

2004-06-08 EBA FONSI  
SANDWICH ISLES COMMUNICATIONS  
SUBMARINE FIBER-OPTIC CABLE  
VOL 2 OF 2

JUN 8 2004

FILE COPY

Volume 2 of 2

# Final Environmental Assessment/ Finding of No Significant Impact

## Submarine Fiber-Optic Cable Project

Prepared Pursuant to  
Chapter 343, Hawaii Revised Statutes and  
Title 11, Chapter 200, Hawaii Administrative Rules



Proposed by:  
**Sandwich Isles Communications, Inc.**

Prepared by:  
**Parsons Brinckerhoff Quade & Douglas, Inc.**

April 2004

Appendix 1  
**Scoping, Pre-Consultation, and Public Involvement Activities**



**Final Environmental Assessment/  
Finding of No Significant Impact**  
Submarine Fiber-Optic Cable Project



Parsons  
Brinckerhoff  
Quade &  
Douglas, Inc.  
1001 Bishop Street  
Honolulu, HI 96813



Sandwich Isles Communications, Inc.  
Submarine Cable Project  
May 8, 2003  
Page 3 of 3

May 8, 2003

Aloha,

**Subject:** Sandwich Isles Communications, Inc.  
Submarine Cable Project  
Pre-Assessment Consultation

Sandwich Isles Communications, Inc. (SIC) a rural telephone company headquartered in Honolulu, Hawaii, is developing a Statewide Telecommunications Network. The U.S. Department of Agriculture Rural Utilities Service (RUS) is providing loan assistance for the project. The portion of the project that would connect the major Hawaiian Islands by submarine telecommunications cables is now entering the federal and State environmental review processes.

The purpose of this letter is to request any comments or suggestions you may have on the environmental aspects of the proposed submarine cables and cable landing areas. Comments pertaining to the project's environmental aspects will be addressed in an Environmental Assessment (EA), which is now in preparation.

**PROPOSED ACTION**

The current proposal involves the installation of undersea fiber optic cables that will connect five major Hawaiian Islands (Kauai, Oahu, Molokai, Maui, and Hawaii). The undersea fiber optic cables will connect to onshore fiber optic cable systems. These cables will establish connections for SIC's Statewide Telecommunications Network, ensuring reliable high quality service to network subscribers.

A cable-laying ship will place cables on the ocean floor between the islands. Where the cables approach land, a cable landing will be constructed using a technique called horizontal directional drilling (HDD). The HDD method was selected because of its ability to drill under reefs, minimizing impact to coastal areas. Starting from onshore manholes sites, the HDD equipment bores below the ground and reel areas to a point under water at least 60 feet deep and 2,000 to 5,000 feet offshore.

The preliminary identification of cable landing sites is as follows:

- On Kauai, in the Kakaha area at Akaloa Road
- On Oahu, in the Māhaha and Hawaii Kai areas at Kil Drive and Sandy Beach
- On Molokai, in the Kaunakakai area at Onea'i Homesteads
- On Maui, in the Lahaina and Mākena areas at Waihu'i and Po'olenalana Park
- On Hawaii, in the Kawahua area at Kāhwe Street

Comments may be mailed to the following address:

Randall Urasaki  
Parsons Brinckerhoff  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

They may also be sent by facsimile transmission to (808) 528-2368 or email at [urasaki@pbworld.com](mailto:urasaki@pbworld.com). Comments will be most useful to us if received within one month of your receipt of this letter.

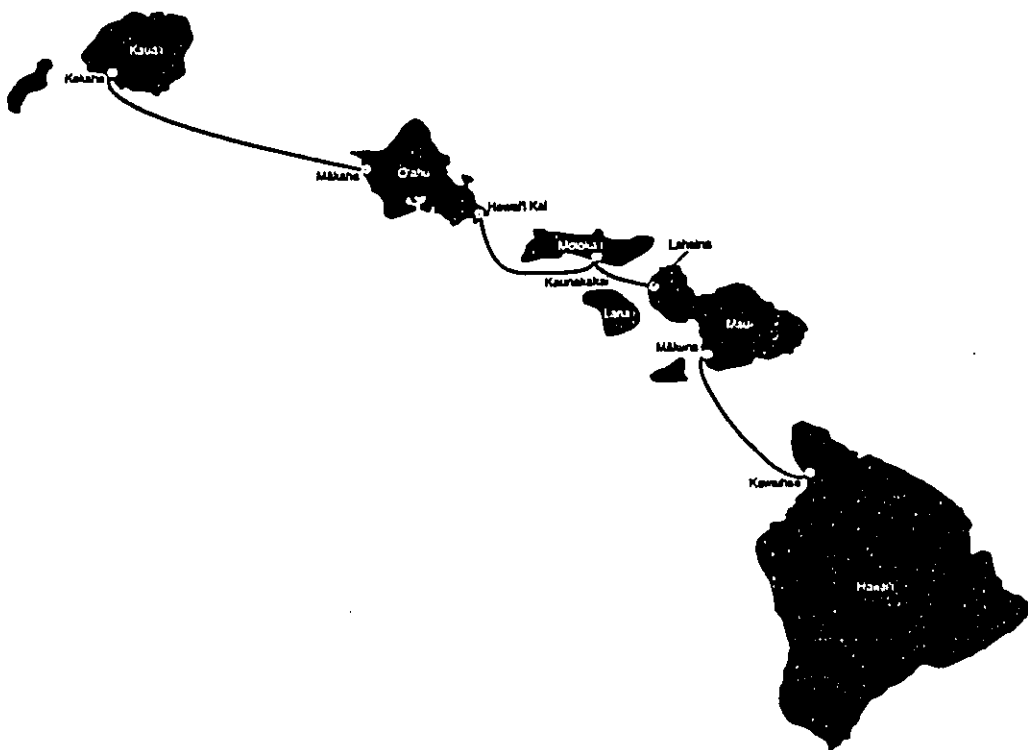
This will not be your final opportunity to comment on this project. You will be notified when the Draft Environmental Assessment is issued. If you would like to receive a copy of the Draft EA, please notify us by mail or email.

We look forward to receiving your comments.

Mahaio,  
PARSONS BRINCKERHOFF QUADE & DOUGLAS, Inc.

Randall Urasaki, P.E.  
Project Manager

Attachment: Proposed Submarine Cable Landing Sites Map





From: Urasaki, Randall M.  
Sent: Tuesday, June 24, 2003 2:28 PM  
To: Akhn, David  
Subject: FW: Sandwich Iles Submarine Cable Project

-----Original Message-----  
From: Kuratka, John T [mailto:kuratka.jt@mcpsparl.navy.mil]  
Sent: Friday, June 20, 2003 8:10 AM  
To: Urasaki, Randall M.  
Subject: Sandwich Iles Submarine Cable Project

Dear Sirs:  
The Navy would like to be notified when the draft EA for the project is released, and would like to receive a copy of the document. Please let me know if there are any questions. Thank you very much.

John T. Kuratka  
Regional Environmental Department  
e-mail: kuratka.jt@mcpsparl.navy.mil  
phone: 471-1171 ext 229  
fax: 471-1160

From: Urasaki, Randall M.  
Sent: Tuesday, June 24, 2003 2:33 PM  
To: Akhn, David  
Subject: FW: Submarine Cable Project

-----Original Message-----  
From: Scott, William CWO [mailto:WScott@D14.uscg.mil]  
Sent: Wednesday, June 11, 2003 10:46 AM  
To: Urasaki, Randall M.  
Subject: FW: Submarine Cable Project

16503  
June 11, 2003

> Mr. Randall Urasaki  
> Parsons Brinckerhoff  
> American Savings Bank Tower  
> 1001 Bishop Street, Suite 3000  
> Honolulu, HI 96813  
> E-mail: urasaki@pbworld.com

> Dear Mr. Urasaki,

> The Fourteenth Coast Guard District is interested in publishing the  
> Sandwich Iles Communications, Inc. Submarine Cable Project in the  
> Local Notice to Mariners. In order to promulgate information to  
> mariners, this office requires the name of the vessel(s) involved,  
> dates, times, and VHF-FM channels and/or a point of contact phone  
> number.

> If you have any questions, please contact myself or Petty Officer  
> Sunny Holman at (808) 561-2316 or by e-mail: sholman@d14.uscg.mil.

Sincerely,

W. A. SCOTT /s/  
Chief Warrant Officer, U. S. C.  
Coast Guard  
Acting Chief, Surface  
Operations and Aids to Navigation Branch  
by direction

---

**From:** Urasaki, Randall M.  
**Sent:** Wednesday, June 1, 2003 8:02 AM  
**To:** Aikin, David  
**Subject:** FW: please send a copy of the draft EA for the SIC Submarine Cable Project

Hi

-----Original Message-----  
**From:** David Helweg [mailto:dhelweg@usgs.gov]  
**Sent:** Wednesday, June 11, 2003 7:53 AM  
**To:** Urasaki, Randall M.  
**Subject:** please send a copy of the draft EA for the SIC Submarine Cable Project

Aloha Mr. Urasaki,

We received your letter describing preparation of an EA for a proposed SIC Submarine Cable Project. We would greatly appreciate the opportunity to review the draft EA when it is ready. Please send one copy to each of the following addresses:

David Helweg  
Deputy Center Director  
USGS Pacific Island Ecosystems Research Center  
3190 Maka Wey, Rm 408  
Honolulu, HI 96822

Gordon Trumble  
District Chief  
USGS-WRD  
677 Ala Moana Blvd, Room 415  
Honolulu, HI 96813-5412

Don Swanson  
Chief Geologist  
USGS-GD  
PO Box 62  
Hawaii National Park, HI 96718

Thanks very much in advance,  
Dave Helweg

---

David A. Helweg, Ph.D.  
Deputy Center Director  
Pacific Island Ecosystems Research Center  
3190 Maka Wey, Rm 408  
Honolulu, HI 96822  
phone (808) 956-9308, fax (808) 956-8687  
email <dhelweg@usgs.gov>

6/11/2003

LINDA LIMOLE  
COMPTROLLER



STATE OF HAWAII  
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES  
P.O. BOX 118, HONOLULU, HAWAII 96810

MAY 27 2003

MAY 29 2003  
JAMES K. SATO  
COMPTROLLER  
KATHERINE H. THOMAS  
DEPUTY COMPTROLLER  
(711)613

LINDA LIMOLE  
COMPTROLLER  
MAJOR GENERAL ROBERT G. F. LEE  
DIRECTOR OF CIVIL DEFENSE  
TIMOTHY S. TORRES  
VICE DIRECTOR OF CIVIL DEFENSE



STATE OF HAWAII  
DEPARTMENT OF DEFENSE  
OFFICE OF THE DIRECTOR OF CIVIL DEFENSE  
344 DIAMOND HEAD ROAD  
HONOLULU, HAWAII 96814-4485

June 19, 2003

JUN 20 2003  
JAMES K. SATO  
COMPTROLLER  
KATHERINE H. THOMAS  
DEPUTY COMPTROLLER  
(711)613

Mr. Randall Urasaki, P.E., Project Manager  
Parsons Brinckerhoff  
American Savings Bank Tower  
1001 Bishop Street, Suite 300  
Honolulu, Hawaii 96813

Dear Mr. Urasaki:

Subject: Sandwich Isles Communications, Inc.  
Submarine Cable Project  
Environmental Assessment Consultation

Thank you for the opportunity to review the information on the Submarine Cable Project. The project does not impact any of the Department of Accounting and General Services' projects or existing facilities. Therefore, we have no comments to offer on environmental issues.

If you have any questions, please have your staff call Mr. David DePonte of the Public Works Division at 586-0492.

Sincerely,

*Russ K. Satou*  
RUSS K. SATO  
State Comptroller

Mr. Randall Urasaki, P.E.  
Parsons Brinckerhoff Quade & Douglas, Inc.  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96816

Dear Mr. Urasaki:

Thank you for the opportunity to comment on the Sandwich Isles Communications Submarine Cable Project.

State Civil Defense strongly supports this project. There is a prevailing need for redundant high-speed intrastate digital connectivity to serve the population of the State of Hawaii. This project will accomplish this need and serves rural population centers which other telecommunications providers traditionally bypass.

While there are unavoidable environmental aspects related to developing undersea fiber optic cable infrastructure, the importance of the resulting telecommunications infrastructure mitigate these impacts and far outweigh the environmental concerns.

I would like to suggest that Sandwich Isles Communications, Inc., consider the importance of interfacing their infrastructure with existing Emergency Management/Civil Defense Emergency Operating Centers to insure that the population centers serviced by this new system are directly accessible.

Please address questions related to this input to Mr. George Burnett, State Civil Defense Telecommunication Officer, at 733-4300, extension 530.

Sincerely,

*Robert G. F. Lee*  
ROBERT G. F. LEE  
Major General, HIRANO  
Director of Civil Defense

LEIOLA LEMUE  
COMMISSIONER

STATE OF HAWAII  
DEPARTMENT OF EDUCATION  
P.O. BOX 2300  
HONOLULU, HAWAII 96804



OFFICE OF ADMINISTRATIVE SERVICES

May 20, 2003

Mr. Randall Urasaki, P.E.  
Parsons Brinckerhoff  
American Savings Bank Tower  
Honolulu, Hawaii 96813

Dear Mr. Urasaki:

Subject: Sandwich Isles Communications, Inc.  
Submarine Cable Project  
Pre-Assessment Consultation

The Department of Education has no comment on the Sandwich Isles Communications, Inc. proposed plans for installing submarine telecommunications cables to provide telecommunications service to homestead communities administered by the Department of Hawaiian Home Lands.

Should you have any questions, please call Ms. Heidi Meeker of our branch at 733-4862.

Sincerely yours,

*Deborah M. Myer*

Reynor M. Minard, Director  
Facilities and Support Services Branch

RMM:hy

cc: Rae M. Loui, OAS

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

REGIONAL MANAGER  
SUPERVISOR

LEIOLA LEMUE  
COMMISSIONER

STATE OF HAWAII  
DEPARTMENT OF HAWAIIAN HOMELANDS  
P.O. BOX 1019  
HONOLULU, HAWAII 96809



May 21, 2003

Mr. Randall Urasaki  
Parsons Brinckerhoff  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, Hawaii 96813

Dear Mr. Urasaki:

Subject: Pre-Environmental Assessment, Sandwich Isles  
Communications, Inc., Kawahae Submarine Cable  
Landing Site, Hawaii

This is to acknowledge receipt of your request for comments on the above-referenced project.

We have no comments at this time, however, please keep the Department of Hawaiian Home Lands on your list to receive a copy of the Draft EA so that we can continue to monitor and comment on the proposed project.

Should you have any questions, please call Linda Chinn, Acting Land Management Branch Manager, at 587-6432.

Aloha and mahalo,

*Linda Chinn*

Mike Keckroy, Administrator  
Land Management Division

cc: SIC

MAY 22 2003

HONOLULU, HAWAII

From: Urasaki, Randall M.  
Sent: Friday, June 06, 2003 9:24 AM  
To: Akin, David  
Subject: FW: Draft EA SIC

fyi

-----Original Message-----  
From: Carolyn I. Darr@hawaii.gov [mailto:Carolyn.I.Darr@hawaii.gov]  
Sent: Friday, May 16, 2003 11:05 AM  
To: Urasaki, Randall M.  
Subject: Draft EA SIC

Randall -  
Please keep us in the loop w/ Draft EA etc. Thanks  
Department of Hawaiian Home Lands  
Land Management Division  
P. O. Box 1879  
Honolulu 96805

From: Urasaki, Randall M.  
Sent: Saturday, May 17, 2003 7:43 PM  
To: Akin, David  
Subject: FW: Sandwich Isles Communications, Inc., Submarine Cable Project, Pre-Assessment Consultation

-----Original Message-----  
From: Mike L. Lauret@hawaii.gov [mailto:Mike.L.Lauret@hawaii.gov]  
Sent: Thursday, May 15, 2003 8:16 AM  
To: Urasaki, Randall M.  
Subject: RE: Sandwich Isles Communications, Inc., Submarine Cable Project, Pre-Assessment Consultation

Randall,  
I've heard parcel 32 was suppose to go to DHHL, but haven't seen any paperwork. I will assume that it has, which means DHHL gets to comment on that one. Parcel 7 is an executive order set aside to the County of Kauai - give them an opportunity to comment on that since I think their life-guard station is somewhere around there. The roadway parcels belong either to DOT Highways, or County of Kauai Public Works.  
Based on that stuff, I get to say "No comments or objections" since it doesn't impact DDIR programs.....

"Urasaki, Randall  
M."  
<Urasaki@pbworld.com>  
Communications, Inc., Submarine  
Consultation 05/15/2003 06:56 AM  
TO: "Mike L. Lauret@hawaii.gov"  
<Mike.L.Lauret@hawaii.gov>  
CC: Subject: RE: Sandwich Isles  
Cable Project, Pre-Assessment  
Consultation

Nike,  
The parcels that will be used for Kekaha are:  
(4) 1-2-002:032 (I believe this was DDIR property that has been transferred to DHHL)  
(4) 1-2-002:007 (Kahal of the roadway)  
and the roadway parcels (4)1-2-002:999 and (4) 1-2-001:999.  
Please e-mail me if you have further questions,

Thanks,  
Randall M. Urasaki  
Senior Supervising Engineer  
Parsons Brinckerhoff Quade & Douglas, Inc.  
Honolulu Office  
Pacific Room  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

urasaakipbworld.com  
tel: 808-531-7094  
fax: 808-528-2368

-----Original Message-----  
From: Mike.L.Laureta@hawaii.gov [mailto:Mike.L.Laureta@hawaii.gov]  
Sent: Tuesday, May 13, 2003 2:37 PM  
To: Urasaki, Randall M.  
Subject: Sandwich Isles Communications, Inc., Submarine Cable Project, Pre-Assessment Consultation

Do you have the tax map key of the parcel of land in the Kohala area to be used for the cable landing site? In order to provide usefully comments, I'd like to double check if the land is in the ODIR inventory or not.

LEO/LUCILE  
CHIEF OF BUREAU



STATE OF HAWAII  
DEPARTMENT OF HEALTH  
P.O. BOX 3378  
HONOLULU, HAWAII 96811-3378

May 30, 2003

ORIGINAL SUBMITTED  
DEPARTMENT OF HEALTH

1  
5  
1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60  
61  
62  
63  
64  
65  
66  
67  
68  
69  
70  
71  
72  
73  
74  
75  
76  
77  
78  
79  
80  
81  
82  
83  
84  
85  
86  
87  
88  
89  
90  
91  
92  
93  
94  
95  
96  
97  
98  
99  
100

05070CEC.03

Mr. Randall Urasaki, P.E.  
Project Manager  
Parsons Brinckerhoff Quade & Douglas, Inc.  
American Savings Bank Tower, Suite 300  
1001 Bishop Street  
Honolulu, Hawaii 96810

Subject: Pre-Assessment Consultation for the Draft Environmental Assessment (DEA)  
Sandwich Isles Communication, Inc. (SIC)  
Installation of Undersea Fiber Optic Cables Connecting Five (5) Major  
Hawaiian Islands, State of Hawaii

Dear Mr. Urasaki:

This is in response to your May 8, 2003 letter to Dr. Chiyoeme Fukino regarding the DEA preparation for the subject project. The Department of Health (DOH), Clean Water Branch (CWB), appreciate the opportunity to provide comments on the proposed DEA for the subject project.

The SIC proposes to install undersea fiber optic cables which will connect five (5) Hawaiian islands (Kauai, Oahu, Molokai, Maui, and Hawaii). The undersea fiber optic cables will connect to the onshore fiber optic cable systems. The CWB acknowledges that the onshore fiber optic cable systems are under construction. These cables will establish connections for SIC's Statewide Telecommunications Network, ensuring reliable high quality service to network subscribers. The following are comments from the CWB:

1. The Army Corps of Engineers (COE) should be contacted at (808) 438-9258 to identify whether a Federal license or permit (including a Department of Army permit) is required for this project. Pursuant to Section 401(b)(1) of the Federal Water Pollution Act (commonly known as the "Clean Water Act"), a Section 401 Water Quality Certification is required for "any applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters...."

2. A National Pollutant Discharge Elimination System (NPDES) general permit coverage is required for the following activities:

- a. Storm water associated with industrial activities, as defined in Title 40, Code of Federal Regulations, Sections 122.26(b)(14)(i) through 122.26(b)(14)(i2) and 122.26(b)(14)(i3);
- b. Construction activities, including clearing, grading, and excavation, that result in the disturbance of equal to or greater than one (1) acre of total land area. The total land area includes a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under a larger common plan of development or sale. An NPDES permit is required before the commencement of the construction activities.
- c. Discharge of treated effluent from leaking underground storage tank remedial activities; and
- d. Discharge of construction dewatering effluent.

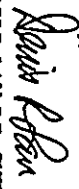
The CWRB requires that a Notice of Intent (NOI) to be covered by a NPDES general permit for any of the above activities be submitted at least 30 days before the commencement of the respective activities. The NOI forms may be picked up at our office or downloaded from our website at <http://www.state.hi.us/doh/cwrb/forms/genindex.html>.

3. The SIC may be required to apply for an individual NPDES permit if there is any type of activity in which wastewater is discharged from the project into State waters and/or coverage of the discharge(s) under the NPDES general permit(s) is not permissible. An application for the NPDES permit is to be submitted at least 180 days before the commencement of the respective activities. The NPDES application forms may also be picked up at our office or downloaded from our website at <http://www.state.hi.us/doh/cwrb/forms/ndiv-index.html>.

4. Hawaii Administrative Rules, Section 11-55-38, also requires the owner to either submit a copy of the new NOI or NPDES permit application to the State Department of Land and Natural Resources, State Historic Preservation Division (SHPD) or demonstrate to the satisfaction of the DOH that the project, activity, or site covered by the NOI or application has been or is being reviewed by SHPD. Please submit a copy of the request for review by SHPD or SHPD's determination letter for the project.

Should you have any questions, please contact Mr. Edward Chen of the Engineering Section, CWRB, at 586-4309.

Sincerely,

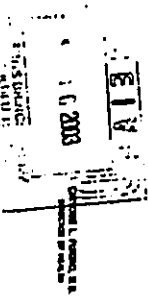
  
DENIS R. LAU, P.E., CHIEF  
Clean Water Branch

EC/ik

cc: Regulatory Branch, HHD/COB  
U.S. Fish and Wildlife Service  
National Marine Fisheries Service  
CZM Program, Office of Planning/DEBDT  
SHPD/DLNR



STATE OF HAWAII  
DEPARTMENT OF HEALTH  
P.O. BOX 3218  
HONOLULU, HAWAII 96813-0318



03-261-143

September 5, 2003

Mr. Randall Urasaki, P.E.  
Project Manager  
Parsons Brinkerhoff Quade & Douglas, Inc.  
American Savings Tower, Suite 3000  
1001 Bishop Street  
Honolulu, Hawaii 96813

Subject: Sandwicht Isles Communications, Inc.  
Submarine Cable Project  
Pre-Assessment Consultation

Dear Mr. Urasaki:

Thank you for your letter of June 4, 2003 inviting Hawaii Department of Health (HDOH), Hazard Evaluation and Emergency Response (HEER) Office to comment on the Sandwicht Isles Communications, Inc. Submarine Cable Project. If during construction activities there is a release or the discovery of a hazardous substance above the listed, reportable quantities including a release of oil (as defined in the State Contingency Plan) greater than 25 gallons than the HEER Office should be notified by phone at 808 588-4249. In addition the attached draft "Guidance Fact Sheet For The Use When Petroleum Contamination is Encountered During Subsurface Soil Excavation" should be adhered to during construction activities.

We apologize for the time taken for this response. Should you have any question concerning the above please feel free to contact Mr. Mark Sutterfield of the HEER Office at 588-7574.

Sincerely,

Clarence A. Callahan, Ph.D., Acting Supervisor  
Site Discovery, Assessment and Remediation Section  
Attachment: Guidance Fact Sheet For The Use When Petroleum Contamination is Encountered During Subsurface Soil Excavation

DRAFT 8/1/03

GUIDANCE FACT SHEET FOR USE WHEN PETROLEUM CONTAMINATION IS ENCOUNTERED DURING SUBSURFACE SOIL EXCAVATION

Hawaii State Department of Health  
Hazard Evaluation and Emergency Response Office (HEER)  
February 2003

**PURPOSE:** To provide guidance for construction projects when petroleum or petroleum contaminated soil(s) is encountered. These guidelines apply to construction projects which involve the excavation of soils except excavations associated with underground storage tank (UST) removals. These guidelines are consistent with Hawaii Revised Statutes 128D, Hawaii Environmental Response Law. Administrative procedures should be in place within your organization so that project managers, contract workers, field workers, essentially anyone who might be involved in construction and excavation of soils follow these basic guidelines:

When must notification to the HEER Office be made?

The reportable quantity for petroleum is one of the following:

- a) any amount of oil which when released into the environment causes a sheen to appear on surface water, or any navigable water of the State;
- b) any free product that appears in soil or on ground water;
- c) any amount of oil released to the environment greater than 25 gallons; or,
- d) any amount of oil released to the environment which is not contained and resided within 72 hours. This criteria requires that even petroleum-stained soil encountered during excavation work be reported.

Who must notify?

Any person who has any knowledge of a release of a reportable quantity must immediately notify the HEER Office. Failure to notify the HEER Office of a release is subject to a civil penalty not to exceed \$10,000 for each day of failure to report.

What is the number to call?

(808)588-4249 during working hours, Monday - Friday, 7:45 a.m. - 4:30 p.m.

OR

(808) 247-2191 during non-working hours including holidays.

What information is required to be provided to the HEER Office?

The information gathered should be sufficient to answer the following, but notification shall not be delayed due to incomplete notification:

- 1. Name of the observed chemical released;



2. Approximate quantity observed;
3. The location and an address of the release. The location may be determined by either surveying by a licensed surveyor or the use of a Global Positioning System (GPS) unit which provides latitude and longitude. The latitude and longitude of the contaminated area should be accurate to within 25 feet of the actual position. A detailed map should be submitted to the HERR Office at a later date;
4. The name, address, and telephone number of the caller;
5. The name, address, and telephone number of the owner/operator of the site where the release has occurred;
6. The name, address, and telephone number of the contact person at the site where the release has occurred;
7. Measures taken or proposed to be taken in response to the release at the time of the notification;
8. Any other information, including but not limited to, potential on-site worker and public or environmental impacts.

Who else should be notified?

If the project is being conducted by a party other than the landowner, then a separate notification needs to be made to the landowner to allow them to determine their liability and the next course of action.

What additional steps must be taken?

1. When petroleum or (PCB) is discovered during construction activities, a determination on the immediate threat to the health and welfare of on-site workers or the nearby public needs to be made. A Combustible Gas Indicator may be used to determine if there is a flammable or explosive potential. Each combustible gas has its own Lower Explosive Level (LEL) and its Upper Explosive Level (UEL). For example, methane gas has a LEL of 5% by volume and an UEL of 15% by volume. Between 5 to 15% by volume, a spark could cause an explosion. If the atmosphere has less than 5% methane, a spark could cause an explosion. If the atmosphere has less than 15% methane, an explosion can not occur even if a source of ignition is present. Likewise, if the atmosphere has greater than 15% methane, the air-fuel mixture is too rich to burn. Gasoline has a LEL of 1.4% by volume and an UEL of 7.4% by volume.

If a determination that a combustible hazard exists, an Emergency Response Plan should be put into effect. No work may continue until a determination has been made that the area is safe.

2. The project may be continued with an implementation of a Health and Safety Plan in accordance with applicable occupational safety and health regulations. This plan should address exposure issues and include appropriate air monitoring.
3. If free-floating petroleum product is encountered during the project, the product is to be recovered and either re-used or disposed of appropriately.
4. If petroleum is encountered and the project requires dewatering, oil/water separation is the minimum effort to be taken. Any contaminated water must be treated or disposed of in accordance with all applicable local, state, and federal regulations.

5. Petroleum contaminated soil is to be excavated and segregated from clean soils. The excavated contaminated soil must be placed under a liner and covered. Contaminated soils must be treated or disposed of in accordance with all applicable local, state and federal requirements.

#### On-Sight Management of Contaminated Soils

When deciding whether to re-deposit contaminated soil, the time saved by proceeding with the project immediately should be weighed against the possible increase in cost caused by deferring remedial action at a later date. If re-deposition is chosen, be advised that this does not absolve any party from liability should the actions taken exacerbate potential health and environmental impacts. If the option of re-depositing is chosen, a barrier must be in place to prevent (PCB) from contaminating clean soils.

6. Detailed records of the investigation and any clean-up activities are to be maintained and submitted to the HERR Office.

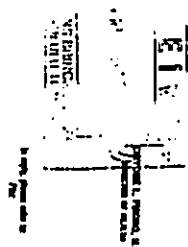
7. In cases where a site assessment and evaluation is to be conducted, the HERR Office Technical Guidance Manual and the State Contingency Plan are available at the following web site:  
<http://www.state.nj.us/health/eh/herr/statutes.html>.

8. If uncertain of action to take, call the HERR Office at 808-586-4349.

MAIL ROOM  
Department of Health



STATE OF HAWAII  
DEPARTMENT OF HEALTH  
700 SOUTH  
HONOLULU, HAWAII 96813



June 9, 2003

Randall Urasaki, P.E., Project Manager  
Parsons Brinckerhoff Quade & Douglas, Inc.  
American Savings Bank  
Tower, Suite 3000  
1001 Bishop Street  
Honolulu, Hawaii 96813

Dear Mr. Urasaki:

This is in reference to your letter dated June 4, 2003 concerning the Sandwich Isles  
Communication, Inc. Submarine Cable Project Pre-Assessment Consultation.

We have no comments regarding this project.

If there are any questions, please call me at 586-4700.

Sincerely,

Russell S. Takata  
Program Manager  
Noise, Radiation & IAQ Branch

From: Urasaki, Randall M.  
Sent: Tuesday, June 24, 2003 2:25 PM  
To: Atha, David  
Subject: FW: Sandwich Isles Communication, Inc.

fyi

-----Original Message-----  
From: Grace Simmons [mailto:gsimmons@oha.health.state.hi.us]  
Sent: Tuesday, June 24, 2003 10:18 AM  
To: Urasaki, Randall M.  
Cc: LOTSU.OSM; SHIB; KMO@oha.health.state.hi.us  
Subject: Sandwich Isles Communication, Inc.

Mr. Urasaki,

The Department of Health, Solid & Hazardous Branch has  
reviewed your pre-assessment consultation letter  
regarding Sandwich Isles Communication, Inc.'s  
submarine cable project.

The Solid Waste Section and the Hazardous Waste  
Section do not have any comments.

Should you have any questions, please contact me at  
586-4326.

Grace Simmons  
Hazardous Waste Section

LINDA LINDSEY  
CONFIDENTIAL



STATE OF HAWAII  
DEPARTMENT OF HEALTH  
105-945 Hialeah Valley Street  
Honolulu, Hawaii 96813

July 1, 2003

Mr. Randall Urasaki  
Parsons Brinckerhoff Quade & Douglas, Inc.  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, Hawaii 96813

Dear Mr. Urasaki:

Thank you for allowing our program the opportunity to comment on your Submarine Cable Project.

Since the onshore fiber optic cable systems of the project will be installed underground, mostly within existing public rights-of-way, such as roads, the potential rodent problems that may occur should be minor. However, should any buildings need to be demolished or any site in the project need to be cleared of vegetation harboring rodents, you are required to eradicate any rodents from the site. (Hawaii Administrative Rules, Chapter 11-26, "Vector Control")

Rodent traps and/or rodenticides should be set out on the site for at least a week or until rodent activity ceases. This practice will prevent rodents harboring on the site from dispersing to surrounding areas when buildings are demolished or sites are cleared.

If you should have any questions, please contact the Vector Control Branch at 483-2535.

Sincerely,

Wesley Warashina  
Acting Program Manager  
Vector Control Branch

CYNTHIA L. PETERSON, M.A.  
DIRECTOR OF HEALTH

In Reply, Please Refer to  
FILE #

At 3

73 DIRECTOR  
41111

LINDA LINDSEY  
CONFIDENTIAL



STATE OF HAWAII  
DEPARTMENT OF HEALTH  
P.O. BOX 2379  
HONOLULU, HAWAII 96813

June 10, 2003

Mr. Randall Urasaki  
Parsons Brinckerhoff Quade & Douglas, Inc.  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, Hawaii 96813

Dear Mr. Urasaki:

Subject: Sandwich Isles Communication, Inc.  
Submarine Cable Project  
Pre-Assessment Consultation

We have reviewed the document on the subject project submitted by your office which requests comments as part of the pre-assessment consultation for the Sandwich Isles Communications, Inc. (SIC) project which is proposing a Statewide Telecommunications Network.

Neither wastewater generation or treatment have been addressed in this write up, therefore, we can offer no comments to at this time. We do recommend should there be wastewater generation at the various cable installation building sites, that wastewater treatment and disposal be handled via connection to the City or County sewer system. If this is not possible, wastewater generation can be treated and disposed of by use of onsite wastewater systems.

All wastewater plans must conform to applicable provisions of the Department of Health's Administrative Rules, Chapter 11-62, "Wastewater Systems." We do reserve the right to review the detailed wastewater plans for conformance to applicable rules. Should you have any questions, please contact the Planning & Design Section of the Wastewater Branch at 586-4294.

Sincerely,

HAROLD K. YEE, P.E., CHIEF  
Wastewater Branch

CYNTHIA L. PETERSON, M.A.  
DIRECTOR OF HEALTH

In Reply, Please Refer to  
FILE #

At 3

73 DIRECTOR  
41111

UNCLASSIFIED  
EXEMPT FROM GDS



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES



DIVISION OF STATE PARKS  
POST OFFICE BOX 671  
HONOLULU, HAWAII 96809

May 23, 2003

Randall Urasaki, P.E. Project Manager  
Parsons Brinckerhoff Qande & Douglas, Inc  
American Savings Bank Tower  
1001 Bishop St.  
Honolulu, Hawaii 1

Dear Mr. Urasaki:

RE Proposed Submarine Cable Project for Sandwich Isles Communications, Inc.

From what we could determine with the information contained in your letter, it appears that the proposed cable landing sites will not impact any State parks. We would like however, to receive a copy of the draft environmental assessment that is being prepared for the subject project.

Should you have questions, please contact Lauren Tanaka of the Park Planning Branch at 587-0293.

Very truly yours,

Daniel S. Quinn, State Parks Administrator

From: Urasaki, Randall M.  
Sent: Saturday, May 17, 2003 7:42 PM  
To: Adm, David  
Subject: FW: Sandwich Isles Communications, Inc. - Submarine Cable Project

-----Original Message-----  
From: Barry.Kim@hawaii.gov [mailto:Barry.Kim@hawaii.gov]  
Sent: Monday, May 12, 2003 9:22 AM  
To: Urasaki, Randall M.  
Cc: glenn.okimoto@hawaii.gov; frederick.kunaga@hawaii.gov; Fred.Pascua@hawaii.gov; Patrick.Torres@hawaii.gov; Joni.Savusa@hawaii.gov  
Subject: Sandwich Isles Communications, Inc. - Submarine Cable Project

Aloha Randall,

Thank you for your letter of May 8, 2003, regarding the subject noted. You've preliminarily identified cable site on Oahu as Makaha and Hawaii Kai areas at Kill Drive and Sandy Beach. Unless the project, Submarine Cable, will be using sites within Kalaheo Harbor, Point Harbor, the energy corridor between Kalaheo Harbor Point Harbor and Honolulu Harbor, Honolulu Harbor, and Kewalo Basin, this District will have no comments. Should this change in the future, please write to Mr. Glenn Okimoto, Harbors Administrator, Harbors Division, 79 S. Nimitz Highway, Honolulu, HI 96813 and comments will be provided.

Regards,

Barry Kim  
Oahu District Manager  
Harbors Division  
700 Fort Street, Pier 11 Gallery  
Honolulu, Hawaii 96813  
Phone: 808.587.2100  
Fax: 808.587.2065

LEO LINGUE  
GOVERNOR



STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
727 KAWAHI STREET  
HONOLULU, HAWAII 96819

ROOSEVELT HARRISON  
DIRECTOR  
Keanu Oshiro, Director  
Executive Director  
KAWAHI  
MAY 11 2003  
HAWAII  
HONEYWELL INC.  
HWY-O  
2.03-584

June 5, 2003

Mr. Randall Urasaki, P.E.  
Project Manager  
Parsons Brinckerhoff Quade & Douglas, Inc.  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, Hawaii 96813

Dear Mr. Urasaki:

Subject: Sandwich Isles Communications, Inc.  
Submarine Cable Project  
Pre-Assessment Consultation

Thank you for your letter dated May 8, 2003 requesting comments or suggestions on the environmental aspects of the proposed submarine cables and cable landing areas. After reviewing your letter, we have no comments or suggestions.

Sincerely,

Martin Okabe  
Oahu District Engineer

LEO LINGUE  
GOVERNOR



STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
KAWAHI DISTRICT  
3060 EWA STREET, ROOM 205  
LAIE, HAWAII 96788

ROOSEVELT HARRISON  
DIRECTOR  
Keanu Oshiro, Director  
Executive Director  
KAWAHI  
MAY 16 2003  
HAWAII  
HONEYWELL INC.  
HWY-K-4.030426

May 14, 2003

Mr. Randall Urasaki  
Parsons, Brinckerhoff, Quade & Douglas, Inc.  
American Savings Tower  
1001 Bishop Street, Suite 3000  
Honolulu, Hawaii 96813

Dear Mr. Urasaki:

Subject: Sandwich Isles Communications, Inc.  
Submarine Cable Project  
Pre-Assessment Consultation

Our Pre-Assessment consultation comments regarding the proposed project are as follows:

1. Plans and specifications for all work that will be conducted within the State highway right of way shall be submitted to this office for review/approval.
2. No work within the State highway right of way shall commence unless a "Permit to Perform Work Upon State Highways" has been issued by this office.
3. Pre-Assessment consultation letter and all environmental documents (EAVES) shall be also submitted to the State Highways Division Right of Way Office in Kapolei, Oahu, for review/comments.
4. All proposed communications cable facilities shall not interfere with existing, and/or, proposed highway facilities in the area of the cable landing sites.

1001 BISHOP STREET, SUITE 3000, HONOLULU, HAWAII 96813

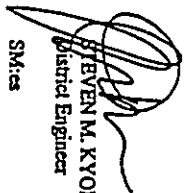
Mr. Randall Urzaki  
Page 2  
March 14, 2003

HWY-K 4.030426

5. This office reserves the right to add, or impose, additional conditions as necessary to mitigate adverse impacts to State highway facilities.

Thank you for giving us the opportunity to review and comment on this project. If you have any questions, please call Steve Morikawa at 274-3118.

Very truly yours,

  
STEVEN M. KYONO, P.E.  
District Engineer  
SM:cs

BOARD OF WATER SUPPLY  
CITY AND COUNTY OF HONOLULU  
630 SOUTH BERTMANA STREET  
HONOLULU, HI 96813



May 30, 2003

Mr. Randall Urasaki  
Parsons Brinckerhoff  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, Hawaii 96813

Dear Mr. Urasaki:


Subject: Your Letter of May 8, 2003 on the Pre-Assessment Consultation  
for Sandwich Isles Communications, Inc. Submarine Cable Project

Thank you for the opportunity to comment on the proposed project.

The construction drawings should be submitted for our review and approval.

If you have any questions, please contact Joseph Kakuua at 748-5442.

Very truly yours,

  
CLIFFORD S. JAMILLE  
for  
Manager and Chief Engineer

5

SENIOR MANAGER, WATER  
EDDIE FLORES, Jr., Chairman  
CHARLES A. STEL, Vice-Chairman  
JAY ULY, ASST.  
ROBERT B.K. KAPUNA, SR.  
DANIELA H. LINDO  
ROBERT K. HANCOCK, Executive  
LARRY L. LEONARD, Executive  
CLAYTON S. JAMILE  
Manager and Chief Engineer  
DORNA PAT K. KATOUANG  
Deputy Manager and Chief Engineer

DEPARTMENT  
DIVISION

DEPARTMENT OF BUDGET AND FISCAL SERVICES  
CITY AND COUNTY OF HONOLULU  
630 SOUTH KING STREET, ROOM 208 • HONOLULU, HAWAII 96813  
PHONE: (808) 523-4610 • FAX: (808) 523-4771 • INTERNET: www.ci.honolulu.hi.us



June 12, 2003

Mr. Randall Urasaki, P.E.  
Project Manager  
Parsons Brinckerhoff Quade & Douglas, Inc.  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, Hawaii 96813

Dear Mr. Urasaki:

SUBJECT: SANDWICH ISLES COMMUNICATIONS, INC. (SIC)  
SUBMARINE CABLE PROJECT  
PRE-ASSESSMENT CONSULTATION

We are submitting our comments to you on the subject project. In response to your letter dated May 8, 2003 to David Arakawa, Corporation Counsel.

The Department of Budget and Fiscal Services is the agency that coordinates the granting of any easements within the county roadways and the proposed submarine cable landing sites. These easement grants require prior Council approval.

We have not yet consummated any agreement with SIC on the granting of these easements. We request that SIC obtain the approvals prior to the installation of the fiber optic cable lines.

We would also appreciate a copy of the final environmental assessment, and the final list of the county roadways that will be affected by the installation of the fiber optic cables for the onshore system.

Should you require further assistance, please contact Charles Katsuyoshi, Purchasing Administrator, at 523-4887 or Diane Muraia, Property Management Section, at 523-4796.

NAVALI UERAWA  
DIRECTOR  
CHRIS A. DEBLING  
DEPUTY DIRECTOR

Mr. Randall Urasaki, P.E.  
June 12, 2003  
Page 2

Thank you for the opportunity to comment on the subject project.

Sincerely,

*Ivan M. Lukwan*  
IVAN M. LUKWAN, DIRECTOR  
Department of Budget and Fiscal Services

IMLK:dm

cc: Department of the Corporation Counsel

DEPARTMENT OF THE CORPORATION COUNSEL  
CITY AND COUNTY OF HONOLULU  
120 SOUTH KING STREET, ROOM 110 • HONOLULU, HAWAII 96813  
TELEPHONE: (808) 525-2495 • FAX: (808) 525-4823 • INTERNET: www.dcc.hawaii.gov



June 10, 2003

VIA FACSIMILE AND MAIL

Mr. Randall Urasaki, P.E.  
Project Engineer  
Parsons Brinckerhoff Guade  
& Douglas, Inc.  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, Hawaii 96813

Dear Mr. Urasaki:

Re: Sandwich Isles Communications, Inc.  
Submarine Cable Project  
Pre-Assessment Consultation

This is in response to your solicitation dated May 8, 2003, seeking comments or suggestions on environmental aspects of proposed submarine cables and cable landing areas for a statewide telecommunication network project of Sandwich Isles Communications, Inc.

The Department of Facility Maintenance, City and County of Honolulu, has expressed an interest in commenting upon the Draft Environmental Assessment for this project upon its issuance. The Department has also expressed a desire that it have access to plans and construction timelines for all construction that is planned or proposed for public rights-of-way on Oahu so that it may be assured that the overall impact





DEPARTMENT OF PARKS AND RECREATION  
CITY AND COUNTY OF HONOLULU

430 SOUTH KING STREET, 10TH FLOOR • HONOLULU, HAWAII 96813  
TELEPHONE: (808) 525-4182 • FAX: (808) 527-5155 • INTERNET: www.dparks.hawaii.gov



June 3, 2003

Mr. Randall Urasaki, P.E., Project Manager  
Parsons Brinkerhoff Quade & Douglas, Inc.  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, Hawaii, 96813

Dear Mr. Urasaki:

Subject: Sandwich Isles Communication, Inc.  
Submarine Fiber Optic Cable Project  
Pre-Assessment Consultation

Thank you for the opportunity to review and comment on the Pre-Assessment Consultation relating to Sandwich Isles Communications, Inc., Submarine Cable Project.

The Department of Parks and Recreation does not have any comments on the environmental aspects of the proposed submarine cables and cable landing areas; however, we encourage Sandwich Isles Communications, Inc., to submit their plans for approval and request for easements as soon as possible for cable landing areas proposed to be constructed in City and County of Honolulu Parks.

Should you have any questions, please contact Mr. John Reid, Planner, at 692-5454.

Sincerely,

*W.D. Balfour, Jr.*  
WILLIAM D. BALFOUR, JR.  
Director

WDB:mk  
(06/17)

cc: Ms. Dawn Spurlin, Deputy Corporation Counsel  
Mr. Don Griffin, Department of Design and Construction

DEPARTMENT OF TRANSPORTATION SERVICES  
CITY AND COUNTY OF HONOLULU

430 SOUTH KING STREET, 10TH FLOOR • HONOLULU, HAWAII 96813  
TELEPHONE: (808) 525-5125 • FAX: (808) 525-4120 • INTERNET: www.dparks.hawaii.gov



June 17, 2003

Mr. Randall Urasaki, P.E.  
Parsons Brinkerhoff  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, Hawaii 96813

Dear Mr. Urasaki:

Subject: Sandwich Isles Communications, Inc. Submarine Cable Project

In response to your May 8, 2003 letter, we reviewed the project information provided, recognizing that comments are being requested specifically on the environmental aspects of the submarine cables between the islands and the cable landing sites. The following comments are provided for your use:

1. As related in our November 16, 2000 letter, the utility agreement for those portions of the project within the City's right-of-way will require that two pairs of single-mode fiber optic cable be dedicated to the City at no cost.
2. One of the cable landing sites has been preliminarily identified as Kili Drive in Māhala, where the City has established traffic controls. Therefore, any road work required for this project that would affect Kili Drive or any other City-jurisdiction roadway should be submitted for DTS review and comment, through the Department of Planning and Permitting.
3. The cable landing site in the Sandy Beach area may affect Kalamansole Highway. As such, the State Department of Transportation should be informed of this and provided an opportunity to review and comment on the proposal.

We look forward to reviewing the draft environmental assessment. Should you have any questions regarding these comments, please contact Faith Miyamoto of the Transportation Planning Division at 527-6976.

Sincerely,

*Cheryl D. Soon*  
CHERYL D. SOON  
Director

WILLIAM D. BALFOUR, JR.  
DIRECTOR  
EDWARD J. STAFFIN, PAUL  
SERVING HONOLULU

AGREY HARRIS  
ADMIN

CHERYL D. SOON  
DIRECTOR  
SERVING HONOLULU  
KORNEE TEROR ANTONIO  
ADMINISTRATOR

TP503-26143R

RECEIVED  
MAY 21 2003

**CITY AND COUNTY OF HONOLULU**

FIRE DEPARTMENT  
2378 KULANANA STREET, SUITE 402B • HONOLULU, HAWAII 96813-1843  
TELEPHONE: (808) 531-7781 • FAX: (808) 531-7780 • INTERNET: [www.honolulu.gov](http://www.honolulu.gov)



JUN 6 2003  
JERRY HARRIS  
MAYOR



ATTORNEY GENERAL  
JOHN CLARK  
DEPUTY ATTORNEY GENERAL

May 21, 2003

Mr. Randall Urasaki, P.E.  
Project Manager  
Parsons Brinckerhoff Quade & Douglas, Inc.  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, Hawaii 96813

Dear Mr. Urasaki:

Subject: Sandwich Isles Communications, Inc.  
Submarine Cable Project  
Pre-Assessment Consultation

We received your letter dated May 8, 2003, requesting our comments on the above-mentioned project.

The proposed project will not adversely impact the services provided by the Honolulu Fire Department.

Should you have any questions, please call Battalion Chief Lloyd Rogers of our Fire Prevention Bureau at 831-7778.

Sincerely,

ATTILIO K. LEONARDI  
Fire Chief

AKL/DL:rh

JERRY HARRIS  
MAYOR

**CITY AND COUNTY OF HONOLULU**

POLICE DEPARTMENT  
801 SOUTH BERTANIMA STREET  
HONOLULU, HAWAII 96813 • AREA CODE (808) 528-3111  
<http://www.honolulu.gov>



JUN 6 2003  
LEE D. DONOHUE  
CHIEF  
DEEN B. KAJIYAMA  
PAUL D. PUTZIG  
DEPUTY CHIEFS

June 12, 2003

Mr. Randall Urasaki, P.E.  
Project Manager  
Parsons Brinckerhoff Quade & Douglas, Inc.  
1001 Bishop Street, Suite 3000  
Honolulu, Hawaii 96813

Dear Mr. Urasaki:

Thank you for the opportunity to review and comment on the Pre-Assessment Consultation for the Submarine Cable Project.

Whenever there is any construction work conducted on public roadways, calls for police services are usually impacted. Therefore, police operations in Districts 7 (East Honolulu) and 8 (Waianae/Kapolei) may be affected by this proposal. However, we do reserve further comment until more details are known.

If there are any questions, please call Ms. Carol Sodelant of the Support Services Bureau at 529-3658.

Sincerely,

LEE D. DONOHUE  
Chief of Police

BY KARL GODSEY  
Assistant Chief of Police  
Support Services Bureau

Printing and Preparing with Aloha



DEPARTMENT OF  
HOUSING AND HUMAN CONCERNS  
COUNTY OF MAUI

ALAN M. ABRAKAWA  
Mayor  
ALICE L. LEE  
Deputy Mayor  
HELENA T. ANDAYA  
Deputy Director

200 SOUTH HIGH STREET • WAILUKU, HAWAII 96793 • PHONE: (808) 270-7800 • FAX: (808) 270-7165

May 20, 2003

MAY 20 2003

Mr. Randall Urasaki, P.E.  
Project Manager  
Parsons, Brinckerhoff, Quade &  
Douglas, Inc.  
American Savings Bank Tower,  
Suite 3000  
1001 Bishop Street  
Honolulu, Hawaii 96813

Dear Mr. Urasaki:

SUBJECT: SANDWICH ISLES COMMUNICATIONS, INC.  
SUBMARINE CABLE PROJECT  
PRE-ASSESSMENT CONSULTATION

We have reviewed your May 8, 2003 letter and attachment and would like to offer the following comments:

1. Please include detailed maps in the Environmental Assessment that will show the exact location of the cable landing sites for the Islands of Maui and Molokai.
2. Besides the onshore manholes, will the project involve the construction of any onshore structures? If so, please provide sketches with dimensions of such structures.
3. The Environmental Assessment should include an explanation as to why DPHL areas on the Island of Lanai is not included in the project.

Thank you for the opportunity to comment.

Very Truly Yours,  
*Alice L. Lee*  
ALICE L. LEE  
Director

ETO:hs  
c: Housing Administrator

TO SUPPORT AND ENHANCE THE SOCIAL WELL-BEING OF THE CITIZENS OF MAUI COUNTY



DEPARTMENT OF WATER SUPPLY  
COUNTY OF MAUI

P.O. BOX 1109  
WAILUKU, MAUI, HAWAII 96793-7109  
Telephone (808) 270-7818 • Fax (808) 270-7833

June 6, 2003

Mr. Randall Urasaki  
Parsons Brinckerhoff  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu HI 96813

Dear Mr. Urasaki:

SUBJECT: Sandwich Isle Communications, Inc. - Submarine Cable Project

Thank you for the opportunity to participate in the pre-assessment consultation process for this project. The Department of Water Supply provides the following information.

The applicant identified three preliminary cable landing sites on Maui County where onshore fiber optic cables will be installed. Since the underground cables will be installed mostly within existing public rights-of-way, such as roads, we have attached maps showing the alignment of waterlines along Kamehameha V Highway in Molokai, Honouliuli Highway in Lahaina, and Malena Alanui Road in Kihei for your reference (not to scale) waterlines in red). The applicant should submit construction plans to our Engineering Division for review as well as coordinate construction to minimize water service disruption. We suggest that the electric and gas companies be given the opportunity to comment on this project proposal.

We encourage the applicant to participate in our effort to conserve our Islands' limited water resources by using brackish resources for dust control during construction, if such alternative source is available.

The onshore project overrides the Kamehameha and Kamehameha aquifers with sustainable yields of 5, 8, and 11 MGD, respectively. In order to protect surface and groundwater resources, we recommend that the applicant adopt Best Management Practices (BMP) designed to minimize infiltration and runoff from construction and vehicle operations. We have attached sample BMPs for pesticide operations for reference. In addition, we encourage the applicant to implement the following BMPs designed to minimize amount of waste generated at boatyards and marinas as applicable:

- Pressure Washing and Surface Preparation - prevent run-off from hydro blasting and any abrasives, dust, or paint chips from reaching waterways and storm drains. For boatyards without onsite settling tanks, lay tarps around the vessels and sweep up any remaining paint chips after the tarps are removed.
- Painting - train employees on proper spraying techniques. Mix paints in designated areas away from waterways.
- Engine Maintenance - use good housekeeping techniques, clean up spills thoroughly, and properly dispose of any wastes that are generated.
- Materials Handling and Disposal - store materials in protected, secure locations away from the drain openings. Provide secondary containment when required. Label containers with correct information regarding the type and characteristics of its content. Do not commingle wastes.

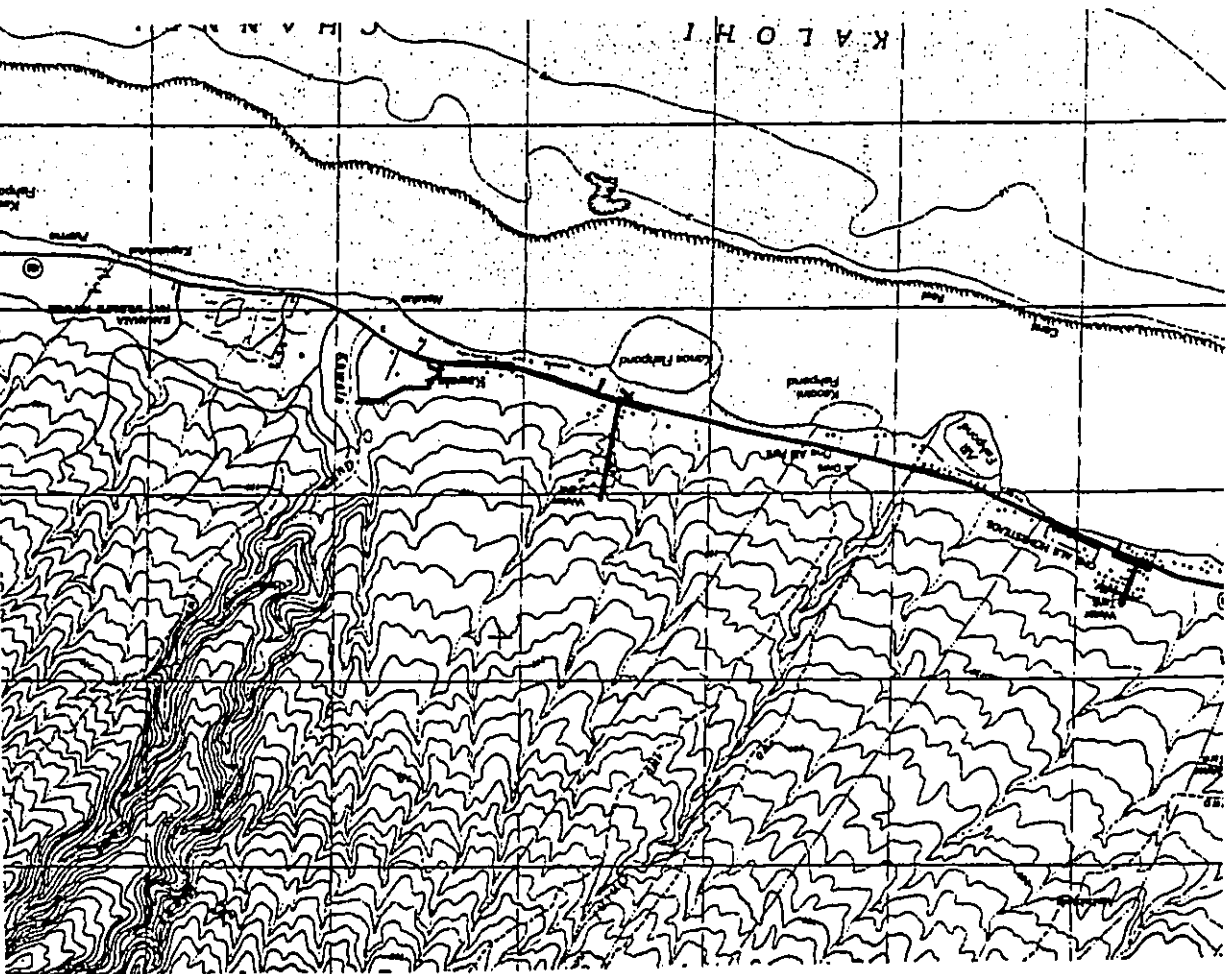
Boat Sewage - discharge sanitary wastes to a dockside pump-out station that is discharged to a sanitary sewer system or to a commercial waste disposal company. Most marinas provide this service. Another alternative is to arrange pump-out service provided by commercial tank-boats.  
Bilge Water - Bilge water sometimes contains oils and solvents that should not be discharged to the sanitary sewer. Prior to discharge to the sanitary sewer, oil should be decanted. Decanted oil may be disposed at used-oil collection centers. Residual surface oil can be absorbed by an oil-absorbing blanket. Bilge water may then be discharged to the sanitary sewer.

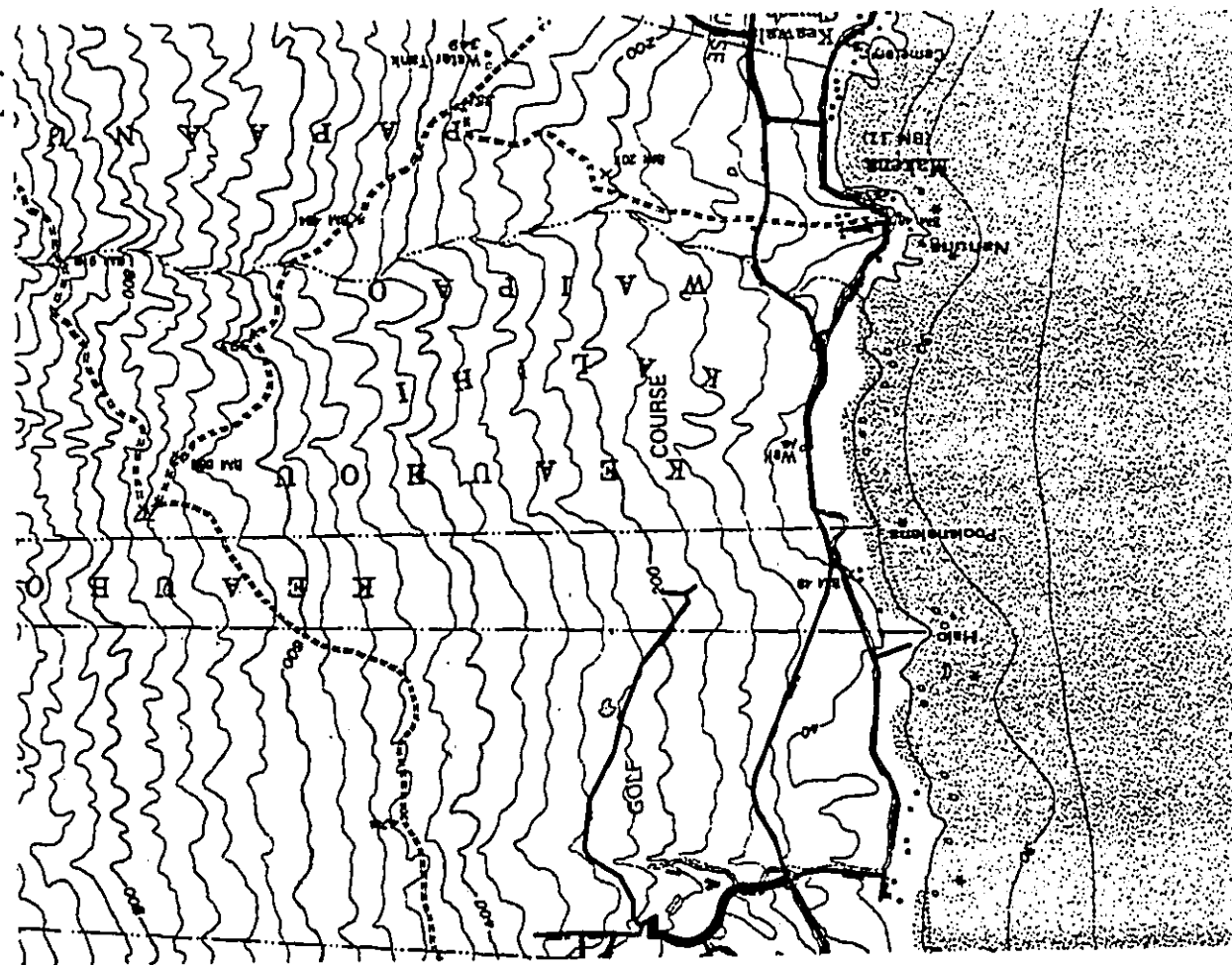
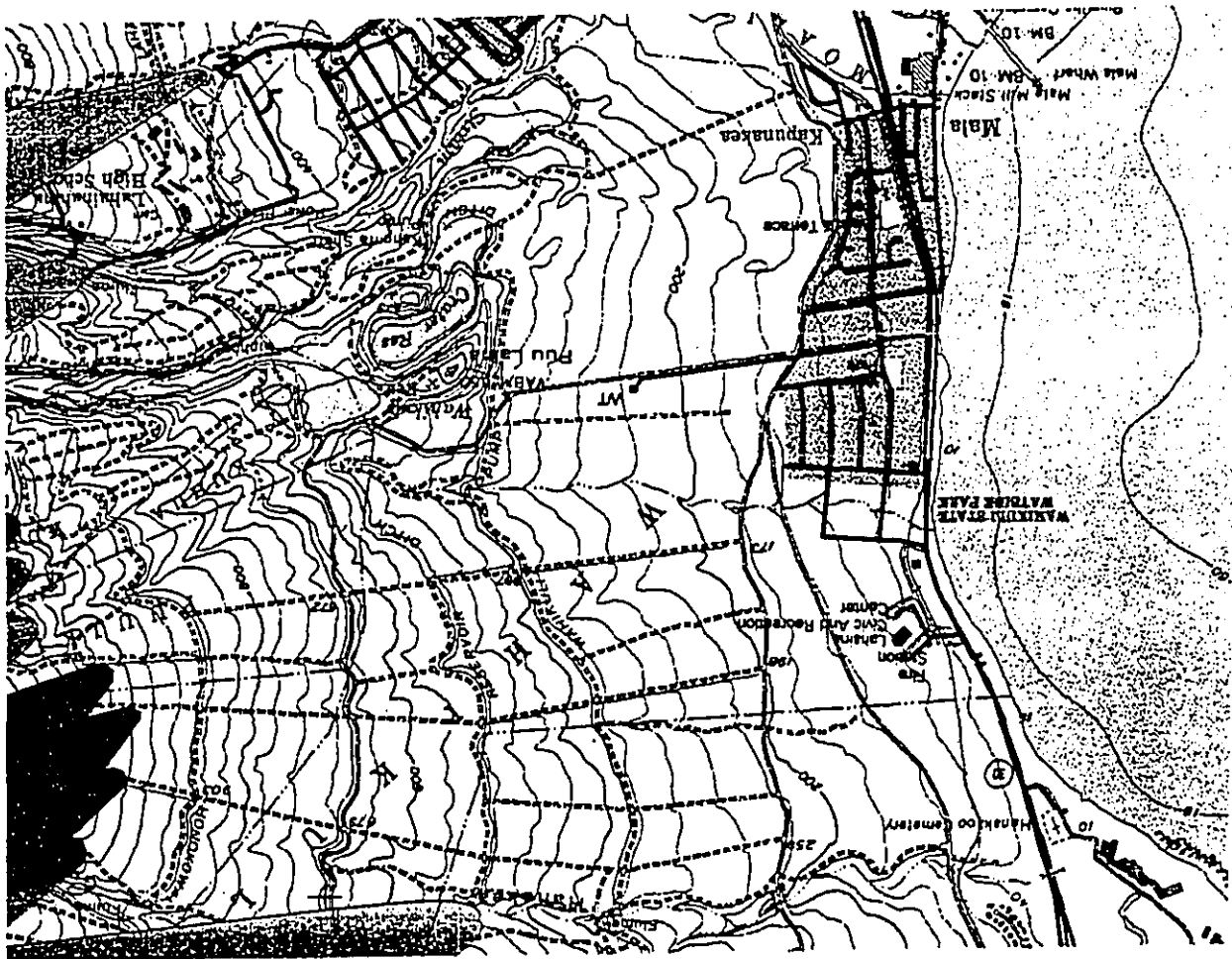
Should you have any questions, please contact our Water Resources and Planning Division at 270-7189.

Sincerely,

  
George J. Bergman  
Director

City of Norfolk  
Department of Public Works  
27000 Norfolk Boulevard, Norfolk, VA 23510  
Phone: 757/622-7000  
Fax: 757/622-7001  
www.norfolk.gov







JAMES "KIMO" APANA  
MAYOR

OUR REFERENCE  
YOUR REFERENCE

**POLICE DEPARTMENT  
COUNTY OF MAUI**

55 MAHALANI STREET  
WAILUKU, HAWAII 96793

(808) 244-6400  
FAX (808) 244-4411

June 2, 2003



THOMAS M. PHILLIPS  
CHIEF OF POLICE

KENYUAKUO R. AKAMA  
DEPUTY CHIEF OF POLICE

**COPY**

TO : THOMAS PHILLIPS, CHIEF OF POLICE, COUNTY OF MAUI  
VIA : CHANNELS *2/3/03*  
FROM : SCOTT Y. MIGHTA, P.O. III, BIKE PATROL OFFICER  
SUBJECT : SUBMARINE CABLE PROJECT

*Terri Haden to 01/06  
draft copy  
5/29/03*

Mr. Randall Urasaki  
Parsons Brinckerhoff  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

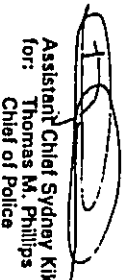
Dear Mr. Urasaki:

**SUBJECT:** Sandwich Isles Communications, Inc.  
Submarine Cable Project  
Pre-Assessment Consultation

Thank you for your letter of May 8, 2003, requesting comments on the above subject.

Officers from our Lahaina, Molokai, and Kihai Districts have reviewed the proposed summary. Enclosed is a copy of our officer's comments and recommendations. Thank you for giving us the opportunity to comment on the proposed project.

Very truly yours,

  
Assistant Chief Sydney Kikuchi  
for: Thomas M. Phillips  
Chief of Police

Enclosures  
cc: Michael Foley, Planning Department

Sir, this To-From is being submitted regarding the proposed Submarine Cable Project to be taking place at Waihihiki Park in Lahaina. Based on the information provided in the letter dated May 8, 2003 from Project Manager, Randall URASAKI of PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, Inc. On 051503 at about 1630 hours, I had spoken with Nami OHTOMO, an Environmental Planner with said company. OHTOMO related that the draft Environmental Assessment (EA) will not be completed for another two months. I am requesting information on land based construction equipment operating in this area. This information would be needed in order to determine if there will be an impact on traffic and safety issues in the Waihihiki area during the installation of the undersea fiber optic cables.

On 051603, at approximately 1357 hours, I had spoken with Project Manager, Randall URASAKI. URASAKI related that this project is being done for Hawaiian homelands properties, where their engineering design company is in charge of installing the fiber optic telecommunications wiring. Stated that this project is in its early planning stages, where actual construction will not begin for another two years. This will take about two months to complete and the hours of construction projected is pending Department Of Transportation approval. He had stated that the they will be installing a manhole on the 'mauka' shoulder of the roadway, where construction will be taking place on the dirt shoulder, south of the Waihihiki Post Office (mauka of Honopulihi Highway). Related one 'mauka' lane would need to be closed on the highway. I had mentioned to URASAKI that the traffic and safety issue is a priority. Also, I had expressed my concern on the traffic congestion during construction, especially during weekday hours, where per URASAKI, night work may be an option, pending approval by DOT. These concerns will be addressed in the final EA.

Submitted for your information and perusal.

RESPECTFULLY SUBMITTED,

SCOTT Y. MIGHTA, E-1122  
P.O. III, BIKE PATROL OFFICER  
051703 AT 1500 HOURS

*Handwritten notes:*  
Was using live to DENIED  
CONSTRUCTION Plans, EPP, there is  
APPEALING COMPANIES TO CONSIDER  
CONSENT. All STALUD

*Handwritten notes:*  
Name: *SP Phillips*  
9/24/03 @ 1415  
#  
*SP Phillips*  
9/25/03

TO : THOMAS PHILLIPS, CHIEF OF POLICE  
 VIA : CHANNELS  
 FROM : MILTON MATSUOKA, CAPTAIN, DISTRICT V  
 SUBJECT : COMMENTS ON PROPOSED SUBMARINE CABLE PROJECT

**COPY**  
 Ferry Mail for 04/01/03 response  
 (around there)  
 Jof 1/1/03

These comments are in regards to the proposed installation of undersea fiber optic cables that will connect five of the major Hawaiian Islands (Kauai, Oahu, Molokai, Maui and Hawaii).

In the letter submitted by Parsons, Brinckerhoff, Quade & Douglas, Inc. dated May 8, 2003 there are sections designated Background and Public Comments.

The Background section notes "Onshore, fiber optic cables will be installed underground, mostly within existing public rights-of-way, such as roads". This will be a traffic safety issue should construction of their "cable landing" and "onshore manholes" occur on public right-of-way. The length of time as well as the times of day that construction will occur are possible factors that will impact our personnel.

Potentially of more concern is the Public Comments section. It states that Hawaiian organizations have been consulted. In the past, group(s) on Molokai that have environmental concerns have been very vocal, demanding and physical in dealing with these issues. This has included protests and criminal property damage. If this occurs it will be more of a manpower issue than the traffic safety.

As Sandwichee Isles Communications, Inc. has stated that it has already been consulting with the communities in the affected areas I would request that should the company have any indication that problems will occur that they keep us apprised so that contingency plans can be made well in advance.

Another suggestion would be for the company to be in contact with specific group(s) on Molokai, if they haven't already, well prior to the start of construction to try and avoid some of the same problems that occurred during the cruise ship protests. One of the specific issues during these protests was the possible damage to the reef outside of Kaunakakai Harbor. Any protest or acts of disobedience will have a direct and heavy impact on resources in our district as well as Maui which has already occurred in the past.

Milton M. Matsuoka 6948  
 05/20/03 1740 hrs

TO : THOMAS M. PHILLIPS, CHIEF OF POLICE  
 VIA : CHANNELS  
 FROM : O. NONEZA, JR., COMMUNITY POLICE OFFICER  
 SUBJECT : SANDWICH ISLES COMMUNICATIONS, INCORPORATED  
 SUBMARINE CABLE PROJECT  
 PRE-ASSESSMENT CONSULTATION

**COPY**

MPP Concerns would center on on-shore impacts, however the letter indicates DOT has given approval. Environmental assessment details more project details. One box cable was covered. Copies

This officer has reviewed the letter from Randall URASAKI, Project Manager with Parsons Brinckerhoff Quade & Douglas, regarding the submarine cable project proposed by SANDWICH ISLES COMMUNICATIONS.

As stated within URASAKI's letter, its purpose is to solicit any comments or suggestions regarding environmental aspects of the proposed submarine cables and cable landing areas destined for Lahaina and Makena. Also, as stated in URASAKI's letter, this communication will not be the Department's final opportunity to comment on this project.

Due to the scarcity of information provided by the letter, this officer's comments and suggestions are limited as follows -

1. URASAKI needs to obtain comments from environmental groups and activists regarding the ocean and reef impact of this project. This officer has no knowledge or experience in such matters.
2. The cable landing areas will be the most visible sign of the presence of the proposed project; therefore -
  - A. The design of fixed structures needs to be minimized and visually blend in to the surrounding environment.
  - B. The location of such landing areas must not have any cultural significance to the resident population.

This officer looks forward to reviewing the draft environmental assessment on this submarine cable project and providing further comments and suggestions about it when more details are available.

ONLY UP WITH URASAKI'S COMMENTS REGARDING INSUFFICIENT INFORMATION TO COMMENT

Respectfully submitted,  
 Orino NONEZA, Jr.  
 May 28, 2003  
 E-0885  
 1510-Hours

To be submitted to the community board. Review on 5/28/03

05/28/03





**Telephone Conversation Memorandum**

Persons Brokerage  
Quade & Douglas, Inc

Pacific Tower, Suite 3000  
1001 Bishop Street  
Honolulu, HI 96813  
808-531-7294  
Fax: 808-529-2368

Project: Sandwich Isles Communications

Job No: 163734

Date: 5/16/03

Talked to: Officer Miglia

From: County of Maui Police Department

808-385-3368

Item discussed: Waikeolu, Lahaina, Maui Landing Site

**Information obtained:**

- Based on the questions, I provided Officer Miglia the following information:
- We are presently in the planning portion of the project.
  - We estimate project construction approximately 2 years from now.
  - Lane closures will be required to install the manhole within the roadway right-of-way and pulling of the cable.

Officer Miglia indicated that their concerns are based on safety during construction. He provided the following information:

- In this area during the daytime, the roadway is congested throughout the day. He believes that closing of lanes during the day will cause a gridlock situation.
- He believes night work will be permitted in this area and preferred.
- However, night work is dangerous due to drunk drivers. There have been two officers killed on night duty in the past several years in this area.

I informed Officer Miglia that we would refer to the Department of Transportation's requirements regarding lane closures (night/day) for the area.

**Action requested:** Officer Miglia indicated that he would like to see safety during construction addressed in the Draft EA.

distribution

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

4/1

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

Harry Kim  
Mayor



County of Hawaii  
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT  
25 Aupuni Street, Room 204 • Hilo, Hawaii 96720-1531  
(808) 941-2823 • Fax (808) 941-2826

Barbara Bell  
Director

MAY 14  
1993

May 12, 2003

Mr. Randall Urasaki, P.E.  
Project Manager  
Parsons Brinckerhoff Quade & Douglas, Inc.  
American Savings Bank Tower  
Suite 3000  
1001 Bishop Street  
Honolulu, HI 96813

Re: Sandwich Isles Communications, Inc.  
Submarine Cable Project  
Pre-Assessment Consultation

Dear Mr. Urasaki,

We have no comments at this time regarding the proposed submarine cables and cable landing areas.

Thank you for allowing us the opportunity to offer input on this project and if we can be of further assistance, please don't hesitate to contact us.

Barbara Bell  
DIRECTOR

Harry Kim  
Mayor



County of Hawaii  
DEPARTMENT OF PARKS AND RECREATION  
181 Puuuli Street, Suite 6 • Hilo, Hawaii 96720  
(808) 941-4311 • Fax (808) 941-4311

Barbara G. Engelhard  
Director  
Randall N. Mizuno  
Deputy Director

MAY 28  
1993

May 25, 2003

Randall Urasaki  
Parsons Brinckerhoff  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

Re: Sandwich Isles Communications, Inc.  
Submarine Cable Project  
Pre-Assessment Consultation

Dear Mr. Urasaki:

We have no comments to offer at this time, inasmuch as the project appears to have no direct impact to any County recreational site or program.

Thank you for the opportunity to participate in the pre-assessment consultation phase.

Sincerely,  
  
Barbara G. Engelhard  
Director

Harry Kim  
Mayor



MAY 28  
OLIE KESION  
Managing Director  
1770 KULU TERESA  
DEPT. OF LAND & NATURAL RESOURCES

23 August Street, Room 213 • 15th, Hawaii 96720-4372 • Fax (808) 941-4313  
KONA: 75-5796 Kapaehauna Highway, Suite 103 • Kaneohe, Hawaii 96740  
(808) 328-5128 • Fax (808) 328-5463

**County of Hawaii**

May 22, 2003

Randall Urasaki, P.E.  
Project Manager  
Parsons Brinckerhoff Quade & Douglas, Inc.  
1001 Bishop Street, Suite 3000  
Honolulu, Hawaii 96813  
Re: Sandwich Isles Communications, Inc.  
Submarine Cable Project  
Pre-Assessment Consultation

Dear Mr. Urasaki:

Thank you for your letter of May 8, 2003, soliciting comments on the environmental aspects of the submarine cables between the islands and the cable landing sites proposed for this project.

At this time, I have no comments or suggestions. I look forward to reviewing the draft environmental assessment when it is issued.

Aloha,  
  
Harry Kim  
MAYOR

Harry Kim  
Mayor



JUN 22  
LAWRENCE K. MAHUNA  
Police Chief  
1770 KULU TERESA  
DEPT. OF LAND & NATURAL RESOURCES  
Harry S. Kobolivi  
Deputy Police Chief

**County of Hawaii**  
POLICE DEPARTMENT  
349 Kapaehauna Street • 15th, Hawaii 96720-3794  
(808) 912-3111 • Fax (808) 941-1249

May 19, 2003

Mr. Randall Urasaki  
Project Manager  
Parsons Brinckerhoff  
American Savings Bank Tower, Suite 3000  
1001 Bishop Street  
Honolulu, Hawaii 96813

Dear Mr. Urasaki:

Subject: Sandwich Isles Communications, Inc.  
Submarine Cable Project

In reply to your letter of May 8, 2003, the Hawaii County Police Department offers no comments at this time on the Submarine Cable Project.

We thank you for the opportunity to provide input on the installation of undersea fiber optic cables between the Hawaiian Islands.

Sincerely,  
  
LAWRENCE K. MAHUNA  
POLICE CHIEF  
CKC/M

Meat Electric Company, Ltd. • 210 West Kamehameha Avenue • PO Box 390 • Kihuna, Maui, HI 96753-0390 • (808) 871-9461



515 Kamehame Street Honolulu, Hawaii 96811  
P.O. Box 3000 Honolulu, Hawaii 96822-3000  
Telephone 808.533.9700 Facsimile 808.534.3500 Sales

5:26 6

MAY 23

10 01 AM '03

THE GAS COMPANY  
Natural Gas Service

June 4, 2003

May 22, 2003

Randall Urasaki  
Parsons Brinckerhoff  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

Dear Mr. Urasaki:

Subject: Sandwich Isles Communications, Inc.  
Submarine Cable Project  
Pre-Assessment Consultation

Thank you for allowing us to comment on the subject project.


In reviewing the information transmitted and our records, we have no objection to the subject project. We have the following comments:

1. We encourage the developer's electrical consultant to meet with MECO as soon as practical to verify the project's electrical requirements so that service can be provided on a timely basis.
2. We request that when SIC negotiates assessments for facilities at these cable landing sites, that assessments required for electrical service also be included to avoid any potential delays in providing service.
3. We request a copy of the design drawings to verify any clearance requirements to our existing overhead and underground facilities.
4. MECO underground facilities will need to be identified and located prior to construction in the vicinity of the proposed communication facilities.

MECO may also be interested in having IPers upon project completion. We would appreciate any information in this regard as it becomes available.

If you have any questions or concerns, please call Dan Takahata at 871-2385.

Sincerely,

  
Neal Shinyama  
Manager, Energy Delivery

NS/tpk/kt

CC: D. Takahata

Parsons Brinckerhoff Quade & Douglas, Inc.  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, Hawaii 96813

Attention: Mr. Randall Urasaki, P.E.  
Project Manager

Gentlemen:

Subject: Sandwich Isles Communications, Inc. Submarine Cable Project  
Pre-Assessment Consultation

Please be advised that The Gas Company maintains underground utility gas mains in the project vicinity, which serves commercial and residential customers in the area and is interconnected with our utility network. We would appreciate your consideration during the project planning and design process to minimize any potential conflicts with the existing gas facilities in the project area.

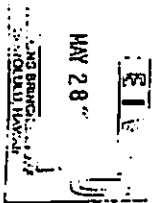
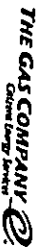
Thank you for the opportunity to comment on the project proposal. Should there be any questions, or if additional information is desired, please call Chris Anderson at 594-5564.

Sincerely,

  
Charles E. Calved, P.E.  
Manager, Engineering

CEC/CA  
01:17

515 Kamakee Street Honolulu, Hawaii 96814  
P.O. Box 3000 Honolulu, Hawaii 96822-3000  
Telephone 808.533.1900 Facsimile 808.539.4500 Sales



May 23, 2002

Parsons Brinckerhoff Quade & Douglas Inc.  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, Hawaii 96813

Attention: Mr. Randall Urasaki, P.E.  
Project Manager


Gentlemen:

Subject: Sandvich Isles Communications, Inc., Submarine Cable Project  
Proposed Construction in Keolu

Please be advised that The Gas Company maintains underground utility gas mains in the project vicinity, which serves commercial and residential customers in the area and is interconnected with the utility network in Keolu. We would appreciate your consideration during the project planning and design process to minimize any potential conflicts with the existing gas facilities in the project area.

Thank you for the opportunity to comment on your letter dated May 12, 2003. Should there be any questions, or if additional information is desired, please call me at 594-5570.

Sincerely,

  
Charles E. Calvert, P.E.  
Manager, Engineering

CC:cm  
03-118

From: Urasaki, Randall M.  
Sent: Wednesday, May 21, 2003 11:46 AM  
To: Barbara J. Tanabe; Calvin Teuda  
Cc: Allan, David; dtrichang@hokaea.com; Lari Laplito; Joe W. Laplito III; Yezawa, Jason A.  
Subject: RE: Inquiry to your EA letter

Barbara, Cal,

I spoke with John Maloney this morning. He was actually more concerned about the terrestrial portion rather than the marine portion.

His concerns are that they have been working on the main roadway for sometime now. They are currently placing electrical ducts and once that's done they will be repaving the roadway. His concern is that the SIC project will come in right after they are done and tear up the roadway again to place SIC ducts. He indicated that the community/homeowners will not be too happy if this happens.

I told him that the terrestrial portion will be designed by another firm (SSFM). The terrestrial portion has an approved environmental assessment, but to my knowledge, design for this area has not been done. He requested a contact at SSFM.

So heads up, Cal, because I gave him your name.

Randy

-----Original Message-----  
From: Barbara J. Tanabe [mailto:btanabe@hokaea.com]  
Sent: Friday, May 16, 2003 8:40 AM  
To: Urasaki, Randall M.; Yezawa, Jason A.  
Cc: Allan, David; dtrichang@hokaea.com; Lari Laplito; Joe W. Laplito III  
Subject: Inquiry to your EA letter

Randy,  
A call was referred to me from the SIC switchboard. Here are details:  
John Maloney, Pacific Rim Land, Inc. 808-574-5283, is developing parcels near the Poehenakana site. One is already underway north of Makana and PRL intends to pave the road in about 2 months. Two other subdivisions south of Poehenakana will be ready to construct within one year. He wants to know if you can give him details about the area of construction for the landing site and the alignment of the connecting line. I told him timing would be no earlier than one year from now, as the EA still needs to be done.  
Can you please call him?  
Thanks,  
Barbara

Hokaea LLC  
1001 Bishop Street  
Pearl Tower, 27th Floor  
Honolulu, Hawaii 96813  
Tel: 808-539-3581  
Fax: 808-599-4653  
Mobile: 808-298-8414  
Email: btanabe@hokaea.com

5/21/2003



Parsons  
Brinckerhoff  
American Savings Bank Tower  
1001 Bishop Street, Suite 2000  
Honolulu, HI 96813

May 12, 2003

Dear Property Owner and/or Current Resident:

**Subject: Sandwich Isles Communications, Inc., Submarine Cable Project  
Request for comments on proposed construction in Kekaha**

Sandwich Isles Communications, Inc. (SIC), a rural telephone company headquartered in Honolulu, Hawaii, is developing a statewide telecommunications network to service the Department of Hawaiian Home Lands (DHHHL). The project will provide DHHHL beneficiaries with access to a modern, independent, and affordable telecommunications system. Additional information on this project is provided in the attached Fact Sheet.

In order to complete this network, SIC plans to install a submarine cable landing in Kekaha, in the vicinity of Akalaka Road (TMK pct. 4-1-2-002.032). The location of this submarine cable landing site (named "Akalaka Road") is shown on the attached maps. Construction will start after the environmental review process is completed. Hours of construction activity may vary from 6 to 24 hours a day and last one to three months. The cables will be installed underground, using a technique called horizontal directional drilling, which would minimize ground disturbance.

If you have any questions or concerns, please contact me at the following address:

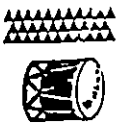
Randall Urasaki  
Parsons Brinckerhoff Quade & Douglas, Inc.  
American Savings Bank Tower  
1001 Bishop Street, Suite 2000  
Honolulu, HI 96813

Comments may also be sent by fax to (808) 528-2308 or email at [URASAKI@PBWORLD.COM](mailto:urasaki@pbworld.com). All comments received will be included and addressed in the Draft Environmental Assessment (Draft EA) currently being prepared. Your comments will be most useful to us if received within one month of your receipt of this letter. The Draft EA will be made publicly available when completed. Mahalo.

PARSONS BRINCKERHOFF QUADE & DOUGLAS INC.

Randall Urasaki, P.E.  
Project Manager

Enclosures:  
SIC Network for Hawaiian Home Lands Fact Sheet  
Maps of Akalaka Road landing site, Kekaha, Kauai (2)  
Over a Century of  
Engineering Excellence



Sandwich Isles  
Communications, Inc.

#### Sandwich Isles Communications Network for Hawaiian Home Lands Fact Sheet

**Company Description:** Sandwich Isles Communications, Inc. (SIC) is a rural telephone company with a license to provide service to Department of Hawaiian Home Lands (DHHHL). Its mission is to provide modern, next generation, high-speed broadband telecommunications services to Hawaiian Homestead lands. SIC was founded in 1985, and has been serving DHHHL since 1998.

**SIC Operations:** SIC is certified by the Federal Communications Commission (FCC) as a rural local exchange carrier (RLEC). It is authorized by the State of Hawaii Public Utilities Commission (PUC) to provide telecommunications services on Department of Hawaiian Home Lands. As a rural telephone company, SIC is eligible for Universal Service Fund support to build and operate a telecommunications network and service rural areas, specifically DHHHL. Since SIC initiated services and became operational in 1998, it has invested over \$100 million in facilities, digital switching and related equipment and services.

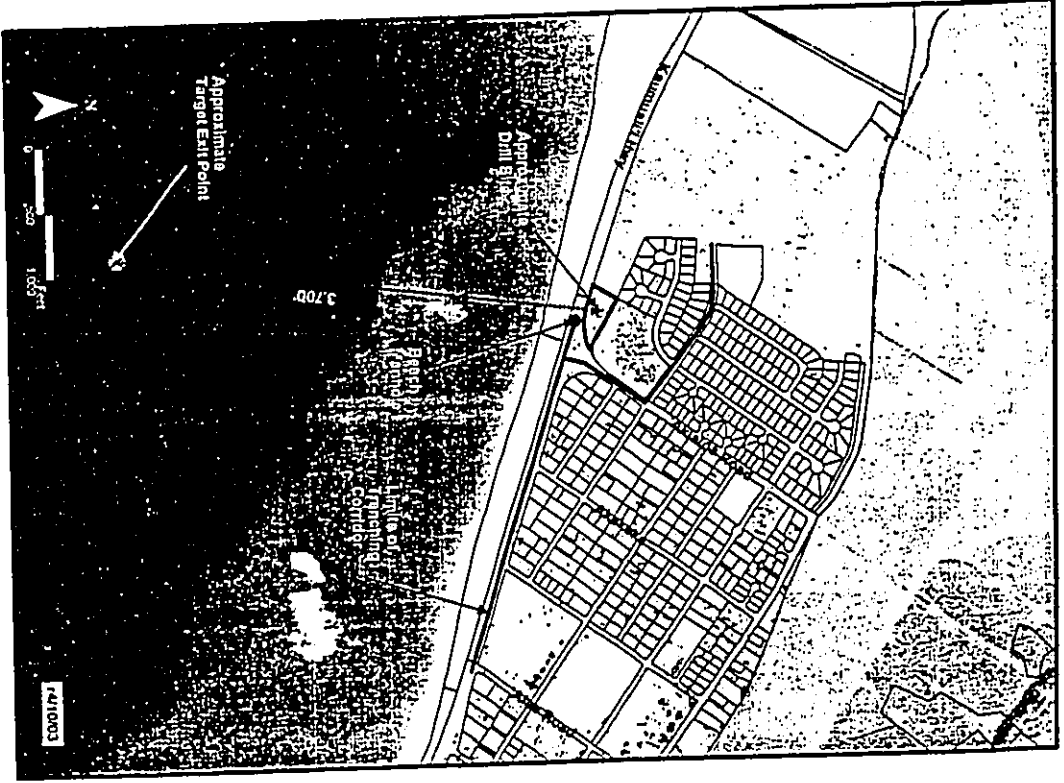
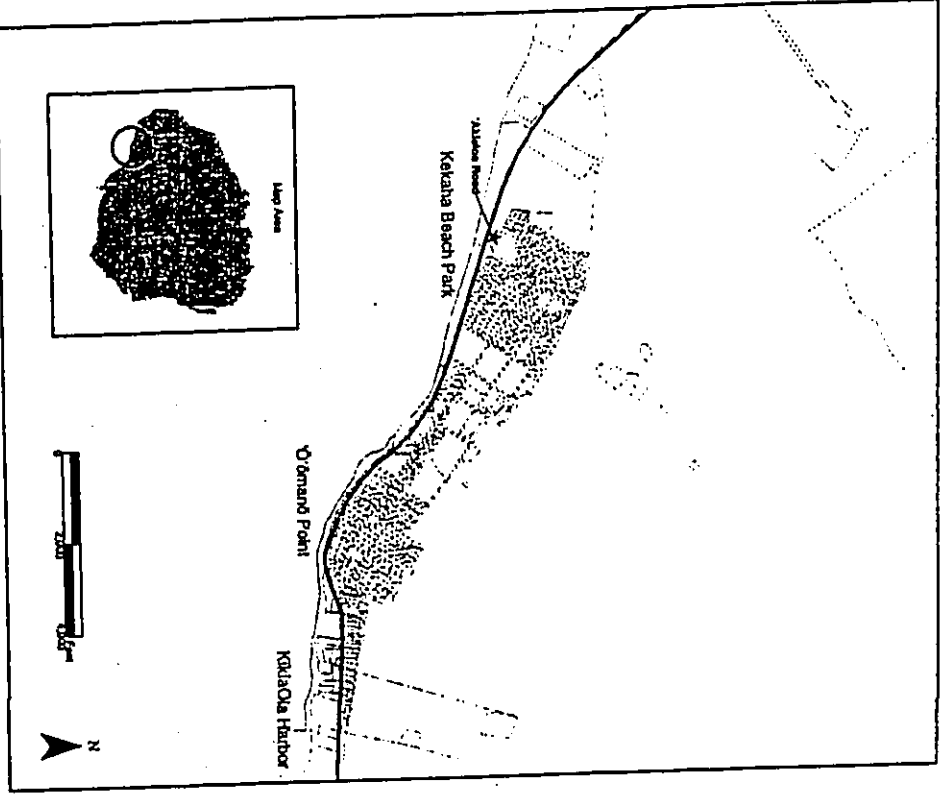
**Network Description:** The SIC network will tie together DHHHL areas on the six major Hawaiian Islands. It is designed to avoid disrupting scenic view planes through the installation of underground fiber optic cables. During construction, SIC is asking contractors to use drilling and boring techniques to minimize open trenching, erosion, and traffic disruption. The SIC project will be independent of any existing networks owned and operated by other current providers in the State of Hawaii. The SIC network will stretch 1,500 miles over land and undersea.

