DRAFT
ENVIRONMENTAL ASSESSMENT
HONOTUA FIBER OPTIC CABLE SYSTEM
SPENCER BEACH, HAWAIʻI

TMK 6-2-02:08

January 2009

Prepared for:
Alcatel-Lucent Submarine Networks (ASN)

and

Office des postes et télécommunications de Polynésie française (OPT)

Submitted by:
AMEC Earth and Environmental, Inc.
3375 Koapaka Street, Suite F251
Honolulu, HI 96819

Prepared in Accordance with Requirements of Chapter 343, Hawaiʻi Revised Statutes
and Title 11, Chapter 200, Hawaiʻi Administrative Rules

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Honolulu, Hawai‘i 96819
Phone: +1.808.545.2462

PROJECT SUMMARY

Project:	Honotua Fiber Optic Cable System
Applicant:	Office des postes et télécommunications de Polynésie française (OPT)
Accepting Authority:	State of Hawaiʻi Department of Land and Natural Resources
Tax Map Key:	6-2-02:08
Location:	Spencer Beach, Hawaiʻi
Lot Area:	0.5 acre of 13.4-acre parcel
Owner:	County of Hawaiʻi Department of Parks and Recreation 101 Pauahi Street, Suite 6 Hilo, Hawaiʻi 96720
Agent:	AMEC Earth & Environmental, Inc. 703 Market Street, Suite 1511 San Francisco, CA 94103 Contact: Denise Toombs 415.847.3363
Existing Land Uses	Beach Park, Telecommunications Facilities
State Land Use District:	Urban / Conservation (submerged land)
General Plan LUPAG Designation:	Open Area
County Zoning Designation:	Open
Permits/Approvals Required:	Conservation District Use Permit, Submerged Land Easement, U.S. Army Corps of Engineers permit, Shoreline Setback Variance permit.

EXECUTIVE SUMMARY

Introduction

Office des postes et télécommunications de Polynésie française (OPT) has contracted Alcatel-Lucent Submarine Networks (ASN) to supply and install one subsea fiber optic cable that will provide a connection between the existing cable station and onshore telecommunications infrastructure at Spencer Beach, Hawai‘i, and OPT's infrastructure on the island of Tahiti, French Polynesia. The proposed subsea cable system, the Honotua Cable System (Honotua)[1], consists of a single fiber optic cable that will establish the first subsea telecommunications services linking to countries outside of French Polynesia. The Honotua system will also provide domestic connectivity within French Polynesia, but the domestic portion of the system is not part of this proposed action. The system will also interconnect in Hawai‘i with trans-Pacific systems extending from the west coast of the United States (U.S.) to Japan, China and other rapidly developing countries of the western Pacific rim, improving system security and diversity, and accommodating projected growth in broadband applications and e-commerce.

The project design aims to minimize new construction by focusing on the use of spare capacity within the existing infrastructure currently available at Spencer Beach, already one of the major international subsea cable landing sites in Hawai‘i.

Project activity will consist of installation of the subsea cable, "landing" the cable at the beach where the existing beach manhole (BMH) is located, connection to the cable station via the existing BMH and ducts, and operation of the cable system for a period of approximately 25 years.

Project Location

The project location is on the northwest side of Hawai‘i Island, in the South Kohala District of the County of Hawai‘i, and offshore of this location, generally to the west of the coast. The cable landing location consists of the existing GST (Pacific LightNet Inc., PLNI) and GTE Hawaiian Telephone Company conduits, two BMHs, upland ducts, and two cable stations, and is described in more detail in Chapter 2, Project Description, including location maps.

[1] "Honotua" is a Tahitian name meaning the link towards the open sea.

Background and Purpose

The purpose of the project is to install a single cable at Spencer Beach using available infrastructure, consistent with the successful installation and operation of the existing cables at the landing. Currently, there are no subsea cables that directly link French Polynesia[2] with the U.S. The new Honotua Cable System, therefore, will provide international connectivity and reliability on this route.

The new cable system will provide capacity necessary for the increasing amount of international communications traffic driven by the growing number of home and business broadband users. Businesses and consumers will benefit from enhanced capacity and reliability for services such as telecommuting, video conferencing, advanced multimedia and mobile video applications. Equally important, the addition of the Honotua Cable System into the international telecommunications network will increase overall redundancy to telecommunications networks, thereby reducing the potential for system failures during natural or other disasters, a critical component to strengthening homeland security.

Proposed Action and Methods

The project consists of the following elements:

- Main lay cable installation by cable ship;
- Shore-end landing and beach works; and
- Commissioning and operation of the system.

Each of these project elements is described below.

Main Lay Cable Installation

The Honotua cable will be laid by cable ship from Tahiti to Spencer Beach through U.S. territorial and Hawai‘i state waters.[3] The ship will have a dynamic positioning (DP) system that enables it to maneuver in the nearshore area without anchoring, as noted in the discussion of the shore-end landing. Smaller boats are typically required to assist the cable ship during the shore-end landing operation. The cable ship will comply with applicable federal and

[2] Most of this document will refer to Tahiti, rather than French Polynesia, as the specific landing location within French Polynesia.
[3] The boundaries are 12 and 3 nautical miles (nm), respectively, for U.S. territorial and state waters.

international regulations and conventions addressing navigational safety, safe operations, and pollution prevention measures. The location and duration of the vessel's presence in the project area will be included in a notice submitted in advance, in accordance with U.S. Coast Guard (USCG) requirements. The USCG will issue a notice to mariners to alert other vessels of the cable ship's presence, expected time in the project area, and contact information.

The main lay will be conducted 24 hours per day until the ship reaches shallow water where the shore-end landing operation will be carried out. During the main lay, the ship will operate at a speed of up to 4 knots as it approaches Hawaiʻi Island.

Shore-End Landing and Beach Works

The Shore-End landing will consist of the following key activities:

- Beach preparation and equipment staging;
- Installation of an ocean grounding bed (OGB);
- Cable landing operation;
- Cable pull to BMH;
- Placement on seafloor and application of cable protection where required; and
- Post-landing operations, including beach burial and restoration.

Equipment and Materials

- Excavators (3) (one spare)
- Quadrant
- Shovels, hand tools
- Cable detection equipment
- Hauling ropes, floats
- Temporary fencing

Equipment and materials will be staged at the project area. The worksite will be cordoned off from public access using temporary safety fencing. Markers and site control on the beach will identify and maintain a safe work area. Akoni Pule Highway (Highway 270) and Spencer Beach Park Road will not be affected by this cable landing set-up, and will remain open to public use throughout all operations.

When the cable ship arrives a safe distance offshore, the vessel will stop laying, and turn through 90° to be perpendicular to the route and parallel to the beach. She will maintain position using her DP system, so no anchoring will be required. The landing operation will be conducted during daylight hours, with operations ideally commencing around 06:00 local time.

Vessels and Divers

- Cable ship: 140 m
- No anchoring
- Support boats: 1-2
- Divers, landing: 1-2
- Divers, post-lay: 4-5

A floating hauling line will be run from shore to the cable ship to haul the cable ashore. As the cable is paid out from the cable ship, floats will be attached.

Once the cable end is secured ashore and tests are completed, divers will be instructed to start trimming the remaining cable floats. The floats will be cut away progressively from the shore line towards the cable ship. The divers will confirm the cable is lying flat on the seabed in an acceptable manner and position, and where possible may manually reposition the cable if required. After the cable is placed on the seabed, the cable end, currently on the beach, will be installed in the BMH.

After the cable has been installed in the BMH, articulated pipe will be applied over the cable from the BMH to a distance of approximately 100 m (329 ft) offshore. A trench will then be excavated from the BMH to the water line to bury the cable. No sediments will be removed from the project area, nor will materials be introduced to the beach to fill the excavated area.

An OGB will be installed near the two existing BMHs. The OGB will be installed prior to or immediately after the shore-end landing.

The work area will be marked and site access controlled for public safety. After installation, the site will be restored to its original condition.

The expected duration of the beach works and shore-end activities is approximately 10 days. The installation vessel will be present on site for 1 to 2 days.

Commissioning and Operation

Once installed, the cable requires no routine maintenance. The existing cables at Spencer Beach, for example, have remained in place since installation and have required no maintenance or repair. In the unlikely event of a repair being required, this would be done using similar equipment and techniques as those described for the installation, in the water and on the beach.

Alternatives Considered

Beach Site

Two beach landing locations were considered for the Honotua cable. The preferred alternative is Spencer Beach Park. Because there is established onshore infrastructure available at Spencer Beach, and existing conduit running to the cable station, this alternative avoids construction of new structures (cable station, BMH). Mauʻu Mae Beach, located approximately .87 km (.54 mi) south of Spencer Beach, is the second alternative, but was dismissed because it lacked existing infrastructure and would require more construction to reach an existing cable station. No cables currently exist at Mauʻu Mae Beach and no onshore infrastructure is in place.

Beach Landing Site at Spencer Beach

The existing cables installed at Spencer Beach approach and cross the beach through a rocky tidepool area. The proposed approach and shore crossing for the Honotua cable is to the immediate south of the existing cables at the sandy shoreline, developed because of conditions observed at the site during the planning stage. Specifically, there is no conduit through which the Honotua cable could be installed at the existing shore crossing area, and so installation at this location would disturb a portion of the tidepool area. Another factor is that there are five cables and three ground wires crossing through this location and buried under the beach. Because the existing corridor is “crowded” and is without ducts under the beach to connect to the BMH, the potential for damaging one of the existing cables is of concern, and achieving satisfactory depth of burial could be difficult. The location is also more congested by features in the park area, resulting in less space for staging and maneuvering equipment. Access to the existing landfall has been partially obstructed by recent park improvements.

For these reasons, a different approach to the beach was developed that still takes advantage of the sand channel offshore, but crosses the shore at the sandy part of the beach. The proposed location avoids the tidepool area and the other cables. It also has the advantage of having a more direct path to the BMH than the corridor used for the existing cables. Therefore the existing crossing at the tidepool was not proposed.

Cable Stations

Only existing cable stations were considered as a means of avoiding new construction. The PLNI Terminal Station is located approximately 3.5 km (2.17 mi) south of the Spencer Beach site on the South Kohala coast. The GTE station is located approximately 1.4 km (.85 mi) north of the PLNI station. Both are operating cable stations, but the PLNI Terminal Station has more available capacity and space. Although the GTE Cable Station is closer to the proposed landing site, OPT selected the PLNI Terminal Station because it is with PLNI that OPT has reached commercial agreement for hosting the Honotua terminal equipment and for providing onward connectivity.

Alternative Shore Crossing Method

OPT proposes a conventional landing method for installing the Honotua cable. This technical approach is consistent with prior landings at the project location, and is the most common technique used in the industry throughout the world. Another technique, horizontal directional drilling (HDD), is sometimes considered where trenching is problematic and to avoid surface disturbance to roads and beaches. Using HDD as a shore crossing method, the cable would be installed by drilling under the beach area to a point offshore. .

The critical elements of an HDD approach that required consideration are:

- Space required for the HDD drilling rig, fuel and drilling mud storage, and materials.
- Duration of drilling operations.
- Localized air emissions and noise in a public recreation area.
- Potential damage to rock or coral substrate at the bore exit location.
- Potential for “frac-out[4].”

The reasons for not proceeding with an HDD technique for the shore crossing are the following: increased potential for disturbance because of the longer duration; potential for incidents resulting in a release of bentonite (drilling fluid) and/or diesel; and possible nearshore impacts resulting from the bore exit near coral mounds and/or hard substrate.

[4] “Frac-outs” result when the fluid, typically a bentonite slurry, escapes through a fracture in the subsurface rock or substrate and is released into the water.

Therefore the HDD alternative was not selected on the basis of the relative impacts compared with the preferred project.

No Action Alternative

The No Action alternative would avoid the potential impacts of the project and alternatives. There would still be five cables installed beneath the beach and on the seafloor just offshore of the BMH at the current landing site. However, if the No Action alternative were selected, the project objectives of increasing access to trans-Pacific telecommunications networks and improving the diversity and security of existing networks would not be achieved.

Summary of Impacts and Proposed Mitigations

Table ES-1 provides a summary of impacts by resource area, best management practices that reduce or avoid effects, and proposed mitigation measures.

Significance Criteria

Hawai‘i Administrative Rules, Title 11, department of Health, Chapter 200, “Environmental Impact Statement Rules” provides significance criteria for evaluating impacts on the environment. Table ES-2 lists the significance criteria and the recommended findings, based on the evaluation presented in this Draft EA. The recommended preliminary determination for the proposed project is a Finding of No Significant Impact (FONSI).

Table ES-1. Honotua Cable System Project Impacts Summary

Resource Area	Short-term Impacts	Long-term Impacts	Mitigation and Best Management Practice (BMP)
Topography & Geological Resources	• Ground-disturbing activities (i.e., during site preparation and construction). • Temporary redistribution of sediments.	No impact	BMPs: • Site restoration to original condition at conclusion of project. No Mitigation required.
Land Use	• Controlled public access in a limited area of the beach at Spencer Beach Park.	No impact	BMPs: • Local authorities, such as County Parks and local lifeguards, will be given advance notice of the work schedule. • Controlled access to the work area for public safety, but no beach closures. Access will be controlled through a number of measures, which may include temporary fencing, signage, and staff. • Security protection of equipment for public safety. Mitigation: • Protection of coastal resources (see Archaeological and Historical Resources).
Archaeological & Historical Resources	• Potential disturbance to archaeological and historical resources during excavation.	No impact	Mitigation: • A qualified archaeological monitor will be present during excavation activities in the cable corridor; and • If potentially significant resources are uncovered during excavation or trenching activities, all excavation or trenching activity shall halt until the nature and significance of the resources can be determined by the on-site archaeologist.
Cultural, Social & Economic Resources	No impact.	No impact	See Land Use and Archaeological Resources for related BMPs and mitigations.
Visual & Aesthetic Resources	• Presence of equipment and vessels and equipment for 6 to 10 days, which will be visible to beach users.	No impact	Equipment will be confined to work areas and the site kept tidy.

Table ES-1. Honotua Cable System Project Impacts Summary (Continued)

Resource Area	Short-term Impacts	Long-term Impacts	Mitigation and BMP
Water Resources	• Localized and temporary increase in turbidity in the surf zone when cables jetted into the sediments by divers.	No impact	BMPs: • Management of refuse and general site management to prevent materials from entering drainages or ocean. • Spill prevention and response plans for vessels and site management of equipment fluids. • Safety plans specific to the work area to prevent accidents. No Mitigation required.
Marine & Nearshore Resources	No impact.	No impact	BMPs: • Use of desktop study findings to select cable design and routing; • Application of cable route survey data to refine the cable route and design to avoid external hazards (landslides, steep slopes, anchorages); and • Maximized use of existing infrastructure and landing sites, which provides site and operating history that can be used in routing and cable design. No Mitigation required.
Terrestrial & Aquatic Biological Resources	• Short-term disturbance to the flat sandy area between the BMH and the water during excavation. • Potential for short-term disturbance to marine mammals and sea turtles by the presence of vessels and placement of cables during installation of the cable. • Potential direct effects on corals during installation of the cable on the seafloor.	No impact	BMPs: • Following the completion of construction activities, the contractor will return the site to its preconstruction condition. • Vessel crew will be briefed on the specific requirements to be adhered to during installation in the project area so they are fully aware of issues or resources with project-specific procedures or reporting requirements. • Inshore installation procedures are based on an established route that was developed in concert with the marine biological dive survey so procedures are aligned with site-specific considerations. Corals and

Table ES-1. Honotua Cable System Project Impacts Summary (Continued)

Resource Area	Short-term Impacts	Long-term Impacts	Mitigation and BMP
			reef structures were factored into the route planning. Mitigations: • Marine Protected Species Protection Protocols for marine mammals and turtles will be implemented by an onboard observer during installation to identify and take actions (if needed) to avoid disturbance to or contact with an animal. • Implement the BMPs for *Boat Operations and Dive Activities* provided by National Marine Fisheries Service (NMFS). • An observer shall be present on shore prior to beach activities to ensure there are no turtles or seals present at the beach. • Designated resource managers will be contacted for any incidents involving marine mammals or sea turtles. The "hotline" numbers shall be included on the protocols noted above, and incidents shall be documented in the ship's daily log. • A video transect of the installed cable alignment will be conducted from shore (visibility in the surf zone allowing) to the 25-m (82-ft) water depth contour to document post-installation conditions. OPT will formulate a mitigation plan, based on observed conditions, with input from the relevant resource agencies. Mitigation will be developed, as required, to provide an adequate and appropriate means of addressing site-specific and species-specific impacts.
Air Quality	• Short-term and localized emissions from excavator, winch, and drilling rig.	No impact	BMPs: • Construction equipment and vehicles shall be maintained in proper working order to reduce air emissions. No Mitigations required.
Noise	• Temporary source of noise above ambient levels from excavation, winch, drilling rig and vessels.	No impact	BMPs: • Construction equipment and vehicles shall be

Table ES-1. Honotua Cable System Project Impacts Summary (Continued)

Resource Area	Short-term Impacts	Long-term Impacts	Mitigation and BMP
			maintained in proper working order to reduce air emissions. No Mitigations required.
Public Facilities	• Disruption to a limited area of the beach at Spencer Beach Park.	No impact	See Land Use for related BMPs and mitigations.

Table ES-2. Summary of Impacts and Mitigation

No.	Significance Criteria	Significant?
1	*Involves an irrevocable commitment to loss or destruction of any natural or cultural resource*	No
2	*Curtails the beneficial uses of the environment*	No
3	*Conflicts with the State's long-term environmental policies or goals and guidelines expressed in Chapter 344, Hawai'i Revised Status (HRS), and any revisions thereof and amendments thereto, court decisions, or executive orders*	No
4	*Substantially affects the economic or social welfare of the community or State*	No
5	*Substantially affects public health*	No
6	*Involve substantial secondary impacts*	No
7	*Involves substantial degradation of environmental quality*	No
8	*Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions*	No
9	*Substantially affects a rare, threatened, or endangered species, or its habitat*	No
10	*Detrimentally affects air or water quality or ambient noise levels*	No
11	*Affects or is likely to suffer damage by being located in an environmentally sensitive area such as a floodplain, or coastal waters*	No
12	*Substantially affects scenic vistas and viewplanes identified in county or state plans or studies*	No
13	*Requires substantial energy consumption*	No

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CHAPTER 1: INTRODUCTION

1.1 Overview

Office des postes et télécommunications de Polynésie française (OPT) has contracted Alcatel-Lucent Submarine Networks (ASN) to supply and install one subsea fiber optic cable that will provide a connection between the existing cable station and onshore telecommunications infrastructure at Spencer Beach, Hawai‘i, and OPT's infrastructure on the island of Tahiti, French Polynesia. The proposed subsea cable system, the Honotua Cable System (Honotua)[1], consists of a single fiber optic cable that will establish the first subsea telecommunications services linking to countries outside of French Polynesia. The Honotua system will also provide domestic connectivity within French Polynesia, but the domestic portion of the system is not part of this proposed action. The system will also interconnect in Hawai‘i with trans-Pacific systems extending from the west coast of the United States (U.S.) to Japan, China and other rapidly developing countries of the western Pacific rim, improving system security and diversity, and accommodating projected growth in broadband applications and e-commerce.

The project design aims to minimize new construction by focusing on the use of spare capacity within the existing infrastructure currently available at Spencer Beach, already one of the major international subsea cable landing sites in Hawai‘i.

Project activity will consist of installation of the subsea cable, "landing" the cable at the beach where the existing beach manhole (BMH) is located, connection to the cable station via the existing BMH and ducts, and operation of the cable system for a period of approximately 25 years.

1.2 Applicant and Supplier

OPT is a public entity owned by the territory of French Polynesia. OPT's main responsibility is to provide comprehensive telecommunication services throughout French Polynesia, including to remote islands. In addition, OPT operates 81 postal offices providing postal and banking services. OPT owns or controls other entities such as Tikiphone for mobile GSM services,

[1] "Honotua" is a Tahitian name meaning the link towards the open sea.

MANA for internet services, Tahiti Nui Satellite (which operates 23 channels direct to home video services), and Tahiti Nui Telecom for international telephone traffic.

ASN will design, manufacture and install the system, and is preparing the site-specific designs for the Honotua system from Tahiti to Hawaiʻi. ASN is the world's largest supplier and installer of subsea systems, and has installed over 461,500 kilometers (km) (286,760 miles [mi]) of subsea networks, enough cable to circle the globe at its equator 11 times. ASN's technical expertise in the design, planning, routing and installation of submarine fiber optic systems has been applied worldwide, but also takes full account of local conditions (technical, environmental and regulatory) to develop each site-specific technical approach and plan.

1.3 Project Location

The project location is on the northwest side of Hawaiʻi Island, in the South Kohala District of the County of Hawaiʻi, and offshore of this location, generally to the west of the coast. See Figure 1-1. The cable landing location consists of the existing GST (Pacific LightNet Inc., PLNI) and GTE Hawaiian Telephone Company conduits, two BMHs, upland ducts, and two cable stations, and is described in more detail in Chapter 2, Project Description.

1.4 Conventions Used in This Document

Dimensions such as length, area, and water depth are represented in both metric and English units. Most survey and design data are expressed in metric units and are used throughout this document. Approximate conversions are provided for readers most familiar with English units, but these conversions are not precise.

1.5 Organization of this Document

This Draft Environmental Assessment (EA) is organized in the following Chapters and appendices:

Executive Summary
Chapter 1 Introduction
Chapter 2 Project Description
Chapter 3 Alternatives Considered
Chapter 4 Affected Environment and Impacts

Chapter 5 Secondary and Cumulative Impacts

Chapter 6 Consistency and Compliance with Federal, State and Local Regulations, Plans, and Policies

Chapter 7 Pre-Consultation and Coordination

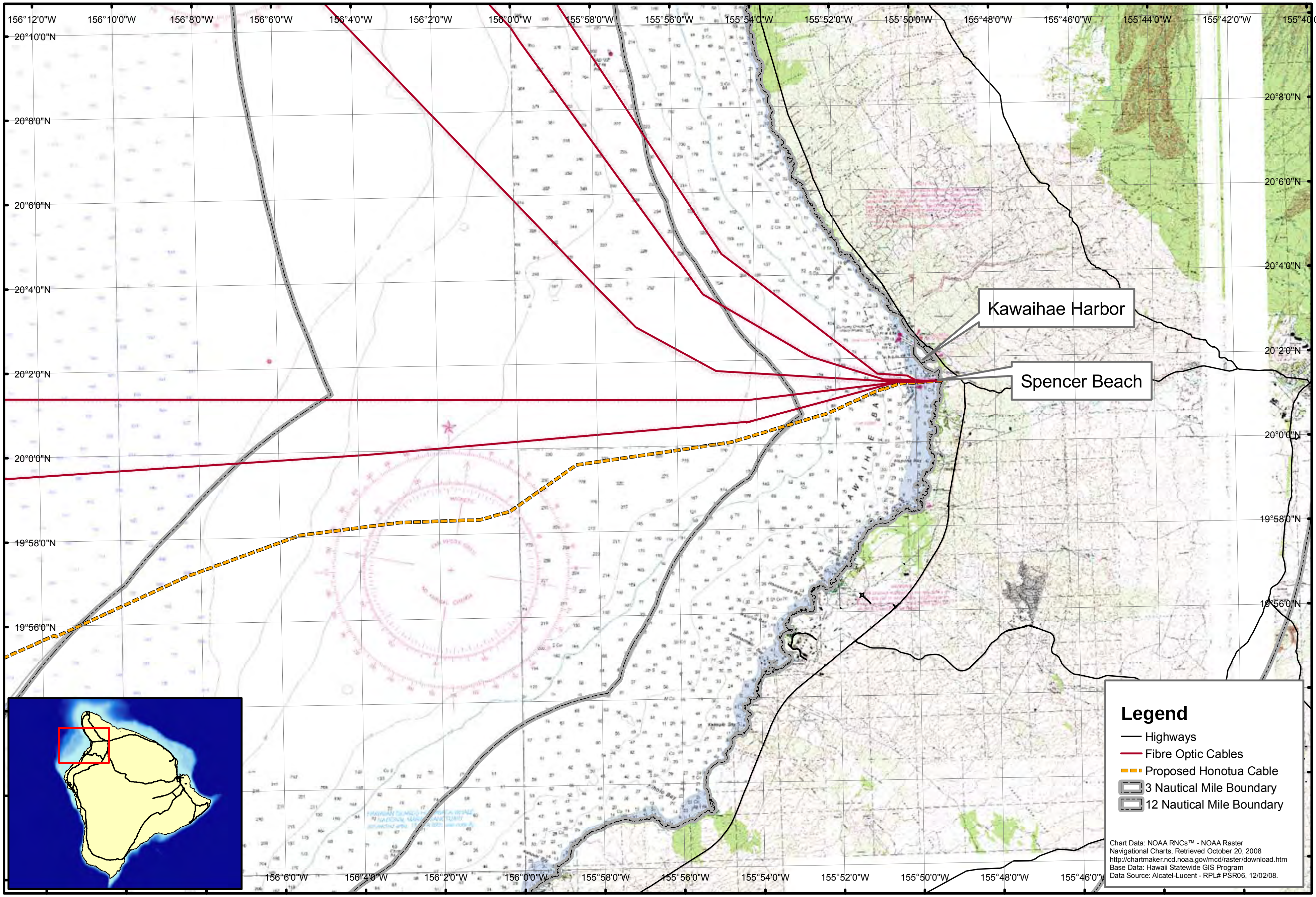
Chapter 8 Impacts, Mitigations, and Significance Evaluation

Chapter 9 Findings and Reasoning Supporting Determination

Chapter 10 References

Appendices:

- A Dive Survey Report
- B Archaeological Assessment
- C Proposed Marine Protected Species Protection Protocols
- D BMPs for Boat and Dive Activities
- E Articulated Pipe Placement Techniques



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Honotua Cable Project
Spencer Beach, Hawaii

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Figure 1-1

Project Location

0 1 2 4 6 8 10 Miles

0 2.5 5 10 15 Kilometers

CHAPTER 2: PROJECT DESCRIPTION

2.1 Project Location and Existing Infrastructure

> Existing Spencer Beach Infrastructure Proposed for Use by the Honotua System
>
> - Beach manhole
> - Onshore duct to cable station
> - Cable station

The project location is on the northwest side of Hawaiʻi Island, in the South Kohala District of the County of Hawaiʻi, and offshore of this location. The cable landing location consists of the existing GST (Pacific LightNet Inc. [PLNI]) and GTE Hawaiian Telephone Company conduits, two BMHs, upland ducts, and a cable station. The PLNI Terminal Station is located along Queen Kaahumanu Highway (Hwy 19), just south of the entrance to Mauna Kea Resort. A second cable station in the project area that is not part of this project, the GTE Cable Station, is located approximately 1.1 km (0.7 mi) north of the PLNI station and is currently the terminus for five active subsea cables. The project location and existing infrastructure noted for the Honotua system are shown in Figure 2-1.

An important feature of the project is the use of existing telecommunications infrastructure and corridors, which will retain the present “footprint” of the existing infrastructure. The beach and upland project activity will be confined to the beach landing, connection at the BMH, and installation within existing conduits. Installation will not require new trenching in public roads, or construction of a new cable station.[1]

The proposed installation methods are consistent with prior installations at this landing location, and the Honotua cable route will be located within the same nearshore corridor on submerged land as the existing five cables at the site. The cable will be installed through a sand channel currently occupied by existing cables. See Figure 2-2.

[1] PLNI will be constructing a duct beneath Queen Ka'ahumanu Highway between the GTE and PLNI cable stations. That activity is currently under review and will be completed before the Honotua system is installed.

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Spencer Beach, Hawaii

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Figure 2-1

Project Area and Existing Infrastructure

0 500 1,000 2,000 3,000 Feet

0 250 500 1,000 Meters

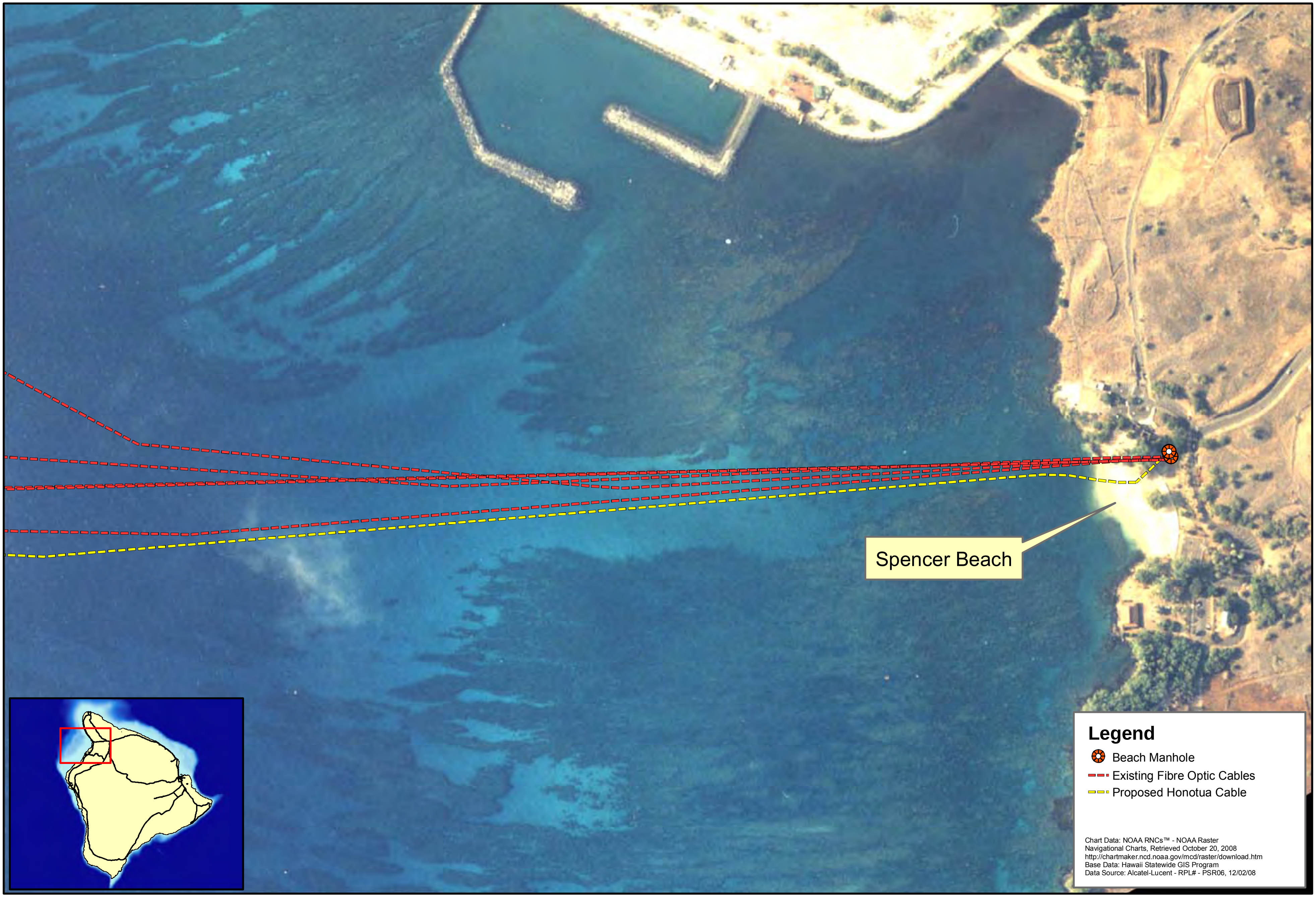

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Figure 2-2

Existing and Proposed Cable Routing

0 150 300 600 900 1,200 Feet

0 45 90 180 270 360 Meters

2.2 Purpose and Need for the Project

The purpose of the project is to install a single cable at Spencer Beach using available infrastructure, consistent with the successful installation and operation of the existing cables at the landing. Currently, there are no subsea cables that directly link French Polynesia[2] with the U.S. The new Honotua Cable System, therefore, will provide international connectivity and reliability on this route.

