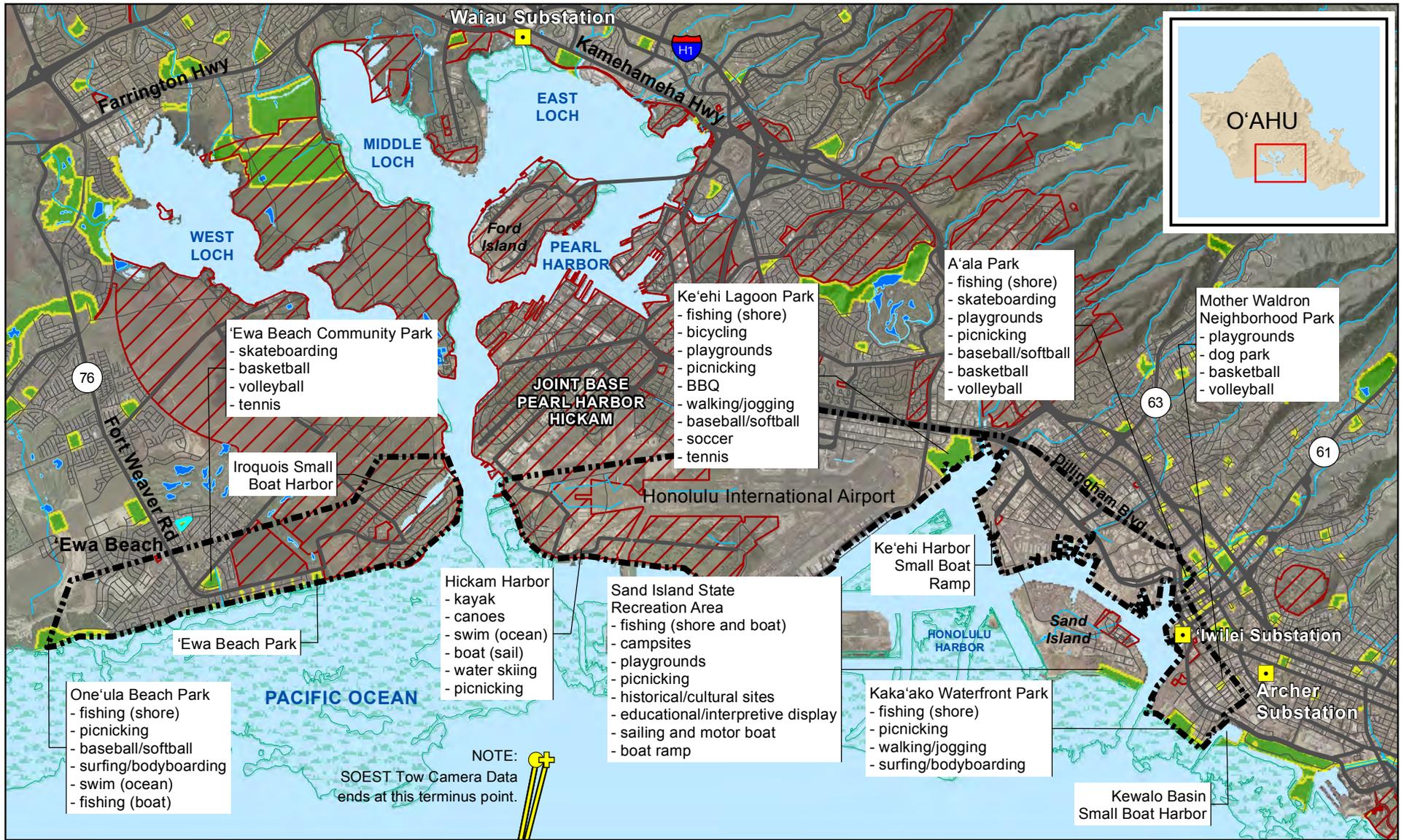


Kāneʻohe Landing Site Area: Terrestrial and Marine Recreational Resources



* 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, USFWS, CCH, UH-SOEST, AECOM, 2012

Figure 3.12-5



Pearl Harbor Landing Site Area: Terrestrial and Marine Recreational Resources

- | | | | |
|---------------------------------------|---------------------------|-------------------------------|------------|
| Route with camera data * | SOEST Cable Routes | Drainages, Rivers and Streams | Open Water |
| Route without camera data ** | HIREP Study Analysis Area | Freshwater Lake or Pond | Parks |
| Identified O'ahu Substation Locations | Federally Owned Land | Nearshore Coral Reefs | |
| Highways & Major Roads | | | |
| Other Roads | | | |

* 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.

Figure 3.12-6