**Project Financing:** The SIC project is financed by long term, low interest federal loans from the U.S. Department of Agriculture, Rural Utilities Service (RUS). Its mission is to promote and financially support the development of utility infrastructure and services in rural America, so that everyone in rural and insider areas has affordable access to emergency essential and modern utility conveniences comparable to the level available in urban areas. SIC will also invest private funds to enhance the network's service and reliability. SIC will repay the RUS loans with subscriber revenues and payments from the Universal Service Fund, a private fund administered by the FCC. Because of the availability of federal loans to build the telecommunications infrastructure, no state funds are necessary.

**Benefits to Hawaii:** A modern, broadband fiber optic system will provide DHHHL with essential telecommunications services at affordable rates. It would also allow underserved DHHHL homesteaders to access new interactive services such as telemedicine, educational programming, video and data transmissions, and the Internet. Because SIC is participating in a federal loan program to build out the telecommunications network, no funds are needed from the Department of Hawaiian Home Lands. This allows DHHHL to dedicate more funds to build modern infrastructure for its remote parcels, promoting economic development and accelerating the availability of its properties for residential and commercial use.

4-1-03  
Contact: Hokaea LLC  
Tel: 808 539-3580  
Email [hokaea@hokaea.com](mailto:hokaea@hokaea.com)

Kekaha, Kauai: Landing Site Map - Akiakoa Road





Parsons  
Brinckerhoff  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

May 12, 2003

Dear Property Owner and/or Current Resident:

**Subject: Sandwich Isles Communications, Inc., Submarine Cable Project  
Request for comments on proposed construction in Makaha**

Sandwich Isles Communications, Inc. (SIC), a rural telephone company headquartered in Honolulu, Hawaii, is developing a statewide telecommunications network to service the Department of Hawaiian Home Lands (DHHL). The project will provide DHHL beneficiaries with access to a modern, independent, and affordable telecommunications system. Additional information on this project is provided in the attached Fact Sheet.

In order to complete this network, SIC plans to install a submarine cable landing in Makaha, in the vicinity of Kill Drive (TMK por. 1-8-4-002-047). The location of this submarine cable landing site (named "Kill Drive") is shown on the attached maps. Construction will start after the environmental review process is completed. Hours of construction activity may vary from 6 to 24 hours a day and last one to three months. The cables will be installed underground, using a technique called horizontal directional drilling, which would minimize ground disturbance.

If you have any questions or concerns, please contact me at the following address:

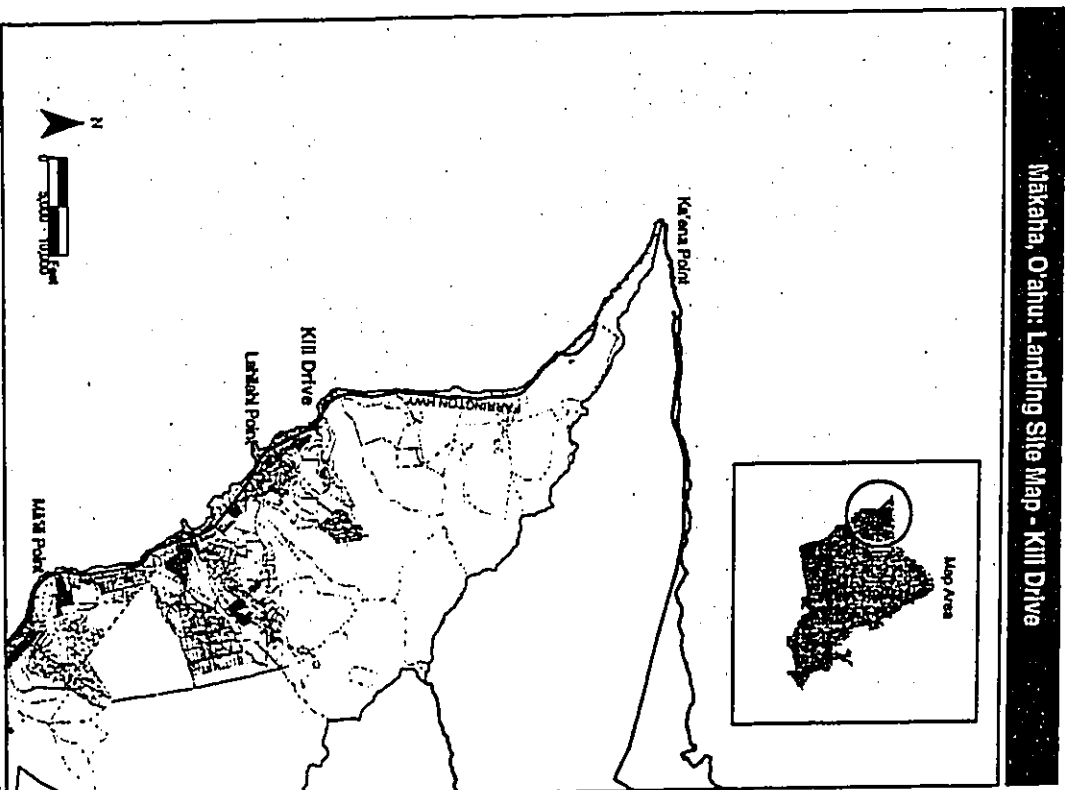
Randall Urasaki  
Parsons Brinckerhoff Quade & Douglas, Inc.  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

Comments may also be sent by fax to (808) 528-2368 or email at [urasaki@pbworld.com](mailto:urasaki@pbworld.com). All comments received will be included and addressed in the Draft Environmental Assessment (Draft EA) currently being prepared. Your comments will be most useful to us if received within one month of your receipt of this letter. The Draft EA will be made publicly available when completed. Mahalo.

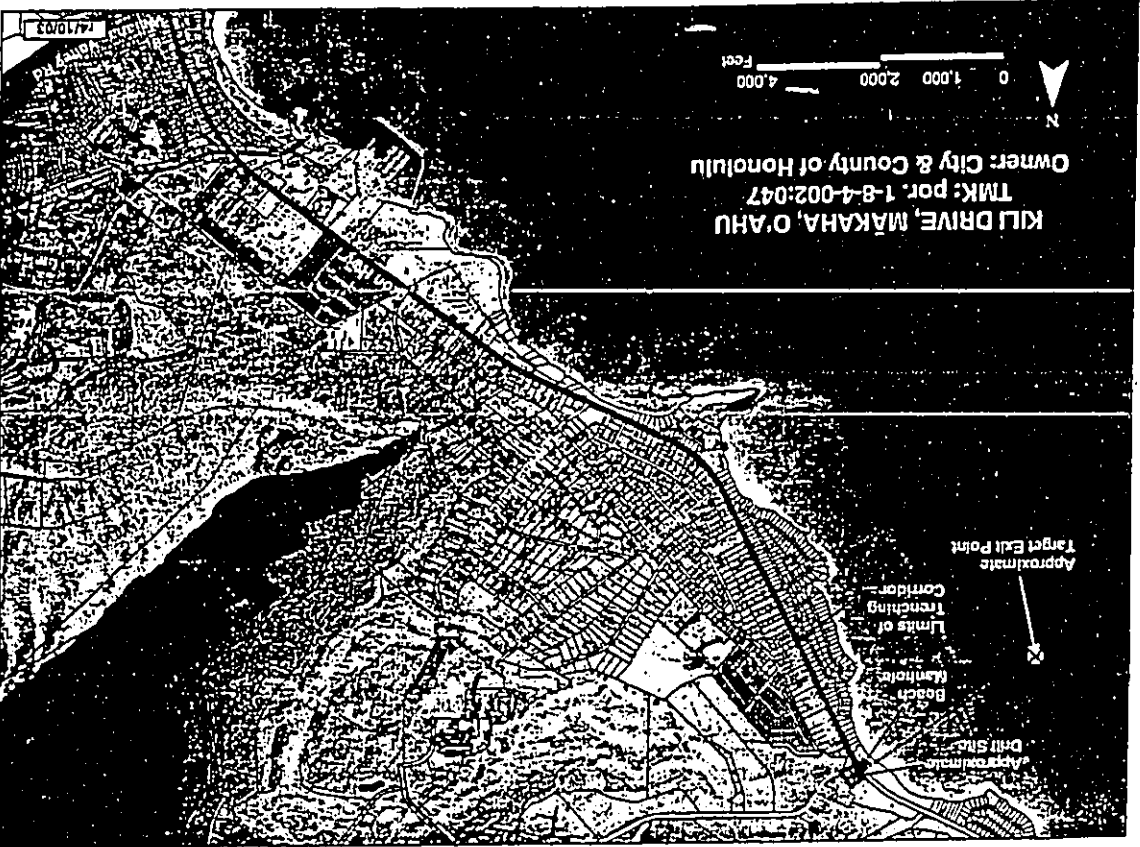
PARSONS BRINCKERHOFF QUADE & DOUGLAS INC.

Randall Urasaki, P.E.  
Project Manager

Enclosures:  
SIC Network for Hawaiian Home Lands Fact Sheet  
Maps of Kill Drive landing site, Makaha, Oahu (2)  
Over a Century of  
Engineering Excellence







Parsons  
Brinckerhoff  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

May 12, 2003

Dear Property Owner and/or Current Resident:

**Subject: Sandwichee Isles Communications, Inc., Submarine Cable Project  
Request for comments on proposed construction in Hawaii Kai**

Sandwichee Isles Communications, Inc. (SIC), a rural telephone company headquartered in Honolulu, Hawaii, is developing a statewide telecommunications network to service the Department of Hawaiian Home Lands (DHHL). The project will provide DHHL beneficiaries with access to a modern, independent, and affordable telecommunications system. Additional information on this project is provided in the attached Fact Sheet.

In order to complete this network, SIC plans to install a submarine cable landing in Hawaii Kai, in the vicinity of Sandy Beach (TMK por. 1-3-9-015:001). The location of this submarine cable landing site (named "Cily Park") is shown on the attached maps. Construction will start after the environmental review process is completed. Hours of construction activity may vary from 6 to 24 hours a day and last one to three months. The cables will be installed underground, using a technique called horizontal directional drilling, which would minimize ground disturbance.

If you have any questions or concerns, please contact me at the following address:

Randall Urasaki  
Parsons Brinckerhoff Quade & Douglas, Inc.  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

Comments may also be sent by fax to (808) 528-2368 or email at [urasaki@pbworld.com](mailto:urasaki@pbworld.com). All comments received will be included and addressed in the Draft Environmental Assessment (Draft EA) currently being prepared. Your comments will be most useful to us if received within one month of your receipt of this letter. The Draft EA will be made publicly available when completed.

Mahalo,

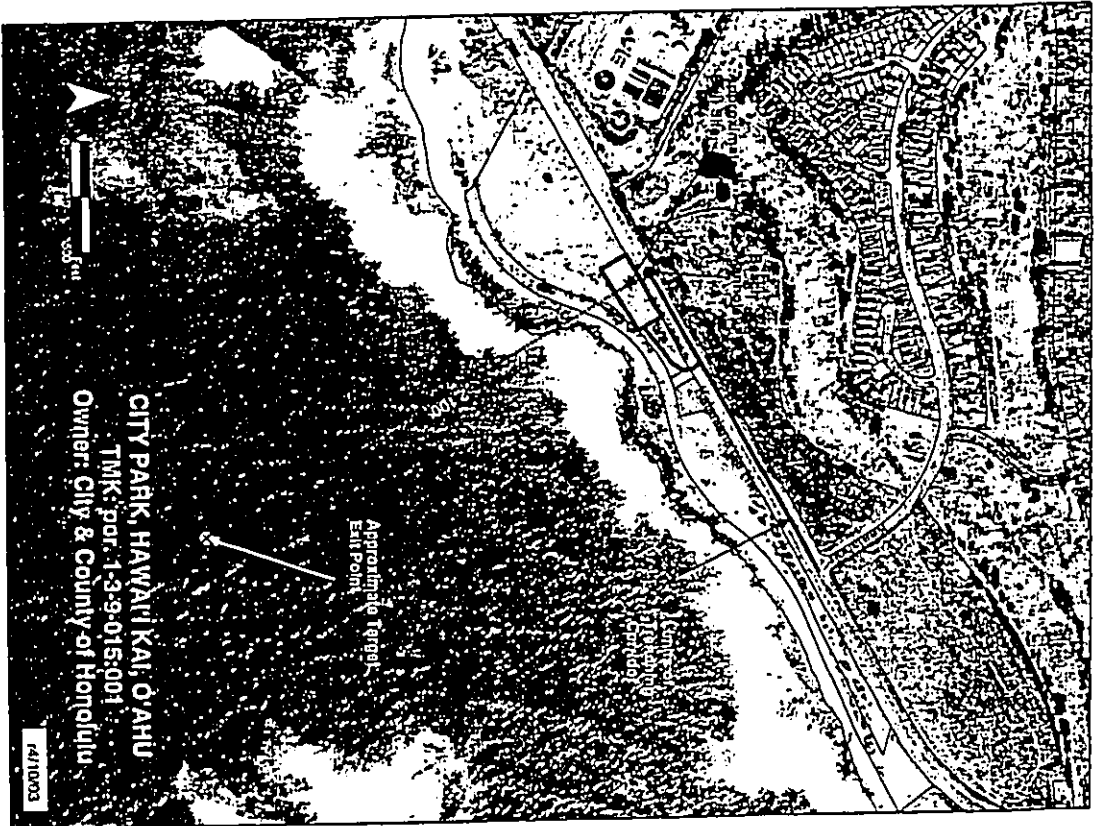
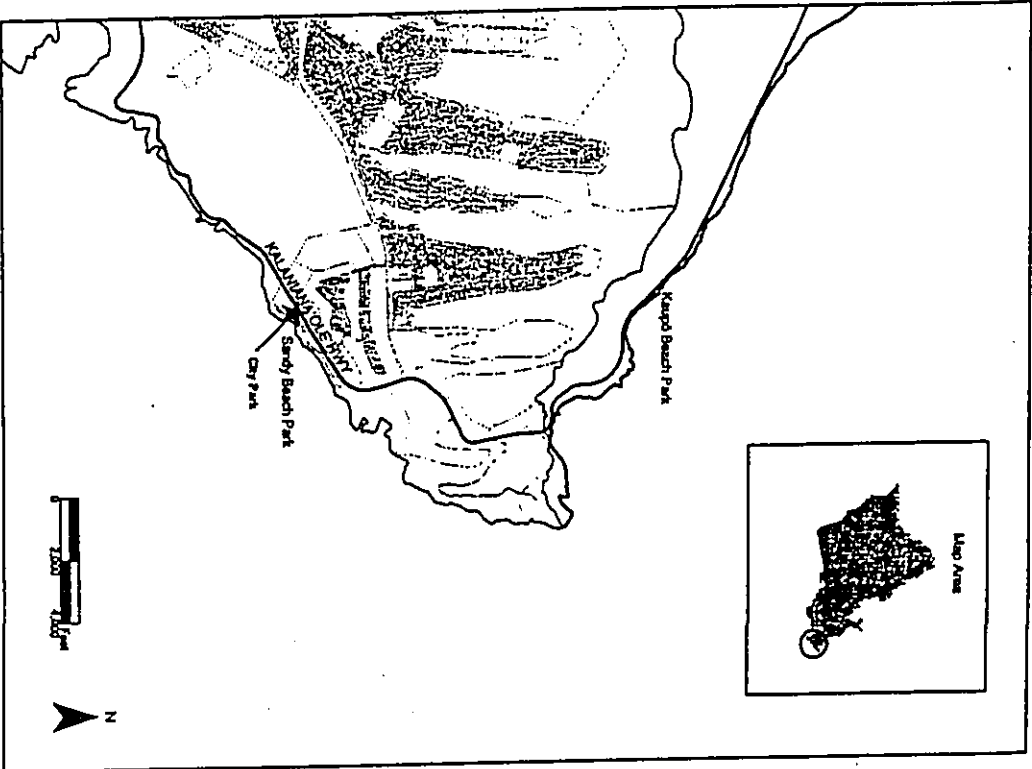
PARSONS BRINCKERHOFF QUADE & DOUGLAS INC.

Randall Urasaki, P.E.  
Project Manager

Enclosures:  
SIC Network for Hawaiian Home Lands Fact Sheet  
Maps of City Park landing site, Hawaii Kai, Oahu (2)

Over a Century of  
Engineering Excellence

Hawai'i Kai, O'ahu: Landing Site Map - City Park





Parsons  
Brinckerhoff  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

May 12, 2003

Dear Property Owner and/or Current Resident:

**Subject: Sandwich Isles Communications, Inc., Submarine Cable Project  
Request for comments on proposed construction in Kaunakakai**

Sandwich Isles Communications, Inc. (SIC), a rural telephone company headquartered in Honolulu, Hawaii, is developing a statewide telecommunications network to service the Department of Hawaiian Home Lands (DHHL). The project will provide DHHL beneficiaries with access to a modern, independent, and affordable telecommunications system. Additional information on this project is provided in the attached Fact Sheet.

In order to complete this network, SIC plans to install a submarine cable landing in Kaunakakai, in the vicinity of Onea'i Homesteads (TMK: 2-5-4-006:019). The location of this submarine cable landing site (named "Onea'i Homesteads") is shown on the attached maps. Construction will start after the environmental review process is completed. Hours of construction activity may vary from 6 to 24 hours a day and last one to three months. The cables will be installed underground, using a technique called horizontal directional drilling, which would minimize ground disturbance.

If you have any questions or concerns, please contact me at the following address:

Randall Urasaki  
Parsons Brinckerhoff Quade & Douglas, Inc.  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

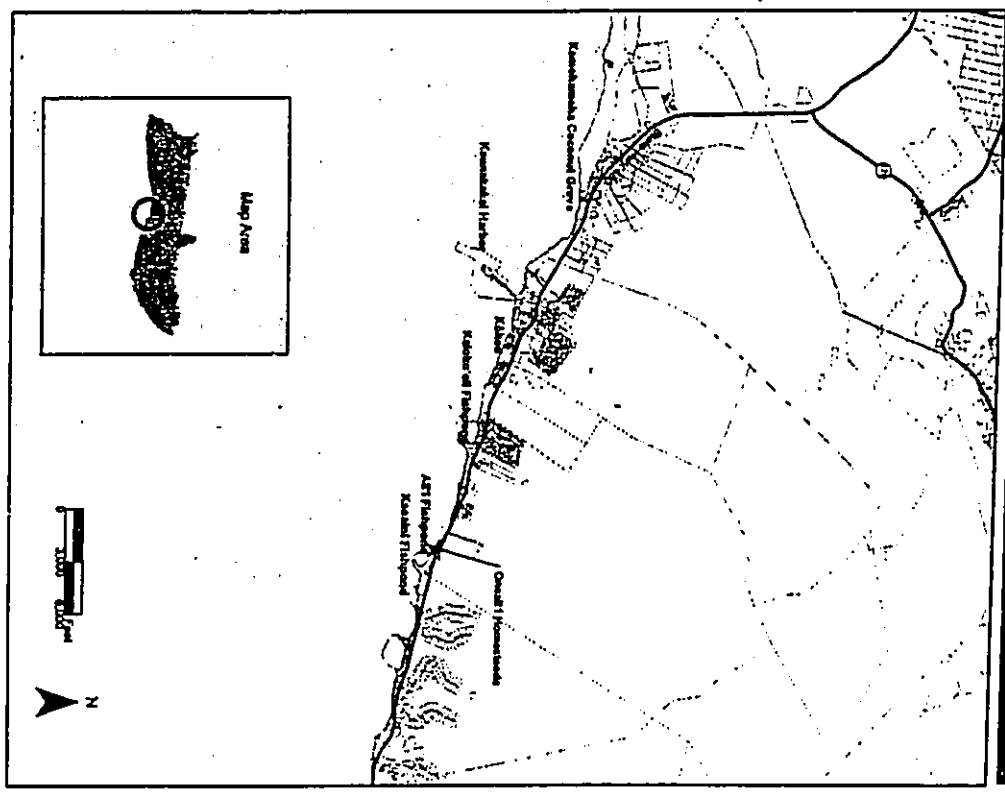
Comments may also be sent by fax to (808) 528-2388 or email at [urasaki@pbwvqd.com](mailto:urasaki@pbwvqd.com). All comments received will be included and addressed in the Draft Environmental Assessment (Draft EA) currently being prepared. Your comments will be most useful to us if received within one month of your receipt of this letter. The Draft EA will be made publicly available when completed.

Mahalo,  
**PARSONS BRINCKERHOFF QUADE & DOUGLAS INC.**

Randall Urasaki, P.E.  
Project Manager

Enclosures:  
SIC Network for Hawaiian Home Lands Fact Sheet  
Maps of Onea'i Homesteads landing site, Kaunakakai, Molokai (2)  
Over a Century of  
Engineering Excellence

**Kaunakakai, Molokai: Landing Site Map - Onea'i Homesteads**





Parsons  
Brinckerhoff  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

May 12, 2003

Dear Property Owner and/or Current Resident:

**Subject: Sandwichee Isles Communications, Inc., Submarine Cable Project**  
**Request for comments on proposed construction in Lahaina**

Sandwichee Isles Communications, Inc. (SIC), a rural telephone company headquartered in Honolulu, Hawaii, is developing a statewide telecommunications network to service the Department of Hawaiian Home Lands (DHHL). The project will provide DHHL beneficiaries with access to a modern, independent, and affordable telecommunications system. Additional information on this project is provided in the attached Fact Sheet.

In order to complete this network, SIC plans to install a submarine cable landing in Lahaina, in the vicinity of Waikuli (TMK: 2-4-5-021:015). The location of this submarine cable landing site (named "Waikuli") is shown on the attached maps. Construction will start after the environmental review process is completed. Hours of construction activity may vary from 6 to 24 hours a day and last one to three months. The cables will be installed underground, using a technique called horizontal directional drilling, which would minimize ground disturbance.

If you have any questions or concerns, please contact me at the following address:

Randall Urasaki  
Parsons Brinckerhoff Quade & Douglas, Inc.  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

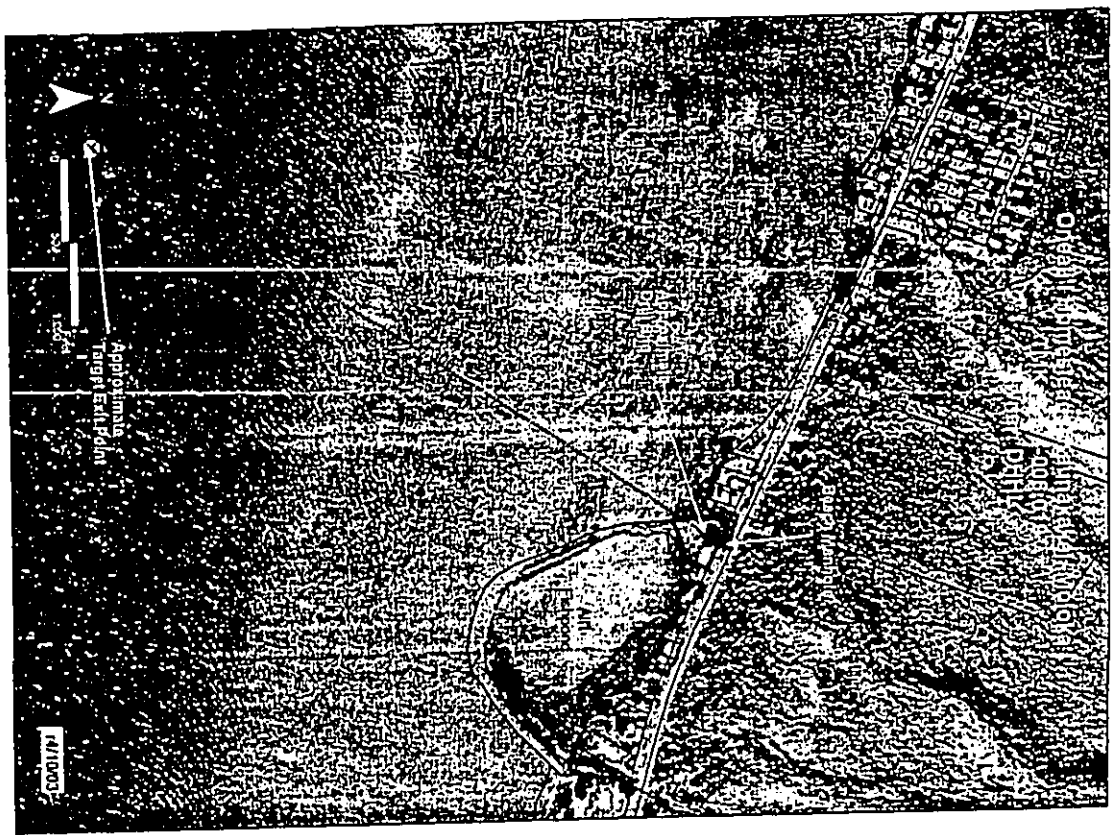
Comments may also be sent by fax to (808) 528-2388 or email at [urasaki@pbworld.com](mailto:urasaki@pbworld.com). All comments received will be included and addressed in the Draft Environmental Assessment (Draft EA) currently being prepared. Your comments will be most useful to us if received within one month of your receipt of this letter. The Draft EA will be made publicly available when completed.

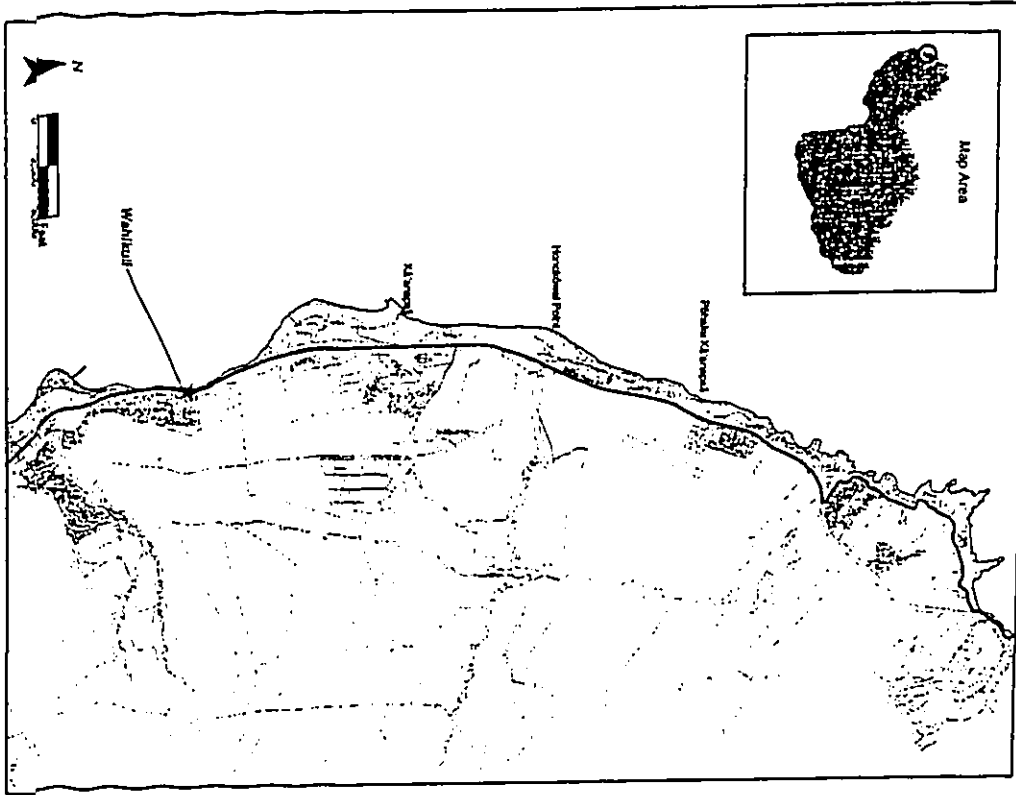
Mahalo,  
**PARSONS BRINCKERHOFF QUADE & DOUGLAS INC.**

Randall Urasaki, P.E.  
Project Manager

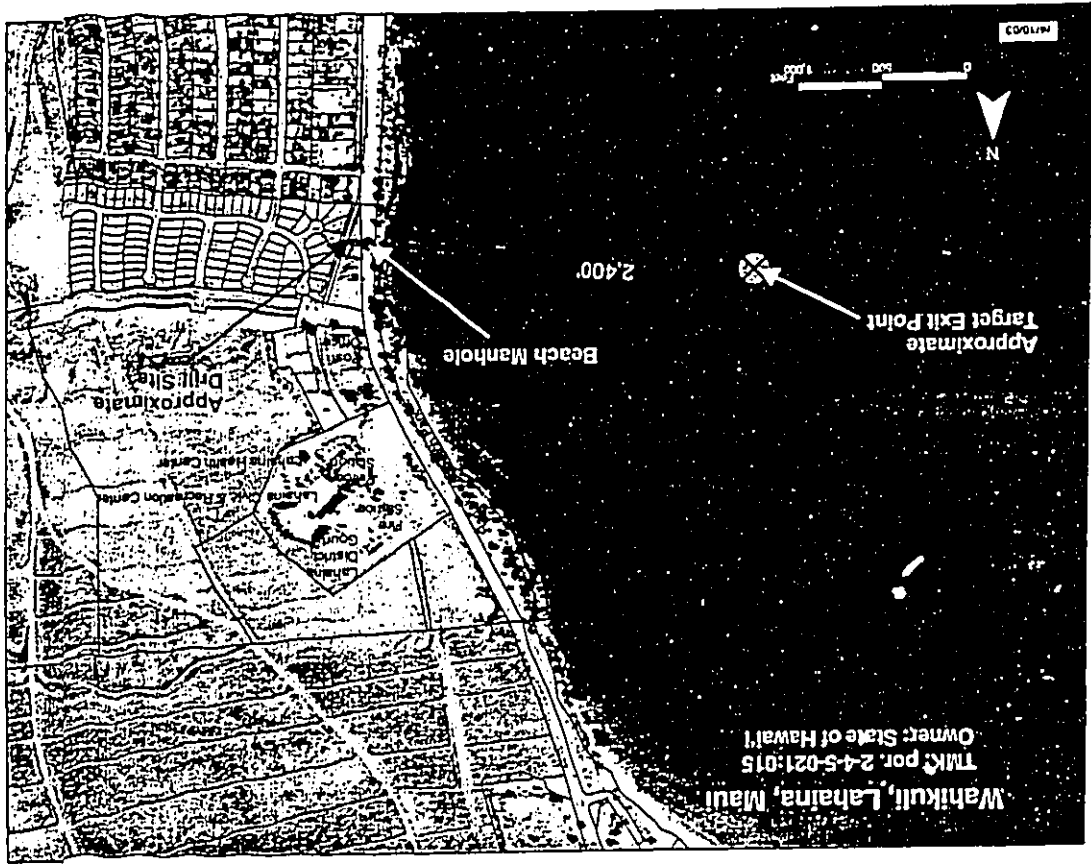
Enclosure:  
SIC Network for Hawaiian Home Lands Fact Sheet  
Maps of Waikuli landing site, Lahaina, Maui (2)

Over 3 Century of  
Engineering Excellence





Lahaina, Maui: Landing Site Map - Wahikuli





Parsons  
Brinckerhoff  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

May 12, 2003

Dear Property Owner and/or Current Resident:

**Subject: Sandwich Isles Communications, Inc., Submarine Cable Project  
Request for comments on proposed construction in Mākena**

Sandwich Isles Communications, Inc. (SIC), a rural telephone company headquartered in Honolulu, Hawaii, is developing a statewide telecommunications network to service the Department of Hawaiian Home Lands (DHHL). The project will provide DHHL beneficiaries with access to a modern, independent, and affordable telecommunications system. Additional information on this project is provided in the attached Fact Sheet.

In order to complete this network, SIC plans to install a submarine cable landing in Mākena, in the vicinity of Po'olenalena Park (TMK pos. 2-2-1-007-072). The location of this submarine cable landing site (named "Po'olenalena Park") is shown on the attached maps. Construction will start after the environmental review process is completed. Hours of construction activity may vary from 6 to 24 hours a day and last one to three months. The cables will be installed underground, using a technique called horizontal directional drilling, which would minimize ground disturbance.

If you have any questions or concerns, please contact me at the following address:

Randall Urasaki  
Parsons Brinckerhoff Quade & Douglas, Inc.  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

Comments may also be sent by fax to (808) 528-2368 or email at [urasaki@pbworld.com](mailto:urasaki@pbworld.com). All comments received will be included and addressed in the Draft Environmental Assessment (Draft EA) currently being prepared. Your comments will be most useful to us if received within one month of your receipt of this letter. The Draft EA will be made publicly available when completed.

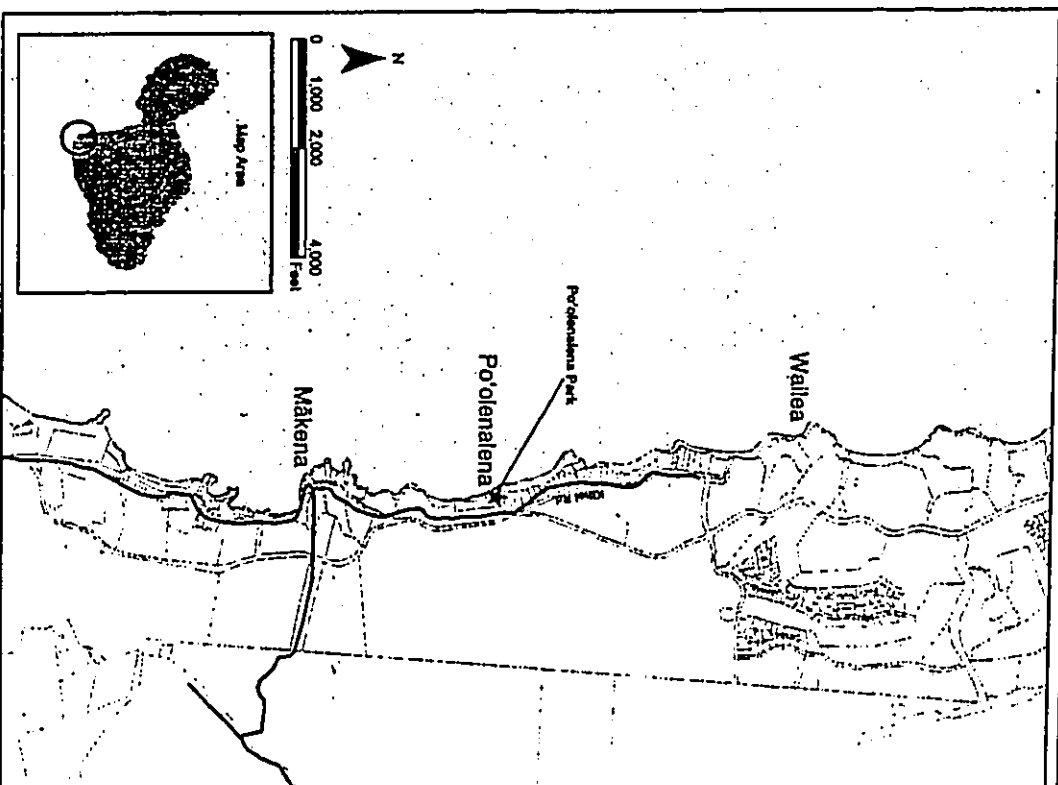
Mahalo,

PARSONS BRINCKERHOFF QUADE & DOUGLAS INC.

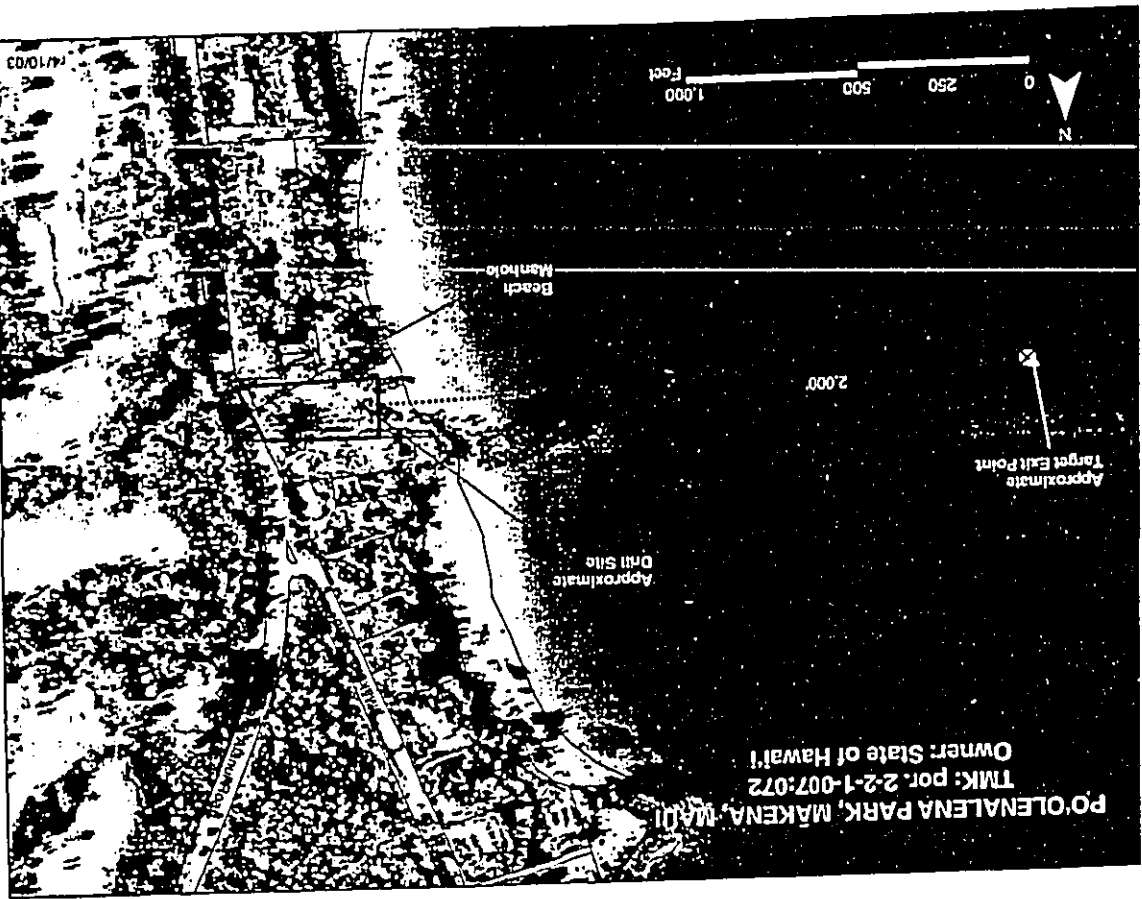
Randall Urasaki, P.E.  
Project Manager

Enclosures:  
SIC Network for Hawaiian Home Lands Fact Sheet  
Maps of Po'olenalena Park landing site, Mākena, Maui (2)  
Over a Century of  
Engineering Excellence

Mākena, Maui: Landing Site Map - Po'olenalena Park



RECEIVED AS FOLLOWS



**PARSONS**  
BRINCKERHOFF  
QUADE & DOUGLAS  
INC.

Parsons  
Brinckerhoff  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

May 12, 2003

Dear Property Owner and/or Current Resident:

**Subject: Sandwich Isles Communications, Inc., Submarine Cable Project**  
Request for comments on proposed construction in Kawahae

Sandwich Isles Communications, Inc. (SIC), a rural telephone company headquartered in Honolulu, Hawaii, is developing a statewide telecommunications network to service the Department of Hawaiian Home Lands (DHHL). The project will provide DHHL beneficiaries with access to a modern, independent, and affordable telecommunications system. Additional information on this project is provided in the attached Fact Sheet.


In order to complete this network, SIC plans to install a submarine cable landing in Kawahae, in the vicinity of Ka'awe Street (TMK por. 3-6-1-004-020). The location of this submarine cable landing site (named "Ka'awe Street") is shown on the attached maps. Construction will start after the environmental review process is completed. Hours of construction activity may vary from 6 to 24 hours a day and last one to three months. The cables will be installed underground, using a technique called horizontal directional drilling, which would minimize ground disturbance.

If you have any questions or concerns, please contact me at the following address:

Randall Urasaki  
Parsons Brinckerhoff Quade & Douglas, Inc.  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

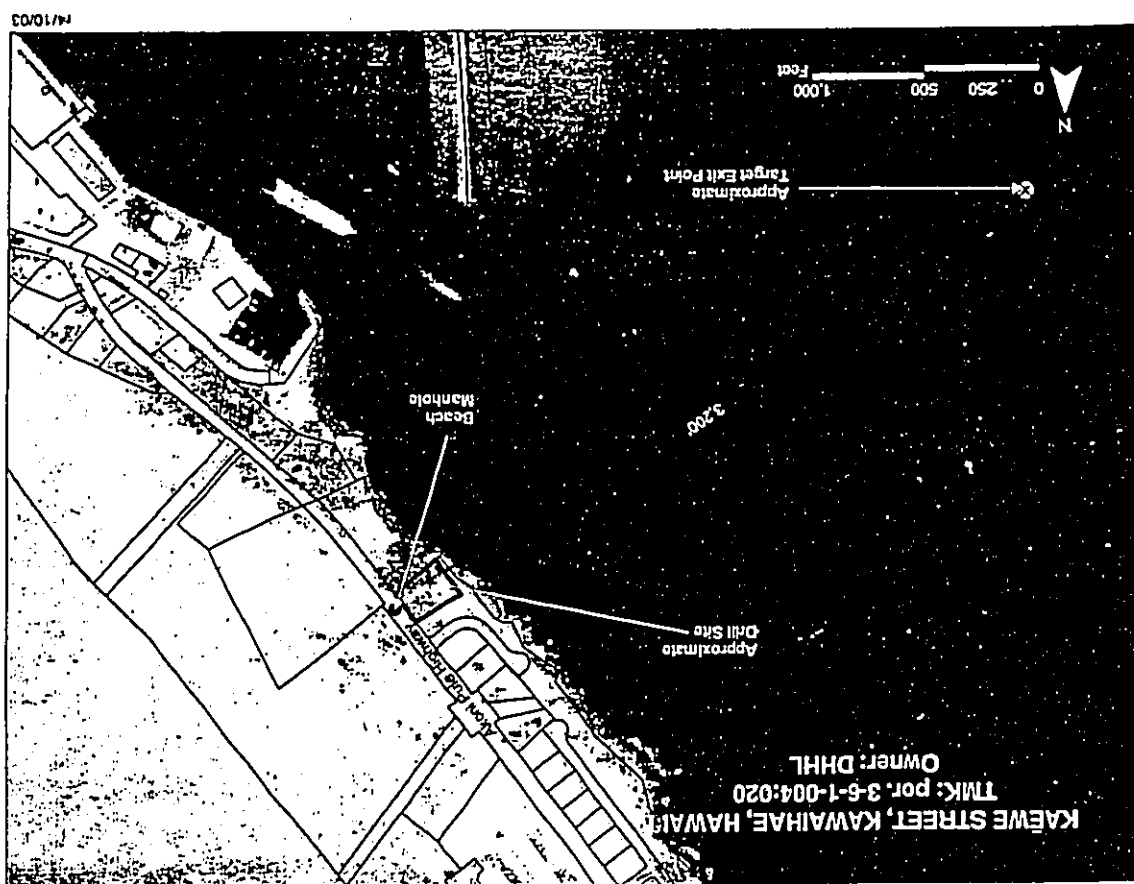
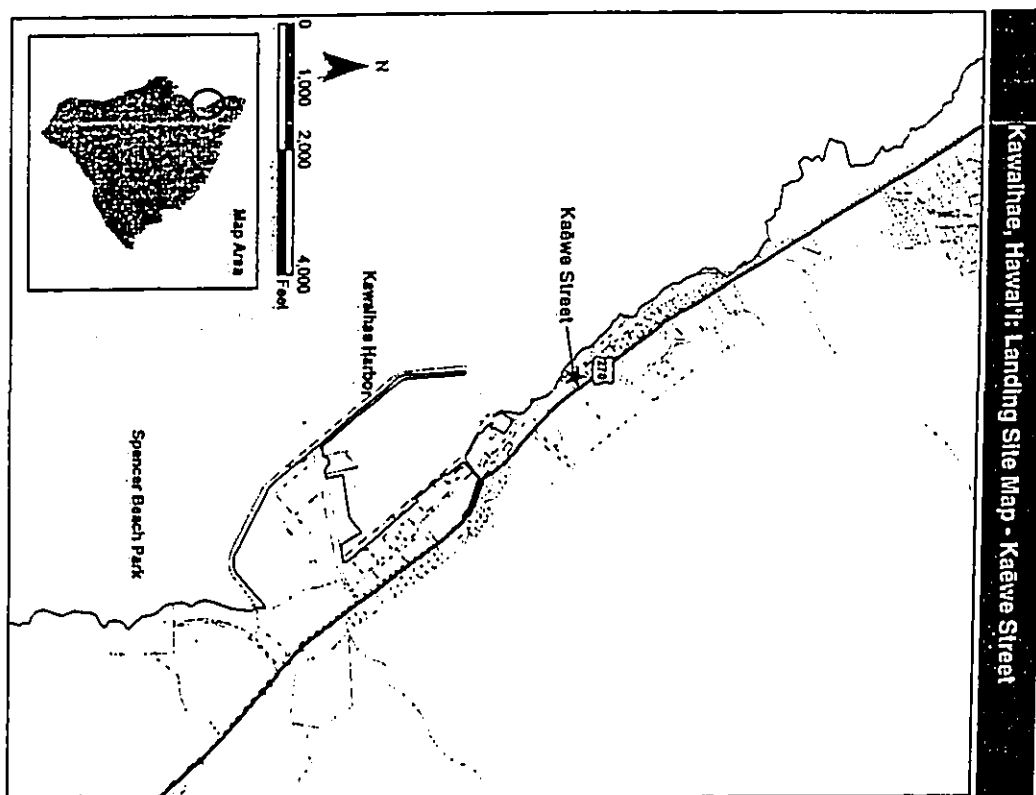
Comments may also be sent by fax to (808) 528-2368 or email at [urasaki@pbqworld.com](mailto:urasaki@pbqworld.com). All comments received will be included and addressed in the Draft Environmental Assessment (Draft EA) currently being prepared. Your comments will be most useful to us if received within one month of your receipt of this letter. The Draft EA will be made publicly available when completed.

Mahalo,  
PARSONS BRINCKERHOFF QUADE & DOUGLAS INC.

  
Randall Urasaki, P.E.  
Project Manager

Enclosures:  
SIC Network for Hawaiian Home Lands Fact Sheet  
Maps of Ka'awe Street landing site, Kawahae, Hawaii (2)  
Over a Century of  
Engineering Excellence

RECEIVED AS FOLLOWS





RECEIVED AS FOLLOWS

Makaha, O'ahu

Page 1 of 1

---

From: Urasaki, Randall M.  
Sent: Monday, May 19, 2003 7:40 AM  
To: Akhn, David  
Subject: FW: Sandwich Isles Makaha Cable Project

-----Original Message-----  
From: AhsakWahr@gmail.com [mailto:AhsakWahr@gmail.com]  
Sent: Friday, May 16, 2003 9:29 AM  
To: Urasaki, Randall M.  
Subject: Sandwich Isles Makaha Cable Project

Dear Sir

I hope this project will not disturb the colony of sea turtles that hangs out in this vicinity.

I also hope there will be NO visual impact from this project, at the beach or at the facility making the road. The existing facility is ugly enough.

Andrew Raak  
Owner #305  
Makaha Shores

5/21/2003

RECEIVED AS FOLLOWS

From: Urasaki, Randall M.  
Sent: Wednesday, May 28, 2003 10:50 AM  
To: Allyn, David  
Subject: FW: Cable Project

Original Message  
From: Paige Barber (mailto:paigebarber@hawaii.rr.com)  
Sent: Wednesday, May 28, 2003 9:26 AM  
To: urasaki@plover.net  
Subject: Cable Project

I am responding to your request for views as past-president of the Waiānāe Hawaiian Civic Club and of president of the Manakū Housing Corporation. We are in full support of the potential services made possible by SIC for native Hawaiians who are eligible for DHHL leases do not reside on DHHL managed lands and there may be confusion over who will be eligible to access this service for a discounted rate. Unless, of course, SIC does intend to serve all native Hawaiians who can prove they are 50% regardless of where they live.



Telephone Conversation Memorandum

Person's Businesscard  
Owens & Douglas, Inc  
Pacific Tower, Suite 3000  
1001 Bishop Street  
Honolulu, HI 96813  
808-531-7094  
Fax: 808-528-2389

Project: Sandwich Isles Communications      Job num: 15373      Date: 5/27/2003  
called by Ms. Tall      from: Randall Urasaki  
President of Makaha Shores Condominium Association  
Re: Assessment: Kūi Drive Landing Site - Preassessment Letter

Information obtained: Ms. Tall indicated that she has received several calls from mainland owners who received PB's preassessment letter, and therefore wanted more information regarding the project. She indicated that most owners do not live in the building, and that many of the condos are rented or leased (long and short term types).

I provided her the following information:

- SIC's project is to connect Hawaiian Home Lands properties on all islands.
- Kūi Drive landing site would connect directly to Kōkaiua, Kāua'i Landing Site.
- Ms. Tall indicated that she would inform her tenants that inquire:
  - There will be no effect on building regarding service of any kind.
  - There will be no effect on the building during construction.

action requested: None.

distribution

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

RECEIVED AS FOLLOWS

From: Urasaki, Randall M.  
Sent: Wednesday, June 11, 2003 8:19 AM  
To: Akin, David  
Subject: FW: Sandwich Isles Communications  
fy1

-----Original Message-----  
From: Toni Auld Yardley [mailto:hawaiiannews@hawaii.rr.com]  
Sent: Monday, June 09, 2003 10:42 PM  
To: Urasaki, Randall M.  
Subject: Re: Sandwich Isles Communications  
Randall Urasaki, e-mail: urasaki@pworld.com  
Parsons Brinckerhoff  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, Hawaii 96813  
Re: Response/Reply dated June 6, 2003 for mail and e-mail  
to Sandwich Isles Communications, Inc.  
Submarine Cable Project  
Pre-Assessment Consultation

Aloha Randall,  
Could you please send me information on this project, as I would like to review it for  
comment if there is still time. Mahalo, Toni Auld Yardley Lanikini Productions Cultural  
Resource Management Specialist  
Phone: (808) 595-4819  
email:hawaiiannews@hawaii.rr.com

From: Urasaki, Randall M.  
Sent: Friday, June 06, 2003 9:22 AM  
To: Coletta Sakoda  
Cc: Akin, David  
Subject: FW: Response to your inquiry

Follow up response by Ho'akea.

-----Original Message-----  
From: Joseph W Lapillio III [mailto:jlapillio@hotmail.com]  
Sent: Wednesday, June 04, 2003 10:32 AM  
To: Urasaki, Randall M.  
Subject: Fwd: Response to your inquiry  
Sorry this did not get to you earlier - I had a typo in your email address.

-----Original Message Follows-----  
From: "Joseph W Lapillio III" <jlapillio@hotmail.com>  
To: jeanite@yahoo.com, ih@hawaii.edu  
Cc: urasaki@pworld.com, jlapillio@hokaea.com  
Subject: Response to your inquiry  
Date: Tue, 03 Jun 2003 14:03:07 -1000  
Aloha, Ihl.

Mahalo for your questions relating to the Sandwich Isles Communications  
Inc., (SIC) Project. The company's mission is to provide modern  
telecommunications services to all Dept. of Hawaiian Homelands (DHHL)  
properties throughout the state including Kekaha.

As you know, SIC is presently installing underground fiber optic cables in  
the roadways from Hanalei to Kekaha. This terrestrial project will be  
connected to a submarine cable at a designated landing site area. Right now  
the landing site area SIC is considering is located at the corner of Akihoa  
Road and Kamae Highway. Pre-assessment consultation letters have been  
mailed to residents in the area and will include notification of homes  
within 500 feet of the landing site area.

Based on the agreement with DHHL and funding from the Rural Utility Service,  
SIC will provide basic phone services only to homesteaders that are  
currently unserved or under-served. The priority for SIC is to provide  
service to the new residences in the Kekaha Hawaiian Homestead. Once the  
statewide network is complete however, SIC will look at providing advanced  
telecommunications services statewide.

We have been, and will continue to meet with homesteaders and Kekaha  
residents on this project. In October, I canvassed house-to-house with  
information. We attended a DHHL community meeting in December, and have met  
with some of the officers of the Kekaha Hawaiian Homestead Association.

I am scheduling additional meetings with individuals and groups in the  
community for June and July. Any suggestions you have of names we can  
contact would be greatly appreciated. I would also like to meet with you at  
your convenience to discuss the project and solicit any additional concerns or comments  
you may have.

I hope this addresses your points satisfactorily. I am open to any further  
dialogue with you and anyone else from or interested in Kekaha.

RECEIVED AS FOLLOWS

Again, mahalo for your questions, Joseph.

MSN 8 helps eliminate e-mail viruses. Get 2 months FREE!  
<http://join.msn.com/?page=features/virus>

From: Ursaki, Randall M.  
Sent: Friday, June 06, 2003 8:27 AM  
To: Alan, David; Colette Sakoda  
Subject: FW: Reply to your correspondence

Ho'akea responded to this. Will forward response.

-----Original Message-----  
From: Ilei B [mailto:ilei@leib@yahoo.com]  
Sent: Tuesday, May 27, 2003 5:16 PM  
To: hoakes@hoakes.com  
Cc: ileib@hawaii.edu; urasaki@pcworld.com  
Subject: Reply to your correspondence  
Aloha,

Need to ask:

1. Will all those along Alaiala Rd. receive your services? It is not clear from your letter.
2. Will you be holding some sort of Kakaia community informational meeting prior to the "noisy" construction? So that we don't post unnecessary rebellious "picket sign waving"??

Thank you,  
Ilei

-----  
Ilei Benluelina  
Assistant Professor  
University of Hawaii '1-Kaunoi  
808-245-8260

Do you Yahoo?  
Yahoo! Calendar - Free online calendar with sync to Outlook(TM). <http://calendar.yahoo.com>

RECEIVED AS FOLLOWS

Page 1 of 5

From: Urasaki, Randall M.  
Sent: Friday, June 06, 2003 10:34 AM  
To: Dawn Chang (datchang@hawaii.com); 'Gai Tam'  
Cc: Aiko, David; Dahlg, Richard C. V.; Small, Perry  
Subject: FW: OPPOSITION(S) OBJECTION(S) Documented and Fwd: Thank you for your e-mail.

Dawn, Gai,  
Due to the distribution of this e-mail (see "to" line), I am forwarding this to you for your information.

-----Original Message-----  
From: Amelia Gora [mailto:hawaiihistory2002@yahoo.com]  
Sent: Friday, June 06, 2003 6:38 AM  
To: Urasaki, Randall M.; senator@akaka.senate.gov; senator@hawaii.senate.gov; nonno@hik.com;  
keakaha@hik.com; royaldor@hawaii.com; luna\_kente@hotmail.com; rph@cs.com;  
paakalana@msn.com; john.maguire@frfr.bureau@pca-pca.org; rodriguez@hawaii.com;  
zlahn@hawaii.com; ush@ebnet.com  
Cc: hawaiihistory@yahoo.com  
Subject: OPPOSITION(S) OBJECTION(S) Documented and Fwd: Thank you for your e-mail

June 6, 2003

Randall Urasaki, e-mail: [urasaki@pbworld.com](mailto:urasaki@pbworld.com)  
Parsons Brinckerhoff  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, Hawaii 96813  
Re: Response/Reply dated June 6, 2003 for mail and e-mail

to Sandwiche Isles Communications, Inc.  
Submarine Cable Project  
Pre-Assessment Consultation  
Dated May 8, 2003  
Greetings,  
6/11/2003

Page 2 of 5

I, Amelia Kuulei Gora, one of Kamemehameha's descendants, a Royal Person not subject to the laws, hereby document OPPOSITION to your proposed submarine cables and cable landing areas. I am also documenting OPPOSITION to the U.S. Department of Agriculture Rural Utilities Service (RUS) who "is providing loan assistance for the project." Am in OPPOSITION to the Federal and State environmental review because they are NOT GRANTED JURISDICTION in Hawaii.

As you may already know, Hawaii is OCCUPIED by Americans backed by the United States since the wrongful delimitation of Queen Liliuokalani in 1893. Queen Liliuokalani maintained that the United States BREACHED THE Law OF Nations and documented that the claimed Provisional "government" (Turned Republic of Hawaii, then Territory of Hawaii, then State of Hawaii) WITH DOCUMENTED OPPOSITIONS) was NEITHER *de facto* NOR *de jure*....meaning it was an ENTITY of American businessmen, bankers, documented conspirators or TERRORISTS, an updated term used in letters to the former President William Clinton and books dating 2001 by myself with my 16+ years of research....23 books have been written to date.

Regarding conspirators/TERRORISTS, an updated term: It was in 2002 since 911, that the present President George Bush began using the term TERRORISTS. Since 1893, Hawaii's Queen maintained conspirators opened to assume Hawaii. Former President William Clinton signed Public Law 103-150 recognizing the criminal acts of the time with a disclaimer. Research shows that a FULL DISCLOSURE was NOT MADE in the Public Law 103-150 pushed by Senator Inouye, et al. Who also stated that no ramifications would result from the apology.

It appears that the move to have the Akaka Bill with companion bills is set in place, currently in Congress for approval with OPPOSITIONS by myself and others.

It is the intention of the bill to fully transfer all the lands to the Federal Government and disregarding all the ALLODIAL DEEDS, Kingdom of Hawaii's, a Monarchical Government, with Crown Lands, whose OWNERS EXIST, with various Alii/Ai'i Nui lands, and Sovereigns as people or Rights of Tenants lands. Researchers have also found that the intentions to impound RESEARCHERS in genealogies and land research, etc. would be made as well. OPPOSITIONS are maintained via this letter which will also be e-mailed and mailed to both Senators AKAKA and INOUE.

Further note that documented conspirators/TERRORISTS CANNOT USE a term that is already in use. The term has been documented and used since the letter to former President William Clinton since December 11, 2000. Since that date, therefore, the term "TERRORISTS" an updated word for "conspirators" applies to the Americans/businessmen et al. (includes descendants of such) and their government, the United States, whose Presidents have wrongfully assumed claims to interest in Hawaii which was recognized by J.P. MORGAN, CHARLES REED BISHOP and FRIENDS, et al. BANKERS, the ENTITY and who supported United States Presidents since 1893 or the period of the illegal "overthrow", in actuality the "wrongful delimitation" of Hawaii's Queen Liliuokalani.

In the December 11, 2000 letter to former U.S. President William Clinton, a claim was sent to maintain our families and Kanaka maoli claims to ANCIENT 1,650+ years old Hawaii, our Hawaiian Archipelago, which includes all 133 islands, coral reefs, fishes; etc.

United States President Clinton had announced that the coral reefs of the Northwestern Hawaiian Islands would receive a broad protection and a long-term program to protect coastal areas around the country.

The "seamounts" of Kauai northwest to Kure Atoll for the purposes of federal wildlife refuges would create a marine counterpart for the parks and wilderness areas. Under an administrative protection the

6/11/2003

RECEIVED AS FOLLOWS

Page 3 of 5

claim was that Clinton would order Federal agencies to protect the Hawaii waters permanently. The letter was sent as an **OPPOSITION/OBJECTION** to the U. S. President Clinton and many others, documented in my history book **CHRONOLOGICAL HISTORY OF HAWAII, ABROAD, AND THE UNITED STATES** and sold to the public since 2001.

A letter to President George Bush was sent on February 23, 2001:

"My name is Amelia K. Gora, one of Kamehameha's descendants. 133 islands remain claimed by our families, Kamehameha's descendants. The coral reefs are included as noted in the last correspondence to President William Jefferson Clinton/Bill Clinton."

It was American Minister Daggit in Hawaii who sent official dispatches to Washington and stated:

"With the death, a few months since, of Mrs. Bernice Pauahi Bishop, the Kamehameha family, so far as lineage, the Sovereign right of the existing dynasty, which stands alone, at last, as the sole representative, unless very remotely, of the Hawaiian rulers of the past."

"The Minister in Hawaii, Daggit, FAILED TO DO HIS HOMEWORK and made his **COMMENTS/OPINIONS** about Kamehameha's families, believed the **TERRORISTS/ AMERICAN TERRORISTS** in Hawaii creating a precedence, an erroneous precedence and sent **ERRONEOUS** information to Washington.

There are many other areas of questions, irresponsibilities, faults, criminal malfeasance that have occurred in Hawaii before and after the wrongful dehumanization/overthrow of Queen Liliuokalani, who, by the way was **NOT PAID THE YEARLY AMOUNTS REGULARLY**. (Correction: according to Queen Liliuokalani's documents on file at the Archives, Honolulu, Hawaii, she maintained that she was **NOT PAID** at all....also see her book, **HAWAII'S STORY** by Hawaii's Queen Liliuokalani).

**OPPOSITION** to Statehood was made by Mr. Harold Cahoon who claimed to be descended from Kamehameha II through KEAKA (W). I too am a descendant of KEAKA(W). The following is submitted for your records."

Note: Letters to the Japanese Consulate (included genealogies of those who documented the claims in our historical records and my families genealogies) for the ramming of the **EHIME MARU** by the United States and other attachments were sent to President Bush in this letter.

The claim that was maintained in the letter to former President Clinton and current President Bush follows:

"The ownership and jurisdiction recognized belong to the Kingdom of Hawaii (de jure) in reference to the coral reefs, fishes, etc. surrounding our Hawaiian archipelago which is part of the hereditary rights of Kamehameha's descendants; and Kanaka maoli. The konohiki/caretakers are regarded the rights of "Pitcairny". Ref: Archives; Native Testimony Volume 3 Part 2 dated March 31, 1853; Organic Act; Fundamental Law of Hawaii 1840-1900 Preface to the Laws of 1842, page VII; The First Constitution of Hawaii Granted by Kamehameha III October 8, 1840; Laws of 1842 pgs. 21-23 "Re free fishing grounds" "Respecting the taboo fishing grounds"; "But no restrictions whatever shall by any means be laid on the sea without the reef even to the deepest ocean."

The law of the Sea was signed by 117 nations excepting the United States. See **HAWAII**

6/11/2003

Page 4 of 5

#### CONSTITUTION GRANTING LAWS, LAND DIVISIONS AND AWARDS by Louis K. Agard Jr.

So, with that I, Amelia Kuulei Gora, one of Kamehameha's descendants, a Royal Person not subject to the laws, hereby maintain **OPPOSITIONS/OBJECTIONS** to all documented above. **OPPOSITIONS** include the "AKAKA" bills and companion bills in Congress, **OPPOSITIONS/OBJECTIONS** to the "President's of the United States" claims to Hawaii/Hawaiian Archipelago, including 133 islands (Crown Lands, etc.), coral reefs, fishes, etc. surrounding our Hawaiian Archipelago.

For the purpose of this communication, I, Amelia Kuulei Gora, one of Kamehameha's descendants, a Royal Person not subject to the laws hereby maintain **OPPOSITIONS/OBJECTIONS** to the "Submarine Cable Project of the Sandwich Isles Communications, Inc. (SIC) a rural telephone company headquartered in Honolulu, Hawaii;" in "developing a Statewide Telecommunications Network" through funding of the "U.S. Department of Agriculture Rural Utilities Service (RUS)" via "loan assistance" for a "project that would connect the major Hawaiian Islands by submarine telecommunications cables" to be reviewed by the "Federal and State environmental review processes."

Jurisdiction IS NOT GRANTED to the U.S.

Federal and State "government" entity and

Maintaining documented **OPPOSITIONS/**

**OBJECTIONS** and now

Documenting **OPPOSITIONS/OBJECTIONS**

To these matters:

Amelia Kuulei Gora, one of

Kamehameha's descendant, a Royal

Person not subject to the laws

e-mail: [hawaiiandhistory@yahoo.com](mailto:hawaiiandhistory@yahoo.com) or

[hawaiiandhistory2002@yahoo.com](mailto:hawaiiandhistory2002@yahoo.com)

website:

<http://myweb.complaint.com/GORAB803Z>

address:

P.O. Box 893753

Mililani, Hawaii 96789

Or

6/11/2003

RECEIVED AS FOLLOWS

95-009 Kuahelehi Avenue #108

Mililani, Hawaii 96789

e-mailed to: Senator Akaka and for U.S. President George W. Bush

Senator Inouye

Other interested persons/parties

Page 5 of 5

---

Note: forwarded message attached.

Do you Yahoo?

Free online calendar with sync to Outlook(TM).

6/11/2003

F T T T T T S S F F S S - 4 5 F T T T T T 0 0 0 0 0 0 0 0 0 0 0 0 0 0

RECEIVED AS FOLLOWS

Kekaha, Kaua'i



1111 Puuopae Rd. Kapaa, HI 96746 • 822-1451  
May 17, 2003

Randall Urasaki, P. E.  
Project Manager  
PARSONS BRINCKERHOFF QUADE & DOUGLAS, INC.  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

Re. Sandwich Isles Communications, Inc. (SIC)  
Submarine Cable Project

Dear Mr. Urasaki:

Thank you for your letter dated May 08, 2003 requesting comments or suggestions appertaining to subject. I was surprised that my name and address was available for such a request. Nevertheless, I am grateful for this opportunity to express a couple of concerns at the outset of the EA process.

One question: Is how were the proposed cable landing sites selected? e.g. Kekaha, Makaha, Kawaihae, etc. resemble remoteness somewhat as compared to the "usual business" sites closer to the bustling of its cities such as Lihue or Hilo or Ho'olehua, etc. If these chosen sites are the best to benefit DHTL and its beneficiaries, would these cables serve all DHTL residential sites on every island? Please clarify. They would include DHTL sites as Anahole, Papakolea, Kaunakahi, and so on?

Also, as the drilling gets closer to the reef areas would these cable lines be in complete regulation with no apparent danger to reef fish habitats or marine life that the people would go to get food for their families. Please confirm.

I am writing in an expeditious way since 30 days from the date of your letter I would be away from Hawaii. If I do have more concerns, I hope you will receive them later than the 30 days time constraint placed.

I await your response to my first two queries.

Sincerely,

Beverly H. S. L. A. Muraoka  
Kumu Hula



RECEIVED AS FOLLOWS

Appendix 2  
**Agency Coordination Activities**



**Final Environmental Assessment/  
Finding of No Significant Impact**  
Submarine Fiber-Optic Cable Project

RECEIVED AS FOLLOWS

## APPENDIX 2

This Appendix contains copies of relevant correspondence for consultation and coordination activities that have been conducted to date. Project information in the form of maps and fact sheets have been repeatedly distributed as attachments to such correspondence. In order to cut down on such repetition in this appendix, Table A.2-1 describes the letters sent to the various agencies, and the attachments that accompanied them. Copies of the attachments presented in the table are found in the pages that follow. In cases where the attachment to the letter is unique, the attachment has been omitted from the table and is presented with the letter.

RECEIVED AS FOLLOWS

TABLE A.2-1  
COORDINATION CORRESPONDENCE AND ATTACHMENTS

	Proposed Cable Landing Sites & Project Area	Horizontal Directional Drilling (HDD) Technology	Cable Routes & Marine Sanctuary	Kekaha, Kauai: Landing Site Map - 'Akaloa Road	'Akaloa Rd, Kekaha, Kauai' - Aerial Photo	Makaha, Oahu: Landing Site Map - Kill Drive	Kill Dr., Makaha, Oahu - Aerial Photo	Hawaii Kai, Oahu Landing Site Map - City Park	City Park, Hawaii Kai, Oahu - Aerial	Kaunakakai, Molokai: Landing Site Map - Oneali Homesteads	Oneali Homesteads, Kaunakakai, Molokai - Aerial Photo	Lahaina, Maui: Landing Site Map - Wahikuli	Wahikuli, Lahaina, Maui - Aerial Photo	Makaha, Maui: Landing Site Map - Po'olenalena	Po'olenalena Park, Makaha, Maui - Aerial	Kawaihae, Hawaii: Landing Site Map - Kaewa Place	Kaewa Place, Kawaihae, Hawaii - Aerial Photo
February 26, 2003 letter from the U.S. Department of Agriculture, Rural Utility Service (RUS) to the USFWS	X	X															
April 22, 2003 letter from Parsons Brinckerhoff (PB) to the USFWS			X													X	
February 26, 2003 letter from the RUS to NMFS	X	X															
DATE, 2003 letter to federal and State Sanctuary Co-Managers																	
May 7, 2003 letter from PB to the Division of Aquatics, DLNR		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
May 7, 2003 letter from PB to the Division of Forestry and Wildlife, DLNR		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
February 11, 2003 letter from PB to the SHPD	X	X															
May 7, 2003 letter from PB to SHPD			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
April 16, 2003 letter from PB to CWRM	X																

RECEIVED AS FOLLOWS

	Proposed Cable Landing Sites & Project Area	X	Horizontal Directional Drilling (HDD) Technology		Cable Routes & Marine Sanctuary		Kekaha, Kauai: Landing Site Map - Aklaloa Road		'Aklaloa Rd, Kekaha, Kauai - Aerial Photo		Makaha, Oahu: Landing Site Map - Kill Dive		Kill Dr., Makaha, Oahu - Aerial Photo		Hawaii Kai, Oahu Landing Site Map - City Park		City Park, Hawaii Kai, Oahu - Aerial		Kaunakakai, Molokai: Landing Site Map - Onea'i Homesteads		Onea'i Homesteads, Kaunakakai, Molokai - Aerial Photo		Lahaina, Maui: Landing Site Map - Waihi		Waihi, Maui - Aerial Photo		Makaha, Maui: Landing Site Map - Po'olenalena		Po'olenalena Park, Maui - Aerial		Kaunakakai, Maui: Landing Site Map - Aerial		Kaunakakai, Maui: Landing Site Map - Aerial Photo		Kaunakakai, Maui: Landing Site Map - Aerial Photo				
May 23, 2003 letter from PB to NRCS	X	X																																					
May 7, 2003 Letter from PB to USACE	X	X																																					
May 8, 2003 letter from PB to DLNR	X	X																																					
May 23, 2003 letter from PB to DLNR Land Division	X	X																																					
January 8, 2003 letter from PB to OP	X	X																																					
May 7, 2003 letter from PB to OP	X	X																																					
May 7, 2003 letter from PB to Kauai Planning Department	X	X																																					
May 7, 2003 letter from PB to DPP	X	X																																					
May 7, 2003 letter from PB to the Maui County Department of Planning	X	X																																					
May 7, 2003 letter from PB to the County of Hawaii Planning Department	X	X																																					

Final Environmental Assessment /  
Finding of No Significant Impact

A.2-3

Submarine Fiber-Optic Cable Project  
April 2004





**Sandwich Isles Telecommunications, Inc.**

**ATTACHMENT 2**

**Sandwich Isles Telecommunications System:  
Horizontal Directional Drilling (HDD) Construction Technology**

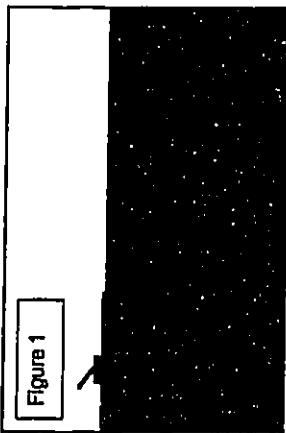
The submarine cable landfalls will be constructed using equipment and technology that has been selected to minimize disruption to the environment and neighboring communities. The construction technique will employ "horizontal directional drilling" (HDD).

HDD is an established method of installing underground pipes and conduits where surface disturbance need to be minimized. HDD has been previously used in Hawaii and elsewhere. A remotely-controlled drill head bores through the soil or rock producing a small six-inch diameter hole into which a metal or plastic conduit and fiber optic cable are later placed. The only surface disturbance occurs where the underground bore begins and ends. As new equipment is developed, the length of the tunnel that is technically feasible increases, and the range of subsurface conditions to which the HDD technology can be applied increases.

The basic steps and characteristics of the HDD landfall installation proposed for this project are as follows:

1. Onshore ground disturbance at the landing site will be confined to a work area of approximately one acre or less that provides space for drilling activities. The construction area includes an entrance pit, material storage areas, centrifuges, tanks, and storage for excavated material and other equipment, such as several large trailer or mobile units (typically three units).
2. The only excavation required will occur within the onshore work area to create an entrance pit for the drilling. This pit becomes the point of entry for the drill head. The pit typically measures no larger than 10 feet by 20 feet. After construction the excavation pit will be backfilled. The excavated material will be stockpiled on site, and used as the backfill or disposed at a landfill. Best Management Practices (BMP) will be designed and implemented to control erosion from this temporary stockpile and the entire work area. Any excess material after backfilling will be disposed onshore in accordance with applicable requirements. The pit area may be used as the site for construction of a subsurface transition or beach manhole.

3. Starting at the entrance pit, the removable drill head commences boring towards the ocean, as shown in Figure 1. A typical drilling rig is shown in Figure 2. This unit drives a rotating shaft, or drill rod, with a cutter head mounted at the end. Sections of pipe are added at the pit to push the drill head along. Another machine positions sections of drill rod to be added successively as the hole is extended. The angle of drilling will be no more than 12 degrees from horizontal. The drill shaft casing will



Page 1 of 4



**Sandwich Isles Telecommunications, Inc.**

**ATTACHMENT 2**

become the casing conduit for the fiber optic cables to be installed later. The HDD process thereby creates a guided, rigid, casing-lined underground corridor that can penetrate different types of soil and rocks to an exit point on the ocean floor.

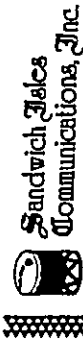


Figure 2

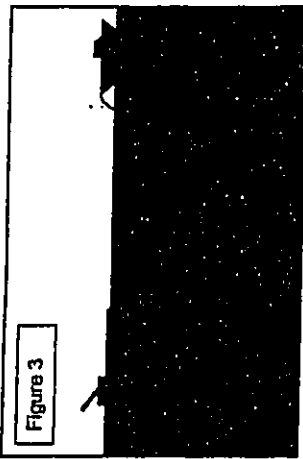
4. As the drill head bores its way underground, soil and rock is ground up and must be removed to create the hollow subterranean bore. The excavated material is called "cuttings". During the drilling operations, a slurry or "drilling mud," consisting of special clay (bentonite) and water is injected into the hole to remove cuttings, lubricate the pipe, reduce frictional drag, and cool the drill bit. To minimize discharges and recycle the slurry, the slurry and cuttings are pumped to a centrifuge (called a desander or drilling fluid/mud handling tank) where the cuttings are separated from the slurry. The cuttings are disposed at a local landfill in accordance with all applicable regulations, and the slurry is recycled and re-injected into the bore hole.
5. Additional site equipment includes control stations, pumps, generators, front-end loaders, and trucks.
6. The drill head progresses to the underwater "pop-out point" (POP) which will be located at approximately 60 feet below mean sea level (msl) or deeper. This depth has been selected to reduce the potential for damage to the undersea cables from surface wave action.
7. Before reaching the POP, the bore is flushed with water to extract all of the slurry back to the onshore centrifuge, and the slurry in the bore is replaced with water. Therefore, when the drill head "pops out" into the ocean, there will be no discharge of slurry or cuttings into the ocean. A probe located near the drill head allows its position to be monitored at all times. At the POP, a diver will remove the drill head. The drill casing becomes the conduit for the fiber optic cable.

Page 2 of 4

RECEIVED AS FOLLOWS

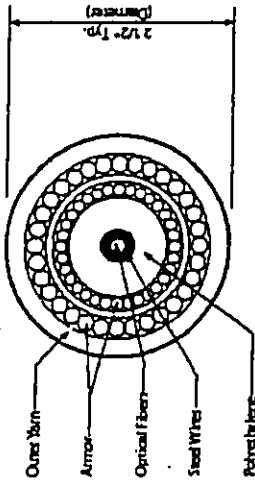


8. Once onshore construction is completed, a diver inserts the fiber optic cable from a nearby ship into the casing. The cable is then pulled back toward the entrance pit as it spools off of reels on board the ship (see Figure 3).



9. The submarine cable is laid by ship along a pre-determined cable route between islands. A cross-sectional diagram of the type of armored cable that will be used is shown in Figure 4. The ocean routes are selected to minimize length, interactions with other pre-existing cables, and encroachments into environmentally sensitive offshore areas, as well as to cross geologically stable areas. The cable is made of non-toxic armor materials and is not expected to have any adverse effect on water quality and/or marine biology. The SIC system has been designed to avoid the use of submarine boosters or repeaters (equipment to maintain signal strength on long cable segments). Therefore, no harmful environmental impacts are anticipated from laying cables on the ocean bottom and operating these cables once the system is completed.

DOUBLE ARMORED FIBER OPTIC SUBMARINE CABLE\*  
(100-200 Meter Depth)



\* Size, material & depth may vary depending on manufacturer.



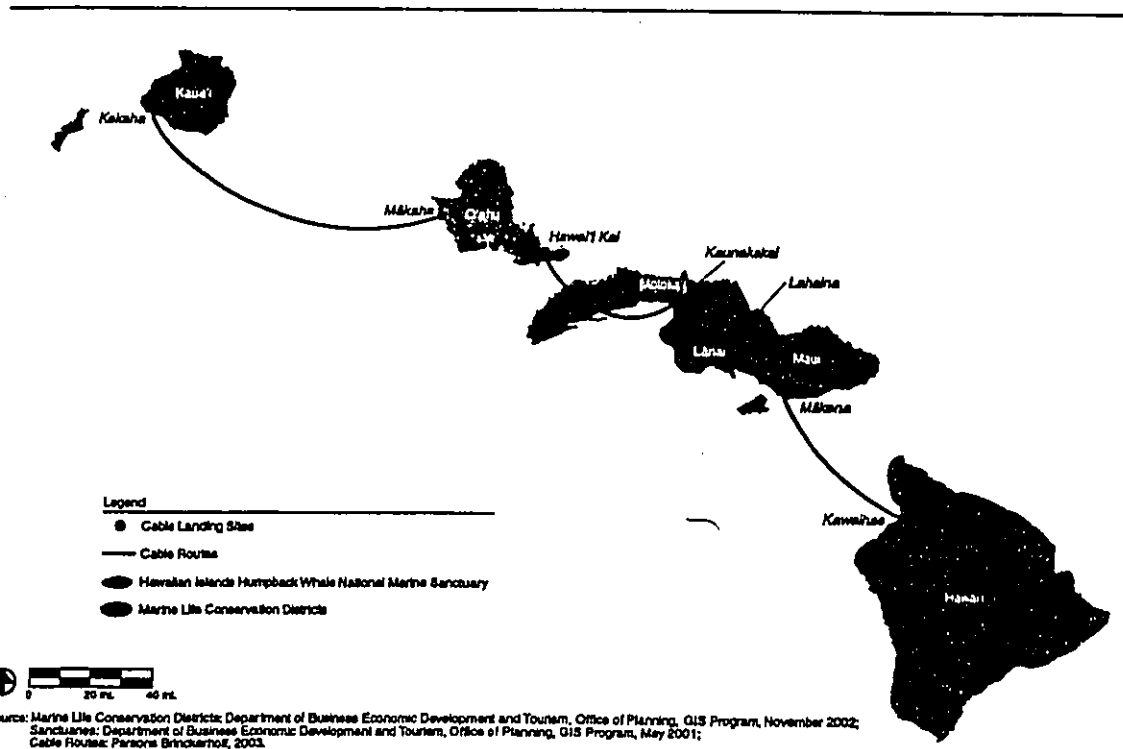
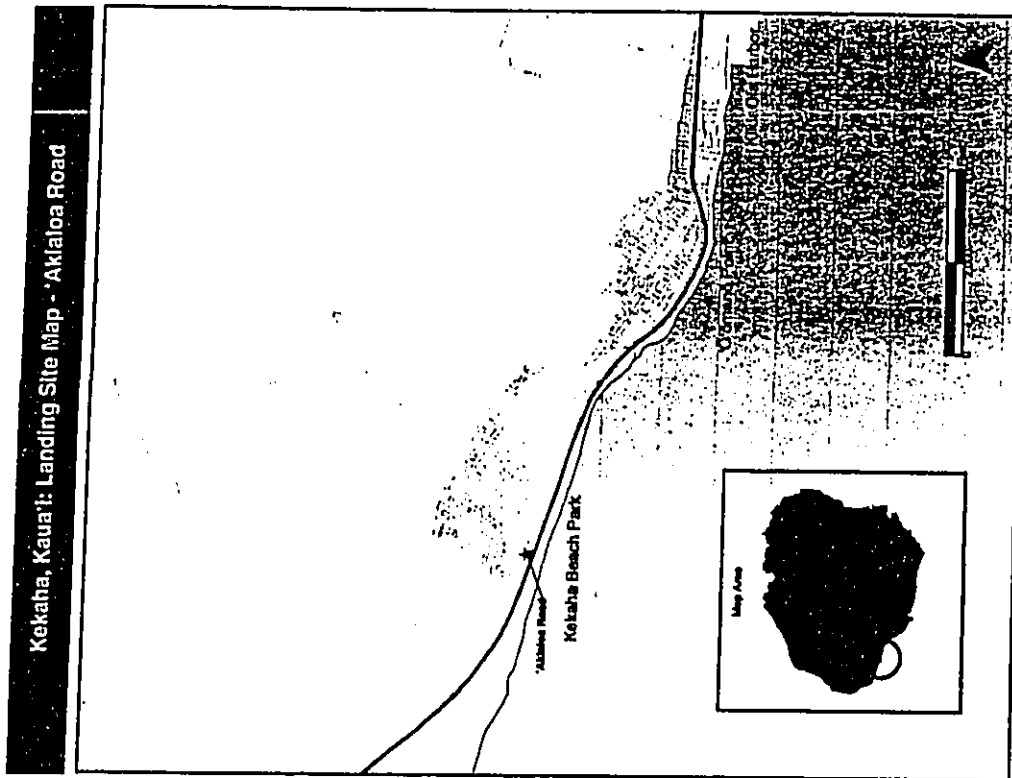
Environmental Advantages of HDD

In comparison to the traditional construction method of open trenching, side casting and backfilling, HDD provides numerous environmental advantages.

1. HDD allows the underground bore to be placed below environmentally sensitive surface resources such as archeological sites, beaches, shorelines, and other coastal features.
2. HDD is usually safer and faster than trenching because the equipment is confined to the entrance pit work area, and the majority of construction operations occurs underground. The duration of construction activities at each landing site is estimated to be two months.
3. The only onshore surface disturbance occurs at the entrance pit. Some localized grading may be required to accommodate the construction equipment. Once on-site work is completed, the ground is returned to its previous condition, and there will be no additional disturbance at the landing site aside from access to the manhole for periodic maintenance.
4. The cables will be placed underground and on the ocean floor. They will not be exposed to environmental conditions at the surface, such as wave action in the nearshore environment. Therefore, there is reduced risk of potential damage to the marine benthic community, as well as damage to the cables.
5. No intensive construction effort is required in the aquatic environment.