The new cable system will provide capacity necessary for the increasing amount of international communications traffic driven by the growing number of home and business broadband users. Businesses and consumers will benefit from enhanced capacity and reliability for services such as telecommuting, video conferencing, advanced multimedia and mobile video applications. Equally important, the addition of the Honotua Cable System into the international telecommunications network will increase overall redundancy to telecommunications networks, thereby reducing the potential for system failures during natural or other disasters, a critical component to strengthening homeland security.

2.3 Background on Cable Technology and Route Planning

Although the first subsea (or "submarine") telegraphic cable systems were operational in the late 1800s, modern fiber optic cables are capable of delivering much greater speed, capacity and reliability than earlier systems. The evolution of these systems has been reviewed in recent documents evaluating similar fiber optic cable projects in the project area.[3] The Honotua system will deliver an ultimate capacity of 320 Gigabits per second (CommsDay 2008).

The proposed cable route has been chosen based on results of detailed investigations and surveys, and will consist of approximately 4,400 km (2,734 mi) of cable between Tahiti and Hawaiʻi Island. The proposed cable is an optical fiber subsea cable, designed and incorporating materials to minimize environmental impact. The cable design can accommodate up to six pairs of fibers, which are housed in a jelly-filled stainless steel tube, surrounded by two layers of steel wires that form a protective vault against pressure and external contact, and also provide tensile strength. This vault is then enclosed in a hermetically sealed copper tube and insulated with a

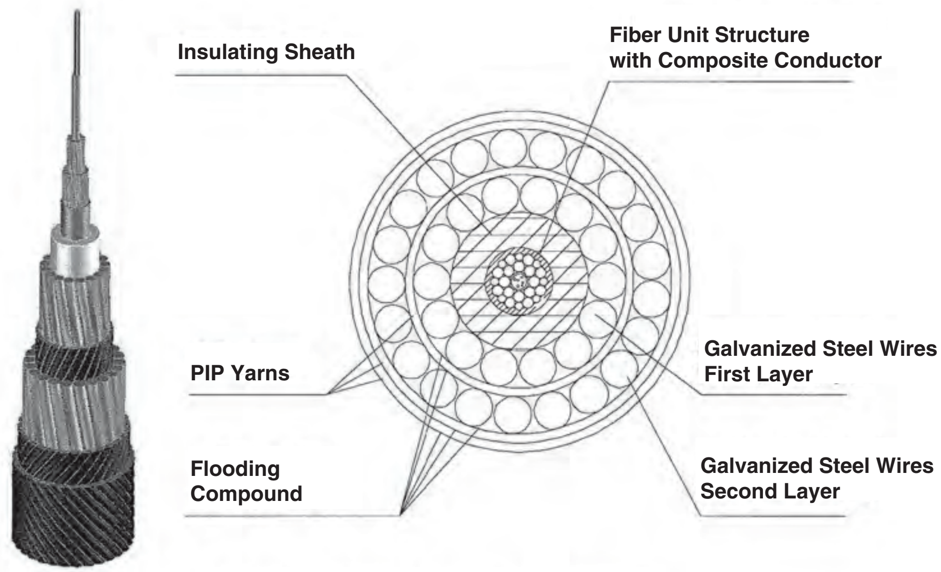
[2] Most of this document will refer to Tahiti, rather than French Polynesia, as the specific landing location within French Polynesia.
[3] See EA prepared for the Australia-Hawaiʻi System (AMEC 2007).

layer of polyethylene to form the basic deep-sea Light Weight (LW) cable. The outer low-density polyethylene coating provides high voltage electrical insulation, as well as abrasion protection. Whenever possible, the raw materials selected are of the same type as those used in previous generations of coaxial and optical fiber cables, which have demonstrated more than 20 years of reliability. This basic LW cable is generally used in waters greater than 3,500 meters (m) (11,500 feet [ft]) deep and is 17 millimeters (mm) (0.67 inches [in]) in diameter. Figure 2-3 is a diagram of the type of cable proposed for this project.

Because these cables are installed for an operational life of approximately 25 years on or beneath the seabed, the design incorporates features to protect the cable from the marine environment, and external forces it may encounter during installation and operation. In shallower waters, additional protection is provided by addition of galvanized steel armor wires. Single Armor (SA) cable is made by stranding a single layer of high strength galvanized steel wires over the basic lightweight (LW) cable structure. The steel wires are saturated with bituminous compound and covered by polypropylene yarns. This cable is normally used where full protection by burial is possible. It may be used at any water depth between 0 and 1,500 m (4,920 ft), or down to 2,000 m (6,560 ft) in special conditions. SA cable is 26 mm (1 in) in diameter.

In very shallow waters, Double Armor (DA) cable can be used. DA cable is made by adding a second layer of galvanized steel wires around the SA cable, saturated with bituminous compound and covered with polypropylene yarns. This cable is normally used for surface lay or to add additional protection where burial was originally thought to be possible. It may be used at any water depth between 0 and 500 m (1,640 ft) but is generally used between 0 and 200 m (656 ft). DA cable is 35 mm (1.4 in) in diameter.

Where cable stability and protection require it, articulated pipe may be fitted over the cable. If necessary and to prevent further lateral movement of the articulated pipe, Stainless Steel Saddle Clamps will be installed by divers at suitable intervals where seabed conditions permit along the articulated pipe to provide ultimate stability. Articulated pipe is applied by divers, so the maximum deployment water depth is usually 20 m (66 ft). See Appendix E.



Source: Alcatel-Lucent 2007.

Double Armoured (DA) Cable Arrangement

FIGURE
2-3

Cable design and selection of cable type are developed in the planning stages based on engineering considerations identified during the route planning process. The landing was selected to optimize the approach to the existing infrastructure, to minimize interference with existing cables, and to use the seafloor features that effectively function as a natural corridor for the cable route. The cable route was engineered to avoid potential hazards, disruption to marine resources and operations, and to secure long-term protection of the cable. The cable route and project design are developed and refined through two main stages:

- Desktop Study (DTS) – detailed review of all factors affecting the routing of the cable, including physical, environmental, socioeconomic, and regulatory aspects; and
- Cable Route Study (CRS) – surveys of the inshore and deep-water sections of the route. Bathymetric and other data are collected and analyzed in order to define the optimum route for cable installation.

The route proposed and described in Section 2.4 reflects the results of the DTS and CRS.

2.4 Proposed Action

The project consists of the following elements:

- Main lay cable installation by cable ship;
- Shore-end landing and beach works; and
- Commissioning and operation of the system.

Each of these project elements is described below.

2.4.1 Main Lay Cable Installation

The “main lay” will involve laying the cable along a pre-determined route using a special-purpose cable ship, also referred to as the “main lay” vessel to distinguish it from support boats.

The Honotua cable will be laid by cable ship from Tahiti to Spencer Beach through U.S. territorial and Hawai‘i state waters.[4] The ship will be approximately 140 m (420 ft) long, and will have a dynamic positioning (DP) system that enables it to maneuver in the nearshore area without anchoring, as noted in the discussion of the shore-end landing. Smaller boats are typically required to assist the cable ship during the shore-end landing operation. There will be

[4] The boundaries are 12 and 3 nautical miles (nm), respectively, for U.S. territorial and state waters.

one or two support boats, the size of which will depend upon local availability of the boats, but they would typically be approximately 5 to 9 m (18 to 30 ft) in length.

The cable ship will comply with applicable federal and international regulations and conventions addressing navigational safety, safe operations, and pollution prevention measures. The location and duration of the vessel's presence in the project area will be included in a notice submitted in advance, in accordance with U.S. Coast Guard (USCG) requirements. The USCG will issue a notice to mariners to alert other vessels of the cable ship's presence, expected time in the project area, and contact information.

The main lay will be conducted 24 hours per day until the ship reaches shallow water where the shore-end landing operation will be carried out. During the main lay, the ship will operate at a speed of up to 4 knots as it approaches Hawaiʻi Island. The duration of the main lay operations will be approximately one day from the ship's entry in territorial waters to the Spencer Beach landing. Once positioned offshore of the landing location, the cable ship will wait for daylight hours and suitable conditions (calm weather and minimal swell) before initiating the shore-end landing operations.

The main lay and landing are scheduled for the fall/winter of 2009.

2.4.2 Shore-end Landing and Beach Works

The shore-end landing will consist of the following key activities:

- Beach preparation and equipment staging;
- Installation of the ocean grounding bed (OGB).
- Cable landing operation;
- Cable pull to BMH;
- Placement on seafloor and application of cable protection where required;
- Post-landing operations, including beach burial and restoration at the BMH; and

The general layout for beach activities is shown in Figure 2-4.

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Figure 2-4

Beach Layout and Excavation Areas

2.4.2.1 Beach Preparation

> **Equipment and Materials**
>
> - Excavators (3)
> - Drilling rig
> - Quadrant
> - Shovels, hand tools
> - Cable detection equipment
> - Hauling ropes, floats
> - Temporary fencing

Equipment and materials will be staged at the project area. The location of the existing in-service cables and associated grounding cables[5] will be identified and marked where they cross the beach. The existing cables will be identified using specialized cable detection equipment and localized digging as necessary to validate cable detection. Sand around the BMH will be removed to access the PLNI BMH.

Also before the landing, an excavator will be positioned on the sandy area shown in Figure 2-4 to be used as a deadweight holding-point for the quadrant. See Figure 2-5 for pictures of similar arrangements from recent installations. Floating hauling ropes will be positioned in readiness for the hauling operation.

The worksite will be cordoned off from public access using temporary safety fencing. Markers and site control on the beach will identify and maintain a safe work area. Security will be provided for equipment that may be staged overnight. Akoni Pule Highway (Highway 270) and Spencer Beach Park Road will not be affected by this cable landing set-up, and will remain open to public use throughout all operations.

2.4.2.2 Cable Landing Operation

Before the landing, the cable ship will arrive laying cable from her stern, heading in towards the beach. When the cable ship arrives a safe distance offshore (expected to be at a water depth of 15 m [49 ft], approximately 1,000 m [3,281 ft] offshore), the vessel will stop laying, and turn through 90° to be perpendicular to the route, and parallel to the beach. On the offshore side she will be still holding on to the cable running into deep water, while the inshore side will be used to land the shore-end cable. She will maintain position using her DP system, so no anchoring will be required. The crew onboard will prepare the cable end for the landing.

> **Vessels and Divers**
>
> - Cable ship: 140 m
> - No anchoring
> - Support boats: 1-2
> - Divers, landing: 1-2
> - Divers, post-lay: 4-5

[5] Two of the existing cables have a "grounding" cable connecting to the GTE BMH; these grounding cables are also buried under the beach.

Excavator and Quadrant on Beach

Example of Similar Arrangement on a Public Beach

The landing operation will be conducted during daylight hours, with operations ideally commencing around 06:00 local time.

A floating hauling line will be run from shore to the cable ship to haul the cable ashore. The ship will simultaneously pay out the cable, allowing it to be pulled ashore. As the cable is paid out from the cable ship, floats will be attached (usually every 3 to 5 m [10 to 16 ft]). See Figure 2-6.

Hauling operations will continue until sufficient cable is ashore to reach the BMH and all the remaining shore-end cable onboard the ship is paid overboard. The final heaving from the shore will straighten the cable out, and the ship will lower the cable to the seafloor. The cable will then be released and the ship will move away to deeper water.

Once the cable end is secured ashore, it will be opened up for electrical insulation and fiber tests. As soon as the tests are completed, divers will be instructed to start trimming the remaining cable floats. The floats will be cut away progressively from the shore line towards the cable ship. Before cutting each float the divers will manually, or with the assistance of a small boat, position the cable so it falls into its desired location. The divers will confirm the cable is lying flat on the seabed in an acceptable manner and position, and where possible may manually reposition the cable if required.

After the cable is placed on the seabed, the cable end, currently on the beach, will be installed in the BMH. This operation is expected to conclude by late morning.

2.4.2.3 Post Landing Operations

After the cable has been installed in the BMH, articulated pipe will be applied over the cable from the BMH to a distance of approximately 100 m (329 ft) offshore. A trench will then be excavated from the BMH to the water line to bury the cable. Figure 2-4 shows the location of this area on the beach. The planned depth of the trench across the beach will be 2 m (7 ft). The estimated amount of sand to be excavated is approximately 474 cubic meters.

Cable with Floats Deployed from Cable Ship

Cable End Being Floated Ashore

Source: AMEC 2008.

Typical Landing Directly from Cable Ship

If the trench cannot be excavated with the sidewalk in place, a section of the sidewalk may be removed to trench the cable from the shoreline to the BMH. This work will be performed with a grinding wheel and pneumatic drill. The sidewalk will be restored to its original condition after the cable installation is complete.

The cable will be positioned in the bottom of the trench. The trench will be back-filled and the beach returned to its former condition. An excavator will be used to bury the cables as close as possible to the low water mark. No sediments will be removed from the project area, nor will materials be introduced to the beach to fill the excavated area.

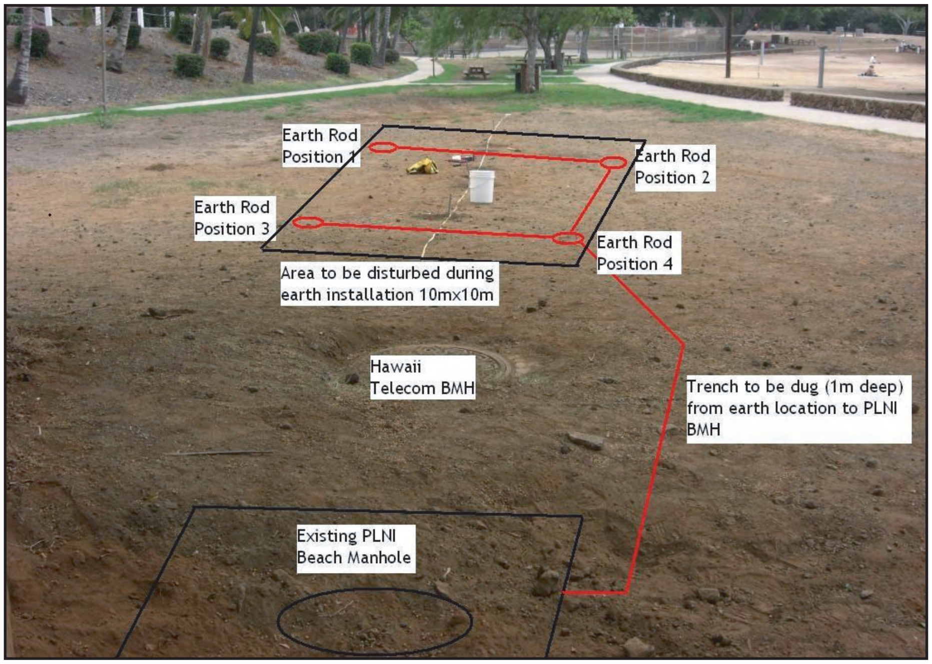
The cable will be buried on the beach to low water mark by excavator and is expected to self bury in the surf zone. If the cable does not self bury it will be jet buried into the seabed by divers to a depth of 3 m (10 ft) where sufficient sediment cover exists.

2.4.2.4 Installation of the OGB

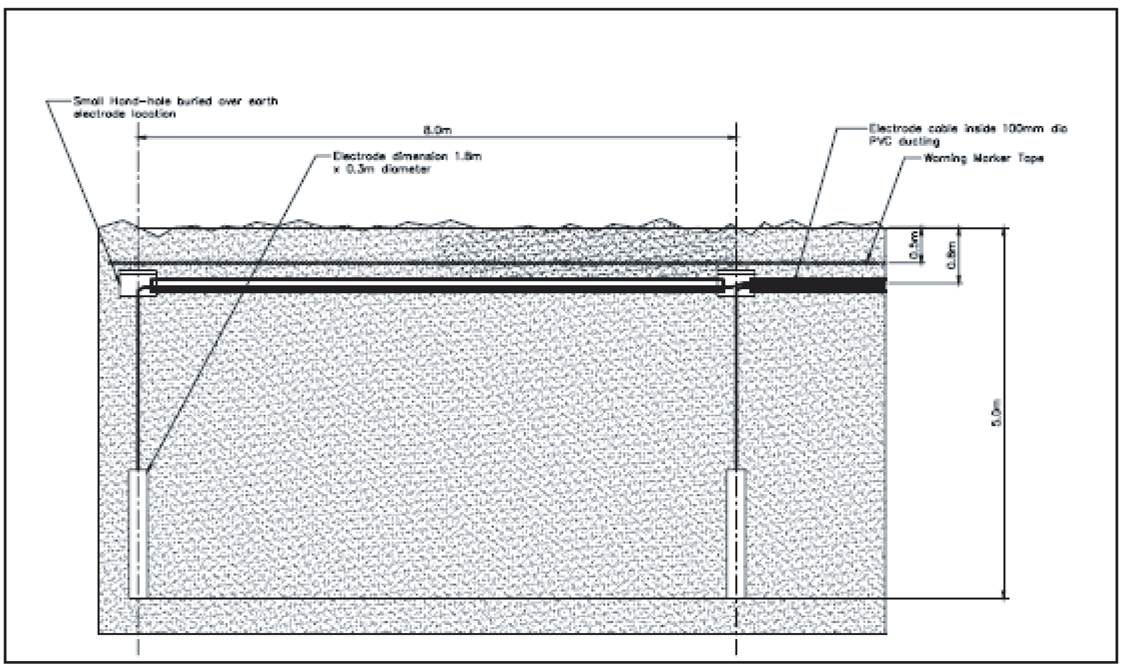
An OGB will be installed near the two existing BMHs prior to or immediately after the shore-end landing. See the proposed location and layout in Figure 2-4. .

Four electrodes 1.8 m (6 ft) long and 0.3 m (12 in) in diameter will be spaced 8 m (26 ft) apart and drilled 5 m (16 ft) below surface at their lowest points (to allow approximately 3 m [10 ft] soil as cover). Ducts made of polyvinyl chloride (PVC) will be placed between the OGB and BMH for the electrode cables to connect to the BMH. Figure 2-7 shows the OGB location and cross-sectional diagram.

Electrodes will be installed into each of four holes drilled by a truck-mounted drilling rig. This method reduces the volume of soil excavated, as compared to excavating a larger area. A truck-mounted drilling rig will be staged at the site where the OGB is to be located. The work area will be marked and site access controlled for public safety. After the OGB is installed, the site will be restored to its original condition.



Location



Cross-Section

Ocean Grounding Bed and Cross-Section

FIGURE 2-7

2.4.2.5 Duration and Dimensions of Shore-end Activities

The expected duration of the beach works and shore-end activities is approximately 10 to 12 days, and an estimated breakdown of duration by activity is shown below.

Day 1: Drilling rig and one excavator for OGB installation arrive on site. Install first electrode.

Days 2-4: Install OGB remaining electrodes.

Day 5: Excavate area around BMH to expose cables and install grounding cables into the BMH. Demobilize the drilling rig used to install the OGB.

Day 6: Add two more excavators onsite plus rigging equipment for shore-end landing.

Day 7: Prepare for shore-end landing (safety fencing and staging).

Day 8: Shore-end landing.

Day 9: Install cable into BMH, fit articulated pipe to cable from BMH to 100 m (ft) offshore, bury cable from BMH to water. Make beach joint at BMH.

Days 10-12: Contingency and restore site.

All the above durations are dependent on weather and swell conditions.

Table 2-1 summarizes key dimensions associated with the project activity.

Table 2-1. Dimensions of Beach Activity

Activity	Area or Volume
Equipment staging area (parking lot, paved)	310 m^2
Working area, excavators and quadrant	1,553 m^2
Work area, OGB installation including grounding cable to BMH	300 m^2
Beach excavation area, BMH to water line	237 m^2
Beach excavation volume, BMH to water line	474 m^3

2.4.3 Operation

Once installed, the cable requires no routine maintenance. The existing cables at Spencer Beach, for example, have remained in place since installation and have required no maintenance or repair. In the unlikely event of a repair being required, this would be done using similar equipment and techniques as those described for the installation, in the water and on the beach.

2.4.4 Best Management Practices and Mitigation Measures

The project has been designed and planned to achieve the installation with minimal disturbance to coastal and marine resources and users. Best management practices and industry standards fundamental to the design, installation and operation of systems like the Honotua system are summarized in Table 2-2.

Table 2-2. Best Management Practices

Project Element	Best Management Practices
Route Planning	• Desktop studies and cable route surveys to assess site-specific conditions and areas to avoid. • Adherence to industry standards, including the International Cable Protection Committee (ICPC) guidelines for routing.
Main lay Operations	• Maritime law and practices related to ship movements. • Safe operating procedures. • Trained crews and operators. • Use of navigational equipment, procedures and communications with other marine users, including but not limited to communications with the USCG. • Vessel pollution prevention (refuse and oil/chemical releases) required by international and U.S. federal laws.
Shore-end Landing	• Maximized use of existing infrastructure. • Trained crews and divers. • Detailed procedures, plan of work and daily reports documenting activity. • Site safety and spill prevention plans. • Planned and frequent communication between ship and shore crews. • Establishment and enforcement of safe distances from equipment, and designated work areas. • Advance communication with appropriate agencies and local authorities. • Site access control. • Maintain clean work area and remove project-related refuse at the end of each day.

Mitigation measures have been developed to avoid or reduce impacts during installation of the cable. Mitigation measures are identified in Chapter 4 in the respective discussions of potential impacts by resource area, and are summarized in the Executive Summary.

2.4.5 Project Schedule and Cost

The landing operation in Hawaiʻi is currently scheduled for the fall/winter of 2009.

The estimated cost of the project is $200,000.00.

CHAPTER 3: ALTERNATIVES CONSIDERED

This section addresses alternatives considered in the development of the Honotua project, including the No Action alternative.

3.1 Alternative Development

3.1.1 Landing Site and Route Selection Criteria

Selection of the landing site and marine route requires intensive review and evaluation of physical, regulatory and commercial information. The landing site must provide:

- Access to telecommunication markets and users, either directly or through interconnection with other subsea networks;
- Access to onshore infrastructure that will minimize the need for additional construction and infrastructure development; and
- A location where the subsea cable can feasibly be landed, with due regard for long-term cable protection, safety and environmental considerations.

The selection and optimization of the marine route in the approach to the landing site is a process that takes account of numerous considerations, including the following:

- Access to the selected landing site;
- Seabed characteristics;
- Bathymetry;
- Restricted areas, such as marine sanctuaries and military operation areas;
- Sea uses in the project area, including recreation and fishing;
- Sensitive habitats and resources;
- Natural and man-made hazards;
- Cultural resources such as shipwrecks; and
- Regulatory and permitting requirements.

When available, cable fault history is also considered in project design and planning. At Spencer Beach, where cables have been installed and operated since 1994 (Fugro 2008), fault history is useful to assess whether the installation techniques used on previous installations have provided adequate protection for the cables.

At the route planning stage, information is obtained from agency contacts, databases, site visits and route surveys to identify and validate information critical to planning the route and landing. The route survey for the Honotua system included side-scan sonar and video surveys of the nearshore area, and a biological survey to obtain site-specific data used in refining the route and landing.

3.1.2 Shore-End Landing Considerations

The development of beach landing techniques includes consideration of:

- Existing infrastructure and beach access area(s);
- Nearshore bathymetry;
- Seafloor profile and characteristics;
- Presence of rock, sediment, corals, existing cables, and other features;
- Seasonal conditions affecting sediment transport, wave energy and working conditions;
- Sensitive habitats and cultural resources;
- Beach and nearshore uses; and
- Work area “footprint” and duration as they affect disturbance to resources and users.

3.2 Alternative Landing Sites

3.2.1 Beach Site

Two beach landing locations were considered for the Honotua cable. The preferred alternative is Spencer Beach Park. Because there is established onshore infrastructure available at Spencer Beach, and existing conduit running to the cable station, this alternative avoids new construction of new structures (cable station, BMH). Mauʻu Mae Beach, located approximately .87 km (.54 mi) south of Spencer Beach, is the second alternative (see Figure 3-1), but was dismissed because it lacked existing infrastructure. No cables are currently installed at Mauʻu Mae Beach and no onshore infrastructure is in place.

3.2.2 Beach Landing Site at Spencer Beach

The existing cables installed at Spencer Beach approach and cross the beach through a rocky tidepool area. The proposed approach and shore crossing for the Honotua cable is to the immediate south of the existing cables at the sandy shoreline, developed because of conditions observed at the site during the planning stage. Specifically, there is no conduit through which the Honotua cable could be installed at the existing shore crossing area, and so installation at this location would disturb a portion of the tidepool area. (Refer to photographs of the existing cables in Chapter 2.)

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Figure 3-1

Alternative Landing At Mau'u Mae Beach

0 500 1,000 2,000 3,000 Feet
0 250 500 1,000 Meters

Another factor is there are five cables and three ground wires crossing through this location and buried under the beach. Because the existing corridor is “crowded” and is without ducts under the beach to connect to the BMH, the potential for damaging one of the existing cables is of concern, and achieving satisfactory depth of burial could be difficult. The location is also more congested by features in the park area, resulting in less space for staging and maneuvering equipment. Access to the existing landfall has been partially obstructed by recent park improvements.

For these reasons, a different approach to the beach was developed that still takes advantage of the sand channel offshore, but crosses the shore at the sandy part of the beach. The proposed location avoids the tidepool area and the other cables. It also has the advantage of having a more direct path to the BMH than the corridor used for the existing cables. Therefore the existing crossing at the tidepool was not proposed.

3.2.3 Cable Stations

Only existing cable stations were considered as a means of avoiding new construction. The PLNI Terminal Station is located approximately 3.5 km (2.17 mi) south of the Spencer Beach site on the South Kohala coast. The GTE station is located approximately 1.4 km (.85 mi) north of the PLNI station. (See Figure 3-1.) Both are operating cable stations, but the PLNI Terminal Station has more available capacity, and space. Conduit construction is currently underway completing the link between the GTE and PLNI stations. This is scheduled to be completed prior to the installation of the Honotua Cable.

Although the GTE Cable Station is closer to the proposed landing site, OPT selected the PLNI Terminal Station because it is with PLNI that OPT has reached commercial agreement for hosting the Honotua terminal equipment and for providing onward connectivity.

3.3 Alternative Shore Crossing Installation Method

OPT proposes a conventional landing method for installing the Honotua cable. This technical approach is consistent with prior landings at the project location, and is the most common technique used in the industry throughout the world. Another technique, horizontal directional drilling (HDD), is sometimes considered where trenching is problematic and to avoid surface disturbance to roads and beaches. HDD has been used successfully in cable installations[1] where there is no existing landing site (and BMH), the distance across the beach or other sensitive area is sufficiently long that beach use would be precluded by direct landing, and subsurface geology is suitable to prevent release of drilling fluid into the marine environment through rock fissures during development of the bore.[2]

HDD was discussed during pre-application meetings with agencies regarding the recent Australia-Hawai‘i project, which ultimately employed a conventional installation technique rather than HDD. Recent projects have included HDD to avoid beach disturbance, and the technique has been considered by some agencies as generally a more favorable installation technique compared with conventional landings.[3] One of the primary reasons for favoring HDD is the stated ability of the technique to limit most impacts inshore of the bore exit points, thereby avoiding disturbance to the beach and coastal resources. An HDD approach was therefore considered as an alternative for the Honotua project.

Using HDD as a shore crossing method, the cable would be installed by drilling under the beach area to a point offshore. The bore would originate near the existing BMH and exit offshore at approximately 25 m (82 ft) water depth, which is approximately 1.2 km (0.75 mi) from the BMH.

The critical elements of an HDD approach that required consideration are noted below. For a more detailed description of HDD installation and requirements, see Chapter 3 of the EA for the Australia-Hawai‘i project (AMEC 2007).

- Space required for the HDD drilling rig, fuel and drilling mud storage, and materials.
- Duration of drilling operations.
- Localized air emissions and noise in a public recreation area.
- Potential damage to rock or coral substrate at the bore exit location.
- Potential for “frac-out.”

---

[1] The TGN system, which was approved but not installed, proposed two landings, one by direct landing and the second by HDD. The direct landing at Kahe Point Beach Park would have included a new BMH and two 5-inch diameter ducts on the beach, as described in the Final EA (2001).
[2] Such releases are called “frac-outs” and result when the fluid, typically a bentonite slurry, escapes through a fracture in the subsurface rock or substrate and is released into the water. This is of particular concern to reefs and areas of live rock because the bentonite, though typically non-toxic, can disperse and interfere with the organisms’ feeding and filtration mechanisms, or cause abrasion. See California State Lands Commission 2005 (Monterey Bay Accelerated Research System [MARS] Cabled Observatory System EIS/EIR), for example.
[3] DLNR Staff Report for Sandwich Isles Communications cable project, July 2004.

The reasons for not proceeding with an HDD technique for the shore crossing are summarized below.

Beach disturbance and upland footprint – The beach disturbance for the preferred conventional installation option would require activity on the beach, and would restrict access to the beach for public safety while the cable is being pulled up the beach and buried. This disturbance would be approximately three days out of the total 10-day installation. HDD operations would not likely restrict access to the beach itself – depending on the exact location of the rig – but would disturb some beach activity because of the noise, equipment exhaust, and staging area required for the rig set-up. HDD operations, not including set-up and restoration, would probably take about 7 to 10 days, and this would be in addition to the shore-end activity when the ship arrives. The duration for the HDD option would be affected by subsurface conditions, which influence the ability to advance the drill if rock or variable conditions are encountered. These complications can significantly extend the duration of drilling operations. (Both approaches would require the installation of the OGB.)

Potential for Upsets -- An HDD approach would require more equipment and materials to be staged and used in the project area than a conventional approach, including diesel for fuel and bentonite for use as drilling mud or lubricant. Spillage capture techniques are used during HDD operations (spill tanks, straw bales etc) to avoid the release of fuel or bentonite; however, there remains potential for bentonite, topsoil or other sediment to escape into the fresh and seawater environments should heavy rain conditions affect the site, causing these mitigation measures to fail. There is also a potential for a diesel release from the stored fuel, although preventive and response measures would be applied to reduce this possibility.