RECEIVED AS FOLLOWS

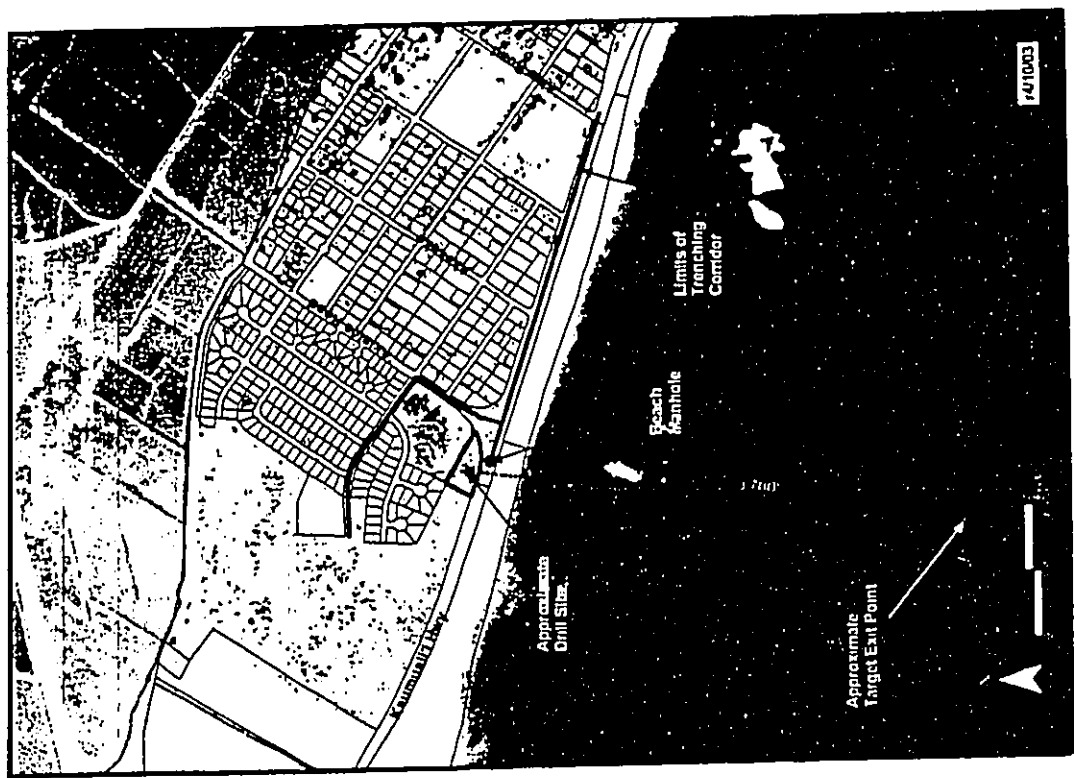
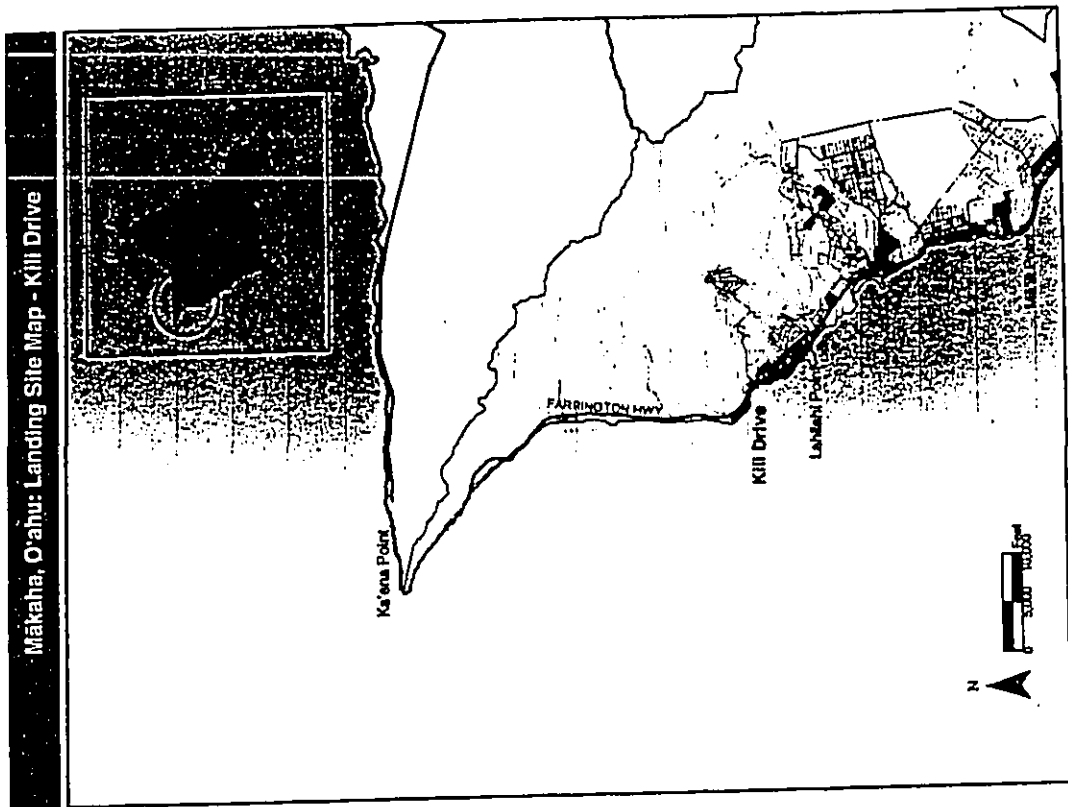
RECEIVED AS FOLLOWS



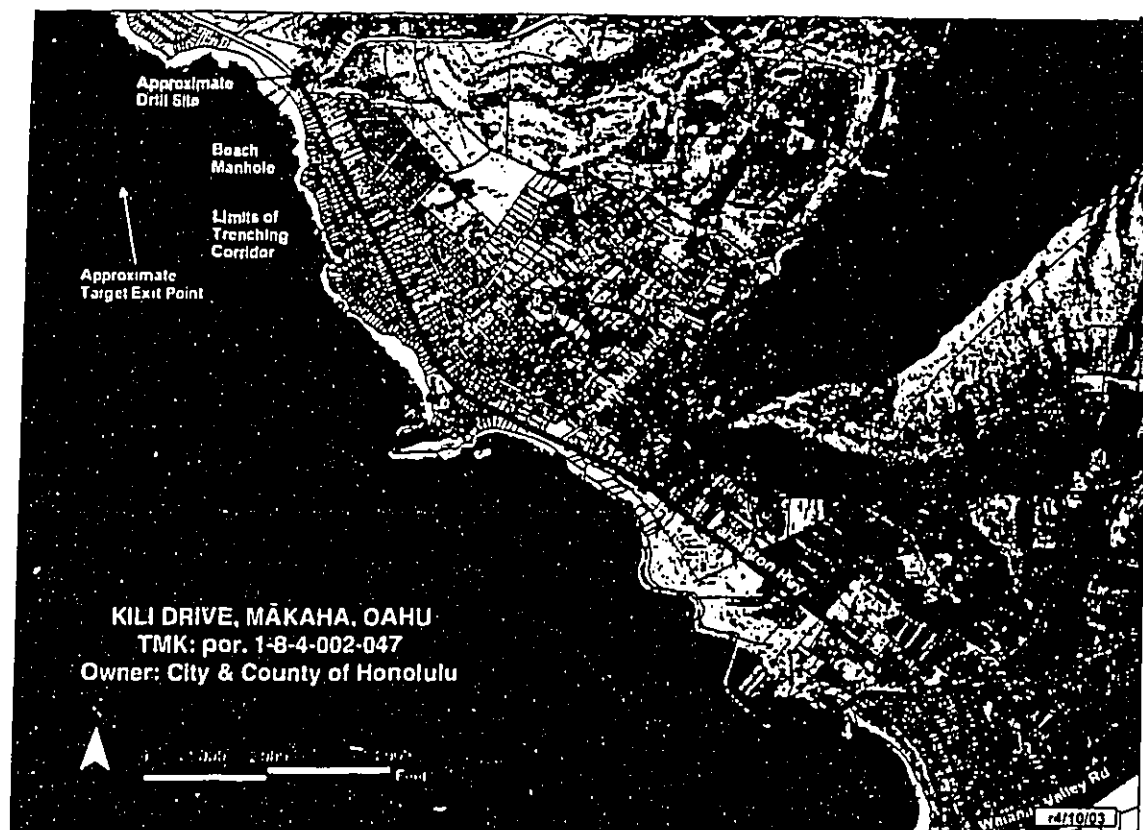
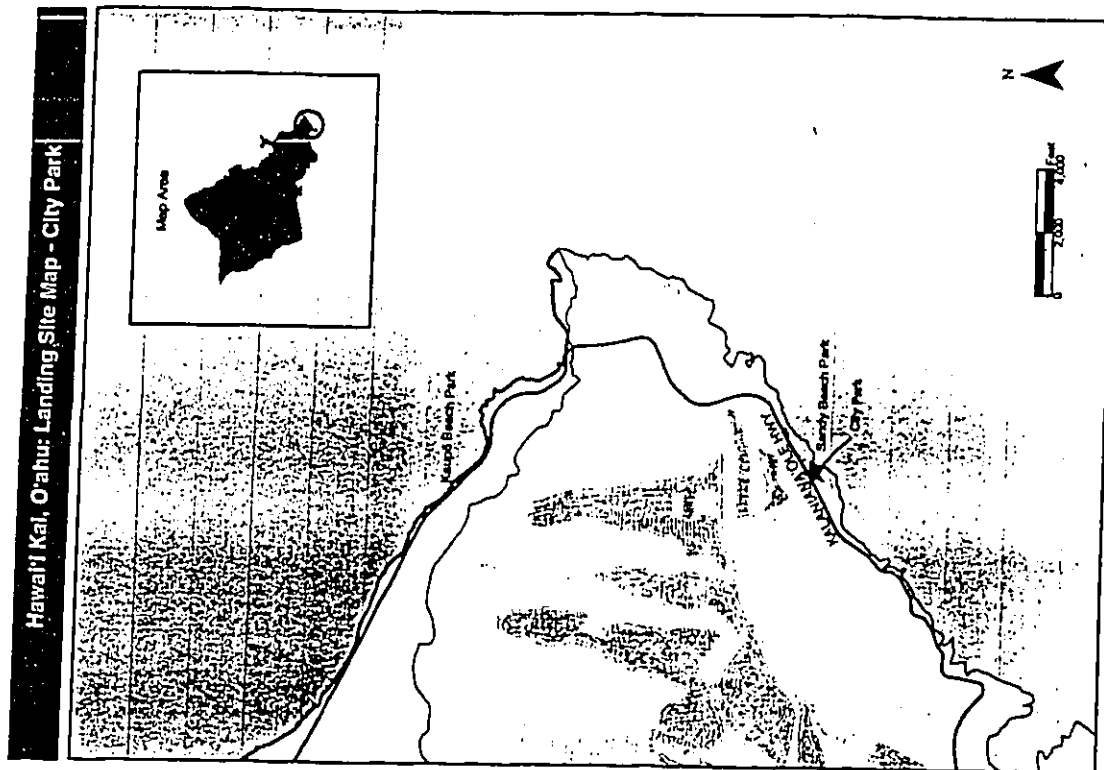
Source: Marine Life Conservation Districts: Department of Business Economic Development and Tourism, Office of Planning, GIS Program, November 2002;  
 Sanctuaries: Department of Business Economic Development and Tourism, Office of Planning, GIS Program, May 2001;  
 Cable Routes: Parsons Brinckerhoff, 2003.



RECEIVED AS FOLLOWS



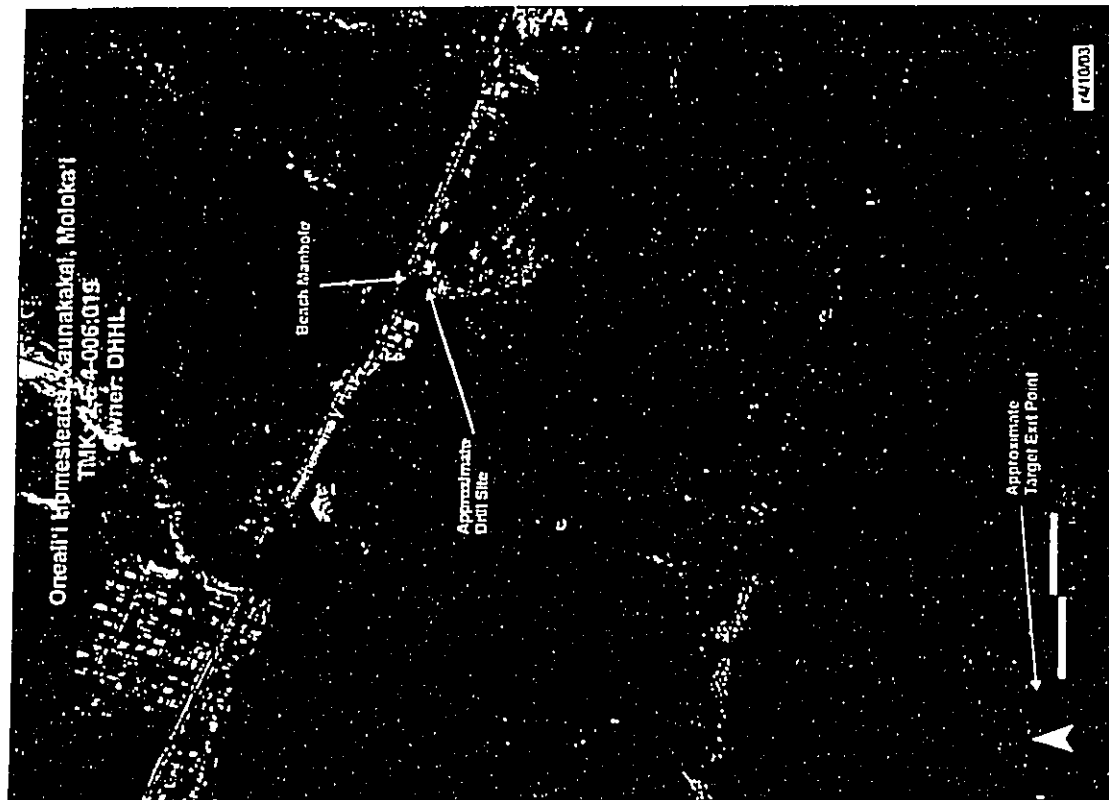
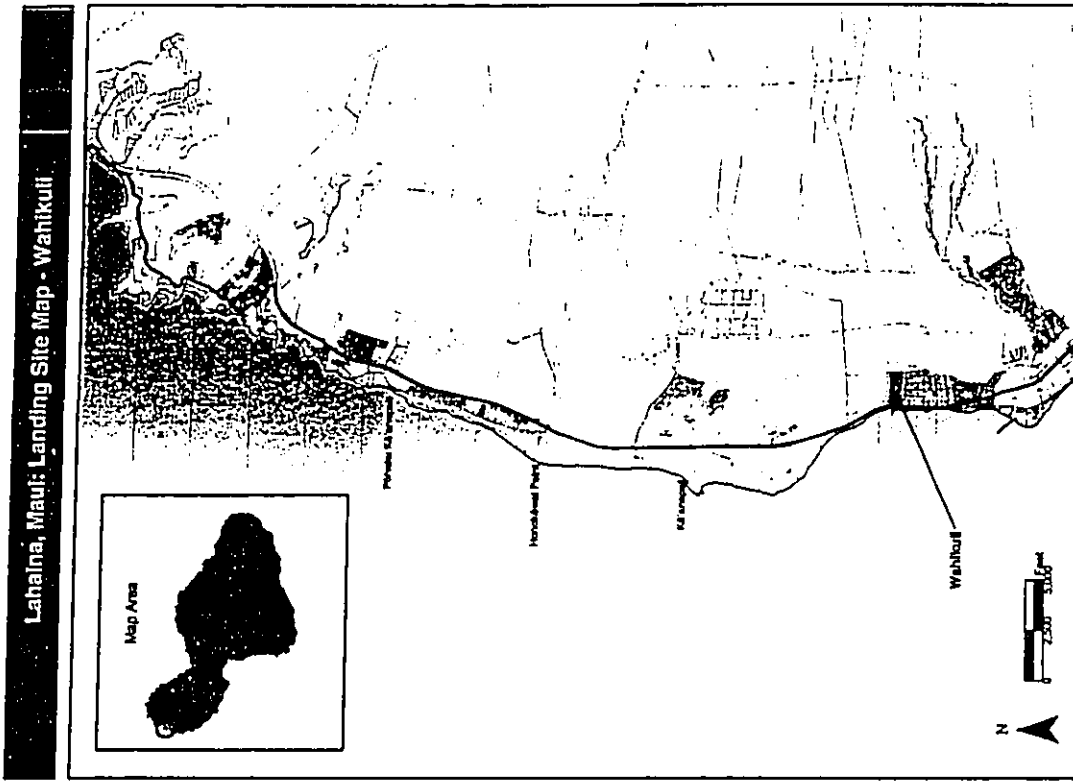
RECEIVED AS FOLLOWS



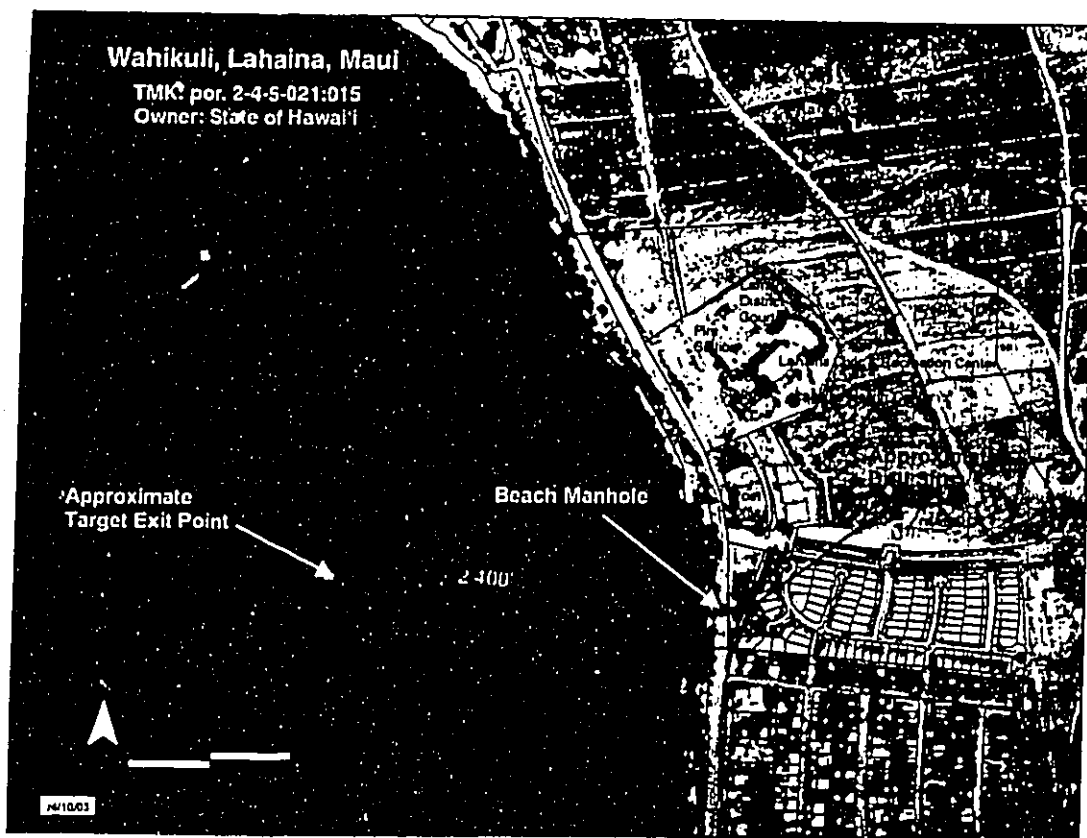
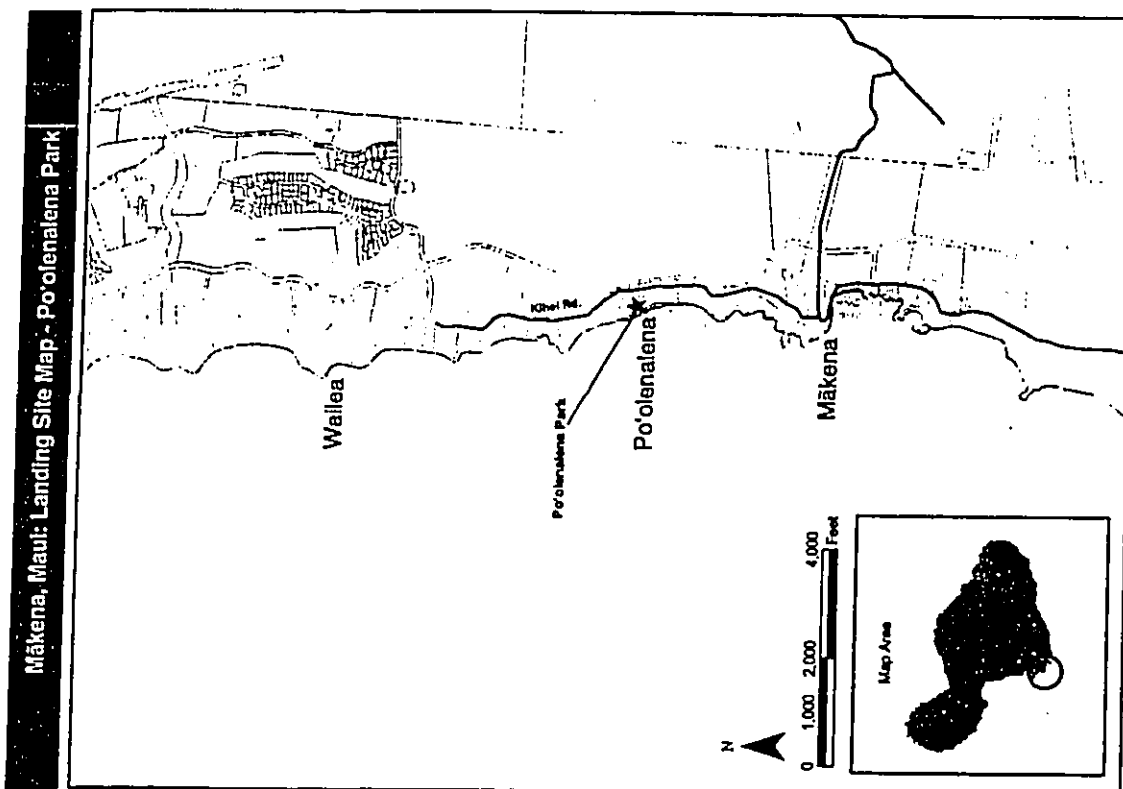
RECEIVED AS FOLLOWS



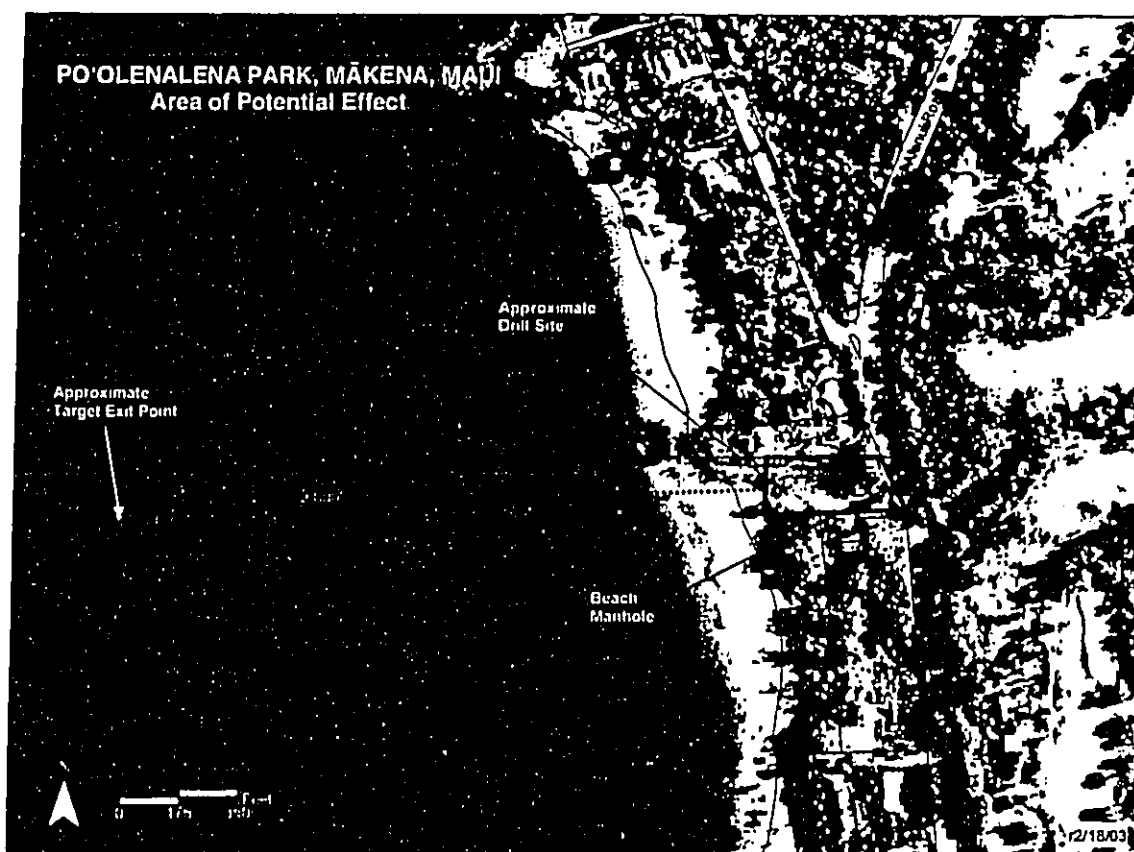
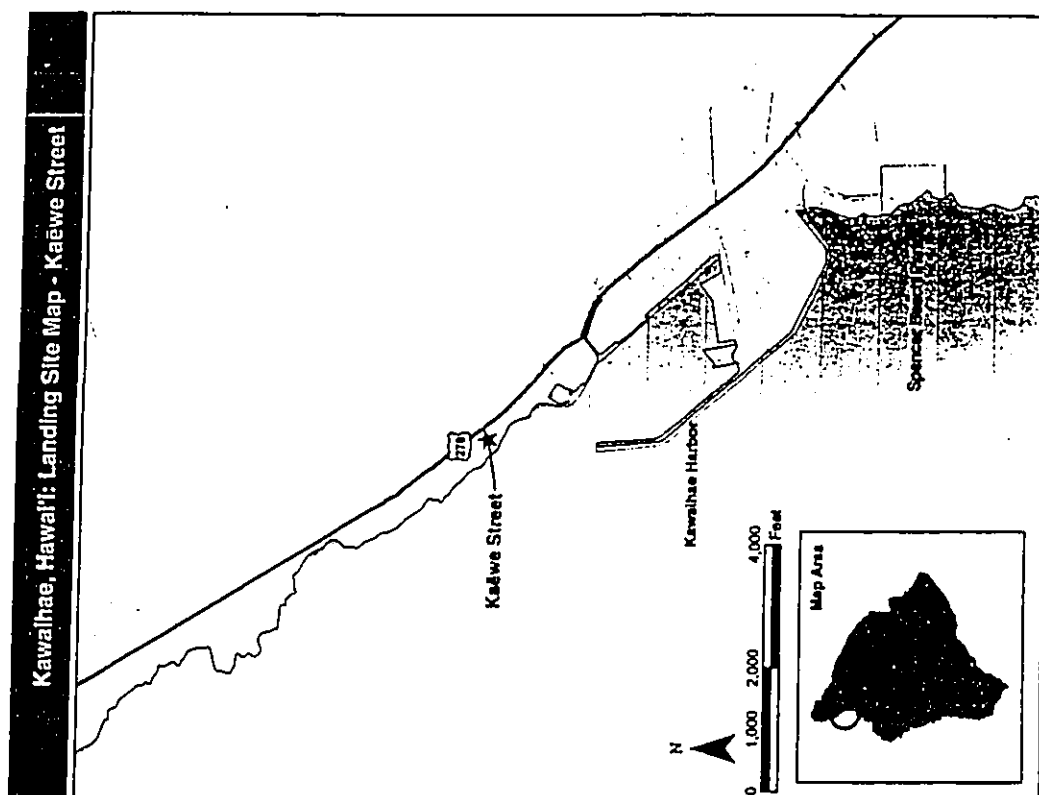
RECEIVED AS FOLLOWS



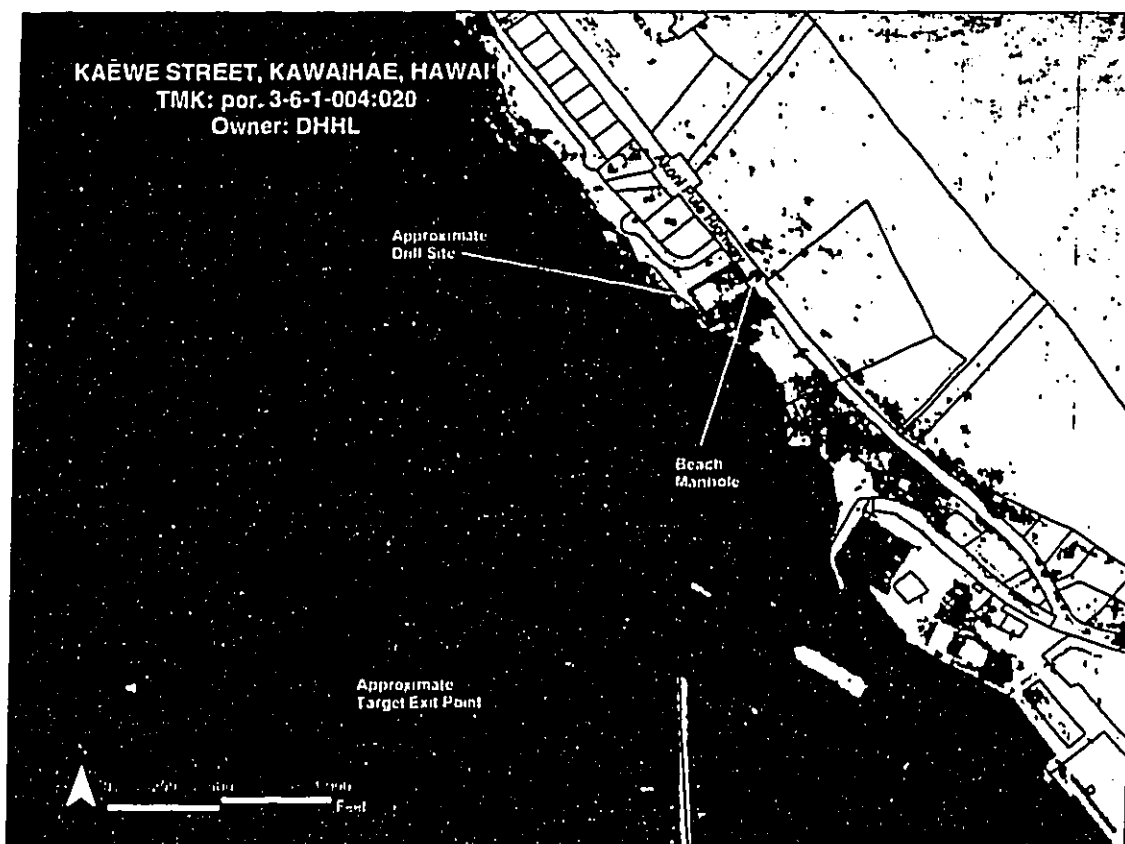
RECEIVED AS FOLLOWS



RECEIVED AS FOLLOWS



RECEIVED AS FOLLOWS



RECEIVED AS FOLLOWS

Mr. Paul Henson



United States Department of Agriculture  
Rural Development

Rural Business-Cooperative Service • Rural Housing Service • Rural Utilities Service  
Washington, DC 20250

February 26, 2003

Mr. Paul Henson  
Pacific Islands Office  
U.S. Fish and Wildlife Service  
300, Ala Moana Boulevard, Room 3-122, Box 50088  
Honolulu, Hawaii 96850

Dear Mr. Henson:

**Subject:** Sandwich Isles Communications Statewide Telecommunications Network Submarine Cables and Landing Sites; Scoping and coordination pursuant to the National Environmental Policy Act, the Endangered Species Act, the Migratory Bird Treaty Act, and the Fish and Wildlife Coordination Act

The U.S. Department of Agriculture, Rural Utilities Service (RUS), may provide financial assistance for the creation of a fiber optic communications cable network that will provide Hawaiian homestead beneficiaries and leasees with access to essential telecommunications services.

The purposes of this letter are the following:

- Request scoping comments from the U.S. Fish and Wildlife Service (USFWS), pursuant to the National Environmental Policy Act (NEPA) and the State of Hawaii environmental review law (Chapter 343);
- Request that USFWS provide a list of threatened and endangered species under its jurisdiction for the project areas potentially affected by the project, pursuant to Section 7 of the Endangered Species Act (ESA);
- Request comments on any concerns USFWS may have regarding migratory birds, pursuant to the Migratory Bird Treaty Act (MBTA); and
- Consult with the USFWS pursuant to the Fish and Wildlife Coordination Act (FWCA).

Please note that this project was discussed at a multi-agency pre-coordination meeting held on May 31, 2002 which was attended by members of your staff.

Print Development by an Equal Opportunity Employer  
Committee of Government Printing, Washington, DC 20540

**Project Description**

The proposed communications cable network will be owned and operated by Sandwich Isles Communications, Inc. (SIC). SIC is certified by the Federal Communications Commission as a rural local exchange carrier and is authorized by the Hawaii Public Utilities Commission to provide telecommunications service on Department of Hawaiian Home Lands (DHHL) properties. SIC presently provides 12 Hawaiian Home Land communities with telecommunications services, but DHHL land holdings extend beyond the 12 communities already served by SIC.

The system will provide homesteaders on additional properties owned by the DHHL with telecommunications services, which may include telemedicine, distance learning, video/data transmission, and the internet, in addition to standard telephone service. The network will connect DHHL properties on the six Hawaiian islands where DHHL lands are located (see Attachment 1).

One of the key characteristics of the proposed SIC system will be its independence from existing telecommunications networks in Hawaii, thus helping provide intrastate redundancy and reliability of service. One element of creating an independent and redundant system is the construction of cable landing sites in locations that do not presently have cable landings. Thus, in the event of a natural disaster or other emergency disabling a landing site, systems using other landing sites will more likely remain functional to serve the community at large. However, some landing sites will be in the same corridor as existing cable lines, due to environmental constraints.

A total of seventeen (17) proposed cable landing sites have been identified on the six islands that will be served by the SIC system. The following is a list of the proposed landing sites by island (shown in Attachment 1):

- Kauai - Kekaha, Anahola
- Oahu - Makaha, Haleiwa, Waimanalo
- Molokai - Kalaupapa, Kalamaula
- Lanai - Kaunaloa, Muncie Bay
- Mau - Ka'anapali, Waiehu, Ke'anae Point, Waihua, Hana, Makana
- Hawaii - Kawaihae, Hilo

The total length of marine and terrestrial cables would be approximately 1,500 miles. Environmental investigations of the proposed landing sites and the proposed offshore alignments are in progress. Cable laying for the offshore alignments is expected to begin in 2004.

**Construction Method and Drilling Technology**

The SIC project will use construction equipment and technology that has been selected to minimize disruption to the environment and neighboring communities. Horizontal Directional Drilling (HDD) technology is a method of installing underground pipes and conduits that allows drilling to occur underneath environmentally sensitive areas and may be faster and have less environmental impacts than the open trenching techniques typically used in the past. Additional information on the proposed construction methods and a brief description of HDD is provided in Attachment 2.



Mr. Paul Henson

3

A small amount of trenching may be conducted to connect the marine and terrestrial cables at selected sites. The trenches will be constructed in existing road right-of-ways and will typically be about three feet deep and one to two feet wide.

Based on the foregoing information, we request that the Service identify the federally listed, proposed, and/or candidate species under its jurisdiction that would be subject to ESA Section 7 consultation. We also request that the Service identify any designated critical habitat in the vicinity of the proposed project. In addition, please provide comments for NEPA, MBTA, and FWCA scoping, review, and consultation.

If you have questions or require additional information, please contact Mr. Larry Wolfe of my staff at (202) 720-5093 or email at [lwolfe@rus.usda.gov](mailto:lwolfe@rus.usda.gov).

Sincerely yours,

  
GLENDON DEAL

Director  
Engineering & Environmental Staff  
Water & Environmental Programs

Enclosures:

Attachment 1: Proposed Submarine Cable Landing Sites (Map)  
Attachment 2: HDD Construction Technology

cc. Ms. Lorena Wada, USFWS  
Mr. David Nichols, NMFS  
Dr. Wendy Willis, EPA  
Mr. Paul Conry, DLNR-DOFAW  
Mr. Francis Oishi, DLNR-DAR  
Mr. Randall Urusaki, PB



Pacific Tower, Suite 3000  
1001 Bishop Street  
Honolulu, HI 96813  
808-531-7094  
Fax: 808-528-2368

Parsons  
Brinckerhoff

April 22, 2003

Mr. Paul Henson  
Pacific Islands Office  
U.S. Fish and Wildlife Service  
300 Ala Moana Boulevard, Room 3-22  
Box 50088  
Honolulu, Hawaii 96850

Dear Mr. Henson:

Subject: Additional information concerning the Sandwich Isles Communications Statewide  
Telecommunications Network Submarine Cables and Landing Sites Project

In a letter dated February 26, 2003, the U.S. Department of Agriculture, Rural Utilities Service (RUS) requested information and comments from the Service regarding regulatory requirements related to the Sandwich Isles Communications Statewide Telecommunications Network project, including but not limited to compliance with Section 7 of the Endangered Species Act. The proposed communications cable network will be owned and operated by Sandwich Isles Communications, Inc. (SIC). RUS is providing financial assistance for this project, which will seek to provide services owned by the Department of Hawaiian Home Lands (DHHL) with telecommunications services.

In recent communications with Ray Hoy of your staff, RUS was asked to provide more detailed maps of the proposed submarine cable project. Parsons Brinckerhoff, as consultant to SIC, was directed by RUS to provide these additional project details to the Service. The purpose of this letter is to satisfy Mr. Hoy's request by transmitting project maps that better indicate the location of the proposed cable landing sites.

Please also note that since the February 26 letter, the project description has been modified. In light of current economic conditions, SIC has determined that in order to provide modern telecommunications services to DHHL subscribers in a timely fashion, they have had to design a network that can be built in the most expeditious and economical manner. Therefore, the marine cable landing project has been redesigned, at this time, to include only seven (7) landing sites to connect all the DHHL projects on the five (5) major islands. In the future, given a more positive economy, additional cable landings may be added for system redundancy. In all other respects, the project description remains unchanged.

Parsons Brinckerhoff  
Engineering & Construction

RECEIVED AS FOLLOWS



Mr. Paul Hanson  
 April 22, 2003  
 Page 2 of 2

The seven proposed cable landing sites are as follows, and are shown in maps attached to this letter:

- Kauai - Kekaha (Akihoa Road site)
- Oahu - Mākaha (Kill Drive site) and Hawai'i Kai (City Park site)
- Molokai - Kaunakakai (Onea'i'i Homesite site)
- Maui - Lahaina (Wahikuli site) and Makena (Pō Otenalena Park site)
- Hawaii - Kawahae (Ka'ewe Street site)

If you have further questions or require additional information, please do not hesitate to call me at (808) 531-7094.

Sincerely yours,

PARSONS BRINCKERHOFF

RANDALL URASAKI, P.E.  
 Project Manager

Enclosures:

- Statewide map of submarine cable route and seven landing sites
- 14 site specific maps (two per landing site)

- cc:
- Mr. Larry Wolfe, RUS
  - Mr. Antonio Benivoglio, USFWS
  - Ms. Lorena Wada, USFWS
  - Mr. David Nichols, NMFS
  - Dr. Wendy Willse, EPA
  - Mr. Paul Conry, DLNR-DOFAW
  - Mr. Francis Oishi, DLNR-DAR

UNITED STATES OF AMERICA



United States Department of the Interior

FISH AND WILDLIFE SERVICE  
 Pacific Islands Fish and Wildlife Office  
 300 Ala Moana Boulevard, Room 3-122  
 Box 50988  
 Honolulu, Hawaii 96850

In Reply Refer To:  
 FI-03-61

Glendon Deal  
 Director - Water and Environmental Programs  
 United States Department of Agriculture  
 Rural Development  
 Room 2240  
 Washington, D.C. 20250-0700

JUN 19 2003

Dear Mr. Glendon:

This responds to your letter regarding "Sandwich Isles Communications Statewide Telecommunications Network Submarine Cables and Landing Sites: Scoping and Coordination Pursuant to the National Environmental Policy Act (NEPA), Endangered Species Act (ESA), the Migratory Bird Treaty Act (MBTA), and the Fish and Wildlife Coordination Act (FWCA)," received on March 4, 2003, with additional information received on April 23, 2003. You requested a list of threatened and endangered species under the jurisdiction of the U.S. Fish and Wildlife Service (Service) that may be affected by the proposed project and our comments on the project with regards to ESA, MBTA, FWCA, and NEPA. This letter has been prepared under the authority of and in accordance with provisions of the NEPA of 1969 [42 U.S.C. 4321 *et seq.*; 83 Stat. 852], as amended, the FWCA of 1934 [16 U.S.C. 661 *et seq.*; 48 Stat. 401], as amended, the ESA of 1973 [16 U.S.C. 1531 *et seq.*; 87 Stat. 884], as amended, the MBTA (16 U.S.C. 703-711), as amended, and other authorities mandating Department concern for environmental resources. Based on these authorities, we offer the following comments for your consideration.

Based on the information provided, the project will create "an independent and redundant" telecommunication cable system connecting Department of Hawaiian Home Lands (DHHL) in the main Hawaiian Islands. A total of 17 proposed cable landing sites were identified, these are: Kauai - Kekaha and Anahola; Oahu - Makaha, Haleiwa, and Waimanalo; Molokai - Kalaupapa and Kamalaui; Lanai - Maunaloa and Manele Bay; Maui - Kaanapali, Waichu, Keanea Point, Wailua, Hana and Makena; and Hawaii - Kawahae and Hilo. Landing sites at each location will require terrestrial excavation pits for the use of Horizontal Directional Drilling (HDD) to install telecommunication cables between islands. The HDD system bores underground out to a depth of about 60 feet and the drill head progresses to the underwater "pop-out-point" (POP). At the POP, cable is fed from a ship through the excavated hole to the landing site. The cable is then laid along a pre-determined cable route between islands.

RECEIVED AS FOLLOWS

Glendon Deal

2

The enclosed list identifies the Federally listed species that occur within the proposed project area. If you determine that your project may affect any listed or proposed endangered or threatened species or proposed or designated critical habitat, we recommend you enter into consultation with us. We recommend that the National Marine Fisheries Service (NMFS) be consulted regarding the listed marine mammals. Also we recommend that NMFS be consulted regarding listed sea turtles which are under their jurisdiction when they occur in the marine environment.

The Service is willing to work with you to identify specific POP's and cable routes to avoid and minimize impacts to fish and wildlife resources, including coral reefs. This process will involve characterizing the marine benthic and coastal habitat within the proposed project site. Where impacts are unavoidable, discussion regarding appropriate compensatory mitigation may be necessary.

Please contact Fish and Wildlife Biologist Antonio Benivoglio of my staff at (808) 541-3441 or by email at [Antonio\\_Benivoglio@hawaii.gov](mailto:Antonio_Benivoglio@hawaii.gov) if you have any questions. We look forward to working with you on this project in the future.

Sincerely,



Paul Henson, Ph.D.  
Field Supervisor

cc: Randall Urasaki, Parsons Brinckerhoff, Honolulu  
Alan Everson, NMFS PERO, Honolulu  
Enclosure

#### SPECIES LIST

The proposed project is a multi-island project and consists of installing a total of seven telecommunications landing sites. The installation sites are located on the islands of Kauai (TMK:por.4-1-2-002:032), Oahu (TMK:por.1-8-4-002:047 and TMK:por.1-3-9-015:001), Molokai (TMK:por.2-5-4-006:019), Maui (TMK:por.2-4-5-021:015 and TMK:por.2-2-1-007:72), and Hawaii (TMK:por.3-6-1-004:20).

We reviewed the information you provided and pertinent information in our files, including maps prepared by the Hawaii Natural Heritage Program. The following listed species may occur in the area:

Species	TMK	Status
Hawaiian hoary bat or 'opo'opo's ( <i>Lasiurus cinereus semotus</i> )	por.4-1-2-002:032 por.2-4-5-021:015 por.3-6-1-004:20	Endangered
Hawaiian monk seal or 'Ilio-holo-i-ka-uaua ( <i>Monachus schauinslandi</i> )	por.1-3-9-015:001 por.2-4-5-021:015 por.2-2-1-007:72	Endangered
'Ohai plant ( <i>Sesuvium tomentosum</i> )	por.2-5-4-006:019	Endangered
'Awikawika plant ( <i>Casuarina pubescens</i> )	por.2-2-1-007:72	Candidate
Blackburn's sphinx moth ( <i>Manduca blackburni</i> )	por.2-2-1-007:72	Endangered
'Ihi plant ( <i>Portulaca villosa</i> )	por.3-6-1-004:20	Species of Concern

RECEIVED AS FOLLOWS

RECEIVED AS FOLLOWS

Ms. Gina Shultz

Page 2 of 6

**USDA**  
United States Department of Agriculture  
Rural Development  
Rural Business-Cooperative Service • Rural Housing Service • Rural Utilities Service  
Washington, DC 20250

March 4, 2004

Ms. Gina Shultz  
Acting Field Supervisor  
Pacific Islands Office  
U.S. Fish and Wildlife Service  
300 Ala Moana Boulevard, Room 3-122  
Box 50088  
Honolulu, Hawaii 96850

Dear Ms. Shultz:

**Subject:** Sandwich Isles Communications, Inc. Submarine Fiber-Optic Cable Project  
Project Coordination under Section 7 of the Endangered Species Act

The purpose of this letter is to continue the Section 7 consultation with the U.S. Fish and Wildlife Service (FWS) pursuant to the Endangered Species Act (ESA) for the subject project. The U.S. Department of Agriculture, Rural Utilities Service (RUS) is also pursuing ESA Section 7 consultation, and coordination under the Marine Mammals Protection Act, with the National Marine Fisheries Service (NOAA Fisheries) (see attachment).

The proposed 300-mile submarine fiber-optic cable communications network will be owned and operated by Sandwich Isles Communications, Inc. (SIC) for the purpose of providing properties owned by the Department of Hawaiian Home Lands (DHHL) with telecommunications services. As part of the overall statewide network, SIC is currently designing, installing and operating terrestrial fiber-optic cable networks on the major Hawaiian Islands, with the exception of Lanai. RUS may provide financial assistance for both the terrestrial and submarine networks.

The following is a summary of our coordination activities conducted to date:

- May 31, 2002 joint agency meeting involving the U.S. Environmental Protection Agency, FWS, NOAA Fisheries, and SIC consultants, which included Hoytka, Environmental Planning Solutions and Parsons Brinckerhoff (PB);
- February 26, 2003 letter from RUS to the FWS requesting list of Federal Trust Species that could be affected by the proposed project;
- April 22, 2003 letter from PB to the FWS providing supplemental updated information about the project; and
- June 19, 2003 letter from the FWS to the RUS providing a list of Federal Trust Species that could be affected by the proposed project

**Protected Species**

The June 19, 2003 FWS letter identified the following species that may be affected by the project pursuant to ESA Section 7, in addition to the Migratory Bird Treaty Act, and the Fish and Wildlife Coordination Act. The list is categorized by landing site.

ʻAlailoa Road, Kauai  
Hawaiian booby bat or ʻŌpōpō (Larus cinereus semotus) - Endangered  
Sandy Beach Park, Oahu  
Hawaiian monk seal or ʻŌle-ʻole-i-ka-uua (Monachus schauinslandi) - Endangered  
Ocealipi Homesteads, Molokai  
ʻŌhalu plant (Scaevola tomentosa) - Endangered

Waipahoehoe, Maui  
Hawaiian booby bat or ʻŌpōpō (Larus cinereus semotus) - Endangered  
Hawaiian monk seal or ʻŌle-ʻole-i-ka-uua (Monachus schauinslandi) - Endangered  
Poʻolenalena Park, Maui  
Hawaiian monk seal or ʻŌle-ʻole-i-ka-uua (Monachus schauinslandi) - Endangered  
ʻAwehiwhi plant (Crematosia pubescens) - Candidate  
Blackburn's sphinx moth (Manduca blackburni) - Endangered

Kaewa Place, Hawaii  
Hawaiian booby bat or ʻŌpōpō (Larus cinereus semotus) - Endangered  
ʻŌhi Plant (Porulaca villosa) - Species of Concern

**Project Description and Environmental Controls**

Since we last corresponded with the FWS, the project definition was modified to include only seven landing sites and four ocean segments (see enclosed map) between five of the major islands. We previously (February 26, 2003 letter) informed the FWS that the project involved 17 landing sites and 13 ocean segments on six of the major islands (Lanai was dropped). The seven proposed cable landing sites are as follows:

- Kauai - Kakaia (Kakaloa Road)
- Oahu - Mīlaha (Kūi Drive) and Hawaiʻi Kai (Sandy Beach Park, formerly "City Park")
- Molokai - Kamakahi (Ocealipi Homestead)
- Maui - Labana (Waipahoehoe) and Mālika (Poʻolenalena Park)
- Hawaii - Kawāhac (Kaewa Place)

Depending on the landing site, trenching may be conducted between the drill site and the beach manhole (some drill sites are on the mauna side of the roadway that would contain the beach manhole), and for the connecting routes. Trenches will typically be about three feet deep and one to two feet wide.

#### Biological Survey Findings

Surveys of terrestrial flora and marine biology were conducted at each landing site (see enclosures). The botanical surveys covered the maximum area that may be affected by construction at each landing site, including connecting routes at applicable landing sites. For those landing sites where the HDD string is within a relatively small parcel, the entire property was surveyed. The marine biological surveys focused on the area surrounding the proposed EPs.

Flora surveys at all landing sites found no protected plant species, including the three plant species listed in June 19, 2003 letter. Vegetative communities potentially affected by proposed construction activities are common throughout the Hawaiian Islands, and many of them are considered weedy.

#### Discussion of Potential Impacts on Protected Species

This section provides a discussion of potential project impacts on the species identified by FWS.

##### Hawaiian hoary bat or *Lasiurus cinereus scrofa*

According to the FWS website, the Hawaiian hoary bat is a solitary bat that roosts among trees in areas near forests and feeds at night. The Akaloa Road and Waihoi landing site parcels, two of the sites that the FWS stated are in areas where Hawaiian hoary bats were observed in the past, do not provide the type of habitat favored by the bat. The Akaloa Road landing site is next to a residential community and the Waihoi site is in Lahaina adjacent to Honouliuli Highway and the Lahaina civic center. The other landing site parcel identified by the FWS as being in an area of Hawaiian hoary bat sightings, Kaewa Place, contains a closed-canopy kiawe forest. Therefore, it is possible that Hawaiian hoary bats roost in the parcel, but there are nearby residences and the site is near Kawaihae Harbor. The Hawaiian hoary bat sighting was in 1960 at Spencer Beach Park, located one and a half miles from the landing site. No sightings have been recorded since then.

##### Blackburn's sphinx moth (*Manduca blackburni*)

According to the FWS website, the Blackburn's Sphinx Moth was believed extinct until 1984 when a small population was rediscovered on the south coast of East Maui in a dry undeveloped area. The sighting near the Popoia Park landing site was in 1940 at a location one mile to the south. The Popoia Park parcel does not appear to provide the type of habitat that Blackburn's Sphinx Moth would favor, according to the FWS website.

##### Hawaiian monk seal (*Monachus schauinslandi*)

The Hawaiian monk seal, called *ʻŌlō-holo-ʻi-ka-uani* in Hawaiian, is known to occur in Hawaii's waters and to haul out on beaches. However, neither project scouting nor inquiries with knowledgeable locals has identified monk seals as a topic of concern at any of the seven proposed landing sites. Monk seals are known to frequent the proposed landing sites, and therefore, no adverse impacts are expected.

Landing sites are the connections between the submarine and terrestrial networks. Landing site infrastructure would include an under-sea/underground (landside) conduit, which would be the point of fiber-optic cables, and a beach manhole within the nearest road right-of-way, which would be the point of connection between the submarine and terrestrial networks. The length of the under-sea/underground conduit would vary by landing site, depending on near shore conditions (e.g., ocean depth and presence of live coral reefs). The landing sites on Kauai and Oahu do not meet directly with the terrestrial network. Therefore, these landing sites require "connecting routes" using existing roadway rights-of-way to link the submarine and terrestrial networks. The lengths of the connecting routes would vary by landing site. The ocean end or opening of the conduit is called the submarine exit point (SEP), which would be located typically 60 feet below mean sea level. Seaward of the EP, the fiber-optic cable would lie on the ocean floor. The cable would be deep enough seaward of the EP to not be affected by wave action or storm conditions.

All seven landing sites will be constructed using horizontal directional drilling (HDD), a construction alternative to traditional trenching. Installation of previous cable landing sites by others due to trenching caused disturbances to coastal and marine environments during construction. The SIC project will avoid such impacts by the use of HDD.

Marine disturbance caused by construction of the landing site would be limited to the area directly around the EP. The drill head emerging from the EP would be a controlled event, observed by divers who would cap the bore when completed to await later hook-up with the submarine cable, which will also be a controlled event conducted by divers. If a threatened or endangered species and/or a marine mammal is observed in the immediate vicinity, the drill head emergence or cable hook-up would be delayed until the animal moves away of its own volition. EPs have been located in areas where there are no live coral communities, and the cable seaward of the EP would not be laid on live coral.

A slurry of water and bentonite would be used to lubricate the drill cutter head and seal the bore. Slurry would be replaced by water immediately prior to the drill head emerging from the EP, so slurry is not expected to leak from the bore. However, accidental or inadvertent discharges of slurry into the ocean are possible. For example, the drill head might encounter an unexpected void that is accessible to the ocean water, or the contractor could miscalculate the timing of the slurry to water exchange when the drill head emerges from the EP. Slurry in the ocean would temporarily affect water turbidity, but ocean currents or wave action would be expected to dissipate the turbidity relatively quickly. Bentonite in the slurry is a naturally-occurring clay material, which is not toxic or harmful to the ocean environment. The SIC contractor would immediately be aware of losses of slurry, as indicated by a drop in pressure or the absence of returning slurry (slurry is constantly being recycled). The contractor would stop drilling if the discharges cannot be stopped.

If the contractor were to find that slurry is leaking from the drill bore into the ocean environment, there are several measures to prevent further discharges. If the problem cannot immediately be resolved, drilling, and the introduction of additional slurry, will stop. Drilling shall resume only after the contractor has taken measures to prevent further slurry discharges into the ocean. Divers stationed at the EP when the drill head emerges into the ocean shall be equipped with specialized pumps and filter bags in case slurry is accidentally discharged.

RECEIVED AS FOLLOWS

Ms. Gina Shultz

Page 5 of 6

If a rock seal should appear in the vicinity of the construction activity, either during landing site construction or submarine cable laying, all construction activities would cease until the animal voluntarily moves out of the immediate area.

Potential Operational Phase Interactions

None of the landing sites are located in designated critical habitat.

Following construction, the drill sites would be restored to their pre-construction conditions. The beach manhole cover within the roadway right-of-way would be the only visible change after construction is completed.

Finding and Request for Concurrences

Pursuant to ESA Section 7, the RUS has carefully considered the potential for impacts to species identified by the FWS. Based on the information provided above, the RUS finds that the species listed in the June 19, 2003 letter would not likely be adversely affected by the proposed Submarine Fiber-Optic Cable project. The RUS requests that FWS provide written concurrence with this finding.

If you have questions or require additional information, please contact Mr. Larry Wolfe of my staff at (202) 720-5093 or email at [larry.wolfe@usda.gov](mailto:larry.wolfe@usda.gov). Sincerely yours,

Glendon D. Deal, P.E.

GLENDON DEAL  
Director  
Engineering & Environmental Staff  
Water & Environmental Programs

Ms. Gina Shultz

Page 6 of 6

Enclosures:

1. Letter to the Natural Oceanic and Atmospheric Administration, National Marine Fisheries FWS regarding project coordination under Section 7 of the Endangered Species Act and the Marine Mammals Protection Act dated March 4, 2004.
2. Map of Proposed SIC Submarine Fiber-Optic Cable Network
3. Brock, Richard. Marine Biological Assessment of Fiber Optic Cable Deployment at Seven Sites in the Hawaiian Islands in Support of the Sandwich Isles Communications, Inc. Network. July 2003
4. Carr & Associates Botanical Resources Assessment Kaula Cable Landing Site, Kaula, Waialeale District, Kauai. October 2002.
5. Botanical Resources Assessment Kili Drive Cable Landing Site, Makaha, Waipuu District, Oahu. November 2002.
6. Botanical Resources Assessment Sandy Beach Cable Landing Site, Honolulu District, Oahu. November 2002.
7. Botanical Resources Assessment Kalamo Cable Landing Site, Molokai District, Molokai. April 2003.
8. Botanical Resources Assessment Waikeolu Cable Landing Site, Waikeolu, Lanai, Maui. May 2003.
9. Botanical Resources Assessment Puuolanihena Cable Landing Site, Maunaloa, Mahalo District, Maui. April 2003.
10. Botanical Resources Assessment Kawaihae Cable Landing Site, South Kona District, Hawaii. April 2003.

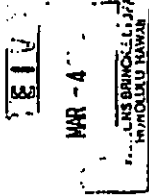
cc.

- Ms. Margaret Alamine, NOAA Fisheries
- Dr. Woody Wiltsz, EPA
- Mr. Paul Coory, DLNR-DOFAW
- Mr. Francis Oishi, DLNR-DAR
- Mr. Randall Uranski, PB



United States Department of Agriculture  
Rural Development

Rural Business-Cooperative Service • Rural Housing Service • Rural Utilities Service  
Washington, DC 20250



MAR - 4

February 26, 2003

Mr. David Nichols  
National Marine Fisheries Service  
Pacific Islands Area Office  
1601 Kapiolani Boulevard, Suite 1110  
Honolulu, HI 96814

Dear Mr. Nichols:

**Subject:** Sandwich Isles Communications Statewide Telecommunications Network Submarine Cables and Landing Sites; Scoping and coordination pursuant to the National Environmental Policy Act, Section 7 of the Endangered Species Act, Essential Fish Habitat provision of the Sustainable Fisheries Act of 1996, and the Marine Mammal Protection Act

The U.S. Department of Agriculture, Rural Utilities Service (RUS), may provide financial assistance for the creation of a fiber optic telecommunications cable network that will provide Hawaiian homestead beneficiaries and lessees with access to essential telecommunications services.

The purposes of this letter are the following:

- to request scoping comments from the National Marine Fisheries Service (NMFS), pursuant to the National Environmental Policy Act (NEPA) and the State of Hawaii environmental review law (known as Chapter 343);
- to request that the Service provide a list of threatened and endangered species under its jurisdiction for the project areas potentially affected by the project, pursuant to Section 7 of the Endangered Species Act (ESA);
- to coordinate with the Service on any potential impacts to Essential Fish Habitat, pursuant to the Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996; and
- to consult with the Service on marine mammals protected by the Marine Mammal Protection Act.

Please note that this project was discussed at a multi-agency pre-coordination meeting held on May 31, 2002 which was attended by the Service.

Rural Development is an Equal Opportunity Employer  
Candidates of minorities and women are encouraged to apply  
Department of Agriculture, Washington, DC 20250

Mr. David Nichols

2

**Project Description**

The proposed communications cable network will be owned and operated by Sandwich Isles Communications, Inc. (SIC). SIC is certified by the Federal Communications Commission as a rural local exchange carrier and is authorized by the Hawaii Public Utilities Commission as a provider of telecommunications services on Department of Hawaiian Home Lands (DHHL) properties. SIC presently provides 12 Hawaiian Home Land communities with telecommunications services, but DHHL land holdings extend beyond the 12 communities already served by SIC.

The system will provide homesteaders on additional properties owned by the DHHL with telecommunications services, which may include telemedicine, distance learning, video/data transmission, and the internet, in addition to standard telephone service. The network will connect DHHL properties on the six Hawaiian Islands where DHHL lands are located (see Attachment 1).

One of the key characteristics of the proposed SIC system will be its independence from existing telecommunications networks in Hawaii, thus helping provide intrastate redundancy and reliability of service. One element of creating an independent and redundant system is the construction of cable landing sites in locations that do not presently have cable landings. Thus, in the event of a natural disaster or other emergency disabling a landing site, systems using other landing sites will more likely remain functional to serve the community at large. However, some landing sites will be in the same corridor as existing cable lines, due to environmental constraints.

A total of seventeen (17) proposed cable landing sites have been identified on the six islands that will be served by the SIC system. The following is a list of the proposed landing sites by island (shown in Attachment 1):

Kauai - Kekaha, Anahola  
Oahu - Makaha, Haleiwa, Waimanalo  
Molokai - Kaluapapa, Kalama'ula  
Lana'i - Kaunaleapaa, Manalo Bay  
Maui - Ka'anapali, Waichu, Ke'anae Point, Waiiua, Hana, Makana  
HAWAII - Kawaihae, Hilo

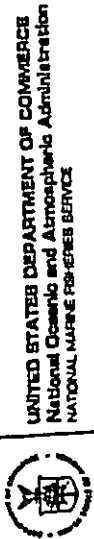
The total length of marine and terrestrial cables would be approximately 1,500 miles. Environmental investigations of the proposed landing sites and the proposed offshore alignments are in progress. Cable laying for the offshore alignments is expected to begin in 2004.

**Construction Method and Drilling Technology**

The SIC project will use construction equipment and technology that has been selected to minimize disruption to the environment and neighboring communities. Horizontal Directional Drilling (HDD) technology is a method of installing underground pipes and conduits that allows

RECEIVED AS FOLLOWS

RECEIVED AS FOLLOWS



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE

April 14, 2003

Glendon Deal, Director  
Engineering & Environmental Staff  
Water and Environmental Programs  
United States Department of Agriculture  
Rural Development  
Washington, DC 20250

RE: Sandwich Isles Telecommunications Inter-Island Fiber Optic Telecommunication System  
Please refer to Consultation No. I-PI-03-243:MM-0 - Species List

Dear Mr. Deal,

This responds to your request received March 4, 2003, for a list of threatened and endangered species that may be found in the areas potentially affected by the Sandwich Isles Communications Statewide Telecommunications Network Submarine Cable Landing Project. This fiber optic cable network will connect Hawaiian homestead parcels on the six major Hawaiian Islands. The total length of marine and terrestrial cables will be approximately 1500 miles and will be independent of existing networks in Hawaii. The National Marine Fisheries Service (NOAA Fisheries) provide the following information as requested under our statutory authorities under the Endangered Species Act of 1973, as amended, 16 U.S.C. 1531 *et seq.*, and the Marine Mammal Protection Act of 1972, as amended 16 U.S.C. 1361 *et seq.* (MMPA). The following is a list of protected species that may be found in and around the proposed project areas.

Threatened green turtles (*Chelonia mydas*), and endangered hawksbill turtles (*Eretmochelys imbricata*) occur in the waters around the Main Hawaiian Islands (MHI). Endangered humpback whales (*Megaptera novaeangliae*) are found during the winter breeding season (December-March). Endangered sperm whales (*Physeter macrocephalus*) are found offshore of the MHI year round. Endangered Hawaiian monk seals (*Monachus schauinslandi*) may also be found in the nearshore waters and beaches of all MHI.

Additionally, all marine mammals are protected under the MMPA. Marine mammals occurring in Hawaiian waters include:

- Bryde's whale (*Balaenoptera edeni*)
- Cuvier's beaked whale (*Ziphius cavirostris*)
- Pygmy sperm whale (*Kogia breviceps*)



Mr. David Nichols

3

drilling to occur underneath environmentally sensitive areas and may be faster and have less environmental impacts than the open trenching techniques typically used in the past. Additional information on the proposed construction methods and a brief description of HDD is provided in Attachment 2.

Based on the foregoing information, we request that the NMFS identify the federally listed, proposed, and/or candidate species under its jurisdiction that would be subject to ESA Section 7 consultation. We also request that the Service provide NEPA comments, including identifying any designated essential fish habitat, habitat areas of particular concern that may be affected by the proposed project, as well as potential interactions with protected marine mammals in the proposed project area.

If you have questions or require additional information, please contact Mr. Larry Wolfe of my staff at (202) 720-5093 or email at [lwolfe@rus.usda.gov](mailto:lwolfe@rus.usda.gov).

Sincerely yours,

GLENDON DEAL

Director  
Engineering & Environmental Staff  
Water & Environmental Programs

Enclosures:  
Attachment 1: Proposed Submarine Cable Landing Sites (Map)  
Attachment 2: HDD Construction Technology

- cc. Ms. Lorena Wada, USFWS
- Dr. Wendy Wilce, EPA
- Mr. Paul Coury, DLNR-DOFAW
- Mr. Francis Oishi, DLNR-DAR
- Mr. Randall Urasaki, PB



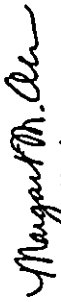
RECEIVED AS FOLLOWS

Dwarf sperm whale (*Kogia simus*)  
Melon-headed whale (*Peponocephala electra*)  
Pygmy killer whale (*Feresa attenuata*)  
False killer whale (*Pseudorca crassidens*)  
Killer whale (*Orcinus orca*)  
Short finned pilot whale (*Globicephala macrorhynchus*)  
Spinner dolphins (*Stenella longirostris*)  
Striped dolphin (*Stenella coeruleoalba*)  
Pantropical spotted dolphin (*Stenella attenuata*)  
Common dolphin (*Delphinus delphis*)  
Risso's dolphin (*Grampus griseus*)

Based upon the project description provided in your letter received March 4, 2003, NOAA Fisheries recommends considering all potential listees related to protected species. NOAA Fisheries will continue its coordination with the United States Department of Agriculture. Additional comments will follow upon receipt of the Environmental Assessment for the action.

Should you have further questions regarding protected species in waters around Hawaii and/or the section 7 process, please contact David Nichols or myself at (808) 973-2937 or fax (808) 973-2941.

Sincerely,

  
Margaret A. Kamine  
Protected Species Program

cc: Randall Urasaki (PB)

RECEIVED AS FOLLOWS

Ms. Margaret Akamine

Protected Species  
The April 14, 2003 NOAA Fisheries letter identified the following species that may be affected by the project pursuant to ESA Section 7 and the MMPA:

- Green sea turtle (*Chelonia mydas*) - Threatened
- Hawksbill turtle (*Eretmochelys imbricata*) - Endangered
- Humpback whale (*Megaptera novaeangliae*), winter breeding season only (December-May) - Endangered
- Sperm whale (*Physeter macrocephalus*) - Endangered
- Hawaiian monk seal or ʻŌhōhoi-ka-ʻuana (*Monachus schauinslandi*) - Endangered

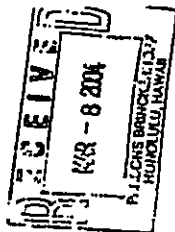
Species protected by the MMPA, but not listed under ESA:

- Bryde's whale (*Balaenoptera edeni*)
- Cuvier's beaked whale (*Ziphius cavirostris*)
- Pygmy sperm whale (*Kogia breviceps*)
- Dwarf sperm whale (*Kogia sima*)
- Melon-headed whale (*Peponocephala electra*)
- Pygmy killer whale (*Feresa attenuata*)
- False killer whale (*Pseudorca crassidens*)
- Killer whale (*Orcinus orca*)
- Short finned pilot whale (*Globicephala macrorhynchus*)
- Spinner dolphin (*Stenella longirostris*)
- Striped dolphin (*Stenella coeruleoalba*)
- Pantropical spotted dolphin (*Stenella attenuata*)
- Common dolphin (*Delphinus delphis*)
- Risso's dolphin (*Grampus griseus*)

Project Description and Environmental Controls

Since we last corresponded with the NOAA Fisheries, the project definition was modified to include only seven landing sites and four ocean segments (see enclosed map) between five of the major islands. We previously (February 26, 2003 letter) informed NOAA Fisheries that the project involved 17 landing sites and 13 ocean segments on six of the major islands (Laysan was dropped). The seven proposed cable landing sites by island are as follows:

- Kauai - Kakaia (Yakihou Road)
- Oahu - Milaha (Kili Drive) and Hawaii Kai (Sandy Beach Park, formerly "City Park")
- Molokai - Kaunakahi (Oncaliyi Homestead)
- Maui - Lahaina (Wahikuli) and Milkena (Pololouena Park)
- Hawaii - Kawaiha (Kawa Place)



USDA  
United States Department of Agriculture  
Rural Development  
Rural Business-Cooperative Service • Rural Housing Service • Rural Utilities Service  
Washington, DC 20250

March 4, 2004

Ms. Margaret Akamine  
Protected Species Program  
National Marine Fisheries Service  
Pacific Islands Area Office  
1601 Kapiolani Boulevard, Suite 1110  
Honolulu, HI 96814

Dear Ms. Akamine:

Subject: Sandwich Isles Communications, Inc. Submarine Fiber-Optic Cable Project  
Project Coordination under Section 7 of the Endangered Species Act and the Marine Mammals Protection Act.

The purpose of this letter is to continue the Section 7 consultation pursuant to the Endangered Species Act (ESA) and coordination under the Marine Mammals Protection Act (MMPA) for the subject project with the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA Fisheries). The U.S. Department of Agriculture, Rural Utilities Service (RUS) is also pursuing ESA Section 7 consultation with the Fish and Wildlife Service (FWS) with regards Federal Trust plant and terrestrial animal species (see enclosed letter).

The proposed 300-mile submarine fiber-optic cable communications network will be owned and operated by Sandwich Isles Communications, Inc. (SIC) for the purpose of providing properties owned by the Department of Hawaiian Home Lands (DHHL) with telecommunications services. As part of the overall statewide network, SIC is currently designing, installing and operating terrestrial fiber-optic cable networks on the major Hawaiian Islands, with the exception of Laysan. RUS may provide financial assistance for both the terrestrial and submarine networks.

The following is a summary of the project's coordination activities conducted to date with NOAA:

- May 31, 2002 joint agency meeting involving the U.S. Environmental Protection Agency, the FWS, NOAA Fisheries, and SIC consultants, which include Hoyt Lee, Environmental Planning Solutions and Parsons Brinckerhoff (PB);
- October 28, 2002 meeting involving the Co-Managers of the Humpback Whale National Marine Sanctuary, NOAA Fisheries, the State Department of Land and Natural Resources Sanctuary and PB;
- February 26, 2003 letter from the RUS to NOAA Fisheries requesting a list of Federal Trust Species that could be affected by the proposed project, and to initiate coordination regarding the Sustainable Fisheries Act and the MMPA; and
- April 14, 2003 letter from NOAA Fisheries to RUS providing a list of protected species pursuant to Section 7 and the MMPA.

Print Development by an Equal Opportunity Employer  
Government Printing Office  
Washington, DC 20540

Landing sites are the connections between the submarine and terrestrial networks. Landing site infrastructure would include an under-sea/floor/underground (landside) conduit, which would contain fiber-optic cables, and a beach manhole within the nearest road right-of-way, which would be the point of connection between the submarine and terrestrial networks. The length of the under-sea/floor conduit would vary by landing site, depending on near shore conditions (e.g., ocean depth and presence of live coral reefs). The landing sites on Kauai and Oahu do not meet directly with the terrestrial network. Therefore, these landing sites require "connecting routes" using existing roadway rights-of-way to link the submarine and terrestrial networks. The lengths of the connecting routes would vary by landing site. The ocean end or opening of the conduit is called the submarine exit point (EP), which would be located typically 60 feet below mean sea level. Seaward of the EP, the fiber-optic cable would lie on the ocean floor. The cable would be deep enough seaward of the EP to not be affected by wave action or storm conditions.

All seven landing sites will be constructed using horizontal directional drilling (HDD), a construction alternative to traditional trenching. Installation of previous cable landing sites by others due to trenching caused disturbances to coastal and marine environments during construction. The SIC project will avoid such impacts by the use of HDD.

Marine disturbance caused by construction of the landing site would be limited to the area directly around the EP. The drill head emerging from the EP would be a controlled event, observed by divers who would cap the bore when completed to await later hook-up with the submarine cable, which will also be a controlled event conducted by divers. If a threatened or endangered species and/or a marine mammal is observed in the immediate vicinity, the drill head emergence or cable hook-up would be delayed until the animal moves away of its own volition. EPs have been located in areas where there are no live coral communities, and the cable seaward of the EP would not be laid on live coral.

A slurry of water and bentonite would be used to lubricate the drill cutter head and seal the bore. Slurry would be replaced by water immediately prior to the drill head emerging from the EP, so slurry is not expected to leak from the bore. However, accidental or inadvertent discharges of slurry into the ocean are possible. For example, the drill head might encounter an unexpected void that is accessible to the ocean water, or the contractor could miscalculate the timing of the slurry to water exchange when the drill head emerges from the EP. Slurry in the ocean would temporarily affect water turbidity, but ocean currents or wave action would be expected to dissipate the turbidity relatively quickly. Bentonite in the slurry is a naturally-occurring clay material, which is not toxic or harmful to the ocean environment. The SIC contractor would immediately be aware of losses of slurry, as indicated by a drop in pressure or the absence of returning slurry (slurry is constantly being recycled). The contractor would stop drilling if the discharges cannot be stopped.

If the contractor were to find that slurry is leaking from the drill bore into the ocean environment, there are several measures to prevent further discharges. If the problem cannot immediately be resolved, drilling, and the introduction of additional slurry, will stop. Drilling shall resume only after the contractor has taken measures to prevent further slurry discharges into the ocean. Divers stationed at the EP when the drill head emerges into the ocean shall be equipped with specialized pumps and filter bags in case slurry is accidentally discharged.

#### Biological Survey Findings

Surveys of terrestrial flora and marine biology were conducted for each landing site (see enclosures). The botanical surveys covered the maximum areas that may be affected by construction at each landing site, including connecting routes at applicable landing sites. For those landing sites where the HDD staging is within a relatively small parcel, the entire property was surveyed. The marine biological surveys focused on the area surrounding the proposed EPs.

Of the listed ESA species only green sea turtles were observed at two of the seven landing sites during the on-site biological surveys. At least one humpback whale was also sighted from shore during a separate site visit at the proposed Waikuli, Maui landing site on January 10, 2003, which is not unexpected along the East Maui shoreline during winter. During the marine survey, a small pod of roughly 20 spinner dolphins (*Stenella longirostris*) was observed during the marine biological survey at Kawahāna, Hawaii (Kawāna Place landing site). While no other listed species were noted at any of the landing sites, they may occur in the general vicinity.

#### Discussion of Potential Impacts on Protected Species

This section provides a discussion of potential interactions between protected species identified by NOAA Fisheries and the planned construction and operation activities.

##### Green sea turtles (*Chelonia mydas*) and Hawaiian monk seals (*Neomonachus imbricatus*)

Green sea turtles (*Chelonia mydas*) are a threatened species found throughout State waters, but it is generally believed that their distribution has been reduced in recent years due to loss of breeding sites and foraging areas. They tend to rest along ledges or in caves in coastal waters usually from 40 to 60 feet in depth during the day, and travel in shallow waters at night to forage on macroalgae.

During the marine biological surveys conducted at proposed landing sites, green sea turtles were observed at two of the seven landing sites. At Māhaha, Oahu (Kali Drive landing site), one roughly 60-centimeter (cm) turtle was observed about 150 meters (450 feet) inshore and west of the proposed EP. This turtle appeared to be passing through the area. At Leleina, Maui (Waikuli landing site), four green sea turtles (two 75 cm and two 50 cm turtles) were observed about 100 m (300 feet) offshore at an apparent resting area (Brook, 2003).

Landing site construction and cable-laying are not expected to adversely affect turtles because construction activities would be benign and temporary, causing only a low level of disturbance to the marine environment, as described above. Cable pop-out is a brief and controlled event, which will be conducted under visual observation by divers, so as not to startle or harm any turtles that may be nearby.

If turtles were observed in the vicinity prior to or during construction, all activities involving the EP would be halted until the animal(s) move away of its own volition.

RECEIVED AS FOLLOWS

RECEIVED AS FOLLOWS

Ms. Margaret Akamine

Page 5 of 7

Humpback whale (Megaptera novaeangliae) and Sperm whale (Physeter macrocephalus)

North Pacific humpback whales (*Megaptera novaeangliae*) are the second most depleted endangered cetacean in the Pacific. Although no humpback whales were observed during the marine surveys, they are known to frequent Hawaii's waters during the winter breeding season (defined by NOAA Fisheries as December through April), when they migrate from Alaska water to the major mating, calving, and calf-rearing grounds in the relatively shallow waters around the island of Maui. During this season, humpback whales are regularly observed off the shore of all islands, and they tend to occur most frequently in waters less than 100 fathoms (600 feet) deep. Sperm whales (*Physeter macrocephalus*) are widely distributed in the North Pacific and believed to be present year-round around in Hawaii, but are more cryptic than the better-documented humpback whales.

Because of the depths they prefer, the primary concern with humpback whales would be potential interactions during cable laying activities. With appropriate mitigation, adverse interactions with these animals can be avoided when laying cable during the winter months. In general, if humpback or sperm whale activity is detected in the path of the cable vessel or in an area where they may interact with the vessel or deployment of the cable, the operation would be halted until the whales move away from the vessel or cable deployment area.

No impact is anticipated during cable landing site construction, which involve depths shallower than known to be preferred by humpback whales. However, similar precautions would also be taken during HDDD pop-out in shallower waters to avoid all cetaceans.

Hawaiian monk seal (Monachus schauinslandi)

The Hawaiian monk seal, called *ʻŌiō-hoʻo-i-ka-uama* in Hawaiian, are known to occur in Hawaii's waters and to haul out on beaches. However, neither project scoping nor inquiries with knowledgeable locals has identified monk seals as a topic of concern at any of the seven proposed landing sites. None are known to frequent the proposed landing sites, and therefore, no adverse impacts are expected.

If a monk seal should appear in the vicinity of the construction activity, either during landing site construction or submarine cable laying, all construction activities would cease until the animal voluntarily moves out of the immediate area.

Other MMPA Protected Species

As with threatened and endangered species, it is unlikely that other protected marine mammals would be affected by the proposed action. These species are highly mobile and would be able to avoid unusual activity in the water, especially for such a short duration as that involved in landing site construction and submarine cable laying.

The presence of spinner dolphins – one of the most common protected marine mammal species – can generally be detected by their obvious activity in the water. If they or other protected marine animals appear in the vicinity of the construction area, all activities would cease until the animal(s) move away from the immediate area.

Similar mitigation measures as those to avoid potential impacts on ESA species would be applied to MMPA species.

Ms. Margaret Akamine

Page 6 of 7

Potential Operational Phase Interactions

Following construction, the marine environment would be returned as much as possible to existing conditions, with the only change being a submarine fiber optic cable laying on the ocean floor and an under-sea-floor conduit containing the fiber-optic cable. There is no evidence to suggest that the presence of submarine fiber optic cables on the ocean floor or under the seafloor would cause adverse impacts to species protected under ESA and MMPA. As an example, there are numerous cables on the leeward coast of Oahu, where both whales and porpoises continue to be present.

Finding and Request for Concurrence

Pursuant to ESA Section 7 and the MMPA, the RUS has carefully considered the potential for impacts to species identified by the NOAA Fisheries. Based on the information provided above, the RUS finds that the species listed in the April 14, 2003 letter would not likely be adversely affected by the proposed Submarine Fiber-Optic Cable project. The RUS requests that NOAA Fisheries provide written concurrence with this finding.

If you have questions or require additional information, please contact Mr. Larry Wolfe of my staff at (202) 720-5093 or email at larry.wolfe@usda.gov.

Sincerely yours,

Glendon D. Deal, PE.

GLENDON DEAL  
Director  
Engineering & Environmental Staff  
Water & Environmental Programs

RECEIVED AS FOLLOWS

Ms. Margaret Akamine

Page 7 of 7

Enclosures:

1. Letter to the U.S. Fish and Wildlife Service regarding project coordination under Section 7 of the Endangered Species Act dated March 4, 2004.
2. Map of Proposed SIC Submarine Fiber-Optic Cable Network
3. Brock, Richard. Marine Biological Assessment of Fiber Optic Cable Deployment at Seven Sites in the Hawaiian Islands in Support of the Sandwich Isles Communications, Inc. Network. July 2003. Char & Associates Botanical Resources Assessment Kelaha Cable Landing Site, Kelaha, Waimea District, Kauai. October 2002.
5. Botanical Resources Assessment Kii Drive Cable Landing Site, Makaha, Waipahoehoe District, Oahu. November 2002.
6. Botanical Resources Assessment Sandy Beach Cable Landing Site, Hooaloa District, Oahu. November 2002.
7. Botanical Resources Assessment Kalamayula Cable Landing Site, Molokai District, Molokai. April 2003.
8. Botanical Resources Assessment Wahihuli Cable Landing Site, Wahihuli, Lanai, Maui. May 2003.
9. Botanical Resources Assessment Pofolemalena Cable Landing Site, Makana, Makawao District, Maui. April 2003.
10. Botanical Resources Assessment Kawaihae Cable Landing Site, South Kona District, Hawaii. April 2003.

cc. Ms. Gina Shultz, USFWS  
Dr. Wendy Wilkes, EPA  
Mr. Paul Conry, DLNR-DORAW  
Mr. Francis Oishi, DLNR-DAR  
Mr. Randall Urasaki, PB

cc: Official File/EBS Lwolle Gdeal  
RUS:RES:LWolle:720-5093-03/03/04:lad:fmal:03-03-04

PAImable:SWAT RJenkins:GFR

RECEIVED AS FOLLOWS



Parsons  
Brinckerhoff  
American Savings Bank Tower  
1001 Bishop Street, Suite 2000  
Honolulu, HI 96813



Mr. Francis G. Oishi, Program Manager  
Division of Aquatics  
Page 2

May 7, 2003

Mr. Francis G. Oishi, Program Manager  
Division of Aquatics  
Department of Land and Natural Resources  
State of Hawaii  
1151 Punchbowl Street, Room 330  
Honolulu, Hawaii 96813

Dear Mr. Oishi:

Subject: Sandwich Isles Communication, Inc.  
Submarine Cable Project  
Pre-Assessment Consultation

Sandwich Isles Communications, Inc. (SIC) is a rural telephone company headquartered in Honolulu, Hawaii that is developing a statewide telecommunications network to service the Department of Hawaiian Home Lands. The U.S. Department of Agriculture Rural Utilities Service (RUS) is providing loan assistance for the project. The portion of the project that would connect the major Hawaiian Islands by submarine telecommunication cables is now entering the federal and State environmental review processes.

Representatives of SIC have met with DLNR staff several times to discuss this project. In addition, a project presentation was made to Director Coloma-Agaran and several DLNR division directors on August 27, 2002 (minutes attached). At that meeting, Director Coloma-Agaran gave permission for SIC representatives to coordinate directly with the various divisions of DLNR that will be providing project oversight. Since that time, the project has been more clearly defined.

The purpose of this letter is to request any comments or suggestions you may have on the environmental aspects of the proposed submarine cables and cable landing areas pursuant to the National Environmental Policy Act (NEPA) and the Hawaii Revised Statutes (HRS) Chapter 343. Our initial assessment indicates that we will also need to coordinate with your agency regarding the State of Hawaii Endangered Species Act, HRS Chapter 1950. Letters Initiating Informal section 7 consultation (Endangered Species Act), have already been sent to the U.S. Fish and Wildlife Service and to the National Marine Fisheries Service (see attached). We trust that complying with the Section 7 process will satisfy the requirements of HRS Chapter 1950 as long as the federal agencies are able to make non-jeopardy determinations, which we anticipate. Comments pertaining to the project's environmental aspects will be addressed in an Environmental Assessment (EA) to be approved by RUS and the Hawaii Department of Land and Natural Resources. Those providing comments at this stage will receive a copy of the Draft EA when it is issued.

Over a Century of  
Engineering Excellence

Over a Century of  
Engineering Excellence

**PROPOSED ACTION**

The current proposal involves the installation of undersea fiber optic cables that will connect five major Hawaiian Islands (Kauai, Oahu, Molokai, Maui, and Hawaii). The undersea fiber optic cables will connect to onshore fiber optic systems. These cables will establish connections for SIC's Statewide Telecommunications Network, ensuring reliable high quality service to network subscribers.

A cable-laying ship will place cables on the ocean floor between the islands. Where the cables approach land, a cable landing will be constructed using a technique called horizontal directional drilling (HDD). The HDD method was selected because of its ability to drill under reefs, minimizing impact to coastal areas. Starting from onshore manholes sites, the HDD equipment bores below the ground and reel areas to a point under water at least 60 feet deep and 2,000 to 5,000 feet offshore.

In light of the current economic conditions, SIC has determined that in order to provide modern telecommunications services to DHHL subscribers in a timely manner, they will proceed with a network that can be built in the most expeditious and economical manner. Therefore, the marine cable landing project has been redesigned to include only seven landing sites at this time that will connect all the DHHL projects on the five major islands. In the future, given a more positive economy, additional cable landings may be added for redundancy. However, the initial network of seven landing sites will provide a complete, independent, functioning network even if additional cable landings are not provided.

The preliminary identification of cable landing sites is as follows:

- On Kauai, in the Kekaha area; at Akiaba Road (TMK: por. 4-1-2-002:032)
- On Oahu, in the Mākaha and Hawaii Kai areas; at Kūi Drive and City Park (TMK: por. 1-9-4-002-047 and TMK: por. 1-3-9-015:001)
- On Molokai, in the Kaunakakai area; at Onea'i'i Homesite (TMK: 2-5-4-006:019)
- On Maui, in the Lahaina and Mākena areas; at Waihi and Po'olenalena Park (TMK: por. 2-4-5-021:015 and TMK: por. 2-2-1-007:072)
- On Hawaii, in the Kawahae area; at Kaāwe Street (TMK: por. 3-6-1-004:020)

**BACKGROUND**

SIC is certified by the Federal Communications Commission and is authorized by the State of Hawaii Public Utilities Commission to provide telecommunications service on properties administered by the Department of Hawaiian Home Lands (DHHL). SIC has been serving DHHL communities since 1998. Many DHHL areas are located in rural communities where telecommunications (telephone) services are neither existent nor sufficient. SIC's proposed project will connect five major Hawaiian Islands and provide essential telecommunications services and a modern, broadband fiber optic system to DHHL areas at affordable rates.



Mr. Francis G. Oishi, Program Manager  
Division of Aquatics  
Page 3

Onshore, fiber optic cables will be installed underground, mostly within existing public rights-of-way, such as roads. SIC previously prepared Environmental Assessments (EA's) for the terrestrial system in each county, and these EA's were accepted by the Hawaii Department of Transportation. This project is also proceeding in accordance with a Memorandum of Agreement (under Section 106 of the National Historic Preservation Act) designed to protect cultural and historic properties that may be encountered along the routes.

The benefits of this project include:

1. DHHL and its beneficiaries will have access to a modern, independent and affordable telecommunications infrastructure.
2. This infrastructure will enable subscribers to have access to new interactive services such as telemedicine, tele-educational programming, video and data transmissions, and the internet.
3. Creation of hundreds of jobs during the construction of the network and attraction of new high tech and other businesses to DHHL parcels.
4. To date, SIC has spent \$100 million from an RUS loan on new construction. Within the next 2 to 3 years up to an additional \$300 million is also available through the same loan for future project-related expenses.

**COMMENTS**

SIC has been consulting with members of native Hawaiian organizations, government agencies, businesses, and communities in the affected areas since the environmental review process began for the terrestrial cable systems. Your input is now requested specifically on environmental aspects of the submarine cables between the islands, and the cable landing sites. Written comments will become part of the official project record and will be addressed in the forthcoming Draft EA for the submarine cable network.

Comments may be mailed to the following address:

Mr. Randall Urasaki  
Parsons Brinckerhoff  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

They may also be sent by facsimile transmission to (808) 528-2368 or email at urasaki@pbworld.com. Comments will be most useful to us if received within one month of your receipt of this letter.

This will not be your final opportunity to comment on this project. You will be notified when the Draft Environmental Assessment is issued. If you would like to receive a copy of the Draft EA, please notify us by mail, email, or phone.

Over a Century of  
Engineering Excellence



Mr. Francis G. Oishi, Program Manager  
Division of Aquatics  
Page 4

We look forward to receiving your comments.

Mahalo,  
PARSONS BRINCKERHOFF QUADE & DOUGLAS INC.

Randall Urasaki, P.E.  
Project Manager

c: Mr. Peter Young, Director DLNR  
Mr. Michael G. Buck, DOFAW

**Enclosures:**

- Attachment 1: Proposed Submarine Cable Landing Sites (Map)
- Attachment 2: HDD Construction Technology
- Attachment 3: Kekaha, Kauai; Landing Site Map and 'Akaioa Road Map
- Attachment 4: Māhaha, O'ahu; Landing Site Map and Kili Drive Map
- Attachment 5: Hawaii Kai, O'ahu; Landing Site Map and City Park Map
- Attachment 6: Kaunakakai, Molokai; Landing Site Map and Onepahi Homesteads Map
- Attachment 7: Lahaina, Maui; Landing Site Map and Wāhukū Map
- Attachment 8: Mākena, Maui; Landing Site Map and Po'olenalena Park Map
- Attachment 9: Kawaihae, Hawaii; Landing Site Map and Ka'awe Street Map
- Attachment 10: Minutes of Meeting with Director Coloma-Agaran, August 30, 2002
- Attachment 11: Letter to U.S. Fish and Wildlife Service, February 26, 2003
- Attachment 12: Letter to National Marine Fisheries Service, February 26, 2003

RECEIVED AS FOLLOWS

Over a Century of  
Engineering Excellence



**Memorandum**

**To:** File  
**From:** David Atkin  
**Date:** 30 August 2002  
**Subject:** Meeting with DLNR  
Sandwich Isles Communications Project  
Kalahele Building  
27 August 2002

**Attendees:** Gi Coloma-Agaran  
Carol Ogata  
Francis Orsi  
Sam Lemmo  
Lani Ma a Lapiko  
Dawn Chang  
Codelito Sakoda  
Randall Urasaki  
David Atkin  
DLNR  
SHPD  
Aquatics Division  
Land Division/Planning  
Ho'akea  
Ho'akea  
Environmental Planning Solutions  
Parsons Brinckerhoff  
Parsons Brinckerhoff

**Meeting Summary:**

PB requested a meeting with DLNR to introduce the marina part of the SIC project and establish a protocol for further coordination with the various divisions of DLNR. Dawn made a brief project presentation and emphasized the use of HDD as a construction technique.

The SIC team requested that DLNR be the accepting authority for the Chapter 343 document to be prepared for the project, and DLNR agreed. The SIC team noted that a NEPA EA would also be prepared for this project, with RUS being the accepting authority on the NEPA document.

**Points of discussion included:**

- Would the cable alignments follow existing cable alignments? A: Not always because the preferred landing sites are D-H-F-L parcels. Therefore, there will be new landing sites. Also, because of the low level of environmental impact with HDD, the adverse environmental impacts of not corridor-sharing are substantially reduced.
- What rules for landing sites have been adopted by other states? A: Oregon and California may have adopted rules; this is being researched.
- Sam commented that even HDD has potential adverse impacts, as follows:
  1. impacts at the onshore drilling site, the approach trench can involve substantial excavation;
  2. the beach manhole ("junction box structure") can be a large structure that could potentially interfere with beach processes or affect existing activities at the site of the "junction box";
  3. drilling mud can contain toxic constituents so they must be handled appropriately and releases into the environment avoided.



- Sam commented that the assignment to develop the long-requested State policy on cable landings had been passed to the Office of Planning.
- SIC: Would the Land Board delay decisions on landing site CDUP's until the State policy is developed? Sam: Don't know, there's no formal moratorium, the administration will change.
- Sam: If a landing site triggers an SMA requirement and the landing site upland is within a State "Conservation District," the SMA must be granted before decision-making on the CDUA. (Subsequent analysis has determined that many proposed landing sites fall into this situation.) There is no linkage between SMA and CDUA if there is no need for an SMA, or if an SMA is needed but the upland of the landing site is not in the Conservation District.
- A CDUP can be processed in 6 months after the Final EA, if there are no SMA complications.
- The CDUA review criteria are somewhat modified since the SIC project serves a "public purpose."
- The CDUA process involves a public hearing, and given the geographic scope of this project, there will need to be a public hearing on every island.
- GI: Stay out of Natural Area Preserves (e.g., Makana). Stay off of Penguin Banks because it is a prime fishing area as well as being in the Humpback Whale National Marine Sanctuary. Marine operations in the Humpback Whale National Marine Sanctuary when the whales are in town will be an issue. Whale populations have increased. SIC is advised to meet with the managers of the Whale Sanctuary. The Sanctuary is co-managed by NOAA and DLNR. The DLNR point of contact is Jeff Walters and should be contacted first. The most appropriate NOAA contact beginning Oct. 1 would be Allan Tom because the local NOAA office is restructuring and a local position above the sanctuary manager is being created.
- Comment: Provide information on prior local applications of HDD technology, particularly the use of HDD to construct existing cable landings. (comment: consider a site visit)
- GI: there could be substantial delays if a Habitat Conservation Plan (HCP) is needed (e.g., if the alignment goes through "critical habitat"). This is because Chapter 195D (the State Endangered Species Law) does not presently allow State agencies to sponsor HCP's. This applies to D-H-F-L, should an HCP be required because of critical habitat on D-H-F-L land. This problem with the law may be fixed by the next session of the legislature.
- SIC may contact the specific Divisions within DLNR to discuss additional details:
  1. DAF: Francis Orsi
  2. SHPD: Don Hibbard or Ross Cordy
  3. Land Division: Sam Lemmo

RECEIVED AS FOLLOWS





Parsons  
Brinckerhoff  
Goodrich &  
Dunlap, Inc.  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813  
808-537-7054  
Fax: 808-538-2566

May 7, 2003

Mr. Michael G. Buck, Administrator  
Division of Forestry and Wildlife  
Department of Land and Natural Resources  
State of Hawaii  
P.O. Box 621  
Honolulu, Hawaii 96809

Dear Mr. Buck:  
Subject: Sandwich Isles Communication, Inc.  
Submarine Cable Project  
Pre-Assessment Consultation

Sandwich Isles Communications, Inc. (SIC) is a rural telephone company headquartered in Honolulu, Hawaii that is developing a statewide telecommunications network to service the Department of Hawaiian Home Lands. The U.S. Department of Agriculture Rural Utilities Service (RUS) is providing loan assistance for the project. The portion of the project that would connect the major Hawaiian Islands by submarine telecommunication cables is now entering the federal and State environmental review processes.

Representatives of SIC have met with DLNR staff several times to discuss this project. In addition, a project presentation was made to Director Cokoma-Agaran and several DLNR division directors on August 27, 2002 (minutes attached). At that meeting, Director Cokoma-Agaran gave permission for SIC representatives to coordinate directly with the various divisions of DLNR that will be providing project oversight. Since that time, the project has been more clearly defined.

The purpose of this letter is to request any comments or suggestions you may have on the environmental aspects of the proposed submarine cables and cable landing areas pursuant to the National Environmental Policy Act (NEPA) and the Hawaii Revised Statutes (HRS) Chapter 343. Our initial assessment indicates that we will also need to coordinate with your agency regarding the State of Hawaii Endangered Species Act, HRS Chapter 195D. Letters initiating Informal Section 7 consultation (Endangered Species Act), have already been sent to the U.S. Fish and Wildlife Service and to the National Marine Fisheries Service (see attached). We trust that complying with the Section 7 process will satisfy the requirements of HRS Chapter 195D as long as the federal agencies are able to make non-jeopardy determinations, which we anticipate. Comments pertaining to the project's environmental aspects will be addressed in an Environmental Assessment (EA) to be approved by RUS and the Hawaii Department of Land and Natural Resources. Those providing comments at this stage will receive a copy of the Draft EA when it is issued.

Over a Century of  
Engineering Excellence



Mr. Michael G. Buck, Administrator  
Division of Forestry and Wildlife  
Page 2

**PROPOSED ACTION**

The current proposal involves the installation of undersea fiber optic cables that will connect five major Hawaiian Islands (Kauai, Oahu, Molokai, Maui, and Hawaii). The undersea fiber optic cables will connect to onshore fiber optic cable systems. These cables will establish connections for SIC's Statewide Telecommunications Network, ensuring reliable high quality service to network subscribers.

A cable-laying ship will place cables on the ocean floor between the islands. Where the cables approach land, a cable landing will be constructed using a technique called horizontal directional drilling (HDD). The HDD method was selected because of its ability to drill under reefs; minimizing impact to coastal areas. Starting from onshore manholes sites, the HDD equipment bores below the ground and feet areas to a point under water at least 60 feet deep and 2,000 to 5,000 feet offshore.

In light of the current economic conditions, SIC has determined that in order to provide modern telecommunications services to DHHL subscribers in a timely manner, they will proceed with a network that can be built in the most expeditious and economical manner. Therefore, the marine cable landing project has been redesigned to include only seven landing sites at this time that will connect all the DHHL projects on the five major islands. In the future, given a more positive economy, additional cable landings may be added for redundancy. However, the initial network of seven landing sites will provide a complete, independent, functioning network even if additional cable landings are not provided.

The preliminary identification of cable landing sites is as follows:

- On Kauai, in the Kekaha area; at Akiakoa Road (TMK: por. 4-1-2-002-032)
- On Oahu, in the Mākaaha and Hawaii Kai areas; at Kūi Drive and City Park (TMK: por. 1-8-4-002-047 and TMK: por. 1-3-9-015-001)
- On Molokai, in the Kaurakakai area; at Onea'i'i Homesteads (TMK: 2-5-4-006-019)
- On Maui, in the Lahaina and Mākena areas; at Waikuli and Po'olenalena Park (TMK: por. 2-4-5-021-015 and TMK: por. 2-2-1-007-072)
- On Hawaii, in the Kawaihae area; at Ka'āwe Street (TMK: por. 3-6-1-004-020)

**BACKGROUND**

SIC is certified by the Federal Communications Commission and is authorized by the State of Hawaii Public Utilities Commission to provide telecommunications service on properties administered by the Department of Hawaiian Home Lands (DHHL). SIC has been serving DHHL communities since 1998. Many DHHL areas are located in rural communities where telecommunications (telephone) services are neither existent nor sufficient. SIC's proposed project will connect five major Hawaiian Islands and provide essential telecommunications services and a modern, broadband fiber optic system to DHHL areas at affordable rates.

Onshore, fiber optic cables will be installed underground, mostly within existing public rights-of-way, such as roads. SIC previously prepared Environmental Assessments (EA's) for the

Over a Century of  
Engineering Excellence

RECEIVED AS FOLLOWS



Mr. Michael G. Buck, Administrator  
Division of Forestry and Wildlife  
Page 3

terrestrial system in each county, and these EA's were accepted by the Hawaii Department of Transportation. This project is also proceeding in accordance with a Memorandum of Agreement (under Section 106 of the National Historic Preservation Act) designed to protect cultural and historic properties that may be encountered along the routes.

The benefits of this project include:

1. DHHL and its beneficiaries will have access to a modern, independent and affordable telecommunications infrastructure.
2. This infrastructure will enable subscribers to have access to new interactive services such as telemedicine, tele-educational programming, video and data transmissions, and the internet.
3. Creation of hundreds of jobs during the construction of the network and attraction of new high tech and other businesses to DHHL parcels.
4. To date, SIC has spent \$100 million from an FUS loan on new construction. Within the next 2 to 3 years up to an additional \$300 million is also available through the same loan for future project-related expenses.

**COMMENTS**

SIC has been consulting with members of native Hawaiian organizations, government agencies, businesses, and communities in the affected areas since the environmental review process began for the terrestrial cable systems. Your input is now requested specifically on environmental aspects of the submarine cables between the islands, and the cable landing sites. Written comments will become part of the official project record and will be addressed in the forthcoming Draft EA for the submarine cable network.

Comments may be mailed to the following address:

Mr. Randall Urasaki  
Parsons Brinckerhoff  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

They may also be sent by facsimile transmission to (808) 528-2368 or email at urasaki@pbworld.com. Comments will be most useful to us if received within one month of your receipt of this letter.

This will not be your final opportunity to comment on this project. You will be notified when the Draft Environmental Assessment is issued. If you would like to receive a copy of the Draft EA, please notify us by mail, email, or phone.

We look forward to receiving your comments.

RECEIVED AS FOLLOWS



Mr. Michael G. Buck, Administrator  
Division of Forestry and Wildlife  
Page 4

Mahalo,  
PARSONS BRINCKERHOFF QUADE & DOUGLAS, INC.

Randall Urasaki, P.E.  
Project Manager

C: Mr. Peter Young, Director DLNR  
Mr. Francis G. Oishi, DOFAW

**Enclosures:**

- Attachment 1: Proposed Submarine Cable Landing Sites (Map)
- Attachment 2: HDD Construction Technology
- Attachment 3: Kekaha, Kauai; Landing Site Map and 'Aka'ala Road Map
- Attachment 4: Māhaha, O'ahu; Landing Site Map and Kili Drive Map
- Attachment 5: Hawaii Kai, O'ahu; Landing Site Map and City Park Map
- Attachment 6: Kaunakakai, Molokai; Landing Site Map and Oneali'i Homesteads Map
- Attachment 7: Lahaina, Maui; Landing Site Map and Waihuku Map
- Attachment 8: Mākena, Maui; Landing Site Map and Po'olenalena Park Map
- Attachment 9: Kawaihae, Hawaii; Landing Site Map and Ka'āwea Street Map
- Attachment 10: Minutes of Meeting with Director Coloma-Agaran, August 27, 2002
- Attachment 11: Letter to U.S. Fish and Wildlife Service, February 26, 2003
- Attachment 12: Letter to National Marine Fisheries Service, February 26, 2003



Memorandum

To: File  
 From: David Altun  
 Date: 30 August 2002  
 Subject: Meeting with DLNR  
 Sandwich Isles Communications Project  
 Kalaheoku Building  
 27 August 2002

Attendees: Gil Coloma-Agaran  
 Carol Ogata  
 Francis Oishi  
 Sam Lemmo  
 Lani Ma a Lapilo  
 Dawn Chang  
 Colette Sakoda  
 Ranceal Urasaku  
 David Altun  
 DLNR  
 SHPO  
 Aquatics Division  
 Land Division/Planning  
 Ho'akea  
 Ho'akea  
 Environmental Planning Solutions  
 Parsons Brinckerhoff  
 Parsons Brinckerhoff

Meeting Summary:

PB requested a meeting with DLNR to introduce the marine part of the SIC project and establish a protocol for further coordination with the various divisions of DLNR. Dawn made a brief project presentation and emphasized the use of HDD as a construction technique. The SIC team requested that DLNR be the accepting authority for the Chapter 343 document to be prepared for the project, and DLNR agreed. The SIC team noted that a NEPA EA would also be prepared for this project, with RUS being the accepting authority on the NEPA document.

- Would the cable alignments follow existing cable alignments? A: Not always because the preferred landing sites are DPH-L parcels. Therefore, there will be new landing sites. Also, because of the low level of environmental impact with HDD, the adverse environmental impacts of not corridor-sharing are substantially reduced.
- What rules for landing sites have been adopted by other states? A: Oregon and California may have adopted rules; this is being researched.
- Sam commented that even HDD has potential adverse impacts, as follows:
  1. impacts at the onshore drilling site, the approach trench can involve substantial excavation;
  2. the beach manhole ("junction box structure") can be a large structure that could potentially interfere with beach processes or affect existing activities at the site of the "junction box";
  3. drilling mud can contain toxic constituents so they must be handled appropriately and releases into the environment avoided.

RECEIVED AS FOLLOWS



- Sam commented that the assignment to develop the long-requested State policy on cable landings had been passed to the Office of Planning.
- SIC: Would the Land Board delay decisions on landing site CDUP's until the State policy is developed? Sam: Don't know, there's no formal moratorium, the administration will change.
- Sam: If a landing site triggers an SMA requirement and the landing site is upland is within a State "Conservation District," the SMA must be granted before decision-making on the CDUA. (Subsequent analysis has determined that many proposed landing sites fall into this situation.) There is no linkage between SMA and CDUA if there is no need for an SMA, or if an SMA is needed but the upland of the landing site is not in the Conservation District.
- A CDUP can be processed in 6 months after the Final EA, if there are no SMA complications.
- The CDUA review criteria are somewhat modified since the SIC project serves a "public purpose."
- The CDUA process involves a public hearing, and given the geographic scope of this project, there will need to be a public hearing on every island.
- GI: Stay out of Natural Area Preserves (e.g., Maikona). Stay off of Penguin Banks because it is a prime fishing area as well as being in the Humpback Whale National Marine Sanctuary. Marine operations in the Humpback Whale National Sanctuary when the whales are in town will be an issue. Whale populations have increased. SIC is advised to meet with the managers of the Whale Sanctuary. The Sanctuary is co-managed by NOAA and DLNR. The DLNR point of contact is Jeff Walters and should be contacted first. The most appropriate NOAA contact beginning Oct. 1 would be Alan Tom because the local NOAA office is restructuring and a local position above the sanctuary manager is being created.
- Comment: Provide information on prior local applications of HDD technology, particularly the use of HDD to construct existing cable landings. (comment: consider a site visit)
- GI: there could be substantial delays if a Habitat Conservation Plan (HCP) is needed (e.g., if the alignment goes through "critical habitat"). This is because Chapter 195D (the State Endangered Species Law) does not presently allow State agencies to sponsor HCP's. This applies to DPH-L, should an HCP be required because of critical habitat on DPH-L land. This problem with the law may be fixed by the next session of the legislature.
- SIC may contact the specific Divisions within DLNR to discuss additional details:
  1. DAR: Francis Oishi
  2. SHPO: Don Hibbard or Ross Cordy
  3. Land Division: Sam Lemmo



## Memorandum

**To:** File  
**From:** Jason Yazawa  
Colette Sakoda  
**Date:** February 14, 2003  
**Subject:** Sandwich Isles Communications, Inc.  
Submarine Cable Project  
Meeting with State Historic Preservation Division on February 5, 2003

**In Attendance:** Sara Collins, SHPD  
Elaine (Muffet) Jourdana, SHPD  
Pat McCoy, SHPD  
Caitleen Dagher, SHPD  
Lani Lapilio, Hoakea  
Colette Sakoda, EPS  
Perry Small, PB  
Jason Yazawa, PB

### Project Overview and Construction

Mr. Small provided a briefing on the overall project, and its relationship with terrestrial cable system that Sandwich Isles Communications, Inc. (SIC) is presently building. Mr. Small also explained the role of PB. Ms. Lapilio explained the role of Hoakea.

Mr. Small explained that all cable landing sites would be constructed using horizontal directional drilling (HDD). He then described how HDD is conducted, and the types of vehicles and equipment that are used. Mr. Small also explained that trenching (TDD) may be used in some instances) would be required to connect the landing sites to the terrestrial system. Following construction, the only evidence of the infrastructure will be a manhole, and cable house or cabinet at some of the landing sites.

### Proposed HRS Chapter 6E Rules

When asked about the implications of the proposed HRS Chapter 6E rules to the project, SHPD responded that the Section 106 process would still be more stringent.

### Soil Sampling

SHPD stated that the Land Board should have consulted with them before granting right-of-entry to conduct soil sampling on State land. SHPD does not blame PB because permission was granted. SHPD asked that they be consulted on future soil

Over a Century of  
Engineering Excellence

Meeting with State Historic Preservation Division  
February 5, 2003  
Page 2

sampling, and to provide them with a list of sites that have already undergone sampling.

### Area of Potential Effect

PB proposed a definition of the area of potential effect (APE) that would be applied to every landing site. SHPD agreed with this definition, but to also include the road or path to the construction site if one needs to be cleared. PB noted that for large undeveloped parcels, the construction area was much larger than what would be needed to stage HDD operations. This is to allow the contractor with flexibility in avoiding archaeological sites if found on site.

### Discussion of Landing Sites

SHPD, Hoakea, EES and PB discussed each landing site, including the appropriate level of study to identify historic sites. Follow-up discussions with SHPD personnel attending this meeting and discussions with the Island archaeologists on the other islands will continue. A summary of the discussion is provided below:

- **Kekaha:** The area has a history of archaeological discoveries, therefore an inventory survey was recommended. SHPD agreed, but further consultation will be held with the Kaula archaeologists who was not present at the meeting.
- **Anahola:** The area north of the proposed landing site has past archaeological discoveries. However, short of the recommendation of the need for anything other than assessment level study, further consultation will also be held with the Kaula archaeologist.
- **Dole and Kalaka Park:** Neither proposed landing site has any archaeological concerns, but SHPD indicated that the gap routes to Weed Circle may raise potential "hot" impact concerns. Further consultation will occur with Muffet, the Oahu archaeologist when the site is finalized.
- **Kill Drive:** SHPD concurred that although staff would prefer not to see another Waiānā/Makaha landing site due to the numerous existing sites, selecting one is inevitable since there is a lot of DPHL land on this side of the island. CSH recommended an inventory survey for the Kill Drive site, and SHPD concurred.
- **Sandy Beach:** SHPD concurred that because the proposed landing site is aligned with the existing sewer outfall and Verizon cable landing, an assessment level study will be the next step.
- **Kalaupapa (old pol factory):** Ms. Collins noted that the site was probably not used for burials, but there is the possibility that remnants of the pol factory building may be in the subsurface. She recommended that the project start with an assessment to determine whether building remnants may be uncovered. If not, the assessment should suffice for Section 106 purposes. Ms. Lapilio noted

Over a Century of  
Engineering Excellence

RECEIVED AS FOLLOWS

that the archaeological work may require an ARPA (Archaeological Resources Protection Act) permit. NAGPRA would also apply. SHPD also noted that the cable house has to be consistent with the historic characteristics of the town.

- Kalamauia (Alii Fishpond): Ms. Collins noted that the area of the site is called Kapaakea. The site itself, according to Ms. Collins, is probably recently accreted, and that an assessment should be able to uncover this.
- Kaunaloa Harbor: Ms. Dagher did not see any problems with using the proposed site because construction vehicles would be parked on the remnant highway.
- Manele Bay: Ms. Dagher did not see any problems using the area just upland of the boat ramp because it is used for trailer parking.
- Honokowai (old airport): SHPD did not raise any issues, but further consultation will be held with the Maui archaeologist, who did not attend the meeting.
- Waiehu: SHPD is aware of the high number of burials in the area of this site, but acknowledged that drilling would be conducted from the parking lot. Further consultation will be held with the Maui archaeologist.
- Keanae, Waialua, and Hana: SHPD did not raise any issues. PB noted that these sites are not firm.
- Poolanaiena: SHPD noted that the area of this site contains a lot of archaeological sites. Further consultation will be held with the Maui archaeologist.
- Kawaihale: Mr. McCoy stated that the site does not appear to have archaeological issues, but was unsure about subsurface conditions. He will look into further.
- Hilo/Keokea: Mr. McCoy does not anticipate problems with the site.

#### Consultation

SHPD recommended that the project consult with the Office of Hawaiian Affairs, Hui Malama, the Island burial councils, homestead associations and civic clubs.

#### Memorandum of Agreement

There was discussion on whether the existing MOAs for the terrestrial systems can be amended to include possible "adverse effects" of the proposed landing sites. It was decided to defer this discussion to a later date.

RECEIVED AS FOLLOWS

RECEIVED AS FOLLOWS

Dr. Holly McEldowney  
February 11, 2003  
Page 2 of 6



Parsons  
Brinckerhoff  
Pacific Tower, Suite 2000  
1001 Bishop Street  
Honolulu, HI 96813  
808-531-7084  
Fax: 808-526-2368

February 11, 2003

Dr. Holly McEldowney  
Acting Administrator  
State of Hawaii Department of Land and Natural Resources  
Historic Preservation Division  
Kakuhewa Building, Suite 555  
601 Kamehaha Boulevard  
Kapolei, Hawaii 96707

Dear Dr. McEldowney:

**SUBJECT:** Sandwich Isles Communications Statewide Telecommunications Network - Soil Sampling at Proposed Landing Sites for Submarine Cables, February 24-27, 2003

Sandwich Isles Communications, Inc., is building a fiber optic communications cable network that will provide Hawaiian homestead beneficiaries and lessees with access to essential telecommunications services. SIC is certified by the Federal Communications Commission (FCC) as a rural local exchange carrier and is authorized by the Hawaii Public Utilities Commission (PUC) to provide telecommunications service on D-H-L properties.

As consultants to SIC, Parsons Brinckerhoff (PB) and Ho'akea LLC met with your staff on February 5, 2003. At this meeting, PB and Ho'akea described the details of the project and obtained preliminary guidance on archaeological documentation procedures for each proposed cable landing site, as well as discussing agency coordination and regulatory oversight issues.

The purposes of this letter are to follow up on the discussions at the February 5<sup>th</sup> meeting, provide additional information specifically on two proposed landing sites on the island of Hawaii, and afford SHPD staff an opportunity to comment on these two sites prior to soil sampling activities scheduled for February 24-27, 2003. Rights of entry (ROE) to conduct the soil sampling have already been obtained.

Soil sampling has already been completed at several of the proposed cable landing sites, as shown in Table 1 below.

**Background**

SIC presently provides 12 Hawaiian Home Land communities with telecommunications services, but D-H-L land holdings extend beyond the 12 communities already served by SIC. The network will connect D-H-L properties on the six Hawaiian Islands where D-H-L lands are located (see Attachment 1). The proposed communications cable network will be owned and operated by SIC. A total of 17 proposed cable landing sites have been identified on the six islands to be served by the SIC system.

**Table 1: Status of Soil Sampling at Proposed Landing Sites**

Proposed Landing Sites	Agency Approving ROE	Status of Soil Sampling
KAUAI		
Keleha	D-H-L	Completed
Anahola	D-H-L	Completed
OAHU		
Makaha - Kai Drive	C&C Honolulu	To be scheduled
Haleiwa (Option 1) - Dole/Waiatus Sugar	Walaka Sugar Co.	Completed
Haleiwa (Option 2) - Kalaka Park	C&C Honolulu	Completed
Hawai Kai - Sandy Beach	C&C Honolulu	Completed
LANAI		
Manele Bay	Lana & Co.	To be scheduled
Kaunaloa	Castle & Cooke	To be scheduled
MAUI		
Honokowai - Old Keanahele Airport	AMFAC	To be scheduled
Waiehu	Mau County DFR	Completed
Waiehu	D-H-L	To be scheduled
Kealahou	D-H-L	To be scheduled
Hana (Option 1) - Hana Bay	DUNR	To be scheduled
Hana (Option 2) - Waiapanapa State Park	DUNR	To be scheduled
Makaha - Pookenalea	DUNR	Completed
MOLOKAI		
Kalaupapa	D-H-L	To be scheduled
Kalaupapa	D-H-L	Completed
HAWAII (Big Island)		
Kawaha	D-H-L	Feb. 26-27, 2003
Hoo - Kookea	D-H-L	Feb. 24-25, 2003

Notes: D-H-L = State of Hawaii Department of Hawaii Home Lands  
DFR = State of Hawaii Department of Land and Natural Resources  
DUNR = Department of Parks & Recreation  
C&C = City and County

A key feature of the project is that it will utilize horizontal directional drilling (HDD), a less invasive construction method than trenching. Attachment 2 describes the HDD process in more detail.

To finalize landing site locations, on-site soil sampling must be conducted to determine whether site geology would allow HDD to be used successfully. Right-of-entry (ROE) permits have been or will be obtained from land owners to conduct the soil sampling. At each site, two holes roughly four inches in diameter will be drilled to depths of 20 to 40 feet. The first hole will be placed at the proposed location of the HDD pit; the second hole will be placed as close to the coastline as possible. On-site soil testing activity will last two days.

Over a Century of  
Engineering Excellence

Over a Century of  
Engineering Excellence



At the meeting on February 5, we learned that the SHPD was not consulted when ROE permits were issued for publicly-owned lands. We would like to offer SHPD the opportunity to provide comments before future soil sampling activities are conducted.

As shown in Table 1, soil sampling activities are scheduled at two Big Island sites for the last week of February. Our archaeological subconsultant visited the proposed sites and prepared the following preliminary assessment of both sites. Areas of potential effects (APE) discussed on February 5 are shown in Attachments 3 and 4. Note that for the Hilo (Keokea) site, soil sampling will take place on two separate parcels, because the HDD pit would be placed mauka of the road.

#### Hilo, Hawaii - Keokea

The proposed Keokea soil sampling sites are located within TMK: 2-1-021:79, a 0.61 acre vacant DHHL Kuhio Settlement Lots parcel, and TMK: 2-1-011:005, a 9.46 coastal DHHL parcel used as a beach park, in the Land of Waialea, South Hilo District. Both of the parcels are characterized by Keaukaha extremely rocky muck (Sato et al. 1973). This soil series is characterized by pahoehoe outcrops occupying at least 25% of the surface, and a thin layer of very dark brown muck over lava bedrock.

Examination of the current tax map for the parcels indicates that there are no Land Commission Awards in the subject parcels. The maps for Plats 021 and 011 show areas of swamp in the beach park parcel. The only archaeological work in the immediate vicinity of the project area is a survey by Hudson (1932) that identified seven sites along the shoreline. The sites consist of a large burial platform, a residential complex of low platforms, a platform, a seawall, and a pen and a paved and walled platform, a possible shrine, on the tip of Keokea Point. The seawall and a parallel inland terraca embankment served to protect a c. 5 acre marsh that extended inland to the old Keaukaha Road. According to Hudson, the marsh was a former taro pondfield, and at the time of his visit, a portion of the taro field had been recently excavated for a fishpond.

The parcels were inspected by Haun & Associates staff on December 18, 2002 and February 9, 2003. The residential lot is covered with a layer of fill approximately 3-4 ft in thickness and vegetated with grasses and low shrubs. The park parcel consists of a maintained lawn, restroom facility, and parking lot. The caretaker of the park was present during the December inspection. He has extensively modified the area with earthmoving equipment primarily to fill areas subject to periodic flooding. This activity apparently filled in the marsh reported by Hudson and the swamps shown on the tax maps.

No surface archaeological or historical surface sites were identified on the residential lot, or in the vicinity of the proposed drill site in the eastern portion of the beach park. Remnants of a seawall, possibly the one reported by Hudson (1932), are present seaward of the beach park parcel on State of Hawaii-owned Parcels 2 and 7 (TMK: 2-1-011). Based on the field inspection, it is recommended that the test borings be



monitored by an archaeologist to determine if subsurface taro pondfield or other cultural deposits are present.

#### Kawaihāe, Hawaii

The proposed Kawaihāe soil sampling sites are located at the southeastern end of TMK: 6-1-004:002, a 6.6 acre DHHL Kawaihāe residential lots parcel in the Land of Kawaihāe 1, South Kohala District. The parcel is characterized by Kawaihāe very rocky very fine sandy loam on 6-12% slopes (Sato et al. 1973:26). This soil is characterized by a surface layer of a dark reddish brown extremely stony, very fine sandy loam with a subsoil comprised of a dark reddish brown to dusky red stony silt loam. Bedrock outcrops occupy 10-20% of the ground surface.

Examination of the current tax map indicates that there are no Land Commission Awards in the subject parcel. The parcel was included in a survey by Allen (1987) which has not yet been reviewed.

The parcel was inspected by Haun & Associates staff on December 18, 2002. The drill site is located in an asphalt road that ends at the shoreline where a boulder beach and the remains of a historic pier or wharf are present. The remains consist of formed concrete and stone foundation remnants on the shoreline and concrete piers in the water. A formed concrete building foundation is present on the south side of the road. A stone and concrete retaining wall borders the south side of the road next to the foundation. An area immediately north of the road next to the shoreline has been modified by earthmoving activity evidenced by scarred bedrock and piles of stone and earth.

It is unlikely that the test boring in the road will encounter subsurface deposits because the roadbed was probably graded prior to paving and the area is characterized by exposed bedrock with areas of shallow soil. An inventory survey of the parcel to document the historic structural remains may be necessary, depending upon the adequacy of the earlier survey by Allen (1987).

Haun & Associates, the project's archaeology and cultural subconsultant for the Big Island, will observe the soil sampling for the Hilo (Keokea) site. No observer is deemed necessary for the Kawaihāe site, based on the preliminary assessment provided above.

Additional information about other proposed sites that have yet to be tested will be provided to SHPD at a later date.

RECEIVED AS FOLLOWS


RECEIVED AS FOLLOWS



Dr. Holly McElowney  
February 11, 2003  
Page 5 of 6

Please provide your input, if any, as soon as possible. If you have questions or require additional information, please do not hesitate to call me at (808) 531-7094.

Sincerely yours,

  
Randall Urasaki  
PB Project Manager

Enclosures:

- Attachment 1: Proposed Submarine Cable Landing Sites (Map)
- Attachment 2: HDD Construction Technology
- Attachment 3: Kawaihae DPHL Site, Hawaii, Area of Potential Effects
- Attachment 4: Keokea, Hilo, Hawaii, Area of Potential Effects

cc. Mr. Patrick McCoy, Sr-PPD  
Ms. Lani Ma'a Lapilio, Ho'akea LLC



Dr. Holly McElowney  
February 11, 2003  
Page 6 of 6

References Cited:

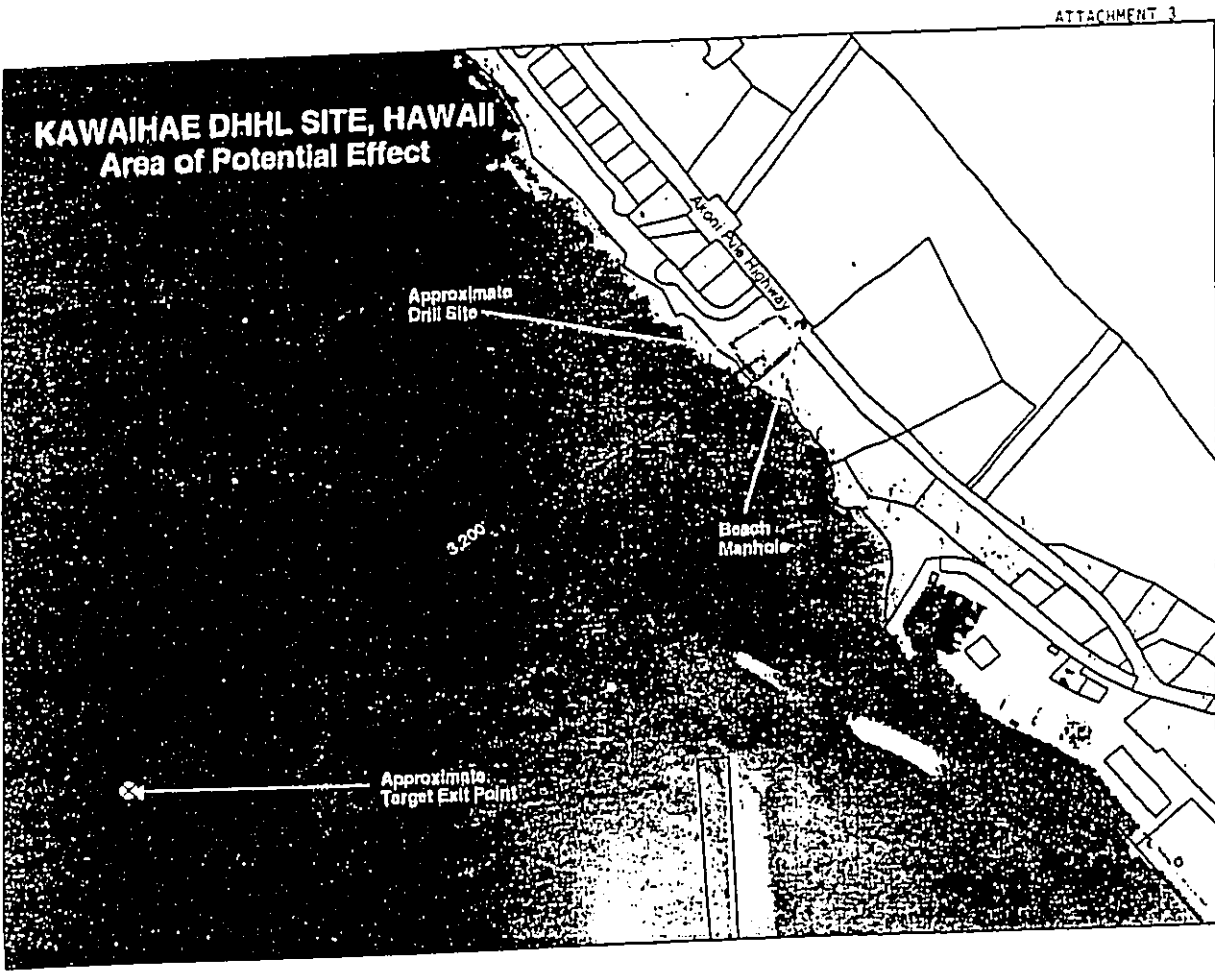
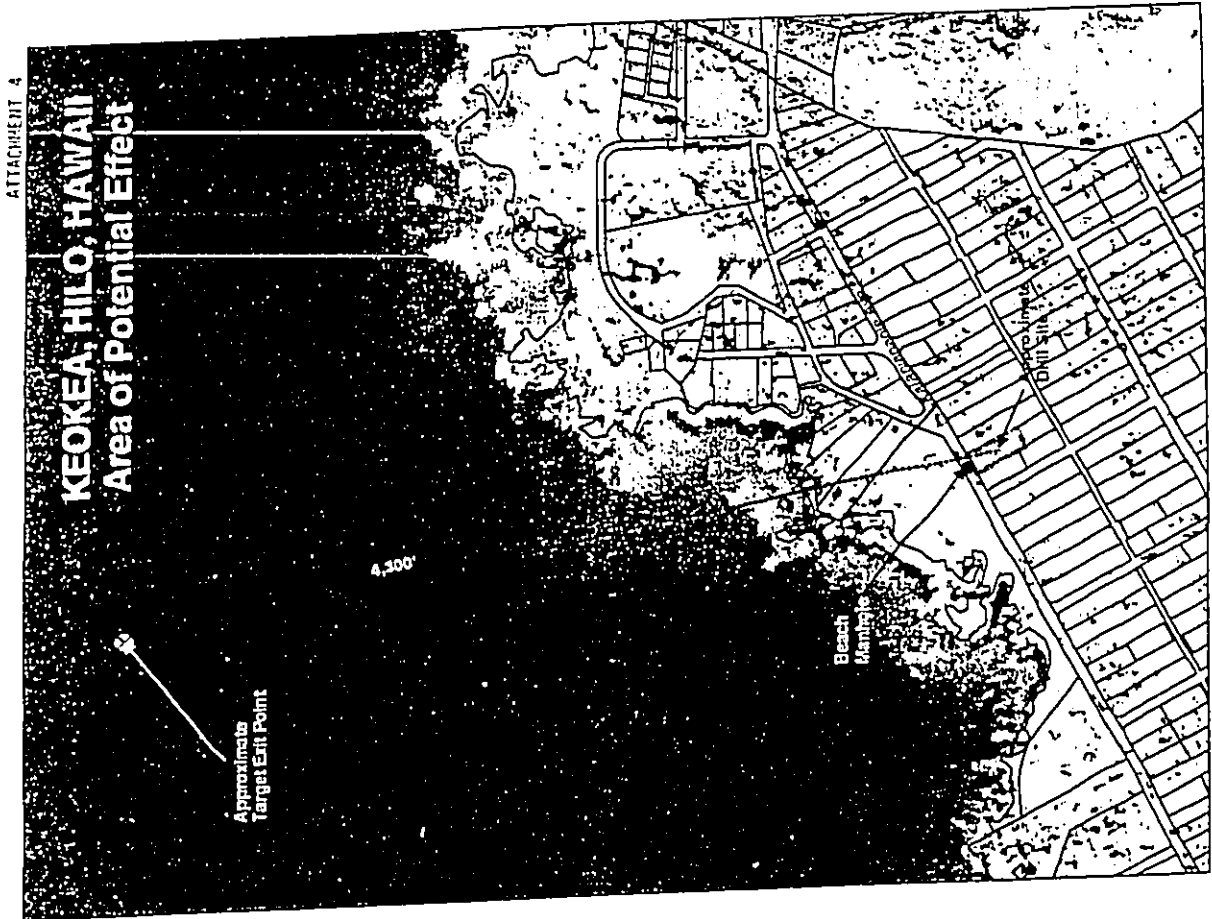
- Allen, M.  
1987 Archaeological Inventory Survey of Department of Hawaiian Home Lands, Kawahae 1, South Kohala, Hawaii.
- Hudson, A.E.  
1932 Archaeology of East Hawaii. B.P. Bishop Museum Manuscript, Honolulu.
- Sato, H.H., E.W. Ikeda, R. Paeth, R. Smythe, and M. Takehito Jr.  
1973 *Soil Survey of the Island of Hawaii*. U.S. Dept. of Agriculture, Soil Conservation Service and University of Hawaii Agricultural Experiment Station, Washington D.C. Government Printing Office.

Over a Century of  
Engineering Excellence

Over a Century of  
Engineering Excellence



RECEIVED AS FOLLOWS





## Memorandum

Meeting with State Historic Preservation Division, Maui Archaeologist  
February 13, 2003  
Page 2

**To:** File  
**From:** Jason Yazawa  
**Date:** February 14, 2003  
**Subject:** Sandwich Isles Communications, Inc.  
Submarine Cable Project  
Meeting with State Historic Preservation Division, Maui Archaeologist, on  
February 13, 2003

**In Attendance:** Melissa Kirkendall, SHPD  
Erik Fredericksen, SHPD  
Jason Yazawa, PB

Mr. Yazawa provided a briefing on the discussion that occurred during February 5, 2003 meeting with SHPD staff in Kapolei. This included a description of HDD, and post-construction facilities.

Per discussion with SHPD Kapolei staff, Mr. Yazawa informed Ms. Kirkendall that the project will submit the schedule for planned soil samplings on State land (include Hawaiian Home Lands) for SHPD review despite the project already receiving right-of-entry to conduct soil sampling. Mr. Yazawa also informed Ms. Kirkendall that the PB has already conducted soil sampling at the Waiehu and Poolanalena sites prior to knowing about SHPD's concerns. Mr. Pat McCoy, the acting head of archaeology for February, requested that the submission include a mini assessment of each site. Ms. Kirkendall stated that she agrees with this, but would have wanted more for Waiehu and Poolanalena. Mr. Fredericksen field work will be coordinated with soil sampling.

### Discussion of Landing Sites

A summary of the discussion on Maui and Lanai landing sites provided below:

- Honokowai (old airport): Ms. Kirkendall recommended an inventory survey should this site be fully evaluated as a landing site.
- Waiehu: Ms. Kirkendall recommended consultation with the burial on the scope of study at the Waiehu site. She predicts that the burial council will request that an inventory study be conducted, with subsurface testing from the drill site and along the proposed drill alignment up to the coastline. If that is the case, it may be preferable to locate the drill site as close to the coastline as possible (e.g., at the end of the road). However, Mr. Fredericksen noted that the coastline is receding. The burial council may also ask that a trench be dug between the drill

Over a Century of  
Engineering Excellence

RECEIVED AS FOLLOWS

site and the coastline during construction to make sure there are no burials directly above the underground cable conduit.

- Keanae: Ms. Kirkendall recommended an inventory survey, but noted that uncovering burials would be highly unlikely.
- Waiehu: Ms. Kirkendall recommended an inventory survey, with a larger area of potential effect. She surmised that an old church, with a cemetery, may have been in the vicinity, even though the TMK for this site is shown to be relatively far from the site (this is not unusual). She noted that the inventory survey would be more "creative", not necessarily more "intensive". A preservation (maybe an interim) plan for the two habitation sites would probably be needed to ensure that they are protected during construction.
- Hana: Ms. Kirkendall recommended an inventory survey for either Hana site. An inventory survey may be appropriate concurrent with trenching along the gap of either site.
- Poolanalena: This site may be more problematic as the Waiehu site in terms of as being a culturally sensitive area. A burial was found nearby. Ms. Kirkendall anticipates that the burial council would have problems with using the site, and recommends that SIC choose another site.
- Kaunapau Harbor: Ms. Kirkendall stated that an assessment or a surface inventory survey would suffice.
- Manele Bay: Ms. Kirkendall stated that an assessment would suffice.

Over a Century of  
Engineering Excellence

RECEIVED AS FOLLOWS

Mr. Randall Urasaki  
Page 2

The second proposed landing site is located at the southeastern end of TMK: 6-1-004:002, a 6.6 acre DHHL residential lot in Kawahae, South Kohala. The proposed drill site on this parcel is located on an asphalt road that terminates at the shoreline where there is the remains of an historic concrete and stone pier or wharf. This site was also inspected by Haun & Associates. It is unlikely that historically significant cultural deposits would be found during the boring because of previous disturbance in the area of the roadbed and the fact that the soils in the area are shallow. Further documentation of the pier or wharf may be required in the future if the site is chosen as a cable landing. Archaeological monitoring of this drill site is deemed to be unnecessary because of the location in a roadbed and soil characteristics of the local area.

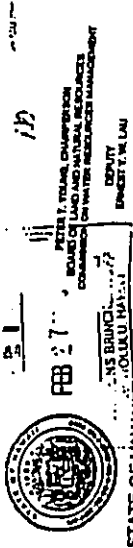
Based on the information provided in your letter we believe that no significant historic properties will be affected by the proposed soil sampling at Keokea and Kawahae. Archaeological monitoring of the Keokea site will be undertaken to make a more informed evaluation of the potential for the presence of subsurface cultural deposits. If such deposits are present further archaeological investigations may be required. A monitoring report should be submitted to our office to complete the review process.

If you or your staff should have any questions please feel free to call our Hawaii Island archaeologist, Patrick McCoy at 892-8029.

Aloha

*[Signature]*  
Peter Young, Chairperson and  
State Historic Preservation Officer  
PM/jen

c Ms. Lani Ma'a Lapiko, Ho'akea LLC



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES

AQUATIC RESOURCES  
BOATING AND OCEAN RECREATION  
CONSERVATION AND RESTORATION  
MANAGEMENT  
CONSERVATION AND RESOURCES  
SPROUCEMAN  
FORESTRY AND WILDLIFE  
LAND  
STATE PARKS

1-3-14

LOG NO: 031738  
DOC NO: 0302PM07

Mr. Randall Urasaki  
Parsons Brinckerhoff  
Pacific Tower, Suite 3000  
1001 Bishop Street  
Honolulu, Hawaii 96813

Dear Mr. Urasaki:

**SUBJECT:** National Historic Preservation Act --Section 106 Review Sandwich  
Isles Communications Statewide Telecommunications Network --  
Soil Sampling at Proposed Landing Sites for Submarine Cables,  
February 24-27, 2003  
Waiakea and Kawaihae, South Hilo and South Kohala Districts,  
Hawaii Island  
TMK: (3) 2-1-021:79; 2-1-011: 005 and 6-1-004:002

Thank you for your letter of February 11, 2003 and the opportunity to review and comment on the proposed soil sampling at two of Sandwich Isles Communications (SIC), Inc.'s potential fiber optic cable landing sites on the Island of Hawaii. You note that SIC is certified by the Federal Communications Commission (FCC) as a rural local exchange carrier. Since SIC is working on behalf of the FCC the project is an undertaking as defined in Section 106 of the National Historic Preservation Act of 1992, as amended. You have requested our input on the proposed project, which was initially discussed with our staff in a meeting on February 5, 2003.

The purpose of the proposed soil testing is to obtain data to help make a final decision on whether horizontal directional drilling can be successfully employed at the two preferred landing sites. The sampling would consist of drilling two holes roughly four inches in diameter and 20 to 40 feet deep at the two candidate landing sites.

One of the proposed landing sites is located at Keokea in Waiakea, South Hilo. Holes would be drilled at two locations identified as TMK: 2-1-021:79 (a 0.81 acre vacant lot in the Department of Hawaiian Home Lands (DHHL) Kuho Settlement) and TMK: 2-1-011:005 (a 9.48 acre DHHL parcel used as a beach park). Your letter indicates that Haun & Associates conducted a site inspection of the two parcels. No evidence of historic sites was found on the surface of either parcel, both of which are described in your letter as having been extensively modified in the past. Archaeological monitoring is recommended for both drill sites to determine whether pond field or other subsurface cultural deposits are present.

Corrected 10/1/03  
03/02/03 1:14:28



Parsons  
Brinckerhoff  
Corrosion &  
Design, Inc.

American Savings Bank Tower  
1707 Bishop Street, Suite 2000  
Honolulu, HI 96813  
808-531-7094  
Fax 808-537-2268



Dr. Holly McEldowney, Administrator  
State Historic Preservation Division  
Page 2

May 7, 2003

Dr. Holly McEldowney, Administrator  
State Historic Preservation Division  
Department of Land and Natural Resources  
P.O. Box 621  
Honolulu, Hawaii 96809

Dear Ms. McEldowney:

**Subject:** Sandwich Isles Communication, Inc.  
Submarine Cable Project  
Pre-Assessment Consultation

Sandwich Isles Communications, Inc. (SIC) is a rural telephone company headquartered in Honolulu, Hawaii that is developing a statewide telecommunications network to service the Department of Hawaiian Home Lands. The U.S. Department of Agriculture Rural Utilities Service (RUS) is providing loan assistance for the project. The portion of the project that would connect the major Hawaiian Islands by submarine telecommunication cables is now entering the federal and State environmental review processes.

Representatives of SIC have met with DLNR staff several times to discuss this project. In addition, a project presentation was made to Director Cokoma-Agaran and several DLNR division directors on August 27, 2002 (minutes attached). At that meeting, Director Cokoma-Agaran gave permission for SIC representatives to coordinate directly with the various divisions of DLNR that will be providing project oversight.

Thereafter we met previously with your staff at Kapolei on February 5, 2003 to discuss this project. Minutes of these meetings are attached. Since that time, the project has been more clearly defined.

The purpose of this letter is to request further comments or suggestions you may have on the environmental aspects of the proposed submarine cables and cable landing areas pursuant to the National Environmental Policy Act (NEPA) and the Hawaii Revised Statutes (HRS) Chapter 343. Additional coordination regarding Section 106 of the National Historic Preservation Act and HRS Chapter 6E will also be necessary, and has begun with SHPD agents in each county. Archaeological reconnaissance surveys and cultural impact assessments are underway or near completion at each of the landing sites, and specialists have coordinated these studies with SHPD staff for each island. In addition, at some sites, geotechnical boring investigations have also been coordinated with SHPD staff. Comments pertaining to the project's environmental aspects will be addressed in an Environmental Assessment (EA) to be approved by RUS and the Hawaii Department of Land and Natural Resources.

Over a Century of  
Engineering Excellence

Over a Century of  
Engineering Excellence

RECEIVED AS FOLLOWS

Resources. Those providing comments at this stage will receive a copy of the Draft EA when it is issued.

**PROPOSED ACTION**

The current proposal involves the installation of undersea fiber optic cables that will connect five major Hawaiian Islands (Kauai, O'ahu, Molokai, Maui, and Hawaii). The undersea fiber optic cables will connect to onshore fiber optic systems. These cables will establish connections for SIC's Statewide Telecommunications Network, ensuring reliable high quality service to network subscribers.

A cable-laying ship will place cables on the ocean floor between the islands. Where the cables approach land, a cable landing will be constructed using a technique called horizontal directional drilling (HDD). The HDD method was selected because of its ability to drill under reefs; minimizing impact to coastal areas. Starting from onshore manholes sites, the HDD equipment bores below the ground and reel areas to a point under water at least 60 feet deep and 2,000 to 5,000 feet offshore.

In light of the current economic conditions, SIC has determined that in order to provide modern telecommunications services to DHHL subscribers in a timely manner, they will proceed with a network that can be built in the most expeditious and economical manner. Therefore, the marine cable landing project has been redesigned to include only seven landing sites at this time that will connect all the DHHL projects on the five major islands. In the future, given a more positive economy, additional cable landings may be added for redundancy. However, the initial network of seven landing sites will provide a complete, independent, functioning network even if additional cable landings are not provided.

The preliminary identification of cable landing sites is as follows:

- On Kauai, in the Kekaha area; at Aklaloa Road (TMK; por. 4-1-2-002:032)
- On O'ahu, in the Mākaha and Hawaii Kai areas; at Kill Drive and City Park (TMK; por. 1-8-4-002-047 and TMK; por. 1-3-9-015:001)
- On Molokai, in the Kaunakakai area; at Oneali Homeslands (TMK; 2-5-4-006:019)
- On Maui, in the Lahaina and Mākena areas; at Wahikuli and Poolenalena Park (TMK; por. 2-4-5-021:015 and TMK; por. 2-2-1-007:072)
- On Hawaii, in the Kawahae area; at Kaēwe Street (TMK; por. 3-6-1-004:020)

**BACKGROUND**

SIC is certified by the Federal Communications Commission and is authorized by the State of Hawaii Public Utilities Commission to provide telecommunications service on properties administered by the Department of Hawaiian Home Lands (DHHL). SIC has been serving DHHL communities since 1998. Many DHHL areas are located in rural communities where telecommunications (telephone) services are neither existent nor sufficient. SIC's proposed project will connect five major Hawaiian Islands and provide essential telecommunications services and a modern, broadband fiber optic system to DHHL areas at affordable rates.



Onshore, fiber optic cables will be installed underground, mostly within existing public rights-of-way, such as roads. SIC previously prepared Environmental Assessments (EA's) for the terrestrial system in each county, and these EA's were accepted by the Hawaii Department of Transportation. This project is also proceeding in accordance with a Memorandum of Agreement (under Section 106 of the National Historic Preservation Act) designed to protect cultural and historic properties that may be encountered along the routes. It may be appropriate to cover the submarine cable network with the existing MOA for SIC's terrestrial system.

The benefits of this project include:

1. DHHL and its beneficiaries will have access to a modern, independent and affordable telecommunications infrastructure.
2. This infrastructure will enable subscribers to have access to new interactive services such as telemedicine, tele-educational programming, video and data transmissions, and the internet.
3. Creation of hundreds of jobs during the construction of the network and attraction of new high tech and other businesses to DHHL parcels.
4. To date, SIC has spent \$100 million from an RUS loan on new construction. Within the next 2 to 3 years up to an additional \$300 million is also available through the same loan for future project-related expenses.

**COMMENTS**

SIC has been consulting with members of native Hawaiian organizations, government agencies, businesses, and communities in the affected areas since the environmental review process began for the terrestrial cable systems. Your input is now requested specifically on environmental aspects of the submarine cables between the islands, and the cable landing sites. Written comments will become part of the official project record and will be addressed in the forthcoming Draft EA for the submarine cable network.



Comments may be mailed to the following address:

Mr. Randall Urasaki  
Parsons Brinckerhoff  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

They may also be sent by facsimile transmission to (808) 528-2368 or email at urasaki@pbworld.com. Comments will be most useful to us if received within one month of your receipt of this letter.

This will not be your final opportunity to comment on this project. You will be notified when the Draft Environmental Assessment is issued. If you would like to receive a copy of the Draft EA, please notify us by mail, email, or phone.

We look forward to receiving your comments.

Mahalo,  
PARSONS BRINCKERHOFF QUADE & DOUGLAS INC.

Randall Urasaki, P.E.  
Project Manager

- c: Mr. Peter Young, Director DLNR  
Dr. Nancy McMahon, SHPD Kauai Archaeologist  
Dr. Sara Collins, SHPD Mokai and Oahu Archaeologist  
Dr. Melissa Kirkendall, Lanai and Maui Archaeologist  
Dr. Pal McCoy, Hawaii Archaeologist

**Enclosures:**

- Attachment 1: Proposed Submarine Cable Landing Sites (Map)
- Attachment 2: HDD Construction Technology
- Attachment 3: Kekaha, Kauai: Landing Site Map and 'Akaioa Road Map
- Attachment 4: Mākaaha, O'ahu: Landing Site Map and Kā Drive Map
- Attachment 5: Hawaii Kai, O'ahu: Landing Site Map and City Park Map
- Attachment 6: Kāunakakai, Molokai: Landing Site Map and Onea'i'i Homesteads Map
- Attachment 7: Lahaina, Maui: Landing Site Map and Waiakūi Map
- Attachment 8: Mākena, Maui: Landing Site Map and Po'olenalena Park Map
- Attachment 9: Kawaihae, Hawaii: Landing Site Map and Kaēwe Street Map
- Attachment 10: Minutes of meeting with Director Kokoma-Agaran, August 27, 2002
- Attachment 11: Minutes of Meeting with SHPD, February 5, 2003

RECEIVED AS FOLLOWS

RECEIVED AS FOLLOWS



Dr. Holly McEldowney, Administrator  
State Historic Preservation Division  
Page 5



Memorandum

cc: Mr. Doug Borthwick, Cultural Surveys Hawaii  
Mr. Erik Fredericksen, Xamanek Researches  
Mr. Alan E. Haun, Haun & Associates

To: File  
From: David Athin  
Date: 30 August 2002  
Subject: Meeting with DLNR  
Sandwich Isles Communications Project  
Kalaninokū Building  
27 August 2002

Attendees: Gil Coloma-Agaran DLNR  
Carol Ogata SHPD  
Francis Oishi Aquatics Division  
Sam Lemmo Land Division/Planning  
Lani Ma a Lapiko Ho'akaa  
Dawn Chang Ho'akaa  
Colette Saluda Environmental Planning Solutions  
Randall Urasaki Parsons Brinckerhoff  
David Athin Parsons Brinckerhoff

**Meeting Summary:**  
PB requested a meeting with DLNR to introduce the marine part of the SIC project and establish a protocol for further coordination with the various divisions of DLNR. Dawn made a brief project presentation and emphasized the use of HDD as a construction technique.  
The SIC team requested that DLNR be the accepting authority for the Chapter 343 document to be prepared for the project, and DLNR agreed. The SIC team noted that a NEPA EA would also be prepared for this project, with PUS being the accepting authority on the NEPA document.

- Points of discussion included:
- Would the cable alignments follow existing cable alignments? A: Not always because the preferred landing sites are D-H-L parcels. Therefore, there will be new landing sites. Also, because of the low level of environmental impact with HDD, the adverse environmental impacts of not corridor-sharing are substantially reduced.
  - What rules for landing sites have been adopted by other states? A: Oregon and California may have adopted rules; this is being researched.
  - Sam commented that even HDD has potential adverse impacts, as follows:
    1. impacts at the onshore drilling site, the approach trench can involve substantial excavation;
    2. the beach marhole ("junction box structure") can be a large structure that could potentially interfere with beach processes or affect existing activities at the site of the "junction box";
    3. drilling mud can contain toxic constituents so they must be handled appropriately and releases into the environment avoided.

Over a Century of  
Engineering Excellence

Over a Century of  
Engineering Excellence



- Sam commented that the assignment to develop the long-requested State policy on cable landings had been passed to the Office of Planning.
- SIC: Would the Land Board delay decisions on landing site CDUP's until the State policy is developed? Sam: Don't know, there's no formal moratorium, the administration will change.
- Sam: If a landing site triggers an SMA requirement and the landing site upland is within a State "Conservation District," the SMA must be granted before decision-making on the CDUA. (Subsequent analysis has determined that many proposed landing sites fall into this situation.) There is no linkage between SMA and CDUA if there is no need for an SMA, or if an SMA is needed but the upland of the landing site is not in the Conservation District.
- A CDUP can be processed in 6 months after the Final EA, if there are no SMA complications.
- The CDUA review criteria are somewhat modified since the SIC project serves a "public purpose."
- The CDUA process involves a public hearing, and given the geographic scope of this project, there will need to be a public hearing on every island.
- Gil: Stay out of Natural Area Preserves (e.g., Makens). Stay off of Penguin Banks because it is a prime fishing area as well as being in the Humpback Whale National Marine Sanctuary. Marine operations in the Humpback Whale National Marine Sanctuary when the whales are in town will be an issue. Whale populations have increased. SIC is advised to meet with the managers of the Whale Sanctuary. The Sanctuary is co-managed by NOAA and DLNR. The DLNR point of contact is Jill Walters and should be contacted first. The most appropriate NOAA contact beginning Oct. 1 would be Alan Tom because the local NOAA office is restructuring and a local position above the sanctuary manager is being created.
- Comment: Provide information on prior local applications of HDD technology, particularly the use of HDD to construct existing cable landings. (comment: consider a site visit)
- Gil: there could be substantial delays if a Habitat Conservation Plan (HCP) is needed (e.g., if the alignment goes through "critical habitat"). This is because Chapter 195D (the State Endangered Species Law) does not presently allow State agencies to sponsor HCP's. This applies to DPHL, should an HCP be required because of critical habitat on DPHL land. This problem with the law may be fixed by the next session of the legislature.
- SIC may contact the specific Divisions within DLNR to discuss additional details:
  1. DAR: Francis Oishi
  2. SHPD: Don Hubbard or Ross Cordy
  3. Land Division: Sam Lemmo



Memorandum

**To:** File

**From:** Jason Yazawa  
Colette Sakoda

**Date:** February 14, 2003

**Subject:** Sandwich Isles Communications, Inc.  
Submarine Cable Project  
Meeting with State Historic Preservation Division on February 5, 2003

**In Attendance:** Sara Collins, SHPD  
Elaine (Muffet) Jourdana, SHPD  
Pat McCoy, SHPD  
Cathleen Dagher, SHPD  
Lani Lapito, Hoakea  
Colette Sakoda, EPS  
Perry Small, PB  
Jason Yazawa, PB

**Project Overview and Construction**

Mr. Small provided a briefing on the overall project, and its relationship with terrestrial cable system that Sandwich Isles Communications, Inc. (SIC) is presently building. Mr. Small also explained the role of PB. Ms. Lapito explained the role of Hoakea.

Mr. Small explained that all cable landing sites would be constructed using horizontal directional drilling (HDD). He then described how HDD is conducted, and the types of vehicles and equipment that are used. Mr. Small also explained that trenching (HDD) may be used in some instances) would be required to connect the landing sites to the terrestrial system. Following construction, the only evidence of the infrastructure will be a manhole, and cable house or cabinet at some of the landing sites.

**Proposed HRS Chapter 6E Rules**

When asked about the implications of the proposed HRS Chapter 6E rules to the project, SHPD responded that the Section 106 process would still be more stringent.

**Soil Sampling**

SHPD stated that the Land Board should have consulted with them before granting right-of-entry to conduct soil sampling on State land. SHPD does not blame PB because permission was granted. SHPD asked that they be consulted on future soil

RECEIVED AS FOLLOWS

sampling, and to provide them with a list of sites that have already undergone sampling.

#### Area of Potential Effect

PB proposed a definition of the area of potential effect (APE) that would be applied to every landing site. SHPD agreed with this definition, but to also include the road or path to the construction site if one needs to be cleared. PB noted that for large undeveloped parcels, the construction area was much larger than what would be needed to stage HDD operations. This is to allow the contractor with flexibility in avoiding archaeological sites if found on site.

#### Discussion of Landing Sites

SHPD, Hoakea, EES and PB discussed each landing site, including the appropriate level of study to identify historic sites. Follow-up discussions with SHPD personnel attending this meeting and discussions with the island archaeologists on the other islands will continue. A summary of the discussion is provided below:

- Kekaha: The area has a history of archaeological discoveries, therefore an inventory survey was recommended. SHPD agreed, but further consultation will be held with the Kauai archaeologists who was not present at the meeting.
- Anahela: The area north of the proposed landing site has past archaeological discoveries. However, short of the recommendation of the need for anything other than assessment level study, further consultation will also be held with the Kauai archaeologist.
- Doie and Kaiaka Park: Neither proposed landing site has any archaeological concerns, but SHPD indicated that the gap routes to Weed Circle may raise potential "lo" impact concerns. Further consultation will occur with Muffet, the Oahu archaeologist when the site is finalized.
- Kili Drive: SHPD concurred that although staff would prefer not to see another Waianae/Makaha landing site due to the numerous existing sites, selecting one is inevitable since there is a lot of DHL land on this side of the island. CSH recommended an inventory survey for the Kili Drive site, and SHPD concurred.
- Sandy Beach: SHPD concurred that because the proposed landing site is aligned with the existing sewer outfall and Verizon cable landing, an assessment level study will be the next step.
- Kalaupapa (old poi factory): Ms. Collins noted that the site was probably not used for burials, but there is the possibility that remnants of the poi factory building may be in the subsurface. She recommended that the project start with an assessment to determine whether building remnants may be uncovered. If not, the assessment should suffice for Section 106 purposes. Ms. Lapillo noted

that the archaeological work may require an ARPA (Archaeological Resources Protection Act) permit. NAGPRA would also apply. SHPD also noted that the cable house has to be consistent with the historic characteristics of the town.

- Kalamaula (Alii Fishpond): Ms. Collins noted that the area of the site is called Kapakapa. The site itself, according to Ms. Collins, is probably recently accreted, and that an assessment should be able to uncover this.
- Kaunapapa Harbor: Ms. Dagher did not see any problems with using the proposed site because construction vehicles would be parked on the terminal highway.
- Manele Bay: Ms. Dagher did not see any problems using the area just upland of the boat ramp because it is used for trailer parking.
- Honokowai (old airport): SHPD did not raise any issues, but further consultation will be held with the Maui archaeologist, who did not attend the meeting.
- Waiehu: SHPD is aware of the high number of burials in the area of this site, but acknowledged that drilling would be conducted from the parking lot. Further consultation will be held with the Maui archaeologist.
- Keanae, Waiua, and Hana: SHPD did not raise any issues. PB noted that these sites are not firm.
- Poolanala: SHPD noted that the area of this site contains a lot of archaeological sites. Further consultation will be held with the Maui archaeologist.
- Kawaihai: Mr. McCoy stated that the site does not appear to have archaeological issues, but was unsure about subsurface conditions. He will look into further.
- Hilo/Keokea: Mr. McCoy does not anticipate problems with the site.

#### Consultation

SHPD recommended that the project consult with the Office of Hawaiian Affairs, Hui Malama, the island burial councils, homestead associations and civic clubs.

#### Memorandum of Agreement

There was discussion on whether the existing MOAs for the terrestrial systems can be amended to include possible "adverse effects" of the proposed landing sites. It was decided to defer this discussion to a later date.

RECEIVED AS FOLLOWS



RECEIVED AS FOLLOWS

\*no adverse effect\* to any significant historic sites that may be present. We look forward to review the results of these test borings.

We note for your future reference that Section 108 of the National Historic Preservation Act provides for a period of 30 days from receipt of notification for the SHPO to provide comment on the proposed undertaking. In the subject case, your notification arrived in our office on April 21, 2003, and in it you indicated that the test borings at Makaha would take place on April 28-29, 2003. Obviously, a Federal Agency cannot be in compliance with Section 106 of the National Historic Preservation Act when it schedules the undertaking to take place before the end of the statutory review period.

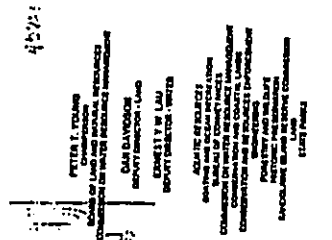
Should you have any questions, please feel free to call Sara Collins at 692-8026 or Elaine Jourdan at 692-8027.

Sincerely,

Peter T. Young, Chairperson and  
State Historic Preservation Officer

E:jk

c: Colette Sakoda, Environmental Planning Solutions,  
Lani Ma'a Lapiio, Ho'akea LLC



LOG NO: 2003.0390  
DOC NO: 0304EJ33

Randall Urasaki  
PB Project Manager  
Parsons Brinckerhoff  
1001 Bishop Street, Suite 3000  
Honolulu, Hawaii 96813

Dear Mr. Urasaki:

**SUBJECT: National Historic Preservation Act Section 106 Review - Sandwich  
Isles Communications Statewide Telecommunications Network -  
Soil Sampling at Proposed Landing Sites for Submarine Cables,  
April 28, 2003  
Makaha, Waialae, O'ahu  
TMK: (1) 8-4-002:047**

Thank you for the opportunity to comment on the proposed changes in marine landing sites for the Sandwich Isles Telecommunications project. In order to finalize landing site locations you have proposed soil sampling to determine site geology at several sites and have finalized this activity at some locations. We met with Hoakea LLC and PB staff in February to discuss procedures for these activities. The purpose of your current letter is to provide information on soil sampling activities proposed for a landing site near the intersection of Kii Drive and Farrington Highway. Ground disturbance proposed for the test borings consist of 4 inch diameter holes drilled to 20 to 40 feet depths. Archaeological survey conducted within this parcel did not locate any surface historic sites in the vicinity of the test borings although a subsurface cultural layer has been identified c. 200 feet north of the proposed landing site. We have been in contact with your archaeological consultant regarding the proposed sampling activities and understand that they will be on site to observe the soil sampling.

Although neither you nor the responsible Federal Agency (USDA) has made a determination of effect for the subject undertaking, based on your information, we believe that the proposed activities may have an "adverse effect" on significant historic sites that may be present subsurface in the vicinity of the test boring in Makaha along Kii Drive. Since you plan to have qualified archaeologist on-site to monitor the test-boring activity, we further believe that this precaution will result in



## Memorandum

DRAFT

To: File

From: Jason Yazawa

Date: October 23, 2003

Subject: Sandwich Isles Communications, Inc. (SIC)  
Submarine Fiber-Optic Cable Project  
Meeting with State Historic Preservation Division (SHPD) Maui Archaeologist on  
October 22, 2003

In Attendance: Melissa Kirkendall, SHPD  
Erik Fredericksen, Xamenek Researches  
Randy Urasaki, PB  
Jason Yazawa, PB

This memorandum summarizes the discussion between Ms. Melissa Kirkendall, the SHPD Maui Archaeologist, Mr. Erik Fredericksen, the archaeological consultant for SIC for the Maui County Island of Maui, Waihiuli and Po'olenalena.

### Waihiuli Landing Site

PB reported that Mr. Fredericksen completed an inventory survey report for the proposed Waihiuli landing site, and provided Ms. Kirkendall with an advanced copy of report. PB is planning to "officially" submit the archaeological reports prepared for all seven proposed landing sites to the main SHPD office for review. Ms. Kirkendall asked that the official copy be comb bound, and sent directly to her rather than to the Kapolei office. The transmittal letter(s) should inform the SHPD Kapolei office that the Maui reports were being sent directly to the SHPD Maui office.

Mr. Fredericksen briefly noted that the inventory survey uncovered no significant sites or resources, but recommended archaeological monitoring during excavation of the HDD slurry pit. Without the benefit of reviewing the report, Ms. Kirkendall agreed with the recommended mitigation, and does not anticipate problems with using this site.

### Po'olenalena Park Landing Site

PB reported that Mr. Fredericksen completed fieldwork at the Po'olenalena Park landing site, which included an inventory survey of a trench that would be part of the alignment of the landing site cable construction by horizontal directional drilling (HDD). Completion of the report is pending testing results from the mainland, which is expected in about three weeks. However,

Over a Century of  
Engineering Excellence

Meeting with Ms. Melissa Kirkendall  
SHPD Maui Archaeologist  
October 22, 2003  
Page 2

DRAFT

Mr. Fredericksen has completed an "end of fieldwork" report that summarizes his findings. PB and Ms. Kirkendall previously received copies of this report.

Mr. Fredericksen found significant cultural deposits, consisting of three layers (IIA, IIB and V). A very notable find was a potential "pavement" at Test Unit 1, which is closest to the parking area. Mr. Fredericksen would probably evaluate the cultural deposit as significant under Criterion "D", and possibly under Criterion "E". Ms. Kirkendall agreed with this preliminary assessment, considering the archaeological findings from the adjacent parcel, where a burial site was found. She noted that there is the strong possibility that the cultural deposit found on the adjacent parcel is the same cultural deposit found on the Po'olenalena Park parcel. Mr. Fredericksen will review the other report to evaluate whether or not the sites are the same.

The group discussed mitigation measures, including how data recovery if required could be coordinated with construction. However, Ms. Kirkendall was not convinced that data recovery would be the appropriate mitigation action, noting that it may not be in the best interest of SIC, especially if burials are uncovered during the data recovery work. Considering the potential "pavement" site in the area where HDD would be staged, Ms. Kirkendall believes that further inventory survey work is needed to better define and evaluate the cultural deposit. Therefore, she is considering recommending an addendum (or second) inventory survey of the drill site, and the alignment of the fiber-optic cable conduit from the drill site towards Makena Alanui Road. Ms. Kirkendall thinks that the cultural deposit extends only within the sand formation, which probably ends about halfway from the end of the parking lot to the road. If so, the limits of the inventory survey would be to the end of the sand formation. To determine the end of the sand formation, Ms. Kirkendall recommended that auger cores be conducted from Makena Alanui Road towards the beach, and that this information be provided to her as soon as possible.

Ms. Kirkendall noted that one of the advantages of conducting the second inventory survey prior to construction is that it would be better to find a burial, if uncovered, during the inventory survey rather than during data recovery, which may be closely tied to the construction schedule. Finding a burial during the inventory survey would allow the engineer to re-design the alignment to avoid disturbing the site. PB indicated that the underground cable conduit would be aligned just outside the driveway and parking lot pavement.

PB indicated that SIC would probably not object to conducting the second inventory survey covering the area of the drill site and part of the cable conduit trench. However, SIC has scheduled public release of the Draft Environmental Assessment (EA) within the next two months, which would include all the archaeological reports. Ms. Kirkendall recommended that the Po'olenalena Park report, which is expected in about a month (see above), be included in the Draft EA despite her intent to ask for additional work. In addition, she will provide a written response to the "end of fieldwork" report, which would probably include the above recommendations regarding additional inventory survey work. She recommended that the letter be included in the Draft EA.

PB informed Ms. Kirkendall that Section 106 applies to the project because SIC is seeking federal loans from the Rural Utilities Service. Based on the results of the inventory survey and discussions of the meeting, it is obvious that the project would have an "adverse effect" on the cultural deposit in accordance with Section 106. Since "adverse effect" determinations require

Over a Century of  
Engineering Excellence

RECEIVED AS FOLLOWS

DRAFT

resolution in the form of a Memorandum of Agreement (MOA). PB postulated that two options are available: (1) amend the existing MOA of the SIC terrestrial system on Maut; or (2) prepare a new MOA for the Po'olenalena Park landing site. No decision was sought or made.

The MOA may include the stipulation that SIC conduct the addendum (or second) inventory survey if it cannot be completed prior to the MOA. In addition, the MOA would most likely include a stipulation that SIC prepare a preservation plan.

RECEIVED AS FOLLOWS

RECEIVED AS FOLLOWS

Mr. Erik Fredericksen  
Page 2

planning, it was decided that additional inventory level testing is necessary at this point. The additional testing will be conducted in the proposed area of impact, to assess the mauka boundaries of the cultural deposits, and to insure that historic properties are identified in the corridor. Should historic properties be identified during the supplementary testing, appropriate mitigation measures will be discussed. If the historic properties include burials, the corridor will, at that time, be relocated to allow for preservation in place.

Thank you for providing us with this update regarding the status of the inventory survey. We will await the archaeological inventory survey, including the supplementary testing as an addendum. As always, if you disagree with our comments or have questions, please contact Dr. Melissa Kirkendall (Maui/Lana'i SHPD 243-5169) as soon as possible to resolve these concerns.

Aloha,

*Dr. Holly McElowney*  
P. Holly McElowney, Acting Administrator  
State Historic Preservation Division  
MKJ/en

C: Michael Foley, Director, Department of Planning, County of Maui, FAX 270-7834  
Bard Rette, County of Maui, Land Use and Codes, FAX 270-7872  
Glen Ueno, County of Maui, Land Use and Codes, FAX 270-7872  
Mr. Jason Yazawa, Parsons Brinkerhoff, FAX 528-2388  
Cultural Resources Commission, Planning Dept, 250 S. High Street, Wailuku, HI 96783

PETER J. YOUNG  
Chairman  
BOARD OF LAND AND NATURAL RESOURCES  
100 KAHULUKEA AVENUE, SUITE 100  
KAHULUKEA, HAWAII 96741  
DAN DAVIDSON  
DEPUTY DIRECTOR  
EMMETT W. LAM  
DEPUTY DIRECTOR



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION  
KAOIWAHANA BUILDING, ROOM 505  
6011 KAOIWAHANA BOULEVARD  
HAPOLEI, HAWAII 96707

LOG NO: 2003.2425  
DOC NO: 0311MK08

November 26, 2003  
Mr. Erik Fredericksen  
Xamanek Researches  
P.O. Box 880131  
Pukalani, Hawaii 96789

Dear Mr. Fredericksen,

SUBJECT: Chapter 6E-8 Historic Preservation Comment on an End of Field Work Summary for an Archaeological Inventory Survey Proposed Sandwich Isles Communications (SIC) Fiber Optics Project at Po'olenalena Beach Park Landing Site [State/DHHL]  
Keaunohu Ahupua'a, Makawao District, Maui  
TMK (2) 2-1-07-72

Thank you for the opportunity to review this end of field report which our staff received on October 20, 2003. The end of field report preceded a meeting held at the DLNR-SHPD conference room, October 22, 2003, with Mr. Randy Urasaki, Mr. Jason Yazawa (Parsons Brinkerhoff), Mr. Erik Fredericksen (Xamanek Researches), and Dr. Melissa Kirkendall (Maui Archaeologist, SHPD). Mr. Fredericksen presented the end of field results at the meeting, and alternative strategies for identifying historic properties were discussed. The archaeological inventory survey report is in preparation.

During the field work, a 42 meter trench was excavated in the pathway under which the HDD cable is proposed to enter the sea. This trench was excavated at the recommendation of SHPD with concurrence from the MLJBC, to insure that no burials lie above the HDD corridor. After the identification of three distinct cultural layers, three test units were excavated adjacent to the corridor. The cultural layers appear to represent pre-contact through early historic era deposits. Five radiocarbon samples have been submitted for analysis by Beta Analytic.

We concur, preliminarily, that the deposits are significant under Criterion "D" and possibly Criterion "E". Cultural deposits have been identified on the parcels to the south, and the inventory level analysis should allow us to assess if the deposits identified during this work are contemporaneous.

We do not concur with the recommendation in the end of field report for data recovery at this time. As was indicated in the October 22, 2003 meeting, additional subsurface testing is recommended. During the meeting, various alternatives were explored. Because the cable trenching from the point at which the HDD cable surfaces to the road necessitates pre-



Persons  
Brinckerhoff  
Goodie &  
Dugliani, Inc.  
American Savings Bank Tower  
1001 Bishop Street, Suite 2000  
Honolulu, HI 96813  
808-537-7004  
Fax: 808-528-2368



Ms. Holly McEldowney  
State Historic Preservation Division  
December 10, 2003  
Page 2

December 10, 2003

Ms. Holly McEldowney, Acting Administrator  
Historic Preservation Division  
State of Hawaii Department of Land and Natural Resources  
Kakuhihewa Building, Suite 555  
601 Kamehaha Boulevard  
Kapolei Hawaii 96707

Dear Ms. McEldowney:

Subject: Sandwich Isles Communications, Inc.  
Submarine Fiber-Optic Cable Project  
Archaeological Survey Reports

On behalf of Sandwich Isles Communications, Inc. (SIC), we are pleased to submit archaeological reports prepared for the subject project for State Historic Preservation Division (SHPD) review.

As you might be aware, SIC was granted a license by the State of Hawaii's Department of Hawaiian Home Lands (DHHL) to provide modern telecommunications infrastructure for its properties at no cost to DHHL. SIC is currently installing terrestrial fiber-optic cable networks on Kauai, Oahu, Molokai, Maui, and Hawaii, and has coordinated with you and your staff regarding archaeological monitoring during construction.

**Project Description**

To connect the island networks, SIC proposes to construct and operate approximately 300 miles of submarine fiber-optic cables Statewide, divided into the following four segments (see enclosed figure):

- Kekaha, Kauai, to Mākaaha, Oahu;
- Hawaii Kai, Oahu, to Kaunakakai, Molokai;
- Kaunakakai, Molokai, to Lahaina, Maui; and
- Māheve, Maui, to Kawāhaeo, Hawaii.

The submarine cables would achieve landfall at the following sites. These landing sites would be the nodes where the SIC submarine network would connect with the terrestrial networks.

- Akiakoa Road, Kekaha, Kauai (TMK: 4-1-2-002-032)
- Kili Drive, Mākaaha, Oahu (TMK: por. 1-8-4-002-047)
- Sandy Beach Park, Hawaii Kai, Oahu (TMK: 1-3-9-015-001)
- Oneali'i Homesteads, Kaunakakai, Molokai (TMK: 2-5-4-006-019)
- Waikuli, Lahaina, Maui (TMK: 2-4-5-021-015)

Over a Century of  
Engineering Excellence

- Po'olenalena Park, Mākena, Maui (TMK: 2-2-1-007-072)
- Kaewa Place, Kawaihae, Hawaii (TMK: 3-6-1-004-020)

The ocean-land fiber optic cable connections will be constructed using horizontal directional drilling (HDD), a method that would avoid having to trench through sensitive coastal and nearshore resources, such as beaches and coral reefs.

A landing site would include an under-sea/underground cable conduit to a beach manhole that would be placed within the right-of-way of the nearest public roadway. The manhole would provide connection to the terrestrial system. However, the three proposed landing site parcels on Kauai and Oahu are not adjacent to existing or future terrestrial cables. Therefore, at these landing sites, sections of underground fiber-optic cable will be installed in road rights-of-way to connect the landing site to the closest approach of the terrestrial network. These connections are called "connecting routes".

**Coordination with SHPD Staff**

We have coordinated with your staff as noted below:

1. Meeting on February 5, 2003 with Ms. Sara Collins, Ms. Muffet Jourdana, Mr. Pat McCoy and Ms. Cathleen Dagher
2. Meetings on February 13, 2003 and October 22, 2003 with Ms. Melissa Kirkendall

Our early discussions with your staff involved the level of study necessary to analyze the impacts of the project on historic resources. The project archaeologists later consulted with your staff on technical issues relating to the studies. In addition, we have corresponded with your staff regarding our soil sampling activities at the proposed landing sites.

**Archaeological Studies**

The archaeological studies surveyed the proposed landing sites, which included the HDD staging area, and alignment of the underground cable conduit up to the roadway. It also included the connecting routes, which are part of three of the proposed landing sites. For the smaller landing site parcels, the entire property was surveyed. At the larger parcels, a conservative estimate of the construction area was surveyed. The following archaeological reports are enclosed:

**Archaeologist: Cultural Surveys Hawaii:**

Archaeological Inventory Survey in Support of the Proposed Sandwich Isles Fiber Optic Cable Landing at Akiakoa Road, Kekaha, Waimea Ahupua'a, Kona District, Island of Kauai, August 2003

Archaeological Inventory Survey in Support of the Proposed Sandwich Isles Fiber Optic Cable Landing at Kili Drive, Mākaaha Ahupua'a, Waianae District, Island of Oahu, August 2003

Over a Century of  
Engineering Excellence

RECEIVED AS FOLLOWS



Archaeological Inventory Survey in Support of the Proposed Sandwich Isles Fiber Optic Cable Landing within Sandy Beach Park, Ahupua'a of Maunaloa, Island of O'ahu, August 2003

Archaeologist: Xamanek Researches:

An Archaeological Assessment of a Portion of a Parcel in Makakupa'ia Ahupua'a, Island of Molokai, October 8, 2003

An Archaeological Inventory Survey of the Proposed Sandwich Isles Communications, Inc. Fiber Optics Landing Location Near the Lahaina Post Office, Waihi Ahupua'a, Lahaina District, Island of Maui, July 18, 2003

An Archaeological Inventory Survey of the Proposed Fiber Optics Landing Location at Po'olenalena Beach Park, Keaunohu Ahupua'a, Honou'uli moku, Makawao District, Island of Maui, December 2, 2003.

Archaeologist: Haun & Associates:

Archaeological Inventory Survey, TMK: 6-1-04: Por. 20, Land of Kawaihae 1, South Kohala District, Island of Hawaii, June 2003

Copies of the Kauai and Maui reports, 'Akiakoa Road, Waihi and Po'olenalena Park, will be sent directly to Ms. Nancy McMahon and Ms. Kirkendall, respectively, along with a copy of this letter.

Historic Review Process

Since our landing sites will be within submerged lands, we are planning to submit a Conservation District Use Application (CDUA) along with a Draft Environmental Assessment to the DLNR Land Division within a few weeks. In addition, SIC is seeking federal loans from the U.S. Department of Agriculture, Rural Utilities Service to help finance construction of the submarine fiber-optic cable network. Therefore, our project must comply with both Section 6E-8 of the Hawaii Revised Statutes (HRS) and Section 106 of the National Historic Preservation Act (NHPA).

If the State Historic Preservation Division finds that the enclosed reports meet your agency's standards and requirements, we will then initiate HRS Section 6E-8/NHPA Section 106 review and consultation.

Over a Century of  
Distinction & Excellence



If you have any questions or require additional information, please call me at 566-2260 or Mr. Jason Yazawa at 566-2235.

Sincerely yours,  
Patricia Brinckerhoff Quade & Douglas, Inc.

Randall Urasaki, P.E.  
Project Manager

Cc. Ms. Nancy McMahon, SHPD Kauai Archaeologist ('Akiakoa Road report enclosed)  
Ms. Melissa Kirkendall, SHPD Maui Archaeologist (Waihi and Po'olenalena Park reports enclosed)  
Mr. Sam Lemmo, DLNR Land Division (w/o attachments)

RECEIVED AS FOLLOWS

Over a Century of  
Distinction & Excellence

RECEIVED AS FOLLOWS

Mr. Randall Urasaki, Project Manager  
Page 2

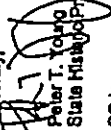
(3) The drainage referred to in the "Summary and Conclusions" section is not depicted on any of the maps in the report. Since its proposed use is an important part of your consultant's recommendations, we in turn recommend that the drainage area to be used be depicted on one or more of the maps, particularly Figures 2 and 3.

(4) Conducting an archaeological inventory survey "concurrent with construction activities" is not an acceptable approach. If a survey is warranted, then it should be carried out prior to any ground-disturbing activities, particularly those associated with the excavation of a drilling spoils/tarry pit.

(5) We would like to request better copies of the photographs included in the report.

Should you or your consultant have any questions, please contact Sara Collins at 892-8026.

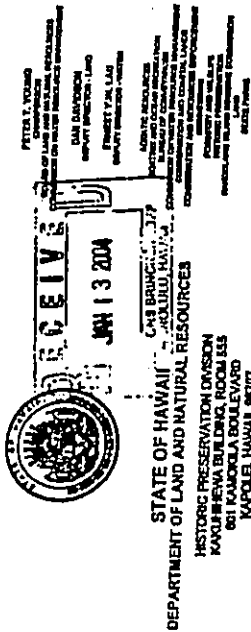
Sincerely,

  
Peter T. Young  
State Historic Preservation Officer

SC:jen

cc: Erik Fredericksen, Xamanak Researches  
Cultural Resources Commission, Planning Dept. 250 S. High Street, Wailuku, HI 96783  
Maia Akutagawa, Chair, Mokuai Png Comm, PO Box 1715, Kaulakakai, HI 96748

4954



JAN 12 2004

LOG NO: 2004.0069  
DOC NO: 0401SC03

Mr. Randall Urasaki, Project Manager  
Parsons Brinckerhoff Quade & Douglas, Inc.  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, Hawaii 96813

Dear Mr. Urasaki:

**SUBJECT:** National Historic Preservation Act, Section 108 Compliance -  
Sandwich Isles Communications, Inc. Submarine Fiber-Optic  
Cable Project; Review and Comments on an Archaeological  
Assessment of a Landing Site at Makakupa'ia, Mokuai  
Makakupa'ia, Kona, Mokuai  
TMK: 121-5-4-008:019

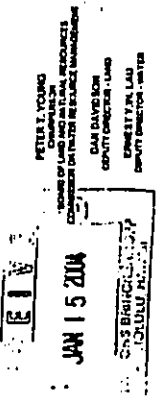
Thank you for the opportunity to comment on a report documenting the results of an archaeological assessment of a proposed cable landing site at Makakupa'ia on Mokuai Makakupa'ia Ahupua'a, Island of Mokuai (TMK: 5-4-00:19). We received the subject report on December 10, 2003 and provide the following comments. Our review has been conducted with reference to the recently promulgated Hawaii Administrative Rules (HAR 13-275 through 284) governing archaeological activities in the state.

In general, the work seems to have been carried out satisfactorily. The 1.5-acre survey area underwent pedestrian survey, and two soil borings conducted for the subject undertaking were also monitored. Apart from an extension of the wall of AHI Firpoard (SHIP No. 50-60-03-105) which may form part of the *maka* side of the subject parcel, no evidence of historic sites, including subsurface deposits, was found during the survey. A portion of the subject parcel owned by the Department of Hawaiian Home Lands is overlain by fill up to 50 cm thick. In addition, there is considerable evidence of prior land disturbance.

Before your company accepts the report as final, we would recommend that several minor revisions or clarifications be addressed, as follows:

- (1) We recommend that a USGS map (1:24,000 scale) of the Area of Potential Effect and/or survey area be included with the report, as indicated in HAR 13-278.
- (2) If your consultant's review of prior land use included data on LCAs or Informant Interviews of any kind, this information should be included in the background section.

RECEIVED AS FOLLOWS



PETER L. YOUNG  
COMMISSIONER  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
OFFICE OF HISTORIC PRESERVATION  
JAN 15 2004  
STATE OF HAWAII  
DEPT. DIRECTOR - 1817A  
EMERITUS LAU  
DEPT. DIRECTOR - 1817B



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
HISTORIC PRESERVATION DIVISION  
KAPALEHA BLDG. 2ND FLOOR 555  
601 KAPALEHA BLVD. LEVARD  
KAPOLELE, HAWAII 96707

JAN 13 2004

Mr. Randall Urasaki, Project Manager  
Parsons, Brinckerhoff, Quade and Douglas Inc.  
American Savings Bank Tower  
1001 Bishop St. Suite 3000  
Honolulu, Hawaii 96813

LOG NO: 2003.2831  
DOC NO: 0312NM10

Dear Mr. Urasaki:

**SUBJECT:** National Historic Preservation Act, Section 106 Compliance - Historic Preservation Review - Archaeological Inventory Survey in Support of the Proposed Sandwith Isles Fiber Optic Cable Landing at 'Akaioa Road, Kekaha, Waimea Ahupua'a, Kona District, Island of Kauai' (Tuichin and Hammatt, CSH, 2003)  
TMK: 1-2-02;  
Kekaha, Waimea, Kauai

Thank you for submitting a report documenting the results of archaeological inventory survey work (Tuichin and Hammatt, CSH, 2003, ms. *Archaeological Inventory Survey in Support of the Proposed Sandwith Isles Fiber Optic Cable Landing at 'Akaioa Road, Kekaha, Waimea Ahupua'a, Kona District, Island of Kauai'*). We received the report on December 13, 2003 and provide the following comments.

The project area was less than an acre in size, and surveyed through inspection and the excavation of one backhoe trench in the vicinity of the proposed cable drilling site. No evidence of sites or human burials was found. Archaeological monitoring is recommended as mitigation for burials since the area is underlain by sandy soils, known to contain burials and cultural layers. We can accept the findings made, and also concur with this recommendation.

The report is acceptable with one exception. The cover sheets do not have the parcel number. We believe it is 32, but please verify. Please submit corrected tax map key information; separate pages may be sent to us for inclusion with the report copies on file.

If you have any questions, please call Nancy McMahon (808) 742-7033.

Sincerely,

Peter L. Young, Chairperson, and  
State Historic Preservation Officer

c. Ian Costa, Planning Department  
Chair, Kauai Iki Iki Burial Council  
Chair, Kauai Historic Preservation Review Commission  
Kana'i Kapuleia, Burial Sites Program  
Mr. David Shideler, Cultural Surveys Hawaii

NM:ak

Mr. Erik Fredericksen  
Page 2

We find this report to be acceptable. The historic preservation review process is concluded. No historic properties will be affected by development of the project areas will have no effect on significant historic sites. As always, if you disagree with our comments or have questions, please contact Dr. Melissa Kirkendall (Mau/Lana'i SHPD 243-5188) as soon as possible to resolve these concerns.

Aloha,

*Dr. Holly McElowney*

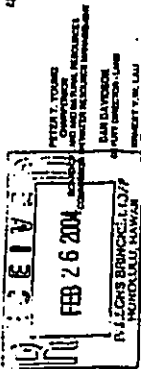
P. Holly McElowney, Administrator  
State Historic Preservation Division  
MKCjen

c. Michael Foley, Director, Department of Planning, County of Maui, FAX 270-7634  
Bert Rattie, County of Maui, Land Use and Codes, FAX 270-7972  
Glen Ueno, County of Maui, Land Use and Codes, FAX 270-7972



RECEIVED AS FOLLOWS

49167



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
HISTORIC PRESERVATION DIVISION  
KAPOLLEWA BUILDING, ROOM 415  
801 KALANOKA BOULEVARD  
KAPOLEI, HAWAII 96707

LEWIS LUMBLE  
CHIEF OF BUREAU



February 19, 2004

Mr. Randall Urusaki, Project Manager  
Parsons Brinckerhoff Quade & Douglas, Inc.  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, Hawaii 96813

LOG NO: 2004.0483  
DOC NO: 0402SC10

Dear Mr. Urusaki:

**SUBJECT:** National Historic Preservation Act, Section 106 Compliance - Review  
And Comments on Report Documenting the Results of an Archaeological  
Inventory Survey at Sandy Beach Park  
Maunaloa, Kona, O'ahu  
THK: (1)3-8-012:002

Thank you for the submission of a report documenting the results of an archaeological inventory survey in support of a proposed Sandwich Isles fiber optic cable landing site at Sandy Beach Park on O'ahu (Borthwick, York, Tulin & Hammett, 2003, *Archaeological Inventory Survey for the Proposed Sandwich Isles Fiber Optic Cable Landing Within Sandy Beach Park, Ahupua'a of Maunaloa, Island of O'ahu* [3-9-12-02]). We received the subject report on December 10, 2003 and provide the following comments. Our review is late and we apologize for any inconvenience this may have caused you and your client.

The historical and archaeological background sections of the report are acceptable, and provide sufficient data for hypothesizing about probable site types within the survey area. The survey area included the Area of Potential Effect for the proposed cable landing; a 6-meter-wide corridor within the eastern section of the beach park and along Kalanokoa Highway to Kalanokoa Avenue. The survey area underwent surface inspection; no subsurface testing was conducted. Surface survey work indicated that the entire cable route within the beach park has been significantly modified for roadway and park purposes, and the landing site is at the interface of the active beach and terrestrial soils. No historic sites were found, and no further work is recommended apart from a cautionary statement pertaining to inadvertent finds during construction.

We believe that the report adequately documents the survey work, and recommend that it be accepted as final. We would only recommend that the recommended cautionary statement, as given on page 22, be amended to the following wording:

PETER T. YOUNG  
CHIEF OF BUREAU  
NAME OF LAND AND NATURAL RESOURCES  
COMMISSIONER IN CHIEF OF THE BUREAU



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
HISTORIC PRESERVATION DIVISION  
KAPOLLEWA BUILDING, ROOM 415  
801 KALANOKA BOULEVARD  
KAPOLEI, HAWAII 96707

February 6, 2004

Mr. Erik Fredericksen  
Xamanak Researches  
P.O. Box 880131  
Pukalani, Hawaii 96788

LOG NO: 2003.2500  
DOC NO: 0312MK03

Dear Mr. Fredericksen,

**SUBJECT:** Historic Preservation Review - 8E-42 - Archaeological Inventory Survey  
Proposed Sandwich Isles Communications, Inc. Fiber Optics Landing  
Location Near the Lahaina Post Office  
Wahikuli Ahupua'a, Lahaina District, Maui  
THK (2)4-5-21:15

Thank you for the opportunity to review this report which our staff received on October 22, 2003 (Fredericksen and Fredericksen 2003, *An Archaeological Inventory Survey of the Proposed Sandwich Isles Communications, Inc. Fiber Optics Landing Location Near the Lahaina Post Office, Wahikuli Ahupua'a, Lahaina District, Island of Maui* [THK 4-5-21:15]). Xamanak (ms). We have previously commented on this action, most recently regarding a monitoring plan prepared preliminary to soils testing (Log 2003.0266VDoc 0304MK12) in which we indicated that the results of the abbreviated monitoring program would be included in the archaeological inventory survey report.