Nearshore impacts – The HDD alternative would avoid direct contact between the cable and seafloor from the BMH to the bore exit location offshore. However, HDD has the potential for indirect effects on corals if a frac-out were to occur.[4] At the bore exit, the seabed would be disturbed or potentially damaged as the bore breaks through the seafloor. According to dive survey observations, the area consists of a sand channel, with coral heads interspersed; it is not immediately known whether rocky substrate and corals could be avoided because it is difficult to

[4] The California Coastal Commission cites potential adverse effects of bentonite from frac-outs, and notes that 3 of the 4 permitted fiber optic cable projects experienced frac-outs during HDD operations. See California Coastal Commission Staff Report E-05-007 MBARI 2005.

predict the precise location of the bore exit. The preferred option would lay the cable directly on the seafloor, which consists of a range of features that will be selectively avoided or targeted by divers during installation. Beyond the bore exit, the effects of the preferred and HDD shore crossing approaches would be the same.

The most prominent contributing factor in the assessment is the existing condition of the landing, which includes infrastructure on the beach and five cables. The short-term effects of HDD installation would exceed those of the preferred project in both duration and intensity, and potentially create additional complexity not encountered during previous installations at the project site. Neither the beach nor the nearshore project areas show signs of long-term disruption or damage to coral and marine growth from the prior installations using the conventional landing technique proposed. In fact, the diver survey has concluded that existing cables have not had a detrimental effect on coral growth or condition.

Therefore the HDD alternative was not selected on the basis of the relative impacts compared with the preferred shore crossing approach.

3.4 No Action Alternative

The No Action alternative would avoid the potential impacts of the project and alternatives. There would still be five cables installed beneath the beach and on the seafloor just offshore of the BMH at the current landing site. However, if the No Action alternative were selected, the project objectives of increasing access to trans-Pacific telecommunications networks, and improving the diversity and security of existing networks would not be achieved.

CHAPTER 4: AFFECTED ENVIRONMENT

4.1 Topography and Geological Conditions

This section describes the geologic and seismic setting at the site, which includes regional and site specific geologic descriptions, area soils, and regional and local faulting. In addition, geologic hazards that may affect the site and/or project design are also addressed.

4.1.1 Existing Conditions

As described in the Sandwich Isles Communications EA (2004): "The island of Hawaiʻi consists of approximately 4,000 square miles of land formed by volcanic activity. The five volcanoes comprising the Big Island are Kohala (long extinct), Mauna Kea (dormant, with some activity during recent geologic time), Hualālai (considered dormant, with last eruption in 1801), and the active volcanoes Mauna Loa and Kīlauea". The highest point in the State of Hawaiʻi is located at the summit of Mauna Kea at an elevation of 4,200 m (13,796 ft) above sea level.

4.1.1.1 On-Shore Setting

The proposed cable landing site is located on the northwest side of the island of Hawaiʻi, just south of Kawaihae Harbor at Spencer Beach Park. The project site is underlain by unconsolidated marine calcareous sediments over shallow basalt bedrock. The calcareous sediments consist of beach sand primarily comprised of coral fragments. The basalt bedrock in this area originated as lava flows from Kohala and Mauna Kea. The most recent volcanic activity in this area consisted of lava flows from the Hāmākua Volcanic Series originating from Mauna Kea during the mid to late Pleistocene Epoch, roughly 100,000 years ago (USGS 2007).

4.1.1.2 Offshore Setting

The proposed offshore cable route follows a sand channel before crossing mixed rocky and sandy seabed with well-developed coral mounds. Seabed sediments in the sand channel are predominantly composed of well-sorted fine to medium grained sand comprised of coral and basalt rock fragments. The sand is approximately 1 to 2 m (3 to 6 ft) thick in the sand channel, which can be seen in aerial photographs in Chapter 2. This horizon overlies a sequence of dense to very dense sand, gravel, coral, and rock. Rock dominates the seabed farther offshore (AMEC 2008).

The Kawaihae deep draft port is located approximately 0.75 km (0.5 mi) to the north-northwest of Spencer Beach Park. The main channel to the deep draft port passes approximately 3 km (2 mi) to the northwest of the beach and the channel to the small boat harbor passes 1 km (0.6 mi) to the northwest of Spencer Beach (AMEC 2008).

4.1.2 Geologic Hazards

4.1.2.1 Earthquakes

In the central Pacific, high seismic hazard areas are mostly confined to the Island of Hawai‘i. Seismic hazard near the Spencer Beach cable landing site is rated high by the U.S. Geologic Survey National Earthquake Center (Figure 4-1) (Fugro 2006).

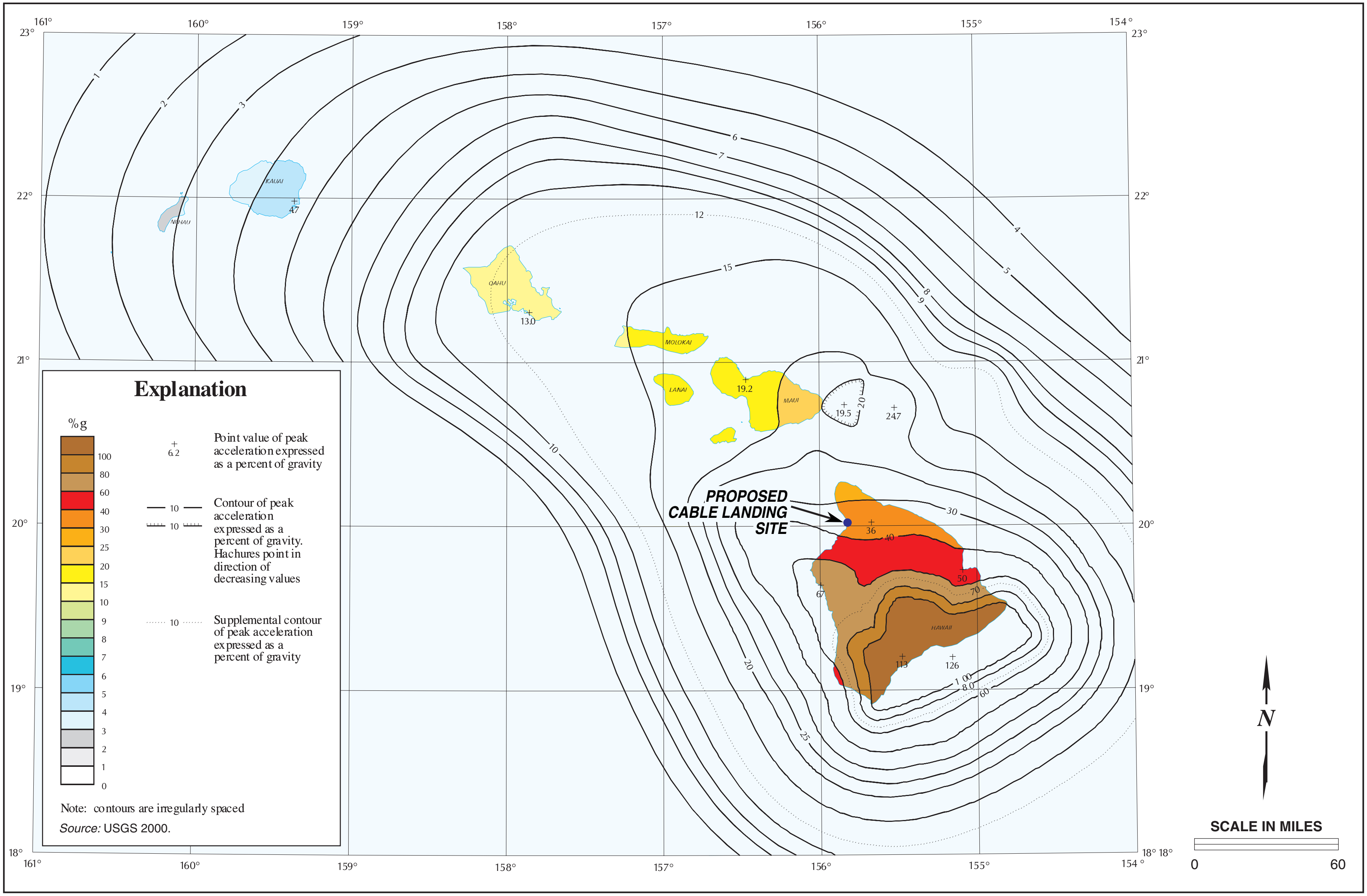
4.1.2.2 Volcanoes

In Hawai‘i, active volcanism is confined to Mauna Loa and Kilauea volcanoes located on the Island of Hawai‘i, and Loihi Seamount located off the southeast coast of Hawai‘i. Hawaiian eruptions are rarely life-threatening because the lava advances slowly enough to allow safe evacuation, but large lava flows can cause considerable economic loss by destroying property and agricultural lands (Fugro 2006). The most recent volcanic activity in the vicinity of the proposed cable landing site occurred approximately 100,000 years ago, as part of the Hāmākua Volcanic Series originating from Mauna Kea. Mauna Kea is considered dormant rather than extinct, so there is a possibility that there could be more volcanic activity originating from Mauna Kea in the future (McDonald 1970).

4.1.2.3 Tsunamis

Tsunamis are seismic sea waves caused by earthquakes, submarine landslides, and, infrequently, by eruptions of island volcanoes. During a major earthquake, the seafloor can move by several meters and an enormous amount of water is set into motion. The result is a series of waves that move across the ocean at speeds greater than 800 km (497 mi) per hour.

In the Hawaiian Islands, both a prehistoric and historic record of locally-generated tsunamis exist. Historic local tsunamis were produced in 1886 and 1975 by large earthquakes that occurred under the island of Hawai‘i. The earthquakes that produced these tsunamis had



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Earthquake Hazard Designations in the Vicinity of the Proposed Project

FIGURE
4-1

magnitudes of 7.2 or greater and were the result of tectonic movement of the island (Fugro 2006). The proposed cable landing site is located in a tsunami evacuation zone, as designated by the Pacific Disaster Center (Pacific Disaster Center 2008).

4.1.3 Short-Term Impacts

Ground-disturbing activities (i.e., during site preparation and installation) will be restricted to the equipment staging areas and beach, as described in Chapter 2. Installation activity would not change the existing topography or geology of the immediate area of the proposed Honotua Cable System landing site. Equipment will be staged either on the road shoulder or on the beach, and would not cause erosion or runoff to creeks or drainages. There will be no ground disturbance in the upland areas near the drainages.

After excavation and burial along the beach is complete, the beach will be restored to its pre-installation condition, and the resulting topography and beach profile will be unchanged. No rocks or reef sections will be cut or altered, so these geologic resources will not be adversely affected.

The activity in the water will not remove native sediments or materials or introduce new materials as part of the installation. If jetting is necessary, it will temporarily displace and redistribute sediments in the shallow water zone (less than 3 m [10 ft] water depth), but they will settle naturally, and will not adversely affect geological resources. The level of disturbance by jetting will be insignificant compared with natural sediment movement in the nearshore area.

4.1.4 Long-Term Impacts

Installation of the cable affects a small area of the beach and nearshore, and will not change the topography or geologic character of the project area. Upland infrastructure (e.g., the duct between the existing BMH and cable station) will not require changes as part of this action; as noted in Section 2, some extension of existing ducting is underway under a separate permit application. The project will not result in erosion that could have long-term impacts.

4.1.5 Mitigation Measures/Best Management Practices (BMPs)

No mitigation is required. All project installation activities would occur on the beach or roadside where soils have been previously disturbed. BMPs will include site restoration to maintain the existing topography and beach profile. Therefore, project implementation would not result in significant impacts to geology or geologic resources.

4.2 Land Use

4.2.1 Existing Conditions

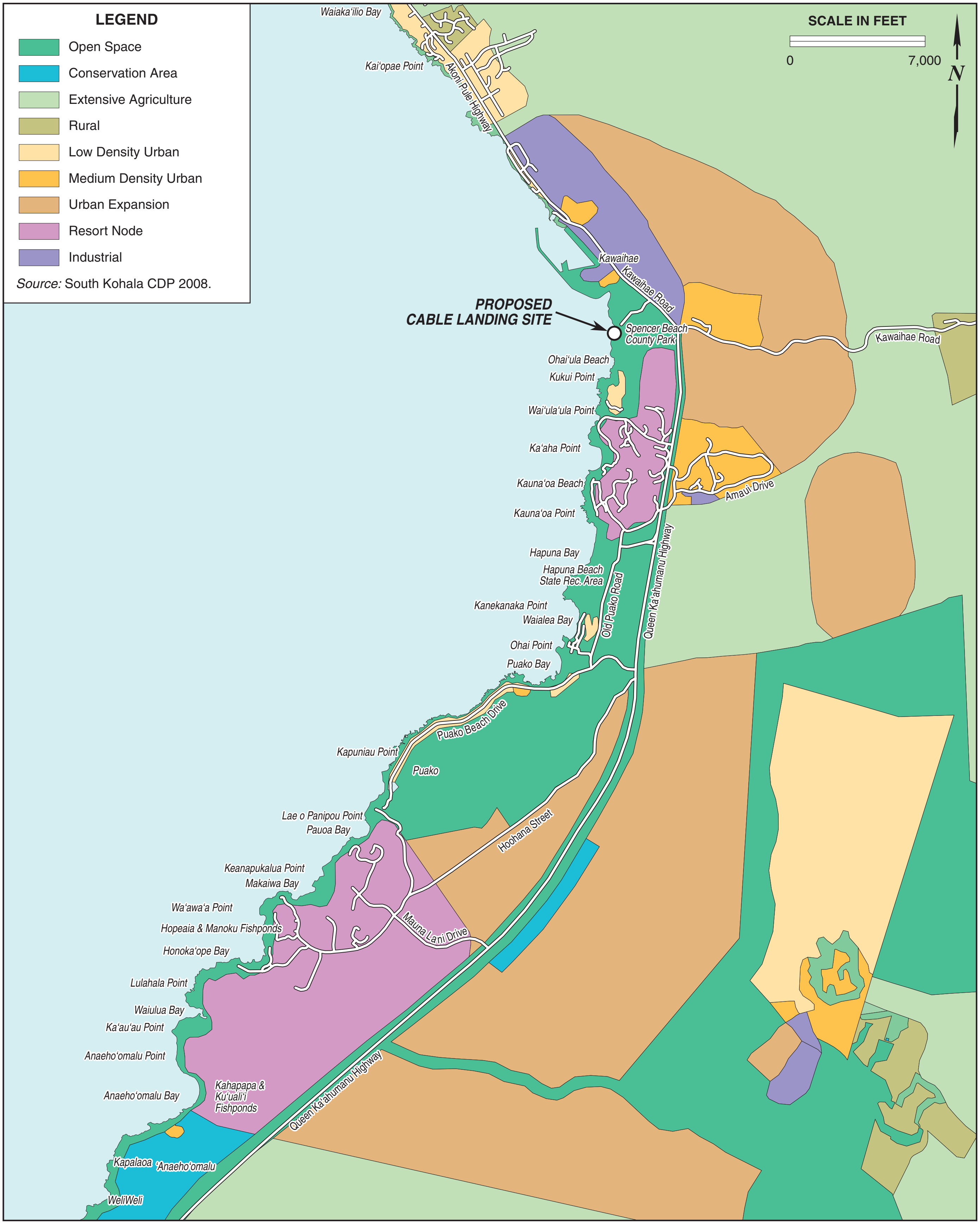
This section provides a discussion on zoning/General Plan designations for the site and surrounding land uses.

The proposed cable landing site is located on the northwest side of the island of Hawai‘i within the South Kohala District at Spencer Beach Park. The South Kohala coastline is largely rural with development clustered in the Kawaihae area to the north and Waikoloa and Puako areas to the south. The proposed project site is under the jurisdiction of the County of Hawai‘i and located within the boundaries of the county park. Activities and development within the South Kohala District are guided by the South Kohala Community Development Plan (County of Hawai‘i 2008). The Plan area applies to 176,500 acres, or 6.8 percent of Hawai‘i's total area. The Plan addresses the core issues of preservation, growth, development, population, housing, infrastructure, and public facilities.

The proposed cable landing site is located in an area designated *Urban* by the State Land Use Commission (submerged land portion is designated *Conservation*) and zoned *Open* by the County of Hawai‘i (Figure 4-2) (County of Hawai‘i 2008).

4.2.1.1 Subzone

Within the Conservation District, there are also five subzones: *Protective, Limited, Resource*, *General* and *Special*. Omitting the *Special* subzone, the four subzones are arranged in a hierarchy of environmental sensitivity, ranging from the most environmentally sensitive (*Protective*) to the least sensitive (*General*). These subzones define a set of “identified land uses” which may be allowed by discretionary permit.



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Land Use Designations in the Vicinity of the Proposed Project

FIGURE 4-2

Based on Chapter 13-5, Hawai‘i Administrative Rules, Conservation District, the *Resource* subzone encompasses “Lands and state marine waters seaward of the upper reaches of the wash of waves…”. Therefore, the proposed project is partially situated in the *Resource* subzone. The objective of this subzone is “to develop, with proper management, areas to ensure sustained use of the natural resources of those areas.” Permitted uses in this subzone also include all permitted uses stated in the Protective and Limited subzones: aquaculture, artificial reefs, and commercial fishing operations.

4.2.1.2 Coastal Zone

The proposed project is located within the designated Coastal Zone. The Hawai‘i Coastal Zone Management Program (CMP) is designed to manage the State’s coastal areas and resources. Coastal resources include beaches, fishponds, scenic areas, marinas, wetlands, recreational areas, anchialine ponds, fish, open spaces, whales, sea turtles, harbors, historic sites, and ecosystems. Because the coastal areas and their resources have traditionally been and continue to be an integral part of the lifestyle of the people of Hawai‘i, their management is important. Therefore, the CMP is based on the premise that coastal resources’ use and development must be environmentally sound, socially acceptable, and economically beneficial to the people of Hawai‘i. The landing site at Spencer Beach is used for recreational purposes such as surfing, swimming, fishing, boating and picnicking. Balance and effective management are the primary purposes of the CMP (State of Hawai‘i, Office of State Planning 1990).

Additionally, the landing site is located within the State of Hawai‘i Special Management Area (SMA). County governments play an important role in implementing the CMP by regulating development in geographically designated SMAs. Through their respective SMA permit systems, the counties assess and regulate development proposals in the SMA for compliance with the coastal zone management objectives and policies and SMA guidelines set forth in Chapter 205A, Hawai‘i Revised Statutes (HRS).

<u>Spencer Beach Park</u>

Spencer Beach Park is just south of Kawaihae Harbor. Protected by the breakwater of the harbor, the water is usually calm, and therefore suitable for swimming and snorkeling. The area is used for picnicking, basketball, volleyball, tennis and camping. The sandy beach and offshore reef are used for swimming, snorkeling, diving and fishing.

4.2.2 Short-Term Impacts

As described in Chapter 2, cable installation activities will be limited to a defined area of the park's beach. The contractors will maintain controlled access to the work area for public safety, but the remainder of the beach will remain open throughout the installation. The entire installation will conclude in approximately 10 days, which includes staging and restoration.

The effects on land uses in the project area will be limited and temporary. Recreational use of Spencer Beach Park will not be precluded by the project activity. A portion of the beach will be designated as a work area to maintain safe distances, as described in Chapter 2, but the remainder of the beach will be open for recreation. Swimming, diving and boating will be restricted near project activities in the water, also for public safety, for approximately one day. Restricted access to portions of the beach and ocean will be temporary, and upon completion will be unchanged from its current use.

See also Chapters 4.3 (Archaeological Resources), 4.8 (Terrestrial and Marine Biology) and 4.11 (Public Facilities) for related discussions of effects on resources in the coastal zone, and measures to protect coastal resources during the project.

4.2.3 Long-Term Impacts

The project will not result in long-term impacts to existing and surrounding land uses. Once installed, the Honotua cable will operate within existing underground telecommunications infrastructure and will not be discernable from site conditions as they currently exist. Existing beach and beach access and nearshore ocean recreational activities will not be affected by the proposed project.

4.2.4 Mitigation Measures/Best Management Practices

BMPs addressing protection of public beach use and access are:

- Local authorities, such as County Parks and local lifeguards, will be given advance notice of the work schedule.
- The contractor will maintain controlled access to the work area to maintain public safety while the beach remains open for public use. Access will be controlled through a number of measures, which may include temporary fencing, signage, and security staff.

- Security may be provided overnight for the equipment on the beach to ensure it is not vandalized and can remain in proper working condition for the duration of the installation. Security needs will be assessed in consultation with local authorities prior to mobilizing equipment.

Mitigations addressing the protection of coastal resources are noted in the discussions of archaeological resources and biological resources.

4.3 Archaeological and Historic Resources

4.3.1 Existing Conditions

The Kawaihae area is thought to have been sparsely populated in traditional times because of the barren landscape and the lack of fresh water. Despite the harshness of the land, the off-shore area was a rich fishing ground. The Pelekane area (which encompasses Spencer Beach Park and the proposed project site) was thought to have been occupied between AD 1250 and 1560.

The most prominent archaeological sites in the vicinity of the project are Puʻukoholā and Mailekini Heiau. Construction of Puʻukoholā, or "Whale Hill", was completed in 1791, after King Kamehameha received a prophecy from one of his kahuna directing him to build a heiau for the war god, Kūkāʻilimoku. This heiau is quite large, consisting of multiple terraces, platforms, and pavings. Mailekini, or "many maile vines", is located below Puʻukoholā, and is said to have been constructed earlier by a district chief. Genealogical calculations indicate construction of this heiau at approximately AD 1640 to 1660. Below Mailekini is the area of Pelekane, where King Kamehameha resided during the construction of Puʻukoholā (GANDA 2008).

As noted previously, there are five existing cables installed at the site. The beach area was disturbed during those installations, as well as from development associated with landscaping, walkway construction, road construction and beach use of Spencer Beach Park.

An archaeological assessment of the project area was conducted in October 2008 to determine whether there were cultural and archaeological resources present. The assessment included:

1. Pedestrian survey and subsurface testing along the proposed beach cable corridor and existing beach cable route;

2. Pedestrian survey and subsurface testing at possible locations for the OGB; and
3. Pedestrian survey and subsurface testing around the existing BMH.

Archaeological fieldwork was conducted by Garcia and Associates (GANDA) on October 30, 2008.[1] The letter report prepared by GANDA is included in Appendix B. The report notes:

- The main study area runs from the waterline at Spencer Beach Park to an existing BMH located in the park, and the area adjacent to the BMH. Terrain consists of fill material, with marine sand, possibly imported, on the beach and rocky fill above the coastal strip.
- The coastal region of Kawaihae has been well studied, dating back to the early 1900's. Early archaeological work in the Kawaihae region consisted mostly of recording major heiau in the area. See Appendix B for a list of previous archaeological surveys in the area.
- The most prominent archaeological features in the region are Puʻukoholā and Mailekini Heiau. A variety of sites have also been documented in the surrounding area. These include "C-shapes", terraces, alignments, mounds, walls, trails, cairns, enclosures, platforms, and cultural deposits.
- For the Honotua project assessment, excavation of eight shovel test pits and five trenches (backhoe excavation) yielded no presence of cultural deposition. The test pits were excavated to bedrock, the water table, or until hand shoveling was no longer possible. Trenches were approximately 1.5 m (4.9 ft) in width and ranged in length from 2.2 to 3.4 m (7.2 to 11.1 ft). The depth of the trenches ranged from 1.0 to 1.8 m (3.2 to 5.9 ft). The test pits were staggered at various intervals along the existing and proposed cable routes. The trenches were spread across the proposed OGB area, an alternate OGB location and the BMH area.

GANDA concluded that because this corridor has been previously excavated for cable installation, the area around the BMH has been filled and graded and excavated for underground sprinkler and utilities, and the beach sand is thought to have been imported, there is an extremely low probability for containing intact cultural resources. GANDA's recommendations have been incorporated as mitigations (see discussion below) (GANDA 2008).

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[1] Work in October 2008 was performed under permission from the County of Hawaiʻi Department of Parks and Recreation.

4.3.2 Short-Term Impacts

As noted above, an archaeological assessment, including shovel test pits and trenches in the proposed beach excavation areas, indicated that no cultural or archaeological resources are likely to exist at the proposed project site. Because the site has been previously disturbed by excavation activities and is predominantly made up of fill material, intact cultural resources are unlikely to occur. Based on the findings obtained during the field investigation, and the history of the project area, no impacts to archaeological resources are expected during installation.

4.3.3 Long-Term Impacts

No long-term impacts to archaeological or historic resources are anticipated.

4.3.4 Mitigation Measures/Best Management Practices

As a precaution, for the protection of archaeological, cultural, and historic resources, the following mitigation measures are proposed:

- A qualified archaeological monitor shall be present during beach excavation activities in the cable corridor; and
- If potentially significant resources are uncovered during excavation or trenching activities, all excavation or trenching activity shall halt until the nature and significance of the resources can be determined by the onsite archaeologist.

4.4 Cultural, Social and Economic Activities

4.4.1 Existing Conditions

According to the 2000 U.S. Census, the resident population in the vicinity of the proposed cable landing site (Census Tract 217.01) numbers 6,015. In comparison, the population of Hawaiʻi County was 148,677 in 2000 (U.S. Census Bureau 2000).

No residences or commercial properties are located at the proposed project site. The nearest residential and commercial properties, apart from the GTE cable station and PLNI Terminal station, are located in Puako, approximately 9.6 km (6 mi) south of the project site. The use of the project area for recreation is discussed in Chapters 4.2, Land Use, as well as the importance of coastal resources. The beach and coastal resources have cultural, social and economic value to the local community.

4.4.2 Short-Term Impacts

As discussed in Chapter 4.2, the beach will remain open during project activity, with controlled access to the work area, and will not preclude regular socioeconomic activity in the project area, which is primarily used for recreation. Measures taken to protect coastal resources are addressed in Chapter 4.8.

The discussion in Chapter 4.3 noted an archaeological assessment was conducted at the site in October 2008, and that shovel and backhoe test units yielded no evidence of cultural deposition. On the basis of these tests, background review of available surveys, and known conditions at the site, no impacts to cultural resources are expected.

No impacts to existing resident and worker populations in the South Kohala District are expected. The proposed project will provide limited opportunities for purchases of materials and services, and potential for short-term employment, associated with the construction activities. There will be no impact on State and County operational expenditures for public services on the island.

Beach areas are known to be vulnerable to thefts from vehicles. Overnight security staff will be provided during the construction period to monitor equipment left on site, as discussed in Chapter 4.2.

4.4.3 Long-Term Impacts

The project will not have long-term adverse impacts in the project area related to the presence of the cable at the beach. The installation and operation of the Honotua cable will provide economic and commercial benefits at the state level by increasing telecommunication access and expanding Hawai‘i’s current position as a telecommunications hub.

Because the operation of the Honotua cable system will be conducted at the existing PLNI Terminal Station, no new employment is expected to be necessary, and the project will not induce commercial growth or the need for housing at the project site or immediate project area.

The project will not permanently disrupt or change the unique character of the South Kohala District.

4.4.4 Mitigation Measures/Best Management Practices

BMPs and mitigations addressing the use of the beach and protection of coastal resources are discussed in Chapter 4.2. Combined with the mitigations proposed in Chapter 4.3, these mitigation measures are protective of cultural, social and economic activities in the project area. No further mitigation is required.

4.5 Visual and Aesthetic Resources

4.5.1 Existing Conditions

South Kohala contains two distinct physical environments, the green mountainous region in the north, and the dry, rugged landscape in the south. The proposed project site is in the rugged, arid southern region near Kawaihae Harbor. Each environment has its unique natural beauty, and the beach at Spencer Beach Park (Ohaiula Beach) has been designated a Natural Beauty Site (County of Hawaiʻi 2005). Views from the project site look directly at the open ocean (Pelekane Bay) with Kawaihae Harbor visible to the north.

The project description (Chapter 2) provides maps and aerial photographs of the project site and general area.

4.5.2 Short-Term Impacts

Installation of the Honotua cable will last approximately 10 days, including equipment staging and site restoration on or at the beach. Excavation and restoration will take 3 to 4 days. These activities will require controlled access to the work area but will otherwise not restrict beach use. Project vessels will be present during part or all of this period, but the cable ship would be present for a more limited time, about one day.

Project activities will be temporary and will not adversely affect a designated scenic vista. The equipment and vessels will be visible to the public from the beach park and the vessel will be visible from Puʻukohala Heiau National Historic Site, Kawaihae Harbor, and possibly beaches to the south, but the vessel will be visible for 1 to 2 days. Therefore, impacts are not considered significant.

4.5.3 Long-Term Impacts

After installation, the project will have no visual impact, and will not affect existing view sheds or scenic resources.

4.5.4 Mitigation Measures/Best Management Practices

No mitigation measures are necessary.

4.6 Water Resources

4.6.1 Existing Conditions

Water resources considered in this analysis include surface water and drainage, flood hazards, groundwater, and water quality. Surface water resources include the Pacific Ocean, lakes, rivers, and streams, and are important for a variety of economic, ecological, recreational, and human health reasons. Groundwater resources are essential in many areas for potable water consumption, agricultural irrigation, and industrial applications.

4.6.1.1 Surface Water

At the project site, the annual mean high water level is 54 cm (21 in) and the annual mean low water level is 24 cm (9 in). The average tidal range is 36 cm (14 in).

Waters offshore the project site are in the Class A category as defined by the Department of Health (DOH). According to DOH administrative rules, marine waters are categorized as Class AA and Class A. Class AA waters are to “remain in their natural pristine state as nearly as possible.” Class A waters can be used for “recreational use and aesthetic enjoyment,” among other allowable uses compatible with protecting the natural resources in these waters (Hawai’i Administrative Rules Chapter 11-54, Water Quality Standards).

No surface water bodies or streams exist in the immediate project area.

4.6.1.2 Flood Hazards

The Flood Insurance Rate Map (FIRM) describes the proposed landing site area as a Special Flood Hazard Area inundated by the 100-year flood. The designation for this shoreline area is generally Zone AE, indicating areas where base flood elevations are determined (Federal Emergency Management Agency [FEMA] 1988). Base flood elevations in this area during a 100-year flood are identified as being 2 to 3 m (8 to 9 ft).

4.6.1.3 Groundwater

The primary component of the hydrogeologic environment within the island of Hawaiʻi is a deep basal, fresh groundwater body floating on, displacing, and existing in dynamic equilibrium with salt water saturating the highly permeable basalt of the island base. This basal groundwater body originates primarily as rainwater percolating into the island from higher drainage basins. The tendency of percolated groundwater is to migrate seaward through zones of the highly permeable basaltic basal rock until it meets thick sequences of the comparatively impermeable caprock that overlaps the seaward margins of basal rock.

According to Mink and Lau (1993), the proposed landing site overlies the Waimea Aquifer System of the West Mauna Kea Aquifer Sector. The aquifer is classified as an unconfined, basal aquifer in flank (horizontally extensive) lavas. It is an irreplaceable aquifer that is currently used as a drinking water source. It has low salinity and is highly vulnerable to contamination because of its close proximity to the surface.

4.6.2 Short-Term Impacts

The primary water quality concern during installation is the potential for increased turbidity from sediments disturbed in the nearshore area and runoff from the project activities in the beach area. During beach excavation and diver jetting (if needed), sediments will be temporarily displaced and redistributed, which will cause some temporary turbidity. As described in Chapter 2, the cable will be jetted into the sediments to an approximate water depth of 3 m (10 ft). Neither the beach excavation nor the jetting will introduce new or non-native materials to the water. The beach will be restored after the cables are in place, and after diver jetting the sediments will settle naturally.

The temporary displacement of sediments during installation will not introduce or resuspend contaminants into the water column. (See also Chapter 4.8 regarding findings of the September 2008 dive survey.) The beach and nearshore sediments in this area are mobile and subject to regular natural processes of erosion and deposition.

A secondary consideration is the potential for equipment or vessels to release petroleum hydrocarbons or other hazardous materials into the environment. The implementation of standard BMPs and spill prevention measures will reduce the potential for such releases. BMPs are noted below.

The short-term effects of project installation on water quality will be temporary, and the potential for releases will be reduced by implementation of BMPs.

4.6.3 Long-Term Impacts

Project activities potentially affecting water quality are limited to the installation phase. The cables do not contain materials that would be harmful to water quality and will have no effect on water quality.

4.6.4 Mitigation Measures/Best Management Practices

BMPs will be implemented to avoid introduction of refuse or other non-native materials onto the project site, thereby reducing the potential for material to enter the ocean. Equipment and vessels shall be operated under regulatory requirements and accepted safe practices to prevent accidents that could result in releases. BMPs are noted in Chapter 2, and those applicable to the protection of water quality include:

- Management of refuse and general site management to prevent materials from entering drainages or the ocean.
- Spill prevention and response plans for vessels and site management of equipment fluids.
- Safety plans specific to the work area to prevent accidents.

4.7 Marine and Nearshore Conditions

4.7.1 Existing Conditions

4.7.1.1 Bathymetry

Chapter 4.1, Geological Conditions, describes the offshore conditions along the approach to the site. Figure 4-3 provides a chart of the bathymetry in the project area. The site-specific bathymetry was obtained during the cable route inshore survey in September 2008.

4.7.1.2 Marine Hazards

<u>High Waves</u>

In Hawaiʻi, waves are caused by: 1) the north Pacific swell; 2) the northeast trade wind swell; 3) a south swell; and 4) kona storm swells. The north Pacific swell is generated by storms in the Aleutian Islands area, and it tends to produce wave heights 2 to 9 m (8 to 30 ft) on average between the months of October and May. The north Pacific swell tends to be the most destructive of the four sources. The northeast tradewinds produce wave heights 1.2 to 3.7 m (4 to 12 ft) on average between the months of April to November. The south Pacific swell is most active between April and October and produces wave heights that range 0.3 to 1.2 m (1 to 4 ft). Kona storm waves average 3 to 4.6 m (10 to 15 ft) and can occur at any time of the year (Sandwich Isles Communications 2004).

<u>Storms and Hurricanes</u>

The Hawaiian Islands have some of the most temperate weather conditions in the world due to their geography and the presence of a large stable subtropical high-pressure system that produces persistent cool northeast trade winds across the islands. This accounts for the wetter climate on the windward sides of the islands compared with leeward areas (Sandwich Isles Communications 2004).

Storms originating from the north Pacific usually occur between the months of October and April, and can cause severe wind and rain conditions, particularly on the north side of the islands. However, *kona* (or leeward) storms, which normally form in the west and northwest Pacific Ocean, usually cause the more severe wind and rain conditions on the south side of the islands. Hurricanes are relatively rare to the islands. The last two hurricanes, Iwa in 1982 and

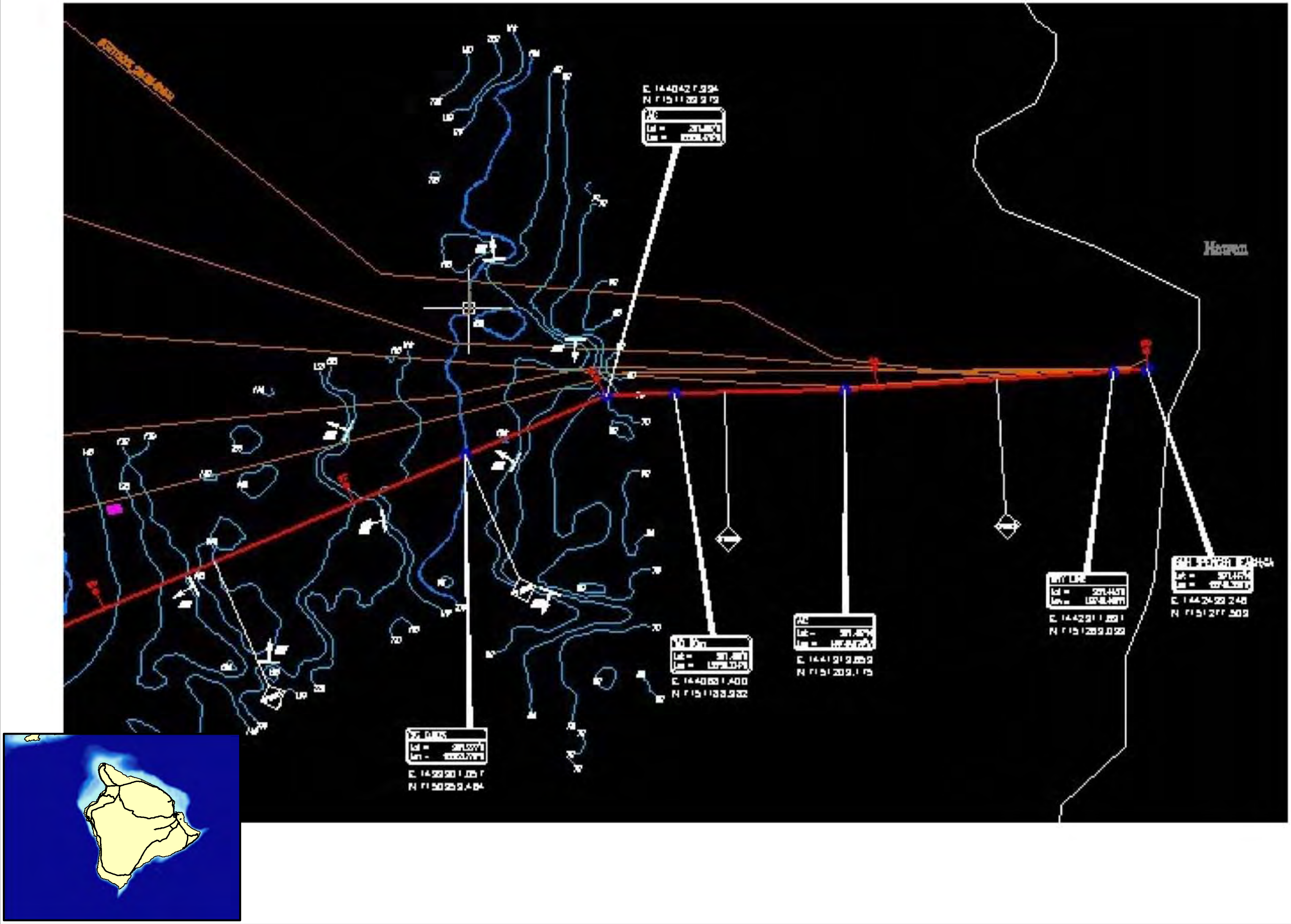

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Figure 4-3

Preliminary Bathymetry Data

Iniki in 1992, caused significant damage mostly to Kauaʻi (Sandwich Isles Communications 2004).

4.7.2 Short-Term Impacts

Project installation will not require cuts or modifications to the reef or other bottom features that would affect bathymetry or natural processes, such as sediment transport. The cable route is designed to stay within the area of existing cables and to avoid disturbance to the reef. Project installation will not adversely affect the natural contours of the project area or coastal processes.

4.7.3 Long-Term Impacts

The potential long-term effect resulting from the installation of cables subject to these marine hazards is the potential for the cables to be damaged and require repair. A repair would not impact coastal processes, but would entail temporary disturbance (similar to installation) to repair the cable.

The potential for damage is avoided or reduced by cable engineering and route design. The Honotua cable system incorporates armoring and the additional protection of articulated pipe suitable for the expected conditions. These features are described in Chapter 2. The five cables currently installed at the project site are the best demonstration of the effectiveness of these design considerations. On the basis of recorded conditions, cable fault history at the landing, and proposed cable protection design, the potential for cable damage from marine hazards is considered to be low.

4.7.4 Mitigation Measures/Best Management Practices

BMPs that address cable protection and design appropriate for the site-specific marine hazards are noted in Chapter 2 and include:

- Use of desktop study findings to select cable design and routing;
- Application of cable route survey data to refine the cable route and design to avoid external hazards (landslides, steep slopes, anchorages); and
- Maximized use of existing infrastructure and landing sites, which provides site and operating history that can be used in routing and cable design.

No mitigation measures are required.

4.8 Terrestrial and Marine Biology

4.8.1 Existing Conditions

4.8.1.1 Terrestrial Biology

The proposed project area is located in Spencer Beach Park and adjacent to Pu‘ukohola Heiau National Historic Site. Spencer Beach park consists of 13.4 acres and approximately 1,200 ft of sandy coastline (County of Hawai‘i 2005). No known rare animals or plants inhabit the proposed project site (DLNR 2005).

The beach area is predominantly sand, but there are sparse patches of grass and several trees in the proposed project area. Table 4-1 lists plant species observed at the beach area in October 2008. Figure 4-4 is a photo of the project area vegetation from October 2008.

Table 4-1. Plants Observed at the Project Site

Scientific Names	Common Name
COMBRETACEAE	
Terminalia catappa	false kamani tree
MALVACEAE	
Thespesia populnea (L.) Sol. ex Correa	milo tree
LEGUMINOSAE	
Prosopis pallida	kiawe tree
ANACARDIACEAE	
Schinus molle	pepper tree
MORACEAE	
Ficus sp.	ficus tree
POACEAE	
Heteropogon contortus,	pili grass
ARECACEAE	
	various palm trees

Source: AMEC 2008.

Figure 4-4. Plants Observed at Project Site

4.8.1.2 Marine Biology

The marine resources considered for this analysis include nearshore (<25 m [82 ft] water depth) and offshore biological communities in the vicinity of the proposed project site at Spencer Beach.

<u>Nearshore Biological Resources</u>

Existing conditions within the nearshore zone were evaluated by a team of project divers who conducted a survey along the proposed cable route in September 2008, from the 25 m [82 ft] water depth contour to the surf zone (approximately 1.5 m [5 ft] water depth) terminating at the tidepool area where existing cables are installed (AMEC 2008). In addition to observing existing conditions along the proposed cable route, divers evaluated a series of 21 transects perpendicular to the alignment to obtain representative information on the biological and physical characteristics within a corridor surrounding the alignment. The transects were conducted at predetermined intervals from 25 to 1.5 m [82 to 5 ft] water depth.

The proposed Honotua cable route takes advantage of a naturally-occurring sand channel that extends from the deep sand plains through the nearshore reef platform to the shoreline at Spencer Beach. In addition, because the composition of the sand channel is fairly homogenous, there is relatively little biotic zonation throughout the area of cable alignment. The overall composition of the marine communities off Spencer Beach occurs as two major habitats. The most dominant habitat, in terms of areal coverage, is a relatively flat, gently sloping sand plain. The other major biotic habitat consists of coral "mounds" or "knolls". The dive team included a specialist in nearshore Hawaiian marine biology, who recorded the predominant marine resources (e.g., corals) within a 30-m-wide (98-ft) survey corridor along the proposed cable. During these underwater investigations, notes on species composition were recorded, and conditions of the area were documented by digital photographs/video. The survey report is contained in Appendix A, and includes photos taken during the survey showing the habitat.

The nearshore and intertidal zone consists of rounded basaltic rock and boulders, interspersed with patches and small channels of coarse-grained white sand. The boulder zone only extends to a distance of approximately 5 m (16 ft) from shore in water depths of 0 to 1 m (0 to 3 ft). Because of the shallow depth, episodic exposure to the energy of breaking waves, and exposure to the atmosphere during low tide, biotic assemblages on the rock substrata were limited. Occurrence of reef corals were limited to intermittent small nubbins of *Pocillopora meandrina*. No other motile invertebrates (e.g., sea urchins, sea cucumbers) were observed in the area. While many of the upper surfaces of the boulders were covered with a short algal turf, no species of macroalgae were observed.

The zone described above will be avoided by shifting the alignment to the south of the tidepool area occupied by the existing cables. The planned route will proceed south from the sand channel across a basalt shelf before crossing the sand portion of the shore. The basalt shelf was described in the 1999 Final EA[2] for the Southern Cross Cable Network as follows:

Between the sand area and the shore of the proposed cable alignment is a small "finger" of emergent basalt (pahoehoe). This hard bottom commences about 15 feet offshore of the sand beach (about 3 feet deep) and continues seaward to a maximum extent of about 80 feet offshore in about 8 feet of water.

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[2] Final EA Southern Cross Cable Network, 1999 (1993-03-23-HA-FEA).

Fish were rare in the nearshore zone compared to the deeper reef platform. Fish observed among the boulders were the brown surgeonfish (*Acanthurus nigrofuscus*), convict surgeonfish (*Acanthurus triostegus*), and saddleback wrasse (*Thallassoma duperrey*).

<u>Sand Plains and Coral Mounds</u>

The dive survey found biological community assemblages interspersed within the sand plains including numerous burrows from an apparently wide assortment of infauna, which likely includes, but is not limited to, worms, mollusks, crustaceans, and fish. The variation in size and appearance of the burrows indicates a wide diversity of infauna. Several macro-invertebrates, noted on the surface of the sand plain, were mollusks, including several large mollusks (*Conus lividus* and *Terebra* sp.). Within the region between 100 m and 300 m (328 to 984 ft) from shore, the sand plain contained meadows of seagrass (*Halophila* sp.). In the deeper regions of the sand plain (>4 m [13 ft]) a thin greenish brown film, which likely consists of a cyanobacterial mat, covered portions of the bottom. No other macroalgae were observed on the sand plain. Fish were rare over the sand flats, where only several goatfishes (*Mulloidichthys* spp.) and black triggerfish (*Melichthys niger*) were observed. Tiger sharks (*Galeocerdo cuvier*) were observed from the boat within the cable landing area.

The most biologically diverse area consists of coral "mounds" or "knolls". These mounds vary in size from single hemispherical colonies of *Porites lobata* to much larger structures on the order of 20 m (66 ft) in length and 3 m (10 ft) in height. The larger mounds are a mixture of coral species, but are primarily composed of *Porites lobata* and patches of *Porites compressa* (finger coral). Other species within the coral mounds, but in much reduced abundance, were *Montipora patula*, *M. capitata*, *Pocillopora meandrina*, *Pavona varians*, and *Pavona duerdeni*. In total, living coral cover on the upper surface of the reef platform was on the order of 90 percent. Other macro-invertebrates that were commonly observed on the coral mounds were the sea cucumbers (*Holothuria atra* and *Actinopyga mauritiana*) and sea urchins (*Tripneustes gratilla*, *Echinometra mathaei*, *Echinometra oblonga*, *Heterocentrus mammillatus*, and *Echinotrix diadema*). The only alga noted on the reef surface was *Amansia* sp., which occurred rarely as small, isolated patches.

The coral mounds provide the habitat for a variety of reef fish. The most common fishes were the damselfishes (*Chromis agilis*, *C. hanui*, *Abudefduf abdominalis*). Particularly abundant were juvenile damselfish (*Dascyllus albisella*). A variety of surgeonfishes (*Acanthurus nigroris*, *A.*

nigrofuscans, *A. olivaceus*, *Naso lituratus*, *Zebrasoma flavescens*), butterflyfishes (*Chaetodon miliaris*, *C. multicinctus*, *C. quadrimaculatus*, *C. auriga*, *Forcipiger longirostris*), and moorish idols (*Zanclus cornutus*) were also observed. Hawkfishes (*Parracirrhites arcatus*, *P. forsteri*, and *Cirrhitops fasciatus*) were common sitting on the upper branch tips of colonies of *Pocilloporid* corals. Common wrasses included *Bodianus bilunulatus* and *Thallosoma duperrey*. Several squirrelfish (*Myripristes* spp.) were observed under ledges at the bases of some of the larger coral mounds.

Five cables bisect the sand plain throughout the survey corridor. The cables lie mainly on the surface of the ocean floor, but there are areas where the cables have self buried in sandy sediments and other areas where the cables are suspended as they cross sand-filled depressions. All of the cables that were situated above the elevation of the seafloor were colonized with living coral colonies. The most common colonizer of the cables was *Pocillopora meandrina* and *Porites lobata*, although in deeper water, several large colonies of *Pocillopora eydouxi* were observed growing on the surface of cables.

Table 1 in Appendix A provides a detailed summary of the abundance of reef fish and coral heads observed along each of the transects evaluated during the September 2008 dive survey. No species of fish, algae, or coral that are listed as endangered, threatened, or species of concern for the state of Hawaiʻi were reported or observed during the survey, except for one green sea turtle (noted below).

Offshore Biological Resources

Sensitive offshore species of concern for the proposed project site were discussed during a pre-application meeting in August 2008 between AMEC and the National Oceanic and Atmospheric Administration (NOAA), and in subsequent telephone conversations (Graham 2008). Hawaiian marine protected species that may occur in the vicinity of the proposed project area include the Federally threatened green sea turtle (*Chelonis mydas*), the Federally endangered Hawaiian monk seal (*Monachus schauinslandi*), the Federally endangered humpback whale (*Megaptera novaeangliae*), and the spinner dolphin (*Stenella longirostris*) (Graham 2008).

Spencer Beach and the immediate inshore area are not known or identified for nesting or basking by the green sea turtle. Similarly, Spencer Beach is not known or identified as a pupping location for Hawaiian monk seals. Seals may haul-out at the site, but it is generally not considered to be a haul-out location. The last sighting of a monk seal in the area was near the Kawaihae Canoe Club in May of 2003 (Graham 2008).

The endangered humpback whale is known to frequent island waters in their annual migrations to Hawaiian wintering grounds. They normally arrive in island waters about November and depart by May but are known to occur from October to June, and have been sighted as early as September. In general, their distribution in Hawaiʻi appears to be limited to 183 m (600 ft) water depth and shallower (Graham 2008). Spencer Beach is located within the Hawaiian Islands Humpback Whale National Marine Sanctuary, created by Congress in 1992 to protect humpback whales and their habitat in Hawaiʻi. Lying within the shallow (<183m or 600 ft), warm waters surrounding the main Hawaiian Islands, this sanctuary encompasses one of the world's most important humpback whale habitats and is the only area in U.S. waters where humpback whales reproduce (NOAA 2008). See Figure 2-5.

Pods of spinner dolphins are frequently encountered along Hawaiʻi's leeward coast near Kawaihae Harbor (Graham 2008).

Fisheries resources within the proposed project area are managed by the National Marine Fisheries Service (NMFS) and Western Pacific Fisheries Management Council (WPFMC). WPFMC is responsible for the creation of management plans for fishery resources (FMPs) and identification of essential fish habitat (EFH) in Federal waters off the coasts of American Samoa, Guam, Hawaiʻi, the Northern Marianas Islands and other US Pacific islands.

Within the Hawaiian archipelago, WPFMC has established FMPs for Western Pacific crustaceans, Western Pacific precious corals, bottomfish and seamount groundfish, Western Pacific pelagic fish, and coral reef ecosystems. The coral reef ecosystem FMP identifies EFH from nearshore to a water depth of 50 fathoms (91 m). EFH is defined as "those waters and substrates necessary for fish to spawn, breed, feed, or grow to maturity."

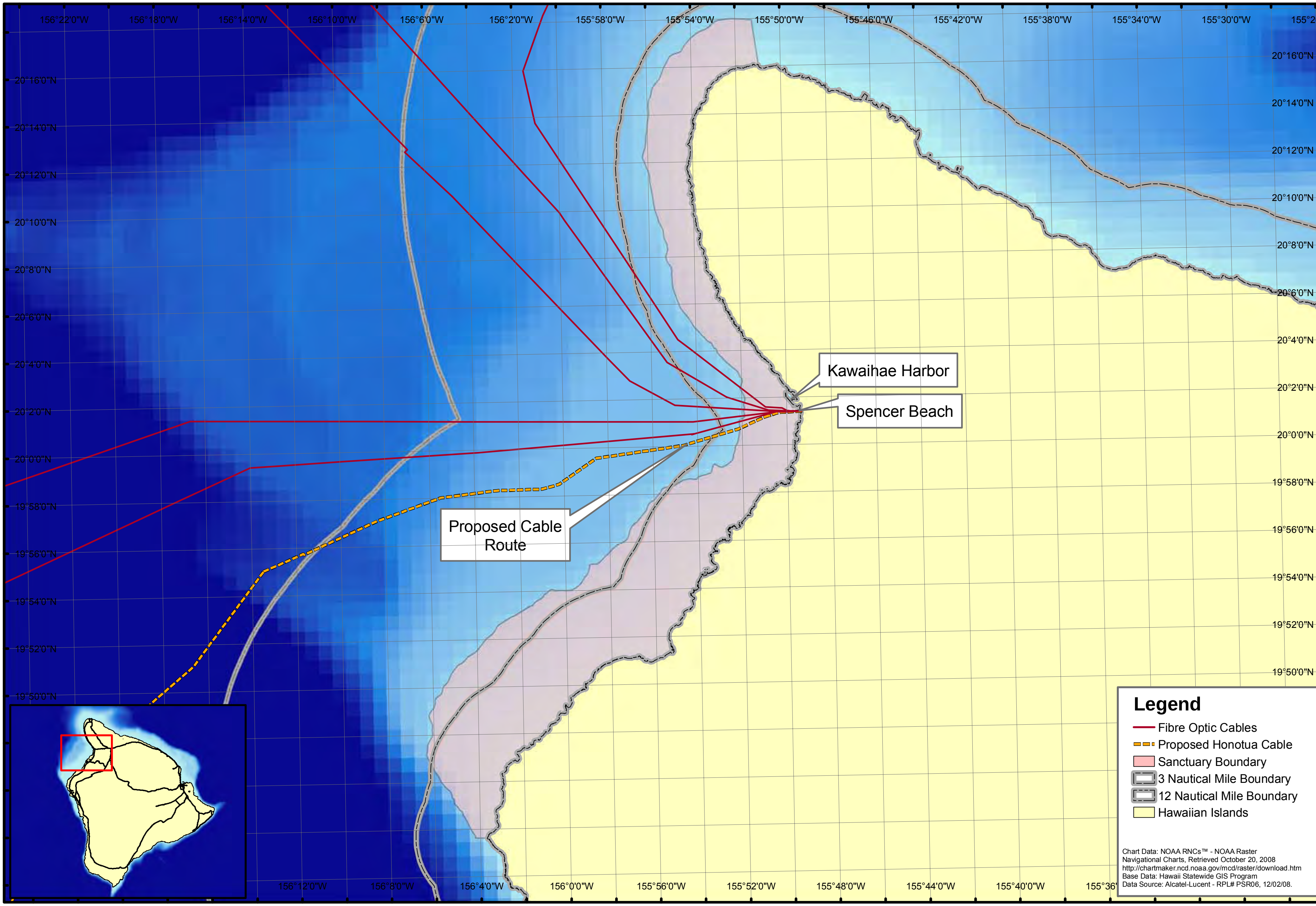

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Figure 4-5

Hawaiian Islands Humpback Whale National Marine Sanctuary Boundary

0 1 2 4 6 8 10 12 14 16 Miles

0 2.5 5 10 15 20 Kilometers

4.8.2 Short-Term Impacts

4.8.2.1 Terrestrial Biology

There are no known threatened or endangered species at the proposed landing site. Short-term disturbance to the flat sandy area near the new restroom facility will occur during excavation to expose the BMH, to bury the cable on the beach and to install the OGB. Following the completion of construction activities, the contractor will return the site to its preconstruction condition. Excavation will occur in unvegetated areas, therefore, short-term impacts to terrestrial biological resources are expected to be less than significant and temporary.

4.8.2.2 Marine Biology

Potential short-term and temporary impacts on marine biological resources from the proposed project could occur during the cable laying and nearshore landing operations. These impacts may include noise from the cable ship, support boats, or shore operations; potential for collision with the cable ship or support boats; contact with the cable and/or cable floats during cable installation; and damage to coral during cable placement on the seabed.

Disturbance from noise and activity – the cable will be laid along a pre-defined route, and during the main lay the vessel moves at a consistent speed of up to 4 knots along the alignment. The vessel's movement is predictable and, based on industry experience; animals tend to avoid the vessels. Similarly, the activity from the support boats and divers tend to be avoided by marine species. These activities will be completed over a few days, during which the actual activity will be intermittent (e.g., positioning the vessel, landing the cable, removing floats).

Potential for collision or contact with cable-laying equipment – as noted above, the cable ship will move at a consistent speed that is sufficiently slow that mammals, in particular, can avoid the vessel. As a means of preventing collision or other contact with protected species, Marine Protected Species Protection Protocols will be established and implemented by an onboard observer, as discussed under Mitigations below.

Potential direct impact on corals – during the biological dive survey the proposed route was planned with a view to minimizing the potential for impact to corals. Nevertheless, corals were observed along the selected alignment, and in some sections of the route there is a potential for the cable to contact coral. Within the constraints imposed by the amount of slack available, the direct impacts to coral can be reduced by divers manually repositioning the cable away from organisms after the floats have been cut and the cable has sunk to the bottom. By shifting the shore crossing point south, away from the tidepool area, the denser coral areas can be avoided. Project vessels will not anchor during installation, avoiding potential impacts from anchoring. It is expected there will be no significant effects or permanent damage to corals. See discussion under Mitigations below.

Potential impact on species listed as endangered, threatened, or species of concern – as discussed above, the cable ship will move at a constant speed that is sufficiently slow that mammals, in particular, can avoid the vessel. Marine Protected Species Protection Protocols will be implemented by an onboard observer as well as on the beach. No impacts to species listed as endangered, threatened, or species of concern are anticipated.

Potential impact on EFH – the cable will be placed on the seabed, which will vary along the route and include sand, corals, and rock. Disturbance to the seabed will be short-term, and the area occupied by the cable is small relative to the habitat area. If warranted by specific conditions, the cable may be anchored to rock to avoid movement and scour (see Chapter 2). The presence of five other cables at the same landing, which were installed in the same manner, and the conditions observed during the dive survey indicate the installation of the cables did not have a detrimental effect on the long-term health of the biota.

The effects described above will be localized, short-term impacts that will not adversely affect the long-term health of the habitat in the project area. This expectation is supported by observed conditions where previous cables have been installed. Disturbance to marine resources, if any, will be limited to the duration of the specific activity.

4.8.3 Long-Term Impacts

4.8.3.1 Terrestrial Biology

There are no projected long-term impacts to terrestrial biology.

4.8.3.2 Marine Biology

The presence of the cable will not degrade or otherwise adversely affect marine species or habitat in the project area. The cable is non-polluting.

Present conditions documented during the September 2008 dive survey provide confirmation that the long-term presence of multiple cables has not affected the health or biotic community structure in the project area. Existing cables cross the reef platform and in some locations have coral colonization (AMEC 2008). Where the cables cross sand flats, they are partially or completely buried, conforming with localized conditions.

The cables presently operational within territorial waters at Spencer Beach have not experienced faults which is an indication that the present routing and design has provided adequate protection to avoid damage that could lead to repairs. The proposed Honotua cable has been routed to take advantage of the sand channel and similar features followed by existing cables, and will also use articulated pipe to protect and maintain the stability of the cable. As described in Section 2 and Appendix E, it may be necessary to pin the cable to rock to avoid movement of the installed cable, which could scour the rock over time in a high energy environment. It is expected that the cable will self bury in areas of sandy sediments.

As a result, placement of a new cable in this same area should not pose any adverse long-term impacts to the marine species, marine habitats or essential fish habitat off of Spencer Beach.

4.8.4 Mitigation Measures/Best Management Practices

4.8.4.1 Terrestrial Biology

BMPs that will be implemented to reduce the potential for impacts:

- Following the completion of construction activities, the contractor will return the site to its preconstruction condition.

No mitigation is recommended. The existing vegetation, which consists of invasive species, will be allowed to revegetate.

4.8.4.2 Marine Biology

BMPs that will be implemented to reduce the potential for impacts:

- Vessel crew will be briefed on the specific requirements to be adhered to during installation in the project area so they are fully aware of issues or resources with project-specific procedures or reporting requirements.

- Inshore installation procedures are based on an established route that was developed in concert with the marine biological dive survey so procedures are aligned with site-specific considerations. Corals and reef structures were factored into the route planning.

Mitigations:

- Marine Protected Species Protection Protocols shall be implemented by an onboard observer during installation to identify and take actions (if needed) to avoid disturbance of or contact with an animal (mammals and turtles). The protocols were implemented during a recent installation after review and concurrence by NOAA, and have been adapted for the Honotua installation. They are provided in Appendix C. Key elements of the protocols are: onboard observer with responsibility for maintaining a watch for animals and authority to suspend operations to avoid contact; emergency contacts for mammal and turtle strandings; and reporting requirements for any incident that may occur. Designated resource agency managers will be contacted for any incidents involving marine mammals or sea turtles. The “hotline” numbers shall be included on the protocols noted above, and incidents shall be documented in the ship’s daily log.
- Implement the BMPs for *Boat Operations and Dive Activities* provided by NMFS, Pacific Islands Regional Office (PIRO), Protected Resources Division (PRD). These are included in Appendix D.
- An observer shall be present onshore prior to beach activities to ensure there are no turtles or seals present at the beach prior to staging equipment and commencing operations. This measure will avoid the potential for contact or harassment with an animal.
- A video transect of the installed cable alignment will be conducted from shore (visibility in the surf zone allowing) to the 25-m (82 ft) water depth contour to document post-installation conditions. If necessary, a post installation mitigation plan will be prepared, based on observed conditions, with input from the relevant resource agencies. Mitigation will be developed, as required, to provide an adequate and appropriate means of addressing site-specific and species-specific impacts.

4.9 Air Quality

4.9.1 Existing Conditions

This air quality discussion focuses on the proposed project in terms of Federal and state regulations for air pollutant standards and emissions. Air quality in a given location is determined by the concentration of various pollutants in the atmosphere. National (and State) Ambient Air Quality Standards (NAAQS) have been established by the U.S. Environmental Protection Agency (USEPA) and DOH. NAAQS represent maximum levels of background pollution that are considered safe, with an adequate margin of safety, to protect public health and welfare. Criteria pollutants include ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), inhalable and fine particulate matter (PM_{10} and $PM_{2.5}$), and airborne lead (Pb). Federal and Hawai‘i ambient air quality standards are presented in the Table 4-2.

Table 4-2. State and Federal Ambient Air Quality Standards

Air Pollutant	Averaging Time	Hawai‘i State Standard	Federal Primary Standard	Federal Secondary Standard
CO	1-hour	10,000	40,000	40,000
	8-hour	5,000	10,000	10,000
NO_2	Annual	70	100	100
PM_{10}	24-hour	150	150	150
	Annual	50	50	50
$PM_{2.5}$	24-hour	N/A	65	65
	Annual	N/A	15	15
O_3	1-hour	N/A	235	235
	8-hour	157	157	157
SO_2	3-hour	1,300	N/A	1,300
	24-hour	365	365	N/A
	Annual	80	80	N/A
Lead	Calendar Quarter	1.5	1.5	1.5
Hydrogen Sulfide	1-hour	35	N/A	N/A

Source: Hawai‘i Administrative Rules Section 11-59; U.S. 40 Code of Federal Regulations Part 50

4.9.1.1 Climate

The major Hawaiian Islands lie within the tropics, but have a subtropical climate owing to the cooling influence of currents from the Bering Sea. Northeasterly trade winds persist throughout most of the year, although southerly Kona winds occasionally blow for several days at a time. These light and variable southeast winds bring hot, humid weather in the summer and occasional fierce storms with high waves, wind, and rain in the winter. Average wind speeds are highest during the summer and often exceed 12 miles per hour. Areas receiving the greatest amount of rainfall are on the windward, or northeastern, sides of the islands. Humidity on the islands is typically high except along the drier (i.e., leeward) coasts and at higher elevations (Sandwich Isles Communications 2004).