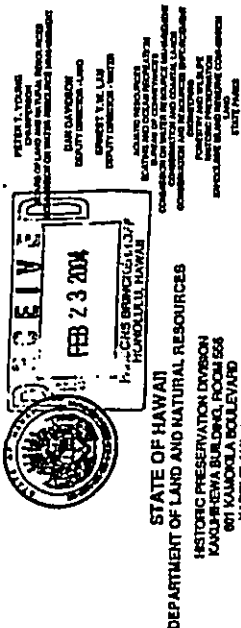
The background section acceptably establishes the ahupua'a's settlement pattern and predicts the likely site pattern in the project area. The historical information provided summarizes the history of the post-contact period land uses. The summary of previous archaeological work in the area provides a baseline for the current work.

The survey has adequately covered the project area documenting no historic properties in the project area. Subsurface testing (seven backhoe trenches) were also negative for evidence of cultural deposits. No cultural properties were identified during the monitoring program in conjunction with soils testing.

We concur that no further archaeological work is warranted. Should a possible large stony pit be necessary, archaeological monitoring is recommended, because of the coastal location of the parcel.

RECEIVED AS FOLLOWS

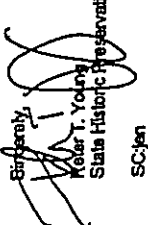
49717



Mr. Randall Unusald, Project Manager  
Page 2

Should historic remains such as artifacts, burials, concentrations of shell or charcoal be encountered during construction activities, work shall cease immediately in the immediate vicinity of the find, and the find shall be protected from further damage. The contractor shall immediately contact the State Historic Preservation Division (932-8015), which will assess the significance of the find and recommend an appropriate mitigation measure, if necessary.

If you have any questions, please contact Sara Collins at 692-8028.

Sincerely,  
  
 Kela T. Young  
 State Historic Preservation Officer  
 SC:jen

Mr. Randall Unusald, Project Manager  
Parsons, Brinckerhoff, Quade & Douglas, Inc.  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, Hawaii 96813

FEB 20 2004  
LOG NO: 2004.0457  
DOC NO: 04025C04

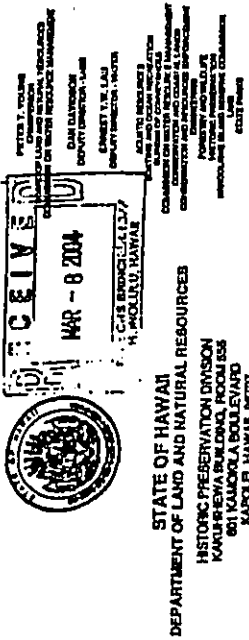
c: Mr. A. Van Horn Diamond, Chair, O'ahu Island Burial Council  
Mr. Kai Merkaui, Burial Sites Program  
Mr. Lance M. Foster, Director, Neighborhood and Native Rights, OHA, 711 Keolu Plaza, Honolulu, HI 96813 (ATTN: Pua Au)

SUBJECT: National Historic Preservation Act, Section 106 Compliance - Comments on a Report Documenting the Results of an Archaeological Inventory Survey at Kih Drive, Māhaha, Waipā, O'ahu  
TMK: (1)-8-4-002-047, Pkg.

Thank you for the opportunity to comment on a report documenting the results of an archaeological inventory survey conducted at a proposed fiber optic cable landing site in Waipā (Tulchin & Hammett, 2003, Archaeological Inventory Survey in Support of the Proposed Sandovich Isles Fiber Optic Cable Landing at Kih Drive, Māhaha Ahupua'a, Waipā District, Island of O'ahu TMK 8-4-02-47 pkg.). We received the subject report on December 10, 2003 and provide the following comments. Our review is late, and we apologize for any inconvenience this may have caused you or your client.

The historical and archaeological sections are acceptable, and provide sufficient information for theorizing about probable site types. The project area included the proposed drill site and a locale immediately west of Farrington Highway; the project area was less than one acre in size. A surface survey was conducted, and subsurface testing was conducted through monitoring of test boring at the proposed drill site and the locale adjacent to the highway. No historic sites were found. Although your consultant did not recommend any further work for these areas, Cultural Surveys Hawaii did note that the fiber optic cable "gap area" in this part of Waipā should be considered in any planning. The "gap area" will be the site of additional subsurface cable installation through trenching within the Farrington Highway right-of-way. Your consultant proposes that on-site archaeological monitoring be carried out for all such trenching, due to past inadvertent discoveries of human burials in the region.

RECEIVED AS FOLLOWS



MAR - 4 2004  
LOA NO. 2004-0054  
DOC NO. 0402P/M14

STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
HISTORIC PRESERVATION DIVISION  
KAPURIPUA BUILDING, ROOM 555  
801 KOLEA BOULEVARD  
HONOLULU, HAWAII 96813

Mr. Randall Urasaki  
Parsons Brinckerhoff Quade & Douglas Inc.  
1001 Bishop Street  
Honolulu, HI 96813

Dear Mr. Urasaki:

**SUBJECT:** National Historic Preservation Act Section 106 and Chapter 46-8 Historic Preservation Review Team & Associates Report 145-080203: "Archaeological Inventory Survey TMS: 8-1-04; Por. 28 Land of Kawaihae 1, South Kohala District Land of Hawaii" (Haun, Henry and Orr 2003) Land of Kawaihae 1, South Kohala District Island of Hawaii TMS: 8-1-04; P.87.20

Thank you for submitting a copy of the above referenced report for our review and comment. The report was received in our office December 10, 2003. We apologize for our late review and any inconvenience this may have caused you and Sandwich Isles Communication, Inc.

The report was prepared to comply with Section 106 of the National Historic Preservation Act (NHPA) and Chapter 46-8 for the Submarine Fiber-Optic Cable Project. We believe that the archaeological inventory survey of the roughly 0.2-acre project area in Kawaihae was adequate. Four historic sites were found in the survey. The sites include two concrete walls (Sites 23857 and 23858), a concrete building foundation (Site 23859), and the remains of a concrete and mortared stone pier (Site 23860), all of which appear to date to the 1930s. The sites have been adequately documented.

We agree with the proposed site significance evaluations in the report. All four sites are evaluated as significant under Criterion "c" because they have yielded information important for understanding historic land uses in the local area. We also agree with the recommendation for no further work at all four sites. The sites have been adequately documented and hold no significant research potential.

The report fulfills the requirements for inventory surveys set forth in our administrative rules and thus meets with our approval. We would appreciate receiving a second copy of this report for our Kona office library.

If you should have any questions about the Kawaihae component of the Submarine Fiber-Optic Cable Project please contact our Hawaii Island archaeologist, Patrick McCoy, at 692-8028.

Sincerely,

*Peter T. Young*

Peter T. Young  
State Historic Preservation Officer

PLJ/en

- c. Sam Lemmo, Office of Conservation and Coastal Lands
- Alan Haun, Haun & Associates
- Sandwich Isles Communication Inc.
- Chris Yuan, Director, Dept of Planning, Hawaii County

Mr. Randall Urasaki, Project Manager  
Page 2

We would recommend acceptance of the subject report of findings, and we concur with the proposal to conduct on-site archaeological monitoring during all trenching associated with additional cable installation in the "gap area." We would only note that in our copy of the subject report, page 23 is missing some information (paragraph 1), and on page 25 paragraph 2 appears to contain transposed references for the Board of Water Supply work. We would appreciate receiving any corrected pages that might be prepared.

Should you have any questions, please contact Sara Collins at 692-8028.

Sincerely,  
*Peter T. Young*  
Peter T. Young  
State Historic Preservation Officer  
SCJ/en

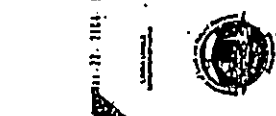
- c. Mr. A. Van Horn Diamond, Chair, Oahu Island Burial Council
- Mr. Kai Marrett, Burial Sites Program

RECEIVED AS FOLLOWS

**STATE OF HAWAII**  
**DEPARTMENT OF LAND AND NATURAL RESOURCES**  
 HISTORIC PRESERVATION DIVISION  
 501 KUMUOLA BOULEVARD  
 HONOLULU, HAWAII 96807



**STATE OF HAWAII**  
**DEPARTMENT OF LAND AND NATURAL RESOURCES**  
 HISTORIC PRESERVATION DIVISION  
 501 KUMUOLA BOULEVARD  
 HONOLULU, HAWAII 96807



LOG NO: 2004-0419  
 DOC NO: 0402AM03

APR 21 2004  
 Mr. Erik Fredericksen  
 Xantrex Researches  
 P.O. Box 888131  
 Puukalani, Hawaii 96788

Dear Mr. Fredericksen,

**SUBJECT:** National Historic Preservation Act, Section 104 Compliance - Historic Preservation Review  
 Of an Archaeological Inventory Survey for the Proposed Sandeich Isles Communications, Inc. Fiber Optic Landing Location Near the Pelelanena Beach Park (FREDERICKSON) Kaunohou Ali'ipua'a, Makawao District, Maui  
 TMS (2) 2-1-07; PG 72

Thank you for the opportunity to review this report which our staff received on December 11, 2003 (Fredericksen and Fredericksen 2003). An Archaeological Inventory Survey of the Proposed Sandeich Isles Communications, Inc. Fiber Optic Landing Location at Pelelanena Beach Park, Kaunohou Ali'ipua'a, Honuaia Moku, Makawao District, Island of Maui (TMS 2-1-07; pg. 72) Xantrex (ms). Our review is late and we apologize for any inconvenience this may cause you or your client.

The background section acceptably establishes the site's settlement pattern and predicts the likely site pattern in the project area. The historical information provided summarizes the history of the post-contact period land use. The summary of previous archaeological work in the area provides a baseline for the current work.

The survey has adequately covered the project area documenting one historic property in the project area. SIs 50-50-14-5408 consists of an extensive precontact habitation site, utilized into the early post contact period. Subsurface testing included super coring, three hand-excavated test units (two 2 x 1 m and one 1 x 1 m), and backhoe trenching covering the area of 33.5 meters, along the proposed APE for the HDO installation. The habitation site was identified in the vicinities of TU 1 and 2. TU 3, the most beach ward test unit, did not evidence cultural materials. Features identified during the testing included an articulated dog burial, hearths, possible postholes, refuse pits, water worn paving, and modern remains.

The analysis portion of the report has documented the findings in tabular form for materials recovered in the 1/8 inch screen. Materials in the 1/8 inch screen will be presented as findings in an addendum report, which will also include additional testing results (as per discussions between Dr. Melissa Kirkland of BHPD Maui, and Mr. Erik Fredericksen). Radiocarbon assays submitted to Beta Analytic yielded results suggesting use of the area from the mid 1400s through the modern period. Please include a complete discussion of laboratory analysis in the addendum report (rather than tabular recordation).

MAI 17 2004

Mr. David Scholer  
 Cultural Surveys Hawaii  
 723 N. Kalia Road  
 Honolulu, Hawaii 96824

LOG NO: 2004-0031  
 DOC NO: 0402AM01

**SUBJECT:** National Historic Preservation Act - Section 104 Compliance: Historic Preservation Review - Revised Pages for Archaeological Inventory Survey in Support of the Proposed Sandeich Isles Fiber Optic Cable Landing at Pelelanena Beach Park, Kaunohou Ali'ipua'a, Makawao District, Island of Maui (TMS 2-1-07; PG 72) Xantrex (ms)

Thank you for submitting the revised pages for the above report which we received on February 26, 2004. The revised pages include the corrected map page designation. The report is now acceptable.

If you have any questions, please call Henry McLendon 749-7023.

*[Signature]*  
 Peter T. Young  
 State Historic Preservation Officer

RECEIVED AS FOLLOWS


Mr. Erik Fredericksen  
Page 2

We concur that Site 5486 is significant under Criterion "D" for its information content. We also believe that the site may be significant under Criterion "A", as it represents one of the few remaining examples of an extensive beach habitation site, especially in an area developed as the south Maui/Maui region. To the southeast of the site is a burial on an adjacent parcel (SD-50-14-5182) which may also be associated with the habitation site. The subject parcel is currently in use as a beach park, which has subjected the area to impact, although the cultural deposit has thus far been protected by the minimal development encroachments posed by a rural beach park (some restroom facilities).

The subject report represents a first phase of inventory survey work in the vicinity of a proposed cable landing site at Po Olanena Beach Park. After field work was completed for the subject report, it became clear that additional, inventory-level work should be carried out at a locale to the east (results of Site 5486 that is within the Area of Potential Effect for the proposed landing site. Consequently, an addendum report will be submitted that documents this second phase of inventory survey work in support of the proposed cable landing site.

Given the fact that the subject report represents the first part of a two-part investigation, we would recommend that the following issues be addressed in the addendum report: revision of the significance assessments as suggested above; reexamination of significance and mitigation issues; the above mentioned analysis of the 18' fraction of midden, along with complete laboratory discussions of all materials; results of additional survey, hand, and backhoe testing from the point at which this Phase of field work compiled up to the highway. If the addendum report includes these items, we will better understand the depositional environment surrounding this important site.

We recommend acceptance of the Phase I report, and will await the addendum report on Phase II of the survey. As always, if you disagree with our comments or have questions, please contact Dr. Melissa Kriestel (maiskriestel@SHPD 243-5165) as soon as possible to resolve these concerns.

  
Peter T. Young  
State Historic Preservation Officer

CO:jin

Michael Foley, Director, Department of Planning, County of Maui, FAX 270-7634  
Beri Rulis, County of Maui, Land Use and Codes, FAX 270-7872  
Glen Ueno, County of Maui, Land Use and Codes, FAX 270-7872  
Lance Nakamura, County of Maui, Land Use and Codes, FAX 270-7872  
Cultural Resources Commission, Planning Dept, County of Maui, 250 B. High Street, Wailuku, HI 96793  
Chair, Maui and Islands Burial Council  
Kana'i Kapehala, Burial Sites Program

COUNTY OF KAUAI  
PLANNING DEPARTMENT  
4444 RICE STREET, SUITE A473  
LIHUE, KAUAI, HAWAII 96766-1326

TEL

541 15

100  
1000  
KALANANOLU

MEMORANDUM

DATE: June 13, 2003  
TO: Parsons, Brinckerhoff, Quade & Douglas, Inc. Attn. Randall Urasaki  
FROM: Kauai Historic Preservation Review Commission  
SUBJECT: Fiber Optic Cable Landing, Kekaha, Kauai

This is to inform you that the Kauai Historic Preservation Review Commission (KHPRC) met on June 1, 2003 to discuss your request for information on potential environmental impacts of the proposed submarine cables and cable landing area. It is the KHPRC's understanding that this request is part of an Environmental Assessment which is required for this project.

The KHPRC was previously submitted comments on cultural and archaeological aspects of the project. Being that the purview of the KHPRC is historic preservation, your May 8<sup>th</sup> letter was received for the record with no further comments offered.

Thank you for keeping the KHPRC apprised of the status and the various aspects of the project.

Please feel free to contact us should you have any questions regarding this matter.

Mahalo.



Parsons Brinckerhoff  
Quade & Douglas, Inc

Pacific Tower, Suite 3000  
1001 Bishop Street  
Honolulu, HI 96813  
808-531-7094  
Fax: 808-528-2368

Telephone Conversation Memorandum

Projects: SIC Job no.: 16351A Date: 10/27/2003  
talked to: Hillary Hochstetter from: EPA, San Francisco

Items discussed: Sole Source Aquifer Review

Information obtained:

Hilary had called last week to follow up.  
I returned his call, points discussed as follows:

- Once the federal agencies have linked up (PB action item) to obtain "authorization as agent" letter from RUS, or have RUS contact EPA, Hilary requested a scoping discussion for the water quality impact analysis. At the time of the scoping discussion, wants to know landing sites and their involvement with Sole Source Aquifers. Details of drilling would be important.
- Hilary thinks using the (state) DEA as an attachment to a USDA transmittal requesting Sole Source Aquifer review will work.
- I told Hilary we would follow up when our site selection process was more advanced.

action requested:

- PB to obtain "authorized agent" designation from RUS.
- PB to conduct scoping discussion with Hilary after sites selected.

distributions

RU	RD	DA	File	Hoak	es
----	----	----	------	------	----

by: David Adkin

RECEIVED AS FOLLOWS



Parsons  
Brinckerhoff  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

April 16, 2003

Mr. Charley Ice  
Hydrologic Planner  
State of Hawaii Department of Land and Natural Resources  
Commission on Water Resource Management  
P.O. Box 621  
Honolulu, Hawaii 96809

Dear Mr. Ice:

Subject: Sandwich Isles Communications (SIC) Statewide Telecommunications Network - Applicability of Permits issued by the Commission on Water Resource Management.

Sandwich Isles Communications, Inc. is building a fiber optic communications cable network that will provide Hawaiian homestead beneficiaries and lessees with access to essential telecommunications services. SIC is certified by the Federal Communications Commission (FCC) as a rural local exchange carrier and is authorized by the Hawaii Public Utilities Commission (PUC) to provide telecommunications service on DHHL properties.

As consultants to SIC, Parsons Brinckerhoff (PB) met with your staff on March 17, 2003 and April 11, 2003. Part of the April 11 meeting addressed whether the project would require permits issued by the Water Commission, apart from the Sole Source Aquifer Review (Section 1424 (e) of the Safe Drinking Water Act) now in progress for the cable landing site on Mokolai.

The purpose of this letter is to follow up on the discussion at the April 11<sup>th</sup> meeting by requesting a written determination of whether the project will require any permits issued by the Commission. A site map has been included for your convenience.

If you have questions or require additional information, please do not hesitate to call Rachel Adams at (808) 566-2257.

Sincerely yours,  
PARSONS BRINCKERHOFF

Randall Urasaki, P.E.  
Project Manager

Over 40 Years of  
Engineering Excellence

MAIL  
MAY -9  
P.O. BOX 621  
HONOLULU, HI 96809  
PETER I. YOUNG  
MARTIN J. DING  
CHRISTOPHER W. HARRIS  
COURTNEY L. HARRIS  
BRYAN L. HARRIS  
HEATHER M. HARRIS  
ERNEST Y. W. LAU



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
COMMISSION ON WATER RESOURCE MANAGEMENT  
P.O. BOX 621  
HONOLULU, HAWAII 96809

May 6, 2003

Mr. Randall Urasaki, P.E.  
Parsons Brinckerhoff  
1001 Bishop Street, Suite 3000  
Honolulu HI 96813

Dear Mr. Urasaki:

Permits Required by Commission on Water Resource Management  
Sandwich Islands Communications Statewide Telecommunications Network

Thank you for your letter of April 16, 2003, confirming the substance of our meeting on March 17, 2003.

Please be advised that, based on the information provided in all our communications, drilling an excavation tube for a communications cable from shore to an exit point beyond the reef about 4300 feet from the shoreline will not require permits from the Commission.

If you have any questions, please call Charley Ice of the Commission staff at 587-0251.

Sincerely,

ERNEST Y.W. LAU  
Deputy Director

Cl:ss

RECEIVED AS FOLLOWS

RECEIVED AS FOLLOWS

Telephone Conversation Memorandum



Persone Brinckerhoff  
Quade & Douglas, Inc.  
Pacific Tower, Suite 3000  
1001 Bishop Street  
Honolulu, HI 96813  
808-531-7094  
Fax: 808-528-2268

Project: Sandwich Isles Telecommunications  
talked to: Shannon Fitzgerald  
Job no.:  
From: Environmental Protection Agency  
Date: Feb. 24, 2004

Item discussed: Status of Groundwater Impact Assessment Review

Information obtained: Shannon returned my call and explained that she has taken over Hillary's Sole Source Aquifer responsibilities while he is temporarily filling in at the Tribal Program Office. I explained to Shannon that I was contacting her to see where we were at with the Groundwater Impact Assessment.

Shannon mentioned that she had seen the Environmental Notice announcement, and just had a few questions. She asked where we were at in the project. I explained that we had just received a Conservation District Use Approval and were currently circulating the Draft for public review. Shannon mentioned that she saw that there would be drilling involved. I told her that this was correct, there would be Horizontal Directional Drilling on the coast. She asked me if this was in Kaunakakai, and I said that it was actually a little East of Kaunakakai.

Shannon explained that based on the information that I had provided to her and that she had received from Hillary, she didn't think that there would be any Ground Water impacts.

I asked Shannon if there was anything else that we needed to fulfill our responsibilities for the Ground Water Impact Assessment, and she said No. Usually, there's a 30 day review period, in which if EPA does not respond, then the Assessment is considered accepted. She was out sick in December, so she really hasn't seen the Groundwater Impact Assessment for the project, but knew it was there somewhere in her office. I asked her if she would like us to send her another copy, she said yes, please. If we could send it to her in an electronic version, that would be very helpful. She said that she could then send something as a response.

Action requested: Send an electronic version of the GWIA to Shannon Fitzgerald (Fitzgerald.shannon@epa.gov)  
By: Rachel Adams

Persone Brinckerhoff  
Quade & Douglas, Inc.  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813  
808-531-7094  
Fax: 808-528-2268

December 22, 2003

Mr. Hillary Hecht  
U.S. Environmental Protection Agency, Region IX  
Mail Code WTR-9  
75 Hawthorne St.  
San Francisco, CA 94105

Dear Mr. Hecht:

Subject: Sandwich Isles Communications Submarine Fiber-Optic Cable Project;  
Safe Drinking Water Act Section 1424(e) Review

Enclosed for your review and concurrence is a Groundwater Impact Assessment for the Molokai Sole Source Aquifer, in reference to the SIC submarine cable project. This assessment has been prepared to comply with Section 1424(e) of the Safe Drinking Water Act. Our staff has discussed this project with you on two previous occasions, first on May 31, 2002, and again on June 12, 2002, when the scope of this Assessment was reviewed with you in more detail. We have also coordinated with the State's Commission on Water Resource Management in the preparation of this assessment.

A draft Environmental Assessment (EA) for the project is now in preparation. We would like to report in the EA, that EPA concurs on the absence of project impacts on Molokai's sole source aquifer. A copy of the draft EA (December 2003) is also enclosed as supporting documentation for this sole source aquifer review request.

If you have any questions or comments, please contact Nami Ohtomo at 808-566-2239 or [nhlomo@pbworld.com](mailto:nhlomo@pbworld.com).

Sincerely yours,  
PABSONS BRINCKERHOFF

*[Signature]*  
Randall Urasaki, P.E.  
Project Manager

Attachments: Groundwater Impact Assessment for Molokai Sole Source Aquifer  
Draft EA for SIC Submarine Fiber-Optic Cable Project (December 2003)

c: Charlie Ica, Commission on Water Resource Management (w/ attachment)  
Lisa Hanl, EPA (w/o attachment)  
Wendy Wise, EPA (w/o attachment)  
Lenny Wolfe, RUS (w/o attachment)  
Flandy Jenkins, RUS (w/o attachment)

Over a Century of  
Engineering Excellence





*Andy*  
 Patricia  
 Brackner  
 1001 Bishop Street, Suite 3000  
 Honolulu, HI 96813

May 23, 2003

Mr. Lawrence T. Yamamoto, Acting State Conservationist  
 Natural Resources Conservation Service  
 U.S. Department of Agriculture  
 300 Ala Moana Blvd., Room 4-118  
 Honolulu, Hawaii 96850

Dear Mr. Yamamoto:

Subject: Sandwich Isles Communication, Inc.  
 Submarine Cable Project  
 Pre-Assessment Consultation

Sandwich Isles Communications, Inc. (SIC) is a rural telephone company headquartered in Honolulu, Hawaii that is developing a statewide telecommunications network to service the Department of Hawaiian Home Lands. The U.S. Department of Agriculture Rural Utilities Service (RUS) is providing loan assistance for the project. A portion of the project that would connect the major Hawaiian Islands by submarine telecommunication cables is now entering the federal and State environmental review processes.

The purpose of this letter is to request any comments or suggestions you may have on the environmental aspects of the proposed submarine cables and cable landing areas pursuant to the National Environmental Policy Act (NEPA) and the Hawaii Revised Statutes (HRS) Chapter 343. Our initial assessment indicates that we will also need to coordinate with your agency regarding the Farmland Protection Policy Act. Of seven proposed marine cable landing sites, the only site that could potentially affect Prime Lands is the Kii Drive Site (see attachments). Currently, this site is not utilized for active farming. The construction method proposed is Horizontal Directional Drilling (HDD), described more fully below. After construction, the only visible change in the land surface would be the presence of a telephone manhole in the roadway right-of-way. Based on this summary, we request that you provide an assessment as to whether the Farmland Protection Policy Act (FPPA) applies to the Kii Drive site.

Comments pertaining to the project's environmental aspects will be addressed in an Environmental Assessment (EA) to be approved by RUS and the Hawaii Department of Land and Natural Resources. Those providing comments at this stage will receive a copy of the Draft EA when it is issued.

Over a Century of  
 Engineering Excellence



Mr. Lawrence T. Yamamoto  
 Sandwich Isles Communications  
 Page 2

**PROPOSED ACTION**

The current proposal involves the installation of undersea fiber optic cables that will connect five major Hawaiian Islands (Kauai, Oahu, Molokai, Maui, and Hawaii). The undersea fiber optic cables will connect to onshore fiber optic cable systems. These cables will establish connections for SIC's Statewide Telecommunications Network, ensuring reliable high quality service to network subscribers.

A cable-laying ship will place cables on the ocean floor between the islands. Where the cables approach land, a cable landing will be constructed using a technique called horizontal directional drilling (HDD). The HDD method was selected because of its ability to drill under reefs, minimizing impact to coastal areas. Starting from onshore manholes sites, the HDD equipment bores below the ground and feet areas to a point under water at least 60 feet deep and 2,000 to 5,000 feet offshore.

In light of the current economic conditions, SIC has determined that in order to provide modern telecommunication services to DHHL subscribers in a timely manner, they will proceed with a network that can be built in the most expeditious and economical manner. Therefore, the marine cable landing project has been redesigned to include only seven landing sites at this time that will connect all the DHHL projects on the five major islands. In the future, given a more positive economy, additional cable landings may be added for redundancy. However, the initial network of seven landing sites will provide a complete, independent, functioning network even if additional cable landings are not provided.

The preliminary identification of cable landing sites is as follows:

- On Kauai, in the Kekaha area; at 'Akkooa Road (TMK: par. 4-1-2-002.032)
- On Oahu, in the Makaha and Hawaii Kai areas; at Kii Drive and City Park (TMK: par. 1-8-4-002-047 and TMK: par. 1-3-9-015:001)
- On Molokai, in the Kaunakakai area; at Oneali Homesteads (TMK: 2-5-4-006:019)
- On Maui, in the Lahaina and Makena areas; at Waihi and Po'olenalena Park (TMK: par. 2-4-5-021:015 and TMK: par. 2-2-1-007-072)
- On Hawaii, in the Kawahoe area; at Kaewe Street (TMK: par. 3-6-1-004:020)

**BACKGROUND**

SIC is certified by the Federal Communications Commission and is authorized by the State of Hawaii's Public Utilities Commission to provide telecommunications service on properties administered by the Department of Hawaiian Home Lands (DHHL). SIC has been serving DHHL communities since 1998. Many DHHL areas are located in rural communities where telecommunications (telephone) services are neither existent nor sufficient. SIC's proposed project will connect five major Hawaiian Islands and provide

Over a Century of  
 Engineering Excellence

RECEIVED AS FOLLOWS



Mr. Lawrence T. Yamamoto  
Sandwich Isles Communications  
Page 3

essential telecommunications services and a modern, broadband fiber optic system to DHHL areas at affordable rates.

Onshore, fiber optic cables will be installed underground, mostly within existing public rights-of-way, such as roads. SIC previously prepared Environmental Assessments (EA's) for the terrestrial system in each county, and these EA's were accepted by the Hawai'i Department of Transportation. This project is also proceeding in accordance with a Memorandum of Agreement (under Section 106 of the National Historic Preservation Act) designed to protect cultural and historic properties that may be encountered along the routes.

The benefits of this project include:

1. DHHL and its beneficiaries will have access to a modern, independent and affordable telecommunications infrastructure.
2. This infrastructure will enable subscribers to have access to new interactive services such as telemedicine, tele-educational programming, video and data transmissions, and the Internet.
3. Creation of hundreds of jobs during the construction of the network and attraction of new high tech and other businesses to DHHL parcels.
4. To date, SIC has spent \$100 million from an IRUS loan on new construction. Within the next 2 to 3 years up to an additional \$300 million is also available through the same loan for future project-related expenses.

**COMMENTS**

SIC has been consulting with members of native Hawaiian organizations, government agencies, businesses, and communities in the affected areas since the environmental review process began for the terrestrial cable systems. Your input is now requested specifically on environmental aspects of the submarine cables between the islands, and the cable landing sites. Written comments will become part of the official project record and will be addressed in the forthcoming Draft EA for the submarine cable network.

Comments may be mailed to the following address:

Mr. Randall Urasaki  
Parsons Brinckerhoff  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

Over a Century of  
Engineering Excellence



Mr. Lawrence T. Yamamoto  
Sandwich Isles Communications  
Page 4

They may also be sent by facsimile transmission to (808) 528-2368 or email at urasaki@pbworld.com. Comments will be most useful to us if received within one month of your receipt of this letter.

This will not be your final opportunity to comment on this project. You will be notified when the Draft Environmental Assessment is issued. If you would like to receive a copy of the Draft EA, please notify us by mail, email, or phone.

We look forward to receiving your comments.

Mahalo,  
PARSONS BRINCKERHOFF GUADE & DOUGLAS, INC.

Randall Urasaki, P.E.  
Project Manager

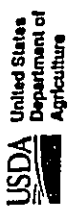
**Enclosures:**

- Attachment 1: Proposed Submarine Cable Landing Sites (Map)
- Attachment 2: HDD Construction Technology
- Attachment 3: Kā Drive, Mākaha, O'ahu - Agricultural Lands of Importance Map

Over a Century of  
Engineering Excellence

RECEIVED AS FOLLOWS

RECEIVED AS FOLLOWS



P.O. Box 50004  
Honolulu, HI 96850  
Phone: 808-541-2800  
FAX: 808-541-1325

Our People...Our Islands...In Harmony

June 24, 2003

AM 7 5

RECEIVED  
MAIL ROOM

Mr. Randall Urasaki  
Parsons Brinckerhoff  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

Dear Mr. Urasaki,

Subject: Sandwich Isles Communication, Inc.  
Submarine Cable Project  
Farmland Protection Policy Act

This is in response to your May 23, 2003 letter to Mr. Lawrence T. Yamamoto who is now the State Conservationist for the Natural Resources Conservation Service, Hawaii. In our phone conversation yesterday, you assured me that the site for the entrance pit near Kill Drive in Maloaha will be restored as much as possible to the original condition and only a telephone manhole will be in the roadway right-of-way.

The Farmland Protection Policy Act applies to Prime, Unique or Other Lands of Statewide Importance that are planned to be converted to uses other than farming. This project will not permanently remove the land from possible use for farming; therefore, the Farmland Protection Policy Act does not apply.

Thank you for the opportunity to review the planned project. Please call me at 541-2800 ext. 133 if you have questions.

Sincerely,

Saku Nakamura  
Soil Scientist

The Natural Resources Conservation Service works in partnership with the American people to conserve and enhance natural resources on private lands. An Equal Opportunity Employer

RECEIVED AS FOLLOWS



Parsons  
Brinckerhoff  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

Mr. George P. Young, Chief  
Regulatory Branch  
Page 3

May 7, 2003

Mr. George P. Young, P.E., Chief  
Regulatory Branch  
U.S. Army Corps of Engineers  
Building 230  
Fort Shafter, Hawaii 96858-5440

1. DHHL and its beneficiaries will have access to a modern, independent and affordable telecommunications infrastructure.
2. This infrastructure will enable subscribers to have access to new interactive services such as telemedicine, tele-educational programming, video and data transmissions, and the internet.
3. Creation of hundreds of jobs during the construction of the network and attraction of new high tech and other businesses to DHHL parcels.
4. To date, SIC has spent \$100 million from an RUS loan on new construction. Within the next 2 to 3 years up to an additional \$300 million is also available through the same loan for future project-related expenses.

**COMMENTS**

SIC has been consulting with members of native Hawaiian organizations, government agencies, businesses, and communities in the affected areas since the environmental review process began for the terrestrial cable systems. Your input is now requested specifically on environmental aspects of the submarine cables between the islands and the cable landing sites. Written comments will become part of the official project record and will be addressed in the forthcoming Draft EA for the submarine cable network.

Comments may be mailed to the following address:

Mr. Randaŭ Urasaki  
Parsons Brinckerhoff  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

They may also be sent by facsimile transmission to (808) 528-2368 or email at [urasaki@pbworld.com](mailto:urasaki@pbworld.com). Comments will be most useful to us if received within one month of your receipt of this letter.

This will not be your final opportunity to comment on this project. You will be notified when the Draft Environmental Assessment is issued. If you would like to receive a copy of the Draft EA, please notify us by mail, email, or phone.

We look forward to receiving your comments.

Over a Century of  
Engineering Excellence



Dear Mr. Young:  
Subject: Sandwich Isles Communication, Inc.  
Submarine Cable Project  
Pre-Assessment Consultation

Sandwich Isles Communications, Inc. (SIC) is a rural telephone company headquartered in Honolulu, Hawaii that is developing a statewide telecommunications network to service the Department of Hawaiian Home Lands. The U.S. Department of Agriculture Rural Utilities Service (RUS) is providing loan assistance for the project. The portion of the project that would connect the major Hawaiian Islands by submarine telecommunication cables is now entering the federal and State environmental review processes.

We met previously with your staff on May 22, 2001 and May 29, 2002 to discuss this project. Minutes of these meetings are attached. Since that time, the project has been more clearly defined.

The purpose of this letter is to request further comments or suggestions you may have on the environmental aspects of the proposed submarine cables and cable landing areas pursuant to the National Environmental Policy Act (NEPA) and the Hawaii Revised Statutes (HRS), Chapter 343. Our initial assessment indicates that we will also need to coordinate with your agency to obtain a United States Department of Army Corps of Engineers permit. Comments pertaining to the project's environmental aspects will be addressed in an Environmental Assessment (EA) to be approved by RUS and the Hawaii Department of Land and Natural Resources. Those providing comments at this stage will receive a copy of the Draft EA when it is issued.

**PROPOSED ACTION**

The current proposal involves the installation of undersea fiber optic cables that will connect five major Hawaiian Islands (Kauai, Oahu, Molokai, Maui, and Hawaii). The undersea fiber optic cables will connect to onshore fiber optic cable systems. These cables will establish connections for SIC's Statewide Telecommunications Network, ensuring reliable high quality service to network subscribers.

Over a Century of  
Engineering Excellence

RECEIVED AS FOLLOWS



Memorandum

Mr. George P. Young, Chief  
Regulatory Branch  
Page 4



Mahalo,  
PARSONS BRINCKERHOFF QUADE & DOUGLAS, INC.

*Randall Urasaki*  
Randall Urasaki, P.E.  
Project Manager

- Enclosures:
- Attachment 1: Proposed Submarine Cable Landing Sites (Map)
- Attachment 2: HDD Construction Technology
- Attachment 3: Kekaha, Kauai; Landing Site Map and 'Akaioa Road Map
- Attachment 4: Māhaha, O'ahu; Landing Site Map and Kū Drive Map
- Attachment 5: Hawaii Kai, O'ahu; Landing Site Map and City Park Map
- Attachment 6: Kaunakakai, Molokai; Landing Site Map and Oneali Homessteads Map
- Attachment 7: Lahaina, Maui; Landing Site Map and Wahikui Map
- Attachment 8: Mākena, Maui; Landing Site Map and Po'olenalana Park Map
- Attachment 9: Kawaihae, Hawaii; Landing Site Map and Ka'awe Street Map
- Attachment 11: Minutes of Meeting with USACE, May 22, 2001
- Attachment 10: Minutes of Meeting with USACE, May 29, 2002

To: File

From: Nami Ontomo

Date: May 23, 2001

Subject: Department of Army Permits for Sandwich Isles Communications Project  
Fort Shelter  
May 22, 2001, 3:00 p.m.

Attendees: LTC Ronald Light U.S. Army Corps of Engineers  
George Young U.S. Army Corps of Engineers  
Jason Yazawa Parsons Brinckerhoff  
Nami Ontomo Parsons Brinckerhoff

Meeting Summary

PR requested a meeting with ACOE to determine the Department of Army (DA) regulatory process for Sandwich Isles Communications (SIC) cable landings project. We met with Colonel Light (Commander/District Engineer) and George Young, Chief of the Regulatory Branch.

Tad briefly described the type of project being proposed and asked for guidance and insight about Department of Army (DA) permits. Although Tad did not mention SIC by name, George Young guessed that SIC is the proposing party based on the project description. He is aware of the project because they received applications for the land-side portion of their project. A Nationwide permit for utility corridors is being used on the land-side portion.

Coral Reefs

ACOE recommended the project avoid damaging coral reefs, mentioning that the Executive Order on Coral Reef Protection has elevated the coral reefs issue. He cited a case in Jacksonville, FL where several environmental groups petitioned the ACOE not to expedite reviews of projects with coral reef impacts. He also mentioned that a Native Hawaiian group was a signatory on that petition. To alleviate concerns about coral reef impacts, George recommended that bota surveys and coral reef coverage studies be conducted.

DA Permit Application Packaging

ACOE indicated that the permit applications can be submitted on a per landing site or on a per county basis. ACOE indicated that they themselves do not have an issue with processing multiple DA permit applications because their scope of environmental review is limited as compared to other reviewing agencies.

ACOE will initiate consultation with other federal and State agencies for compliance with the Coastal Zone Management Act, the Endangered Species Act, and the National Historic Preservation Act. While public outreach efforts may be needed to process the DA permit,

RECEIVED AS FOLLOWS

Memorandum



Sandwich Isles Communication  
10/19/00 Meeting  
Page 2 of 2

ACOE stated that it is their policy not to duplicate the public involvement processes conducted by other permitting agencies. In this project, DLRM would require a public hearing for the CDUA.

ACOE indicated that their jurisdictional limits with regards to coastal waters is three miles from the shore. PB informed them that the project will be within a few thousand feet of the coast.

**NEPA Compliance**  
PB indicated that the scope of the project will be such that an EA would suffice for environmental review under Chapter 343. ACOE also noted that an EA would likely suffice for NEPA.

ACOE stated that the applicant does not have to submit a NEPA document (EA or EIS) along with the DA permit application. It is the responsibility of the ACOE to prepare the NEPA document when they process the permit. However, information (e.g., detailed environmental studies; Chapter 343 document, etc.) will be needed from the applicant. If a NEPA EIS were needed, ACOE typically requires the project proponent to bear the costs of necessary additional research. ACOE would still prepare and issue notification of the EIS document.

ACOE recommended consultations with local community groups, as well as with agencies such as the Office of Hawaiian Affairs and the State Historic Preservation Division. These consultations should be conducted on a locally specific level, and should address issues like gathering practices, and other activities conducted by community groups or families.

**Section 10 vs. Section 404**  
ACOE indicated that if directional drilling is used, the action would fall only under the jurisdiction of a Section 10 of the Rivers and Harbors Act. If no fill were used, a Section 404 permit under the Clean Water Act (CWA) would not be required. Therefore, a Clean Water Certification (Section 401 of CWA) from the Department of Health would not be needed. If trenching were used, George indicated that this may or may not require a 404/401 permit. An example of a directional drilling project that required a Section 404 permit involved an exit point that was geologically unstable. The exit point needed a couple of thousand cubic yards of grout for stabilization.

**Review Time**  
If all of the landing sites are constructed by directional drilling, and fall under the jurisdiction of Section 10 rather than Section 404, ACOE estimates that the permit application can be processed in 60 days. However, reviews by NMFS and USFWS under Section 7 may lengthen the time needed to finish processing the DA permit.

Over a Century of  
Engineering Excellence

To: File  
From: David Allin  
Date: 29 May 2002  
Subject: Meeting with USACE Regulatory Branch  
Sandwich Isles Communications Project  
Fort Shafter  
May 29, 2002

Attendees: Lilly Silva U.S. Army Corps of Engineers  
Dawn Chang  
Colette Saitola  
Randy Urasaki  
David Allin  
Environmental Planning Solutions  
Parsons Brinckerhoff  
Parsons Brinckerhoff

**Meeting Summary:**

The purpose of the meeting was to hold initial discussions with the USACE about the environmental aspects of the marine cable component of the SIC project. PB made a brief project presentation and explained the approach of meeting with the regulatory agency prior to meeting with the various commenting agencies. Dawn noted that Section 106 coordination had already occurred for the terrestrial portion of the project.

Points of discussion included:  
• Lilly was aware of controversy regarding cable landings in Florida, and recommended that PB research the USACE Jacksonville web site for information on the controversy. PB should address the issues that were controversial in Florida in the application for the Hawaii project if those issues are relevant. The controversy may relate to an ATT cable in Puerto Rico in which a beach was constructed as part of the cable project.

• USACE's environmental concerns would need to be addressed in the environmental documentation to be prepared for the project. Those concerns include:

□ Impacts on coral reef. It was suggested that coral reefs in the project vicinity be mapped and the impacts described. Impacts on "live" coral would be much more significant than impacts on "dead" coral. The Coral Reef Initiative is about to public some guidelines on compensatory mitigation for coral reef impacts. The conflicting views on the effectiveness of coral transplantation was discussed. If HDD is employed, impacts on coral reefs could be negligible.

□ It was suggested that the Fish and Wildlife Service be asked to define the seaward limit of their jurisdiction, since the "pop-out point" might be seaward of their jurisdiction.

• Lilly asked if there would be borings, and PB stated that there would likely be two at each landing site, one at the manhole location and one at the shoreline. Both borings would be upland of the Corps jurisdiction.  
• The specific type of regulatory mechanism that the Corps would use to regulate the SIC project was discussed.

□ The simplest technique would be to use a "Letter of Permission" (LOP), which may be used in cases where only a Section 10 review is triggered (e.g., no "discharge"). With a Section 10 LOP, the resource agencies are given 20 days to

Over a Century of  
Engineering Excellence

RECEIVED AS FOLLOWS



Page 2 of 2

- comment, and there is no public review. It may be possible to avoid a "discharge" if HDD is used at all landing sites. Drilling mud would be contained by flushing the bore with sea water just before the pop-out point. The maximum duration to process a LOP would be 120 days, but Lolly tries for 30-45 days when possible. PB suggested that the project could be addressed by Nationwide Permit #12 whether HDD or trenching were employed. Lolly mentioned that DOH Clean Water Branch was proposing to renew blanket Section 401 permits for certain nationwide permits, including NWP #12. (Note: since the meeting, the DOH has issued a blanket Section 401 approval for NWP #12). However, blanket Section 401 approvals are not valid in Class AA marine waters, and the SIC project is likely to be located in such waters. With the blanket Section 401 not being valid for projects in Class AA waters, an individual Section 401 permit would be needed.
- The Corps could require an Individual Permit if the project is deemed "controversial." Dawn explained that the project is likely to be controversial, but extensive pre-active outreach would occur to resolve as many concerns as possible. The details of the outreach and resolution of issues will be discussed in the project's EA, which will be submitted with the USACE permit application. To address the issue of "degree of controversy", the USACE application should include letters of support, records of outreach activities, and a commitment to implement HDD.
  - Lolly requested that we submit a single permit application package, and exceptions will be separated out by the Corps.
  - The Hawaii Coastal Management Program is in the process of issuing blanket CZM approvals for certain NWP. PB should contact the CZM program for further information. However, even CZM blanket approvals go out for a 30-day public review.

Over a Century of  
Engineering Excellence

RECEIVED AS FOLLOWS

Parsons  
Brinckerhoff  
Quade &  
Douglas, Inc.  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813  
808-531-7000  
Fax: 808-529-2308



May 21, 2003

Mr. George Young, Chief  
Regulatory Branch  
U.S. Army Corps of Engineers  
Building 230  
Fort Shafter, Hawaii 96858-5440

Dear Mr. Young:

**Subject: Sandwich Isles Communication, Inc.  
Submarine Cable Project  
Pre-Assessment Consultation Letter**


This is in regards to the Submarine Cable Project proposed by Sandwich Isles Communications, Inc. (SIC). This portion of the project involves connecting the major Hawaiian Islands by submarine telecommunications cables to service the Department of Hawaiian Home Lands (DHHL) sites on the major Hawaiian Islands.

We are in the process of identifying existing submarine cables, wastewater outfalls, and other undersea utilities between the Hawaiian Islands. We are attaching a composite map of existing utility easements which we produced using information obtained from the Department of Land and Natural Resources and the State Harbors Division.

We would appreciate your assistance in verifying the information enclosed and any additional submarine military lines or other undersea utilities including wastewater outfalls that are shown on your records.

If you have any questions, please call Mr. Randall Urasaki at 531-7094.

We look forward to receiving your comments.

Mahalo,  
PARSONS BRINCKERHOFF QUADE & DOUGLAS  
  
Randall Urasaki, P.E.  
Project Manager

Enclosures:  
Attachment: Existing Submarine Utility Composite Map



# CORRECTION

THE PRECEDING DOCUMENT(S) HAS  
BEEN REPHOTOGRAPHED TO ASSURE  
LEGIBILITY  
SEE FRAME(S)  
IMMEDIATELY FOLLOWING

RECEIVED AS FOLLOWS

**Parsons  
Brinckerhoff  
Quade &  
Douglas, Inc.**  
American Samoa Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813  
808-531-7094  
Fax: 808-528-2268



May 21, 2003

Mr. George Young, Chief  
Regulatory Branch  
U.S. Army Corps of Engineers  
Building 230  
Fort Shafter, Hawaii 96858-5440

Dear Mr. Young:

**Subject: Sandwich Isles Communication, Inc.  
Submarine Cable Project  
Pre-Assessment Consultation Letter**

This is in regards to the Submarine Cable Project proposed by Sandwich Isles Communications, Inc. (SIC). This portion of the project involves connecting the major Hawaiian Islands by submarine telecommunications cables to service the Department of Hawaiian Home Lands (DHHL) sites on the major Hawaiian Islands.

We are in the process of identifying existing submarine cables, wastewater outfalls, and other undersea utilities between the Hawaiian Islands. We are attaching a composite map of existing utility easements which we produced using information obtained from the Department of Land and Natural Resources and the State Harbors Division.

We would appreciate your assistance in verifying the information enclosed and any additional submarine military lines or other undersea utilities including wastewater outfalls that are shown on your records.

If you have any questions, please call Mr. Randall Urasaki at 531-7094.

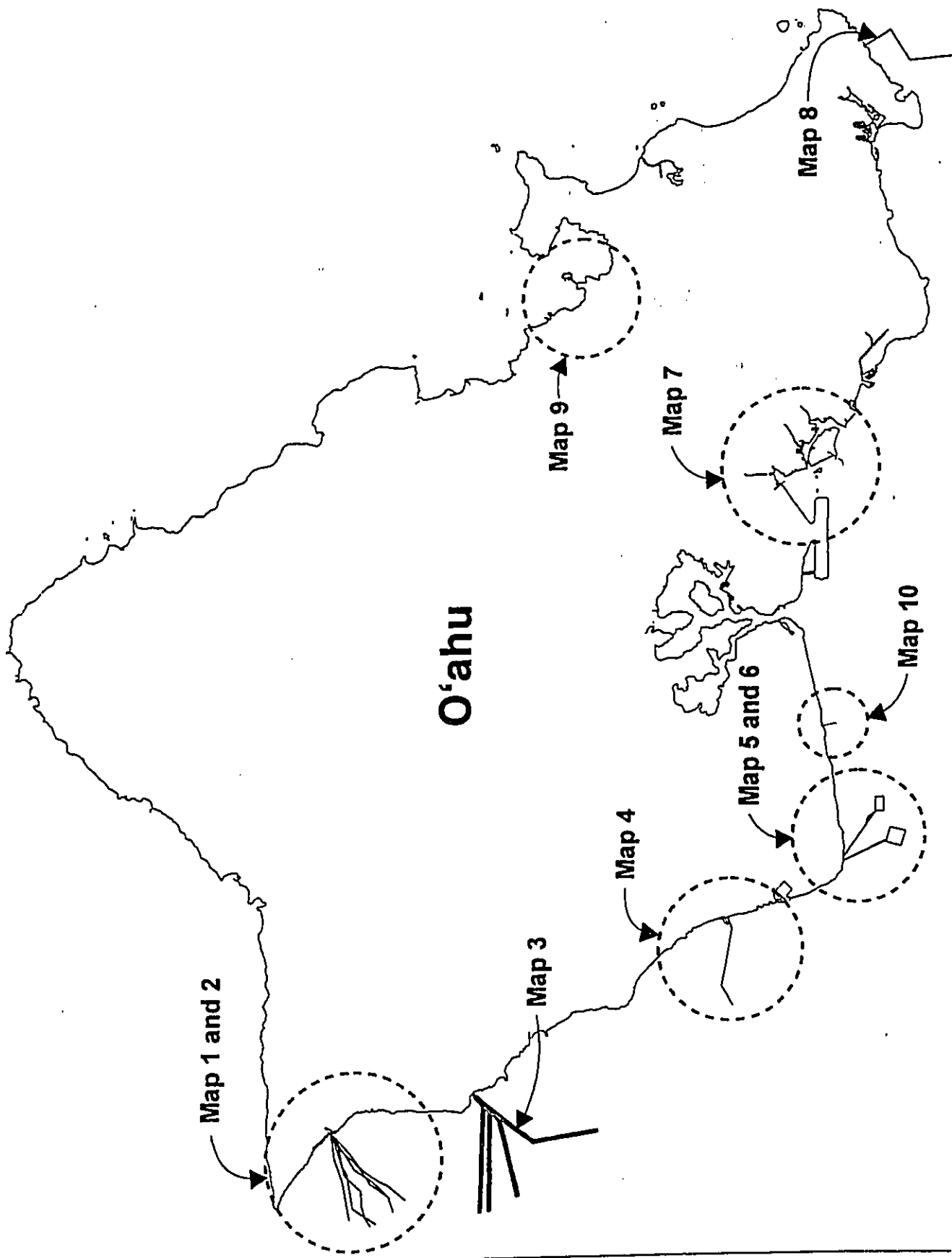
We look forward to receiving your comments.

Mahalo,  
**PARSONS BRINCKERHOFF QUADE & DOUGLAS**  
  
Randall Urasaki, P.E.  
Project Manager

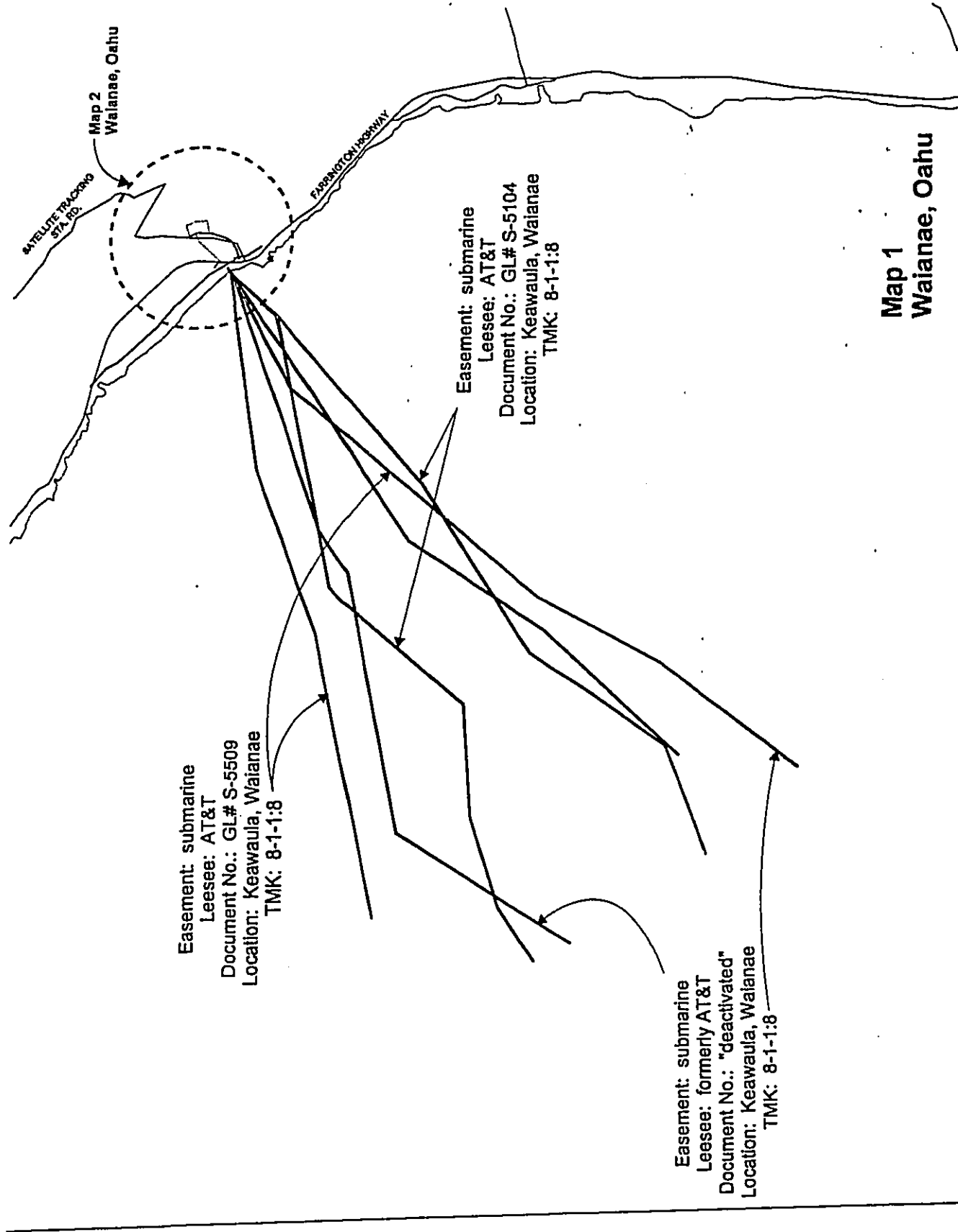
Enclosures: Existing Submarine Utility Composite Map  
Attachment: Existing Submarine Utility Composite Map

Over a Century of  
Engineering Excellence

RECEIVED AS FOLLOWS



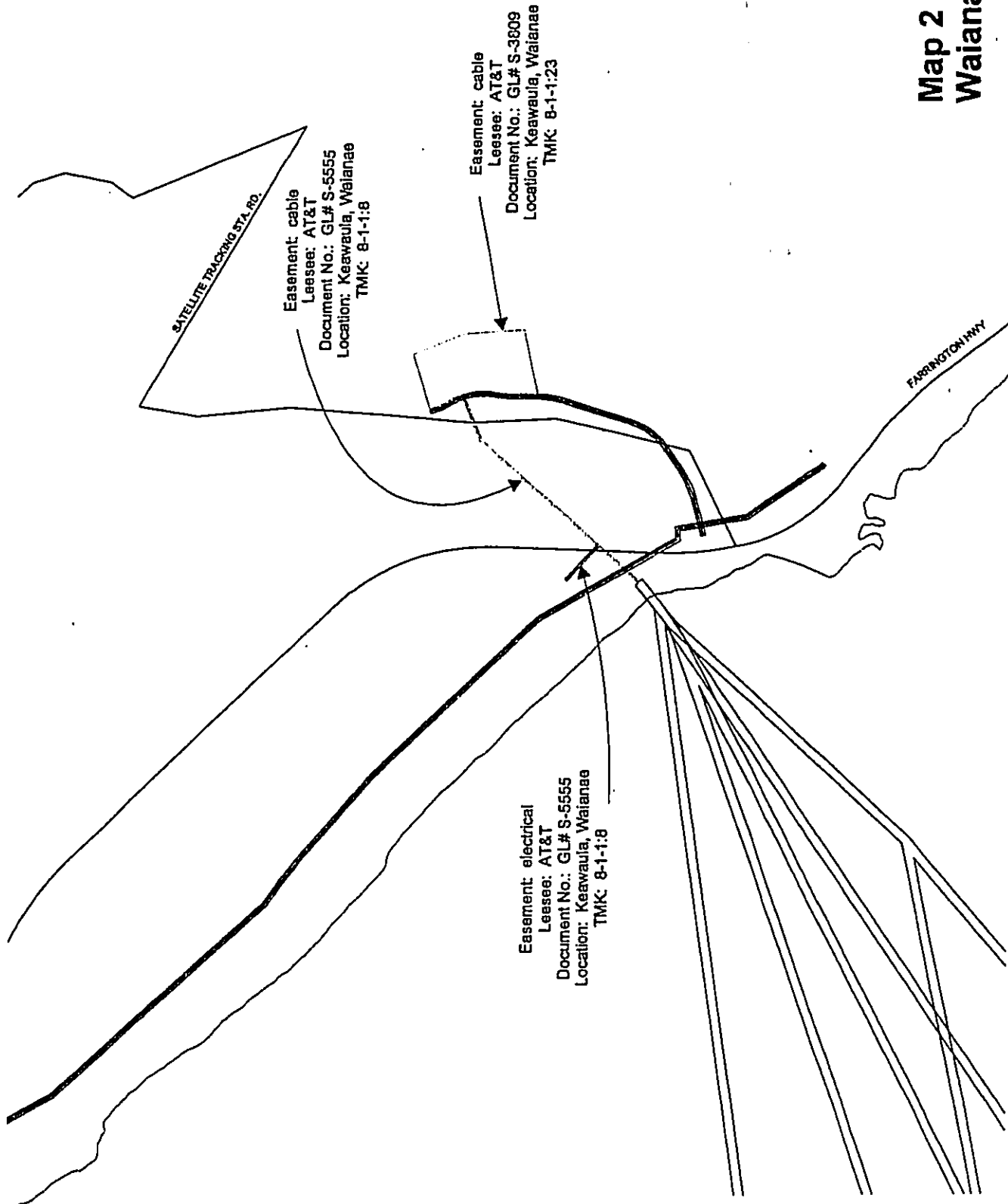
RECEIVED AS FOLLOWS



Map 1  
Waianae, Oahu

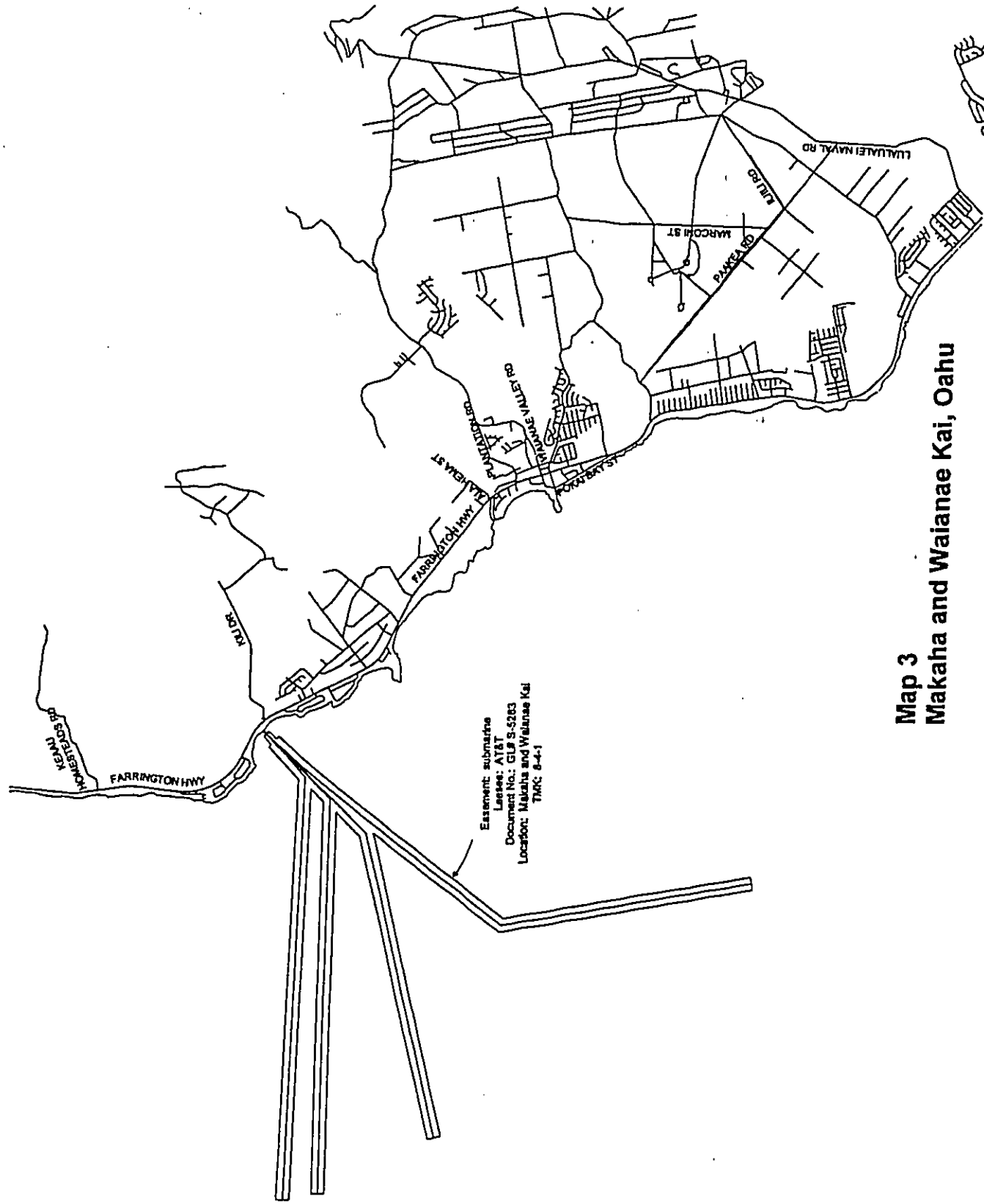
RECEIVED AS FOLLOWS

Map 2  
Waianae, Oahu

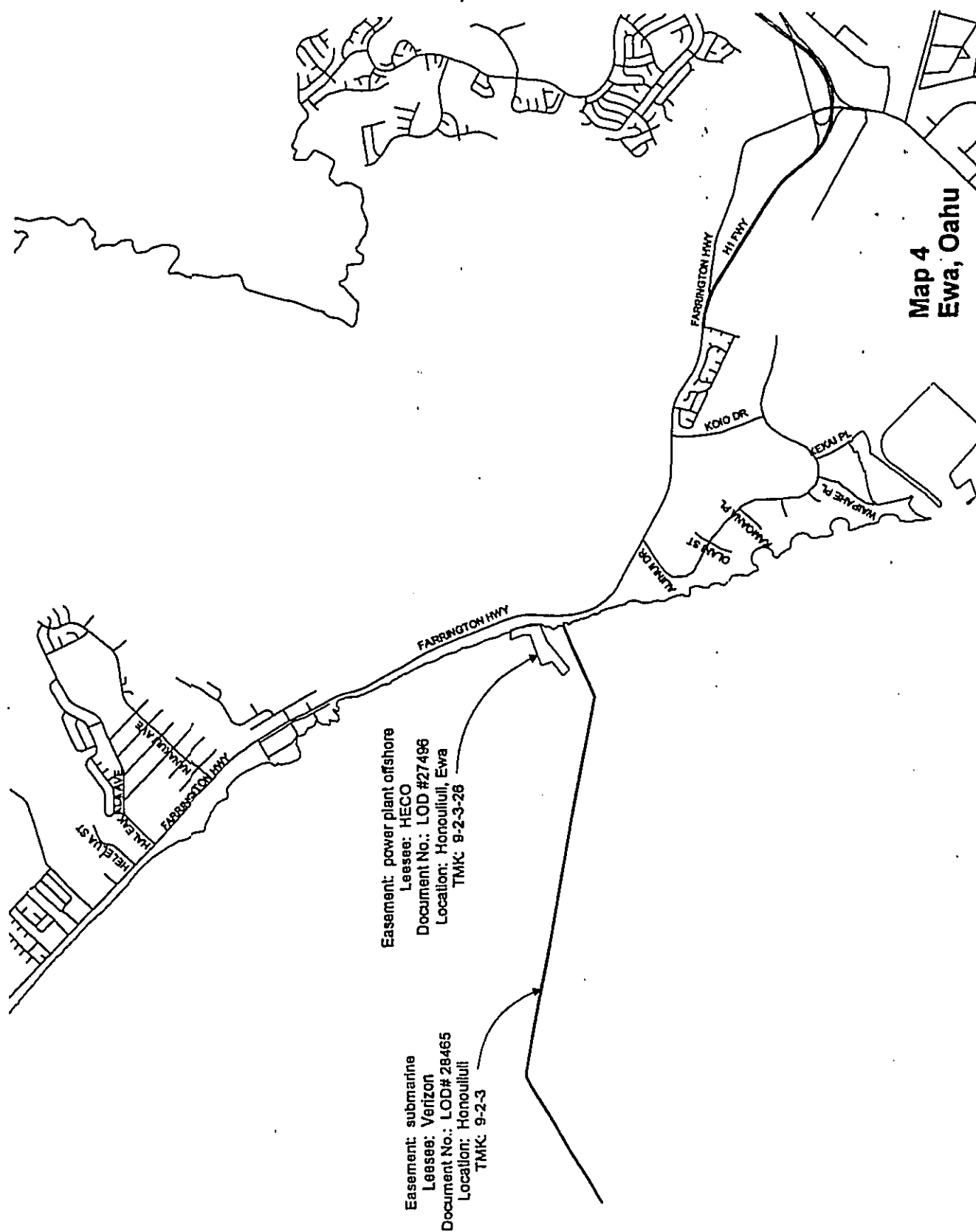


0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

RECEIVED AS FOLLOWS

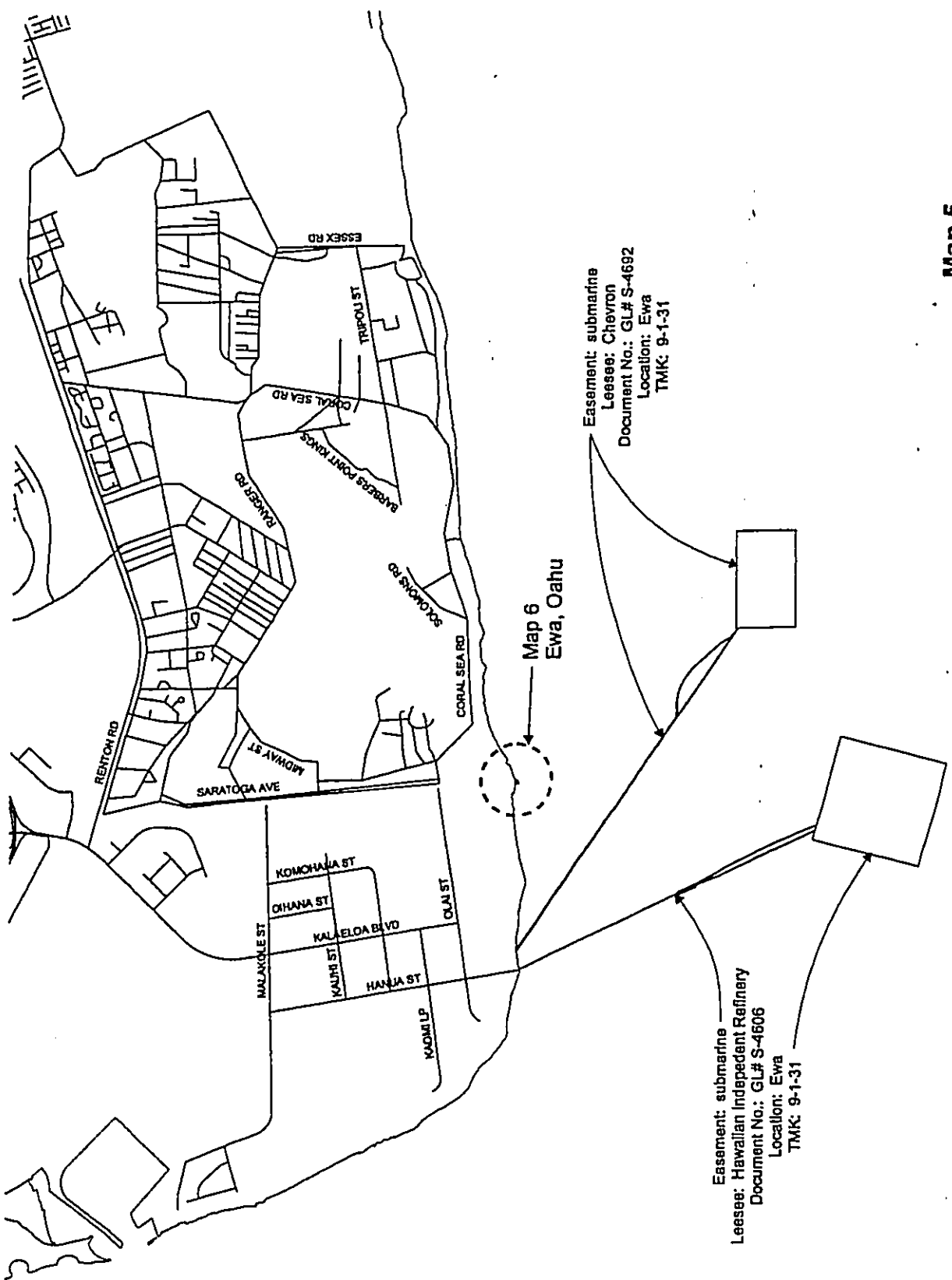


RECEIVED AS FOLLOWS



1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50

RECEIVED AS FOLLOWS



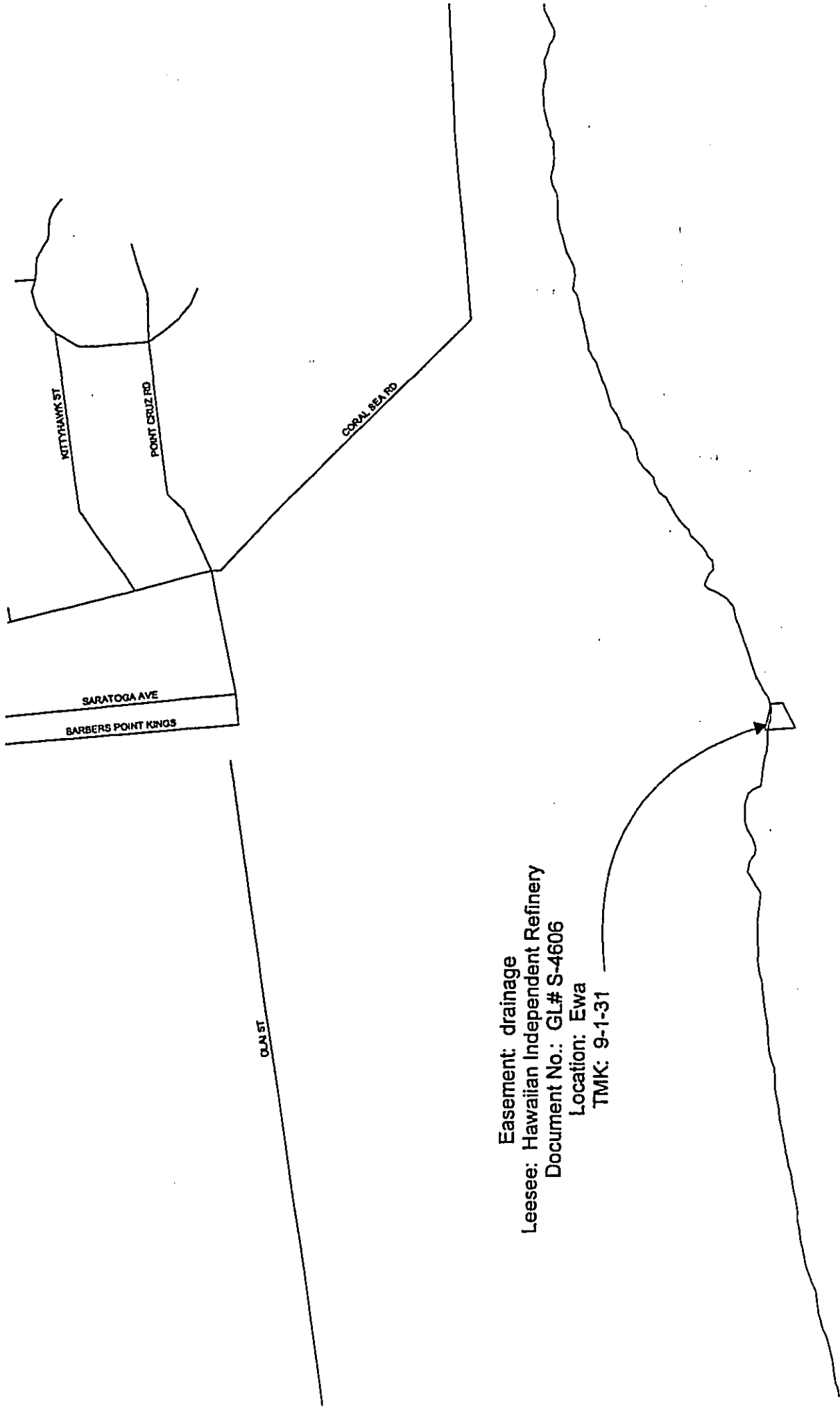
Easement: submarine  
Leasee: Chevron  
Document No.: GL# S-4692  
Location: Ewa  
TMK: 9-1-31

Easement: submarine  
Leasee: Hawaiian Independent Refinery  
Document No.: GL# S-4606  
Location: Ewa  
TMK: 9-1-31

Map 5  
Ewa, Oahu.



RECEIVED AS FOLLOWS

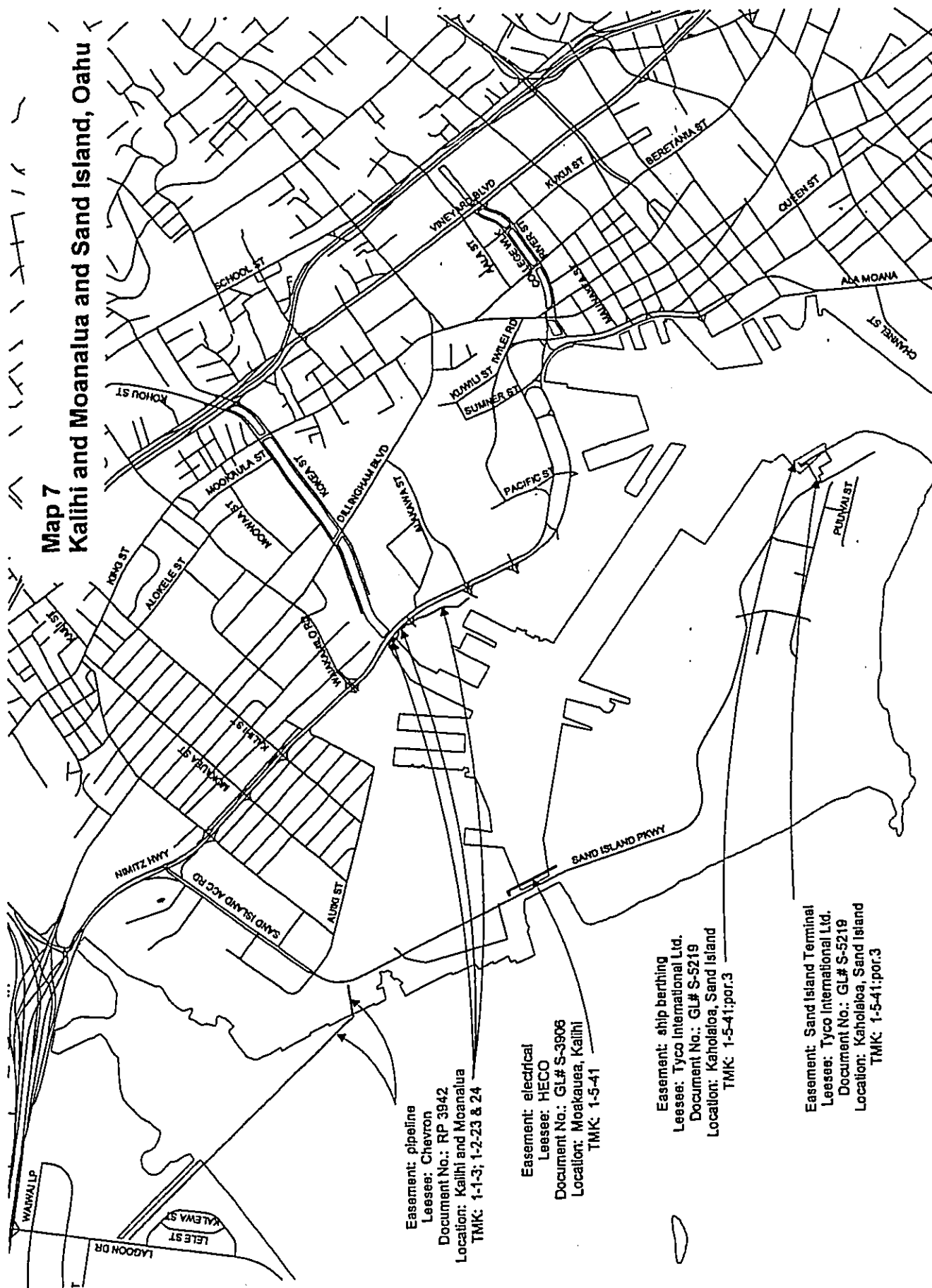


Easement: drainage  
Lessee: Hawaiian Independent Refinery  
Document No.: GL# S-4606  
Location: Ewa  
TMK: 9-1-31

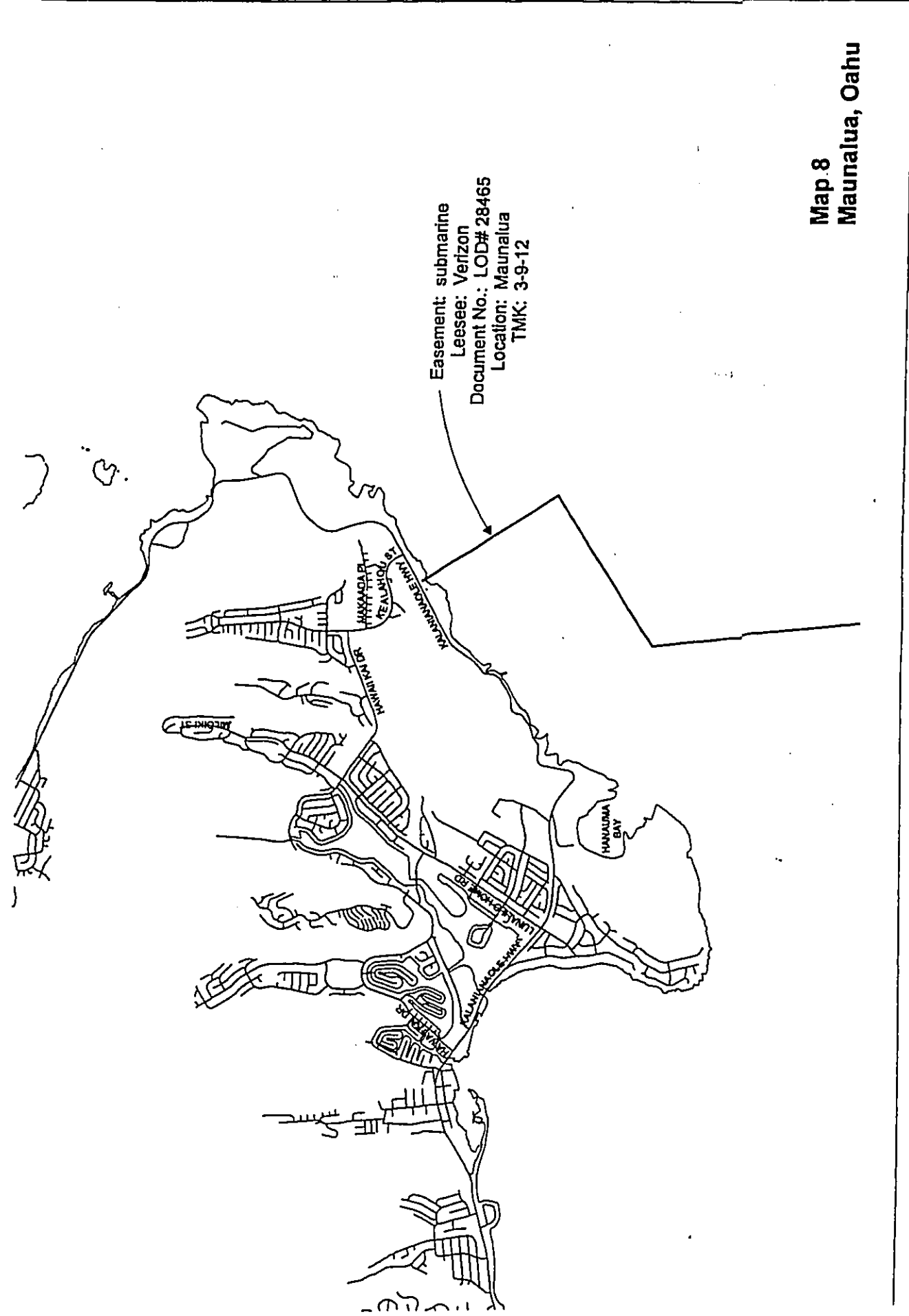
Map 6  
Ewa, Oahu

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

RECEIVED AS FOLLOWS



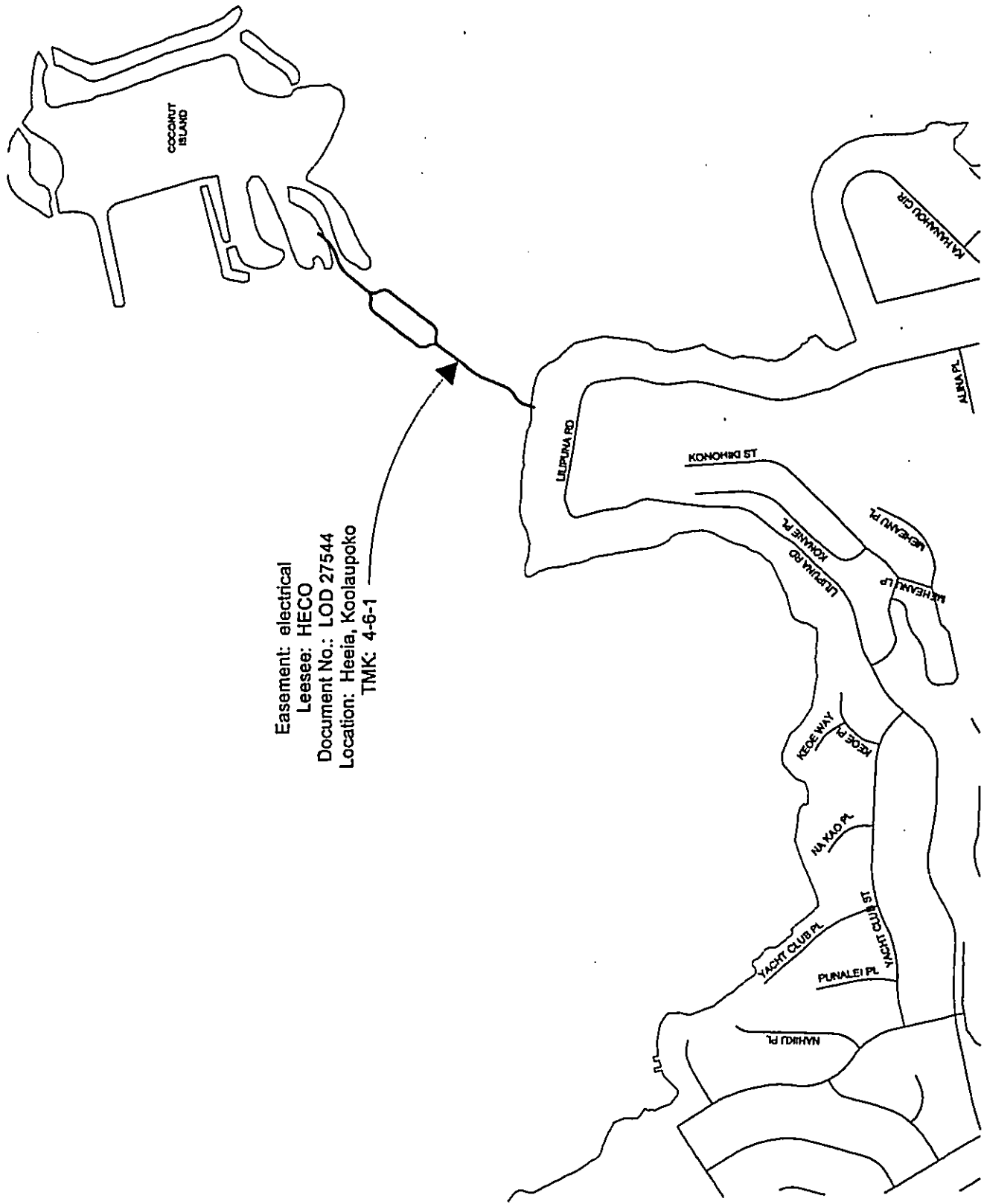
RECEIVED AS FOLLOWS



0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50

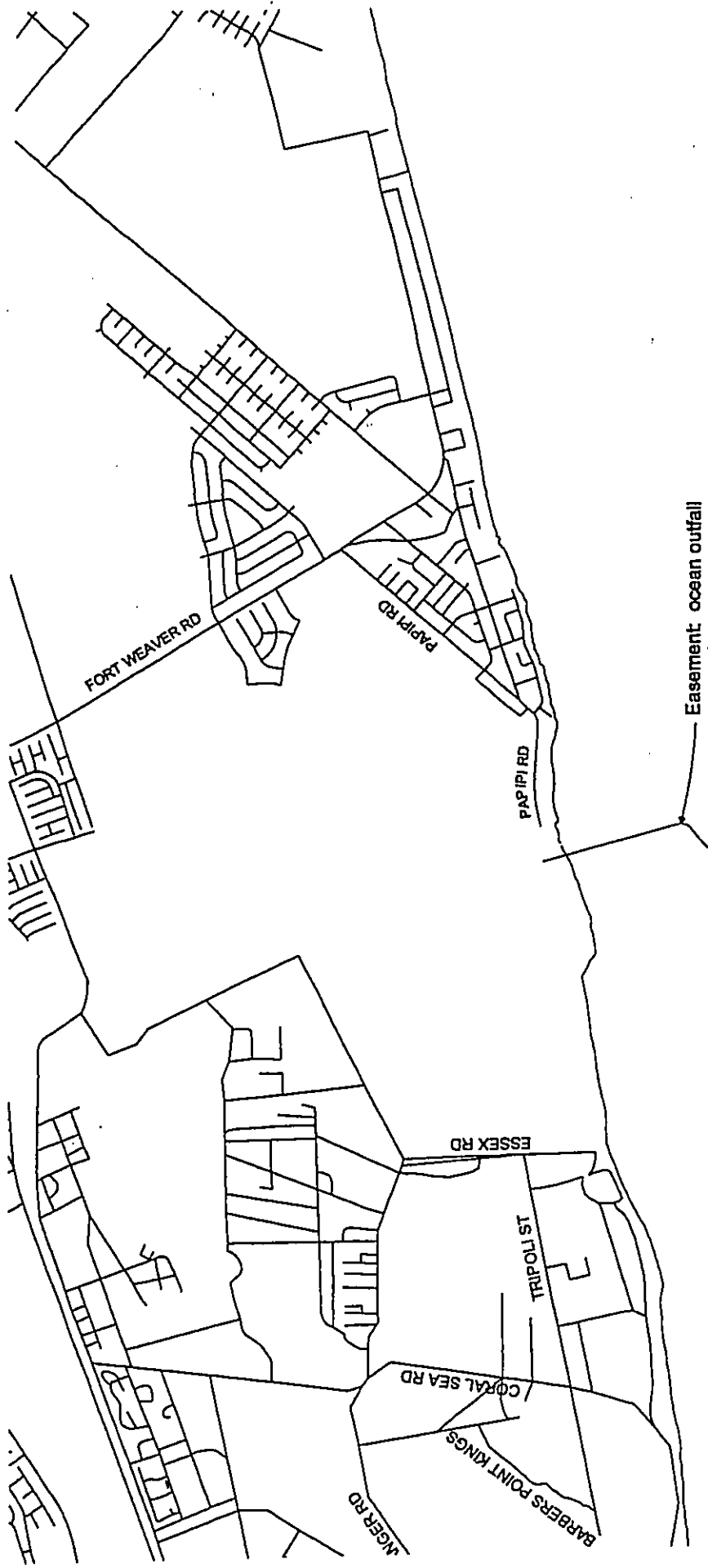
RECEIVED AS FOLLOWS

Map 9  
Heeia, Oahu



Easement: electrical  
Lessee: HECO  
Document No.: LOD 27544  
Location: Heeia, Koolaupoko  
TMK: 4-6-1

RECEIVED AS FOLLOWS

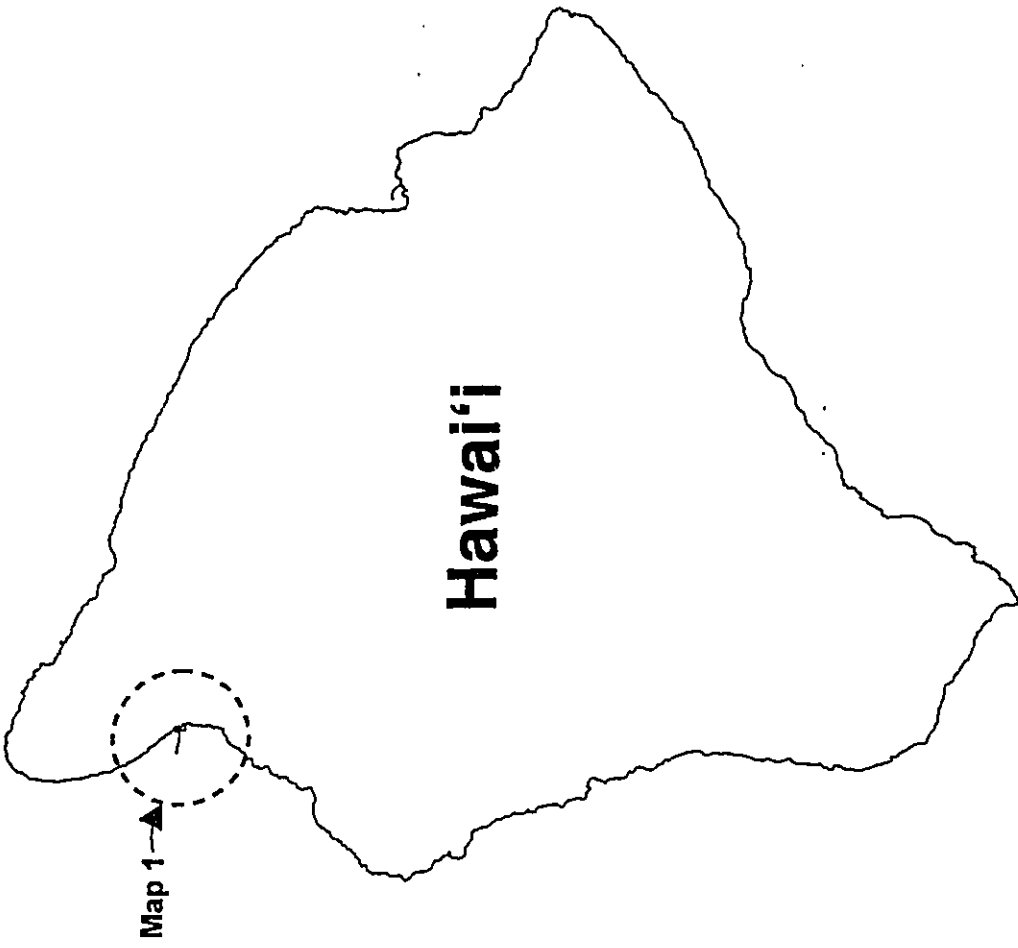


Easement ocean outfall  
Leesee:  
Document No.:  
Location:  
TMK:

Map 10  
Ewa, Oahu

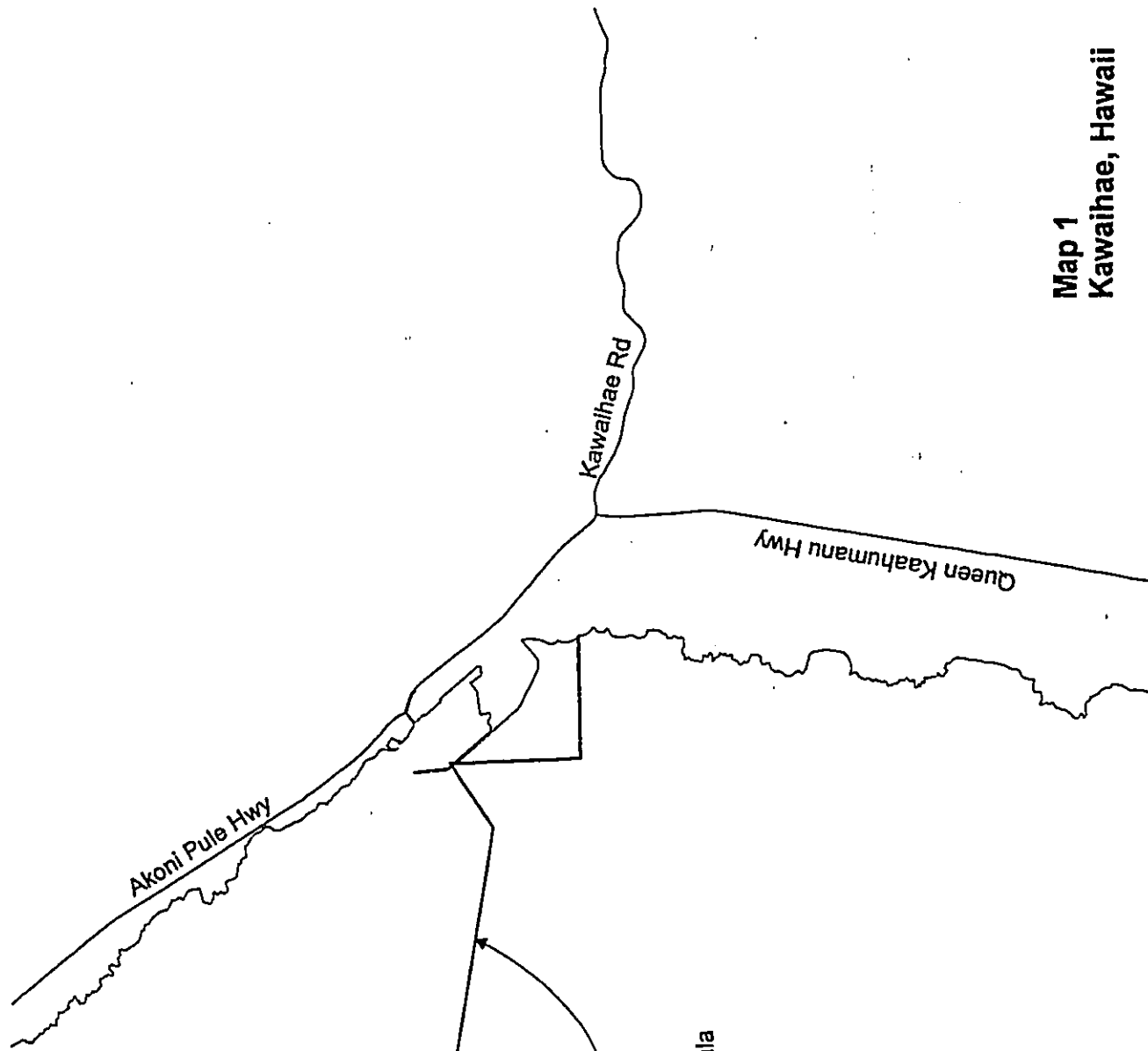
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

RECEIVED AS FOLLOWS



111 08 00 113 11 16 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

RECEIVED AS FOLLOWS



Map 1  
Kawaihae, Hawaii

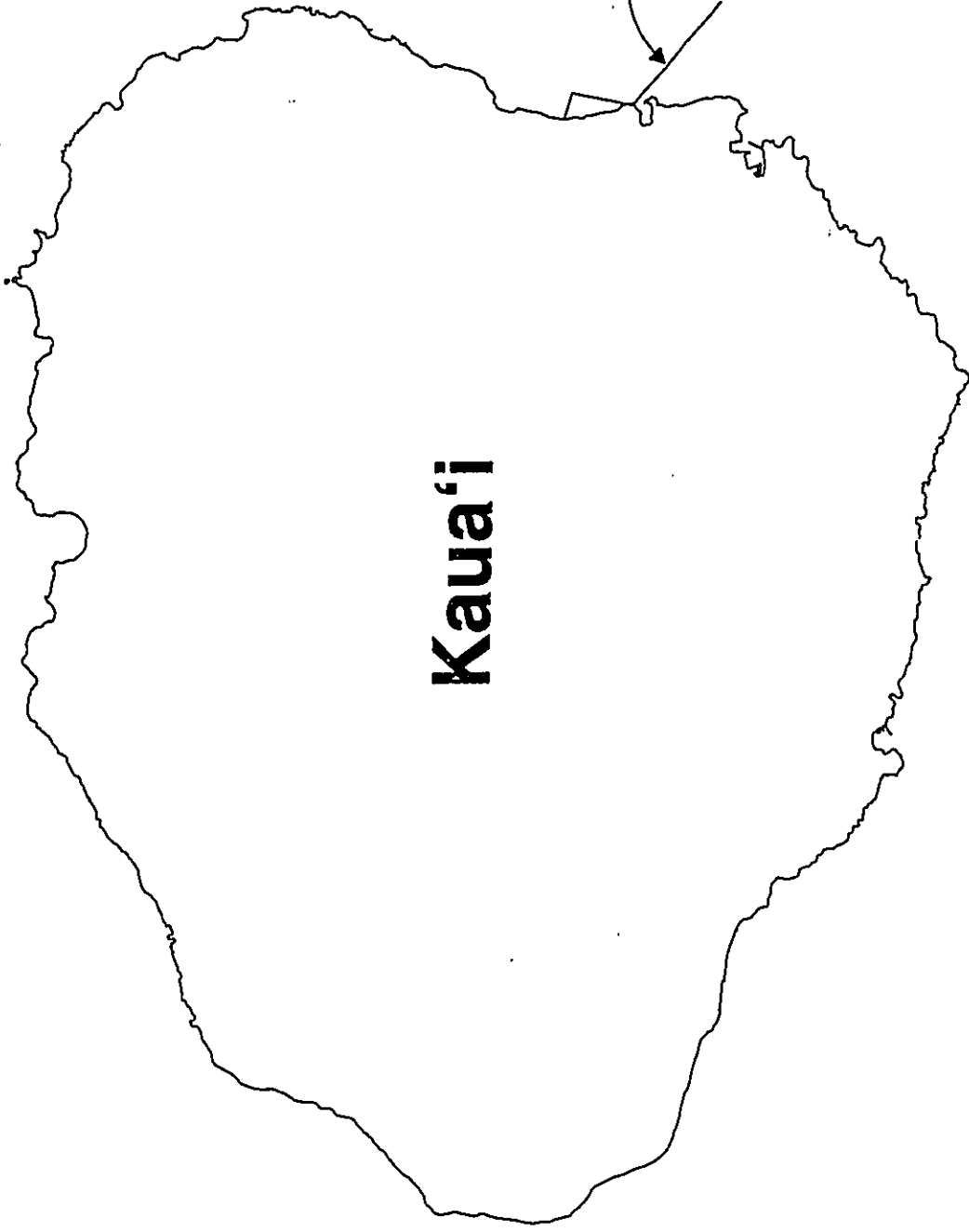
Easement: submarine  
Leasee: Verizon  
Document No.: LOD# 28465  
Location: Kawaihae 2nd, Waimea, S. Kohala  
TMK: 6-2-2

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

RECEIVED AS FOLLOWS

**Kaua'i**

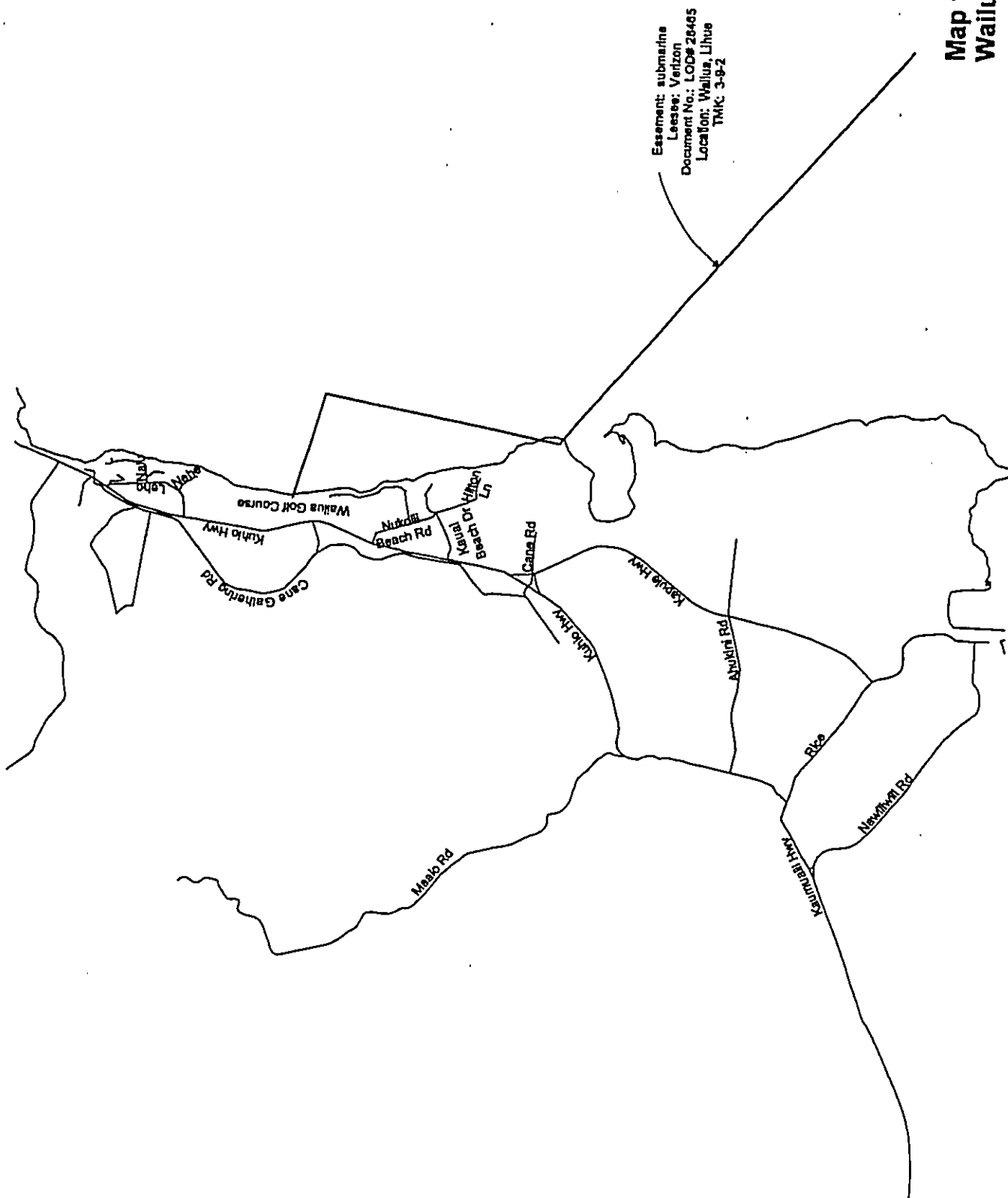
Map 1



THE COUNTY OF KAUAI, TERRITORY OF HAWAII



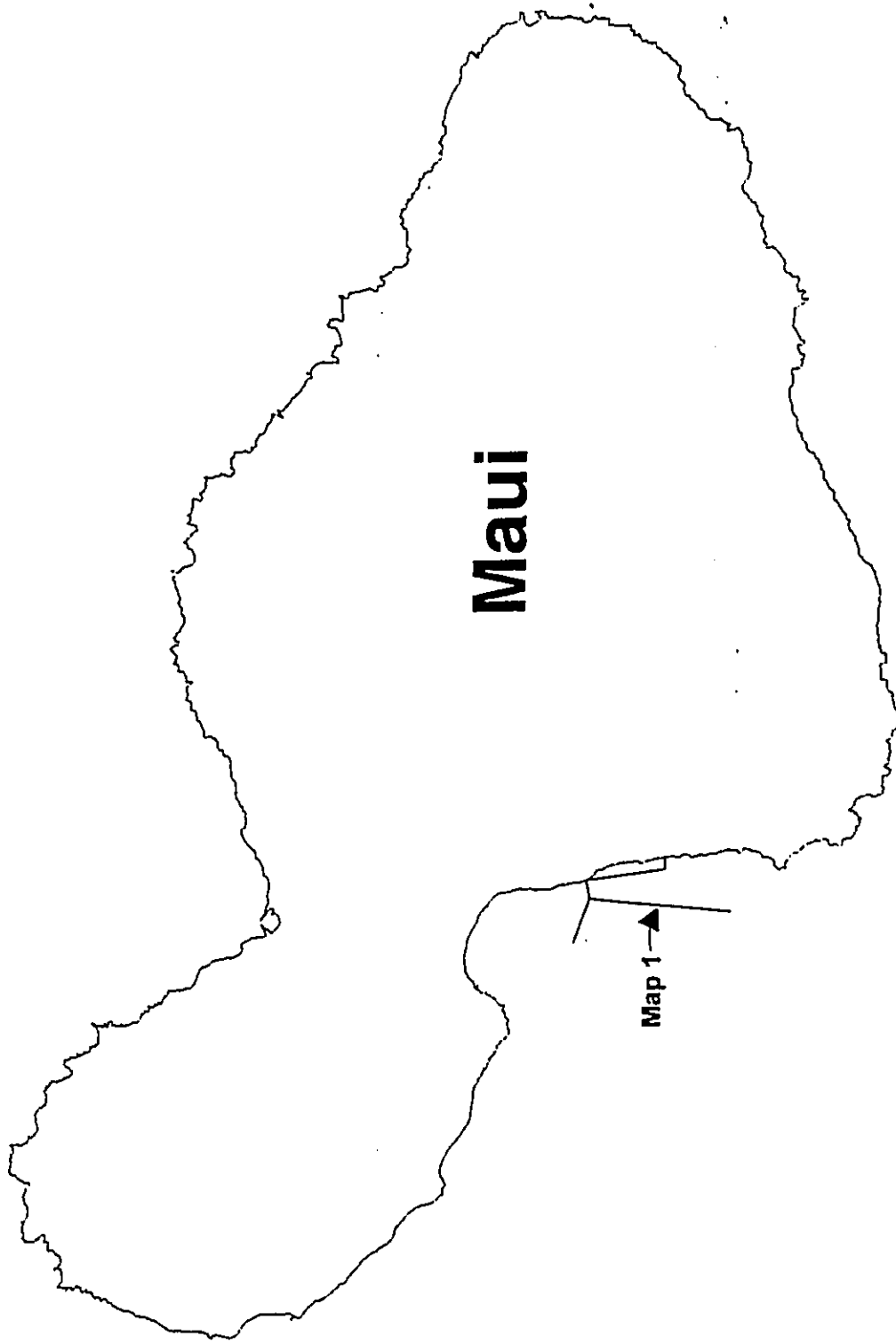
RECEIVED AS FOLLOWS



Map 1  
Wailua, Kauai

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50

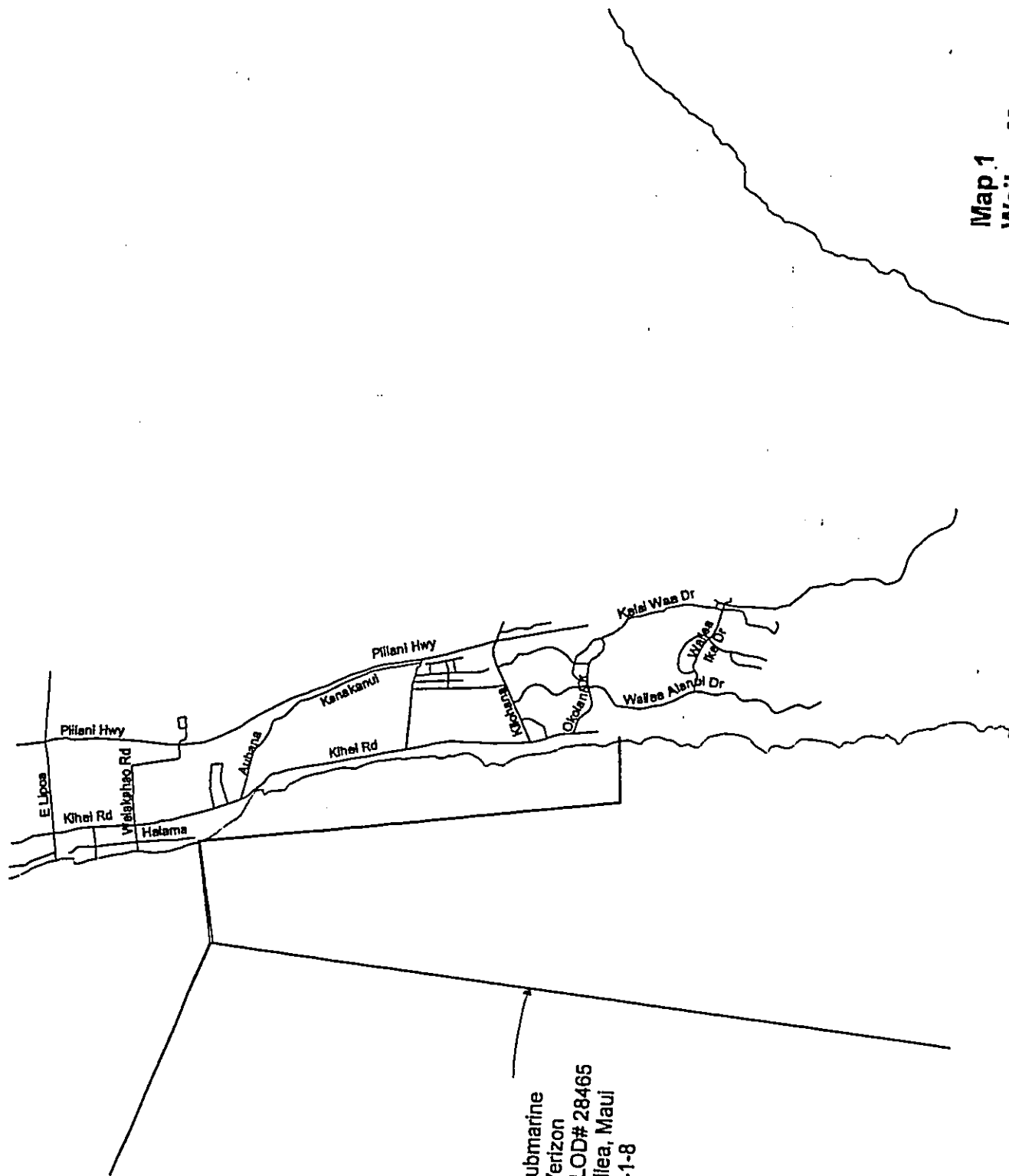
RECEIVED AS FOLLOWS



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

RECEIVED AS FOLLOWS

Map 1  
Wailea, Maui



Easement: submarine  
Lessee: Verizon  
Document No.: LOD# 28465  
Location: Wailea, Maui  
TMK: 2-1-8

RECEIVED AS FOLLOWS

DEPARTMENT OF THE ARMY  
U.S. ARMY ENGINEER DISTRICT, HONOLULU  
FT. SHAFTER, HAWAII 96813

May 30, 2003

NAVY TO  
ATTENTION OF

Regulatory Branch

Mr. Randall Urasaki, P.E.  
Parsons Brinckerhoff  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, Hawaii 96813

Dear Mr. Urasaki:

This is written in regards to your letter dated May 21, 2003, requesting the Corps assistance in identifying submarine cables, outfalls and other undersea utilities located between the Hawaiian Islands for the proposed Department of Hawaiian Home Lands Submarine Cable Project.

My office is unable to assist you in this matter; however, I recommend that you contact the Federal Communications Commission at 445 12<sup>th</sup> Street SW, Washington, D.C. 20554, which regulates interstate and international submarine cable operations and landings. In addition, the U.S. Coast Guard office at the Prince Kuhio Federal Building may be able to assist you regarding undersea utility lines. You may also wish to contact the Department of Commerce National Oceanic Atmospheric Administration Nautical Data Branch, N/CS26, Station 7317, 1315 East-West Highway, Silver Spring, MD 20910.

Should you have questions regarding Corps regulatory matters, you may contact Ms. Lolly Silva at (808) 438-7023 or by e-mail at laurene.silva@usace.army.mil

Sincerely,

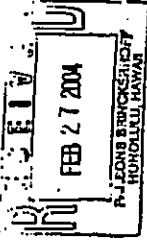
George P. Young, P.E.  
Chief, Regulatory Branch



NAVY TO  
ATTENTION OF  
Regulatory Branch

February 25, 2004

DEPARTMENT OF THE ARMY  
U.S. ARMY ENGINEER DISTRICT, HONOLULU  
FT. SHAFTER, HAWAII 96813



Mr. Samuel J. Lemmo  
Office of Conservation and Coastal Lands  
Hawaii Department of Land and Natural Resources  
P.O. Box 621  
Honolulu, Hawaii 96809

Dear Mr. Lemmo:

This letter provides comments for a Department of the Army (DA) permit requirement for the proposed segments of 4 fiber optic cables and 7 cable landfalls in and under waters of the U.S. at 7 locations between the islands of Hawaii, Maui, Molokai, Oahu and Kauai as described in Conservation District Use Application ST-3176, Statewide Submarine Communications Cable.

The proposed crossings and landings were reviewed pursuant to Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act. Section 10 of the Rivers and Harbors Act requires that a DA permit be obtained for certain structures, or work in, over, through, or under navigable waters of the United States (U.S.) prior to conducting the work (33 U.S.C. 403). Section 404 of the Clean Water Act requires that a DA permit be obtained for the placement or discharge of dredged and/or fill material into waters of the U.S., including adjacent wetlands, prior to conducting the work (33 U.S.C. 1344).

For regulatory purposes, the Corps of Engineers defines navigable waters of the U.S. as those waters subject to the ebb and flow of the tide shoreward to the mean high water mark, and other waters tributary to those waters identified as navigable by the Honolulu District. Based on our review of the information furnished by the applicant, Sandwiche Isles Communications, Inc., DA authorization will be required under Section 10 of the River and Harbor Act of 1899 and may be applicable under Section 404 of the Clean Water Act (depending on the construction practices for in-water horizontal drilling).

The applicant should consult with this office to determine the information needed for a complete DA permit application. Contact Mr. Farley Waterabe at (808) 438-7701 or by fax at (808) 438-4060 for any additional information. Please refer to File No. 200400170 in any written correspondence.

Sincerely,

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

Copy Furnished:  
Mr. John Nakagawa, Office of Planning, Coastal Zone Management Program, P.O. Box 2159 Honolulu, HI 96804  
Mr. Ed Chen, Clean Water Branch, State Department of Health, P.O. Box 3378, Honolulu, HI 96801  
Mr. Randy Urushiki, Process, Brinkerhoff Quade & Douglas, Inc., 1001 Bishop St., # 3000, Honolulu, HI 96813

RECEIVED AS FOLLOWS

Urasaki, Randall M.

From: Mike.L.Laureta@hawaii.gov  
Sent: Thursday, May 15, 2003 8:16 AM  
To: Urasaki, Randall M.  
Subject: RE: Sandwich Isles Communications, Inc., Submarine Cable Project, Pre-Assessment Consultation

Randall,  
I've heard parcel 32 was suppose to go to DHHL, but haven't seen any paperwork. I will assume that it has, which means DHHL gets to comment on that one. Parcel 7 is an executive order set aside to the County of Kauai - Give them an opportunity to comment on that since I think their life guard station is somewhere around there. The roadway parcels belong either to DOT Highways, or County of Kauai Public Works.

Based on that stuff, I get to say "No comments or objections" since it doesn't impact DLNR programs....

"Urasaki, Randall  
M."  
<Urasaki@pbworld.com>  
To: "Mike.L.Laureta@hawaii.gov"  
<Mike.L.Laureta@hawaii.gov>  
Subject: RE: Sandwich Isles  
Cable Project, Pre-Assessment  
Consultation 05/15/2003 06:56 AM

Mike,  
The parcels that will be used for Kekaha are:  
(4) 1-2-002-032 (I believe this was DLNR property that has been transferred to DHHL)  
(4) 1-2-002-007 (Maka of the roadway)  
and the roadway parcels (4)1-2-002:999 and (4) 1-2-001:999.  
Please e-mail me if you have further questions,

Thanks,  
Randall M. Urasaki  
Senior Supervising Engineer  
Parsons Brinckerhoff Quade & Douglas, Inc.  
Honolulu Office  
Pacific Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813  
urasaki@pbworld.com  
tel: 808-531-7094  
fax: 808-528-2368

-----Original Message-----  
From: Mike.L.Laureta@hawaii.gov [mailto:Mike.L.Laureta@hawaii.gov]  
Sent: Tuesday, May 13, 2003 2:37 PM



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
LAND DIVISION  
POST OFFICE BOX 621  
HONOLULU, HAWAII 96809

May 22, 2003

Mr. Randall Urasaki  
Parsons Brinckerhoff Quade & Douglas, Inc.  
American Savings Bank Tower  
Suite 3000  
1001 Bishop Street  
Honolulu, Hawaii 96813

Dear Mr. Urasaki:

Subject: Sandwich Isles Communications, Inc.  
Submarine Cable Project  
Pre-Assessment Consultation

Thank you for your letter dated May 8, 2003 requesting comment on the proposed telecommunication network.

We understand the project involves the installation of undersea fiber optic cables that will connect five major Hawaiian islands. The undersea fiber optic cables will connect to onshore fiber optic cable systems. These cables will establish connections for a statewide telecommunication network, ensuring reliable high quality service to network subscribers.

The applicant should address the issue of spare capacity (if any) of the existing similar systems which may serve the purpose. Subject to approval for other necessary permits, e.g. CDUA, a land disposition is required for the cable. Further, the location of the cables (both undersea and on land) should cause the least disturbance to other utility facilities or users.

Please feel free to contact us at 587-0430 if you have any questions. Thank you.

Sincerely,

*Bary Cheung*  
Bary Cheung

cc: Land Board Member



Parsons  
Brinckerhoff  
American Samoa Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813



Ms. Dede S. Mamiya  
Sandwich Isles Communications  
Page 2

May 23, 2003

Ms. Dede S. Mamiya, Administrator  
Land Division  
Department of Land and Natural Resources  
1151 Punchbowl Street, Room 220  
Honolulu, Hawaii 96813

ATTN: Mr. Sam Lemmo

Dear Ms. Mamiya:

Subject: Sandwich Isles Communication, Inc.  
Submarine Cable Project  
Pre-Assessment Consultation Letter

Sandwich Isles Communications, Inc. (SIC) is a rural telephone company headquartered in Honolulu, Hawaii that is developing a statewide telecommunications network to service the Department of Hawaiian Home Lands. The U.S. Department of Agriculture Rural Utilities Service (RUS) is providing loan assistance for the project. There are two independent projects associated with SIC. One is the terrestrial project which will connect Hawaiian Home Lands by installing underground fiber optic cables through existing State, county, and DHHL right of ways. The EA for that project has been completed and construction is underway. The second project is the marine cable landing project which will connect the five major Hawaiian Islands through undersea cables. The marine cable landing project is now entering the federal and State environmental review processes.

Representatives of SIC have met with your staff to discuss this project. In addition, a project presentation was made to former Chairperson Coloma-Agaran and several DUNR division directors on August 21, 2002 (minutes attached). Based on these meetings, we understand that DUNR will require a Conservation District Use Permit (CDUP) and easement for use of State submerged lands. It is our further understanding that the DUNR, as the accepting authority for the State 343 EA, will not process the CDUP application until the HRS Chapter 343 process is completed.

We are now preparing the Environmental Assessment (EA) for the project and anticipate a Finding Of No Significant Impact (FONSI), which is consistent with all previously approved marine cable landing projects in the State. The purpose of this letter is to confirm that the Board of Land and Natural Resources will be the accepting

Over a Century of  
Engineering Excellence

Over a Century of  
Engineering Excellence

RECEIVED AS FOLLOWS

agency for a single EA and CDUP application for the marine cable landing project proposed by SIC

Since RUS, a federal agency, will be providing federal loan assistance, we proposed to the RUS that the Chapter 343 Final EA also serve as the NEPA EA for the project. RUS has agreed with this approach and we hope this is acceptable to DUNR.

**PROPOSED ACTION**

The current proposal involves the installation of undersea fiber optic cables that will connect five major Hawaiian Islands (Kauai, O'ahu, Molokai, Maui, and Hawaii). The undersea fiber optic cables will connect to onshore fiber optic cable systems. These cables will establish connections for SIC's Statewide Telecommunications Network, ensuring reliable high quality service to network subscribers.

A cable-laying ship will place cables on the ocean floor between the islands. Where the cables approach land, a cable landing will be constructed using a technique called horizontal directional drilling (HDD). The HDD method was selected because of its ability to drill under reefs, minimizing impact to coastal areas. Starting from onshore marinas sites, the HDD equipment bores below the ground and reef areas to a point under water at least 60 feet deep and 2,000 to 5,000 feet offshore.

The preliminary identification of cable landing sites is as follows:

- On Kauai, in the Kekaha area; at Akiakoa Road (TMK: por 4-1-2-002:032)
- On O'ahu, in the Mākaha and Hawai'i Kai areas; at Kili Drive and City Park (TMK: 1-8-4-002-047 and TMK: por. 1-3-9-015:001)
- On Molokai, in the Kaunakakai area; at Oneall's Homesteads (TMK: 2-5-4-006:019)
- On Maui, in the Lahaina and Mākena areas; at Waikeolu and Po'olehālena Park (TMK: por. 2-4-5-021:015 and TMK: por. 2-2-1-007:072)
- On Hawaii, in the Kāhala area; at Kaewe Street (TMK: por. 3-6-1-004:020)

**BACKGROUND**

SIC is certified by the Federal Communications Commission and is authorized by the State of Hawaii Public Utilities Commission to provide telecommunications services on properties administered by the Department of Hawaiian Home Lands (DHHL). SIC has been serving DHHL communities since 1998. Many DHHL areas are located in rural communities where telecommunications (telephone) services are neither existent nor sufficient. SIC's proposed project will connect five major Hawaiian Islands and provide essential telecommunications services and a modern, broadband fiber optic system to DHHL areas at affordable rates.



Onshore, fiber optic cables will be installed underground, mostly within existing public rights-of-way, such as roads. SIC previously prepared Environmental Assessments (EA's) for the terrestrial system in each county, and these EA's were accepted by the Hawaii Department of Transportation. This project is also proceeding in accordance with a Memorandum of Agreement (under Section 106 of the National Historic Preservation Act) designed to protect cultural and historic properties that may be encountered along the routes.

The benefits of this project include:

1. DTHL and its beneficiaries will have access to a modern, independent and affordable telecommunications infrastructure.
2. This infrastructure will enable subscribers to have access to new interactive services such as telemedicine, tele-educational programming, video and data transmissions, and the Internet.
3. Creation of hundreds of jobs during the construction of the network and attraction of new high tech and other businesses to DTHL parcels.
4. To date, SIC has spent \$100 million from an RUS loan on new construction. Within the next 2 to 3 years up to an additional \$300 million is also available through the same loan for future project-related expenses.

**COMMENTS**

SIC has been consulting with members of native Hawaiian organizations, government agencies, businesses, and communities in the affected area since the environmental review process began for the terrestrial cable systems. Written comments will become part of the official project record and will be addressed in the forthcoming Draft EA for the submarine cable network.

Comments may be mailed to the following address:

Mr. Randal Urasaki  
Parsons Brinckerhoff  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

They may also be sent by facsimile transmission to (808) 528-2368 or email at urasaki@pbworld.com. Comments will be most useful to us if received within one month of your receipt of this letter.



We look forward to receiving your input on the points raised at the beginning of this letter.

Mahalo,  
PARSONS BRINCKERHOFF QUADE & DOUGLAS, INC.

*Randal Urasaki*  
Randal Urasaki, P.E.  
Project Manager

- c: Ms. Genevieve Salmonson, Office of Environmental Quality Control  
Mr. Larry Wolfe, RUS  
Mr. Randy Jenkins, RUS  
Mr. Peter Young, DUNR

**Enclosures:**

- Attachment 1: Proposed Submarine Cable Landing Sites (Map)
- Attachment 2: HDD Construction Technology
- Attachment 3: Kekaha, Kauai: Landing Site Map and 'Akiakoa Road Map
- Attachment 4: Māhala, O'ahu: Landing Site Map and Kili Drive Map
- Attachment 5: Hawaii Kai, O'ahu: Landing Site Map and City Park Map
- Attachment 6: Kaunakakai, Molokai: Landing Site Map and Oneall's Homesteads Map
- Attachment 7: Lahaina, Maui: Landing Site Map and Waikuli Map
- Attachment 8: Mākena, Maui: Landing Site Map and Po'olenalena Park Map
- Attachment 9: Kawahae, Hawaii: Landing Site Map and Kōlewa Street Map
- Attachment 10: Minutes of Meeting with Director Kokoma-Agaran, August 27, 2002

RECEIVED AS FOLLOWS

RECEIVED AS FOLLOWS



Page 2 of 2



Memorandum

To: File

From: David Altun

Date: 30 August 2002

Subject: Meeting with DLNR  
Sandwich Isles Communications Project  
Kalaninokū Building  
27 August 2002

Attendees: Gil Coloma-Agaran DLNR  
 Carol Ogata SHPO  
 Francis Oishi Aquatics Division  
 Sam Lemmo Land Division/Planning  
 Lori McLaughlin Ho'ākeā  
 Dawn Chang Ho'ākeā  
 Collette Savoca Environmental Planning Solutions  
 Rencat 'Ihassā Environmental Planning  
 -SVC- -MTC Parsons Brinckerhoff

**Meeting Summary:**  
 PB requested a meeting with DLNR to introduce the marine part of the SIC project and establish a protocol for further coordination with the various divisions of DLNR. Dawn made a brief project presentation and emphasized the use of HDO as a construction technique. The SIC team requested that DLNR be the accepting authority for the Chapter 343 document to be prepared for the project, and DLNR agreed. The SIC team noted that a NEPA EA would also be prepared for this project, with RUS being the accepting authority on the NEPA document.

- Points of discussion included:
- Would the cable alignments follow existing cable alignments? A: Not always because the preferred landing sites are DHHL parcels. Therefore, there will be new landing sites. Also, because of the low level of environmental impact with HDO, the adverse environmental impacts of not corridor-sharing are substantially reduced.
  - What rules for landing sites have been adopted by other states? A: Oregon and California may have adopted rules; this is being researched.
  - Sam commented that even HDO has potential adverse impacts, as follows:
    1. impacts at the onshore drilling site; the approach trench can involve substantial excavation;
    2. the beach marshes ("junction box structure") can be a large structure that could potentially interfere with beach processes or affect existing activities at the site of the "junction box";
    3. drilling mud can contain toxic constituents so they must be handled appropriately and released into the environment avoided.

Over a Century of Engineering Excellence

- Sam commented that the assignment to develop the long-requested State policy on cable landings had been passed to the Office of Planning.
- SIC: Would the Land Board delay decisions on landing site CDUPs until the State policy is developed? Sam: Don't know, there's no formal moratorium, the administration will change.
- Sam: If a landing site triggers an SMA requirement and the landing site upland is within a State "Conservation District," the SMA must be granted before decision-making on the CDUA. (Subsequent analysis has determined that many proposed landing sites fall into this situation.) There is no linkage between SMA and CDUA if there is no need for an SMA, or if an SMA is needed but the upland of the landing site is not in the Conservation District.
- A CDUP can be processed in 6 months after the final EA, if there are no SMA complications.
- The CDUA review criteria are somewhat modified since the SIC project serves a public purpose.
- The CDUA process involves a public hearing, and given the geographic scope of this project, there will need to be a public hearing on every island.
- Gil: Stay out of Natural Area Preserves (e.g., Makana). Stay out of Penguin Banks because it is a prime fishing area as well as being in the hummock Ahale National Marine Sanctuary. Ask the operators of the hummocks, Ahale National Marine Sanctuary when the Ahales are in town whether or not Ahale occupations have increased. SIC is advised to meet with the managers of the Whale Sanctuary. The Sanctuary is co-managed by NOAA and DLNR. The DLNR point of contact is Jeff Walters and should be contacted first. The most appropriate NOAA contact beginning Oct. 1 would be Alan Tom because the local NOAA office is restructuring and a local position above the sanctuary manager is being created.
- Comment: Provide information on prior local applications of HDO technology, particularly the use of HDO to construct existing cable landings. (comment: consider a site visit)
- Gil: there could be substantial delays if a Habitat Conservation Plan (HCP) is needed (e.g., if the alignment goes through "critical habitat"). This is because Chapter 1950 (the State Endangered Species Law) does not presently allow State agencies to sponsor HCPs. This applies to DHHL, should an HCP be required because of critical habitat on DHHL land. This problem with the law may be fixed by the next session of the legislature.
- SIC may contact the specific Divisions within DLNR to discuss additional details:
  1. DAR: Francis Oishi
  2. SHPO: Don Hibbard or Ross Covy
  3. Land Division: Sam Lemmo

Over a Century of Engineering Excellence





Parsons  
Brinckerhoff  
Quade &  
Douglas, Inc.  
American Service Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813  
808-531-7084  
Fax: 808-528-2368



State of Hawaii Department of Land and Natural Resources  
Mr. Peter Young  
December 17, 2003  
Page 2

December 17, 2003

Mr. Peter Young, Chairperson  
Department of Land and Natural Resources  
State of Hawaii  
P. O. Box 621  
Honolulu, Hawaii 96809

Attention: Mr. Sam Lemmo, Office of Conservation and Coastal Lands

Dear Mr. Young:

Subject: Conservation District Use Application (CDUA)  
Sandwich Isles Communications, Inc.  
Submarine Fiber-Optic Cable Project

On behalf of Sandwich Isles Communications, Inc. (SIC), we are pleased to submit a conservation district use application (CDUA) for the subject project. The following documents are enclosed:

- Twenty (20) copies of a CDUA for SIC's Submarine Fiber-Optic Cable Project;
- Twenty (20) copies of a Draft Environmental Assessment (two volumes) for SIC's Submarine Fiber-Optic Cable Project; and
- Cashier's check for \$3,250 payable to the State of Hawaii, which covers the application fee of \$2000 (maximum) and public hearing fee of \$1,250 (We feel that five public hearings may be appropriate, one for each island affected).

Under license from the State of Hawaii Department of Hawaiian Home Lands, SIC is currently installing terrestrial fiber-optic cable networks on Kauai, Oahu, Molokai, Maui, and Hawaii. SIC proposes to construct a 300-mile submarine fiber-optic cable network, which would connect these island networks. Seven termini, or landing sites, are proposed statewide. The ocean-land cable connections will be constructed using horizontal directional drilling, a method that would avoid having to trench through sensitive coastal and nearshore resources.

The proposed project would be a new land use within submerged lands under the jurisdiction of the State of Hawaii. In addition, two proposed landing sites, Sandy Beach Park, Hawaii Kai, Oahu, and Waikuli, Lahaina, Maui, would require easements within properties in the Conservation District, which are owned by the City and County of Honolulu and the County of Maui, respectively.

Over a Century of  
Engineering Excellence

Over a Century of  
Engineering Excellence

RECEIVED AS FOLLOWS

If you have any questions or require additional information, please call me at 566-2260 or Mr. Jason Yazawa at 566-2235.

Sincerely yours,  
Parsons Brinckerhoff Quade & Douglas, Inc.

Randall Urasaki, P.E.  
Project Manager

Cc: Sandwich Isles Communications, Mr. Roy Choates

RECEIVED AS FOLLOWS

PETER S. YOUNG  
BOARD OF LAND AND NATURAL RESOURCES  
COMMISSIONER OF LAND AND NATURAL RESOURCES

DAN DAVENPORT  
DEPUTY COMMISSIONER OF LAND AND NATURAL RESOURCES

BENNETT Y. LAU  
DEPUTY DIRECTOR OF LAND AND NATURAL RESOURCES

AGRICULTURE  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
COMMISSIONER OF LAND AND NATURAL RESOURCES  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
COMMISSIONER OF LAND AND NATURAL RESOURCES  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
COMMISSIONER OF LAND AND NATURAL RESOURCES



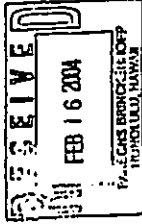
STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
POST OFFICE BOX 67  
HONOLULU, HAWAII 96808



Ref: P&SL

File No.: CDUA ST-3176B  
Acceptance Date: February 16, 2004  
180-Day Exp. Date: August 14, 2004

Mr. Randall Urasaki, P.E.  
Parsons Brinckerhoff & Douglass  
1001 Bishop Street, Suite 3000  
Honolulu, Hawaii 96813



Dear Mr. Urasaki:

NOTICE OF ACCEPTANCE AND PRELIMINARY ENVIRONMENTAL DETERMINATION CONSERVATION DISTRICT USE APPLICATION (CDUA) OA-3176 BOARD PERMIT

This acknowledges the acceptance for processing of your CDUA, on behalf of Sandwich Isles Communications, Inc. for the installation of approximately 300 miles of submarine fiber optic telecommunications cables statewide.

The system would be divided into four (4) segments as follows:

- Kekaha, Kauai to Mahaloa, Oahu
  - Hawaii Kai, Oahu to Kaunakakai, Molokai
  - Kaunakakai, Molokai to Lahaina, Maui; and
  - Makaha, Maui to Kawaihae, Hawaii.
- The cables would achieve landfall at the following sites:
- Akioloa Road, Kekaha, Kauai (TMK: (4) 1-2-2:32)
  - Kili Drive, Makaha, Oahu (TMK: (1) 8-4-2-47)
  - Sandy Beach Park, Hawaii Kai, Oahu (TMK: (1) 3-9-15:1)
  - Oneali Homesite, Kaunakakai, Molokai (TMK: (2) 5-4-6-19)
  - Waihi, Lahaina, Maui (TMK: (2) 4-5-21:15)
  - Poolanalea Park, Makaha, Maui (TMK: (2) 2-1-7:72)
  - Kaewa Place, Kawaihae, Hawaii (TMK: (3) 8-1-4-20)

Landing site infrastructure would include an under-sea/floor/underground (landside) conduit, which would contain fiber optic cables, and a beach manhole within the nearest road right of way, which would serve as the point of connection of the submarine and terrestrial networks. Horizontal directional drilling (HDD) would be used to install the under-sea/floor conduits. HDD would avoid having to trench through sensitive coastal and near shore resources such as beaches or coral reefs.

A specialized cable-laying ship would precisely place the cable along a selected alignment between landing sites (i.e., islands). While moving, the vessel would release the cable at a rate to accurately place the cable on the ocean floor. The cable would be pulled through the exit point of the directionally drilled hole through the steel casing to the drill site, where it would be hooked up with the terrestrial cable.

After reviewing the application, we find that:

1. The proposed use is an identified land use within the Conservation District, pursuant to Section 13-5-22 (P-8) PUBLIC PURPOSE USES (D-2), Hawaii Administrative Rules (HAR);
2. Pursuant to Section 13-5-40(e), HAR, public hearings are required on each island affected by the cable as the proposed project affects the public interest on these islands; and
3. In conformance with Chapter 343, Hawaii Revised Statutes (HRS), as amended, and Chapter 11-200, HAR, a finding of no significant impact (FONSI) to the environment is anticipated for the proposed project.

The applicant's responsibility includes complying with the provisions of Chapter 205A, HRS relating to the Special Management Area (SMA) requirements. Negative action by the Board of Land and Natural Resources on this CDUA can be expected should the applicant fail to obtain from the County and provide to the department at least thirty (45) days prior to the 180-day expiration date (as noted on the first page of this notice) one of the following:

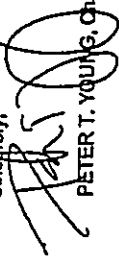
1. A determination that the proposed development is exempt from the provisions of the county rules relating to the SMA;
2. A determination that the proposed development is outside the SMA; or
3. An SMA Use Permit for the proposed development.

Your CDUA will be placed on the agenda of the Board of Land and Natural Resources for their consideration after all reviews and evaluations of the proposal have been made.

RECEIVED AS FOLLOWS

Should you have any questions, please contact Sam Lemmo of our Office of Conservation and Coastal Lands at (808) 587-0381.

Sincerely,



PETER T. YOUNG, Chairperson

cc: Board Members  
All Land Agents  
DAR/DOBOR/HPD/State Parks  
All County Planning Departments  
All County Public Works Departments  
OHAD/OH/OEQ/DO7/DHHL/CZM/CN/ Defense  
NMFS/USACE/USFWS  
Hoakea



Parsons  
Brinckerhoff  
Pacific Tower, Suite 3000  
1001 Bishop Street  
Honolulu, HI 96813  
808-531-7000  
Fax: 808-528-2368



Mr. John Nakagawa  
January 8, 2003  
Page 2 of 2

January 8, 2003

Mr. John Nakagawa  
Department of Business, Economic Development and Tourism  
Office of Planning  
P.O. Box 2359  
Honolulu, HI 96804

Re: Sandwich Isles Communications (SIC) Statewide Telecommunications  
Network Submarine Cable and Landing Sites; Applicability of Hawaii  
Coastal Zone Management Federal Consistency to USDA Rural Utility  
Service Loan

Dear Mr. John Nakagawa:

The United States Department of Agriculture (USDA), Rural Utilities Service (RUS) is the issuer of federal loans to Sandwich Isles Communications (SIC) for the creation of a fiber optic communications cable network that will provide Hawaiian homestead beneficiaries and lessees with access to essential telecommunications services. An overall plan of this project is attached.

In accordance with 15 CFR 930 and Chapter 205A of the Hawaii Revised Statutes, federal actions, specifically actions sponsored by federal assistance programs that have been listed as likely to affect coastal zone land or water uses, are subject to review for consistency with the Hawaii Coastal Zone Management Program (HCZMP).

The purpose of this letter is to request your written confirmation that the USDA Rural Utilities Service loan program is not included on the list of federal financial assistance programs subject to review for federal consistency with the HCZMP. However, your agency will have the opportunity to review this project when the draft Environmental Assessment is issued. Additionally, the US Army Corps of Engineers permit application required for this project will be subject to a HCZMP consistency review.

Over a Century of  
Engineering Excellence

Over a Century of  
Engineering Excellence

RECEIVED AS FOLLOWS

If there are any questions please call David Aikin at 566-2205.

Sincerely,

PARSONS BRINCKERHOFF

Randal Urasaki, P.E.  
Project Manager

Attachment: General Plan, SIC Interisland Fiber Optic Cable Network

CC: Larry Wolfe, Rural Utilities Service, USDA  
Randy Jenkins, Rural Utilities Service, USDA



**DEPARTMENT OF BUSINESS,  
ECONOMIC DEVELOPMENT & TOURISM**

**OFFICE OF PLANNING**

235 South Beretania Street, 6th Floor, Honolulu, Hawaii 96813  
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

Ref. No. P-9963

January 24, 2003

Mr. Rendal Urasaki, Project Manager  
Parsons Brinckerhoff  
Pacific Tower, Suite 3000  
1001 Bishop Street  
Honolulu, Hawaii 96813

Attention: Mr. David Alkin

Dear Mr. Urasaki:

**Subject: Hawaii Coastal Zone Management (CZM) Program Federal Consistency Reviews for  
Federal Assistance from the U.S. Department of Agriculture Rural Utilities Service**

This responds to your letter dated January 8, 2003, inquiring about the applicability of CZM federal consistency requirements for U.S. Department of Agriculture Rural Utilities Service loans to Sandwich Isles Communications. According to additional information provided by Mr. David Alkin, Parsons Brinckerhoff, on January 22, 2003, the source of the federal loans is the Rural Utilities Service Telecommunications and Telephone Loans Program, which is authorized by the Rural Electrification Act of 1936. CZM federal consistency reviews are NOT required by the Hawaii CZM Program for loans and grants authorized under the Rural Electrification Act of 1936.

This determination is not an endorsement of the loans and the activities by Sandwich Isles Communications, nor does it convey approval with any other regulations administered by any State or County agency. Thank you for your cooperation in complying with Hawaii's CZM Program. If you have any questions, please call John Nakagawa of our CZM Program at 587-2878.

Sincerely,

*Mary Lou Kobayashi*

Mary Lou Kobayashi  
Acting Director

cc: Mr. Larry Wolfe, U.S. Department of Agriculture  
Mr. Randy Jenkins, Rural Utilities Service

5 1  
JAN 28  
10:17 AM  
DIRECTOR  
OFFICE OF PLANNING  
DEPARTMENT OF BUSINESS,  
ECONOMIC DEVELOPMENT &  
TOURISM  
HONOLULU, HAWAII

Telephone: (808) 587-2818  
Fax: (808) 587-2814



American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

Parsons  
Brinckerhoff

May 7, 2003

Ms. Mary Lou Kobayashi, Acting Director  
Office of Planning  
Department of Business, Economic Development, & Tourism  
State of Hawaii  
P.O. Box 2359  
Honolulu, Hawaii 96804

ATTN: Mr. John Nakagawa

Dear Ms. Kobayashi:

**Subject: Sandwich Isles Communication, Inc.  
Submarine Cable Project  
Pre-Assessment Consultation**

Sandwich Isles Communications, Inc. (SIC) is a rural telephone company headquartered in Honolulu, Hawaii that is developing a statewide telecommunications network to service the Department of Hawaiian Home Lands. The U.S. Department of Agriculture Rural Utilities Service (RUS) is providing loan assistance for the project. The portion of the project that would connect the major Hawaiian Islands by submarine telecommunication cables is now entering the federal and State environmental review processes.

Dawn Chang of Ho'akea has met previously with John Nakagawa of your staff to discuss this project. In addition, representatives of SIC worked with your office on the development of a telecommunications cable siting analysis paper prepared for DLNR. Also, we have exchanged correspondence with your office clarifying that the RUS loan that is providing financial assistance to this project does not require CZM consistency concurrence at this time.

The purpose of this letter is to request further comments or suggestions you may have on the environmental aspects of the proposed submarine cables and cable landing areas pursuant to the National Environmental Policy Act (NEPA) and the Hawaii Revised Statutes (HRS), Chapter 343. Our initial assessment indicates that we will also need to coordinate with your agency regarding consistency with the Coastal Zone Management (CZM) provisions pursuant to HRS 205A and 15 CFR 930 in relation to a permit from the U.S. Army Corps of Engineers. Comments pertaining to the project's environmental aspects will be addressed in an Environmental Assessment (EA) to be approved by RUS and the Hawaii Department of Land and Natural Resources. Those providing comments at this stage will receive a copy of the Draft EA when it is issued.

RECEIVED AS FOLLOWS



Ms. Mary Lou Kobayashi, Acting Director  
Office of Planning  
Page 2

#### PROPOSED ACTION

The current proposal involves the installation of undersea fiber optic cables that will connect five major Hawaiian Islands (Kauai, Oahu, Molokai, Maui, and Hawaii). The undersea fiber optic cables will connect to onshore fiber optic systems. These cables will establish connections for SIC's Statewide Telecommunications Network, ensuring reliable high quality service to network subscribers.

A cable-laying ship will place cables on the ocean floor between the islands. Where the cables approach land, a cable landing will be constructed using a technique called horizontal directional drilling (HDD). The HDD method was selected because of its ability to drill under reefs; minimizing impact to coastal areas. Starting from onshore manholes sites, the HDD equipment bores below the ground and reef areas to a point under water at least 60 feet deep and 2,000 to 5,000 feet offshore.

In light of the current economic conditions, SIC has determined that in order to provide modern telecommunications services to DHHL subscribers in a timely manner, they will proceed with a network that can be built in the most expeditious and economical manner. Therefore, the marine cable landing project has been redesigned to include only seven landing sites at this time that will connect all the DHHL projects on the five major islands. In the future, given a more positive economy, additional cable landings may be added for redundancy. However, an initial network of seven landing sites will provide a complete, independent, functioning network even if additional cable landings are not provided.

The preliminary identification of cable landing sites is as follows:

- On Kauai, in the Kekaha area; at 'Akiakoa Road (TMK: por. 4-1-2-002:032)
- On Oahu, in the Mākaha and Hawaii Kai areas; at Kili Drive and City Park (TMK: por. 1-8-4-002-047 and TMK: por. 1-3-9-015:001)
- On Molokai, in the Kaunakakai area; at Oneali Homesteads (TMK: 2-5-4-006:019)
- On Maui, in the Lahaina and Mākena areas; at Wahikui and Po'olenalea Park (TMK: por. 2-4-5-021:015 and TMK: por. 2-2-1-007:072)
- On Hawaii, in the Kawaihae area; at Ka'awe Street (TMK: por. 3-6-1-004:020)

#### BACKGROUND

SIC is certified by the Federal Communications Commission and is authorized by the State of Hawaii Public Utilities Commission to provide telecommunications service on properties administered by the Department of Hawaiian Home Lands (DHHL). SIC has been serving DHHL communities since 1998. Many DHHL areas are located in rural communities where telecommunications (telephone) services are neither existent nor sufficient. SIC's proposed project will connect five major Hawaiian Islands and provide essential telecommunications services and a modern, broadband fiber optic system to DHHL areas at affordable rates.

Onshore, fiber optic cables will be installed underground, mostly within existing public rights-of-way, such as roads. SIC previously prepared Environmental Assessments (EA's) for the



Ms. Mary Lou Kobayashi, Acting Director  
Office of Planning  
Page 3

terrestrial system in each county, and these EA's were accepted by the Hawaii Department of Transportation. This project is also proceeding in accordance with a Memorandum of Agreement (under Section 106 of the National Historic Preservation Act) designed to protect cultural and historic properties that may be encountered along the routes.

The benefits of this project include:

1. DHHL and its beneficiaries will have access to a modern, independent and affordable telecommunications infrastructure.
2. This infrastructure will enable subscribers to have access to new interactive services such as telemedicine, tele-educational programming, video and data transmissions, and the internet.
3. Creation of hundreds of jobs during the construction of the network and attraction of new high tech and other businesses to DHHL parcels.
4. To date, SIC has spent \$100 million from an RUS loan on new construction. Within the next 2 to 3 years up to an additional \$300 million is also available through the same loan for future project-related expenses.

#### COMMENTS

SIC has been consulting with members of native Hawaiian organizations, government agencies, businesses, and communities in the affected areas since the environmental review process began for the terrestrial cable systems. Your input is now requested specifically on environmental aspects of the submarine cables between the islands, and the cable landing sites. Written comments will become part of the official project record and will be addressed in the forthcoming Draft EA for the submarine cable network.

Comments may be mailed to the following address:

Mr. Randall Urasaki  
Parsons Brinckerhoff  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

They may also be sent by facsimile transmission to (808) 528-2388 or email at [urasaki@pbworld.com](mailto:urasaki@pbworld.com). Comments will be most useful to us if received within one month of your receipt of this letter.

This will not be your final opportunity to comment on this project. You will be notified when the Draft Environmental Assessment is issued. If you would like to receive a copy of the Draft EA, please notify us by mail, email, or phone.

We look forward to receiving your comments.

RECEIVED AS FOLLOWS



Ms. Mary Lou Kobayashi, Acting Director  
Office of Planning  
Page 4


Mahalo,  
PARSONS BRINCKERHOFF QUADE & DOUGLAS, INC.

*Randal Urasaki*

Randal Urasaki, P.E.  
Project Manager

Enclosures:

- Attachment 1: Proposed Submarine Cable Landing Sites (Map)
- Attachment 2: HDD Construction Technology
- Attachment 3: Kekaha, Kauai: Landing Site Map and 'Akaioa Road Map
- Attachment 4: Mākaaha, O'ahu: Landing Site Map and Kūi Drive Map
- Attachment 5: Hawaii Kai, O'ahu: Landing Site Map and City Park Map
- Attachment 6: Kaunakakai, Molokai: Landing Site Map and Onea'i'i Homesteads Map
- Attachment 7: Lahaina, Maui: Landing Site Map and Wāhikūi Map
- Attachment 8: Mākena, Maui: Landing Site Map and Po'olenalena Park Map
- Attachment 9: Kawaihae, Hawaii: Landing Site Map and Kaēwe Street Map



DEPARTMENT OF BUSINESS,  
ECONOMIC DEVELOPMENT & TOURISM

OFFICE OF PLANNING  
235 South Beretania Street, 8th Floor, Honolulu, Hawaii 96813  
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

Telephone: (808) 547-2348  
Fac: (808) 547-2324

MAY 16 2003

LINDA LINDOLE  
GOVERNMENT  
COMMUNICATIONS  
SECTION  
THEODORE L. LIU  
DIRECTOR

MARY LOU KOBAYASHI  
PLANNING PROGRAM ADMINISTRATOR  
OFFICE OF PLANNING

Ref. No. P-10091

May 15, 2003

Mr. Randal Urasaki, Project Manager  
Parsons Brinckerhoff  
1001 Bishop Street, Suite 3000  
Honolulu, Hawaii 96813

Dear Mr. Urasaki:

Subject: Sandwich Isles Communications, Inc., Submarine Cable Project,  
Pre-Assessment Consultation

This responds to your pre-assessment consultation letter dated May 7, 2003, requesting comments on the proposed submarine cable project by Sandwich Isles Communications, Inc. We acknowledge that you have correctly identified the requirement for the Hawaii Coastal Zone Management (CZM) Program Federal Consistency review, in conjunction with the U.S. Army Corps of Engineers permit.

Thank you for consulting us early in the project development. If you have any questions, please call John Nakagawa of our CZM Program at 587-2878.

Sincerely,

*Mary Lou Kobayashi*

Mary Lou Kobayashi  
Planning Program Administrator

RECEIVED AS FOLLOWS



**Perseus  
Schickelmeier**  
American Savings Bank Tower  
1001 Bishop Court, Suite 3000  
Honolulu, HI 96813



**Mr. Ian Costa, Director**  
Department of Planning, County of Kauai  
Page 2

May 7, 2003

Mr. Ian Costa, Director  
Department of Planning  
County of Kauai  
4444 Rice Street, Suite A473  
Lihue, Hawaii 96766

Dear Mr. Costa:

**Subject: Sandwich Isles Communication, Inc.  
Submarine Cable Project  
Pre-Assessment Consultation**

Sandwich Isles Communications, Inc. (SIC) is a rural telephone company headquartered in Honolulu, Hawaii that is developing a statewide telecommunications network to service the Department of Hawaiian Home Lands. The U.S. Department of Agriculture Rural Utilities Service (RUS) is providing loan assistance for the project. The portion of the project that would connect the major Hawaiian islands by submarine telecommunication cables is now entering the federal and State environmental review processes.

We met previously with your staff on August 30, 2002 to discuss this project. Minutes of this meeting are attached. Since that time, the project has been more clearly defined.

The purpose of this letter is to request further comments or suggestions you may have on the environmental aspects of the proposed submarine cables and cable landing areas pursuant to the National Environmental Policy Act (NEPA) and the Hawaii Revised Statutes (HRS), Chapter 343. Our initial assessment indicates that we will also need to coordinate with your agency to obtain a Special Management Area permit for the landing site on Kauai. Comments pertaining to the project's environmental aspects will be addressed in an Environmental Assessment (EA) to be approved by RUS and the Hawaii Department of Land and Natural Resources. Those providing comments at this stage will receive a copy of the Draft EA when it is issued.

**PROPOSED ACTION**

The current proposal involves the installation of undersea fiber optic cables that will connect five major Hawaiian Islands (Kauai, Oahu, Molokai, Maui, and Hawaii). The undersea fiber optic cables will connect to onshore fiber optic cable systems. These cables will establish connections for SIC's Statewide Telecommunications Network, ensuring reliable high quality service to network subscribers.

A cable-laying ship will place cables on the ocean floor between the islands. Where the cables approach land, a cable landing will be constructed using a technique called horizontal directional drilling (HDD). The HDD method was selected because of its ability to drill under

Over a Century of  
Engineering Excellence

reefs; minimizing impact to coastal areas. Starting from onshore manholes sites, the HDD equipment bores below the ground and reef areas to a point under water at least 60 feet deep and 2,000 to 5,000 feet offshore.

In light of the current economic conditions, SIC has determined that in order to provide modern telecommunications services to DHHHL subscribers in a timely manner, they will proceed with a network that can be built in the most expeditious and economical manner. Therefore, the marine cable landing project has been redesigned to include only seven landing sites at this time that will connect all the DHHHL projects on the five major islands. In the future, given a more positive economy, additional cable landings may be added for redundancy. However, the initial network of seven landing sites will provide a complete, independent, functioning network even if additional cable landings are not provided.

The preliminary identification of cable landing sites is as follows:

- On Kauai, in the Kakaia area; at 'Akiakoa Road (TMK: por. 4-1-2-002:032)
- On Oahu, in the Mākaha and Hawaii Kai areas; at Kill Drive and City Park (TMK: por. 1-8-4-002-047 and TMK: por. 1-3-9-015:001)
- On Molokai, in the Kaunakakai area; at Onea'i'i Homesteads (TMK: 2-5-4-006:019)
- On Maui, in the Lahaina and Mākena areas; at Wahikuli and Po'olenalena Park (TMK: por. 2-4-5-021:015 and TMK: por. 2-2-1-007:072)
- On Hawaii, in the Kawaihae area; at Kāhwe Street (TMK: por. 3-6-1-004:020)

**BACKGROUND**

SIC is certified by the Federal Communications Commission and is authorized by the State of Hawaii Public Utilities Commission to provide telecommunications service on properties administered by the Department of Hawaiian Home Lands (DHHHL). SIC has been serving DHHHL communities since 1998. Many DHHHL areas are located in rural communities where telecommunications (telephone) services are neither existent nor sufficient. SIC's proposed project will connect five major Hawaiian Islands and provide essential telecommunications services and a modern, broadband fiber optic system to DHHHL areas at affordable rates.

Onshore, fiber optic cables will be installed underground, mostly within existing public rights-of-way, such as roads. SIC previously prepared Environmental Assessments (EA's) for the terrestrial system in each county, and these EA's were accepted by the Hawaii Department of Transportation. This project is also proceeding in accordance with a Memorandum of Agreement (under Section 106 of the National Historic Preservation Act) designed to protect cultural and historic properties that may be encountered along the routes.

The benefits of this project include:

1. DHHHL and its beneficiaries will have access to a modern, independent and affordable telecommunications infrastructure.

Over a Century of  
Engineering Excellence

RECEIVED AS FOLLOWS





Mr. Ian Costa, Director  
Department of Planning, County of Kauai  
Page 3

2. This infrastructure will enable subscribers to have access to new interactive services such as telemedicine, tele-educational programming, video and data transmissions, and the Internet.
3. Creation of hundreds of jobs during the construction of the network and attraction of new high tech and other businesses to DHHL parcels.
4. To date, SIC has spent \$100 million from an RUS loan on new construction. Within the next 2 to 3 years up to an additional \$300 million is also available through the same loan for future project-related expenses.

**COMMENTS**

SIC has been consulting with members of native Hawaiian organizations, government agencies, businesses, and communities in the affected areas since the environmental review process began for the terrestrial cable systems. Your input is now requested specifically on environmental aspects of the submarine cables between the islands, and the cable landing sites. Written comments will become part of the official project record and will be addressed in the forthcoming Draft EA for the submarine cable network.

Comments may be mailed to the following address:


Mr. Randall Urasaki  
Parsons Brinckerhoff  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

They may also be sent by facsimile transmission to (808) 528-2358 or email at [urasaki@pbworld.com](mailto:urasaki@pbworld.com). Comments will be most useful to us if received within one month of your receipt of this letter.

This will not be your final opportunity to comment on this project. You will be notified when the Draft Environmental Assessment is issued. If you would like to receive a copy of the Draft EA, please notify us by mail, email, or phone.

We look forward to receiving your comments.

Mahalo,  
PARSONS BRINCKERHOFF QUADE & DOUGLAS, INC.

  
Randall Urasaki, P.E.  
Project Manager

Over a Century of  
Engineering Excellence



Mr. Ian Costa, Director  
Department of Planning, County of Kauai  
Page 4

**Enclosures:**

- Attachment 1: Proposed Submarine Cable Landing Sites (Map)
- Attachment 2: HDD Construction Technology
- Attachment 3: Kekaha, Kauai: Landing Site Map and 'Aialoa Road Map
- Attachment 4: Minutes of Meeting with Planning Department, Kauai County, August 30, 2002

RECEIVED AS FOLLOWS

Over a Century of  
Engineering Excellence

September 2, 2002

Memorandum

To: File  
 From: Colette Sakoda  
 Subject: Sandwich Isles Communications (SIC) Kauai LSAs  
 Kauai County Planning Director Meeting August 30, 2002  
 Meeting Notes  
 Attendees: Dee Crowell, Director  
 Keith Nitta, Planner  
 Randal Urasaki, Parsons Brinckerhoff  
 Colette Sakoda, Environmental Planning Solutions  
 Place: Kauai County Planning Department, Lihue

The purpose of the meeting was to brief the Planning Department Director and staff about the marine component of the statewide fiber optic cable communications system prior to the consultant team doing any environmental field reconnaissance work. This would serve as an early County permit scoping meeting as well.

An overview of the project was presented along with handouts that identified the 17 LSAs statewide, and the candidate Kakaia and Anahola landing sites.

**Question:** Given the fact that horizontal directional drilling (HDD) will allow this to be an underground telecommunications utility line installation within the special management area (SMA), will a Special Management Area Use Permit-major (or minor) be required?

**ANSWER (County):**

1. If the value of the portion within the SMA is no more than \$125,000, an SMP-minor may be all that would be required. Processing time is normally 2 weeks from time of acceptance as a complete application. If not, the SMP-major will take 120 days with a public hearing before the County Planning Commission.
2. If the new utility line were to be constructed within an 'existing corridor,' per the County's Comprehensive Zoning Ordinance (CZO), an SMA Use Permit may not be required. However, the definition of 'existing corridor' is unclear, and it may

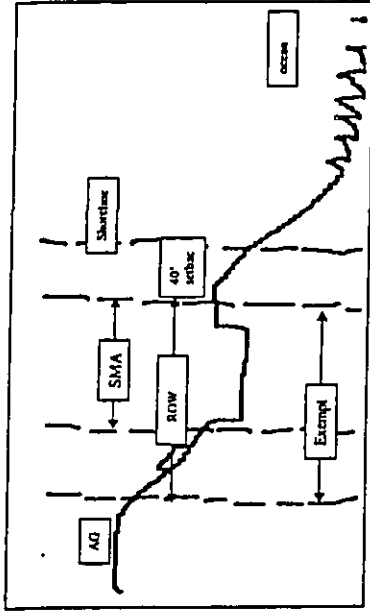


Illustration: Areas under County SMA, ROW, and shoreline setback (labeled 40' setback). #20002

be defined as a yet to be created easement within property either under Department of Hawaiian Home Lands (DHHL) or Department of Land and Natural Resources (DLNR) jurisdiction rather than the County right-of-way (ROW). Further, status and timing of the turnover of the property from DLNR to DHHL are unclear, because additional permit requirements would be placed on the project if affected property were still under DLNR's jurisdiction.

2. Assume the worst case scenario in terms of County Permit requirements: If the affected parcel were still under DLNR, a County Use Permit would be required.
3. Good news is that the SMA major Permit and County Use Permit will be processed simultaneously with a single public hearing before the Planning Commission.

**Question:** Will a Shoreline Setback Variance (SSV) also be required?

**ANSWER (County):** Yes, according to County of Kauai Rules, "no structure, or any portion thereof, ... whether built above, on, or below the ground surface, shall be permitted within the shoreline setback. Construction of facilities that are accessory or incidental to structures located in areas immediately adjacent to the shoreline setback shall not be permitted."

Worst case, then, will be that an SMA Major Permit, Use Permit, and SSV will be required. Good news, however, per Keith Nitta, is that all 3 will be processed simultaneously, with a single public hearing before the Planning Commission.

RECEIVED AS FOLLOWS

Environmental Planning Solutions LLC

Dee Crowell requested that (additional) trenching be conducted to determine depth of sandy/(cultural) layer, if we're targeting the specific DHH/DLNR parcel within which burials and cultural layers have been discovered and documented.

We added that because we have just begun the environmental investigation and documentation phase, application for County permits is about 18 months away. We will be updating County Planning staff as we approach the permit stages.

Further, Keith Nitta pointed out that the Shoreline Setback Variance rule will be updated and revised sometime early 2003. So we will need to see how changes would affect our process as well.

Contacts for Kauai Planning will continue to be:

Dee Crowell (until end of 2002)

Keith Nitta, [knitta@kmaigov.com](mailto:knitta@kmaigov.com)

George Kalisik, [skalisik@kmaigov.com](mailto:skalisik@kmaigov.com) (once County SMA permit is nearing submittal stage).

RECEIVED AS FOLLOWS

-3-  
945 Makaiwa Street, Honolulu, HI 96816  
Phone: (808) 732-8602; Fax: (808) 538-3168  
Email: [sakodac001@hawaii.rr.com](mailto:sakodac001@hawaii.rr.com)

RECEIVED AS FOLLOWS



Parsons  
Brinckerhoff  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

Mr. Eric G. Crispin, Director  
Department of Planning and Permitting  
Page 2



May 7, 2003

Mr. Eric G. Crispin, AIA  
Director  
Department of Planning and Permitting  
City & County of Honolulu  
650 S. King Street  
Honolulu, Hawaii 96813

Dear Mr. Crispin:  
**Subject:** Sandwich Isles Communication, Inc.  
Submarine Cable Project  
Pre-Assessment Consultation

Sandwich Isles Communications, Inc. (SIC) is a rural telephone company headquartered in Honolulu, Hawaii that is developing a statewide telecommunications network to service the Department of Hawaiian Home Lands. The U.S. Department of Agriculture Rural Utilities Service (RUS) is providing loan assistance for the project. The portion of the project that would connect the major Hawaiian Islands by submarine telecommunication cables is now entering the federal and State environmental review processes.

We met previously with your staff on September 4, 2002 to discuss this project. Minutes of this meeting are attached. Since that time, the project has been more clearly defined.

The purpose of this letter is to request any comments or suggestions you may have on the environmental aspects of the proposed submarine cables and cable landing areas pursuant to Hawaii Revised Statutes, Chapter 343 and the National Environmental Policy Act (NEPA). Our initial assessment indicates that we will also need to coordinate with your agency to obtain a Special Management Area (SMA) permit for the landing sites on Oahu. Comments pertaining to the project's environmental aspects will be addressed in an Environmental Assessment (EA), to be approved by RUS and the Hawaii Department of Land and Natural Resources. Those providing comments at this stage will receive a copy of the Draft EA when it is issued.

**PROPOSED ACTION**

The current proposal involves the installation of undersea fiber optic cables that will connect five major Hawaiian islands (Kauai, Oahu, Molokai, Maui, and Hawaii). The undersea fiber optic cables will connect to onshore fiber optic cable systems. These cables will establish connections for SIC's Statewide Telecommunications Network, ensuring reliable high quality service to network subscribers.

A cable-laying ship will place cables on the ocean floor between the islands. Where the cables approach land, a cable landing will be constructed using a technique called horizontal directional drilling (HDD). The HDD method was selected because of its ability to drill under reefs; minimizing impact to coastal areas. Starting from onshore manholes sites, the HDD equipment bores below the ground and reef areas to a point under water at least 60 feet deep and 2,000 to 5,000 feet offshore.

In light of the current economic conditions, SIC has determined that in order to provide modern telecommunications services to DHHL subscribers in a timely manner, they will proceed with a network that can be built in the most expeditious and economical manner. Therefore, the marine cable landing project has been redesigned to include only seven landing sites at this time that will connect all the DHHL projects on the five major islands. In the future, given a more positive economy, additional cable landings may be added for redundancy. However, the initial network of seven landing sites will provide a complete, independent, functioning network even if additional cable landings are not provided.

The preliminary identification of cable landing sites is as follows:

- On Kauai, in the Kekaha area; at Aialoa Road (TMK: por. 4-1-2-002:032)
- On Oahu, in the Mākaha and Hawaii Kai areas; at Kili Drive and City Park (TMK: por. 1-8-4-002-047 and TMK: por. 1-3-9-015:001)
- On Molokai, in the Kaunakakai area; at Oneali'i Hornesteads (TMK: 2-5-4-006:019)
- On Maui, in the Lahaina and Mākena areas; at Wahikui and Po'olenalena Park (TMK: por. 2-4-5-021:015 and TMK: por. 2-2-1-007:072)
- On Hawaii, in the Kawaihae area, at Kaāwe Street (TMK: por. 3-6-1-004:020)

**BACKGROUND**

SIC is certified by the Federal Communications Commission and is authorized by the State of Hawaii Public Utilities Commission to provide telecommunications services on properties administered by the Department of Hawaiian Home Lands (DHHL). SIC has been serving DHHL communities since 1998. Many DHHL areas are located in rural communities where telecommunications (telephone) services are neither existent nor sufficient. SIC's proposed project will connect five major Hawaiian Islands and provide essential telecommunications services and a modern, broadband fiber optic system to DHHL areas at affordable rates.

Onshore, fiber optic cables will be installed underground, mostly within existing public rights-of-way, such as roads. SIC previously prepared Environmental Assessments (EA's) for the terrestrial system in each county, and these EA's were accepted by the Hawaii Department of Transportation. This project is also proceeding in accordance with a Memorandum of Agreement (under Section 106 of the National Historic Preservation Act) designed to protect cultural and historic properties that may be encountered along the routes.

The benefits of this project include:



Mr. Eric G. Crispin, Director  
Department of Planning and Permitting  
Page 3

1. DHHL and its beneficiaries will have access to a modern, independent and affordable telecommunications infrastructure.
2. This infrastructure will enable subscribers to have access to new interactive services such as telemedicine, tele-educational programming, video and data transmissions, and the Internet.
3. Creation of hundreds of jobs during the construction of the network and attraction of new high tech and other businesses to DHHL parcels.
4. To date, SIC has spent \$100 million from an RUS loan on new construction. Within the next 2 to 3 years up to an additional \$300 million is also available through the same loan for future project-related expenses.

**COMMENTS**

SIC has been consulting with members of native Hawaiian organizations, government agencies, businesses, and communities in the affected areas since the environmental review process began for the terrestrial cable systems. Your input is now requested specifically on environmental aspects of the submarine cables between the islands, and the cable landing sites. Written comments will become part of the official project record and will be addressed in the forthcoming Draft EA for the submarine cable network.

Comments may be mailed to the following address:

Mr. Randall Urasaki  
Parsons Brinckerhoff  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

They may also be sent by facsimile transmission to (808) 528-2368 or email at [urasaki@pbworld.com](mailto:urasaki@pbworld.com). Comments will be most useful to us if received within one month of your receipt of this letter.

This will not be your final opportunity to comment on this project. You will be notified when the Draft Environmental Assessment is issued. If you would like to receive a copy of the Draft EA, please notify us by mail, email, or phone.


Over a Century of  
Engineering Excellence



Mr. Eric G. Crispin, Director  
Department of Planning and Permitting  
Page 4

We look forward to receiving your comments.

Mahalo,  
PARSONS BRINCKERHOFF QUADE & DOUGLAS INC.

  
Randall Urasaki, P.E.  
Project Manager

**Enclosures:**

- Attachment 1: Proposed Submarine Cable Landing Sites (Map)
- Attachment 2: HDD Construction Technology
- Attachment 3: Māhaha, O'ahu: Landing Site Map and Kill Drive Map
- Attachment 4: Hawai'i Kai, O'ahu: Landing Site Map and City Park Map
- Attachment 5: Minutes of Meeting with Department of Planning and Permitting, City & County of Honolulu, September 4, 2002

Over a Century of  
Engineering Excellence

RECEIVED AS FOLLOWS

RECEIVED AS FOLLOWS

Environmental Planning Solutions LLC

September 6, 2002

Memorandum

To: File  
From: Colette Sakoda  
Subject: Sandwich Isles Communications (SIC) Oahu LSAs  
City and County DPP Meeting September 4, 2002  
Meeting Notes  
Attendees: Eileen Mark, Land Use Permitting Branch, DPP  
Randall Urasaki, Parsons Brinckerhoff  
Colette Sakoda, Environmental Planning Solutions  
Place: DPP Conference Room, Municipal Building

The purpose of the meeting was to brief the Planning and Permitting Department staff about the marine component of the state-wide fiber optic cable communications system prior to the consultant team doing any environmental field reconnaissance work. This would serve as an early County permit scoping meeting as well.

The Land Use Permitting branch of DPP is responsible for review and processing of the Special Management Area Use Permit (SMP major and minor), Shoreline Setback Variance (SSV), Conditional Use Permit (CUP), and State Special Use Permit (SUP) requests.

An overview of the project was presented along with handouts that identified the 17 LSAs statewide, and the candidate Makaha, Haleiwa and Waimanalo Oahu landing sites.

Ms. Mark observed that the SIC project, while appearing very ambitious with 17 proposed marine landing sites statewide, is, as opposed to prior fiber optic cable telecomm projects that have been transpacific, (initially) proposed to service only DHHL beneficiaries within the state. Because the system would originate locally and solely service the local population, this is viewed as a real benefit to the local residents.

She pointed out her familiarity with the immediate past 2 fiber optic cable marine landing telecommunications projects, one of which involved a joint venture between Verizon and AT&T. Construction method used was horizontal directional drilling (HDD). DPP required the applicants to apply for an SMP-major permit only, and no SSV because construction within the 40' setback was not involved.

Ms. Mark raised the possible alternate scenario in which no land use permit, including the SMP, would be required if the utility (fiber optic cable) were constructed within an

945 Makaiwa Street, Honolulu, HI 96816  
Phone: (808) 732-8602; Fax: (808) 538-3168  
Email: sakodac001@hawaii.rr.com

Environmental Planning Solutions LLC

'existing corridor.' This scenario requires SIC to submit preliminary subdivision maps and to request approval for easement corridors from the DPP subdivision branch prior to actual construction.

The Honolulu City Council is the final approving body for the SMP as opposed to the Planning Commissions in the neighbor island counties. In that sense, the SMP procedure on Oahu is a more involved political process than sometimes necessary when it involves a project that would result in less impact than very large, complex development projects. However, we do need to confirm whether the Council is involved in the approval of utility easements as well. Ms. Mark recommended we discuss the process involved with Bob Moore of the Subdivision branch.

Question: If the manhole site were to be on land designated State Agriculture, would a State SUP be required?

Answer (DPP): Requiring an SUP for the construction of a manhole on State Ag land would seem excessive. However, there was a State Supreme Court ruling (Curtis case) regarding the exemption of equipment shelters associated with telecommunications facilities, but required an SUP for the monopole. So Ms. Mark recommended we discuss this question with Bob Stanfield.

We discussed Hoakea's community outreach component of the project. Ms. Mark suggested that we apprise Lori, Councilmember John DeSoto's aide, prior to the geotechnical sampling field work.

We mentioned that a NEPA EA is being prepared for the marine component of the SIC project. DPP will be one of the reviewing agencies.

In the future, besides the staff members we'll be following up with regarding the subdivision approval process and SUP requirements, questions can be directed to either Eileen Mark or Ardis Shaw-Kim, also of the Land Use Permitting branch.

945 Makaiwa Street, Honolulu, HI 96816  
Phone: (808) 732-8602; Fax: (808) 538-3168  
Email: sakodac001@hawaii.rr.com

DEPARTMENT OF PLANNING AND PERMITTING  
**CITY AND COUNTY OF HONOLULU**

630 SOUTH KING STREET • HONOLULU, HAWAII 96813  
TELEPHONE: (808) 522-2411 • FAX: (808) 527-8743 • WWW.DDPET.HONOLULU.HI



REGISTRATION  
DIVISION

1121

ERIC G. CRISPIN, AIA  
DIRECTOR

ERIC G. CRISPIN, AIA  
DIRECTOR

SUBMARINE CABLE STATION  
SERVICE PROJECT

July 18, 2003 2003/ELOG-1731 and 1908 (ASK)

Mr. Randall Urasaki, P.E.  
Project Manager  
Parsons Brinckerhoff  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, Hawaii 96813

Dear Mr. Urasaki:

Sandwich Isles Communications, Inc.  
Submarine Cable Project  
Pre-Assessment Consultation

This responds to your pre-assessment consultation letter of May 7, 2003 regarding the above project. We have reviewed the submitted documents and offer the following comments:

General

We understand that the proposed undersea fiber optic cables are part of a statewide telecommunications network that will also involve a number of land-based facilities. We recommend that the environmental disclosure document address the entire scope of the project in addition to the submarine cables. If that is not possible, the reasons for not including the entire scope in the initial environmental assessment should be included. All phases of the project, if known, should be described.

The environmental documents should describe the project's consistency with City General Plan and relevant Development/Sustainable Community Plans, Land Use Ordinance, the Special Management Area and Shoreline Setback Ordinances.

Permits

The proposed cable landings appear to be located within the Special Management Area and shoreline setback and are generally subject to permit requirements.

Randall Urasaki, P.E.  
Page 2  
July 18, 2003

Landing Sites

Identified Oahu landing sites 8-4-2, 47 and 3-9-15: 1 do not appear to be ocean front lots. Parcels identified by Tax Map Keys 8-4-1, 12 and 3-9-12: 2 are located makai of these properties. Both of these lots are owned by the City and County of Honolulu.

Please provide us with the Draft Environmental Assessment when they become available for comment.

If you have any questions, you may contact Ardis Shaw-Kim of our staff at 527-5349.

Sincerely yours,

for ERIC G. CRISPIN, AIA  
Director of Planning and Permitting

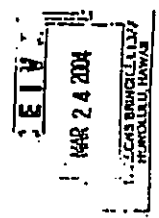
EGC:fm  
dec20/03

RECEIVED AS FOLLOWS

RECEIVED AS FOLLOWS

DEPARTMENT OF PLANNING AND PERMITTING  
CITY AND COUNTY OF HONOLULU

800 SOUTH KING STREET • HONOLULU, HAWAII 96813  
TELEPHONE (808) 527-4111 • FAX (808) 527-4747 • [WWW.DPM.HONOLULU.HI.GOV](http://WWW.DPM.HONOLULU.HI.GOV)



Randall Urasaki, P.E.  
Page 2  
March 22, 2004

The proposed underground cable within the shoreline setback area does not constitute a minor shoreline structure. Accordingly, a shoreline setback variance will be required.

Should you have any questions, please contact Ardis Shaw-Kim of our Land Use Approvals Branch at 527-5349.

Sincerely yours,

ERIC G. CRISPIN, AIA  
Director of Planning  
and Permitting

EOC:cs

[eric.crispin@planning.honolulu.gov](mailto:eric.crispin@planning.honolulu.gov)

Randall Urasaki, P.E.  
Parsons, Brinckerhoff, Quade & Douglas, Inc.  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, Hawaii 96813

Dear Mr. Urasaki:

Permit Determination for  
Sandwich Isles Communications Submarine  
Fiber-Optic Cable Landing Sites,  
Tax Map Keys 3-9-15: 1 and 8-4-2: 47

This responds to your letter dated January 22, 2004, regarding permit requirements for fiber-optic cable landing sites at Sandy Beach and Makaha. Based on the information provided in your letter, we have determined that the projects would qualify for minor Special Management Area (SMA) Use Permits. The work within the 40-foot shoreline setback will require shoreline setback variances.

Each landing site would consist of an underground conduit containing fiber-optic cables, a temporary drill site, a manhole, and "connecting route" (which would connect the manhole to the existing cable network). The portion of the underground system that is within the road right-of-way is exempt from SMA permitting requirements as provided for in Section 25-3.3(2)(M), Revised Ordinances of Honolulu, (ROH).

2004/EOG-213 (ASK)

March 22, 2004

ERIC G. CRISPIN, AIA  
DIRECTOR

PARSONS BRINCKERHOFF  
REPORT NUMBER

Kelly Robinson  
Acting Deputy Director





Parsons  
Brinckerhoff  
Cousens &  
Doenges, Inc.  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813  
808-531-7094  
Fax 808-526-2368

May 7, 2003

Mr. Michael W. Foley, Director  
Department of Planning  
Maui County  
250 S. High Street  
Wailuku, Hawaii 96793

Dear Mr. Foley:  
Subject: Sandwich Isles Communication, Inc.  
Submarine Cable Project  
Pre-Assessment Consultation

Sandwich Isles Communications, Inc. (SIC) is a rural telephone company headquartered in Honolulu, Hawaii that is developing a statewide telecommunications network to service the Department of Hawaiian Home Lands. The U.S. Department of Agriculture Rural Utilities Service (RUS) is providing loan assistance for the project. The portion of the project that would connect the major Hawaiian Islands by submarine telecommunication cables is now entering the federal and State environmental review processes.

We met previously with your staff on October 15, 2002 to discuss this project. Minutes of this meeting are attached. Since that time, the project has been more clearly defined.

The purpose of this letter is to request further comments or suggestions you may have on the environmental aspects of the proposed submarine cables and cable landing areas pursuant to the National Environmental Policy Act (NEPA) and the Hawaii Revised Statutes (HRS), Chapter 343. Our initial assessment indicates that we may also need to coordinate with your agency to obtain a Special Management Area permit for the landing sites on Maui. Comments pertaining to the project's environmental aspects will be addressed in an Environmental Assessment (EA) to be approved by RUS and the Hawaii Department of Land and Natural Resources. Those providing comments at this stage will receive a copy of the Draft EA when it is issued.

**PROPOSED ACTION**

The current proposal involves the installation of undersea fiber optic cables that will connect five major Hawaiian Islands (Kauai, Oahu, Molokai, Maui, and Hawaii). The undersea fiber optic cables will connect to onshore fiber optic systems. These cables will establish connections for SIC's Statewide Telecommunications Network, ensuring reliable high quality service to network subscribers.

A cable-laying ship will place cables on the ocean floor between the islands. Where the cables approach land, a cable landing will be constructed using a technique called horizontal

Over a Century of  
Engineering Excellence



Mr. Michael W. Foley, Director  
Department of Planning, Maui County  
Page 2

directional drilling (HDD). The HDD method was selected because of its ability to drill under reefs, minimizing impact to coastal areas. Starting from onshore manholes sites, the HDD equipment boxes below the ground and reef areas to a point under water at least 60 feet deep and 2,000 to 5,000 feet offshore.

In light of the current economic conditions, SIC has determined that in order to provide modern telecommunications services to DHHL subscribers in a timely manner, they will proceed with a network that can be built in the most expeditious and economical manner. Therefore, the marine cable landing project has been redesigned to include only seven landing sites at this time that will connect all the DHHL projects on the five major islands. In the future, given a more positive economy, additional cable landings may be added for redundancy. However, the initial network of seven landing sites will provide a complete, independent, functioning network even if additional cable landings are not provided.