The climate of the Kawaihae area is generally hot and dry along the coastal areas. Cooler and wetter conditions prevail in the northern mountainous sections of South Kohala. Average annual rainfall is ten inches in the coastal areas (County of Hawaiʻi 2008).

4.9.1.2 Regional Setting

Air quality in the State of Hawai'i is typically excellent, owing to offshore trade winds that help disperse most urban air pollutants. Data collected by DOH indicate that the state has some of the best air quality conditions in the nation. To monitor air quality, DOH operates a network of stations at various locations throughout the islands. Five air quality monitoring stations are located on the island of Hawaiʻi, mainly to monitor the continuing eruption of Kilauea volcano and air quality impacts associated with the geothermal energy production. The closest monitoring station to the project site is located in Kailua, Kona. This station monitors sulfur dioxide (SO_2). The most recent data available (2006) indicates that the state of Hawaiʻi was in attainment for all NAAQS (DOH 2006).

4.9.2 Short-Term Impacts

The excavator and small rig will generate emissions while they are operating intermittently during the 10 days of the installation. Because of the short duration of the equipment use, and because the operations will not be continuous during this period, the emissions will be negligible and therefore not significant.

Ground disturbance to beach sand to expose the conduit will be very limited in area and is not expected to generate a significant amount of dust.

4.9.3 Long-Term Impacts

No long-term impacts to the area's ambient air quality are anticipated because the work site will be restored to its original condition following the completion of installation activities. No additional activity is required once the cable is installed.

4.9.4 Mitigation Measures/Best Management Practices

The BMP relevant to air quality is to maintain construction equipment and vehicles in proper working order to reduce air emissions. No mitigation is recommended.

4.10 Noise

4.10.1 Existing Conditions

Average noise exposure over a 24-hour period is often presented as a community noise equivalent level (CNEL), measured in decibels (dB). CNEL values are calculated from average hourly noise levels, in which the values for the evening period (7 PM to 10 PM) are increased by five dB, and values for the nighttime periods (10 PM to 7 AM) are increased by 10 dB. Such weighting of evening and nighttime noise levels is intended to take into account the greater human disturbance potential of nighttime noises.

The DOH developed objectives and strategies guiding the noise environment of communities in Hawaiʻi (DOH 2004). State noise guidelines are outlined in the Hawaiʻi Administrative Rules Chapter 11-46. These guidelines identify maximum allowable noise levels within zoning districts (Table 4-3).

Table 4-3. Maximum Permissible Noise Levels

Zoning District	Daytime (7 AM to 10 PM) (dBA)	Nighttime (10 PM to 7 AM) (dBA)
Residential, Conservation, Preservation, Public Space, Open Space	55	45
Apartments, Business, Commercial, Hotel, Resort	60	50

Source: DOH 1996.

The proposed cable landing site is located in an area zoned “Urban.” Ambient noise levels in the nearshore project area are predominantly from local vehicular traffic on Akoni Pule Highway (Highway 270), Spencer Beach Park Road, ocean surf, and activities at the beach park.

4.10.2 Short-Term Impacts

During installation activities, excavation, drilling (for OGB), and vessels will provide an additional, temporary source of noise above ambient levels at the project area, where there are no residential or sensitive stationary receptors (the presence of beach users fluctuates).

Noise from the rig and excavator will be intermittent and temporary, occurring within a 10-day period. The noise effects will be localized and temporary, and therefore are not considered significant.

Boats and other vessels used during installation will also be an additional source of noise. The noise will be temporary (approximately one day at the project site, where the public could potentially hear the vessel offshore) and will not be significant. (Effects of noise on marine biota are discussed in Chapter 4.8.)

4.10.3 Long-Term Impacts

There would be no project-related noise once construction is completed.

4.10.4 Mitigation Measures/Best Management Practices

The BMP relevant to noise impacts is: Equipment shall be maintained in proper working order, especially all noise suppression systems, if applicable.

4.11 Public Facilities

4.11.1 Existing Conditions

This section identifies the services and public infrastructure supporting the Kawaihae area of the South Kohala District, and the cable landing site. According to the South Kohala Community Development Plan, Kawaihae Harbor is the main development feature in the area. This commercial harbor is the only harbor in West Hawaiʻi, and the only harbor on the island other than Hilo harbor. Figure 2-5 shows existing facilities in the project area.

4.11.1.1 Recreational Facilities

The project site is within Spencer Beach Park, as discussed in Chapter 4.2, Land Use. Park facilities include a lifeguard station, public restroom, showers, picnic area, basket ball courts, a pavilion, and telephones. The public accesses the beach via Spencer beach Park Road, off of Akoni Pule Highway (Highway 270). Parking is available at the site. No other public facilities are located on or near the proposed cable landing site, which is generally undeveloped.

4.11.1.2 Transportation Facilities

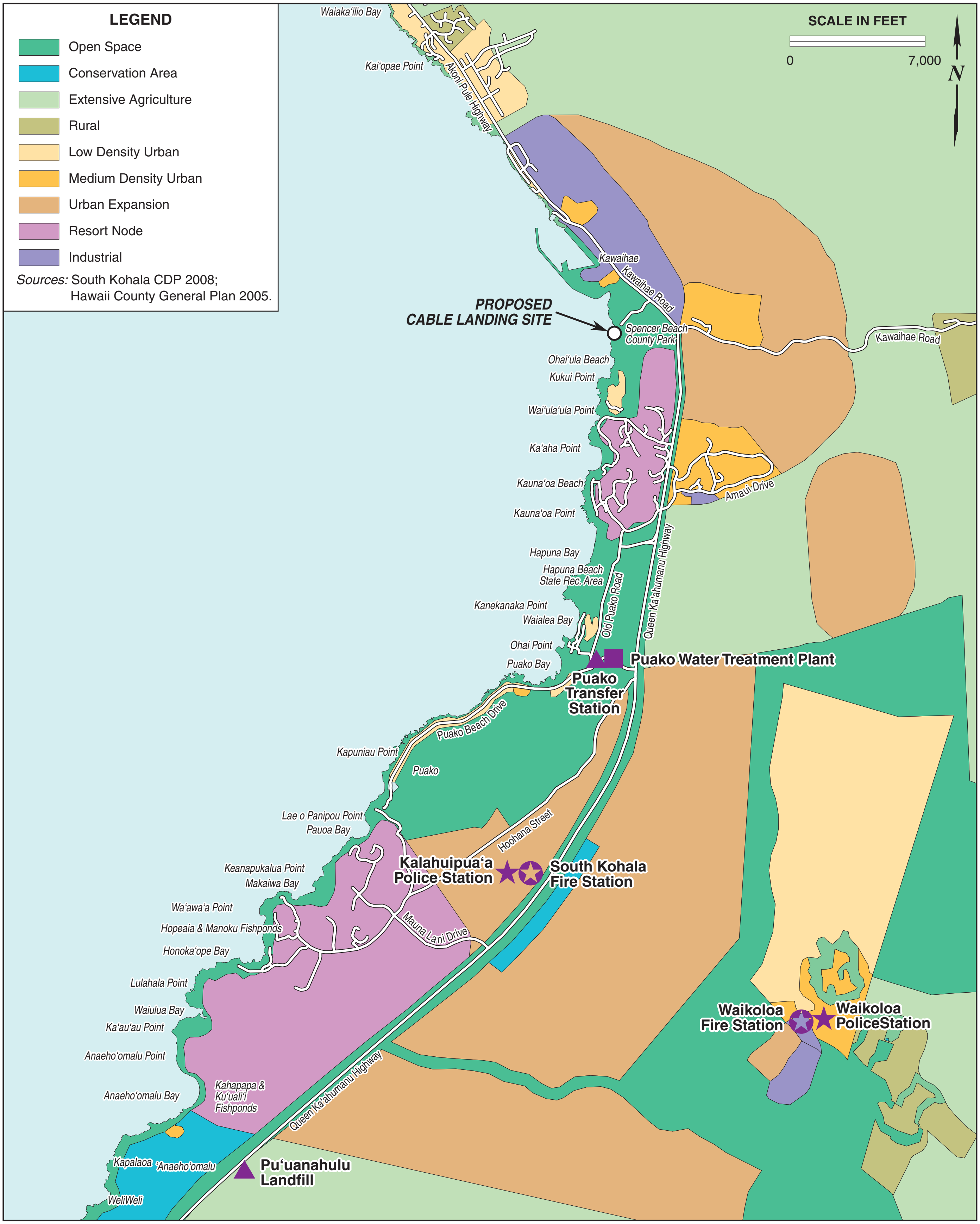
The project site is served by Spencer Beach Park Road, the primary means of accessing the project area. No bus routes or other transit services travel to the site.

4.11.1.3 Telecommunication Facilities

As described in Chapter 2, there is an existing landing, conduit, BMH and cable station at the project site, which provide the infrastructure to connect to other telecommunication networks in Hawai‘i, the mainland, and elsewhere in Asia Pacific.

4.11.2 Short-Term Impacts

During installation the contractors will control access to the work areas on the beach, and near the vessels to maintain safe distances between the public and activity. As described in Chapter 2, the project activity will not preclude use of the park, and the beach will remain open during the 10 days of staging and activity. An example of a similar installation on a high-use beach was



Public Facilities in the Vicinity of the Proposed Project

FIGURE 4-6

provided in Chapter 2 to demonstrate how controlled access can maintain safety while allowing recreation to continue. Similar procedures will be employed for the Honotua installation.

The project will use the existing conduit that extends from the BMH beneath Spencer Beach Road to the cable station (some extension of the ducting is underway under a separate permit application, see Section 2 for additional information). Therefore, no trenching or other disturbance to Spencer Beach Road is proposed or necessary. Equipment will access the site along Spencer Beach Road for initial staging and demobilization, and as necessary traffic control may be employed for public safety while the equipment is being delivered to the site.

A section of the sidewalk may be demolished to trench the cable from the shoreline to the BMH. If so, the sidewalk will be restored to its original condition after the cable installation is complete.

Installation will present limited and controlled public access near the work areas during some portions of the 10- to 12-day installation period. Therefore the impacts on public facilities are not considered significant.

4.11.3 Long-Term Impacts

There will be no project-related impacts to transportation or public utilities following completion of construction activities. Implementation of the proposed project will not require any additional police or fire service and will not require the extension of current public utilities to the project site. The project will have a long-term benefit on telecommunication capacity in the state because of increased access to telecommunications networks, and increased diversity in the existing networks.

Therefore there will be no long-term adverse impacts to public facilities.

4.11.4 Mitigation Measures/Best Management Practices

The BMPs relevant to reducing impact on public facilities were discussed in Chapter 4.2, Land Use, and address coordination and advance notice of activities as they may affect recreational use at Spencer Beach Park and other nearby parks and beaches.

CHAPTER 5: SECONDARY AND CUMULATIVE IMPACTS

The purpose of this chapter is to discuss secondary and cumulative impacts that could potentially result from the proposed project.

Secondary impacts, also known as indirect impacts, are those impacts that occur later in time or at a more distant location, but are reasonably foreseeable results of the original action. Examples of secondary impacts include changes in land use patterns, population density or growth rate, and related impacts on the natural environment.

Cumulative impacts result from implementing several individual projects in the same geographic area and/or time frame, even though each may have limited impacts separately. Cumulative impacts of interlinking separate submarine cable projects are discussed below, as well as impacts potentially resulting from implementation of other unrelated projects.

5.1 Secondary Impacts

5.1.1 Potential Impacts of the Submarine Cable

There are no expected secondary impacts from the cable. The introduction of the Honotua cable would not cause secondary impacts on resources or changes to the local community or resource use.

5.1.2 Potential Impacts at Landing Site

The Honotua cable system would not affect development that is already planned in the South Kohala District.

Impacts associated with this project are related to installation activities and would therefore not persist after installation is complete. The project would not generate migration to the local area. Accordingly, the project would not create a significant increase in or impact upon resident population, housing, demand for public facilities and services, land use patterns, public infrastructure, and the natural environment.

Because no secondary impacts are anticipated, no mitigation measures are proposed.

5.2 Cumulative Impacts

5.2.1 Potential Impacts of Submarine Cable

The potential for incremental environmental impacts on the marine environment from the proposed project is negligible, as the activity is short-term, results in no long-term adverse impacts, and is consistent with current land use. The proposed landing site is currently the terminus for five active cables, all of which were installed using similar methods. No long-term adverse impacts from previous cable installations have been observed. The Honotua cable route will avoid interference with other cables.

The effects will be localized and temporary, which avoids the potential for cumulative effects on other activities in the area.

No cumulative impacts are anticipated to occur from the proposed project.

5.2.2 Potential Landing Site Impacts and Interactions with Planned Projects

Impacts at the landing site would be temporary and related to installation. The area affected is also confined to the beach and nearshore. One improvement project, construction of a restroom facility, is currently underway at Spencer Beach Park, and is expected to be completed in 2009. No other projects are currently planned (Engelhard 2008). The Honotua cable installation is scheduled for late in the year 2009 and is not expected to affect the beach improvement project. Close coordination with the County Parks Department will continue to ensure no project conflicts.

A previous project installed “spare” infrastructure in anticipation of future cable landings, therefore reducing the amount of overall disturbance for future projects.

Because no cumulative impacts are anticipated, no mitigation measures are proposed.

CHAPTER 6: CONSISTENCY AND COMPLIANCE WITH FEDERAL, STATE AND LOCAL REGULATIONS, PLANS, AND POLICIES

6.1 Federal Regulations

6.1.1 Rivers and Harbors Act Section 10

Section 10 of the Rivers and Harbors Act (33 United States Code [USC] 401 et seq.) requires authorization from the U.S. Army Corps of Engineers (USACE) for the construction of any structure in or over any navigable water of the U.S., the excavation/dredging or deposition of material in these water or any obstruction or alteration in a navigable water. Structure or work outside the limits defined for navigable waters of the U.S. require a Section 10 permit if the structure or work affects the course, location, condition, or capacity of the water body.

As part of the review, the USACE will consult with other Federal agencies, as noted below.

6.1.2 Clean Water Act Section 404/401

According to the Federal Clean Water Act (CWA), discharge of dredged or fill material into the waters of the U.S. requires a Section 404 permit from the USACE and a Section 401 Water Quality Certification (WQC) from the state. Waters of the U.S. include all surface waters: navigable waters and their tributaries, all interstate waters and their tributaries, all wetlands adjacent to these waters, and all impoundments of these waters. Typical activities requiring Section 404 permits are:

- Depositing of fill or dredged material in waters of the U.S. or adjacent wetlands.
- Site development fill for residential, commercial, or recreational developments.
- Construction of revetments, groins, breakwaters, levees, dams, dikes, and weirs.
- Placement of riprap and road fills.

The project will not require dredge or fill, but during installation sediments will be redistributed, and the USACE will review the project for compliance with the CWA.

6.1.2.1 Section 401 Water Quality Certification

The 401 WQC is required from State of Hawaiʻi Department of Health (DOH) Clean Water Branch prior to USACE approval of a Section 404 permit. These permitting processes work in tandem and require similar information. If it is determined by the USACE that a Section 404 permit is necessary, a 401 WQC will be submitted and reviewed to assess the potential impacts on water resources.

6.1.3 Endangered Species Act and Other Laws Protecting Biological Resources

Section 7 of the Endangered Species Act (ESA) requires that Federal agencies consult with the U.S. Fish and Wildlife Service (USFWS) and/or NOAA to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any Federally listed threatened or endangered species, or result in the destruction or adverse modification of a critical habitat. Other applicable Federal laws include:

- Magnuson-Stevens Fishery Conservation and Management Act, reauthorized as the Sustainable Fisheries Act;
- Marine Mammal Protection Act
- Fish and Wildlife Coordination Act; and
- Migratory Bird Treaty Act.

Consultation will be conducted by the USACE during the processing of the permit application. The proposed project is not expected to impact sensitive plants or animals, marine mammals, or migratory birds and is therefore considered consistent with the above-listed policies.

6.1.4 National Historic Preservation Act (NHPA)

Section 106 of the NHPA requires that federal agencies consider the effect of their actions on any district, site, building, structure or object that is included or eligible for inclusion in the National Register of Historic Places (NRHP). Such resources are called “historic properties.” Under Section 106, a Federal action (or undertaking) may involve Federally-funded projects, activities, or programs, including those carried out with Federal financial assistance. Federal actions also include projects requiring a Federal permit, license or approval, including those where Federal authority has been delegated to a state or local agency.

Section 106 Review refers to the Federal review process designed to ensure that historic properties are considered during Federal project planning and implementation. Section 106 requires consultation with the State Historic Preservation Officer (SHPO) and other agencies and organizations that may have an interest in or are mandated to protect historic properties. In addition, the Advisory Council on Historic Preservation (ACHP) is afforded the opportunity to comment on actions that may potentially affect historic properties.

This project must comply with Section 106 because the proposed project is located in an area where potential historic resources might exist and requires Federal agency action through a Rivers and Harbors Act, Section 10 permit. An archaeological assessment was conducted in October 2008 and the report is being prepared to submit to the SHPO.

6.2 State Plans, Policies and Regulations

6.2.1 Hawai‘i State Plan

The Hawai‘i State Plan, Chapter 226 of the Hawai‘i Revised Statutes, serves as a guide for future long-range development of the state. It consists of comprehensive goals, objectives, policies, and priorities for all areas of government functions. These functions include the protection of the physical environment, the provision of public facilities systems, and the promotion and assistance of socio-cultural advancement. Policies applicable to the proposed project are listed below.

Objectives and policies for the economy – potential growth activities (226-10)

- Increase research and development of businesses and services in the telecommunications and information industries.

Objectives and policies for the economy – information industry (226-10.5)

- Encourage development and expansion of the telecommunications infrastructure serving Hawai‘i to accommodate future growth in the information industry.
- Provide opportunities for Hawai‘i’s people to obtain job training and education that would allow for upward mobility within the information industry.

Objective and policies for facility systems – in general (226-14)

- Accommodate the needs of Hawai‘i’s people through coordination of facility systems and capital improvement priorities in congruence with state and county plans.
- Ensure that required facility systems can be supported within resource capacities at reasonable cost to the user.

Objectives and policies for facility systems – telecommunications (226-18.5)

- To ensure provision of adequate, reasonably priced, and dependable telecommunications services to accommodate demand.
- Encourage public and private sector efforts to develop means for adequate, ongoing telecommunications planning.

6.2.2 Hawai‘i State Land Use Controls

Lands in the state are divided into four classifications: Urban, Agricultural, Rural, and Conservation. The proposed project site is located in the Conservation District and would therefore require a Conservation District Use Permit (CDUP). No land use change is required for the cable landing.

6.2.3 Conservation District Use Permit

Hawai‘i Revised Statutes Chapter 183C, Conservation Districts, directed the DLNR and the Board of Land and Natural Resources to manage and regulate the Conservation District, including:

- Maintaining an accurate inventory of lands classified within the state Conservation District;
- Appropriately zoning lands within the Conservation District;
- Establishing appropriate uses or activities on conservation lands, including uses or activities for which no permit would be required; and
- Establishing and enforcing land use regulations including the collection of fines for violations of land use and terms and conditions of issued permits or approvals.

The Conservation District includes all submerged lands from the shoreline to a distance of 12 nm offshore. Therefore, all landing site infrastructure seaward of the shoreline would be within the Conservation District, Resource Subzone and subject to CDUP requirements.

Hawai‘i Administrative Rules Section 13-5-24, Identified land uses in the Resource Subzone, states that “all identified land uses and their associated permit or site plan approval requirements listed for the *Protective* and *Limited* Subzones also apply to the *Resource*

Subzone unless otherwise noted.” Section 13-5-22, Identified land uses in the *Protective* Subzone, P-6 Public Purpose Uses (D-2), “communications systems and other such land uses which are undertaken by non-governmental entities which benefit the public” are allowed with a CDUP.

6.2.4 Hawai‘i Revised Statutes Chapter 6E

Hawai‘i Revised Statutes Chapter 6E is the state counterpart law to the NHPA. This statute places similar responsibilities on state agencies as NHPA Section 106 places on Federal agencies. Hawai‘i Revised Statutes Section 6E-8 states that before any agency or officer of the state or its political subdivisions (i.e., counties) commences or permits any project which may affect historic property, aviation artifact, or a burial site, it must provide the SHPO an opportunity for review.

6.2.5 State Endangered Species Law, HRS Chapter 195D

Hawai‘i Revised Statutes Chapter 195D is the state counterpart law to ESA. Similar to Section 7 of the ESA, Chapter 195D, which is administered by the DLNR Division of Forestry and Wildlife requires evaluation of the project’s potential impacts on threatened and endangered species.

6.2.6 Coastal Zone Management

The Coastal Zone Management Act (CZMA) was passed to encourage states to preserve, protect, develop, and where possible, restore or enhance valuable natural coastal resources. The State of Hawai‘i CZMA program was established through passage of Hawai‘i Revised Statutes Chapter 205A in 1977. All Federally proposed activities or activities that require a Federal permit or license are required to be consistent to the maximum extent practicable with the CZMA program. The CZMA program is administered by the DLNR Division of Conservation and Resources Enforcement.

6.3 County Plans, Policies and Regulations

6.3.1 Special Management Area (SMA) and Shoreline Setback

The Hawai‘i CZMA program designated the areas along the shoreline for “special controls on developments to avoid permanent losses of valuable resources and the foreclosure of management options, and to ensure that adequate access by dedication or other means, to publicly owned or used beaches, recreation areas, and natural reserves is provided” (Hawai‘i Revised Statutes Section 205A-21). To accomplish these objectives, Hawai‘i Revised Statutes Chapter 205A established the Special Management Area and shoreline setbacks, and authorized counties to develop and administer permitting systems to control development within both.

The SMA is a regulated zone extending inland from the shoreline to a landward boundary delineated by the counties. The landward boundary of the SMA can vary from a few dozen feet to more than a mile. The proposed project area is a SMA; however, the proposed project does not include development as defined in the statute. Therefore, the proposed project is consistent with this policy. Figure 6-1 shows the SMA boundaries and the proposed project relative to existing cables in the project corridor.

A shoreline survey was conducted by a registered land surveyor in October 2008 and is illustrated in Figure 6-2. This survey was submitted to the State Land Division for certification. Based on preliminary discussions with the DLNR Office of Conservation and Coastal Land, a portion of the area to be excavated, and the equipment staging area may fall within the shoreline setback area. Therefore, a Shoreline Setback Variance may be required. An SSV application will be submitted, if required, upon release of this Final EA and Finding of No Significant Impact.

6.3.2 County of Hawai‘i General Plan

The General Plan of the County of Hawai‘i (2005) provides policy guidance for the long-range comprehensive development of the island of Hawai‘i and a statement of policies necessary to meet the plan’s objectives. The following policies are applicable to the proposed project:

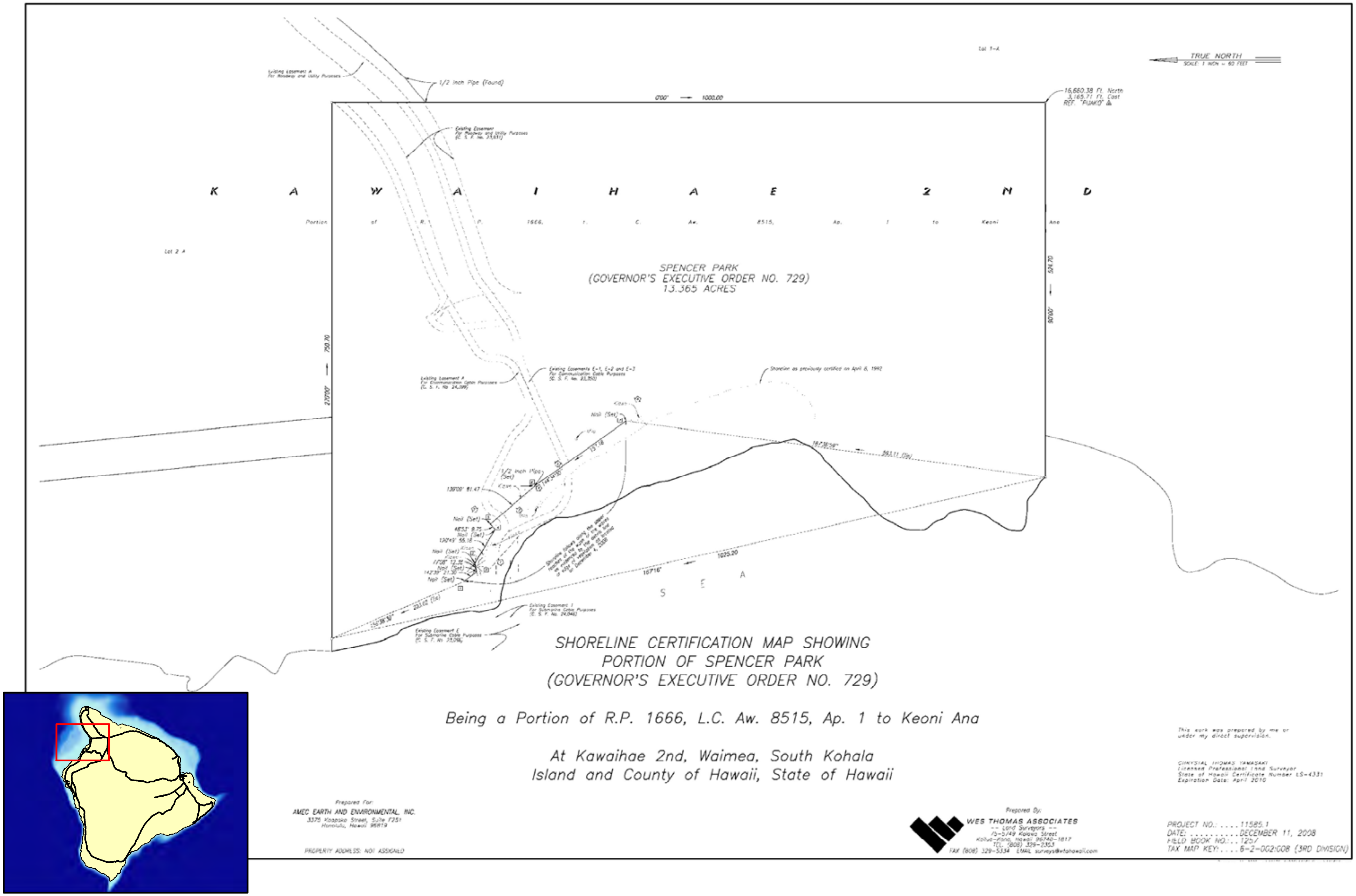
Draft EA
Honotua Cable Project
Spencer Beach, Hawaii
W:\Honotua\MXD\Fig6-1_SMA.mxd DNB Jan 5, 2009

Figure 6-1

Special Management Area Boundaries

0 50 100 200 Feet

0 20 40 60 Meters



Draft EA
Honotua Cable Project
Spencer Beach, Hawaii
W:\Honotua\MXD\Fig6-2_ShorelineSurvey.mxd DNB Jan 5, 2009

Figure 6-2

Shoreline Survey Boundaries

- Policy (d) – Require a study of the significant cultural, social and physical impacts of large developments prior to approval. Although the proposed project involves no development on land and would connect to an existing landing site, this environmental assessment has been prepared to assess the project impacts.
- Policy (j) – Support the development of high technology industries. The proposed project would provide additional telecommunications infrastructure.

6.3.3 Hawai‘i County Zoning Code

The County of Hawai‘i Zoning Code is the legal instrument that regulates land use. The Zoning Code implements the County of Hawai‘i General Plan and is the County's primary land use control. The Zoning Code defines the different types of zoning districts and allowable uses for each zone. Activities permitted in the *Open* zoning districts are "…golf courses, with a use permit, some recreational facilities, and various public and utility-type facilities" (County of Hawai‘i 2005).

6.3.4 South Kohala Community Development Plan

The proposed cable project is consistent with the objectives of the South Kohala Community Development Plan (CDP). The purposes of the South Kohala CDP are to identify the community's priority issues and develop and implement programs to address those priority issues. Below are excerpts from the South Kohala CDP, 2008, and a discussion of the proposed project's consistency with the plan.

- General Policy No. 1: Preserve the Culture and Sense of Place of South Kohala Communities. *An archaeological assessment of the proposed project location has been conducted and no surface or subsurface cultural features were identified. Consultation with the State Historic Preservation Division is currently underway.*
- General Policy No. 2: Provide for the Transportation and Circulation needs of the South Kohala Community and for commuters to/from South Kohala. *No road closures are anticipated. Installation will present limited and controlled public access near work areas, but for only a short duration.*
- General Policy No. 3: Provide Affordable and Workforce Housing Resources for Low and Moderate Income Individuals, Families, and for those Residents of South Kohala with Special Needs. *No residential communities are in the immediate vicinity of the proposed project site, therefore no impacts are anticipated to residents of South Kohala.*
- General Policy No. 4: Develop Programs and Standards that will Protect the South Kohala Community from Natural Hazards, Including Major Storms, Flooding, Tsunami, Lava Flows, and Wildfires. *Environmental hazards are discussed in Chapter 4, no impacts are anticipated.*
- General Policy No. 5: Develop Guidelines and Programs that Promote Environmental Stewardship and the Concept of Sustainability. *In addition to this EA, a baseline study*

of the marine environment and an archaeological survey were conducted. Local, state and federal agencies have been consulted and various environmental permit applications are being submitted for the project.

6.4 List of Permits and Approvals

The following permits or approvals are expected to be required for installation of the project.

Federal

USACE

Nationwide #12 (for compliance with Section 10 Rivers and Harbors Act)

State

DLNR

CDUP
Seabed Easement
Construction Right-of-Entry

Office of State Planning

Coastal Zone Management Consistency Certification

County of Hawai‘i

Planning Department

Shoreline Setback Variance
Special Management Area Assessment

6.5 Consultations

In addition to the above-mentioned permits and approvals, informal consultation activities were conducted prior to the preparation of this document. Chapter 7 is a summary of pre-application communication with agencies.

CHAPTER 7: PRE-CONSULTATION AND COORDINATION

This chapter summarizes the public and agency coordination activities for the Honotua Cable System Project that have been conducted to date. Project scoping and coordination activities have included meetings and correspondence with government agencies and landowners

The project was introduced to permitting and resource agencies resource agencies to provide early information about the project, and to solicit input.

Contacts are noted below.