The preliminary identification of cable landing sites is as follows:

- On Kauai, in the Kekaha area; at Akaioa Road (TMK: por. 4-1-2-002:032)
- On Oahu, in the Makaha and Hawaii Kai areas; at Kill Drive and City Park (TMK: por. 1-8-4-002:047 and TMK: por. 1-3-9-015:001)
- On Molokai, in the Kaimakakai area; at Oneaia Homesteads (TMK: 2-5-4-006:019)
- On Maui, in the Lahama and Makena areas; at Waihihi and Po'olenalena Park (TMK: por. 2-4-5-021:015 and TMK: por. 2-2-1-007:072)
- On Hawaii, in the Kawaihae area; at Kaawa Street (TMK: por. 3-6-1-004:020)

**BACKGROUND**

SIC is certified by the Federal Communications Commission and is authorized by the State of Hawaii Public Utilities Commission to provide telecommunications services on properties administered by the Department of Hawaiian Home Lands (DHHL). SIC has been serving DHHL communities since 1998. Many DHHL areas are located in rural communities where telecommunications (telephone) services are neither existent nor sufficient. SIC's proposed project will connect five major Hawaiian Islands and provide essential telecommunications services and a modern, broadband fiber optic system to DHHL areas at affordable rates.

Onshore, fiber optic cables will be installed underground, mostly within existing public rights-of-way, such as roads. SIC previously prepared Environmental Assessments (EA's) for the terrestrial system in each county, and these EA's were accepted by the Hawaii Department of Transportation. This project is also proceeding in accordance with a Memorandum of Agreement (under Section 108 of the National Historic Preservation Act) designed to protect cultural and historic properties that may be encountered along the routes.

The benefits of this project include:

1. DHHL and its beneficiaries will have access to a modern, independent and affordable telecommunications infrastructure.

Over a Century of  
Engineering Excellence

RECEIVED AS FOLLOWS



Mr. Michael W. Foley, Director  
Department of Planning, Maui County  
Page 3

2. This infrastructure will enable subscribers to have access to new interactive services such as telemedicine, tele-educational programming, video and data transmissions, and the internet.
3. Creation of hundreds of jobs during the construction of the network and attraction of new high tech and other businesses to DHHL parcels.
4. To date, SIC has spent \$100 million from an RUS loan on new construction. Within the next 2 to 3 years up to an additional \$300 million is also available through the same loan for future project-related expenses.

**COMMENTS**

SIC has been consulting with members of native Hawaiian organizations, government agencies, businesses, and communities in the affected areas since the environmental review process began for the terrestrial cable systems. Your input is now requested specifically on environmental aspects of the submarine cables between the islands, and the cable landing sites. Written comments will become part of the official project record and will be addressed in the forthcoming Draft EA for the submarine cable network.

Comments may be mailed to the following address:

Mr. Randall Urasaki  
Parsons Brinckerhoff  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

They may also be sent by facsimile transmission to (808) 528-2368 or email at [urasaki@pbworld.com](mailto:urasaki@pbworld.com). Comments will be most useful to us if received within one month of your receipt of this letter.

This will not be your final opportunity to comment on this project. You will be notified when the Draft Environmental Assessment is issued. If you would like to receive a copy of the Draft EA, please notify us by mail, email, or phone.



Mr. Michael W. Foley, Director  
Department of Planning, Maui County  
Page 4

We look forward to receiving your comments.

Mahaio,  
PARSONS BRINCKERHOFF QUAADE & DOUGLAS, INC.

Randall Urasaki, P.E.  
Project Manager

**Enclosures:**

- Attachment 1: Proposed Submarine Cable Landing Sites (Map)
- Attachment 2: HDD Construction Technology
- Attachment 3: Kaunakakai, Molokai: Landing Site Map and Onea/1 Homesteads Map
- Attachment 4: Lahaina, Maui: Landing Site Map and Waihi/1 Map
- Attachment 5: Makena, Maui: Landing Site Map and Poelenalena Park Map
- Attachment 6: Minutes of Meeting with Department of Planning, Maui County, October 15, 2002

RECEIVED AS FOLLOWS



**Memorandum**

**To:** File

**From:** Jason Yazawa

**Date:** October 16, 2002

**Subject:** Hawaiian Cable Landing Project  
Meeting with County of Maui, Department of Planning  
October 15, 2002

**In Attendance:** John Min, Planning Director  
Clayton Yoshida, Deputy Director of Planning  
Randy Urasaki, PB  
Jason Yazawa, PB

Mr. Urasaki provided a briefing about the Sandwich Isia Communications, Inc. (SIC) project, which included the following information:

- SIC is planning a statewide fiber optic network that will connect all Department of Hawaiian Home Lands properties;
- The project has two major elements: (1) terrestrial and (2) ocean and landing sites;
- Environmental assessments (by county) for the terrestrial element of the project have been completed, and SIC is now proceeding with obtaining permits and construction;
- PB is SIC's prime consultant in the planning and design of the ocean routing and landing sites;
- SIC directed PB to find suitable landing sites at a number of general locations statewide, including six locations on Maui, two on Molokai and two on Lanai;
- Maui has six landing sites, twice the amount proposed for Oahu, which has the next highest number of landing sites, because the fiber optic cable cannot be constructed on Hana Highway without unacceptable disruptions to traffic;
- For each general location, PB has conducted a "desktop" study using GIS to locate promising landing sites, which were presented to the Planning Department; and
- Construction of all landing sites will be by horizontal directional drilling, and is expected to last four to six weeks total, with the actual drilling lasting one to two weeks, per each site.

Mr. Urasaki briefly described each of the ten candidate landing sites in Maui County, but noted that some of these sites may change as new information about these sites are obtained. For example, the Onini site on Molokai will be dropped due to community objection and because of information obtained from the project's archaeological

subconsultant. Mr. Yazawa stated that our next step is to conduct environmental studies of these sites, which will be used in a statewide EA that will cover the ocean routes and the landing sites on all the major islands. PB is looking for input from the Planning Department so that the project team does not waste time and effort conducting environmental analyses on landing sites that are not feasible.

Mr. Min asked if there would be any restrictions on top of the cable easements. Mr. Urasaki answered that buildings with basements or similar underground requirements would probably not be possible. However, there should be no problem with buildings with no or shallow underground requirements.

Mr. Min concluded that the planning department will have regulatory jurisdiction over all elements of the project (cables, manhole, cabinets, etc.) within the Special Management Area (SMA) and shoreline setback. If the total cost of these elements are at least \$125,000 for a landing site, a major SMA use permit will be required. The planning department's evaluation of the project will be issues beyond the SMA, such as the project's cumulative impacts and effect on marine life. They will also be interested in construction impacts to the surrounding community. Mr. Min asked that these issues be covered in the EA.

The SMA application process was discussed, and the following application options were provided:

1. Ten separate applications for each landing site;
2. Three applications by island since decision-making will be made by three planning commissions that were established for each island in the county; or
3. Four applications, that will separate east Maui from west Maui as well as applications for Lanai and Molokai separately.

After discussion, the third option may be the most viable because of the geographic distribution of the landing sites, the need for public hearings and because of decision-making will be made by the three planning commissions. In addition, the Hana Advisory Committee (the only such committee in the county) must be provided the opportunity to review the project and provide a recommendation to the Maui Island Planning Commission. Mr. Min and Yoshida recommended that the Keanae, Wailua and Hana sites be covered in an east Maui application and the other Maui sites be covered in a west Maui application. The Planning Department will probably schedule the east Maui public hearing first, which would allow the Hana Advisory Committee time to provide a recommendation to the planning commission, which would then render a decision on both applications concurrently. Mr. Min and Yoshida also recommended that the project conduct a workshop to brief commission members about the overall SIC project so that they understand the context of their decision.

In addition to normal public notice in the newspaper, the applicant will be required to inform by certified mail all residents within 500 feet of the project site that a SMA use permit is being sought. Mr. Min recommended early communication with nearby

RECEIVED AS FOLLOWS

RECEIVED AS FOLLOWS

residents, such as making presentations before community associations or holding their own meetings.

As the project moves forward, Mr. Min asked that PB periodically inform the Planning Department about the status of the project. Mr. Yoshida would be the contact person. Mr. Yazawa stated that a formal EA scoping letter would be sent to the Planning Department, and that the letter will be sent to Mr. Yoshida. Mr. Min stated that when the SMA use applications are submitted, a planner(s) (possibly more than one if multiple applications) will be assigned to the project who would then act as the department's contact person(s).



January 13, 2004

Mr. Michael W. Foley  
Planning Director  
Department of Planning  
250 South High Street  
Waikuku, Hawaii 96793

Dear Mr. Foley:

Subject: Sandwhich Isles Communications, Inc.  
Submarine Fiber-Optic Cable Project  
Special Management Area and Shoreline Setback

We are providing planning and engineering services to Sandwhich Isles Communications, Inc. (SIC) for its submarine fiber optic cable project. The State of Hawaii Department of Hawaiian Home Lands granted SIC a license to provide telecommunications services to its properties statewide. We met with you and Mr. Yoshida on February 27, 2003 for a briefing about this project.

Proposed SIC Project

SIC is currently designing or installing terrestrial fiber-optic cable networks on Kauai, Oahu, Molokai, Maui, and Hawaii. For the subject project, SIC proposes to construct a 300-mile submarine fiber-optic cable network, which would connect the island networks (see enclosed figure). Seven termini, or landing sites, are proposed statewide, which include one on Molokai and two on Maui.

Landing sites are the connections or nodes between the submarine and terrestrial networks. All seven landing sites will be constructed using horizontal directional drilling (HDD), a construction alternative to traditional trenching. Installation of previous cable landing sites by others due to trenching caused disturbances to coastal and marine environments during construction. The SIC project will avoid such impacts by the use of HDD.

Our three proposed landing sites, or HDD staging areas, in Maui County are the following (maps of the landing sites are enclosed):

- Oneali'i Homesteads, Kaunakakai, Molokai (TMK: 2-5-4-006:019)
- Waikuli, Lahaina, Maui (TMK: 2-4-5-021:015)
- Po'olenalena Park, Makena, Maui (TMK: 2-2-1-007:072)

Landing site infrastructure would include an under-sea/floor/underground (landside) conduit, which would contain fiber-optic cables, and a beach manhole within the nearest road right-of-way, which would be the point of connection of the submarine and terrestrial networks. The ocean end or opening of the conduit is called the submarine exit point (or "EP"). Seaward of the

Over 3 Century of  
Engineering Excellence

Parsons  
Brinckerhoff  
Quade &  
Douglass, Inc.

American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813  
808-531-7054  
Fax: 808-528-2368



Mr. Michael W. Foley, Planning Director  
County of Maui Planning Department  
January 13, 2004  
Page 2

EP, the fiber-optic cable will tie on the ocean floor. The coordinates of the EPs for the Maui County landing sites are as follows:

- Oneali'i Homesteads: N21° 38.180'; W156° 59.3700'
- Waikuli: N20° 54.0019'; W156° 41.5676'
- Po'olenalena Park: N20° 39.8191'; W156° 26.8201'

Oneali'i Homesteads is the only one among the seven proposed landing sites that is a terminus of two submarine cable routes (see statewide submarine network figure). Therefore, two under-sea/floor/underground conduits will be constructed for this site.

We have recently submitted a conservation district use application (CDUA), along with a Draft Environmental Assessment (EA), to the State Department of Land and Natural Resources (DLNR). Upon acceptance of the CDUA, we expect that DLNR will furnish the Maui County Planning Department copies of the CDUA and Draft EA for review and comment.

Special Management Area (SMA)

As discussed during our meeting on February 27, 2003, our three Maui County landing sites would require SMA use permits. The landing site infrastructure would be considered a "development" because although it would be an underground utility, we have not secured easements, landside of the shoreline. We plan to secure the permanent easements after construction. Prior to construction, we plan to obtain construction easements.

Based on the information contained in the following table, we believe that each landing site would qualify for a Minor SMA use permit because the construction cost for each landing site within the SMA would be less than \$125,000. We assume that landing site infrastructure within a roadway right-of-way, such as the beach manhole, would not be considered a "development" in accordance with the SMA regulations because they would be within an "existing corridor." The following are the total construction cost per landing site within the SMA, but outside the roadway right-of-way:

- Oneali'i Homesteads: \$93,800
- Waikuli: \$20,150
- Po'olenalena Park: \$89,500

If we were to add the cost of the infrastructure within roadway rights-of-way, the total construction cost per landing site would be as follows:

- Oneali'i Homesteads: \$126,800
- Waikuli: \$63,550
- Po'olenalena Park: \$121,250

The enclosed table provides a breakdown on how these costs were calculated.

Based on the information herein provided, we respectfully request the planning director make a determination as to whether each landing site would qualify for a Minor SMA use permit?

Over 3 Century of  
Engineering Excellence

RECEIVED AS FOLLOWS

ALANI M. ARAKAWA  
Mayor  
MICHAEL W. FOLEY  
Director  
WAYNE A. BOTEELHO  
Deputy Director



COUNTY OF MAUI  
DEPARTMENT OF PLANNING

February 12, 2004

Mr. Randall Urasaki, P.E.  
Project Manager  
Parsons Brinckerhoff, Quade & Douglass, Inc.  
1001 Bishop Street, Suite 3000  
Honolulu, Hawaii 96813

Dear Mr. Urasaki:

RE: Installation of Inter-Island Submarine Fiber-Optic Cables  
TMK: (2) 5-4-006:019 at Kaunakakai, Molokai; TMK: (2) 4-5-012:015  
at Lahaina, Maui; and TMK: (2) 2-1-007:072 at Makana, Maui  
(LTR 2004/0189)

We have received your letter dated January 13, 2004, requesting that our office provide a determination as to whether the development of the proposed underground fiber optic cable and conduit at the above landing sites will be considered minor structures in accordance with Section 12-203-13 of the Shoreline Rules for the Maui Planning Commission.

At this time a determination cannot be made without additional information. We are enclosing the Shoreline Setback Structure/Activity Determination Informational Sheet and Special Management Area Assessment Application for you to complete and return with appropriate fees. Once this information is provided, a formal determination will be made.

Should you have any further questions, please contact Leanaora Kalaokamalie, Staff Planner, of this office, at 270-7520.

Sincerely,

*Michael W. Foley*  
for MICHAEL W. FOLEY  
Planning Director

MWF:LPK:do  
c: Clayton I. Yoshida, AICP, Planning Program Administrator  
Leanaora Kalaokamalie, Staff Planner  
General File  
K:\WP\_DOCS\PLANNING\LETTERS\2004\0189\_SandwichIslesSubFiberOpticCables.wpd

250 SOUTH KOOHI STREET, WAIKUKU, MAUI, HAWAII 96793  
PLANNING DIVISION (808) 270-7735, ZONING DIVISION (808) 270-7253, FACSIMILE (808) 270-7634



American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

Parsons  
Brinckerhoff

April 20, 2004

Mr. Michael W. Foley, Planning Director  
County of Maui  
Department of Planning  
250 South High Street  
Waikuku, Hawaii 96793

Dear Mr. Foley:

Subject: Sandwich Isles Communications, Inc.  
Submarine Fiber-Optic Cable Project  
Waikukui Landing Site, Lahaina, Maui  
Oneaiki Homesteads Landing Site, Molokai  
Special Management Area Assessment Applications

On behalf of Sandwich Isles Communications, Inc. (SIC), I am pleased to submit two (2) copies each of the Special Management Area (SMA) Assessment Applications for the Waikukui and Oneaiki Homesteads Landing Sites of the subject project.

We are anticipating that the State Department of Land and Natural Resources (DLNR) will publicly announce a Finding of No Significant Impact (FONSI) in the May 23, 2004 edition of the Environmental Notice. We will forward you the FONSI declaration or announcement.

We will also later submit two (2) copies of a certified shoreline survey for each site. We have completed the fieldwork at both sites, and have obtained permission from Mr. Glenn Correa and Mr. Micah Kane, Chairperson of the Hawaiian Homes Commission, for submission of the surveys to DLNR for certification. DLNR is currently reviewing.

We will soon submit an SMA Assessment Application for our Po'okanalea Park Landing Site in Makana. We are in the process of obtaining permission from DLNR, the landowner.

If you require additional information, please contact me at (808) 566-2260.

Sincerely yours,  
Parsons Brinckerhoff Quade & Douglas, Inc.

*Randall Urasaki*  
Randall Urasaki, P.E.  
Project Manager

Enclosures: SMA Assessment Application for the Submarine Fiber-Optic Cable Project,  
Waikukui Landing Site, April 2004 (2 copies)  
SMA Assessment Application for the Submarine Fiber-Optic Cable Project,  
Oneaiki Homesteads Landing Site, April 2004 (2 copies)

Cc: Mr. Sam Lemmo, Administrator, DLNR Office of Conservation and Coastal Lands

Over a Century of  
Engineering Excellence

RECEIVED AS FOLLOWS



**Parsons  
Brinckerhoff**  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

May 7, 2003

Mr. Christopher J. Yuen, Director  
Department of Planning  
County of Hawaii  
101 Pauahi Street, Suite 3  
Hilo, Hawaii 96720

Dear Mr. Yuen:

**Subject: Sandwich Isles Communication, Inc.  
Submarine Cable Project  
Pre-Assessment Consultation**

Sandwich Isles Communications, Inc. (SIC) is a rural telephony company headquartered in Honolulu, Hawaii that is developing a statewide telecommunications network to service the Department of Hawaiian Home Lands. The U.S. Department of Agriculture Rural Utilities Service (RUS) is providing loan assistance for the project. The portion of the project that would connect the major Hawaiian Islands by submarine telecommunication cables is now entering the federal and State environmental review processes.

We met previously with your staff on February 24, 2003 to discuss this project. Minutes of this meeting are attached. Since that time, the project has been more clearly defined.

The purpose of this letter is to request further comments or suggestions you may have on the environmental aspects of the proposed submarine cables and cable landing areas pursuant to the National Environmental Policy Act (NEPA) and the Hawaii Revised Statutes (HRS), Chapter 343. Our initial assessment indicates that we will also need to coordinate with your agency on a Special Management Area permit for the landing site on the Big Island. Comments pertaining to the project's environmental aspects will be addressed in an Environmental Assessment (EA) to be approved by RUS and the Hawaii Department of Land and Natural Resources. These providing comments at this stage will receive a copy of the Draft EA when it is issued.

**PROPOSED ACTION**

The current proposal involves the installation of undersea fiber optic cables that will connect five major Hawaiian Islands (Kauai, Oahu, Molokai, Maui, and Hawaii). The undersea fiber optic cables will connect to onshore fiber optic cable systems. These cables will establish connections for SIC's Statewide Telecommunications Network, ensuring reliable high quality service to network subscribers.

A cable-laying ship will place cables on the ocean floor between the islands. Where the cables approach land, a cable landing will be constructed using a technique called horizontal directional drilling (HDD). The HDD method was selected because of its ability to drill under



Mr. Christopher J. Yuen, Director  
Planning Department, County of Hawaii  
Page 2

reefs; minimizing impact to coastal areas. Starting from onshore manholes sites, the HDD equipment bores below the ground and reef areas to a point under water at least 60 feet deep and 2,000 to 5,000 feet offshore.

In light of the current economic conditions, SIC has determined that in order to provide modern telecommunications services to DHHL subscribers in a timely manner, they will proceed with a network that can be built in the most expeditious and economical manner. Therefore, the marine cable landing project has been redesigned to include only seven landing sites at this time that will connect all the DHHL projects on the five major islands. In the future, given a more positive economy, additional cable landings may be added for redundancy. However, the initial network of seven landing sites will provide a complete, independent, functioning network even if additional cable landings are not provided.

The preliminary identification of cable landing sites is as follows:

- On Kauai, in the Kekaha area; at Akaloa Road (TMK: por. 4-1-2-002-032)
- On Oahu, in the Māhaha and Hawaii Kai areas; at Kūi Drive and City Park (TMK: por. 1-8-4-002-047 and TMK: por. 1-3-9-015-001)
- On Molokai, in the Kaunakakai area; at Oneali Homesite (TMK: 2-5-4-008-019)
- On Maui, in the Lahaina and Mākena areas; at Waihi and Po'olenalena Park (TMK: por. 2-4-5-021-015 and TMK: por. 2-2-1-007-072)
- On Hawaii, in the Kawaihae area; at Kaāwe Street (TMK: por. 3-6-1-004-020)

**BACKGROUND**

SIC is certified by the Federal Communications Commission and is authorized by the State of Hawaii Public Utilities Commission to provide telecommunications services on properties administered by the Department of Hawaiian Home Lands (DHHL). SIC has been serving DHHL communities since 1998. Many DHHL areas are located in rural communities where telecommunications (telephone) services are neither existent nor sufficient. SIC's proposed project will connect five major Hawaiian Islands and provide essential telecommunications services and a modern, broadband fiber optic system to DHHL areas at affordable rates.

Onshore, fiber optic cables will be installed underground, mostly within existing public rights-of-way, such as roads. SIC previously prepared Environmental Assessments (EAs) for the terrestrial system in each county, and these EAs were accepted by the Hawaii Department of Transportation. This project is also proceeding in accordance with a Memorandum of Agreement (under Section 106 of the National Historic Preservation Act) designed to protect cultural and historic properties that may be encountered along the routes.

The benefits of this project include:

1. DHHL and its beneficiaries will have access to a modern, independent and affordable telecommunications infrastructure.

RECEIVED AS FOLLOWS



Mr. Christopher J. Yuan, Director  
Planning Department, County of Hawaii  
Page 3

2. This infrastructure will enable subscribers to have access to new interactive services such as telemedicine, tele-educational programming, video and data transmissions, and the Internet.
3. Creation of hundreds of jobs during the construction of the network and attraction of new high tech and other businesses to DHHH parcels.
4. To date, SIC has spent \$100 million from an RUS loan on new construction. Within the next 2 to 3 years up to an additional \$300 million is also available through the same loan for future project-related expenses.

**COMMENTS**

SIC has been consulting with members of native Hawaiian organizations, government agencies, businesses, and communities in the affected areas since the environmental review process began for the terrestrial cable systems. Your input is now requested specifically on environmental aspects of the submarine cables between the islands, and the cable landing sites. Written comments will become part of the official project record and will be addressed in the forthcoming Draft EA for the submarine cable network.

Comments may be mailed to the following address:

Mr. Randall Urasaki  
Parsons Brinckerhoff  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

They may also be sent by facsimile transmission to (808) 528-2368 or email at [urasaki@pbworld.com](mailto:urasaki@pbworld.com). Comments will be most useful to us if received within one month of your receipt of this letter.

This will not be your final opportunity to comment on this project. You will be notified when the Draft Environmental Assessment is issued. If you would like to receive a copy of the Draft EA, please notify us by mail, email, or phone.


We look forward to receiving your comments.

Over a Century of  
Engineering Excellence



Mr. Christopher J. Yuan, Director  
Planning Department, County of Hawaii  
Page 4

Mahalo,  
PARSONS BRINCKERHOFF OUADE & DOUGLAS, INC.

  
Randall Urasaki, P.E.  
Project Manager

**Enclosures:**

- Attachment 1: Proposed Submarine Cable Landing Sites (Map)
- Attachment 2: HDD Construction Technology
- Attachment 3: Kawahae, Hawaii Landing Site Map and Ka'awa Street Map
- Attachment 4: Minutes of Meeting with Planning Department, Hawaii County, February 24, 2003

RECEIVED AS FOLLOWS

Over a Century of  
Engineering Excellence





Memorandum

To: File
From: Nami Ohtomo
Date: February 25, 2003
Subject: SIC project - Pre-consultation meeting with County of Hawaii Planning Department, February 24, 2003

Distributions: Perry Small, Randy Urasaki, David Alan, Riley Smith (SIC), Ho'aleka

Attendees: County of Hawaii, Planning Dept. Roy Takemoto, Phyllis Fujimoto, PB-Honolulu Nami Ohtomo, Perry Small

Handouts: SIC Fact Sheet, Statewide map of proposed cable routes, Maps of Kawahae and Keakaha landing sites, HDD description sheet

Preliminary Information

PB met with the Planning Department on February 24, 2003, to inform them of the SIC project and to consult with them on County of Hawaii permit processes.

Roy Takemoto is the Deputy Director. Phyllis Fujimoto is the department's planner responsible for Coastal Zone Management (CZM) permits. Phyllis will be our point of contact for all project-related issues. PB does not need to coordinate with the West Hawaii office of the Planning Department in addition to the coordination with Hilo.

PB provided an overview of the SIC fiber optic cable landings project, including its purpose, proposed landing sites on the island of Hawaii, and horizontal directional drilling (HDD). Because HDD is the proposed construction method, only limited environmental impacts are anticipated.

DHHL property and applicability of CZM laws

The manhole to be installed as part of the marine portion of the SIC project will be located in the County road right-of-way. Therefore, the project is under County jurisdiction and subject to CZM review.

However, the County noted that an MOA was recently signed (late 2002) between the County Council and the Hawaiian Homes Commission to clarify policy on land use issues concerning activities on DHHL properties. The issue of whether or not DHHL is subject to CZM requirements was technically unresolved, but the County stated that DHHL has voluntarily agreed to subject its projects to CZM reviews. The Draft Environmental Assessment (EA) should address this MOA.



SMA use permit & Shoreline Setback Variance

The Planning Department staff advised us to submit a Special Management Area (SMA) Assessment Application (form provided), with a cover letter and supporting documentation explaining the nature of the project. The SMA Assessment application can be submitted at any time, even before the Draft EA. The County is required to respond to an assessment application within 21 calendar days of submission. If the County does not respond within the allotted time, the project will automatically be required to obtain a SMA Major permit.

Staff suggested that in the submittal, we could request an exemption from both SMA and SSV. The SIC project is unique in many respects, and therefore may be able to proceed without those permits.

The basis for the SMA exemption may be that the project may not be a "development" subject to SMA. According to County Rules, underground utility projects are exempted from SMA requirements. Even though the rules do not make a distinction, staff pointed out that the exemption is typically for placement of utilities laterally with roads, in contrast to the proposed action to connect a submarine cable that is perpendicular to existing roadways.

They requested that PBSIC get advice from the State's Office of Planning, CZM program to determine if underground utilities in the shoreline area is covered or exempt. Planning staff anticipates that the issue will be referred back to the County level.

Even if an SMA permit is necessary, the project may be eligible for a Minor permit, issued for projects costing less than \$125,000. However, it is unclear if the Planning Department would consider the cost of the project to be based per site, total per island, or total for the statewide network.

Staff inquired how the SMA issue was being handled on other islands, because it would be desirable for all Counties to handle SMA requirements in a consistent fashion. PB stated that guidance from other Counties is undetermined. PB also noted that each landing site within the proposed SIC network is unique, subject to a different set of conditions and issues.

If the project must apply for an SMA use permit, PBSIC must submit the completed EA with the appropriate form(s). If a Minor permit is required, it can be issued in-house within about one month. If a Major permit is required, a Shoreline Setback Variance (SSV) will most likely be required concurrently.

The SSV is required for activities within 40 feet of the shoreline. In the case of the Kawahae landing site, the HDD construction activity may take place within the 40-foot setback. However, construction activities for the Keakaha landing site will be beyond the 40-foot setback, except the drilling will pass through the 40-foot setback underground. It was immediately unclear if the SSV applies to underground drilling under the setback area.

RECEIVED AS FOLLOWS

RECEIVED AS FOLLOWS



Hury Kim  
Mayor



**County of Hawaii**

**PLANNING DEPARTMENT**  
101 Puuhii Street, Suite 3 • Hilo, Hawaii 96720-3043  
(808) 961-8288 • Fax (808) 961-8742

6  
MAY 10 2003  
HAWAII  
CHRISTOPHER J. YUEN  
Director  
ROY R. TAKEMOTO  
Deputy Director

June 10, 2003

Mr. Randall Urasaki, P.E.  
Project Manager  
Parsons, Brinckerhoff, Quade & Douglas, Inc.  
American Savings Bank Tower, Suite 3000  
1001 Bishop Street  
Honolulu, Hawaii 96813

Dear Mr. Urasaki:

**Request for Comments on Environmental Assessment (EA)**  
**Developer:** Sandwichee Communications, Inc.  
**Project:** Submarine Cable Project - Landing Site at Kawailahe  
**Tax Map Key:** (3) 6-1-004:020

This is in response to your letter, dated May 7, 2003, in which you requested our written comments or suggestions in connection with the preparation of an EA for the proposed project. The Hawaii County Planning Department appreciates having this opportunity to comment on the submarine cable landing facility proposed for the subject TMK parcel situated in the Kawailahe area of South Kohala on the Big Island. After careful review of the project's description, as provided in your letter, as well as the attached description of the Horizontal Directional Drilling (HDD) process and the memorandum of minutes of the February 24, 2003 meeting with Planning Department staff, we have the following comments.

Under Rule 9, Planning Commission Rules of Practice & Procedure, the following sections require the submittal of a Special Management Area (SMA) Assessment Application or a SMA Use Permit Application.

In addition, County rules provide exemptions for a "minor structure of activity." It is unclear if the SIC project would be exempted under this definition, but staff suggested we also request an exemption from the SSV in the SMA assessment package.

**Coordination with Other County Departments**

PB was advised to check on Chapter 27 (Floodplain) and Chapter 22 (ROW Construction). Planning staff suggested that we coordinate with Department of Public Works (DPW), in particular Kelly Gomes for flood hazard issues.

PB should also check the County's Recreation Plan, and verify if the project falls within the inventory listed in the Plan. If so, we should coordinate with the Department of Parks and Recreation (Glenn Miyao).

**Tips on Completing County Forms**

Staff requested that we not answer "N/A" to questions on the form. If the questions are not applicable, we should explain why.

**Public Outreach**

Planning Department staff verified that the County of Hawaii does not have designated community groups (such as neighborhood boards on Oahu). Typically, residents within a 300-foot radius (in urban areas) are notified of projects, and will come forward with concerns.

The West Hawaii (Kona) office of the Planning Department has a resident cultural expert who is very knowledgeable about the area: Debbie Chung @ 808-327-3510.

They also suggested DHH-L staff may be able to provide contact names of community leaders.

**Action Items:**

- PB to get guidance from the State's CZM program concerning applicability of the exemption for underground utilities;
- PB to send SMA Assessment Application to County of Hawaii Planning Department
- PB to obtain copy of County-DHHL MOA
- PB to check County's Recreation Plan

RECEIVED AS FOLLOWS

Mr. Randall Urasaki, P.E.  
Project Manager  
Parsons, Brinckerhoff, Quade & Douglas, Inc.  
Page 2  
June 10, 2003

Rule 9-4 (10) "Development" means any of the following uses, activities, or operations on land or in or under water within the Special Management Area:

- A. "Development" includes the following:
- (i) Placement or erection of any solid material or any gaseous, liquid, solid, or thermal waste;
  - (ii) Grading, removing, dredging, mining, or extraction of any materials;
  - (v) Construction, reconstruction, or alteration of the size of any structure.
- B. "Development" does not include the following uses, activities or operations:
- (xiv) Installation of underground utility lines and appurtenant aboveground fixtures less than four feet in height along existing corridors. (Emphasis added)

The proposed project is determined to be "development" given that the proposed drilling site, pit entrance, and trench to Akoni Pule Highway is not in an existing corridor.

Rule 9-8 A. No development shall be allowed within the Special Management Area without obtaining a permit in accordance with these Rules and Regulations.

Rule 9-10 A. The Department shall assess all uses, activities or operations proposed in the Special Management Area except in cases in which the applicant determines that the proposed use, activity or operation will: a) exceed \$125,000 in valuation; or b) have a significant adverse effect on the Special Management Area. In this case, the assessment procedures may be waived and the applicant shall petition the Authority for a Special Management Area Use Permit pursuant to Rule 9-11.

Currently, the Department determines that the valuation of the project shall include the total cost of labor, equipment and materials used in connection with the site preparation, construction and restoration on the subject TMK parcel. This shall include the cost of all underground conduit(s) and cable from the ocean floor exit point to the existing corridor along Akoni Pule Highway. However, the Department does reserve the right to revise this determination pending further consideration that may be given to the methods of valuation applied by the other counties in their

Mr. Randall Urasaki, P.E.  
Project Manager  
Parsons, Brinckerhoff, Quade & Douglas, Inc.  
Page 3  
June 10, 2003

SMA review of the project. Therefore, based on the Department's assumption that the valuation of the proposed project will exceed \$125,000, a SMA Use Permit (Major) will be most likely required, pursuant to Rule 9-11. We have enclosed a SMA Use Permit Application and a SMA Use Permit Assessment Application for your convenience.

Rule 11, Planning Department Rules of Practice and Procedure, governs activities within the shoreline setback area in Hawaii County. Pursuant to the following sections of Rule 11, a determination by the Planning Department of Minor Structure and Minor Activity may be granted in lieu of the requirement to obtain Shoreline Setback Variance (SSV).

- Rule 11-7 Structures or Activities Permitted within the Shoreline Setback Area
- (a) The following structures or activities may be permitted within the shoreline setback area provided written clearance is secured from the Planning Department:
- (4) A minor structure or activity approved in accordance with section 11-8.

Rule 11-8 Determination of Minor Structure or Minor Activity

A minor structure or activity proposed in the shoreline setback area shall not need a shoreline setback variance if the Planning Department determines that it would not affect beach processes or artificially fix the shoreline and would not interfere with public access or public views to and along the shoreline.

- (a) A request for a minor structure or activity determination shall be submitted to the Planning Department and shall be accompanied by applicable information to assist in the determination, which could include but not be limited to a certified shoreline survey, construction plans, a list of proposed plants and their growth at maturation, existing and finished contours, photographs of the shoreline setback area, an environmental assessment, written reasons addressing the criteria set forth in section 11-8 and other information required by the Planning Director.

RECEIVED AS FOLLOWS

Mr. Randall Urasaki, P.E.  
Project Manager  
Parsons, Brinckerhoff, Quade & Douglas, Inc.  
Page 4  
June 10, 2003

Information not included in the submittals already provided to the Planning Department that, in addition to that specified in Rule 11-8(a), is necessary for the issuance of a determination of minor structure or minor activity includes the following:

1. What is the anticipated depth, or volume of earth excavated, of the proposed 10' x 20' entrance pit?
2. What is the anticipated daily volume of "cuttings" to be removed from the drilling site?
3. A detailed description of the anticipated grading required for the construction activity and final installation, including the construction or improvement of any road access from Akoni Pule Highway to and on the construction site. Any permanent alteration of the existing site topography should be noted.
4. A detailed description of the construction and cable placement between the entrance pit and Akoni Pule Highway. This should include a more complete description of the location, size, and final projection above finish grade of any anticipated manholes or underground vaults and/or concrete conduit casings that will be situated on the subject TMK parcel.

For your convenience, we have enclosed a Shoreline Setback Variance Application in the event it is determined that a determination of minor structure or minor activity is not warranted for the subject project.

Finally, the subject 6.633-acre TMK parcel is zoned Open (O) by the County of Hawaii and is situated in the State Land Use Urban district. Pursuant to §25-4-11(e) of the Zoning Code, "Communication, transmission, and power lines of public and private utilities and governmental agencies are permitted uses within any district." However, the State of Hawaii, Department of Hawaiian Home Lands (DHHL) is the owner of the subject TMK parcel. Item III-E of the Memorandum of Agreement between the County of Hawaii and DHHL states:

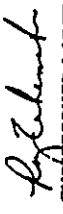
- E. All land use permit applications on Hawaiian home lands must be accompanied by written consent from DHHL before the County can begin processing those applications.

Therefore, each land use permit application submitted to the Planning Department shall be accompanied by a written consent signed by an authorized representative of DHHL.

Mr. Randall Urasaki, P.E.  
Project Manager  
Parsons, Brinckerhoff, Quade & Douglas, Inc.  
Page 5  
June 10, 2003

Should you have questions, please feel welcome to contact Larry Brown or Esther Imamura of my staff at 961-8288.

Sincerely,

  
CHRISTOPHER J. YUEN  
Planning Director

LMB:pak  
F:\WP\TMK\Ury\EA\Common\Ury\EA\SIC 6-1-4-20\SAC\chj.dwg

Encl.: SMA Use Permit Assessment Application  
SMA Use Permit Application

RECEIVED AS FOLLOWS

Mr. Samuel J. Lemmo  
Page 2  
March 5, 2004

Therefore, written consent for the subject project signed by an authorized representative of DPHL must be submitted to the Planning Department before any land use permits or applications will be accepted for processing.

Under Rule 9-4(10)(iv), Planning Commission Rules of Practice & Procedure, development does not include the "installation of underground utility lines and appurtenant aboveground fixtures less than four feet in height along existing corridors."

However, most of the project's components including the proposed drilling site, pit entrance, and trench to Akoni Pule Highway are not in an existing corridor and is, therefore, determined to be "development."

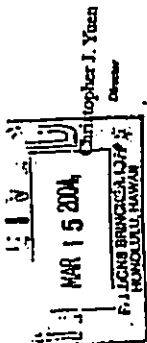
The Department has determined that the valuation of the project shall include the total cost of labor, equipment, and materials used in connection with the site preparation, construction, and site restoration in the SMA, which includes the area from the shoreline to the existing Akoni Pule Highway corridor.

Further, Rule 11, Planning Department Rules of Practice and Procedure, governs activities and the placement of structures within the shoreline setback area in Hawaii County. The proposed project includes activities as defined by Rule 11-3(a).

Therefore, pursuant to Rule 11-6 the proposed activities are prohibited in the Shoreline Setback Area unless a Shoreline Setback Variance (SSV) is approved. However, Sections 11-7 and 11-8 of Rule 11 allow for a determination by the Planning Department of a Minor Structure or Minor Activity, which may be granted in lieu of the requirement to obtain a SSV.

In summary, the following land use permits and approvals are required for the subject project.

1. A letter of consent from an authorized representative of DPHL shall be submitted to the Planning Department with or prior to the acceptance of any land use permits.
2. A SMA "Minor" or "Major" Use Permit for development in the SMA, depending on valuation.
3. A SSV or "determination of minor activity" from the Planning Department for activities in the Shoreline Setback Area.



Roy R. Takemoto  
Deputy Director



**County of Hawaii**

**PLANNING DEPARTMENT**

101 Puuahi Street, Suite 3 • Hilo, Hawaii 96720-3043  
(808) 961-5788 • Fax (808) 961-5742

March 5, 2004

Hury Kim  
Mayor

Mr. Samuel J. Lemmo, Administrator  
Department of Land and Natural Resources  
Office of Conservation and Coastal Lands  
P. O. Box 621  
Honolulu HI 96809

Dear Mr. Lemmo:

Subject: Request for Comments on CDUA No. ST-3176  
Applicant: Sandwitch Isles Communications, Inc.  
Request: Submarine Fiber Optic Cable Project - Landing Site at Kawahae  
TMK(s): (3) 6-1-004:020

We are in receipt of your letter, dated February 12, 2004, requesting our review and comments on the proposed CDUA. Included with your letter were copies of the subject application, the Draft Environmental Assessment, and your Department's Notice of Acceptance and Environmental Determination. After careful review of the above-referenced documents and our previous communications with the applicant's agent we offer the following comments.

The subject 6.633-acre parcel is zoned Open (O) by the County of Hawaii and is situated in the county's Special Management Area (SMA) and the State Land Use Urban district. Pursuant to §25-411(e) of the Hawaii County Code (HCC), "Communication, transmission, and power lines of public and private utilities and governmental agencies are permitted uses within any district." However, the State of Hawaii, Department of Hawaiian Home Lands (DHHL) is the owner of the subject TMK parcel. By the adoption of Resolution 19-03 a Memorandum of Agreement (MOA) clarifying the respective roles, responsibilities, and obligations of the County of Hawaii and DHHL relating to land use planning, infrastructure maintenance, enforcement of laws, and collection of taxes and other fees on Hawaiian home lands became effective on December 30, 2002. Item III-B of the MOA states:

"All land use permit applications on Hawaiian home lands must be accompanied by written consent from DHHL before the County can begin processing those applications."



Mr. Christopher J. Yuen, Planning Director  
County of Hawaii Planning Department  
March 19, 2004  
Page 2

**Special Management Area (SMA)**

As was discussed in a meeting with your staff on February 24, 2003, the proposed Kaewa Place landing site would require an SMA use permit. The landing site infrastructure would be considered a "development" because although it would be an underground utility, we have not secured easements landside of the shoreline. We plan to secure the permanent easements after construction. Prior to construction, we plan to obtain construction easements.

Based on the information contained in the attached Construction Cost Estimate Table, we believe that the Kaewa Place landing site would qualify for a Minor SMA Use Permit because the construction cost within the SMA for the landing site would be less than \$125,000. The landing site's total construction cost within the SMA, but outside the roadway right-of-way, is estimated to be \$77,400. The Construction Cost Estimate Table provides a breakdown on how construction costs within the SMA were calculated for all sites Statewide. Costs include labor, equipment, and materials used in connection with site preparation, construction, and site restoration.

We assume that landing site infrastructure within a roadway right-of-way, such as the beach manhole, would not be considered a "development" in accordance with SMA regulations, because they would be within an "existing corridor." The cost of infrastructure in the road ROW is an estimated \$34,500. We also believe that the costs associated with the portion makai of the shoreline, and therefore outside of the SMA, need not be included in the cost estimate. That portion makai of the shoreline is estimated at \$600,000 (not shown in table).

Based on the information herein provided, we respectfully request that the Planning Department make a determination as to whether the Kaewa Place landing site would qualify for a Minor SMA use permit.

We also request that you waive the SMA Assessment Application requirement for a certified shoreline survey, because the submarine cable landing site would be perpendicular to the shoreline, and by definition must cross the shoreline setback, regardless of where the shoreline is certified to be. We also believe that the project may be considered a Minor Structure and Minor Activity, per the County's shoreline setback rule, as discussed below, and therefore may not warrant a shoreline survey.

The construction cost table also demonstrates that a small difference in the distance to the shoreline from the drift site would not significantly increase the cost estimate, based on a per unit cost of \$310 per foot. The table assumes that the distance to the shoreline at Kaewa Place landing site would be roughly 100 feet.

**Shoreline Setback**

As demonstrated in the SMA Assessment Application, although landing site infrastructure would be located within the shoreline setback, it would not affect beach processes, artificially fix the shoreline, or interfere with public access or public views to and along the shoreline. Therefore, we respectfully request the Planning Department grant a determination that the proposed underground fiber optic cable and conduit would be a Minor Structure and Minor Activity, in

Over a Century of  
Engineering Excellence



Mr. Christopher J. Yuen, Planning Director  
County of Hawaii Planning Department  
March 19, 2004  
Page 3

accordance with the Rule 11, Planning Department Rules of Practice and Procedure governing activities within the shoreline setback area.

In support of this requested determination, we submit the following answers to the questions/comments posed in your letter of June 10, 2003:

1. What is the anticipated depth, or volume of earth excavated, of the proposed 10' x 20' entrance pit?

Response: Anticipated depth is three feet.

2. What is the anticipated daily volume of "cuttings" to be removed from the drilling site?

Response: Anticipated daily volume of "cuttings" is roughly five to ten cubic yards per day, or two small truckloads, assuming 300 linear feet of drilling per day.

3. A detailed description of the anticipated grading required for the construction activity and final installation, including the construction or improvement of any road access from Akoni Pule Highway to and on the construction site. Any permanent alteration of the existing site topography should be noted.

Response: No grading is necessary, with the exception of a temporary removal of a berm preventing access to the site from Akoni Pule Highway. There would be no permanent alteration of the site's topography.

4. A detailed description of the construction and cable placement between the entrance pit and Akoni Pule Highway. This should include a more complete description of the location, size, and final projection above finish grade of any anticipated manholes or underground vaults and/or concrete conduit casing that will be situated on the subject TMK parcel.

Response: This information is provided in the SMA Assessment Application enclosed. Please note that the only visible structure on the surface would be a manhole cover, which will be flush or slightly above grade to prevent water infiltration.

**Use Permit**

Your June 10 letter referred to a Memorandum of Agreement between the County of Hawaii and the Department of Hawaiian Home Lands (DHHL), and appeared to indicate that a Use Permit may be necessary. However, based on a conversation with Mr. Larry Brown of your staff on February 3, 2004, it is our understanding that it is not necessary to submit a Use Permit.

We are also of the understanding that an approval letter from DHHL will be necessary to obtain a building permit in the future. While such an approval letter is not submitted with the SMA Assessment Application at this time, it will be sent to the Planning Department at a future date, and would also accompany the Building Permit application. Please note that a representative of DHHL has signed the SMA Assessment Application, and DHHL is fully informed of this project, which is intended to improve the quality of life of their beneficiaries.

Over a Century of  
Engineering Excellence

RECEIVED AS FOLLOWS


RECEIVED AS FOLLOWS



Mr. Christopher J. Yuen, Planning Director  
County of Hawaii Planning Department  
March 19, 2004  
Page 4

If you require additional information or would like to discuss SMA or shoreline issues further,  
please contact me at (808) 566-2260, or you may contact Ms. Nami Ohtomo at (808) 566-2239.

Sincerely,  
Parsons Brinckerhoff Quade & Douglas, Inc.

  
Randal Urasaki, P.E.  
Project Manager

Enclosures: Map of Proposed SIC Submarine Fiber-Optic Network  
Table of Construction Cost Estimate by Landing Site  
SMA Assessment Application

RECEIVED AS FOLLOWS

Randall Urasaki, P.E.  
Parsons Brinckerhoff Quade & Douglas, Inc.  
Page 2  
April 13, 2004

of Practice and Procedure, is hereby granted. This determination is subject to the conditions contained within SMM 152 and is based on the following findings:

1. The proposed project will not affect natural beach processes or artificially fix the shoreline;
2. The proposed project will not interfere with public access to the shoreline in the vicinity of the project site except as necessary to ensure the public welfare and safety during the actual construction period;
3. Construction of the proposed project shall be completed within approximately three (3) months from commencement;
4. The proposed project will not adversely impact public views to and along the shoreline except during the construction period; and
5. The proposed use and activity will not result in any permanent alteration to the existing topography of the project area.

Should you have questions, please feel welcome to call Larry Brown or Esther Inamura of my staff at 961-8288.

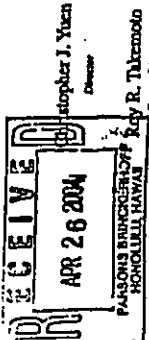
Sincerely,

CHRISTOPHER J. ZURN  
Planning Director

LMB:ptk  
http://www.doh.hawaii.gov/ceqa/ceqa.html.sc&cc=ceqa&cc=ceqa.doc

Enclosures: SMM No. 152  
Department of Public Works April 2, 2004 Memo

cc: Long Range Planning - Ms. Susan Gagorik



County of Hawaii

PLANNING DEPARTMENT  
101 Puuahi Street, Suite 3 • Hilo, Hawaii 96720-3043  
(808) 961-8288 • Fax (808) 961-8742

Henry Kim  
Mayor

April 13, 2004

Randall Urasaki, P.E.  
Parsons Brinckerhoff Quade & Douglas, Inc.  
1001 Bishop Street, Suite 3000  
Honolulu, Hawaii 96813

Dear Mr. Urasaki:

Special Management Area Assessment Application No. 04-018 (SMAAA 04-18)  
Special Management Area Minor Permit No. 152 (SMM 152)  
Project: Submarine Fiber-Optic Cable Landing at Kawahae  
Applicant: Sandwichee Isles Communications, Inc.  
Land Owner: Department of Hawaiian Home Lands  
Location: Kawahae Residence Lots-Makai,  
Kawahae I., South Kohala, Hawaii  
TMK: (3) 6-1-004:020

By this letter we are transmitting the referenced SMA Minor Permit No. 152, which is approved, subject to conditions, for the proposed fiber-optic cable landing site and related improvements on the subject property. That portion of the project being within the Akoni Pule Highway right-of-way is exempt from the definition of "development" pursuant to Rule 9-4(10)(b)(iv), Planning Commission Rules of Practice & Procedure.

We understand that the proposed project is part of a state-wide telecommunications project funded by the State of Hawaii Department of Hawaiian Home Lands (DHHL) to provide DHHL homeowners with affordable telephone and advanced telecommunications services.

As the exact location of the shoreline is not necessary to render a determination, your request for a waiver from the requirement to provide a certified shoreline survey as part of the SMAA application is hereby granted.

Upon due consideration of the information provided in your SMAAA application and the accompanying submittals, your request for a determination of "minor structure or minor activity" in the shoreline setback area, pursuant to Rule 11-8, Planning Department Rules



RECEIVED AS FOLLOWS

DRAFT EA COMMENT AND RESPONSE LETTERS

RECEIVED AS FOLLOWS

American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813  
908-531-7084  
Fax: 908-528-2268

Parsons  
Brimkerhoff  
Quade &  
Douglas, Inc.



April 12, 2004

Mr. George P. Young  
Chief, Regulatory Branch  
Department of the Army  
U.S. Army Engineer District, Honolulu  
Fort Shafter, Hawaii 96858-5440

Dear Mr. Young:

Subject: Sandwich Isles Communications, Inc.  
Submarine Fiber-Optic Cable Project  
Conservation District Use Application, OA-3176 Board Permit  
Environmental Assessment

On behalf of Sandwich Isles Communications, Inc., I wish to thank you for taking the time and effort to provide comments on our Draft Environmental Assessment (EA) for the subject project, which were provided in a letter dated February 25, 2004.

Clarification of your regulatory jurisdiction for this project is greatly appreciated. At the appropriate time, we will apply for Department of the Army (DA) authorization for the project pursuant to Section 10 of the Rivers and Harbor Act of 1899. The project does not require dredging or filling "waters of the U.S." Therefore, we do not anticipate needing DA authorizations pursuant to Section 404 of the Clean Water Act.

If you have any questions, please do not hesitate to call me at (808) 568-2260.

Sincerely yours,  
Parsons Brinckerhoff Quade & Douglas, Inc.

*Sam Lemmo*  
Sam Lemmo, P.E.  
Project Manager

cc. Mr. Sam Lemmo, Administrator, State Department of Land and Natural Resources,  
Office of Conservation and Coastal Lands

Over a Century of  
Engineering Excellence

DEPARTMENT OF THE ARMY  
U.S. ARMY ENGINEER DISTRICT, HONOLULU  
FT. SHAFTER, HAWAII 96858-5440

February 25, 2004



REG-110  
ATTENTION D  
Regulatory Branch

Mr. Samuel J. Lemmo  
Office of Conservation and Coastal Lands  
Hawaii Department of Land and Natural Resources  
P.O. Box 621  
Honolulu, Hawaii 96809

Dear Mr. Lemmo:

This letter provides comments for a Department of the Army (DA) permit requirement for the proposed segments of 4 fiber optic cables and 7 cable landfalls in and under waters of the U.S. at 7 locations between the islands of Hawaii, Maui, Molokai, Oahu and Kauai as described in Conservation District Use Application ST-3176, Statewide Submarine Communications Cable.

The proposed crossings and landfalls were reviewed pursuant to Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act. Section 10 of the Rivers and Harbors Act requires that a DA permit be obtained for certain structures, or work in, over, through, or under navigable waters of the United States (U.S.) prior to conducting the work (33 U.S.C. 403). Section 404 of the Clean Water Act requires that a DA permit be obtained for the placement or discharges of dredged and/or fill material into waters of the U.S., including adjacent wetlands, prior to conducting the work (33 U.S.C. 1344).

For regulatory purposes, the Corps of Engineers defines navigable waters of the U.S. as those waters subject to the ebb and flow of the tide shoreward to the mean high water mark, and other waters tributary to those waters identified as navigable by the Honolulu District. Based on our review of the information furnished by the applicant, Sandwich Isles Communications, Inc., DA authorization will be required under Section 10 of the River and Harbor Act of 1899 and may be applicable under Section 404 of the Clean Water Act (depending on the construction practices for in-water horizontal drilling).

The applicant should consult with this office to determine the information needed for a complete DA permit application. Contact Mr. Farley Watanabe at (808) 438-7701 or by fax at (808) 438-4060 for any additional information. Please refer to File No. 200400170 in any written correspondence.

Sincerely,

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

Copy Furnished:  
Mr. John Nakagawa, Office of Planning, Coastal Zone Management Program, P.O. Box 2339 Honolulu, HI 96804  
Mr. Ed Chen, Clean Water Branch, State Department of Health, P.O. Box 3378, Honolulu, HI 96801  
Mr. Randy Urasaki, Parsons, Brinckerhoff Quade & Douglas, Inc., 1001 Bishop St., # 3000, Honolulu, HI 96813

RECEIVED  
LAND DIVISION  
2004 FEB 27 A 10:12



**DEPARTMENT OF BUSINESS,  
ECONOMIC DEVELOPMENT & TOURISM**

No. 1 Capitol District Building, 250 South Hotel Street, 5th Floor, Honolulu, Hawaii 96813  
Mailing Address: P.O. Box 2158, Honolulu, Hawaii 96813-0215  
Web site: www.hawaii.gov/bdet

LINDA LINGLE  
DIRECTOR  
THE COMMISSIONER  
OF LAND AND  
NATURAL RESOURCES  
RAYMOND M. JEFFERSON  
DEPUTY DIRECTOR

Telephone: (808) 548-2153  
FAC: (808) 548-2177

DEPT. OF LAND  
& NATURAL RESOURCES  
STATE OF HAWAII

Ref. No. P-10391

February 25, 2004

2004:0219006

To: Peter T. Young, Chairperson  
Department of Land and Natural Resources

Attention: Samuel J. Lemmo, Office of Conservation and Coastal Lands

From: Theodore E. Liu, Director  
Department of Business, Economic Development, and Tourism

Subject: Conservation District Use Application ST-3176 for a Statewide Submarine  
Telecommunications Cable Network

We have already prepared and submitted for the Board of Land and Natural Resources' consideration, State planning and evaluation guidelines for submarine fiber optic cables. In addition to assisting developers design projects in conformance with State policies and interests, the guidelines should help agencies evaluate submarine fiber optic cable projects to assure that the public trust interests are adequately considered and incorporated into the design of projects. Moreover, there has been adequate consultation with the Office of Planning to assure that Coastal Zone Management requirements will be satisfied.

At this time, therefore, we do not have further comments to offer. Thank you for the opportunity to review and comment on the application.

RECEIVED  
LAND DIVISION  
2004 FEB 27 A 10:13



Parsons  
Brinckerhoff  
Gusado &  
Douglas, Inc.  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813  
808-531-7094  
Fax: 808-528-2168

April 12, 2004

Mr. Theodore E. Liu, Director  
State of Hawaii  
Department of Business, Economic Development and Tourism  
250 South Hotel Street, 5th Floor  
Honolulu, Hawaii 96813

Dear Mr. Liu:

Subject: Sandwich Isles Communications, Inc.  
Submarine Fiber-Optic Cable Project  
Conservation District Use Application, OA-3176 Board Permit  
Environmental Assessment

On behalf of Sandwich Isles Communications, Inc., I wish to thank you for taking the time and effort to provide comments on our Draft Environmental Assessment (EA) for the subject project, which were provided in letter dated February 25, 2004.

Your letter refers to the report prepared by your agency, "State Planning & Evaluation Guidelines for Submarine Fiber Optic Cables" (November 27, 2002), which is under review by the Board of Land and Natural Resources. Without going into a lot of details or in-depth analysis, we believe the project is consistent with the guidelines for the following reasons:

1. The project provides public benefits as it serves Hawaiian Home Lands beneficiaries;
2. The landing sites will be constructed using a method called horizontal directional drilling, which will avoid the need for trenching through sensitive coastal and near-shore environments (see Section 1.4.4 of the Draft EA for additional information);
3. Seaward of the landing site exit point (seaward end of the under-sea-floor conduit), the fiber-optic cable will not be placed on live coral; and
4. The submarine cable alignments between the islands were carefully planned, considering many factors, such as bathymetry, existing cable and pipeline crossings, and natural and man-made hazards (see Section 1.4.1 of the Draft EA for additional information).

RECEIVED AS FOLLOWS

Over a Century of  
Engineering Excellence



Mr. Theodore E. Liu, Director  
April 12, 2004  
Page 2

If you have any questions, please do not hesitate to call me at (808) 566-2260.

Sincerely yours,  
Parsons Brinckerhoff Quade & Douglas, Inc.

*Randall Urasaki*  
Randall Urasaki, P.E.  
Project Manager

cc. Mr. Sam Lemmo, Administrator, State Department of Land and Natural Resources,  
Office of Conservation and Coastal Lands

RECEIVED  
LAND DIVISION

2004 MAR -5 A 8 33



STATE OF HAWAII  
DEPARTMENT OF HAWAIIAN HOMELANDS

FOR OFFICE USE

March 4, 2004

To: Samuel J. Lemmo, Administrator  
Office of Conservation and Coastal Lands  
Department of Land and Natural Resources

From: Micah A. Kane, Chairman  
Hawaiian Homes Commission *Micah A. Kane*

Subject: CDUA ST-3176/ Statewide Submarine Telecommunications  
Cable Network

Thank you for allowing our review of the reports for the proposed project by Sandwich Isles Communications Inc. to install submarine fiber optic telecommunications cables statewide.

The network will provide modern telecommunications infrastructure to service occupied Hawaiian home lands areas. We support the project. The landing site improvements described can be accommodated on the HHL parcels indicated.

If you have any questions, please call Linda Chinn of our Land Management Division at x7-6432.

RECEIVED AS FOLLOWS

MICAH A. KANE  
CHAIRMAN  
HAWAIIAN HOMES COMMISSION  
1521 KONOHIKI DRIVE  
KAILASHA PARK  
EAST WAILUKU, HI 96741



April 12, 2004

Mr. Micah A. Kane, Chairman  
State of Hawaii  
Department of Hawaiian Home Lands  
P.O. Box 1879  
Honolulu, Hawaii 96805

Dear Mr. Kane:

Subject: Sandwich Isles Communications, Inc.  
Submarine Fiber-Optic Cable Project  
Conservation District Use Application, OA-3176 Board Permit  
Environmental Assessment

Thank you for your letter dated March 4, 2004, which provides comments on our Draft Environmental Assessment (EA) for the subject project. On behalf of Sandwich Isles Communications, Inc., I also want to thank you for your continued support on this project.

If you have any questions, please do not hesitate to call me at (808) 568-2280.

Sincerely yours,  
Parsons Brinckerhoff/Quade & Douglas, Inc.

*Randall Urasaki*  
Randall Urasaki, P.E.  
Project Manager

cc. Mr. Sam Lemmo, Administrator, State Department of Land and Natural Resources,  
Office of Conservation and Coastal Lands

Parsons  
Brinckerhoff  
Quade &  
Douglas, Inc.  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813  
808-531-7094  
Fax: 808-528-2388

100% LEAD  
CONTACT US TODAY



STATE OF HAWAII  
DEPARTMENT OF HEALTH  
P.O. Box 2073  
HONOLULU, HAWAII 96811-2073

March 29, 2004

Mr. Samuel J. Lemmo  
Department of Land and Natural Resources  
P.O. Box 621  
Honolulu, Hawaii 96809

Dear Mr. Lemmo:

SUBJECT: Conservation District Use Application ST-3176  
Statewide Telecommunications Cable Network

Thank you for allowing us to review and comment on the subject document. We have the following comments to offer. If you have any questions about these comments please contact Ryan Davenport at 586-4346.

Clean Water Branch Standard Comment

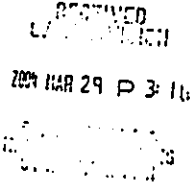
1. The Army Corps of Engineers should be contacted at (808) 438-9238 to identify whether a Federal license or permit (including a Department of Army permit) is required for this project. Pursuant to Section 401(b)(1) of the Federal Water Pollution Act (commonly known as the "Clean Water Act"), a Section 401 Water Quality Certification is required for "[a]ny applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters...."
2. A National Pollutant Discharge Elimination System (NPDES) general permit coverage is required for the following activities:
  - a. Storm water associated with industrial activities, as defined in Title 40, Code of Federal Regulations, Sections 122.26(b)(14)(i) through 122.26(b)(14)(ix) and 122.26(b)(14)(xi).
  - b. Construction activities, including clearing, grading, and excavation, that result in the disturbance of equal to or greater than one (1) acre of total land area. The total land area includes a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under a larger common plan of development or sale. An NPDES permit is required before the commencement of the construction activities.
  - c. Discharges of treated effluent from leaking underground storage tank remedial activities.

Over a Century of  
Engineering Excellence

RECEIVED AS FOLLOWS

CURTIS L. PERDUE, III  
DIRECTOR OF W.A.M.

In Reply, please refer to  
EPO-04-032



Mr. Samuel J. Lemmo  
March 29, 2004  
Page 2

- d. Discharges of once through cooling water less than one (1) million gallons per day.
- e. Discharges of hydrotesting water.
- f. Discharges of construction dewatering effluent.
- g. Discharges of treated effluent from petroleum bulk stations and terminals.
- h. Discharges of treated effluent from well drilling activities.
- i. Discharges of treated effluent from recycled water distribution systems.
- j. Discharges of storm water from a small municipal separate storm sewer system.
- k. Discharges of circulation water from decorative ponds or tanks.

The CWB requires that a Notice of Intent (NOI) to be covered by a NPDES general permit for any of the above activities be submitted at least 30 days before the commencement of the respective activities. The NOI forms may be picked up at our office or downloaded from our website at <http://www.state.hi.us/health/eh/cwb/forms/genl.index.html>.

- 3. The applicant may be required to apply for an individual NPDES permit if there is any type of activity in which wastewater is discharged from the project into State waters and/or coverage of the discharge(s) under the NPDES general permit(s) is not permissible (i.e. NPDES general permits do not cover discharges into Class I or Class AA receiving waters). An application for the NPDES permit is to be submitted at least 180 days before the commencement of the respective activities. The NPDES application forms may also be picked up at our office or downloaded from our website at <http://www.state.hi.us/health/eh/cwb/forms/indiv.index.html>.
- 4. Hawaii Administrative Rules Section 11-55-38, also requires the owner to either submit a copy of the new NOI or NPDES permit application to the State Department of Land and Natural Resources, State Historic Preservation Division (SHPD), or demonstrate to the satisfaction of the DOH that the project, activity, or site covered by the NOI or application has been or is being reviewed by SHPD. Please submit a copy of the request for review by SHPD or SHPD's determination letter for the project.

If you have any questions, please contact the Clean Water Branch at 586-4309.

Sincerely,

*June F. Harrigan-Lum*

JUNE F. HARRIGAN-LUM, MANAGER  
Environmental Planning Office

c: CWB



Parsons  
Brinckerhoff  
Corrado &  
Deuglas, Inc.  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813  
208-531-7094  
Fax: 808-538-2268

April 13, 2004

Ms. June F. Harrigan-Lum, Manager  
State of Hawaii  
Department of Health  
Environmental Planning Office  
P.O. Box 3378  
Honolulu, Hawaii 96801-3378

Dear Ms. Harrigan-Lum:

Subject: Sandwich Isles Communications, Inc.  
Submarine Fiber-Optic Cable Project  
Conservation District Use Application, OA-3176 Board Permit  
Environmental Assessment

On behalf of Sandwich Isles Communications, Inc. (SIC), I wish to thank you for taking the time and effort to provide comments on our Draft Environmental Assessment (EA) for the subject project, which were provided in a letter dated March 29, 2004. I would like to provide the following responses to your comments.

**Comment 1.** Consult with the U.S. Army Corps of Engineers (USACE) regarding Department of the Army (DA) authorization (Section 404) of the project pursuant to the federal Clean Water Act (CWA). If applicable, this would trigger the need for a CWA Section 401 Water Quality Certification.

**Response.** We have consulted with the USACE prior to release of the Draft EA (see Section 12.2 of the Draft EA). In response to this Draft EA, the USACE provided an assessment that the project requires DA authorization pursuant to Section 10 of the Rivers and Harbors Act. We do not anticipate the need to obtain DA authorization pursuant to CWA Section 404. Therefore, Water Quality Certification would not be required.

**Comment 2.** The project might require National Pollutant Discharge Elimination System (NPDES) general permit coverage for various activities.

**Response.** The only NPDES general permit applicable to our project is the "Storm Water Associated with Construction Activity." We anticipate that the construction area at four of the seven landing sites will be less than one acre. The other three landing sites that would have construction areas greater than one acre involve connecting routes between landing sites and SIC's terrestrial networks. At the appropriate time, we will consult with the Department of Health, Clean Water Branch (DOH-CWB) to determine packaging of the Notice of Intent (NOI).

**Comment 3.** An individual NPDES permit is required for "any type of activity in which wastewater is discharged from the project into State waters."

Over a Century of  
Engineering Excellence

RECEIVED AS FOLLOWS



Ma. Jane F. Harrigan-Lum, Manager  
April 13, 2004  
Page 2

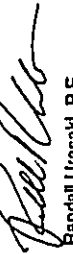
Response. During construction or when operational, the submarine fiber-optic cable network, including the landing sites, does not involve wastewater discharges.

Comment 4. The NOI requires review by the State Historic Preservation Division (SHPD).

Response. It is our understanding that the State Department of Land and Natural Resources, Office of Conservation and Coastal Lands provided a copy of the Draft EA to the SHPD for review pursuant to Section 6E-8 of the Hawaii Revised Statutes. In addition, we have been consulting with the SHPD pursuant to Section 108 of the National Historic Preservation Act, and we have received comments on our archaeological reports. We would have no problem if DOH-CWB requires that our NOI(s) be reviewed by the SHPD.

If you have any questions, please do not hesitate to call me at (808) 566-2260.

Sincerely yours,  
Parsons Brinckerhoff Quade & Douglas, Inc.

  
Randall Uresaki, P.E.  
Project Manager

cc. Mr. Sam Lemmo, Administrator, State Department of Land and Natural Resources,  
Office of Conservation and Coastal Lands

RECEIVED AS FOLLOWS

STATE OF HAWAII  
Department of Land and Natural Resources  
Division of Aquatic Resources

MEMORANDUM

To: William Devick, Administrator  
Through: Richard Sixberry, Aquatic Biologist  
From: Tsey Montgomery, Aquatic Biologist  
Subject: Comments on Conservation District Use Application ST-3176

Comments Requested By: Samuel J. Lemmo, Administrator, Conservation and Coastal Lands

Date of Request: 1/14/04 Date Received: 1/16/04

Summary of Project

Title: 300-Mile Submarine Fiber-Optics Cable Project

Project By: Parsons Brinckerhoff Quade and Douglas, Inc./Sandwich Isles Communications, Inc.

Location: Statewide

Brief Description:

The applicant proposes to develop a fiber optic cable system connecting Hawaiian Home Land areas on Kauai, Oahu, Molokai, Maui, and Hawaii. This system will require connecting the islands with fiber optic cable between 7 sites: Kekaha, Kauai to Makaha, Oahu; Sandy Beach Park, Oahu to Kaunakakai, Molokai; Kaunakakai, Molokai to Lahaina, Maui; Makana, Maui to Kawaha, Hawaii. The cable will be deployed underground out to a depth of 60 to 80 feet. This will be conducted using a Horizontal Directional Drilling method. This will eliminate the need to dredge and bury the cable in the nearshore environment. The cable will exit the substratum at a depth of 60 to 80 feet and then be deployed on the surface of the substratum. The cable will not be anchored and will vary in the amount of cable armor depending on the depth. A double armor cable will be used from the exit point to about 350'. A single armor cable will be deployed from about 350' to 1000'. A lightweight protected cable will be deployed below 1000'.

Comments:

Kekaha, Kauai to Makaha, Oahu

The cable exit point at Kekaha, Kauai and Makaha, Oahu poses no foreseen significant impacts.

Sandy Beach Park, Oahu to Kaunakakai, Molokai

The cable exit point at Sandy Beach Park, Oahu poses no foreseen significant impacts. However, the cable exit point near Kaunakakai presents some concerns. The exit point is surrounded by a continuous ridge of live coral (approximately 87% cover consisting of *Porites compressa* and *Montipora verrucosa*) with a small gap in the coral. The exit point is roughly 100 feet in diameter. The EA does not explain the accuracy of the exit point. There are concerns if the cable misses the exit point and surfaces in the high coral cover. We need more clarification on the accuracy of the method. Also, the cable will be run through a small gap in the coral cover (approximately 25 feet wide) in order to reach deeper water. Again, how much coral will the deployment method have over the cable in a small gap of 25 feet? Could the reef be damaged during deployment? These issues with this site should be cleared before approval.

Kaunakakai, Molokai to Lahaina, Maui

The cable exit point at Lahaina, Maui poses no foreseen significant impacts. However, the EA does not address the details of the cable path between sites. Although, there are no known losses in the other legs of the cable path, there is a known precious coral bed between Kaunakakai and Lahaina. This bed consists of three commercially important species of black coral. This bed also represents a unique deepwater Hawaiian community. It would be advisable to run the cable in such a way to minimize any impact onto this

RECEIVED AS FOLLOWS



Parsons  
Brinckerhoff  
American Samoa, Bora Bora  
1001 Bora Bora Street, Suite 3000  
Honolulu, HI 96813

Hawaiian black coral community. We need more information on the planned path of the cable and the bathymetry along this path before approval is granted.

Makana, Maui to Kawahae, Hawaii

The exit point at Makana, Maui poses no foreseen impacts. However, the exit point at Kawahae, Hawaii has high coral cover with 30 feet of the exit point. Again, there is discussion in the EA about the accuracy of the exit point. This needs to be clarified, and there needs to be reassurances that the exit point will not be misused before approval is given.

Also, the activity at the drill site and the exit point may interrupt fishing activity. Land based fishers may be impacted up to 3 months, while boat based fishers may be impacted much less than 3 months (but no time was stated). This should be acknowledged and considered.

Endangered Species

This section's comments were consulted with Jeff Walters of the Hawaiian Islands Humpback Whale National Marine Sanctuary.

We need a better description of the process of connecting the cable to the exit point (loading); how long it takes, how much, if any, cable will be floated on the surface during the process. A lot of cable suspended at the surface for any length of time could present a collision/entanglement issue for Humpback Whales. The landing sites are in high whale density areas (except maybe, the Kauai site). We need more details on the "construction" activities involved during the landing process. If there is going to be a significant amount of suspended cable (> 100m), then we will need described mitigation measures. This issues need to be addressed before approval is given.

April 13, 2004

Mr. William Devick, Administrator  
State of Hawaii  
Department of Land and Natural Resources  
Division of Aquatic Resources  
P.O. Box 621  
Honolulu, Hawaii 96809

Attention: Mr. Richard Sixberry, Aquatic Biologist

Dear Mr. Devick:

Subject: Sandwich Isles Communications, Inc.  
Submarine Fiber-Optic Cable Project  
Conservation District Use Application, OA-3176 Board Permit  
Environmental Assessment

On behalf of Sandwich Isles Communications, Inc. (SIC), I wish to thank you for taking the time and effort to provide comments on our Draft Environmental Assessment (EA) for the subject project, which were provided in a memorandum we received from Mr. Sam Lammo. We would like to provide the following responses to your comments.

**Comment 1.** Concern that horizontal directional drilling (HDD) at the Oneali'i Homesteads landing site on Mokolai might miss the planned exit point (EP) within the 35-foot diameter sandy area, which is surrounded by five coral beds.

**Response.** A responder provides real-time information on the precise horizontal and vertical location of the drill-head. During drilling the contractor will know the location of the drill head in relation to the ocean bottom at all times. The accuracy of HDD is more than adequate in targeting the 35-foot diameter sandy area. In addition, the drill-head pop-out will be observed by divers.

**Comment 2.** Concern that the submarine cable seaward of the EP at the Oneali'i Homesteads landing site might be placed outside the 25-foot wide sandy channel, on top of five coral reefs.

**Response.** As stated in Section 6.7.4 (Draft EA), Mitigation Measures under Marine and Nearshore Conditions, "since the 25-foot-wide sand corridor is relatively narrow, manual positioning of the cable shall be required to accurately follow the corridor from open ocean to the EP." Manual positioning means that the cable laying will be directed by divers.

**Comment 3.** Concern that three commercial important species of black coral might be in the path of the Kaurakakai, Mokolai to Lahaina, Maui submarine cable alignment. Also noted is that this bed is a "unique deepwater Hawaiian community", and asked that the cable alignment avoid going through this community.

Over a Century of  
Engineering Excellence





Mr. William Devick, Administrator  
April 13, 2004  
Page 2

Response. We do not know the location of the black coral community. During detailed design, we would like to meet with or contact you to obtain information about the location of the community. It will be very easy for us to modify the cable route to avoid the community, if necessary.

Comment 4. Concern that HDD at the Kaewa Place landing site on the Big Island might miss the planned EP.

Response. See our response to your Comment 1.

Comment 5. Concern that cable suspended in the water for an extended period of time during its connection at the EP could cause a humpback to be entangled in the cable.

Response. At those landing sites in the Humpback Whale National Marine Sanctuary and if the operation occurs in the months from December to April, SIC will deploy spotters to make sure no humpback is in the operational area. As stated in Section 11.1.2 of the Draft EA, Endangered Species Act and Other Laws Protecting Biological Resources, "If a whale . . . is spotted . . . in an area where they may interact with . . . deployment of the cable, this operation would . . . be halted until the animal moves away of its own volition." The Terrestrial and Aquatic Biology sections of the landing site chapters of the Draft EA provide similar discussion. Only the amount of cable needed to reach the EP would be spooled from the cable laying vessel. Once the necessary amount of cable is released, it would immediately be taken down to the EP and fastened to a string left in place within the cable conduit. The string would be pulled from the landing site beach manhole, and at the same time, the vessel would release additional cable. We will add the following mitigation measure in Section 11.1.2 of the Final EA: "During the operation to connect the submarine fiber-optic cable to the landing site, care would be taken to avoid excess slack, which could entangle a humpback."

If you have any questions, please do not hesitate to call me at (808) 566-2260.

Sincerely yours,  
Parsons Brinckerhoff-Quade & Douglas, Inc.

*Randall Urasaki*

Randall Urasaki, P.E.  
Project Manager

cc. Mr. Sam Lemmo, Administrator, State Department of Land and Natural Resources,  
Office of Conservation and Coastal Lands

Over a Century of  
Engineering Excellence

MAIL ROOM



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
COMMISSION ON WATER RESOURCE MANAGEMENT  
P.O. BOX 21  
HONOLULU, HAWAII 96811

RECEIVED  
JAN 5 2 04  
STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
COMMISSION ON WATER RESOURCE MANAGEMENT  
PETER T. YOUNG  
MURIEL J. CARO  
ANTHONY BELLAIR  
STEPHEN L. FURUKAWA  
STEPHANIE A. WHALEN  
EMMETT W. LAU

December 30, 2003

Mr. Randall Urasaki, Project Manager  
Parsons Brinckerhoff-Quade & Douglas, Inc.  
1001 Bishop Street, #3000  
Honolulu, HI 96813

Dear Mr. Urasaki:

Sandwich Isles Communications Submarine Fiber-Optic Cable Project

Thank you for transmitting a copy of the two-volume Draft Environmental Assessment for the captioned project.

We did not find reference to the fact that we met with representatives of the project on two occasions, and that we pointed out that there is a spring in the immediate vicinity of the cable landing at Alii Fishpond, Moloakai. This spring is ostensibly a significant reason for the creation of this fishpond, and could be a significant factor in its proper function. The Commission is responsible for assuring that groundwater resources be protected against impairment in the interests of traditional and customary gathering rights of native Hawaiians.

During our discussions, we were assured that this issue would be carefully considered, and reached the conclusion that the project was unlikely to have an impact on this spring. We recommended that local sources be consulted to verify the spring location and to design the landing accordingly. Local sources appear to have been consulted, although the subject does not appear in the Draft EA.

We believe that a permit need not be required, but we remain concerned that the issue seems to have been ignored.

If you have any questions, please call Charley Ice of the Commission staff at 587-0251.

Sincerely,

*Peter T. Young*  
Mr. Peter T. Young  
Chairperson

RECEIVED AS FOLLOWS

RECEIVED AS FOLLOWS



April 13, 2004

Mr. Peter Young, Chairperson  
State of Hawaii  
Department of Land and Natural Resources  
Commission on Water Resource Management  
P.O. Box 621  
Honolulu, Hawaii 96809

Dear Mr. Young:

Subject: Sandwich Isles Communications, Inc. (SIC)  
Submarine Fiber-Optic Cable Project  
Conservation District Use Application, OA-3176 Board Permit  
Environmental Assessment

On behalf of Sandwich Isles Communications, Inc., I wish to thank you for taking the time and effort to provide comments on our Draft Environmental Assessment (EA) for the subject project, which were provided in a letter dated December 30, 2003. We would like to provide the following responses to your comments.

**CWRM Comment 1.** The Draft EA did not include information provided during meetings with Commission on Water Resource Management (CWRM) staff that there is a spring in the immediate vicinity of the Onea'i'i Homesteads landing site, which is a significant factor in the proper function of the fishpond.

**Response.** The following statement was provided in Section 6.6, Water Resources, of the Draft EA:

The weak caprock along the southern Mokolai coast has caused the formation of numerous springs that feed fresh groundwater into the sea. The springs allowed pre-contact native Hawaiians to develop numerous fishponds along the south shoreline, such as Aii'i Fishpond, which is located next to the project site.

In the Final EA, will add the following to the above statement:

In a meeting held on March 17, 2003, staff from the Commission on Water Resource Management stated that there is at least one spring in the vicinity of the Onea'i'i Homesteads Landing Site.

**CWRM Comment 2.** CWRM is responsible for protecting the spring because impacts to the fishpond could impair traditional and customary gathering rights of native Hawaiians.

**Response.** Members of the Mokolai community, which included native Hawaiians, were consulted for the selection of the landing site for Mokolai. Originally, we were not aware of this

Over a Century of  
Engineering Excellence



Mr. Peter Young, Chairperson  
April 13, 2004  
Page 2

Onea'i'i Homesteads site, and they were the ones who suggested it. They had no objections to using the site provided that we avoid aligning the fiber-optic cable line through the Aii'i Fishpond wall. We will comply with this request.

**CWRM Comment 3.** Recommend that the design of the landing site account for the spring location.

**Response.** There is a gap between the parcel's western boundary and the western wall of Aii'i Fishpond. To avoid historical and cultural impacts (see above), our proposed fiber-optic cable alignment will be within this gap. The location of the fiber-optic cable should not impact the spring that feeds the Aii'i Fishpond.

If you have any questions, please do not hesitate to call me at (808) 566-2260.

Sincerely yours,  
Parsons Brinckerhoff Ouade & Douglas, Inc.

Randall Urasaki, P.E.  
Project Manager

cc: Mr. Sam Lemmo, Administrator, State Department of Land and Natural Resources,  
Office of Conservation and Coastal Lands

Over a Century of  
Engineering Excellence

RECEIVED AS FOLLOWS

Peter T. Young  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813  
808-531-7054  
Fax: 808-578-2268

PTOLEY YOUNG  
COMPARISON  
BOARD OF LAND AND NATURAL RESOURCES  
COMMISSION ON THE STATE OF HAWAII

Parsons  
Brinckerhoff  
Quade &  
Douglas, Inc.

DATE DIVISION  
ENVIRONMENTAL PLANNING  
DESIGN DIVISION

April 13, 2004

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

Mr. Peter T. Young  
State Historic Preservation Officer  
State of Hawaii  
Department of Land and Natural Resources  
Historic Preservation Division  
601 Kamohakua Boulevard, Room 555  
Kapolei, Hawaii 96707

Mr. Peter T. Young  
Parsons Brinckerhoff Quade & Douglas, Inc.  
1801 Bishop Street  
Honolulu, HI 96813

Attention: Ms. Holly McElDowney, Administrator  
Dear Mr. Young:

Subject: Sandwich Isles Communications, Inc.  
Submarine Fiber-Optic Cable Project  
Conservation District Use Application, OA-3178 Board Permit  
Environmental Assessment

On behalf of Sandwich Isles Communications, Inc. (SIC), I wish to thank you for taking the time and effort to provide comments on our Draft Environmental Assessment (EA) for the subject project, which were provided on March 4, 2004. Although SHPD's March 4, 2004 letter in response to our December 4, 2003 letter requesting that the Historic Preservation Division (SHPD) review our seven archaeological reports of the proposed landing sites, this letter was copied to Mr. Sam Lemmo, the Administrator of the Office of Conservation and Coastal Lands, who has considered this letter as official Draft EA comments.

The report was prepared to comply with Section 106 of the National Historic Preservation Act (NHPA) and Chapter 6E-8 for the Submarine Fiber-Optic Cable Project. We believe that the archaeological inventory survey of the roughly 0.8-acre project area in Kawaihae was adequate. Four historic sites were found in the survey. The sites include two concrete walls (Sites 23857 and 23858), a concrete building foundation (Site 23859), and the remnants of a concrete and mortared stone pier (Site 23860), all of which appear to date to the 1930s. The sites have been adequately documented.

The March 4, 2004 letter indicates that SHPD concurs with the findings of the archaeological report prepared for the Kaewa Place landing site in Kawaihae, Hawaii.

We agree with the proposed site significance evaluations in the report. All four sites are evaluated as significant under Criterion "d" because they have yielded information important for understanding historic land uses in the local area. We also agree with the recommendation for no further work at all four sites. The sites have been adequately documented and hold no significant research potential.

We thank you for your comments.  
If you have any questions, please do not hesitate to call me at (808) 568-2260.

The report fulfills the requirements for inventory surveys set forth in our administrative rules and thus meets with our approval. We would appreciate receiving a second copy of this report for our Kona office library.

Sincerely yours,  
Parsons Brinckerhoff Quade & Douglas, Inc.  
*Peter T. Young*  
Peter T. Young  
State Historic Preservation Officer

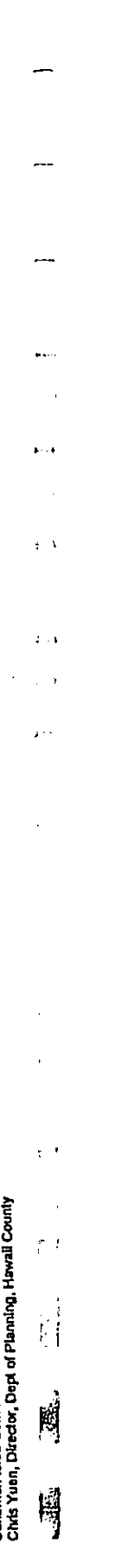
Sincerely,  
*Holly McElDowney*  
Holly McElDowney  
State Historic Preservation Officer

cc: Mr. Sam Lemmo, Administrator, State Department of Land and Natural Resources,  
Office of Conservation and Coastal Lands

cc: Sam Lemmo, Office of Conservation and Coastal Lands  
Alan Haum, Haum & Associates  
Sandwich Isles Communication, Inc.  
Chris Yuen, Director, Dept of Planning, Hawaii County

Over a Century of  
Engineering Excellence

2004 MAR -9 A 8:43  
RECEIVED  
LAND DIVISION



RECEIVED AS FOLLOWS

Samuel J. Lemmo, Administrator  
Page 2

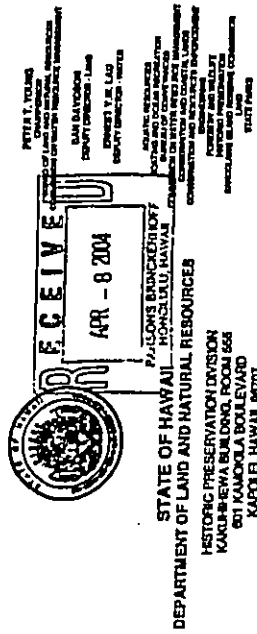
O'ahu Island Burial Council Comments

The OIBC Chairperson, Mr. A. Van Horn Diamond, reviewed the subject DEA and recommended further consultation with knowledgeable persons who have family connections in the Hawai'i Kai area, in the general vicinity of the Sandy Beach landing site. He also had suggestions regarding the issue of cultural monitors for portions of the undertaking on O'ahu Island. Finally, he suggested that the Burial Sites Program staff be consulted regarding their list of recognized descendants for burials identified along the route of the proposed undertaking of O'ahu. Mr. Diamond has also conveyed these comments directly to the applicant's consultant, Ho'akaa.

Should you have any questions about archaeology, please contact Sara Collins at 892-8028. Should you have any questions about burial matters, please contact Kai Markell, Burial Sites Program, at 667-0008.

SC/jen

c Ms. Dawn Chang, Ho'akaa, Pa'uahi Tower, 27<sup>th</sup> Floor, 1001 Bishop Street, Honolulu, HI 96813  
Mr. A. Van Horn Diamond, Chair, O'ahu Island Burial Council  
Mr. Kai Markell, Burial Sites Program  
-Waikanae Outreach, Parsons Brinckerhoff & Douglass, 1001 Bishop St., Ste 3000, HI 96813



LOG NO: 2004.0821  
DOC NO: 0403SC05

April 5, 2004

MEMORANDUM

TO: Samuel J. Lemmo, Administrator  
Office of Conservation and Coastal Lands

FROM: P. Holly McElowney, Administrator and  
Deputy State Historic Preservation Officer  
State Historic Preservation Division

SUBJECT: (File No. ST-3176) National Historic Preservation Act - Section 108  
Compliance - Conservation District Use Application (CDUA) for  
Statewide Submarine Fiber Optic Telecommunications  
Islands of Kauai, O'ahu, Molokai, Maui and Hawaii

We received the subject CDUA application on February 19, 2004 and provide the following comments. Our review is late and we apologize for any inconvenience this may cause you.

State Historic Preservation Division Comments

The draft Environmental Assessment (DEA) prepared for the subject permit application accurately represents the nature and extent of historic preservation compliance. We have reviewed all of the archaeological reports prepared that document the findings of investigations at all of the proposed landing sites: Kakaia, Kauai; Kii Drive, Makaha, O'ahu; Sandy Beach, O'ahu; Oneali; Homestead, Molokai; Waikua, Maui; Po'olenalea, Maui; Maut, Kauhale, Hawaii. The applicant, on behalf of the responsible Federal agency (the US Department of Agriculture), has determined that the proposed undertakings at all landing sites except Po'olenalea State Park will have "no adverse effect" on significant sites, as indicated in Table 11.1-1. The findings made during the archaeological survey at Po'olenalea State Park indicate that there will be an "adverse effect" on significant historic sites. It is anticipated that any "adverse effect" on significant historic sites at Po'olenalea will be mitigated through amendment of the existing MOA for Sandwich Isles Communications' undertakings on the island of Maui. We concur with the findings and recommendations made.

In addition to consulting with the State Historic Preservation Division, and providing reports for review and comment, the applicants have also consulted extensively with the Island Burial Councils regarding the undertakings proposed for each island. At its regular meeting of March 10, 2004, the O'ahu Island Burial Council (OIBC) requested that its comments be included in this letter.



Parsons  
Brinckerhoff  
Quade &  
Douglas, Inc.  
American Samoa Beach Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813  
808-531-7094  
Fax: 808-528-2369



Ms. P. Holly McEldowney  
April 13, 2004  
Page 2

April 13, 2004

Ms. P. Holly McEldowney, Administrator  
Deputy State Historic Preservation Officer  
State of Hawaii  
Department of Land and Natural Resources  
Historic Preservation Division  
601 Kamohala Boulevard, Room 555  
Kapolei, Hawaii 96707

Dear Ms. McEldowney:

Subject: Sandwich Isles Communications, Inc.  
Submarine Fiber-Optic Cable Project  
Conservation District Use Application, OA-3178 Board Permit  
Environmental Assessment

On behalf of Sandwich Isles Communications, Inc., I wish to thank you for taking the time and effort to provide comments on our Draft Environmental Assessment (EA) for the subject project, which were provided in a letter dated April 5, 2004. I would like to provide the following responses to your comments.

**Comment 1.** Your agency has completed review of the archaeological reports and has noted that the Draft EA "accurately represents the nature and extent of historic preservation compliance." Your agency also agrees that an "adverse effect" determination would be appropriate for the Po'olenalena Park landing site, and that the existing Memorandum of Agreement (MOA) for undertakings on the Island of Maui should be amended.

**Response.** We have received comments on the individual archaeological reports prepared for each landing site from the Historic Preservation Division (SHPD). Although some of the reports require minor revisions, SHPD did not disagree with any of the findings, or recommendations. We anticipate that the U.S. Department of Agriculture, Rural Utilities Service will soon submit an effect determination letter to your office with a request for concurrence by the State Historic Preservation Officer. Since we anticipate an "adverse effect" at the Po'olenalena Park landing site, we are consulting with the Maui archaeologist and others on the language of the amendment to the existing MOA.

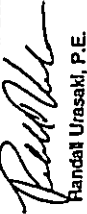
**Comment 2.** Included are forwarded comments from the O'ahu Island Burial Council (OIBC), which recommended:

- Additional consultation with persons knowledgeable or who have family connections in the vicinity of Sandy Beach;
- Cultural monitors be used during construction;
- Burial Sites Program staff be consulted to identify descendants of burials along the landing site and terrestrial routes of the fiber-optic cables.

88500359. Our subconsultant who conducted the cultural impact assessment for the Sandy Beach landing site tried several times to contact an extensive list of individuals for interviews, but was unsuccessful. We will work with the Oahu Island Burial Council to identify persons knowledgeable or who have family connections in the vicinity of Sandy Beach for additional consultation. According to our inventory survey for the site, which was accepted by the SHPD, we do not expect to uncover archaeological resources or burial sites during construction. Therefore, it would appear that cultural monitoring, or additional consultation with Burial Sites Program staff would not be necessary.

If you have any questions, please do not hesitate to call me at (808) 566-2260.

Sincerely yours,  
Parsons Brinckerhoff Quade & Douglas, Inc.

  
Randall Urasaki, P.E.  
Project Manager

cc. Mr. Sam Lamm, Administrator, State Department of Land and Natural Resources,  
Office of Conservation and Coastal Lands

RECEIVED AS FOLLOWS

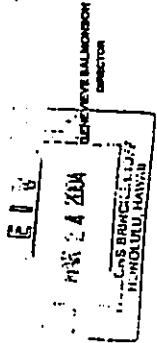
RECEIVED AS FOLLOWS

LINDA LEWALE  
GOVERNOR OF HAWAII



STATE OF HAWAII  
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

235 SOUTH BERTHOUD STREET  
HONOLULU, HAWAII 96813  
TELEPHONE: (808) 586-4185  
FACSIMILE: (808) 586-4186  
E-mail: [oeq@hawaii.gov](mailto:oeq@hawaii.gov)



Persons  
Interested  
Should  
Contact  
Debbie, Inc.