7.1 Regulatory Consultation and Coordination

7.1.1 Federal Agencies

Agency	Representative	Key Topics Discussed
U.S. Army Corps of Engineers (USACE)	Peter Galloway Ecologist	• Briefed USACE on upcoming proposed project. • Pre-application meeting. • Information required for permit application and review.
National Oceanic and Atmospheric Administration (NOAA) Protected Resources Division	Krista Graham Marine Resource Management Coordinator Don Hubner Protected Resources Management Specialist	• Protected resources: turtles, monk seals, humpback whales, spinner dolphins. • Mammal protection protocols • BMPs for work practices in the presence of mammals • Specific topics needed to be included in the project description
NOAA Habitat Conservation Division	Alan Everson Coral Program Coordinator	• Habitat conservation and essential fish habitat • Coral reef fishery management plan • Specific topics needed to be included in the project description

7.1.2 State Agencies

Agency	Representative	Topics Discussed
Department of Lands and Natural Resources (DLNR) (Conservation & Coastal Lands Division)	Kimberly Mills Planner	• Conservation District Use Application (CDUA) and zoning permit • Expected biological issues • Public hearings • Land disposition • Cultural resources
DNLR (Lands Division) Via telephone	Kevin Moore Land Agent	• Lands Division process • Initial actions prior to submitting application • Appraisal

7.1.3 County of Hawai‘i

Agency	Representative	Topics Discussed
Department of Planning and Permitting Via telephone	Jeff Darryl (SSV) Esther Iwamura (SMA)	• Chapter 25 Code regarding Special Management Area permit requirements • Shoreline Setback Variance (Chapter 23) applicability • Application process • Certified Shoreline Survey

CHAPTER 8: IMPACTS, MITIGATIONS, AND SIGNIFICANCE EVALUATION

This section provides a summary of the potential impacts, as evaluated in Chapter 4, and notes associated BMPs and mitigations by resource area. The impacts are evaluated for significance based on state criteria.

8.1 Summary of Impacts

Table 8-1 provides a summary of impacts.

8.2 Significance Evaluation

The assessment provided below is based on an evaluation of potential impacts relative to the "Significance Criteria" specified in HAR 11-200-12 (b). The Significance Criteria appear below in italics, followed by a brief statement relating project effects to the criterion.

1. *Involves an irrevocable commitment to loss or destruction of any natural or cultural resource* -- The proposed project will not involve an irrevocable commitment to the loss or destruction of any natural or cultural resources. Project design and planning incorporate protective measures that will avoid resource loss or destruction. Archaeological monitors and biological observers will provide additional assurance of protection for these resources.
2. *Curtails the beneficial uses of the environment* -- The proposed project will not curtail the range of beneficial uses of the environment. No restriction of the beneficial uses will occur beyond the installation period, when access near the work areas will be controlled for a period of approximately 10 days.
3. *Conflicts with the State's long-term environmental policies or goals and guidelines expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders* -- The proposed project is consistent with the State's long-term environmental policies, which are to conserve natural resources and enhance the quality of life. The project will use existing infrastructure to avoid new construction, and incorporates BMPs and mitigations for additional protection of resources.

Table 8-1. Honotua Cable System Project Impacts Summary

Resource Area	Short-term Impacts	Long-term Impacts	Mitigation and BMP
Topography & Geological Resources	• Ground-disturbing activities (i.e., during site preparation and construction). • Temporary redistribution of sediments.	No impact	BMPs: • Site restoration to original condition at conclusion of project. No Mitigation required.
Land Use	• Controlled public access in a limited area of the beach at Spencer Beach Park.	No impact	BMPs: • Local authorities, such as County Parks and local lifeguards, will be given advance notice of the work schedule. • Controlled access to the work area for public safety, but no beach closures. Access will be controlled through a number of measures, which may include temporary fencing, signage, and staff. • Security protection of equipment for public safety. Mitigation: • Protection of coastal resources (see Archaeological and Historical Resources).
Archaeological & Historical Resources	• Potential disturbance to archaeological and historical resources during excavation.	No impact	Mitigation: • A qualified archaeological monitor will be present during excavation activities in the cable corridor; and • If potentially significant resources are uncovered during excavation or trenching activities, all excavation or trenching activity shall halt until the nature and significance of the resources can be determined by the on-site archaeologist.
Cultural, Social & Economic Resources	No impact.	No impact	See Land Use and Archaeological Resources for related BMPs and mitigations.
Visual & Aesthetic Resources	• Presence of equipment and vessels and equipment for 6 to 10 days, which will be visible to beach users.	No impact	Equipment will be confined to work areas and the site kept tidy...

Table 8-1. Honotua Cable System Project Impacts Summary (Continued)

Resource Area	Short-term Impacts	Long-term Impacts	Mitigation and BMP
Water Resources	• Localized and temporary increase in turbidity in the surf zone when cables jetted into the sediments by divers.	No impact	BMPs: • Management of refuse and general site management to prevent materials from entering drainages or ocean. • Spill prevention and response plans for vessels and site management of equipment fluids. • Safety plans specific to the work area to prevent accidents. No Mitigation required.
Marine & Nearshore Resources	No impact.	No impact	BMPs: • Use of desktop study findings to select cable design and routing; • Application of cable route survey data to refine the cable route and design to avoid external hazards (landslides, steep slopes, anchorages); and • Maximized use of existing infrastructure and landing sites, which provides site and operating history that can be used in routing and cable design. No Mitigation required.
Terrestrial & Aquatic Biological Resources	• Short-term disturbance to the flat sandy area between the BMH and the water during excavation • Potential for short-term disturbance to marine mammals and sea turtles by the presence of vessels and placement of cables during installation of the cable. • Potential direct effects on corals during installation of the cable on the seafloor.	No impact	BMPs: • Following the completion of construction activities, the contractor will return the site to its preconstruction condition. • Vessel crew will be briefed on the specific requirements to be adhered to during installation in the project area so they are fully aware of issues or resources with project-specific procedures or reporting requirements. • Inshore installation procedures are based on an established route that was developed in concert with the marine biological dive survey so procedures are aligned with site-specific considerations. Corals and reef structures were factored into the route planning.

Table 8-1. Honotua Cable System Project Impacts Summary (Continued)

Resource Area	Short-term Impacts	Long-term Impacts	Mitigation and BMP
			Mitigations: • Marine Protected Species Protection Protocols for marine mammals and turtles will be implemented by an onboard observer during installation to identify and take actions (if needed) to avoid disturbance to or contact with an animal. • Implement the BMPs for *Boat Operations and Dive Activities* provided by National Marine Fisheries Service (NMFS). • An observer shall be present on shore prior to beach activities to ensure there are no turtles or seals present at the beach. • Designated resource managers will be contacted for any incidents involving marine mammals or sea turtles. The “hotline” numbers shall be included on the protocols noted above, and incidents shall be documented in the ship’s daily log. • A video transect of the installed cable alignment will be conducted from shore (visibility in the surf zone allowing) to the 25-m (82-ft) water depth contour to document post-installation conditions. OPT will formulate a mitigation plan, based on observed conditions, with input from the relevant resource agencies. Mitigation will be developed, as required, to provide an adequate and appropriate means of addressing site-specific and species-specific impacts.
Air Quality	• Short-term and localized emissions from excavator, winch, and drilling rig.	No impact	BMPs: • Construction equipment and vehicles shall be maintained in proper working order to reduce air emissions. No Mitigations required.

Table 8-1. Honotua Cable System Project Impacts Summary (Continued)

Resource Area	Short-term Impacts	Long-term Impacts	Mitigation and BMP
Noise	• Temporary source of noise above ambient levels from excavation, winch, drilling rig, and vessels.	No impact	BMPs: • Construction equipment and vehicles shall be maintained in proper working order to reduce air emissions. No Mitigations required.
Public Facilities	• Disruption to a limited area of the beach at Spencer Beach Park	No impact	See Land Use for related BMPs and mitigations.

4. *Substantially affects the economic or social welfare of the community or State --* The proposed project will not substantially affect the economic or social welfare of the community or State. The project will reinforce Hawai‘i's position as a hub for submarine telecommunications networks.
5. *Substantially affects public health --* The proposed project, with the implementation of BMPs and committed mitigation measures, will not adversely affect public health or safety.
6. *Involve substantial secondary impacts --* The proposed project will not result in substantial secondary impacts, such as population changes or creation of additional demands for public facilities. The project's effects are related to installation and are temporary and not substantial.
7. *Involves substantial degradation of environmental quality-* The proposed project will not degrade environmental quality. The project's effects are temporary and the beach area will be restored upon completion of installation. As demonstrated by similar actions at the project site, specifically the existence of other cables, the environmental quality of the area has not been adversely affected and this project would have similar effects.
8. *Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions* – The project will not have cumulative effects on the environment, or require a commitment to larger actions.
9. *Substantially affects a rare, threatened, or endangered species, or its habitat* – Rare, threatened, or endangered species will not be substantially affected by the project. Protective measures for turtles and marine mammals have been developed for this project, reviewed by appropriate resource agencies, and will be implemented during installation to avoid impacts.
10. *Detrimentally affects air or water quality or ambient noise levels --* The project will not have a detrimental effect on air or water quality, or on ambient noise levels at the project site. Air emissions from equipment will be intermittent, localized and of very short duration, and are therefore negligible. No materials will be introduced into the water, and the native sediments will settle naturally after the cable is placed on the seabed, as occurs during natural coastal processes in the surf zone. Noise from equipment will be intermittent and of short duration during the installation activity.
11. *Affects or is likely to suffer damage by being located in an environmentally sensitive area such as a floodplain, or coastal waters* – The project area was selected for its suitability,

including the physical setting and potential environmental constraints. The suitability of the site for this project is demonstrated by the successful installation and operation, without incident, of several other cables at the landing site.

12. *Substantially affects scenic vistas and viewplanes identified in county or state plans or studies* -- The project will involve the presence of vessels and equipment during a 10-day period, which will be visible to beach users but will not substantially affect the vista or viewplane upon completion of the installation. After the cable is installed, it will have no effect on vistas or viewplanes.
13. *Requires substantial energy consumption* -- The project will not require substantial energy consumption, and once installed will be incorporated in the routine operation of existing infrastructure.

CHAPTER 9: FINDINGS AND REASONING SUPPORTING DETERMINATION

The installation of the Honotua fiber optic cable system is proposed at Spencer Beach, Hawaiʻi (Tax Map Key: 6-2-02:08), to enhance telecommunication capacity and security. The new cable will be in an area currently occupied by five existing cables that connect to existing BMHs and to the GTE cable station located approximately 2 km (1.2 mi) south of Spencer Beach Park along Highway 19.

The proposed cable installation will not cause significant adverse impacts on the immediate area or vicinity of the project site. Installation will cause some short-term impacts that will not persist after installation is complete. The project site will be restored to its existing state upon completion of installation.

The proposed action will not result in loss or destruction of natural or cultural resources, will not adversely affect the social or economic welfare of the community, County or State, and will not conflict with future plans and policies of the County or State.

Based on significance criteria set forth in Hawai'i Administrative Rules, Title 11, Department of Health, Chapter 200, "Environmental Impact Statement Rules," and evaluated in Chapter 8, the proposed project is not expected to have a significant impact on the environment. The recommended preliminary determination for the proposed project is a Finding of No Significant Impact (FONSI).

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Appendix A

Baseline Study of Nearshore Environment
Proposed Honotua Submarine Cable Landing

BASELINE STUDY OF NEARSHORE ENVIRONMENT
PROPOSED HONOTUA SUBMARINE CABLE LANDING
AT SPENCER BEACH PARK, SOUTH KOHALA DISTRICT
ISLAND OF HAWAI'I

Prepared for:
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January 2009

AMEC Project No. 8554000361 Task 01

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ACRONYMS AND ABBREVIATIONS

ASN	Alcatel-Lucent Submarine Networks
AMEC	AMEC Earth & Environmental Inc.
BMH	beach manhole
EGS	EGS Survey
Km	Kilometer
m	meter
OPT	Office de Telecommunications
PLNI	Pacific LightNet, Inc.
SCUBA	self-contained underwater breathing apparatus
US	United States

EXECUTIVE SUMMARY

This report examines the biological and physical nearshore environmental characteristics in the vicinity of the Honotua landing site on the leeward coast of the Island of Hawai‘i, United States. The proposed landing site is located adjacent to an existing Honotua Cable Landing at Samuel M. Spencer Beach Park, located to the south of Kawaihae Harbor in the South Kohala District. The study area encompasses the planned cable alignment from the 25 meter (m) water depth contour to the shoreline. The Honotua landing site is the terminus for a proposed fiber optic cable system between Tahiti and Hawai‘i. The Honotua landing is the current landing site for five active cables connecting to two beach manholes (BMHs) operated by GTE Hawaiian Telephone Company and Pacific LightNet, Inc (PLNI), formerly GST Hawaii. In addition to the two GTE cables and the three PLNI (identified as Segment C, I and D), there are three PLNI earth plate grounds installed in the nearshore subtidal area, i.e., less than 500 m offshore.

The proposed cable corridor lies within a naturally-formed sand channel bound by surrounding coral mounds. All of the pre-existing GTE and PLNI cables are located within this same prominent sand channel. This sand channel bisects the shallow fringe reef surrounding Spencer Beach that protects the beach from extreme wave action. The channel is contained by a relatively large chain of coral mounds approximately 1 to 3 m in height as the reef extends offshore. The channel is interspersed with smaller elongated mounds in parallel to the main channel, with denser spacing of mounds closer to shore (extending approximately 0 to 300 m offshore). The proposed cable landing channel is conspicuous in the west view from the Spencer Park access road vantage as shown below.

Photo of W/SW view of Spencer Beach Park

This proposed landing site provides two major habitat types for the benthic marine community: the sand plain of the main channel, and the surrounding coral mounds. The immediate nearshore (0 to 25 m offshore) is comprised of nearly contiguous reef with rounded basaltic rocks. The existing GTE and PLNI cables are laid through these shallow sandy depressions and shallow reef. The nearshore coral mounds gradually transition into increasingly sandy bottom from 1 m depth to 5 m depth at 250 m offshore.

As the channel develops farther offshore, the nearly flat, shallow channel comprises the majority of bottom type from approximately a 20 m width at 250 m offshore (5 m water depth) to 60 m width at 600 m offshore (5 m water depth). The sand channel at 600 m begins to slope gently and consistently to the 1,000 m contour (17 m water depth). After 1 km off shore, the open sandy channel increases slightly in slope to 1,200 m (25 m water depth), the depth contour terminus of this nearshore environmental survey.

The biotic community assemblages within the nearshore survey corridor vary from generally sparse to discrete limited zones of moderate abundance and diversity. This gradation was observed in both the sand plain habitat and the coral mound habitat.

The sand plain habitat is comprised of coarse to fine-grained carbonate based sediments. Although benthic infaunal samples were not collected as part of this survey, numerous and assorted burrows were observed throughout the nearshore (0 to 500 m) sand plain indicating a relatively high diversity of infauna such as worms, mollusks, crustaceans and fish. Scattered macro invertebrates were also observed (Kona crab, *Ranina serrata* and large mollusks *Conus lividus*). Macro algae in this stratum were less prevalent, although small meadows of true seagrass (*Halophila* sp.) were observed between 100 to 300 m offshore. The abundance and assortment of visible burrows decreased in deeper waters (500 to 1,200 m).

The other biotic habitat consists of coral mounds or knolls. These mounds were primarily comprised of Porites lobata and varied from single hemi-spherical colonies to much larger reef structures (3 m high and 20 m long) merging into the surrounding fringing reef. Other less abundant coral species included *Montipora patula*, *M. capitata*, *Pocillopora meandrina*, *Pavona* sp. The total living coral on the upper surface of the reef platform was estimated on the order of 90 percent. Other macro invertebrates included sea cucumbers (*Holothuria atra* and *Actinopyga mauritiana*) and sea urchins (*Tripneustes* sp., *Echinometra* sp., *Heterocentrussp*, and *Echinotrix* sp.).

The coral mounds provide structural complexity for a variety of reef fish. The most common fishes were the damselfishes (*Chromis* sp.) and particularly abundant were juvenile damselfish *Dascyllus albisella*. A variety of surgeonfishes (*Acanthurus* sp.) and butterflyfishes (*Chaetodon* sp.) and moorish idols (*Zanclus cornutus*) were also observed. Hawkfishes (*Parracirrhites* sp., and *Cirrhitops fasciatus*) were common sitting on the upper branch tips of colonies of Pocilloporid corals. Common wrasses included *Bodianus* sp. and several squirrelfish (*Myripristes* spp.) were observed. Fish were rare over the sand flats, where only several goatfishes (*Mulloidichthys* spp.) and black triggerfish (*Melichthys niger*) were observed.

In addition to the resident and more common reef fishes, other transient macro fauna were noted. While not observed during the dive survey, at least several (estimated 3 to 4.5 m) tiger sharks (*Galeocerdo cuvier*) were observed from the boat within the cable landing corridor and one green sea turtle (*Chelonia mydas*) approximately 3 m offshore of the proposed cable landfall. It is speculated the sighting of these species correspond to seasonal grazing habitat for the turtle and turtle hunting or pupping for the tiger sharks.

A detailed description of these marine communities is provided in the following sections and the attached Appendix A.

In summary, the nearshore area (<25 m depth) is characterized by two primary stratum and their corresponding biotic communities; a sand channel that extends from the deep offshore limits of the survey area to the intertidal zone; and numerous mounds formed the continuing growth and accretion of a variety of corals. Five active cables and three grounding cables exist in the proposed channel. Where significantly exposed, they are colonized with living coral (predominately *Pocillopora meandrina*). Based on observations of existing cables at the project site, the installation of a new cable is similarly expected to provide a hard substrate suitable for coral recruitment and a habitat for similar macro biota. Existing conditions observed suggest a new cable in the Study area would not have a negative effect on the marine habitat offshore of the Spencer Beach County Park.

1.0 INTRODUCTION

Alcatel-Lucent Submarine Networks (ASN), on behalf of Office des postes et télécommunications de Polynésie française (OPT), is planning the design, routing, and installation of the Honotua cable system. As part of this effort and supporting environmental analyses, ASN has tasked AMEC Earth and Environmental, Inc., (AMEC) to examine the nearshore environment along the proposed fiber optic cable route at the Honotua landing site, which is on the leeward coast of the island of Hawai‘i. A cable overview and vicinity map is provided in Figure 1.

The objective of this study was to document the existing physical and biological characteristics of the marine habitat in the vicinity of the proposed cable alignment. This was accomplished by conducting a dive survey along the planned alignment from the shoreline to 25 m water depth contour. The survey included collecting observations along transects perpendicular to the alignment to characterize the habitat within a corridor surrounding the alignment, which assisted in evaluating potential route refinements.

This report is intended to provide substantive documentation of site conditions observed prior to cable installation. The information is suitable to characterize habitat and species that may be affected during installation, provide the basis for an assessment of potential impacts, identify opportunities to reduce impacts during installation, and to observe the relative health of the project area, which includes five cables installed and in service at this landing.

ProjectG/SD08/Aquatics/Alcatel/mxd/regional_location

Date: 10/14/2008

FIGURE

1

Regional Location Map

2.0 STUDY DESIGN AND METHODS

Field activities were conducted on September 23 to 25, 2008, working from the survey vessel Kanoe, a 23-foot catamaran operated by a local skipper with extensive experience in the environs of the northern Kona coast. A listing of personnel involved in all or part of the survey includes:

NAME	COMPANY	PROJECT TITLE
Sophie Wright	ASN	Client Project Manager
Denise Toombs	AMEC	Project Manager
Rolf Schottle	AMEC	Dive Survey Supervisor
Brian Popp	University of Hawai‘i, O‘ahu, HI (Independent)	UH Scientific/Safety Diver
Steve Dollar	Marine Research Consultants-Hawai‘i (Independent)	Dive Biologist
David Chai	Aquatic Resources Management (Independent)	Vessel Skipper

Concurrent with this baseline assessment, EGS Survey (EGS), Asia Limited, Hong Kong, provided additional marine surveying in the project area including multibeam, side-scan sonar and diving surveys. The biotic survey used a separate transect line within the footprint of the EGS survey area (i.e., the existing active cable corridor).

All field activities were performed in accordance to the *Site Specific Heath and Safety Dive Plan Honotua, Spencer Beach, Hawai‘i* (AMEC 2008). All survey divers were qualified in scientific diving and trained in safe diving procedures, and adhered to the requirements specified in the dive plan. All dives were restricted to depths and time limits that did not require in-water decompression. Diving activities were suspended when conditions were deemed unsafe (e.g., tiger shark sightings) and resumed when the study area was clear of hazards.

2.1 Alignment Survey and Biological Baseline Assessment

A complete visual survey by scientific divers using self-contained underwater breathing apparatus (SCUBA) was conducted along the proposed Honotua alignment. The initial sand channel reconnaissance survey indicated a relatively unobstructed sandy bottom type adjacent and approximately 1 m south of the existing cables. Based on this reconnaissance, the biotic survey transect line was placed at a 1-m separation to these existing cables. The primary alignment assessment survey encompassed ±3 m from 600 m offshore to 0 m (shoreline). Corresponding confirmation transects were performed to 1,200 m offshore as detailed in Section 2.2. As divers traversed the prescribed corridor, a complete video recording was collected and digital photos of representative features captured. In addition, at locations of interest (e.g., exposed reef and transitional areas) the study area was supplemented to ensure all representative biota and bottom types were well documented.

A qualified marine biologist was included on the team to provide a comprehensive baseline assessment of the benthic marine habitats. To fulfill this requirement, Dr. Steve Dollar (Marine Research Consultants, Honolulu, Hawai‘i) performed this component of the survey. Dr. Dollar has over 20 years of experience in Hawai’ian marine habitat assessment and is the primary author of numerous marine biological studies.

2.2 Confirmation Transects

Following the detailed alignment survey discussed in Section 2.1, a series of perpendicular dive transects were made at predetermined intervals from 25 to 1.5 m water depth to obtain additional information on the biological and physical characteristics along the alignment. For all transects, a 30-m weighted transect line was set by divers and centered perpendicular to the alignment (parallel to shore, ±15 m each side of the alignment) at pre-marked intervals. A weighted buoy was released at each transect for subsequent determination of GPS coordinates. Transects were biased to 25 m intervals from 0 to 275 m offshore because coral mounds were more numerous in the nearshore. A complete summary of video confirmation transects is provided in Table 1. Divers documented the physical and biological characteristics at each perpendicular transect from a north to south orientation using video and still photography. Transect paths are indicated in Figure 2. A summary of the results for the confirmation transects are provided in Section 3.2.

3.0 RESULTS AND DISCUSSION

The baseline assessment was subdivided into biotic zones based on the primary physical features. Highlights of these zones and a general description of the composition of biotic assemblages are provided in Section 3.1. The complete baseline biological assessment of the marine environment, including photo documentation, is presented in Appendix A.

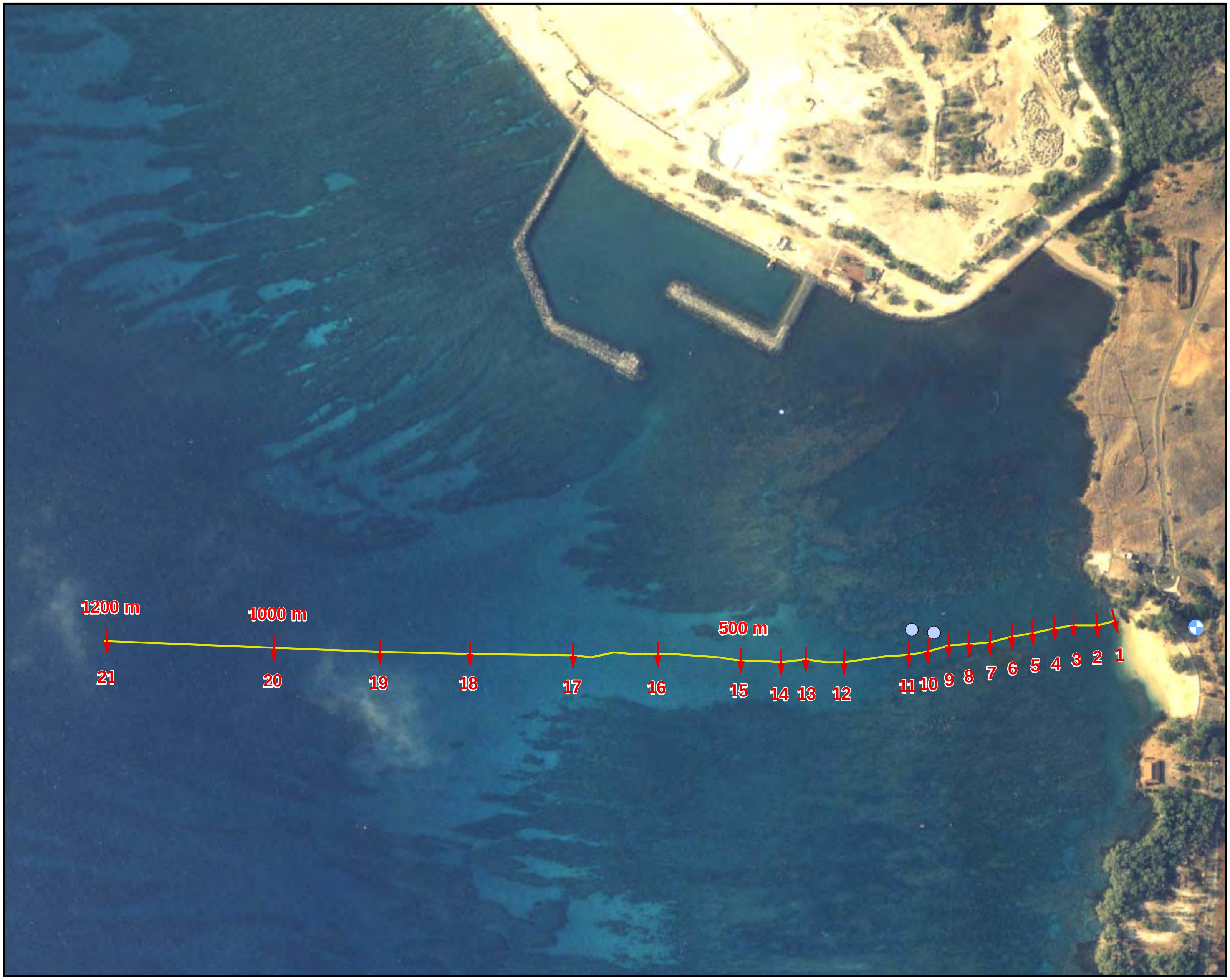
3.1 Physical and Biological Characteristics of the Planned Alignment

This section provides a summary of the physical structures and overview of the biotic community assemblages along the alignment to a depth of 25 m.

The 25 m depth contour extends approximately 1,200 m of horizontal distance from the shoreline along the proposed alignment. Within this corridor, two distinctive strata are encountered. The most dominate strata, in terms of area in the proposed corridor, is a relatively flat channel comprised of fine to very coarsely-grained calcium carbonate sand. Although subject to seasonal deposition, scouring and shoaling, the relatively large size of the channel and surrounding fringe reef supports year round accumulation of sand. The channel narrows along the east-west axis as it approaches the shoreline.

The other major biotic habitat stratum consists of coral “mounds” or “knolls”. These mounds vary in size from single hemispherical colonies to much larger formations that define the “walls” of the channel. These walls are the result of large coral colonies that form the base structure of the local fringe reef system. Within the sandy plain of the main channel are additional coral heads of various sizes. The interspersed coral heads tended to increase in size and decrease in abundance with distance from the shoreline. The larger mounds were generally elongated in shape with the long axis perpendicular to the depth contours. These coral “fingers” are common features and are a result of wave action and subsequent scouring as the water recedes from the reef flat.

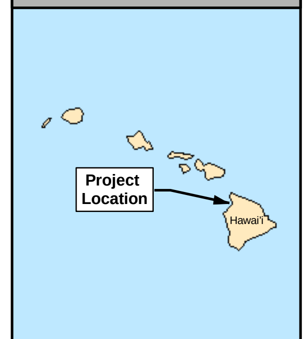
In addition to the coral mounds, the intertidal-subtidal zone (0 to 50 m offshore, 0 to 4 m water depth) is comprised of a mix of rounded, mainly basaltic, cobbles and boulders, exposed scoured fossilized reef, and is interspersed with patches of carbonate sand. A more exposed intertidal basalt shelf (0 to 25 m off shore) extends south of the current cable landing in the shallows of the adjacent sandy beach. Biotic assemblages are limited on this stratum and this zone is clearly subjected to seasonal scouring from wave action and tidal exposure.



Legend

- Primary Transect Corridor
- Video Survey Transect
- Beach Manhole
- Exposed Earth Plate

Regional Location



Map Notes

Video Survey Transect: AMEC (2008)
Primary Transect: AMEC (2008)
Earth Plate: AMEC (2008)

Projection: NAD 83, State Plane Hawaii FIPS 5101, Feet

Date: 10/15/2008

Path: ProjectG/SD08/Aquatics/Alcatel/mxd/transect.mxd

N

1 inch equals 175 meters

0 60 120 180 Meters

FIGURE

2

amec

Honotua Biological Survey Transects

3.2 Physical and Biological Characteristics of the Transects

These transects supplement the alignment data with documentation of the adjacent physical structures and biotic community assemblages along the proposed alignment. This additional information was used in the route planning by enabling the engineers to determine whether small changes in the planned route, or in the field during installation, would encounter materially different conditions. Information gathered along these transects did not identify any unique features or substantially different conditions from the planned alignment. A summary of observations for each transect is presented in Table 1.

3.3 Other Nearshore Site Observations

Throughout the nearshore survey, notes were taken on the activities of other users in the vicinity of the proposed alignment. The proposed alignment is located in the same corridor where a total of five existing cables and three earth grounding leads land near the north end of the beach at Spencer Beach County Park. All cables are buried below the low tide line and extend under the beach to a BMH. The two GTE cables and six PLNI cables (three active cables, three grounding cables) are placed in articulated pipe in the immediate nearshore, as shown below.

GTE (left) and PLNI (right) Cables in Articulated Pipe, at 1 m Water Depth

In addition to documenting the marine habitats, divers located two of three known "earths" or grounding plates that are located in the subtidal area. These earths were designated as Earth 1, 2, and 3 and lay approximately 225, 300, and 400 m offshore of the shore landing, and are installed in between coral mounds to the north of the primary cable corridor. Earth plates 1 and 2 were located (see Table 2). Earth plate 3 was not located and presumed buried by shoaling sand.

The beach is popular for surfing (winter) and other typical beach recreational activities (e.g., bathing). No snorkeling was observed in the vicinity of cable landing, although the beach terminated at a rocky point. Occasional snorkeling was observed in the shallow waters adjacent to the sandy beach. There are camp sites that are frequently occupied immediately upland of the landing site although visitors were infrequently observed at the shoreline likely due to the unstable rocks and overhanging trees. No commercial fishing or diving boats were observed in the vicinity of the nearshore. Based on these observations, the intertidal shallow reef area at the primary cable landing had limited appeal for swimming (due to the rocky bottom) or fishing (poor footing and overhanging trees) when compared to other areas in the immediate vicinity. However, observations were made during the normal work week (Monday through Friday). There were recent beach closures due to shark sightings.

Other marine life known to inhabit the nearshore regionally include: Hawaiʻian monk seals (*Monachus schauinslandi*), spinner dolphins (*Stenella longiroustris*–none observed), Humpback whales (*Megaptera novaeangliae*–none observed), and green sea turtles (*Chelonia mydas*–one observed from shore on 9/26/08 3m offshore of the current GTE cable landing).

Table 1. Summary of Transects

Transect	Date	Depth (m)	Distance from BHM (m)	Bottom type	General Comments/Biology1
T-1	Sep 25 08	1.5	25	100% hard substrate	
T-2	Sep 25 08	2.4	50	95% sand/soft bottom 5% hard substrate	coral heads:1, large fish: moderate
T-3	Sep 25 08	2.4	75	95% sand/soft bottom 5% hard substrate	coral heads:multiple, fish: low
T-4	Sep 25 08	2.7	100	90% sand/soft bottom 10% hard substrate	coral heads:multiple, fish: low
T-5	Sep 25 08	3.0	125	90% sand/soft bottom 10% hard substrate	coral heads:1 large fish: moderate
T-6	Sep 25 08	3.4	150	80% sand/soft bottom 20% hard substrate	
T-7	Sep 25 08	4.0	175	75% sand/soft bottom 25% hard substrate	coral heads:1, large fish: low
T-8	Sep 25 08	4.3	200	50% sand/soft bottom 50% hard substrate	
T-9	Sep 25 08	4.9	225	50% sand/soft bottom 50% hard substrate	coral heads:1, large fish: moderate
T-10	Sep 25 08	5.2	250	25% sand/soft bottom 75% hard substrate	
T-11	Sep 25 08	5.2	275	40% sand/soft bottom 60% hard substrate	
T-12	Sep 24 08	4.9	350	95% sand/soft bottom 5% hard substrate	burrowing organisms: high
T-13	Sep 24 08	3.7	400	95% sand/soft bottom 5% hard substrate	coral heads:1, large fish: moderate-high, burrowing organisms: high
T-14	Sep 24 08	3.7	450	95% sand/soft bottom 5% hard substrate	coral heads:1, med fish:moderate
T-15	Sep 24 08	4.3	500	100% sand/soft bottom	
T-16	Sep 24 08	5.5	600	100% sand/soft bottom	
T-17	Sep 24 08	7	700	100% sand/soft bottom	
T-18	Sep 25 08	9.8	800	100% sand/soft bottom	
T-19	Sep 25 08	13.4	900	100% sand/soft bottom	
T-20	Sep 25 08	17.4	1000	100% sand/soft bottom	
T-21	Sep 25 08	25	1200	100% sand/soft bottom	

[1] Coral Head coverage: sparse <1%, low=1-5%, moderate=5-15%

Fish Abundance: minimal <10, moderate=10-50, high >50%

Table 2. Survey Transect Coordinates and Distance from Shore

Video Transect No.	Distance from shore (m)	Approx. Depth (m) *	Latitude (N) Degrees	Latitude (N) Minutes	Latitude (N) decimal Seconds	Longitude (W) Degrees	Longitude (W) Minutes	Longitude (W) Decimal Seconds
1	25	1.5	20	1	0.451	155	49	0.393
2	50	2.4	20	1	0.448	155	49	0.405
3	75	2.4	20	1	0.448	155	49	0.421
4	100	2.7	20	1	0.446	155	49	0.434
5	125	3.0	20	1	0.443	155	49	0.449
6	150	3.4	20	1	0.44	155	49	0.463
7	175	4.0	20	1	0.437	155	49	0.478
8	200	4.3	20	1	0.436	155	49	0.492
9	225	4.9	20	1	0.435	155	49	0.506
10	250	5.2	20	1	0.431	155	49	0.52
11	275	5.2	20	1	0.429	155	49	0.533
	300	4.9	20	1	0.428	155	49	0.549
	325	4.9	20	1	0.426	155	49	0.563
12	350	4.9	20	1	0.424	155	49	0.577
	370	4.3	20	1	0.424	155	49	0.589
13	400	3.7	20	1	0.426	155	49	0.603
14	450	3.7	20	1	0.424	155	49	0.62
	475	4.0	20	1	0.425	155	49	0.632
15	500	4.3	20	1	0.425	155	49	0.647
	525	4.6	20	1	0.427	155	49	0.662
	550	4.3	20	1	0.428	155	49	0.676
	575	4.6	20	1	0.429	155	49	0.69
16	600	5.5	20	1	0.429	155	49	0.704
	625	5.8	20	1	0.429	155	49	0.721
	650	6.1	20	1	0.43	155	49	0.733
	670	6.4	20	1	0.427	155	49	0.749
17	700	7.0	20	1	0.428	155	49	0.761
18	800	9.8	20	1	0.429	155	49	0.831
19	900	13.4	20	1	0.43	155	49	0.892
20	1000	17.4	20	1	0.432	155	49	0.964
21	1200	25.0	20	1	0.445	155	50	50.023
Other:								
Earth "1" (~225m offshore)			20	1	0.443	155	49	0.516
Earth "2" (~300m offshore)			20	1	0.445	155	49	0.531
Earth "3" (~400m offshore)			NL	NL	NL	NL	NL	NL

* = depth measured on 12/25/08 ~0900.

NL= Not located- covered by sand shoaling

4.0 REFERENCES

AMEC Earth & Environmental, Inc. 2008. Site-Specific Heath and Safety Dive Plan Honotua

Appendix A

Baseline Assessment of the Marine Environment in the Vicinity of the Honotua Cable Landing, Spencer Beach, South Kohala, Hawai'i

BASELINE ASSESSMENT OF THE MARINE ENVIRONMENT IN THE VICINITY OF THE PROPOSED HONOTUA CABLE LANDING , SPENCER BEACH, SOUTH KOHALA, HAWAII

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By:

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October 2008

INTRODUCTION

On behalf of Office des postes et télécommunications de Polynésie française (OPT), Alcatel-Lucent is planning to install a fiber-optic cable for OPT. between Tahiti and Hawaii. The proposed landing site in Hawaii is located adjacent to an existing cable landing at Samuel M. Spencer Beach Park, located to the south of Kawaihae Harbor in the South Kohala District of the Island of Hawaii (termed hereafter as the Honotua landing). Although there are presently numerous cables installed in the nearshore landing corridor, it is important to have an understanding of the physical and biotic structure of the marine habitats in the area where the cable will be installed. This report presents a baseline level assessment of the physical structure and biotic community assemblages within the corridor of the cable route from the shoreline to a water depth of approximately 25 meters (m).

METHODS

All fieldwork was carried out on September 25, 2008 working from a 23 foot workboat, owned and operated by Mr. David Chai. Sea conditions during the survey consisted of overcast skies, calm winds and calm seas, resulting in no breaking surf on the shoreline. The baseline assessment was conducted by S. Dollar, accompanied by B. Popp, and R. Schottle. Survey methods consisted of swimming the entire cable route for a distance of approximately 1,000 m from the 25 m water depth contour to the shoreline. The traverse followed a wire cable that was previously laid on the sea floor to mark the exact proposed cable route. Along the route, a corridor of approximately 3 m on each side of the wire was visually inspected for biotic community composition. At locations of interest, the traverse was halted and photographs of representative features were taken. Conducting the traverse in this manner ensured that the entire cable route was viewed, eliminating the potential for missing any unique or unusual features. During these underwater investigations, notes on species composition were recorded, and numerous photographs recorded the existing conditions of the area.

RESULTS

The alignment for the Honotua cable landing takes advantage of a naturally occurring sand channel that extends from the deep sand plains through the nearshore reef platform to the shoreline (Figure 1). The fortuitous occurrence of the sand channel has resulted in it's utilization for other cable landings, and will result in minimal influence to living marine resources from installation of the Honotua cable. In addition, because the composition of the sand channel is fairly homogenous, there is relatively little biotic zonation through the area of the cable alignment. Described below are major characteristics of the biota within the cable alignment.

Sand Plain

The overall composition of the marine communities off Spencer Beach occurs as two major habitats. The most dominant habitat, in terms of area coverage, is a relatively flat, gently sloping sand plain composed primarily of coarse to fine-grained, marine-derived calcium carbonate sediment. Interspersed in the sand plains are numerous burrows from a wide assortment of infauna, which likely includes, but is not limited to worms, mollusks, crustaceans, and fish. The variation in the size and appearance of the burrows indicates a wide diversity of infauna (Figure 2). Several macroinvebrates that were noted on the surface of the sand plain were mollusks including several large mollusks (*Conus lividus* and *Terebra* sp.) each approximately 15 cm in length. It is also documented that the outer area of the sand zone is the habitat of Kona crab (*Ranina serrata*) (D. Chai, personal communication).

Within a region of between 100 m and about 300 m from shore, the sand plain also contained meadows of the seagrass *Halophila* sp., which is the only true seagrass found in the Hawaiian Islands. In the deeper regions of the sand plain (>4 m) a thin greenish brown film, which likely consists of a cyanobacterial mat, covered portions of the bottom. No other macroalgae were observed on the sand plain. The occurrence of the cyanobacterial mat indicates little resuspension of bottom sediments by wave action.

Coral Mounds

The other major biotic habitat consists of coral "mounds" or "knolls". These mounds (knolls) vary in size from single hemispherical colonies of *Porites lobata* to much larger structures on the order of 20 m in length and 3 m in height (Figures 2-5). The larger structures were generally elongated in shape with the long axis perpendicular to depth contours. The larger mounds consist of a mixture of coral species, but are primarily composed of *Porites lobata* and patches of *Porites compressa* (finger coral). Other species that were noted within the coral mounds, but in much reduced abundance are *Montipora patula*, *M. capitata*, *Pocillopora meandrina, Pavona* *varians*, and *Pavona duerdeni*. In total, living coral cover on the upper surface of the reef platform was on the order of 90%. Other macro-invertebrates that were commonly noted on the coral mound were the sea cucumbers *Holothuria atra* and *Actinopyga mauritiana*, and the sea urchins *Tripneustes gratilla*, *Echinometra mathaei, Echinometra oblonga, Heterocentrus mammillatus*, and *Echinotrix diadema.* As is typical on most reefs of West Hawaii, frondose benthic macroalgae were rare. The only alga noted on the reef surface was *Amansia* sp., which occurred only rarely as small isolated patches.

The coral mounds provide a far greater structural complexity than the surrounding sand flats, and as such are the habitat for a variety of reef fish. As is typical on many Hawaiian reefs, the most common fishes were the damselfishes (*Chromis agilis*, *C. hanui, Abudefduf abdominalis*). Particularly abundant were juvenile damselfish *Dascyllus albisella*. A variety of surgeonfishes (*Acanthurus nigroris, A. nigrofuscans, A. olivaceus, Naso lituratus, Zebrasoma flavescens),* butterflyfishes *(Chaetodon miliaris, C. multicinctus, C. quadrimaculatus, C. auriga, Forcipiger longirostris) and moorish idols (Zanclus cornutus*) were also observed*.* Hawkfishes *(Parracirrhites arcatus, P. forsteri*, and *Cirrhitops fasciatus)* were common sitting on the upper branch tips of colonies of Pocilloporid corals. Common wrasses included *Bodianus bilunulatus* and *Thallosoma duperrey*. Several squirrelfish *(Myripristes spp.)* were observed under ledges at the bases of some of the larger coral knolls. Fish were rare over the sand flats, where only several goatfishes (*Mulloidichthys* spp.) and black triggerfish (*Melichthys niger*) were observed. While not observed during the dive survey, several tiger sharks (*Galeocerdo cuvier*) were observed from the boat within the cable landing area.

<u>Nearshore Zone</u>

Seaward of the sand beach that comprises the shoreline of Spencer Beach, the nearshore and intertidal zone consists of rounded basaltic rock and boulders, interspersed with patches and small channels of coarse-grained white sand. At the proposed Honotua cable-landing site, several cables in articulated pipe were observed crossing the intertidal area (Figure 6). The boulder zone only extends to a distance of approximately 5 m from shore in water depths of 0-1 m. Biotic assemblages on the rock substrata are very limited most likely due to the shallow depth, episodic exposure to the energy of breaking waves, and exposure to the atmosphere during low tide. Occurrence of reef corals was very sparse, limited to only intermittent small nubbins of *Pocillopora meandrina*. No other motile invertebrates (e.g., sea urchins, sea cucumbers) were observed in the area. While many of upper surfaces of the boulders were covered with a short algal turf, no species of macroalgae were observed.

Fish were relatively rare in the nearshore zone compared to the deeper reef platform. Fish observed among the boulders were the brown surgeonfish (*Acanthurus nigrofuscus*), convict surgeonfish (*Acanthurus triostegus*), and saddleback wrasse (*Thallassoma duperrey*).

Of primary importance with respect to the proposed cable landing is consideration of the existing cables that cross the reef platform in the same area. Numerous cables bisect the sand plain throughout the corridor (Figure 7). While the cable lies mainly on the surface of the ocean floor, there are also areas where the cable is suspended as it crosses sand-filled depressions (Figure 7).

Nearly all of the cables observed in the Spencer Beach area that were situated above the elevation of the sea floor were colonized with numerous living coral colonies. The most common colonizer of the cables was *Pocillopora meandrina* and *Porites lobata*, although in deeper water, several large colonies of *Pocillopora eydouxi* were observed growing on the surface of cables (Figures 7). In fact, when elevated off the reef platform, cables provide a more suitable habitat for settlement and growth of coral than the benthic surface, likely owing to lower sand scour.

Summary and Conclusions

A baseline qualitative assessment of the marine habitats along the route of the proposed Honotua cable landing at Spencer Beach, Island of Hawaii provides an overview of the biotic communities in the area, as well as the data to assess the potential effects of the cable to the marine environment. In summary, the physical and biotic structure of the entire area consists of a sand channel that extends from the deep offshore limits of the survey to the intertidal area. Interspersed in the sand channel are numerous mounds that are formed by the continuing growth and accretion of a variety of reef corals.

Numerous existing cables bisect the sand channel. Cables that are not buried, and on the surface of, or elevated over the sand, are colonized by living corals, primarily of the *species Pocillopora meandrina*. As the existing cables provide a habitat for the benthic community and do not appear to present any detrimental aspect to biotic community structure, it can be concluded that placement of a new cable should not pose any negative effect to the marine habitats off of Spencer Beach.

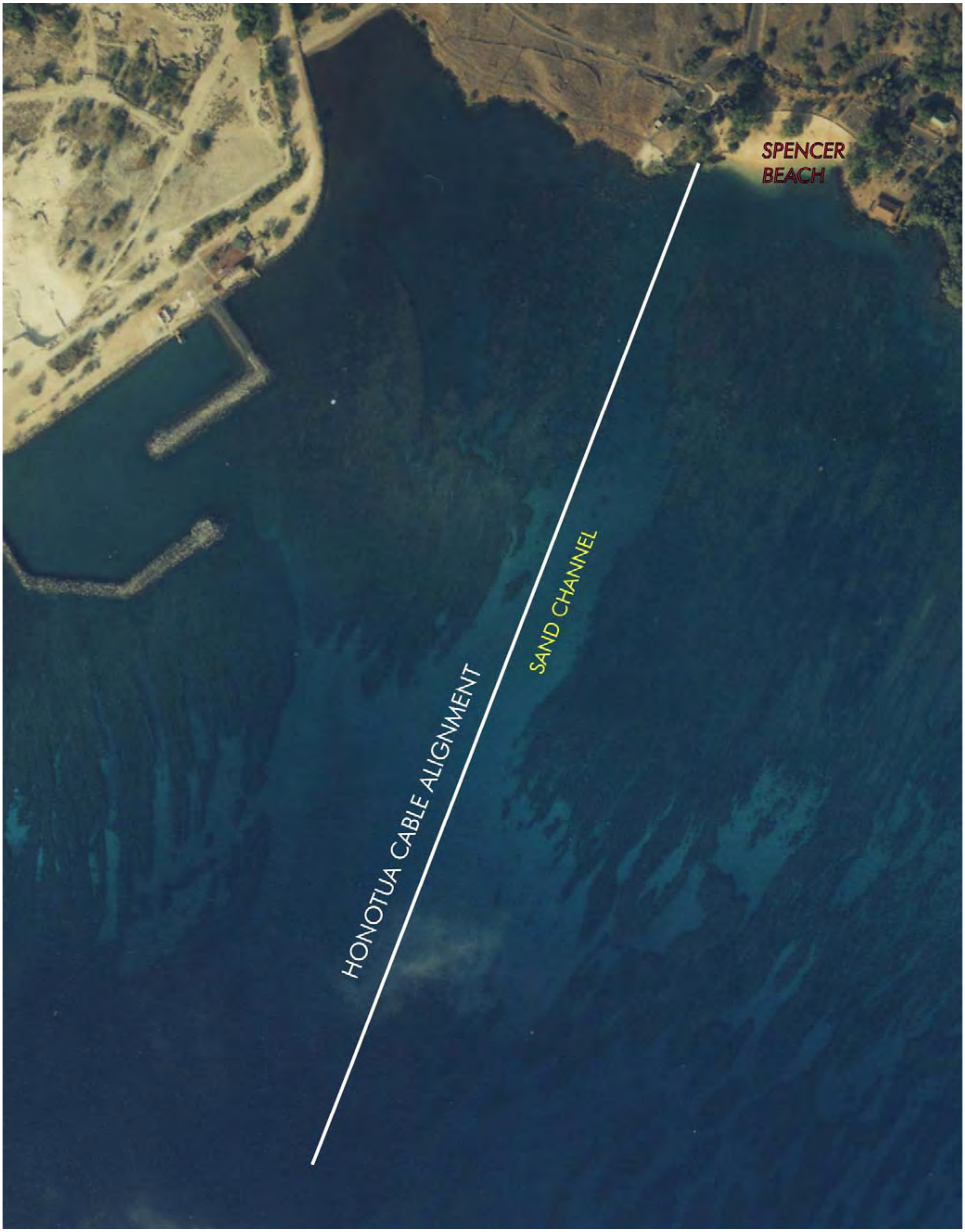

FIGURE 1. Aerial photograph of Spencer Beach and offshore area showing approximately alignment of Tahiti-Hawaii Honotua Cable. Also shown is location of sand channel that extends to the shoreline.

FIGURE 2. Portion of sand channel that extends from deep ocean to the shoreline and comprises the alignment for the Honotua Cable at Spencer Beach (upper photo). Numerous burrows from a variety of infaunal species are common throughout the sand flats. Green plants are the Hawaiian seagrass *Halophila* sp, which also is common throughout the sand area. Bottom photo shows several heads of the coral *Porites lobata* that occur throughout the sand channel. Several existing cables can be seen at lower right.

FIGURE 3. Several views of "coral mounds" that occur throughout sand channel off Spencer Beach that comprises the alignment for the Honotua Cable at Spencer Beach. Predominant coral in both upper and lower photo is *Porites lobata*.

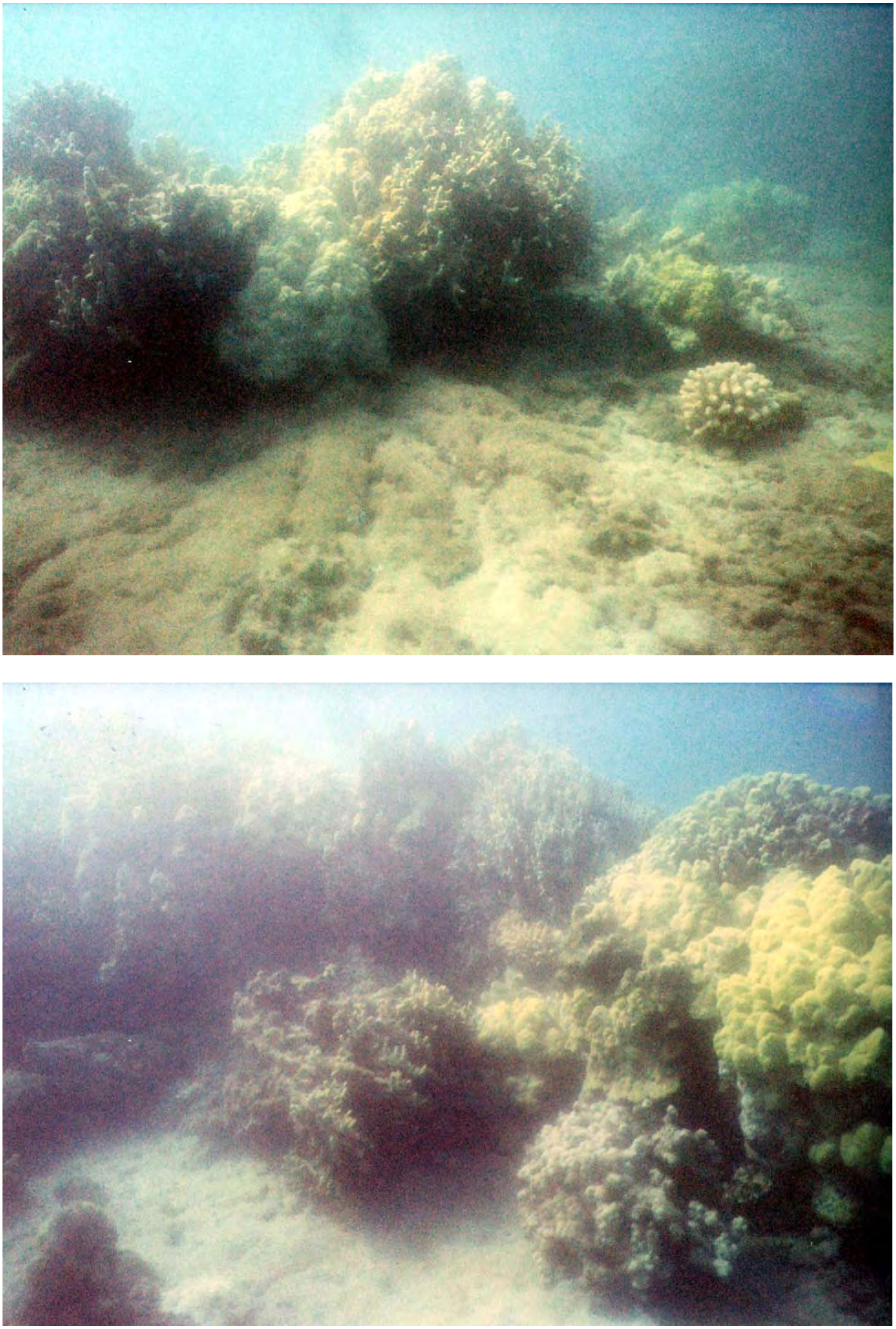

FIGURE 4. Several views of "coral mounds" that occur throughout sand channel off Spencer Beach that comprises the alignment for the Honotua Cable at Spencer Beach. Branching "finger coral" in both upper and lower photo is *Porites compressa*.

FIGURE 5. Several views of "coral mounds" that occur throughout sand channel off Spencer Beach that comprises the alignment for the Honotua Cable at Spencer Beach. Lower photo shows a section of living coral that has "calved" off main mound structure. Continued growth of the broken section will eventually result in horizontal extension of mound structure.

FIGURE 6. Articulated armored cables that traverse the intertidal nearshore area of Spencer Beach along the alignment for the Honotua Cable at Spencer Beach. Note lack of colonization of cables by any biota other than algal turf.

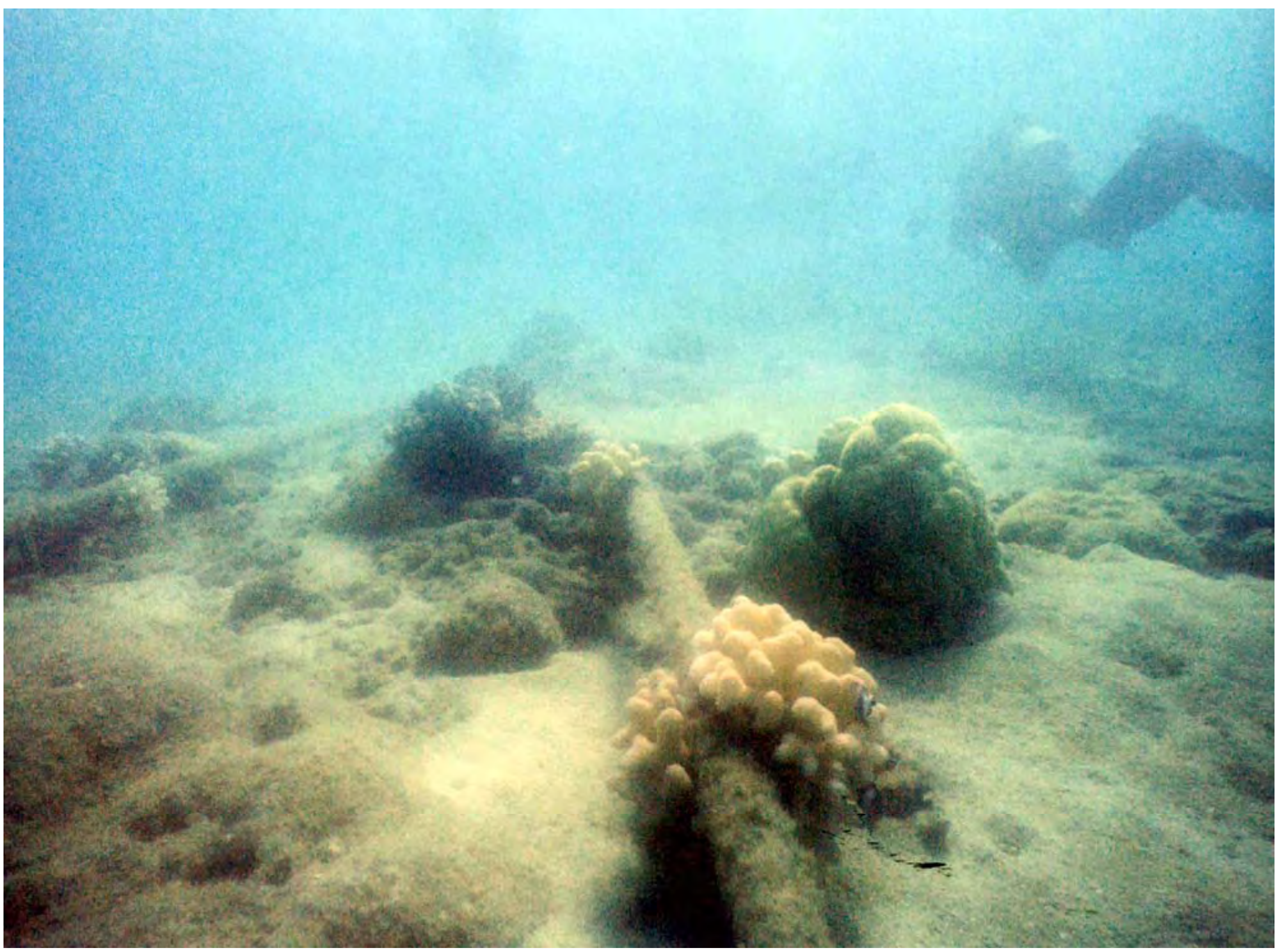

FIGURE 7. Several views of existing cables that traverse the sand channel off Spencer Beach that comprises the alignment for the Honotua Cable at Spencer Beach. In both upper and lower photos corals can be seen colonizing portions of the cables. White branching coral in lower center of bottom photo is *Pocillopora meandrina*.

Appendix B

DRAFT - Archeological Assessment of Fiber Optic Cable Corridor

DRAFT—Archaeological Assessment of Fiber Optic Cable Corridor, Spencer Beach, Kawaihae 2 Ahupua‘a, South Kohala District, Island of Hawai‘i

TMK 3-6-2-002:008

Prepared For:

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Prepared By:

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GANDA Report No. 2150-1

November 2008

DRAFT—Archaeological Assessment of Fiber Optic Cable Corridor, Spencer Beach, Kawaihae 2 Ahupua‘a, South Kohala District, Island of Hawai‘i

TMK 3-6-2-002:008

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GANDA Report No. 2150-1

November 2008

MANAGEMENT SUMMARY

Pedestrian survey and test excavation was conducted at TMK 3-6-2-002:008 in Spencer Beach Park, Kawaihae 2 Ahupuaʻa, South Kohala District, Island of Hawaiʻi. Five backhoe trenches and eight shovel test pits revealed that the area is composed entirely of fill material, with marine sand, possibly imported, on the beach and rocky fill above the coastal strip. No surface or subsurface cultural features were identified and none are likely to be found in the fill.

CONTENTS

FIGURES

TABLES

INTRODUCTION

At the request of Amec Earth and Environmental, Inc., Garcia and Associates conducted an archaeological assessment for a fiber optic cable landing site at Spencer Beach Park, Kawaihae 2 Ahupuaʻa, South Kohala District, Hawaiʻi Island (Figures 1 and 2). The primary focus of the survey was on the identification and appropriate treatment of historic properties that might be affected during fiber optic cable installation.

This report is drafted to meet the requirements and standards of state and federal historic preservation law. These include Chapter 6e of the Hawaiʻi Revised Statutes and the State Historic Preservation Division's *Rules Governing Standards for Archaeological Monitoring Studies and Reports* (§ 13-279-4).

The report begins with a description of the project site and an historical overview of land use, Hawaiian traditions, and archaeology in the area. The next section presents methods used in the surface and subsurface survey, and the following section details the survey results. Project results are summarized and recommendations are made in the final section. Hawaiian words are defined in a glossary at the end of the document.

Project Area and Undertaking

The marine landing site is located at TMK 3-6-2-002:008 on the north end of Spencer Beach Park in Kawaihae 2 Ahupuaʻa. An existing manhole is located just below the steps leading to the Spencer Beach parking area, and the new fiber optic cable will run from the shore to this manhole (Figure 3). Existing fiber optic cables run from the manhole to the sea in a westerly direction, then turning northwest near the shoreline. The new fiber optic route is projected to run straight from the manhole to the ocean, with an ocean grounding bed installed in the open expanse south of the manhole.

Earth disturbing activities associated with fiber optic installation will include: 1) trenching to lay the cable and 2) excavation of a 10 x 10 m area, 8 m southeast of the manhole for placement of the ocean grounding bed. Excavation depth for the cable will be variable, but is targeted at approximately 1.5 m below surface. Near the shoreline, bedrock will be encountered well before this depth. Excavation of the ocean grounding bed will extend to about 0.8 m below surface. Grounding rods will be driven directly into the earth at this depth and will ultimately extend some 3 m below surface.

Environment

Spencer Beach Park lies on the leeward side of Hawaiʻi Island with rainfall averages of less than 10 inches per year in this dry coastal environment (Juvik and Juvik 1998). Soils consist of unconsolidated calcareous sand along the immediate shoreline with Kawaihae Extremely Stony Very Fine Sandy Loam just inland (Sato et al. 1973). Vegetation is sparse in the area, composed of a few large trees and small patches of grass. The Spencer Beach area is heavily landscaped.

Cultural Background

This section includes information on traditional and historic land use in Kawaihae 2 Ahupuaʻa. The area is best known for the celebrated Puʻukoholā Heiau, but was populated by Hawaiians well before construction of that site.

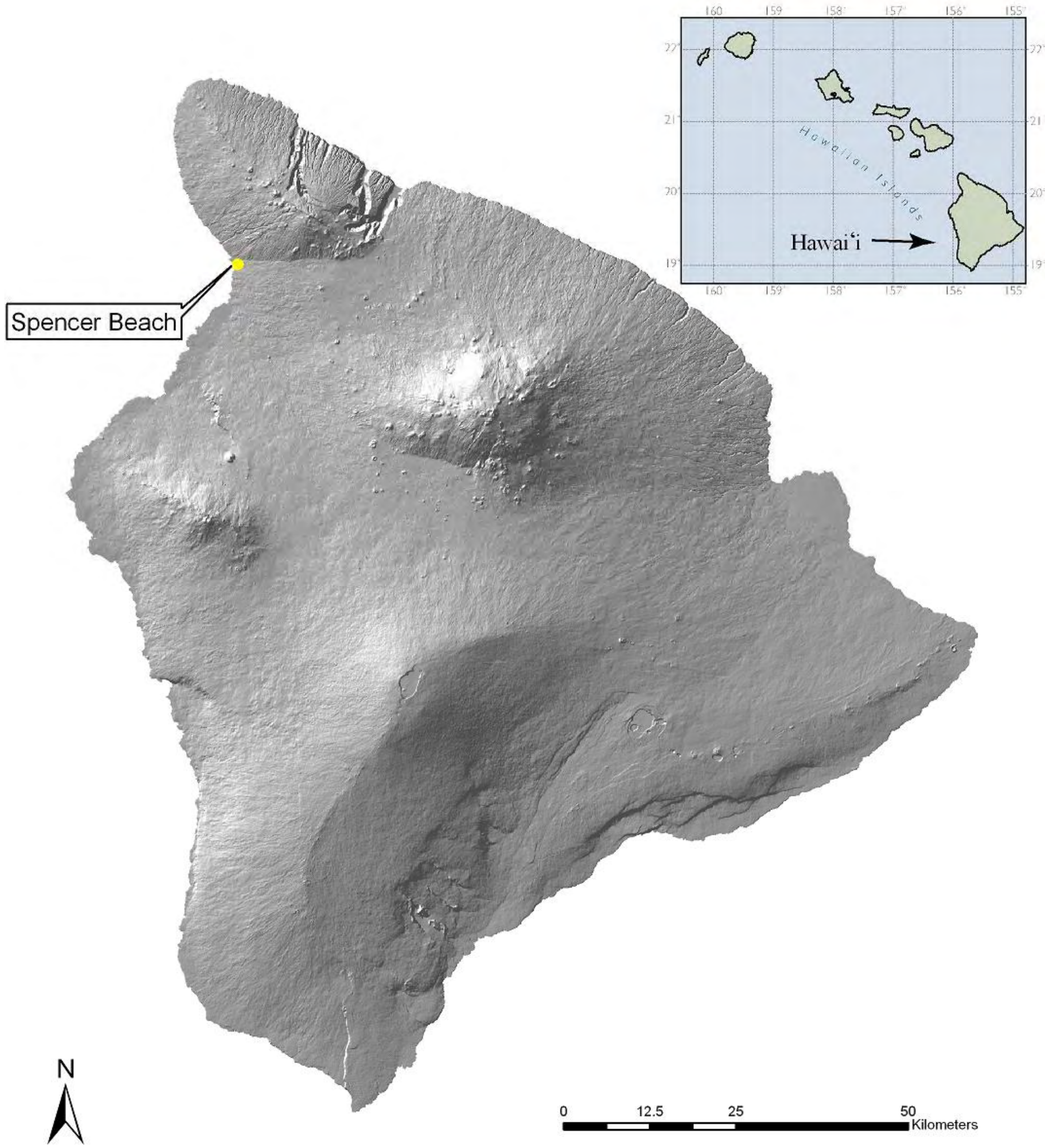

Figure 1. Location of the project area on the west side of Hawai'i Island.

Figure 2. Location of the project area on a USGS topographic map.

Figure 3. Overview of project area and undertaking elements.

Mo'olelo and Land Use

Kawaihae literally translates to "The Water of Wrath," because the area is so dry that people had to fight for water (Pukui et al. 1974:97). Coastal Kawaihae was indeed a dry, barren area, not conducive to agriculture, although taro was cultivated in the lower forest zone just above the coastal region (Handy and Handy 1991:531). Coconut trees are known to have grown in coastal Kawaihae as well (Handy and Handy 1991:173). Kawaihae was also known for its plentiful offshore fishing resources. At least one *'ōlelo no'eau* reinforces this:

> Pua ka lehua. *The* lehua *is in bloom*. Said by the people of Kawaihae when the *aku* fish appear in schools. It was considered unlucky to speak openly of going fishing.
>
> (Pukui 1983:295)

The wind, rain, and sea of Kawaihae are also described in *'ōlelo no'eau*:

> Na makani paio lua o Kawaihae. *The two conflicting winds of Kawaihae*. Refers to the Mumuku wind from the uplands and the Naulu wind, which brings the rains to Kawaihae.
>
> (Pukui 1983:247)

> Ka ua nāulu o Kawaihae. *The cloudless rain of Kawaihae*. The rain of Kawaihae often surprises visitors because it seems to come out of a cloudless sky. A native knows by observing the winds and other signs of nature just what to expect.
>
> (Pukui 1983:172)

> Kawaihae i ke kai hāwanawana. *Kawaihae of the whispering sea*. Refers to Kawaihae, Hawai'i.
>
> (Pukui 1983:178)

> Ke kai hāwanawana o Kawaihae. *The whispering sea of Kawaihae*. Said of Kawaihae, Kohala.
>
> (Pukui 1983:185)

Pu'ukoholā and Mailekini Heiau are the most prominent archaeological features in the vicinity of Spencer Beach Park. Construction of Pu'ukoholā, or "Whale Hill," was completed in 1791 after Kamehameha the Great received a prophecy from one of his *kahuna*. The prophecy foretold that Kamehameha would unite the Hawaiian Islands if he built a *heiau* for the war god Kūkā'ilimoku. Stones were transported to the site via human chain from Waipi'o Valley on the opposite side of the island to construct the mighty structure. The *heiau* is truly massive, made up of multiple terraces, platforms, and pavings. Soon after the *heiau* was completed, Kamehameha's prophecy was fulfilled with the sacrifice of his rival Keoua upon Pu'ukoholā (Kamakau 1992).

Two *'ōlelo no'eau* refer to the slaying of Keoua at Pu'ukoholā:

> Hele aku 'oe ma'ane'i, he wa'a kanaka; ho'i mai 'oe ma'ō he wa'a akua. *When you go from here, the canoe will contain men; when you return, it will be a ghostly canoe*. Warning to Keouakuahu'ula by his *kahuna* not to go to meet Kamehameha at Kawaihae. He went anyway and was killed.
>
> (Pukui 1983:81)

> Makani luna ke lele ‘ino mai la ke ao. *There is wind from the upland, for the clouds are set a-flying*. Signs of trouble are seen. This saying originated shortly after the completion of the Pu‘ukoholā *heiau* by Kamehameha I. He sent Keaweaheulu to Ka‘ū to invite Keouakuahu‘ula to Kawaihae for a peace conference between them. Against the advice of his own high priest, Keouakuahu‘ula went, taking his best warriors along with him. When outside of Māhukona, he saw canoes come out of Kawaihae and realized that treachery awaited him. It was then that he uttered the words of this saying. His navigator pleaded with him to go back, but he refused. Arriving in Kawaihae, Keouakuahu‘ula stepped off the canoe while uttering a chant in honor of Kamehameha. One of the latter’s war leaders stepped up from behind and killed him. All of his followers were slaughtered except Kuakahela, who hid and later found his way home, where he wailed the sad story.
>
> (Pukui 1983:228)

Mailekini, or “Many *Maile* Vines,” sits below Pu‘ukoholā and is thought to have been built earlier by a district chief. Genealogical calculations place construction of the *heiau* at approximately AD 1640–1660 (Cordy 2000:347).

Below Mailekini is the area of Pelekane, where Kamehameha resided during the construction of Pu‘ukoholā. The place name translates to “Britain,” and earlier names are Kikiako‘i (Barrere 1983:27), or Kiikiiakoi (‘I‘i 1959:137). The translation for these earlier names could not be found, although the area was known as a surfing spot (Ii 1959:137).

Hale o Kapuni is a third *heiau* in the area that was probably located in the seas below Mailekini. The *heiau* was named after Kapuni, a high priest serving the *ali‘i* Keawe (Pukui et al. 1974:38). Hale o Kapuni was dedicated to the shark gods and it was a place where sharks were fed.

Explorers such as Vancouver and Menzies visited Kawaihae in the late 1700s, providing very early descriptions of the area. They tell of coral reefs and coconut trees, as well as a very small village:

> The village consisted only of straggling houses, of two classes; those appropriated to the residence of the inhabitants were small, mean, miserable huts; but the others, allotted to the purposes of shading, building, and repairing their canoes, were excellent in their kind; in these occupations several people were busily employed, who seemed to execute their work with great neatness and ingenuity.
>
> (Vancouver 1984:802)

Menzies writes that the area north of Kawaihae was more populated and productive:

> From the north-west point of the island, the country stretches back for a considerable distance with a very gradual ascent, and is destitute of trees or bushes of any kind. But it bears every appearance of industrious cultivation by the number of small fields into which it is laid out, and if we judge by the vast number of houses we saw along the shore, it is by far the most populous part we had yet seen of the island.
>
> (Menzies 1920:52)

Kawaihae in the historic period is reflected in this playful *‘ōlelo no‘eau*:

> Kamipulu Kawaihae. *Damned fool Kawaihae*. Said of Kawaihae natives. Some natives of Kawaihae, Hawai‘i, once sold sweet potatoes to the captain of a ship. He discovered some sticks placed at the bottom of the barrel for filler and called the men damned fools.
>
> (Pukui 1983:160)

The Māhele of 1848 divided the lands of Hawaiʻi, instituting legal land ownership in the islands. All land in Hawaiʻi was divided between the king (crown lands), the Government (government lands), and the *aliʻi* and commoners (*konohiki* lands). *Aliʻi* and commoners were required to submit claims for property to the Land Commission. All claims were assigned Land Commission Award (LCA) numbers, whether or not they were eventually granted. Much of the Kawaihae lands were granted to John Young, advisor of Kamehameha the Great. Only 14 LCA parcels were awarded in Kawaihae 1 and 2.

Today Puʻukoholā and its environs are a National Historic Site, encompassing 60.88 acres (Nelson 2001). Spencer Beach Park, formerly known as Kawaihae Public Park, was formally established in 1936 (Nelson 2001). The park was renamed to honor Samuel Mahuka Spencer (1875–1960), the Hawaiʻi Island county chairman, or mayor by today's terms, from 1924 to 1944.

Previous Archaeology

The coastal region of Kawaihae 2 Ahupuaʻa has been well studied archaeologically (Table 1). The following is a summary of archaeological publications found in the Hawaiʻi State Historic Preservation Division library that report on work carried out in Spencer Beach Park and the surrounding area. Project summaries are presented chronologically.

Early archaeological work in Kawaihae 2 consisted of recording major *heiau* in the area (Thrum 1907a, 1907b, 1938; Stokes and Dye 1991). Puʻukoholā and Mailekini Heiau were formally documented at this time. The two sites were further examined by Bishop Museum archaeologists in the 1960s (Cluff et al. 1969).

Table 1. Previous Archaeology in the Vicinity of the Project Area

Author and Year	Location	Work Completed	Findings
Thrum 1907a, 1907b, 1938; Cluff et al. 1969; Stokes and Dye 1991	Puʻukoholā and Mailekini Heiau	Recording	Documented Puʻukoholā and Mailekini Heiau.
Soehren 1964	Spencer Beach Park	Survey	Historic house site.
Carter 1989	New Spencer Beach Park Road	Subsurface Testing	Tested six features.
Carlson and Rosendahl 1990	South of Spencer Beach	Inventory Survey	Recorded 90 new sites and 58 previously identified sites.
Nelson 2001	Former Spencer Beach Park Road	Reconnaissance, Subsurface Testing	Recorded 13 sites in the vicinity of the road, all previously identified.
Shapiro et al. 2002	Former Spencer Beach Park Road	Monitoring	Documented three previously identified subsurface features.
Carson 2005	Pelekane area of the Puʻukoholā National Historic Site	Inventory Survey	Identified seven sites that include 91 features.
Carson 2006	Pelekane area of the Puʻukoholā National Historic Site	Data Recovery	Excavated two of the sites found during inventory survey.

Also in the 1960s, a surface survey was conducted on the coast between ‘Ōuli and Kawaihae 2 to record archaeological sites surrounding the Mauna Kea Beach Hotel (Soehren 1964). One site was found within Spencer Beach Park. This is a platform with a paved floor, interpreted as an historic house site. The platform is located at the top of the hill behind the Spencer Beach Park restroom on the east side of the road. Historic artifacts, marine shell, coral, and waterworn cobbles were observed on the surface.

After the 1960s, archaeological work in the area has generally been conducted under the umbrella of cultural resource management. In 1989 subsurface testing was completed on six features within the right of way for the new road to Spencer Beach Park (Carter 1989). The features include temporary shelters, a bulldozed wall, and a modern stone alignment. Midden, coral file fragments, and volcanic glass were recovered in the excavations.

Archaeological inventory survey took place on 371 acres of land adjacent to Spencer Beach Park on the south (Carlson and Rosendahl 1990). A total of 90 new sites were identified and 58 previously recorded sites were documented. The sites consist of single and multiple feature components, including C-shapes, terraces, alignments, mounds, walls, trails, cairns, enclosures, platforms, and cultural deposits. Sites were assigned functions of habitation, boundary, transportation, marker, burial, possible ceremonial, agricultural, and World War II military, among others. Two of the sites were radiocarbon dated. Site 14068, a midden deposit, produced three dates ranging from 1180±110 BP to 60±60 BP (Carlson and Rosendahl 1990:24). Site 14063, a cave habitation, yielded six dates ranging from 680±90 BP to 100±60 BP (Carlson and Rosendahl 1990:24).

Archaeological reconnaissance and subsurface testing were carried out in response to removal of the old road to Spencer Beach Park, between Pu‘ukoholā Heiau and Mailekini Heiau (Nelson 2001). A total of 13 archaeological sites were previously identified in the vicinity of the road, including trail remnants, a mound, alignments, wall segments, an historic house, Mailekini Heiau and Pu‘ukoholā Heiau. Two human burials that were unearthed during construction of the road in the 1930s are also located near the road. Subsurface features were also found, including earlier wall segments and road remnants. These features were further documented during monitoring of removal of the road (Shapiro et al. 2002).

Approximately 12 acres were surveyed in the Pelekane area of the Pu‘ukoholā National Historic Site, which lies to the north of Spencer Beach Park (Carson 2005). A total of seven new sites were identified including 90 surface features and one submerged feature. These features consisted of terraces, pavements and alignments, several with subsurface cultural deposits. Four radiocarbon dates were obtained from two of the sites. They range from 230±40 BP to 70±40 BP. These sites were later subjected to data recovery and several earlier radiocarbon dates were obtained (Carson 2006). The surface architecture is thought to have been associated with the Kamehameha Dynasty from the 1790s to 1820s, while buried deposits reflect earlier occupation, with initial use of the area occurring between AD 1250 and 1560.

Summary of Background Information

Kawaihae was thought to be sparsely populated in traditional times due to a dearth of fresh water. The wind, rain, and sea of the *ahupua‘a* are celebrated in *‘ōlelo no‘eau*, and the area was a rich offshore fishing ground. Pu‘ukoholā and Mailekini Heiau are the two most prominent archaeological features in the region, and a variety of sites occur in the surrounding area. These include C-shapes, terraces, alignments, mounds, walls, trails, cairns, enclosures, platforms, and cultural deposits. The Pelekane area, below Pu‘ukoholā, was thought to have been occupied between AD 1250 and 1560. No previous archaeological work has been conducted in the immediate project area.

METHODS

Pedestrian survey and subsurface testing were conducted on 30 October, 2008 by Windy McElroy, PhD and Amanda Sims, BA. Areas that were inspected for surface archaeological remains include: 1) the vicinity of the manhole; 2) the proposed location for the ocean grounding bed; 3) a backup location for the ocean grounding bed; 4) the corridor where existing fiber optic cable runs to the beach; and 5) the proposed route for the new fiber optic cable (Figure 3).

Subsurface testing was also conducted in the above areas. A backhoe was utilized to excavate five trenches on the *mauka* side of the project area, while eight test pits were excavated by hand with shovels in the *makai* portion (Figure 4). Trenches were excavated to approximately 1.5 m, the maximum depth for the proposed ground rods. The 20 to 40-cm diameter test pits were excavated to bedrock, the water table, or until hand shoveling was no longer possible. All excavated material from the shovel test pits was screened through 1/8 inch mesh. Sediments from the backhoe trenches consisted entirely of fill and were not screened. The backhoe excavations were continuously monitored (Figure 5), and all trenches and test pits were backfilled after excavation (Figure 6).

Figure 4. Location of test pits (TPs) and trenches (TRs).

Figure 5. Excavation of Trench 1 with backhoe. View is to the northeast.

Figure 6. Test pits 7 and 8 after backfilling, indicated by black arrows. View is to the northwest.

Representative stratigraphic profiles were drawn and exposed walls were photographed. Sediments were described using Munsell Soil Color Charts and a sediment texture flow chart (Thien 1979). Testing locations were recorded with a 1–3 m accurate Trimble Geo XM Global Positioning System unit. The scale in all field photographs is marked in 10 cm increments. No material was collected and no laboratory analyses were conducted.

RESULTS

Surface Survey

Pedestrian survey of both areas yielded no evidence of surface historical properties. The survey area has experienced substantial previous modification. The open expanse around the manhole has been filled and graded and excavated for underground sprinkler and utility installation. The beach sand is thought to have been imported from elsewhere, although this could not be confirmed.

Test Excavation

A total of five backhoe trenches and eight shovel test pits were excavated. Trenches were spread across the area proposed for grounding rod installation, the backup location for ground rod installation, and in the vicinity of the manhole. Test pits were staggered at various intervals along the existing and proposed fiber optic routes, each offset roughly 3 m from the approximate corridor centerline (See Figures 3 and 4).

Stratigraphic profiles were drawn for all trenches and test pits. Stratigraphy was consistent throughout all the trenches and very similar throughout the test pits. Thus, a sample of one trench profile and one test pit profile are presented here.

Trenches (TR) were 1.5 m in width and ranged in length from 2.2 to 3.4 m. Depths ranged from 1.0 to 1.8 m. Abandoned sprinkler lines were encountered in TR 1 and 2 at 10 cm below surface (cmbs) (Figure 7). An abandoned PVC pipe of unknown function was found in TR 4 at 43 cmbs.

Figure 7. North face of TR 1, showing abandoned sprinkler line.

Caution tape indicating an electric line was encountered at the west end of TR 5 at 10 cmbs, and the trench was therefore moved slightly east. Stratigraphy in all trenches consisted of a single layer of rocky fill (Table 2 and Figure 8).

Test Pits (TP) ranged in size from a 22 cm diameter circle to a 45 x 30 cm oval. Depths ranged from 66 to 80 cmbs, aside from TR 4 and 6, which were terminated at 30 and 11 cmbs respectively

Table 2. Sediment Descriptions

Location	Layer	Depth (cmbs)	Color	Description	Interpretation
TR 4	I	0–130+	10YR 4/2	Silty loam; 50% basalt stones and boulders; sparse modern debris; base of excavation.	Fill
TP 2	I	0–14	10YR 5/3	Medium marine sand; modern debris; smooth, very abrupt boundary.	Fill
	II	14–80+	10YR 4/2	Medium marine sand; mottled; modern debris; base of excavation.	Fill

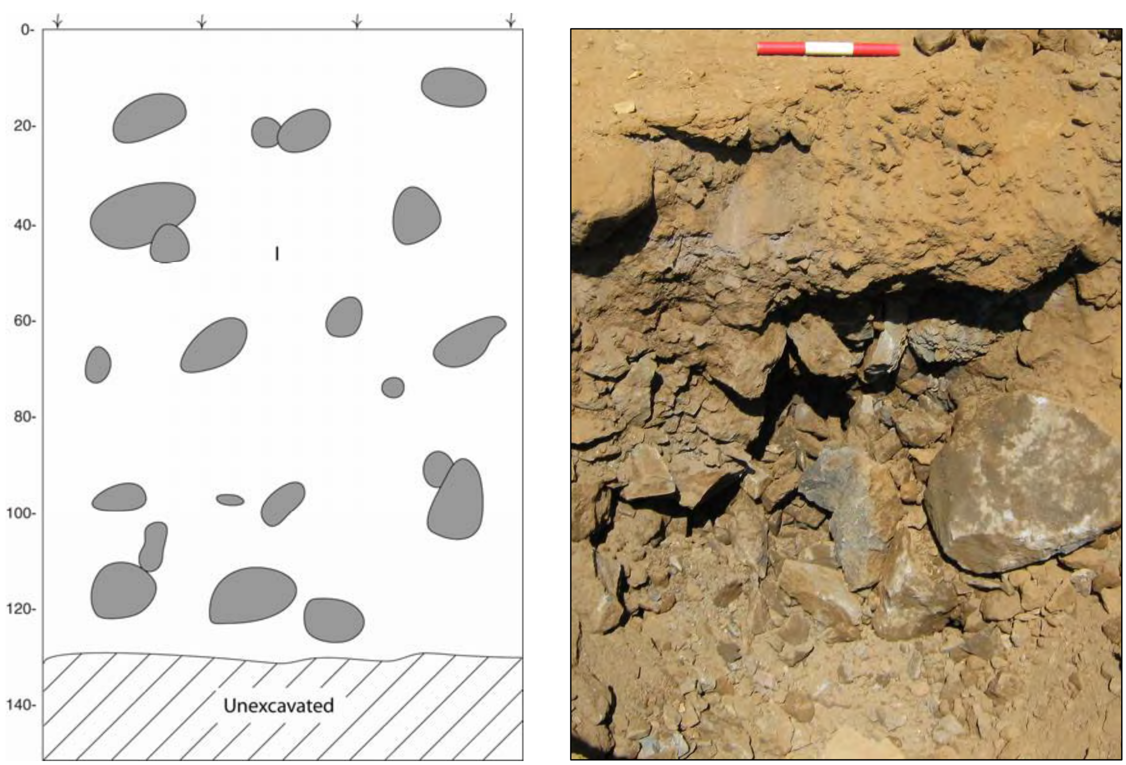

Figure 8. TR 4 north face profile drawing and photograph.

due to the occurrence of bedrock or tightly packed stones. Typical stratigraphy consisted of two layers of sand fill with sparse modern debris (Table 2 and Figure 9).

No traditional cultural material or deposits were encountered in any of the trenches or test pits. Both test areas were composed of fill material and contained dispersed modern refuse, indicating recent deposition and/or disturbance.

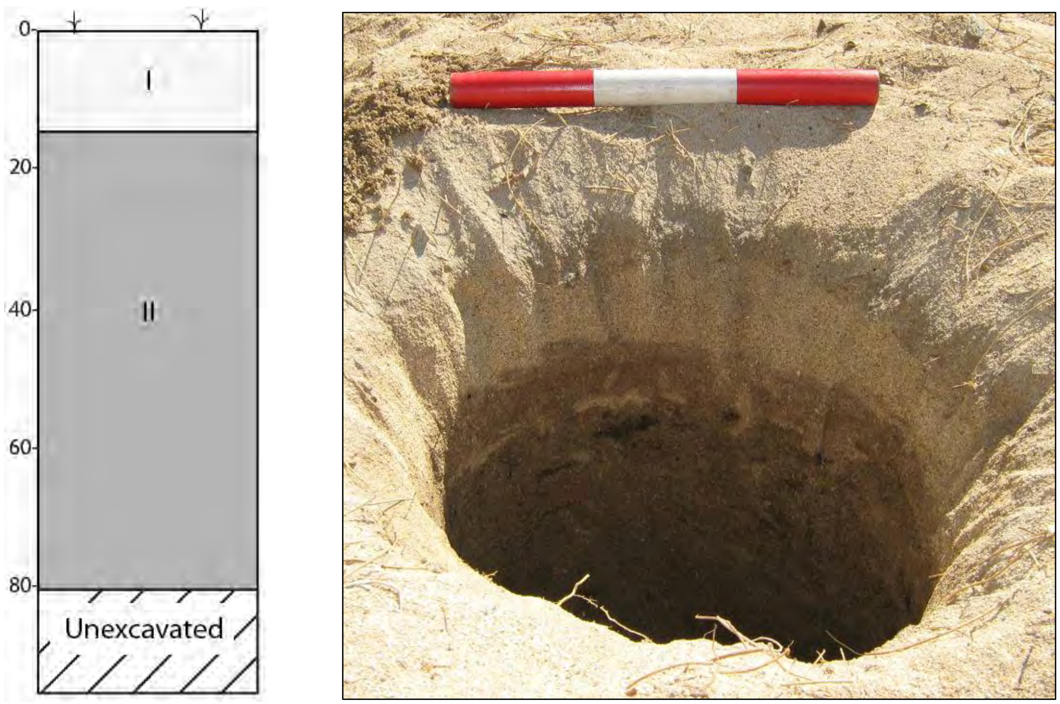

Figure 9. TP 2 east face profile drawing and photograph.

CONCLUSION

Archaeological assessment of the fiber optic cable corridor, conduit manhole vicinity, and ocean grounding bed area at Spencer Beach Park resulted in negative findings for cultural resources. Pedestrian survey determined that the project area had been recently modified and no surface features were found. Excavation of five backhoe trenches and eight shovel test pits yielded no evidence of cultural deposition. Stratigraphy in all excavations consisted of fill sediments containing modern debris.

Given that the testing location is composed entirely of fill, the area has an extremely low probability for containing cultural resources. Intact cultural deposits will almost certainly be absent, although it is possible that isolated artifacts or human remains might be present in the fill, however unlikely.

GLOSSARY

ahupua‘a	Traditional land division, usually extending from the mountains to the sea.
aku	The bonito or skipjack (*Katsuwonus pelamis*), a prized eating fish.
ali‘i	Chief, chiefess, monarch.
heiau	Traditional Hawaiian place of worship.
kahuna	An expert in any profession, often referring to a priest, sorcerer, or magician.
konohiki	The overseer of an *ahupua‘a* ranked below a chief; land or fishing rights under control of the *konohiki*; such rights are sometimes called *konohiki* rights.
lehua	The native tree *Metrosideros polymorpha*, the wood of which was utilized for carving images, as temple posts and palisades, for canoe spreaders and gunwales, and in musical instruments.
Māhele	The 1848 division of land.
maile	*Alyxia olivaeformis*, a native shrub used for twining.
makai	Toward the sea.
mauka	Inland, upland, toward the mountain.
mo‘olelo	A story, myth, history, tradition, legend, or record.
‘ōlelo no‘eau	Proverb, wise saying, traditional saying.

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Appendix C

MARINE PROTECTED SPECIES PROTECTION PROTOCOLS

MARINE PROTECTED SPECIES PROTECTION PROTOCOLS

Honotua Fiber Optic Cable Landing

The following guidelines are to be followed by the crew of the cable ship and support boat(s) during the 2008 installation of the Honotua cable landing at Spencer Beach. These guidelines are intended to establish awareness of the potential for contact with marine protected species (marine mammals and turtles), and actions for avoiding contact during the installation. In addition, procedures for reporting incidents involving marine mammals are described below.

These guidelines are based on protocols used by observers during cable installations and inspection surveys conducted in California.[1]

These guidelines are to be carried out to the extent feasible by the ship's personnel and onboard representative, giving first priority to the safety of the vessel and crew.

- A look-out for marine mammals and turtles shall be included with the normal look-out duties of the vessel's bridge personnel, provided this does not interfere with the safe operation of the vessel.
- Maintain a log of sightings, noting date, time, coordinates, and approximate distance of the animal from the ship. The log shall be turned in daily.
- If contact with a marine mammal appears likely, the vessel speed should be reduced as soon as possible.
- If a mammal approaches the cable lay operation, slack should be taken out of the cable to reduce the amount of cable in the water column. If it is safe to do so, the ship should be allowed to drift.
- In the unlikely event of contact between a marine mammal and the vessel, the following actions should be taken (if it is safe to do so):
  - Contact the onboard Alcatel-Lucent representative immediately;
  - Log all information related to the incident (see attached log) and prepare to report the incident to the Marine Mammal Response Network, and NOAA Marine Mammal Response Network Coordinator, Protected Resources Division. Contact with marine mammals **MUST BE REPORTED** in any circumstance.
  - Await instructions from either the Marine Mammal Response Network or the Alcatel-Lucent representative.
- Record all information related to the incident, with photographs if applicable, and submit with the daily report to the onboard representative.

IN CASE OF MARINE MAMMAL CONTACT WITH A PROJECT VESSEL

CONTACT MARINE MAMMAL RESPONSE NETWORK

1-888-256-9840

[1] The protocols were originally developed by the Marine Mammal Consulting Group in Santa Barbara, California, and approved by state and federal agencies with authority for overseeing the activity.

MARINE PROTECTED SPECIES DAILY REPORTING LOG

DATE	TIME	LOCATION	OBSERVATION

Contact Information:

David Schofield
Marine Mammal Response Network Coordinator
Protected Resources Division
NOAA
PHONE: **888.256.9840**
EMAIL: **david.schofield@noaa.gov**

Other Contacts:

Sea Turtle Strandings **808-983-5730**
Monk Seal Sightings **808-220-7802**

Appendix D

Best Management Practices (BMP) for Boat Operations and Diving Activities

<u>Best Management Practices (BMPs) for Boat Operations and Diving Activities</u>

National Marine Fisheries Service (NMFS)
Pacific Islands Regional Office (PIRO), Protected Resources Division (PRD)

NMFS recommends the following BMPs be followed to reduce or eliminate adverse effects on protected marine species through potential interactions with in-water activities such as boat operations or diving. They are primarily aimed at small-scale projects such as research dives, marine debris removal, or small buoy placement or repair projects conducted by resource agencies or contracted personnel. These BMPs are not necessarily comprehensive for major construction activities:

1. Constant vigilance shall be kept for the presence of Federally Listed Species;
2. When piloting vessels, vessel operators shall alter course to remain at least 100 yards from whales, and at least 50 yards from other marine mammals and sea turtles;
3. Reduce vessel speed to 10 knots or less when piloting vessels in the proximity of marine mammals;
4. Reduce vessel speed to 5 knots or less when piloting vessels in areas of known or suspected turtle activity;
5. Marine mammals and sea turtles should not be encircled or trapped between multiple vessels or between vessels and the shore;
6. If approached by a marine mammal or turtle, put the engine in neutral and allow the animal to pass;
7. Unless specifically covered under a separate permit that allows activity in proximity to protected species, all in-water work will be postponed when whales are within 100 yards, or other protected species are within 50 yards. Activity will commence only after the animal(s) depart the area;
8. Should protected species enter the area while in-water work is already in progress, the activity may continue only when that activity has no reasonable expectation to adversely affect the animal(s); and
9. Do not attempt to feed, touch, ride, or otherwise intentionally interact with any protected species.

Last updated May 2008

Appendix E

ARTICULATED PIPE PLACEMENT TECHNIQUES

APPENDIX E

ARTICULATED PIPE PLACEMENT TECHNIQUES

In some environments, particularly high-energy areas, cables may be anchored or "pinned" to the substrate to secure the cable. The need for a cable to be anchored depends on specific conditions encountered, as does the spacing between anchoring points (if there are multiple locations).

Figure E-1 shows an example of a cable being anchored to rock with stainless steel saddle clamps.

Stainless steel saddle clamps installed by divers.

Saddle clamps secure cable to rock to prevent movement and scour.

Figure E-1

Examples of Anchoring Cable