American Savings Bank Tower  
101 Bishop Street, Suite 3000  
Honolulu, Hawaii 96813  
808-531-7029  
Fax: 808-528-2268

April 13, 2004

Ms. Genevieve Salmonson, Director  
State of Hawaii  
Office of Environmental Quality Control  
235 South Beretania Street, Suite 702  
Honolulu, Hawaii 96813

Dear Ms. Salmonson:

Subject: Sandwich Isles Communications, Inc. (SIC)  
Submarine Fiber-Optic Cable Project  
Conservation District Use Application, OA-3176 Board Permit  
Environmental Assessment

On behalf of Sandwich Isles Communications, Inc., I wish to thank you for taking the time and effort to provide comments on our Draft Environmental Assessment (EA) for the subject project, which were provided in a letter dated March 23, 2004. We would like provide the following responses to your comments.

Comment 1. Consider sharing or co-locating (SIC) cables with existing submarine fiber-optic systems.

Response. In the past, cable installation technology (i.e., trenching) limited the locations of cable landing sites. For instance, many cable landings are "co-located" along the Waianae Coast because it offers favorable near-shore conditions in comparison to other coastal locations on Oahu. We plan to use horizontal directional drilling (HDD) to install the cable landings, which provide much more flexibility in finding appropriate cable landing sites because of its relatively benign impact to the environment. Where feasible possible, we have co-located our cable landings near existing submarine fiber-optic systems. Our Kila Drive landing site is adjacent to a number of other cable landing sites and our Sandy Beach Park landing site is near an existing cable landing site.

Comment 2. Describe how the cable(s) will withstand the impact of sea floor landslides.

Response. As described in Section 1.4.1.1 of the Draft EA, the proposed ocean routes were carefully planned based on a number of factors, including bathymetry. This section stated that the bathymetric data were used to route the cable around submarine hazards and steep slopes. When steep slopes were unavoidable, the cable path was laid perpendicular to the slope to minimize potential damage from slope failure and turbidity currents. The ocean routes were carefully planned to avoid potential sea floor landslide areas, as best possible.

Comment 3. Describe plans to avoid unexploded ordnance in coastal waters.

Response. As described in Section 1.4.1.1 of the Draft EA, the proposed ocean routes were carefully planned based on a number of factors, including bathymetry. This section stated that the bathymetric data were used to route the cable around submarine hazards and steep slopes. When steep slopes were unavoidable, the cable path was laid perpendicular to the slope to minimize potential damage from slope failure and turbidity currents. The ocean routes were carefully planned to avoid potential sea floor landslide areas, as best possible.

March 23, 2004

Mr. Peter Young, Chair  
Department of Land and Natural Resources  
P.O. Box 621  
Honolulu, Hawaii 96809

Dear Mr. Young:

Subject: Draft Environmental Assessment for the Sandwich Isles Submarine Fiber-Optic Cable Project

Thank you for the opportunity to review the subject document. We have the following comments.

1. Please consider sharing or co-locating cables with existing submarine fiber-optic systems.
2. Please describe how the cable will withstand the impact of sea floor landslides.
3. Please describe the plans to avoid unexploded ordnance in coastal waters.

Should you have any questions, please call Jeyan Thiruganaram at 586-4185.

Sincerely,

*Genevieve Salmonson*  
Genevieve Salmonson  
Director

c: Sandwich Isles Communications  
PBQD

Over a Century of  
Engineering Excellence




Ms. Genevieve Salmonson, Director  
April 13, 2004  
Page 2

Response. As described above, the proposed ocean routes were based on a number of factors, one of which is military restrictions. We are not aware of any issue regarding unexploded ordnance on coastal waters near our proposed landing sites or along the submarine cable alignment. The proposed submarine cable alignment was submitted to the U.S. Department of the Navy for review.

If you have any questions, please do not hesitate to call me at (808) 566-2260.

Sincerely yours,  
Parsons Brinckerhoff Quade & Douglas, Inc.

  
Randall Urasaki, P.E.  
Project Manager

cc. Mr. Sam Lemmo, Administrator, State Department of Land and Natural Resources,  
Office of Conservation and Coastal Lands

BRYAN J. BAPTISTE  
MAYOR

GARY K. HEU  
ADMINISTRATIVE ASSISTANT



IAN K. COSTA  
DIRECTOR OF PLANNING

RECEIVED  
LAND DIVISION GARY L. HENNIGH  
DEPUTY DIRECTOR OF PLANNING

70N MAR 16 A 11: 11

COUNTY OF KAUAI  
PLANNING DEPARTMENT  
Kapolei Building  
4444 Rice Street, Suite A473  
Lihou'e, Hawaii 96766-1326

TELEPHONE: 808.311.6477  
FAX: 808.311.6439

March 11, 2004

Samuel J. Lemmo  
Department of Land and Natural Resources  
Office of Conservation and Coastal Lands  
P.O. Box 621  
Honolulu, Hawaii 96809

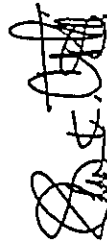
SUBJECT: File No.: CDUA ST-3176B  
Submarine Telecommunications Cable

Thank you for allowing us this opportunity to comment.

The project on Kauai is within the Special Management Area (SMA). We are not certain at this time about the type of SMA permit that will be required. However we will inform your Department about our determination on the SMA permit since we are aware that the SMA permit must precede the CDUA permit. There may be other County permits that will be required such as Shoreline Setback Variances and Zoning Permits.

We will be in discussions with the applicant to obtain more information about the project on Kauai, and will be informing your Department of our determination on permitting.

Please feel free to contact Keith Nitta of my staff at 241-6677 if you have any questions on this matter.

  
IAN K. COSTA  
Planning Director

RECEIVED AS FOLLOWS

RECEIVED AS FOLLOWS



April 12, 2004

Mr. Ian K. Costa, Planning Director  
County of Kauai  
Planning Department  
Kapule Building  
4444 Rice Street, Suite A473  
Lihue, Hawaii 96766-1326

Dear Mr. Costa

Subject: Sandwich Isles Communications, Inc.  
Submarine Fiber-Optic Cable Project  
Conservation District Use Application, OA-3176 Board Permit  
Environmental Assessment

On behalf of Sandwich Isles Communications, Inc., I wish to thank you for taking the time and effort to provide comments on our Draft Environmental Assessment (EA) for the subject project, which were provided in a letter dated March 11, 2004.

Your letter indicates that a special management area (SMA) use permit and shoreline setback variance (SSV) might be required for the 'Akaloa Road landing site in Kekeha. We are proceeding on the assumption that SMA use permits and SSVs would be required for the landing sites, unless the County Planning Department informs us otherwise. We plan to submit applications to you shortly for the Kauai site. For your information, SMA approval of the 'Akaloa Road landing site is not linked to our conservation district use application process because no conservation land is involved landside of the shoreline.

If you have any questions, please do not hesitate to call me at (808) 568-2260.

Sincerely yours,  
Parsons-Binckley Quade & Douglas, Inc.

*Randall Urasaki*  
Randall Urasaki, P.E.  
Project Manager

cc. Mr. Sam Lemmo, Administrator, State Department of Land and Natural Resources,  
Office of Conservation and Coastal Lands

Parsons  
Binckley  
Quade &  
Douglas, Inc.  
American Savings Bank Tower  
1401 Bishop Street, Suite 2000  
Honolulu, HI 96813  
808-531-7100  
Fax: 808-528-2268

BRYAN J. BAPTISTE  
MAYOR

GARY K. HEU  
ADMINISTRATIVE ASSISTANT



AN EQUAL OPPORTUNITY EMPLOYER  
COUNTY OF KAUAI  
DEPARTMENT OF PUBLIC WORKS  
4444 RICE STREET  
1401 BISHOP AVENUE, SUITE 275  
LIHUE, KAUAI, HAWAII 96766-1340

March 8, 2004

Mr. Samuel J. Lemmo, Administrator  
Office of Conservation and Coastal Lands  
Department of Land and Natural Resources  
P.O. Box 621  
Honolulu, Hawaii 96809

Dear Mr. Lemmo:

Thank you for giving us the opportunity to review and comment on subject application. We have no comments to offer.

Please contact Cesar Portugal at (808) 241-6498 if you have any questions.

Very truly yours,

*Ladye H. Martin*  
LADYE H. MARTIN  
Deputy County Engineer

cp

COUNTY ENGINEER  
TELEPHONE 241-6270

LADYE H. MARTIN  
DEPUTY COUNTY ENGINEER  
TELEPHONE 241-6000

RECEIVED  
LAND DIVISION

2004 MAR 17 A 10:14

MAIL ROOM

SUBJECT: CONSERVATION DISTRICT USE APPLICATION  
ST-3176, FOR A STATEWIDE SUBMARINE  
TELECOMMUNICATIONS CABLE





Parsons  
Brinckerhoff  
Quade & Douglas, Inc.  
American Savings Bank Tower  
1001 Bishop Street, Suite 2000  
Honolulu, HI 96813  
808-537-7004  
Fax: 808-528-2368

April 12, 2004

Mr. Lacye H. Martin  
Deputy County Engineer  
County of Kauai  
Department of Public Works  
4444 Rice Street  
Moikeha Building, Suite 275  
Lihue, Hawaii 96766-1340

Dear Mr. Martin:

Subject: Sandwich Isles Communications, Inc.  
Submarine Fiber-Optic Cable Project  
Conservation District Use Application, OA-3178 Board Permit  
Environmental Assessment

Thank you for your letter dated March 8, 2004 regarding our Draft Environmental Assessment (EA) for the subject project.

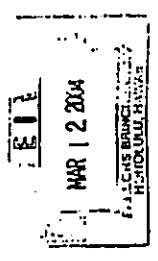
If you have any questions, please do not hesitate to call me at (808) 566-2260.

Sincerely yours,  
Parsons Brinckerhoff Quade & Douglas, Inc.

*Randall Urasaki*  
Randall Urasaki, P.E.  
Project Manager

cc. Mr. Sam Lemmo, Administrator, State Department of Land and Natural Resources,  
Office of Conservation and Coastal Lands

COUNTY OF KAUAI  
PLANNING DEPARTMENT  
4444 RICE STREET, SUITE A473  
LIHUE, KAUAI, HAWAII 96766-1326



MEMORANDUM

DATE: March 11, 2004  
TO: Parsons Brinckerhoff Quade & Douglas, Inc. Attn: Randall Urasaki  
FROM: Kauai Historic Preservation Review Commission  
SUBJECT: Draft EA For Sandwich Isles Communications, Inc.

This is to inform you that the Kauai Historic Preservation Review Commission (KHPRC) met on March 4, 2004 to discuss your request for comments regarding the draft environmental assessment for the above project. It is the KHPRC's understanding that the DEA is necessary to meet the requirements of Chapter 343, HRS.

In light of this information, the KHPRC recommended the following:

- That the applicant consult with the State Historic Preservation Division (and Burial Council), the Department of Hawaii Home Lands and the Office of Hawaiian Affairs;
- That a community input program (eg. Flyers, notices, meeting with community association, kupuna, etc.) be initiated by the applicant to obtain information on cultural practices and/or historic resources in the project area;
- That opportunities for further consultation with the KHPRC occur as this project progresses;

Please feel free to contact us should you have any questions regarding this matter.

Mahalo.

cc: State Historic Preservation Division

RECEIVED AS FOLLOWS



Parsons  
Brinckerhoff  
Quade &  
Douglas, Inc.  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813  
808-531-7200  
Fax: 808-528-2368



Kauai Historic Preservation Review Commission  
April 13, 2004  
Page 2

April 13, 2004

Kauai Historic Preservation Review Commission  
4144 Rice Street, Suite A-473  
Lihue, Hawaii 96766-1326

Attention: Mr. Rick Tsuchiya

Dear Commission:

Subject: Sandwich Isles Communications, Inc. (SIC)  
Submarine Fiber-Optic Cable Project  
Conservation District Use Application, OA-3176 Board Permit  
Environmental Assessment

On behalf of Sandwich Isles Communications, Inc., I wish to thank you for taking the time and effort to provide comments on our Draft Environmental Assessment (EA) for the subject project, which were provided in a letter dated March 11, 2004. I would like to provide the following responses to your comments.

**Comment 1.** Consult with the State Historic Preservation Division (SHPD), the State Department of Hawaiian Home Lands, and the Office of Hawaiian Affairs.

**Response.** We have consulted with these agencies. See Chapter 12 of the Draft EA for further information.

**Comment 2.** Initiate a community program to obtain information on cultural practices and historic resources in the 'Akaioa Road landing site area, which is in Kekaha.


**Response.** We did initiate a community program to obtain input to help us prepare a cultural impact report and archaeological inventory survey report. Please see Volume Two, Appendix 3 of the Draft EA. For your information our inventory survey was recently accepted by the SHPD.

**Comment 3.** Continue consultation with the Kauai Historic Preservation Review Commission as the project progresses.

**Response.** We will continue to consult with the Kauai Historic Preservation Review Commission as the project progresses.

If you have any questions, please do not hesitate to call me at (808) 566-2260.

Sincerely yours,  
Parsons Brinckerhoff Quade & Douglas, Inc.

  
Randall Urasaki, P.E.  
Project Manager

cc. Mr. Sam Lammo, Administrator, State Department of Land and Natural Resources,  
Office of Conservation and Coastal Lands

RECEIVED AS FOLLOWS

DEPARTMENT OF PLANNING AND PERMITTING  
CITY AND COUNTY OF HONOLULU

430 SOUTH KING STREET - HONOLULU, HAWAII 96813  
TELEPHONE (808) 523-4114 - FAX (808) 521-6153 - INTERNET WWW.DPP.HONOLULU.HI.GOV



ERIC G. CRISPIN, AIA  
DIRECTOR

ERIC G. CRISPIN, AIA  
DIRECTOR

BARBARA FINE STANTON  
DEPUTY DIRECTOR

Kathy Sotomayor  
Acting Deputy Director

2004/ELOG-327 (DT)

March 3, 2004

Mr. Samuel J. Lemmo, Administrator  
Department of Land and Natural Resources  
Office of Conservation and Coastal Lands  
P.O. Box 621  
Honolulu, Hawaii 96809

Dear Mr. Lemmo:

Draft Environmental Assessment (EA)  
Statewide Submarins Telecommunications Cable

This is in response to your letter dated February 12, 2004,  
requesting comments on the Draft EA for new telecommunications  
cables on the five major Hawaiian islands. We have the  
following comments regarding the cable sites on Oahu:

1. Makaha Beach Park and Sandy Beach Park are within the  
Special Management Area (SMA). Thus, these portions of the  
project require a Special Management Area Use Permit (SMP)  
and also a Shoreline Setback Variance (SV) for each site.
2. Include the types of Best Management Practices to be  
implemented during installation of the cable at both of the  
above sites.
3. Page 4-13 of the EA (Makaha site) mentions that the  
construction area will not be located within the wetland.  
What is the distance of the wetland to the project site?
4. How much (in cubic yards) clearing, grubbing, and grading  
will be done prior to installing the cable lines for both  
sites?

RECEIVED AS FOLLOWS

Mr. Samuel J. Lemmo, Administrator  
Page 2  
March 3, 2004

5. Currently, it is difficult to determine the approximate  
location of the cable lines for both sites. The site plans  
should include structures, trees, parking, and/or other  
landmarks in the vicinity of the proposed lines.

6. The applicant must address SMA and SV concerns. The  
application and instructions are available on our City's  
website at [www.honolulu.gov](http://www.honolulu.gov). The content guide for  
preparing an EA for both permits can be viewed by first  
clicking on "Download Permits," then "Zoning and Land Use  
Permits."

Please contact Ms. Dana Teramoto at 523-4648, should you have  
any questions.

Thank you for the opportunity to review the DEA.

Sincerely yours,

ERIC G. CRISPIN, AIA  
Director of Planning  
and Permitting

EGC:cb

G:\LandUse\posse\working\directory\luna\describ.c.doc



Parsons  
Brinckerhoff  
Quade &  
Douglas, Inc.  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813  
808-531-7050  
Fax: 808-529-2368

April 13, 2004

Mr. Eric G. Crispin, AIA, Director  
City and County of Honolulu  
Department of Planning and Permitting  
650 South King Street  
Honolulu, Hawaii 96813

Dear Mr. Crispin:

Subject: Sandwich Isles Communications, Inc.  
Submarine Fiber-Optic Cable Project  
Conservation District Use Application, OA-3176 Board Permit  
Environmental Assessment

On behalf of Sandwich Isles Communications, Inc., I wish to thank you for taking the time and effort to provide comments on our Draft Environmental Assessment (EA) for the subject project, which were provided in a letter dated March 3, 2004. I would like to provide the following responses to your comments.

**Comment 1.** The two proposed landing sites on O'ahu require special management area (SMA) use permits and shoreline setback variances (SSVs).

**Response.** We plan to soon submit applications for SMA use permits and SSVs for both sites.

**Comment 2.** Best management practices (BMP) be implemented during construction.

**Response.** Both O'ahu landing sites will require coverage under the National Pollutant Discharge Elimination System (NPDES) general permit for storm water discharges during construction. The Notice of Intent to obtain NPDES coverage requires that we prepare site-specific BMP plans subject to approval by the State Department of Health.

**Comment 3.** The distance between construction area and the wetland located on the affected parcel.

**Response.** The construction area on the parcel would be limited to the area needed to stage horizontal directional drilling. We estimate the distance between this area and the wetland to be no closer than 20 feet.

**Comment 4.** The amount of clearing, grubbing and grading would be required to construct a landing site.

**Response.** An area approximately one acre is required for the construction. Since the Kili Drive site is overgrown with vegetation, this site will require vegetative clearing to allow for the equipment and vehicles needed for horizontal directional drilling (HDD). The Sandy Beach Park

Over a Century of  
Engineering Excellence



Mr. Eric G. Crispin, Director  
April 13, 2004  
Page 2

site would be in an open grassy area. HDD operations typically involve excavation of an entrance pit no larger than 10 feet by 20 feet, and 5 feet deep. The Sandy Beach Park site also requires a trench of about three feet deep and one-foot wide from the drill site to Kalaniana'ole Highway and along the highway to Kealahou Street to install fiber-optic cable conduits. Both sites also require excavation within the road right-of-way to install beach manholes. All excavated areas will be backfilled as soon as possible, and the area restored to its pre-construction condition.

**Comment 5.** The site plans are not detailed enough to show the exact locations of the cable lines, and it should include other structures, trees, and other landmarks.

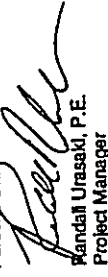
**Response.** We carefully selected all of our proposed landing sites so that no structure or other important landmark or resource is affected. For example we will avoid any situation where the cable conduit is underneath an existing structure. Detailed engineering plans will be developed, and will be subject to review by the appropriate agencies.

**Comment 6.** Address SMA and SSV issues or concerns.

**Response.** We believe that the proposed project is consistent with the objectives and purpose of the SMA and shoreline setback. As stated in Section 11.3.1 of the Draft EA, the "landing sites would not adversely affect shoreline access, beach processes (e.g., sand replenishment), or coastal resources."

If you have any questions, please do not hesitate to call me at (808) 568-2260.

Sincerely yours,  
Parsons-Brinckerhoff Quade & Douglas, Inc.

  
Randall Urasaki, P.E.  
Project Manager

cc. Mr. Sam Lemmo, Administrator, State Department of Land and Natural Resources,  
Office of Conservation and Coastal Lands

Over a Century of  
Engineering Excellence

RECEIVED AS FOLLOWS

DEPARTMENT OF PARKS AND RECREATION  
CITY AND COUNTY OF HONOLULU  
RECEIVED  
150 SOUTH KING STREET, 15TH FLOOR - HONOLULU, HAWAII 96813  
LAND DIVISION

JEFFREY HARRIS  
MAIL ROOM



2004 MAR 11 A 9 45



February 27, 2004

WILLIAM D. BALFOUR, JR.  
DIRECTOR  
EDWARD J. BRINKERHOFF  
SENIOR DIRECTOR

Mr. Samuel J. Lemmo, Administrator  
State of Hawaii  
Department of Land and Natural Resources  
Office of Conservation and Coastal Lands  
Post Office Box 621  
Honolulu, Hawaii 96809

Dear Mr. Lemmo:

Subject: Sandwich Isles Communications, Inc., Submarine Fiber-Optic Cable  
Project Draft Environmental Assessment, December 2003

Thank you for the opportunity to review and comment on the Draft  
Environmental Assessment relating to Sandwich Isles Communications, Inc., Statewide  
Submarine Telecommunications Cable.

The Department of Parks and Recreation has no comment on the DEA, however  
as the owner of the landfill sites at Sandy Beach and Makaha, we encourage the  
applicant, Sandwich Isle Communications, Inc., to submit detailed drawings and their  
requests for easements to the City as early as possible.

Should you have any questions, please contact Mr. John Reid, Planner,  
at 692-5454.

Sincerely,

WILLIAM D. BALFOUR, JR.  
Director

WDB:mik  
(3/26/04)

cc: Mr. Randall Urasaki, P.E., Parsons Brinkerhoff Quade & Douglass



April 12, 2004

Mr. William D. Balfour, Jr., Director  
City and County of Honolulu  
Department of Parks and Recreation  
1000 Uluohia Street, Suite 309  
Kapolei, Hawaii 96707

Dear Mr. Balfour:

Subject: Sandwich Isles Communications, Inc. (SIC)  
Submarine Fiber-Optic Cable Project  
Conservation District Use Application: OA-3178 Board Permit  
Environmental Assessment

On behalf of Sandwich Isles Communications, Inc., I wish to thank you for taking the time and  
effort to provide comments on our Draft Environmental Assessment (EA) for the subject project,  
which were provided in a letter dated February 27, 2004.

As soon as possible, we will submit detailed plans for our Kill Drive and Sandy Beach Park  
landfill sites for your review and comment, as well as requests for easements.

If you have any questions, please do not hesitate to call me at (808) 568-2260.

Sincerely yours,

Parsons Brinkerhoff Quade & Douglas, Inc.

Randall Urasaki, P.E.  
Project Manager

cc: Mr. Sam Lemmo, Administrator, State Department of Land and Natural Resources,  
Office of Conservation and Coastal Lands

Over a Century of  
Engineering Excellence

RECEIVED AS FOLLOWS

ALUJIM ARAKAWA  
Mayor  
MICHAEL W. FOLEY  
Director  
WAYNE A. DOTELHO  
Deputy Director



COUNTY OF MAUI  
DEPARTMENT OF PLANNING

March 9, 2004

RECEIVED  
LARP DIVISION

MAR 11 A 9 40

MAIL ROOM

Mr. Samuel J. Lemmo  
Department of Land and  
Natural Resources  
P.O. Box 621  
Honolulu, HI 96809

Dear Mr. Lemmo:

RE: Conservation District Use Application ST-3176, for a Statewide  
Submarine Telecommunications Cable on behalf of Sandwich Isles  
Communications, Inc. for the Department of Hawaiian Home Lands  
(LTR 2004/0581)

The Maui Planning Department (Department) received the above referenced  
application on February 17, 2004, and provides the following comments:

1. The proposed action requires compliance with Chapter 205A, HRS,  
and the Special Management Area (SMA) Rules and Shoreline  
Setback (SS) Rules for the Maui and Molokai Planning Commissions.  
The SMA and SS Applications may be obtained from our office or on  
the County website at:

<http://www.co.maui.hi.us/departments/Planning/planningforms.htm>

Please be advised that a component of the SMA and SS applications  
include documentation indicating compliance with NEPA or Chapter  
343, HRS, for which a "findings of no significant impact" has been  
filed or a required EIS has been accepted. In addition, a certified  
shoreline survey is required for those parcels abutting the shoreline.

2. Provide a discussion as to the consequences of the cable network  
should the use be discontinued at some point in the future.

Mr. Samuel J. Lemmo  
March 9, 2004  
Page 2

Thank you for your cooperation. Should you require additional clarification  
regarding the foregoing comments, please contact Ms. Kivette A. Caigoy, Environmental  
Planner, of this office at 270-7735. If you require additional information regarding the SMA  
and SS application process, please contact Ms. Leanora Kalaokamalie, Staff Planner, at  
270-7735.

Sincerely,

Michael W. Foley  
Planning Director

MWF:KAC:do  
c: Kivette A. Caigoy, Environmental Planner  
Lea Kalaokamalie, Staff Planner  
General File  
K:\WP\_DOCUMENTS\LETTERS\2004\581\_Statewide\Submahe.wpd

RECEIVED AS FOLLOWS



Parsons  
Brinckerhoff  
Quade &  
Douglas, Inc.  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813  
808-531-7084  
Fac: 808-528-2268

Mr. Michael W. Foley, Planning Director  
April 13, 2004  
Page 2

April 13, 2004

Mr. Michael W. Foley  
Planning Director  
County of Maui  
Department of Planning  
250 South High Street  
Wailuku, Hawaii 96793

Dear Mr. Foley:

Subject: Sandwich Isles Communications, Inc.  
Submarine Fiber-Optic Cable Project  
Conservation District Use Application, OA-3176 Board Permit  
Environmental Assessment

On behalf of Sandwich Isles Communications, Inc. (SIC), I wish to thank you for taking the time and effort to provide comments on our Draft Environmental Assessment (EA) for the subject project, which were provided in a letter dated March 9, 2004. I would like to provide the following responses to your comments.

**Comment 1.** The three proposed landing sites on Mokolai and Maui require special management area (SMA) use permits and shoreline setback variances (SSVs). Also required is a Finding of No Significant Impact (FONSI), or environmental impact statement acceptance, and a certified shoreline survey for the applications.

**Response.** We plan to soon submit applications for SMA use permits and SSVs for all three sites in Maui County. We are anticipating that the Department of Land and Natural Resources will soon declare a FONSI for the project, and we have initiated obtaining certified shorelines for the three sites.

**Comment 2.** The EA should include a "discussion as to the consequences of the cable network should the use be discontinued at some point in the future."

**Response.** As requested, the Final EA will include a new section called Section 1.4.6, Repair and Termination of Network. With regards to the issue of termination of the network, the following text will be provided:

Fiber-optic technology is state-of-the-art in communications, which include voice, video and other forms of data. This technology is anticipated to be the main method of data transmission for the foreseeable future. However, like all technology, fiber-optics will become obsolete as more advanced forms of data transmissions are developed and implemented. Eventually, SIC will decide to terminate its fiber-optic cable networks in favor of newer technology, but this will not happen for many years.

Over a Century of  
Engineering Excellence

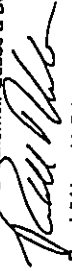
Over a Century of  
Engineering Excellence

RECEIVED AS FOLLOWS

When SIC no longer needs its submarine fiber-optic cable infrastructure, they will inform the Department of Land and Natural Resources (DLNR). SIC will abide by DLNR's decision in regards to its removal.

If you have any questions, please do not hesitate to call me at (808) 566-2260.

Sincerely yours,  
Parsons-Brinckerhoff Quade & Douglas, Inc.

  
Randall Urasaki, P.E.  
Project Manager

cc: Mr. Sam Lemmo, Administrator, State Department of Land and Natural Resources,  
Office of Conservation and Coastal Lands

RECEIVED AS FOLLOWS

**PR**  
Parsens  
Brinckerhoff  
Quade &  
Douglass, Inc.  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813  
808-531-7094  
Fax: 808-528-2068

April 12, 2004

Mr. Glenn T. Correa, Jr., Director  
County of Maui  
Department of Parks and Recreation  
700 Hali'a Naloka Street, Unit 2  
Wailuku, Hawaii 96783

Dear Mr. Correa:

Subject: Sandwich Isles Communications, Inc. (SIC)  
Submarine Fiber-Optic Cable Project  
Conservation District Use Application, OA-3176 Board Permit  
Environmental Assessment

Thank you for your letter dated March 18, 2004 regarding our Draft Environmental Assessment (EA) for the subject project.

As soon as possible, we will submit detailed plans for the Waihiuli landing site for your review and comment.

If you have any questions, please do not hesitate to call me at (808) 566-2260.

Sincerely yours,  
Parsens Brinckerhoff Quade & Douglas, Inc.

*Randall Urasaki*  
Randall Urasaki, P.E.  
Project Manager

cc: Mr. Sam Lemmo, Administrator, State Department of Land and Natural Resources,  
Office of Conservation and Coastal Lands

Over a Century of  
Engineering Excellence

GLENN T. CORREA  
Director  
JOHN L. BUCK III  
Deputy Director  
(808) 270-7230  
Fax: (808) 270-7934



DEPARTMENT OF PARKS & RECREATION  
700 Hali'a Naloka Street, Unit 2, Wailuku, Hawaii 96793

March 18, 2004

Mr. Samuel J. Lemmo, Administrator  
Office of Conservation and Coastal Lands  
State of Hawai'i - DLNR  
PO Box 621  
Honolulu, Hawaii 96809-0621

Dear Mr. Lemmo:

SUBJECT: SANDWICH ISLE COMMUNICATIONS, INC.  
SUBMARINE FIBER-OPTIC CABLE PROJECT  
ISLANDS FO KAUAI, O'AHU, MAUI AND HAWAII  
DRAFT ENVIRONMENTAL ASSESSMENT, DECEMBER 2003

We have reviewed the Draft Environmental Assessment for the subject project and have no comments at this time.

Thank you for the opportunity to review and comment on this project. Please contact me or Mr. Patrick Matsui, Chief of Parks Planning and Development, at (808)270-7387 if there are further questions.

Sincerely,

*Glenn T. Correa*  
GLENN T. CORREA  
Director

c: Randall Urasaki, PBQD  
Patrick Matsui, Chief of Parks Planning and Development

RECEIVED  
L. BUCK III  
2004 MAR 22 A 10:21



RECEIVED AS FOLLOWS

**PR**  
1000  
April 16, 2004

Parsons  
Brinckerhoff  
Quade &  
Douglas, Inc.  
American Savings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813  
808-531-7054  
Fax: 808-526-2268

Mr. Gilbert S. Coloma-Agaran, Director  
County of Maui  
Department of Public Works and Environmental Management  
200 South High Street  
Wailuku, Hawaii 96793

Dear Mr. Agarant:

Subject: Sandwich Isles Communications, Inc.  
Submarine Fiber-Optic Cable Project  
Conservation District Use Application, OA-3176 Board Permit  
Environmental Assessment

On behalf of Sandwich Isles Communications, Inc., I wish to thank you for taking the time and effort to provide comments on our Draft Environmental Assessment (EA) for the subject project, which were provided in a letter dated March 29, 2004. Your comments were:

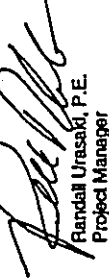
Comment 1. Makena Landing Site - Any work within Makena Alanui Road will need to be coordinated with the Wastewater Reclamation Division (WWRD) as a sewer force main exists within the right-of-way.

Comment 2. Lahaina Landing Site - Any work within Honocapilihi Highway will need to be coordinated with WWRD as both a sewer gravity line and a force main exist within the right-of-way.

At the appropriate time, we will coordinate with WWRD regarding our construction plans for work within the Makena Alanui Road and Honocapilihi Highway rights-of-way.

If you have any questions, please do not hesitate to call me at (808) 566-2260.

Sincerely yours,  
Parsons Brinckerhoff Quade & Douglas, Inc.



Randall Urasaki, P.E.  
Project Manager

cc: Mr. Sam Lemmo, Administrator, State Department of Land and Natural Resources,  
Office of Conservation and Coastal Lands

Over a Century of  
Engineering Excellence

RUPHINAGUMBE, L.S., P.E.  
Development Services Administration  
TRACY YUKAWA, P.E.  
Wastewater Reclamation Division  
LLOYD P.C.W. LEE, P.E.  
Engineering Division  
BRIAN HASHIRO, P.E.  
Highways Division  
JOHN D. HANCOCK  
Solid Waste Division



COUNTY OF MAUI  
DEPARTMENT OF PUBLIC WORKS  
AND ENVIRONMENTAL MANAGEMENT  
200 SOUTH HIGH STREET  
WAILUKU, MAUI, HAWAII 96793

March 29, 2004

Mr. Samuel J. Lemmo, Administrator  
State of Hawaii  
Department of Land and Natural Resources  
Office of Conservation and Coastal Lands  
P. O. Box 621  
Honolulu, Hawaii 96809

Dear Mr. Lemmo:

SUBJECT: CONSERVATION DISTRICT USE APPLICATION  
STATEWIDE SUBMARINE TELECOMMUNICATIONS CABLE  
CDUA ST-3176

We reviewed the subject application and have the following comments:

1. Makena Landing Site - Any work within Makena Alanui Road will need to be coordinated with the Wastewater Reclamation Division (WWRD) as a sewer force main exists within the right-of-way.
2. Lahaina Landing Site - Any work within Honocapilihi Highway will need to be coordinated with WWRD as both a sewer gravity line and a force main exist within the right-of-way.

If you have any questions regarding this memorandum, please call Milton Arakawa at 270-7845.

Sincerely,



GILBERT S. COLOMA-AGARAN  
Director

GSCA:SW  
S:\UCAL\PERMITS\SUM\Comments\Statewide Submarine Telecom\_coba\_jrw.wpd

RECEIVED  
LAND DIVISION  
2004 APR -1 A 9 09  
DEPT. OF LAND &  
NATURAL RESOURCES  
STATE OF HAWAII

RECEIVED AS FOLLOWS

Harry Kim  
Mayor



County of Hawaii

PLANNING DEPARTMENT  
101 Puuhale Street, Suite 3 • Hilo, Hawaii 96720-3043  
(808) 961-8288 • Fax (808) 961-8742

March 5, 2004

Mr. Samuel J. Lemmo, Administrator  
Department of Land and Natural Resources  
Office of Conservation and Coastal Lands  
P. O. Box 621  
Honolulu HI 96809

Dear Mr. Lemmo:

Subject: Request for Comments on CDUA No. ST-3176  
Applicant: Sandwitch Isles Communications, Inc.  
Request: Submarine Fiber Optic Cable Project - Landing Site at Kawahae  
TMK(s): (3) 6-1-004-020

We are in receipt of your letter, dated February 12, 2004, requesting our review and comments on the proposed CDUA. Included with your letter were copies of the subject application, the Draft Environmental Assessment, and your Department's Notice of Acceptance and Environmental Determination. After careful review of the above-referenced documents and our previous communications with the applicant's agent we offer the following comments.

The subject 6.633-acre parcel is zoned Open (O) by the County of Hawaii and is situated in the county's Special Management Area (SMA) and the State Land Use Urban district. Pursuant to §25-4-11(e) of the Hawaii County Code (HCC), "Communication, transmission, and power lines of public and private utilities and governmental agencies are permitted uses within any district." However, the State of Hawaii, Department of Hawaiian Home Lands (DHHL) is the owner of the subject TMK parcel. By the adoption of Resolution 19-03 a Memorandum of Agreement (MOA) clarifying the respective roles, responsibilities, and obligations of the County of Hawaii and DHHL relating to land use planning, infrastructure maintenance, enforcement of laws, and collection of taxes and other fees on Hawaiian home lands became effective on December 30, 2002. Item III-E of the MOA states:

"All land use permit applications on Hawaiian home lands must be accompanied by written consent from DHHL before the County can begin processing those applications."

Mr. Samuel J. Lemmo  
Page 2  
March 5, 2004

Christopher J. Yuen  
Director

Roy R. Takemoto  
County Director

RECEIVED  
LAND DIVISION

2004 MAR 15 A 10:04

DEPT. OF LAND AND NATURAL RESOURCES  
STATE OF HAWAII

Therefore, written consent for the subject project signed by an authorized representative of DHHL must be submitted to the Planning Department before any land use permits or applications will be accepted for processing.

Under Rule 9-4(10)(xiv), Planning Commission Rules of Practice & Procedure, development does not include the "installation of underground utility lines and appurtenant aboveground fixtures less than four feet in height along existing corridors."

However, most of the project's components including the proposed drilling site, pit entrance, and trench to Akoni Pule Highway are not in an existing corridor and is, therefore, determined to be "development."

The Department has determined that the valuation of the project shall include the total cost of labor, equipment, and materials used in connection with the site preparation, construction, and site restoration in the SMA, which includes the area from the shoreline to the existing Akoni Pule Highway corridor.

Further, Rule 11, Planning Department Rules of Practice and Procedure, governs activities and the placement of structures within the shoreline setback area in Hawaii County. The proposed project includes activities as defined by Rule 11-3(e).

Therefore, pursuant to Rule 11-6 the proposed activities are prohibited in the Shoreline Setback Area unless a Shoreline Setback Variance (SSV) is approved. However, Sections 11-7 and 11-8 of Rule 11 allow for a determination by the Planning Department of a Minor Structure or Minor Activity, which may be granted in lieu of the requirement to obtain a SSV.

In summary, the following land use permits and approvals are required for the subject project.

1. A letter of consent from an authorized representative of DHHL shall be submitted to the Planning Department with or prior to the acceptance of any land use permits.
2. A SMA "Minor" or "Major" Use Permit for development in the SMA, depending on valuation.
3. A SSV or "determination of minor activity" from the Planning Department for activities in the Shoreline Setback Area.




Parsons  
Brinckerhoff  
Quade &  
Douglas, Inc.  
American Swings Bank Tower  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813  
Phone: 507-7394  
Fax: 508-538-2368

Mr. Samuel J. Lemmo  
Page 3  
March 5, 2004

We appreciate being afforded the opportunity to comment on the elements of this project affecting the jurisdiction of this office. If you have questions, please feel free to contact Larry Brown or Esther Imamura of this office at 961-8288.

Sincerely,

  
CHRISTOPHER J. YUEN  
Planning Director

LMB:pak  
P:\P\B\B\2\Larry\CDUA Comment\Lemmo-SIC-DH11L5T174.doc

cc: Mr. Randall Urasaki, P.E.  
Parsons Brinckerhoff & Douglas  
1001 Bishop Street, Suite 3000  
Honolulu, Hawaii 96813

April 13, 2004

Mr. Christopher J. Yuen, Planning Director  
County of Hawaii  
Planning Department  
101 Pauahi Street, Suite 3  
Hilo, Hawaii 96720-3043

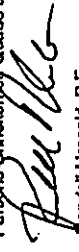
Dear Mr. Yuen:

Subject: Sandwich Isles Communications, Inc. (SIC)  
Submarine Fiber-Optic Cable Project  
Conservation District Use Application, OA-3176 Board Permit  
Environmental Assessment

On behalf of Sandwich Isles Communications, Inc., I wish to thank you for taking the time and effort to provide comments on our Draft Environmental Assessment (EA) for the subject project, which were provided in a letter dated March 5, 2003.

We appreciate your regulatory assessment of our project pursuant to the special management area (SMA) and shoreline setback. We have submitted an SMA Assessment Application for review by your department on March 19, 2004. We have requested the project be issued an SMA minor permit, and be considered a "minor activity" with regards to the shoreline setback. The application included written permission from the State Department of Hawaiian Homelands as required per the MOA.

If you have any questions, please do not hesitate to call me at (808) 568-2260.

Sincerely yours,  
Parsons Brinckerhoff Quade & Douglas, Inc.  
  
Randall Urasaki, P.E.  
Project Manager

cc: Mr. Sam Lemmo, Administrator, State Department of Land and Natural Resources,  
Office of Conservation and Coastal Lands

Over a Century of  
Engineering Excellence

RECEIVED AS FOLLOWS

RECEIVED AS FOLLOWS

Appendix 3  
**Archaeological and Cultural Practice Studies**



**Final Environmental Assessment/  
Finding of No Significant Impact**  
Submarine Fiber-Optic Cable Project

RECEIVED AS FOLLOWS

**SUMMARY OF FINDINGS OF THE KEKAHA CULTURAL IMPACT ASSESSMENT**

On April 17, 2003 we mailed out letters to the 30 individuals and organizations on the enclosed list. Thus far, no one on the list, other than Aletha Kaohi, has mentioned any specific concerns about the project.

We have conducted formal interviews with Aletha Kaohi (Waimea *Aipuna* and manager of the West Kaula'i Visitors Center), Teruo Oshiro (Kekaha resident, fisherman, and former plantation employee), and Kaipō Akana (West Kaula'i *kama'āina*, Kekaha resident in the 1940s, and former member of the Kaula'i Burial Council). All of the interviewees have reviewed the transcript of their interview and have approved its use in the assessment report.

Mrs. Kaohi was also kind enough to informally solicit responses from Kekaha area residents and they have not expressed any thoughts about the project.

The specific information and concerns related to cultural issues noted by the three interviewees include:

- 1) The possibility that burials may be encountered during excavation for the project.
- 2) A concern that the installation of the cable and cable facilities do not detract from or destroy the beauty of the area.
- 3) A concern that the cable is free of harmful emissions.
- 4) The only traditional cultural practice associated with this section of Kekaha was fishing. The concern is that installation of the cable does not affect the reef and fishing resources along the coast.

If these concerns are addressed, the Kekaha cable installation should not have any adverse impact upon native Hawaiian cultural resources, beliefs and practices.

**KEKA #13 Kekaha Fiber Optic Cable Landing Site  
Community Consultation Table**

Akahi For Ahumamae	Office of Hawaiian Affairs
Ane, Dr. Pua	Hanalei
Akama, Kaijo	Hanalei/Kaula'i Archaeologist
Azaka Elizabeth	Hanalei Resident
Brazzington, Ili	Kaula'i Health Heritage Coastal Corridor Committee
Buchwell, Andrew	QLCC-Kaula'i Unit
Casullo, Kari	Royal Order of Kamehameha, Kaunani 1
Holi, Wilma	Chapter No. 3 Kaula'i Island Burial Council
Ida, Ron	State Representative 13*
Kama, Grace H.	State Representative 13*
Kanabek, Richard	State Representative 13*
Katobon, Ezra	State Representative 13*
Kaohi, Aletha Kaohi, Lelei	Office of Hawaiian Affairs/Kaula'i Island Burial Council
Kapaka Arborea, La France	State Historic Preservation Division (Cultural) Historian
Kapelaika, Kaula'i	State Historic Preservation Division (Cultural) Historian
Kinoshita, William Fui	Kaula'i Archaeologist
Kimono, Ernest	Office of Hawaiian Affairs, Acting Director
Lawrence, Mike	Kaula'i Museum
Lovell, Carol	Kaula'i Resident
Lovell-Osaka, Cheryl	Burials Program
Munkali, Ke'iana	State Historic Preservation Division
McElweeney, Holly	State Historic Preservation Division, Kaula'i Archaeologist
McMahon, Nancy	State Historic Preservation Division, Kaula'i Archaeologist
Perry, Warren	State Historic Preservation Division, Kaula'i Archaeologist

RECEIVED AS FOLLOWS

Requinn, Mary	Kans' Historical Society
Rogers, Lucille	Ahi Lika, Inc./ Ke Ola Press No HI Kapaemahu
Somers, Molly	Kans' Community College
Trenchard, Helen	
Tushy, Rick	Kans' Historic Preservation Review Commission

RECEIVED AS FOLLOWS

Table of Contents

CULTURAL IMPACT ASSESSMENT IN SUPPORT  
OF THE PROPOSED SANDWICH ISLES FIBER OPTIC  
CABLE LANDING AT 'AKIALOA ROAD, KEKAHA,  
WAIMEA AHUPUA'A, KONA DISTRICT, ISLAND OF KAUAI

(TMK 4-13-001:999)

by

Rodney Chiogioji, B.A.  
Gerald Ika, B.A.

and  
Hallett H. Hammat, Ph.D.

Prepared for  
Parsons, Brinckerhoff, Quade and Douglas, Inc.

by  
Cultural Surveys Hawai'i, Inc.  
August 2003

TABLE OF CONTENTS

I.	INTRODUCTION.....	1
A.	Project Background.....	1
B.	Project Area Description.....	1
C.	Scope of Work.....	4
D.	Methods.....	7
E.	Identification of Knowledgeable Interview Informants.....	7
II.	HISTORICAL BACKGROUND.....	8
A.	Introduction and Setting.....	8
B.	The Ahupua'a of Kekaha.....	8
C.	The Place Name: Kekaha.....	10
D.	1797 to 1850.....	10
E.	1850 to 1900.....	12
F.	Rice Cultivation.....	17
G.	Sugar.....	17
III.	ARCHAEOLOGICAL RESEARCH IN KEKAHA.....	18
A.	Narrow Valleys and Ridges.....	18
B.	Swamp Lands.....	21
C.	Sandy Plain and Shoreline.....	21
D.	The Edge Effect.....	23
IV.	COMMUNITY CONTACT PROCESS.....	24
V.	KAMA'AINA INTERVIEWS.....	27
A.	Kaipoo Akua.....	27
B.	Aietia Kaohi.....	29
C.	Tenoo Oshiro.....	32
VI.	ASSESSMENT OF FIBER OPTIC CABLE GAP AREAS.....	35
VII.	TRADITIONAL CULTURAL PRACTICES IN KEKAHA AND THE CABLE LANDING PROJECT AREA.....	37
VIII.	SUMMARY AND RECOMMENDATIONS.....	38
A.	Summary.....	38

RECEIVED AS FOLLOWS

List of Figures

**LIST OF FIGURES**

Figure 1 USGS Topographic Map, Kekaha Quad, showing the location of the project area.....2

Figure 2 Portion of TMK 1-2-02, showing the location of the project area.....3

Figure 3 Aerial Photograph (2000), showing the location of the project area.....5

Figure 4 L.E. Inlay Map of Gay and Robinson Lands, Kekaha Area, 1891, showing the approximate location of the project area.....6

Figure 5 T.J. Evans Map of Kekaha Cane and Pasture Lands, circa 1921. Note the location of L.C.A. 5362.....9

Figure 6 TMK 1-3-05, showing the area of L.C.A. 5362 (Naunuu). Note the presence of the fish pond.....13

Figure 7 G.O. Smith 1912 Map of the island of Kaua'i, showing the Mānā Plain and its swamplands, and the approximate location of the project area.....14

Figure 8 Previous Archaeological Studies in the Kekaha Area.....16

Figure 9 Map of Kekaha Housing Project Study Area (Masterston et al. 1994a), showing the location of excavated trenches and identified sites.....19

Figure 10 USGS GS Map Showing the Location of Proposed Trenching Associated with Fiber Optic Cable Gap Areas.....36

Table of Contents

B. Recommendations..... 38

IX. REFERENCES..... 39

APPENDIX A: KAIPO AKANA TRANSCRIPT..... 44

APPENDIX B: ALETHA KAOHI TRANSCRIPT..... 49

APPENDIX C: TERUO OSHIRO TRANSCRIPT..... 53



RECEIVED AS FOLLOWS

I. INTRODUCTION

A. Project Background

At the request of Parsons, Brinckerhoff, Quade, and Douglas, Cultural Surveys Hawai'i, Inc. performed an archaeological inventory survey in support of the Proposed Sandwich Isles Fiber Optic Cable Landing near the intersection of 'Aki'aloa Road with Kaunua'i Highway (Figures 1-3). The marine cable landing project involves the installation of undersea fiber optic cables and a terrestrial cable manhole.

The project will involve the use of horizontal directional drilling to bore from a drill site near the intersection of 'Aki'aloa Road with Kaunua'i Highway to a point approximately 3700 ft. (1128 m) offshore Kekaha, Kaua'i. The cable line will be drilled approximately 25 ft (8 m) beneath the shoreline to an ocean depth of 60 ft. (18 m) and will have a minimum diameter of 4 in. (10 cm). The only permanent surface structure to be constructed as part of this project is a manhole which will be located in Kaunua'i Highway.

The purpose of this cultural impact assessment is to consider the effects the cable landing project may have on native Hawaiians, their culture and their right to practice traditional customs. The Hawai'i State Constitution, Article XII, Section 7 protects "all rights" of native Hawaiians that are "customarily and traditionally exercised for subsistence, cultural and religious purposes."

The suggested "Guidelines for Assessing Cultural Impacts" issued by the Office of Environmental and Quality Control (OEQC) discuss the types of cultural resources, practices and beliefs that might be assessed. The Guidelines read:

The types of cultural practices and beliefs subject to assessment may include subsistence, commercial, residential, agricultural, access-related, recreational, and religious and spiritual customs. The types of cultural resources subject to assessment may include traditional cultural properties or other types of historic sites, both man-made and natural, including submerged cultural resources, which support such cultural practices and beliefs.

The primary focus of this assessment is the specific cable landing project area. However, the assessment also considers cultural resources, practices and beliefs within the broader context of Kekaha that are relevant to assessing the role of the project area within the Kekaha landscape.

B. Project Area Description

The project area is located approximately 130 ft. (40 m) mauka of the shoreline at Kekaha Beach Park, near the intersection of 'Aki'aloa Road with Kaunua'i Highway, Kekaha, Waimea Ahupua'a, Kona District, Island of Kaua'i (TMK 4-13-001:999).

The elevation within the project area ranges from approximately 12-14 ft (3-4 m) AMSL. Soils within the project area are listed as Dune Land (DL) and Jaueas Loamy Fine Sand, 0 to 8 percent slopes (JFB) (Foote et al. 1972). Dune Land "consists of hills and ridges of sand-sized particles drifted and piled by wind" (ibid.:29). Jaueas Series soil "consists of excessively drained, calcareous soils that occur as narrow strips on coastal plains, adjacent to the ocean" (ibid.:48).

LIST OF TABLES

Table 1 Archaeological Studies in the Kekaha Area .....	20
Table 2 Traditional Hawaiian Settlement Patterns in Kekaha .....	23
Table 3 Community Consultation .....	25

RECEIVED AS FOLLOWS

Introduction

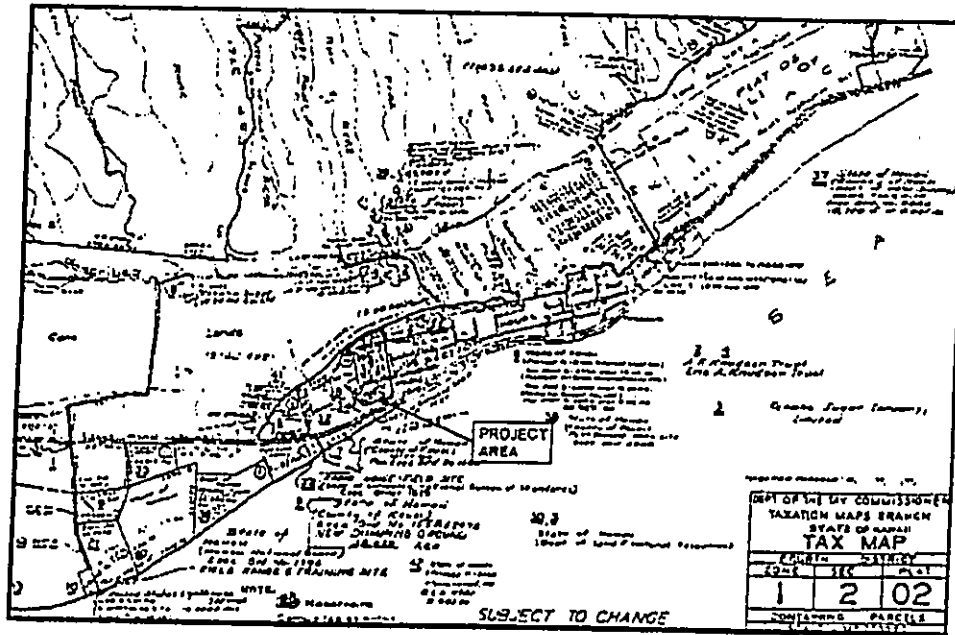


Figure 2 Portion of TMK 1-2-02, showing the location of the project area

3

Introduction

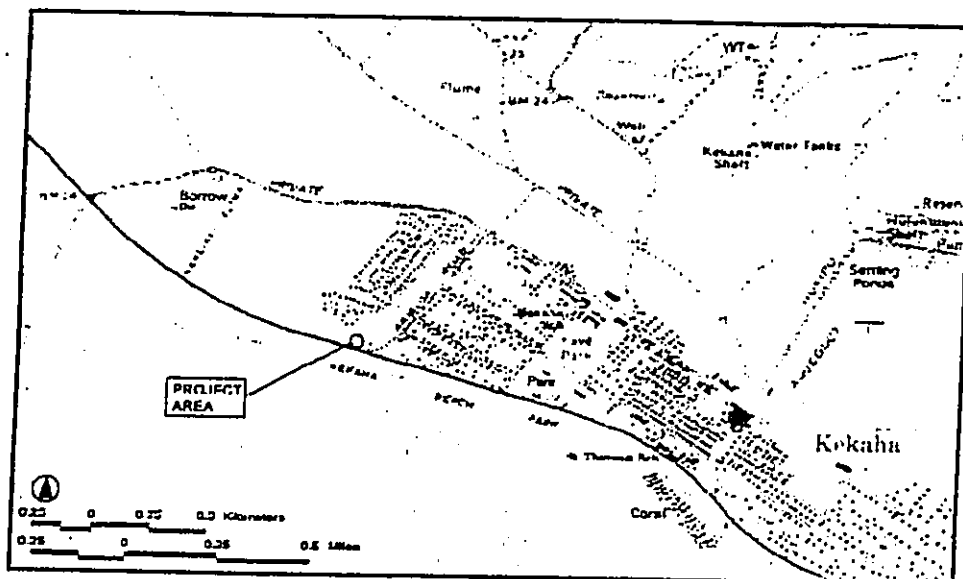


Figure 1 USGS Topographic Map, Kekaha Quad, showing the location of the project area

2

RECEIVED AS FOLLOWS

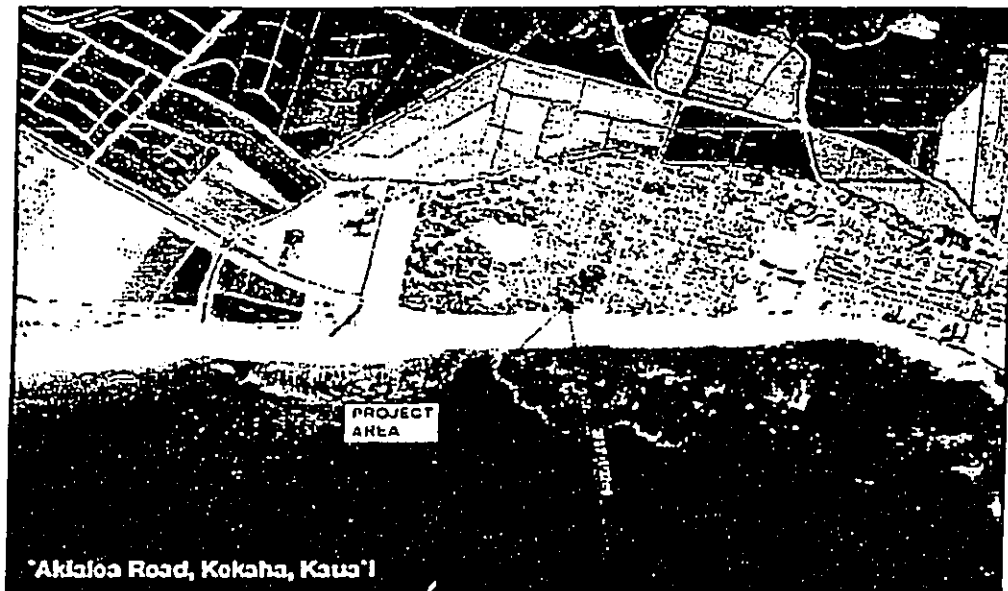


Figure 3 Aerial Photograph (2000), showing the location of the project area

Introduction

Vegetation along this arid coast is sparse. With 20 in. (500 mm) or less of rain annually (Giambelluca et al. 1986), only the hardiest plants adapted to the coastal environments can thrive in this zone. The vegetation is typical of dry seashore environments in Hawai'i and is dominated by alien species. The proposed drilling site is mostly exposed sand with no vegetation. There are a few clumps of grass, but no trees. The tree line (kiawe trees) is situated some 100 ft. (30 m) mauka (north) of the drilling locale.

The permanent manhole for the fiber optic cable infrastructure will be within Kaunualii Highway, just makai (south) of the drilling locale.

C. Scope of Work

The following Scope of Work (SOW) was followed to satisfy requirements related to Hawaiian customary and traditional rights and their applicability to the Kekaha cable landing project area:

1. Examination of historical documents, Land Commission Awards, historic maps, and oral histories with the specific purpose of identifying traditional Hawaiian activities including gathering of plant, animal and other resources or agricultural pursuits as may be indicated in the historic record.
2. A review of the existing archaeological information pertaining to the sites in the vicinity as they may allow us to reconstruct traditional land use activities and identify and describe the cultural resources, practices and beliefs associated with the project area and identify present uses, if appropriate.
3. Conduct oral interviews with persons knowledgeable about the historic and traditional practices in the project area and region.
4. Preparation of a report on items 1-3 summarizing the information gathered related to traditional practices and land use. The report will assess the impact of the proposed action on the cultural practices and features identified.

RECEIVED AS FOLLOWS

Introduction

**D. Methods**  
Historical documents, maps, and photographs were researched at: the Kaula'i Historical Society, the Hawaii'i State Archives; the Survey Office of the Department of Accounting and General Services; the Hawaii'i State Library; the Bernice Pauahi Bishop Museum archives and library; Hamilton Library at the University of Hawaii'i at Manoa; the Mission Houses Museum Library; the State Historic Preservation Division (SHPD) library; and the library of Cultural Surveys Hawaii'i.  
Hawaiian organizations, government agencies, community members and cultural and local descendants with ties to Kekaha were contacted to: (1) identify potentially knowledgeable individuals with cultural expertise and knowledge of the project area and the surrounding vicinity, and (2) identify cultural concerns and potential impacts within the project area. A discussion of the community contact process is found below in Section V of this report.

**E. Identification of Knowledgeable Interview Informants**  
Based on recommendations from organizations and the community, three kama'aina were identified with whom interviews were conducted. The three interviewees were: Kaiipo Akana, Aletia Kaohi, and Tenuo Oshiro. Mr. Akana was a resident of Kekaha during his childhood. Mrs. Kaohi is a lifelong resident of Waimua. Mr. Oshiro is a current resident of Kekaha. All of the interviewees have knowledge of the Kekaha cable landing project area through cultural or professional contact.  
Interview summaries and excerpts are presented below in Section VI\* of this report. Full transcripts of the interviews may be found in the appendices to this report.

**F. The Interview Process**  
Once potential participants were identified, they were contacted by telephone or in person. If the individual expressed a willingness to participate, an appointment was scheduled at a location of the individual's choosing. Following the interview's completion, it was transcribed. The interviewees were given the opportunity to review the typed transcript for corrections, editing and additions. No interview material was used in this study without an "Authorization for Release" form signed by the interviewee.

Introduction

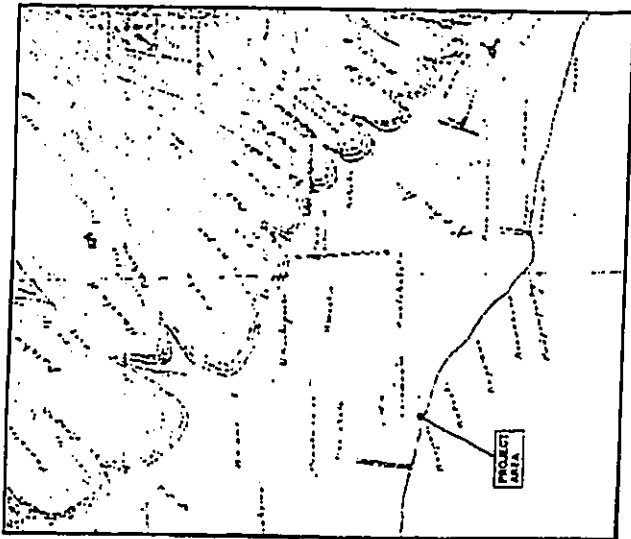


Figure 4 L.E. Inlay Map of Gay and Robinson Land, Kekaha Area, 1891, showing the approximate location of the project area

RECEIVED AS FOLLOWS

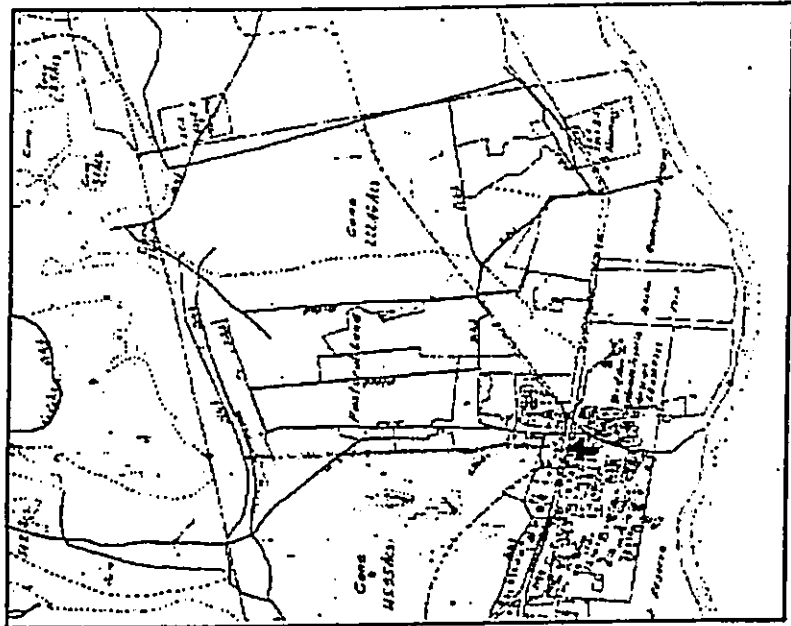


Figure 5 T.J. Evans Map of Kekaha Cane and Pasture Lands, circa 1921. Note the location of L.C.A. 5362

## II. HISTORICAL BACKGROUND

### A. Introduction and Settling

Kekaha is a locality in the ahupua'a of Waimea on the southwest side of the island of Kauai. Part of the old district or moku of Kona, the Waimea Ahupua'a is by far the largest on the island, comprising 92,646 acres and accounting for more than a quarter of the total land area of Kauai. It encompasses all of the Waimea River Canyon area, the uplands of Kō'ō'e, the high swampy plateaus of Alaka'i, and the northwestern coastal valleys of Nu'ulolo and Miloli'i (Gray 1875: 140-146).

On the southwestern leeward coast, a broad, flat plain stretches between the Waimea River delta and Pōlihale to the west. It is here that Kekaha is located, backed on the mauka side by steep low cliffs and a series of small valleys and gulches.

The Waimea ahupua'a is composed of several regions which are very different in climate and terrain. These differences essentially dictated the kinds of resources that were available, and hence had much to do with the way the ahupua'a was settled by prehistoric Hawaiians. The well-watered valley and delta of the Waimea River were ingeniously developed and engineered for wetland agriculture, and represents the epitome of the typical Hawaiian and Kauai-type valley settlement (Handy and Handy 1972:393-397).

In contrast, Kekaha and other settlements on the Mānā plain suffered from a definite lack of fresh surface water. The mauka gulches had only intermittent stream flows, and water sources were primarily springs along the base of the cliffs. For this reason, this portion of the report will focus mainly on the specific area of Kekaha and not attempt to cover the entire ahupua'a of Waimea.

### B. The Ahupua'a of Kekaha

Although the Boundary Commission officially surveyed and set the bounds of the ahupua'a of Waimea in 1875, as generally described previously, there are a few sources which contradict this, maintaining that Kekaha was a separate ahupua'a.

Testimony in the mid-1800s that supports the native land claim of R. Naumua refers to the "Kekaha ahupua'a" in describing the properties (Board of Commissioners 1929: Native Testimony, n.d. Vol. 11:15).

Valdemar Knudsen, an early haole settler in the area, also refers to the "ahupua'a of Kekaha" in a letter to John Dominis, Commissioner of Crown Lands (Knudsen 1866:3). A late 19th century map (Imlay 1891) shows a pie-shaped land section that is labeled "Kekaha," indicated by a dotted line boundary that encompasses the area from the top of Waiaika ridge to the shoreline (Figure 4).

Handy and Handy (1972:427) implies that Kekaha as well as Pōlihale and Mānā were individual ahupua'a of Waimea, though the reasoning for this is not given. However, the native land claim of Elio Lihau for the land of Wai'awa, just west of Kekaha, concedes that this area was indeed part of the ahupua'a of Waimea (Board of Commissioners 1929: Native Register 1848; Vol. 9:244).

## Historical Background

Admittedly, it is unusual for a single ahupua'a to occupy such a large percentage of the land area of a major Hawaiian island. It could easily be argued that the comparatively low agricultural productivity of the Māna plain, due to the scarcity of water, is the basis for its inclusion into Waimea.

However, the same cannot be said for the well watered valleys of Nu'ulolo and Miloli'i; both of which could easily support typical and self-contained valley settlements of perhaps small but stable populations.

It could also be speculated that Waimea, being one of the two areas of the island that traditionally was the domain of the high chiefs (the other being Waialua), commanded the resources of the large upland region of Kōke'e and Alaka'i, among them the large koa trees out of which the hulls of canoes were hewn, and forest birds which supplied the feathers for cloaks, capes, and other items associated with the ali'i.

It is quite possible that at one time, Waimea was divided into several smaller ahupua'a, perhaps before the Māhele, or even in pre-contact times.

## C. The Place Name: Kekaha

Pukui et al. (1974:106) gives the literal translation of Kekaha as "the place." However, Handy and Handy's (1972:54) definition gives more insight as to the descriptiveness of the place name. Kaha was a special term applied to areas facing the shore but not favorable for planting. Kekaha in Kona, Hawaii, was one so named, and Kekaha on Kauai another.

Kelly (1971:2) describes Kekaha on the island of Hawaii as "ūna malo'o or "dry land," and indeed the same could be said of Kekaha, Kaua'i if one considered the area's low annual rainfall and lack of perpetual streams. Kekaha, however, was not void of water or of a prehistoric population that made use of the local resources.

## D. 1797 to 1850

A thorough search of major Hawaiian myths and legends found no mention of Kekaha, but the first western description of the place comes only nine years into the post-contact era. William Beresford was the supercargo on board the British ship Queen Charlotte under Captain George Dixon, which along with the King George, captained by Nathaniel Portlock, sailed on an exploratory voyage to the northwest coast of America. In 1798, both ships wintered in Hawaii, spending much time off Waimea, Kaua'i. On one of the several shore outings, Beresford visited nearby Kekaha, which he called "A Tappa" (Dixon 1968:124-126).

Having frequently heard our people who had been on shore speak of a village, called by the natives A Tappa, where a great number of people were commonly employed in manufacturing cloth, curiosity prompted me to walk to that place first, as I found it was not more than three miles distant, so that I could easily get back by Tyleira's dinner time.

The country, from the place where we landed to A Tappa is tolerably level, and for the space of two miles, very dry. The soil here is a light red earth, and with property cultivation, would produce excellent potatoes, or any thing that suits a dry soil; but at present, it is entirely covered with long coarse grass: the inhabitants, I suppose, finding plenty of ground near their habitations, more conveniently situated for their various purposes. So far, the space from the

## Historical Background

beach to the foot of the mountains is about two miles in breadth, but from hence to A Tappa, it grows gradually narrower, till it terminates in a long sandy point, which I have already observed, is the West extreme of Wymea Bay.

A Tappa is a pretty large village, situated behind a long row of coconut trees, which afford the inhabitants a most excellent shelter from the scorching heat of the noontday sun. Amongst these cocoa-trees is a good deal of wet swampy ground, which is well laid out in plantations of taro and sugar cane.

I had laid my account in seeing their method of manufacturing cloth; but here I was mistaken. A number of our people, prompted by the same curiosity as myself, were got to A Tappa before, where "Labour stood suspended as we passed." The people flocked eagerly about us; some asking us to repose ourselves under the shady branches of trees planted about their doors; other running to the trees for cocoa-nuts and presenting them to us with every mark of kindness and good nature; in short, every inhabitant of the village was fully employed, either in relieving our wants, or gratifying their curiosity in looking at us.

The day being very sultry, we walked leisurely back, and I returned by a different path from that I had taken, in going to A Tappa. On examining the grass, which in most places is higher than the knee, I found it no altogether of a rough coarse sort, but intermixed with various sorts of flowers, together with different grasses, of the meadow kind; so that I have no doubt, with proper management, it would make excellent hay.

Beresford's remark that the dry soil conditions in the area would be most suitable for potatoes is in line with Handy and Handy's (1972:410) assertion that the sweet potato was probably the prime staple of the village, rather than taro because of the limited water resources.

While Beresford described taro, sugarcane, and coconut being cultivated in Kekaha, no mention is made of wauke, the inner bark of which is the raw material for making kapa or bark cloth. This seems curious in light of his statement that cloth making was a major activity of the village and the main purpose of his trek there was to observe this process.

Due to the climatic conditions, the Māna plain was probably not a prime wauke growing area (Handy and Handy 1972:209). However, Beresford did note on a later excursion through the lower Waimea Valley that "cloth mulberry" trees were numerous around the house sites there (Dixon 1968:131). It may be likely that there was some sort of trade going on between the residents of Waimea and Kekaha, involving the raw material and the labor that turned it into cloth.

Native claims for land made to the Board of Commissioners to Quiet Land titles in 1848 also sheds some light as to settlement and land use in the area during the early historic period. Only three claims were made in and nearby Kekaha.

Keonua (No. 8841) claimed a house lot, six lo'i and some kula land near the base of the pali at Pōki'i, about a mile north of Kekaha (Board of Commissioners 1929: Native Register 1848; Vol. 9:397). Eia Lihau (No. 6698) claimed all the land of Wai'awa (just west of Pōki'i), most of which was unused kula, but included a restricted fishery. This claim was never awarded (Board of Commissioners 1929: Native Testimony, Vol 1:155).

The only one to claim land actually in Kekaha was B. Naumu (No. 5386). Mentioned here are lo'i, a house lot, salt bed (alipua akai) and a muliwai called Kapenu. Naumu developed the lo'i in

RECEIVED AS FOLLOWS

Historical Background

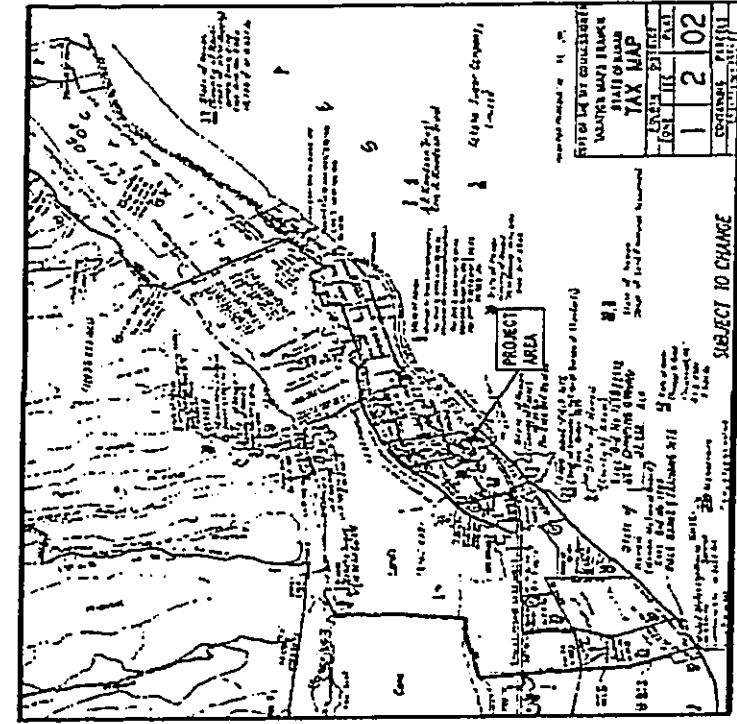


Figure 6 TMK 1-3-05, showing the area of L.C.A. 5362 (Naumu). Note the presence of the fish pond.

Historical Background

1844, stating that it was previously overgrown land (Board of Commissioners 1929: Native Testimony, Vol 11:146).

An 1891 map of West Kaua'i by L.E. Imley (See Figure 4) shows Kapenu as a stream that entered the ocean just east of O'omaio Point. A later 1921 map by Evans does not show the stream, but places one of Naumu's awarded lots in the same area near the shore (Figure 5). It was also awarded a parcel in Kekaha at the base of the makai-facing pali of Hululunu Ridge.

Interestingly, Evans' 1921 map shows an irregular-shaped depression occupying the southeast corner of Naumu's beach lot. In a more recent map tax map (Figure 6), this same depression is labeled a fishpond, and was probably of the pu'u one type. Naumu makes no mention of such in his claim, as he or his heirs probably developed the pond in a later historic period. The fishpond is located approximately 1.7 miles (2.7 km) east of the project area.

E. 1850 to 1900

Most of the historical accounts of Kekaha during this period are the result of letters, papers, and books authored by Valdemar Knudsen and his immediate offspring. Eric A. Knudsen and Ida Elizabeth Knudsen Von Holt. Knudsen came to Hawaii from Norway via the mainland where he had business dealings. He settled at Wai'awa in 1854 as a rancher, agriculturalist and later, sugar planter.

Knudsen took over the lease of government land there from Archibald Archer and a Mr. Gruben. The two men were involved in a failing tobacco farming enterprise. Associated with them was a Mr. Clifford who made cigars (Lydgate 1991:92).

Eventually Knudsen controlled the entire district, excluding kuleana lands, from Nu'aloa to Waimea, including all the mauka area (Knudsen and Noble 1945:35). In this post-Mahela era, he held the title of konohiki, and Hawaiians with no kuleana of their own who lived in the district, reportedly numbering three to four hundred people, worked for Knudsen three days out of the month as "rental" payment (Von Holt 1985:61).

As a side note, among the employees on Knudsen's ranch was a young Hawaiian from Kekaha named Ko'olau who would later become famous as the leprosy "outlaw" who defied banishment to the leper settlement at Kaliuapapa, Moloka'i and successfully held off a siege by government troops on his refuge in Kalaiau Valley on the Nepali coast of Kaua'i (Hoigaard 1991:108-109).

Knudsen described Kekaha as "a low marsh land, full of fish ponds and coconut-trees, but the ponds are overgrown with bullrushes and would cost more than they are worth to bring in order to try once and it cost me circa \$200.00. - There is not much grazing lands belonging to Kekaha and it is chiefly pili grass" (Knudsen 1866:304).

Valdemar's son Eric, later made this observation (Knudsen 1991:98):

From Waimea towards Mana there were no trees, no fences, no cane, all was open country; along the taro patches of Kekaha and Pokii grew quite a number of coconuts. The mango trees were planted by my father. Numbers of Hawaiians lived about Kekaha and Pokii, where there were springs and taro land. Then the land was bare again until you reached Waiawa. Above the road in Pokii, where the cane loaders now stand, was a row of thatched houses and the natives planted a lot of tobacco.

Evidently the area had changed little since Beresford's visit in 1787.

Historical Background

The perpetual swamplands of the plain apparently were greatly enlarged during periods of heavy winter rains. It was possible on these occasions to paddle a canoe from Māna to Waiimea on this inland waterway (Figure 7) (Knudsen 1991:99; Von Holt 1985:77-78).

Waterfowl present in the wetlands provided a food resource for the area residents. Among them the koloa and especially the 'ālae and āe'o (kukuliā'e'o) were numerous (Von Holt 1985:78). All three were traditionally caught and consumed by the Hawaiians (Malo 1951:39).

Kekaha was watered by a spring called Kauhika located at the base of the pali. The spring had a fishpond, then taro lo'i and rice fields before flowing into the swamp (Knudsen and Noble 1945:62).

Most of the residents also lived in this area, near the water source and cultivatable lands. An anecdotal description is given by Eric Knudsen (1991:101, 102):

A row of grass houses extended all the way along the foothills from Waiimea to Mana. Every house site had a name. To find a man you had to find his house name. The natives seemed to know every name and would keep sending you along until you finally came to the spot you were looking for.

At certain hours all the women sat in their houses and beat lapa cloth and as they beat they talked to one another in a lapa beater's code. They could send a message with great speed from Waiimea to Mana. When the men returned from the mountains with fire wood or canoes, the woman that saw them at once tapped out the news and it flew from house to house with the result that every man, when he came home, found his house in order and no surprised visitors hanging around. This man tried to learn this secret code but never did, though an old man at Mana told my father that the men had tried for years to learn the secrets of the lapa code but were never able to do so. The grass houses were all built in one general design - one big living room and two doors - one on each side and opposite to one another. One day my father noticed that all were built with their gable-ends east and west and the doors facing the ocean and the hills. He asked one of the men why that was so and he replied, "Why, you know that Po, the abode of the dead, lies under the ocean just outside Polihale, where the cliffs and the ocean meet, and the spirits of the dead must go there. As the spirits wander along their way to Po, they will go around the gable-end of a house but if the house stood facing the other way, the spirits would walk straight through and it would be very disagreeable to have a spirit walk past you as you were eating your meal." "In fact," he continued, "we can always tell when a battle has been fought by the number of spirits passing at the same time."

Between the swamp and the shoreline was a broad sand deposit, likely inhabited by fishermen on the makai side. The only canoe landing at Pu'upu'upa'akai ("salt piled in heaps") was through the reef on the shore directly makai of the sugar mill. A "large settlement" was there with "canoe sheds lining the beach" (Knudsen and Noble 1945:50).

Historical Background

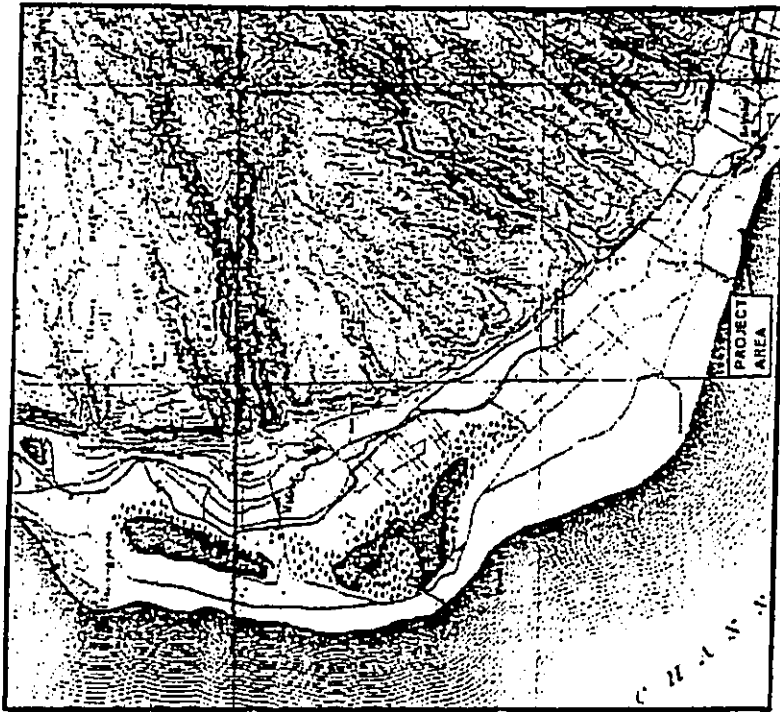


Figure 7 G.O. Smith 1912 Map of the island of Kaua'i, showing the Māna Plain and its swamplands, and the approximate location of the project area.



Historical Background

F. Rice Cultivation

Commercial rice growing came to the Kekaha-Mānā plain in the 1860s. The area's most prolific planter was Leong Pah On, a Chinese immigrant (Joesting 1984:206).

Pah On started farming in Wainea Valley and eventually met Valdemar Knudsen who allowed him to cultivate the swamplands. He imported Chinese laborers, drained the swamps with ditches brought in water buffaloes and eventually acquired more land. At his peak he had about 600 acres in rice throughout Mānā, Kekaha and Wainea (Char and Char 1979:21).

Pah On's ~~interest~~ ~~in~~ ~~the~~ ~~area~~ ~~was~~ ~~lost~~ ~~suddenly~~ ~~in~~ ~~1922~~. ~~The~~ ~~leases~~ ~~on~~ ~~government~~ ~~lands~~ ~~were~~ ~~expiring~~ ~~and~~ ~~H. P. Faye~~, ~~manager~~ ~~of~~ ~~the~~ ~~Kekaha~~ ~~Sugar~~ ~~Co.~~ ~~convinced~~ ~~Pah~~ ~~On~~ ~~not~~ ~~to~~ ~~bid~~ ~~on~~ ~~new~~ ~~leases~~ ~~and~~ ~~let~~ ~~the~~ ~~sugar~~ ~~company~~ ~~take~~ ~~over~~ ~~control~~ ~~of~~ ~~the~~ ~~land~~. ~~In~~ ~~return~~ ~~Kekaha~~ ~~Sugar~~ ~~would~~ ~~sub-lease~~ ~~the~~ ~~rice~~ ~~fields~~ ~~back~~ ~~to~~ ~~Pah~~ ~~On~~. ~~The~~ ~~successful~~ ~~rice~~ ~~grower~~ ~~could~~ ~~have~~ ~~easily~~ ~~out-bid~~ ~~the~~ ~~sugar~~ ~~concern~~, ~~but~~ ~~agreed~~ ~~to~~ ~~the~~ ~~plan~~. ~~When~~ ~~Kekaha~~ ~~Sugar~~ ~~secured~~ ~~the~~ ~~leases~~ ~~its~~ ~~board~~ ~~of~~ ~~directors~~ ~~overruled~~ ~~Faye~~ ~~and~~ ~~denied~~ ~~any~~ ~~subleases~~ ~~to~~ ~~Pah~~ ~~On~~ (Char and Char 1979:22).

G. Sugar

The Reciprocity Treat of 1876 between the United States and Hawai'i gave impetus for the expansion of the sugar industry throughout the islands. The first commercial cane in the Kekaha area was planted in 1878 near Pōki'i by Knudsen and a partner, Christian L'Orange. Hans P. Faye, Knudsen's nephew, was brought in as another grower, and it was he who dug the first artesian wells in the islands at Kekaha. With steady but still small water source investors showed interest and the Kekaha Sugar Co. was incorporated in 1898 (Wenkam 1977:63; Joesting 1984:216-217). The mill was set up on the sand lands of Kekaha at the makai edge of the swamp, its foundations set deep into the underlying coral (Knudsen and Noble 1945:161-162).

The Kekaha Sugar Co. saw expansion after 1907 when the construction of the plantation's major irrigation ditch was completed. The engineering feat brought water to the area from eight miles up the Wainea River via a series of ditches, flumes, tunnels, and siphons (Thrum 1908:158-159).

Historical Background

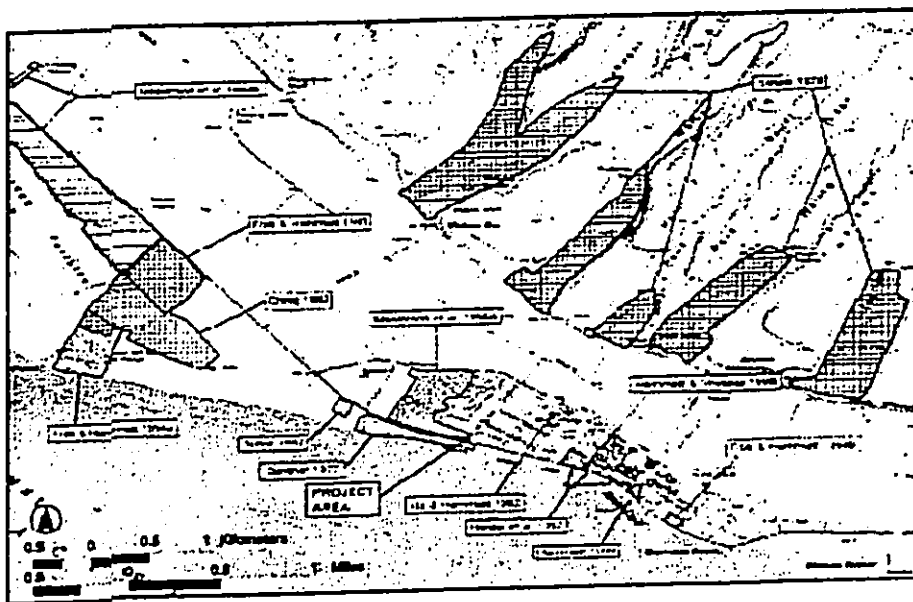


Figure 8 Previous Archaeological Studies in the Kekaha Area

RECEIVED AS FOLLOWS

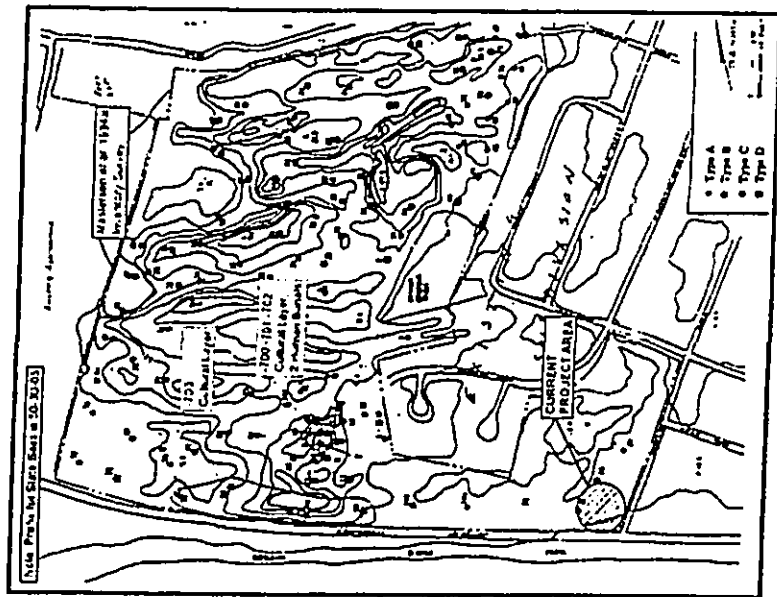


Figure 9 Map of Kekaha Housing Project Study Area (Masterson et al. 1994a), showing the location of excavated trenches and identified sites

### III. ARCHAEOLOGICAL RESEARCH IN KEKAHA

There have been few large-scale systematic archaeological surveys in the Kekaha area. However, a sizable number of small-scale studies have covered a variety of terrain and elevations in Kekaha (Figure 8; Table 1). The following summary of previous research is divided into five environmental zones.

#### A. Narrow Valleys and Ridges

Wendell Bennett, in his 1931 Survey of Kaua'i (Bennett 1931), recorded major prehistoric sites in the vicinity of Kekaha (Sites 11-16). These are listed by Bennett as:

- Site 11- Makahoe heiau and village site, on Niu ridge, Kaunalewa. A small platform village shrine. Thrum describes the village as "Four and one-half miles from the coast and at an altitude of 1200 feet. This village had about 0.5 acres of taro land besides the dry crops to depend on." On the inland side of Niu ridge, small valleys are found with small streams and a few taro terraces. Petroglyphs were reported for this area.
- Site 12- Hooneenuu heiau, along the ditch line inland from the government road near the center of Kaunalewa ridge.
- Site 13- Burial caves, on Kaunalewa ridge.
- Site 14- Two small heiau, near Waiawa, described by Thrum as a 12 by 20-foot shrine, and an 18 by 28-foot shrine.
- Site 15- House sites and taro terraces, in Waiawa valley. Some taro lines may still be seen in lower Waiawa valley. Many house sites are in evidence. They consist for the most part of leveled ground, faced in front with stone, or merely outlined with stone.
- Site 16- Hauola heiau, in Hoia valley at the base of Hiauola ridge.
- Site 17- Burial caves, on Pokii ridge (Bennett 1932:102-103).

Bennett provides greater detail on these sites in his text, but the important point is that it shows habitation evidence in small valleys dissecting Niu Ridge, as well as on the ridge itself. Waiawa Valley contains "many" house sites and associated taro lo'i, and heiau appear both in valleys and on ridges.

Bennett's survey apparently predated at least some of the land impact associated with sugar growing and was early enough to record sites at the base of the Waiawa slope, allowing us to take note of the former importance of this area during pre-contact times.

The Bishop Museum returned to the bases of these narrow valleys overlooking present day Kekaha Town during a study for potential rock borrow areas for the Corps of Engineers (Sinoio 1978). Archaeological sites were noted in Waiakea, Pa'wa, Waipao, Waiawa, Kahoana and Ho'ea. These sites survived in spite of the heavy impact of sugar activities and grazing, and provide reinforcement for this particular zone edging on the Kekaha flats as being a focus of permanent Hawaiian habitation with a steady supply of water from springs.

Table 1 Archaeological Studies in the Kekaha Area

Study	Location	Type	Findings
Bennett 1931	Island Wide Survey incl. Kekaha	Recordation of Major Prehistoric Sites	Described 7 sites in the Kekaha area incl. <i>heiau</i> , burial caves, habitation features, agricultural features
Bondner 1977	Kekaha Beach Park	Reconnaissance Survey	No cultural material observed
Sinoto 1978	Valleys <i>Mauika</i> of Kekaha Town	Reconnaissance Survey	Sites located in valleys of <i>Waiakea</i> , <i>Pawa</i> , <i>Waipoo</i> , <i>Waiawa</i> , <i>Kalioana</i> , and <i>Hio'es</i> No cultural material observed
Ching 1982	Proposed Landfill Site near Barking Sands	Reconnaissance Survey	No cultural material observed
Ida & Hammatt 1992	Kekaha Town Cemetery	Inventory Survey w/ Subsurface Testing	No pre-modern cultural material observed
Speat 1992	West of Kekaha Town	Archaeological Monitoring	No cultural material observed
Folk & Hammatt 1993	Proposed Landfill Expansion near Barking Sands	Inventory Survey w/ Subsurface Testing	No cultural material observed
Folk & Hammatt 1994a	National Guard Rifle Range near Barking Sands	Inventory Survey w/ Subsurface Testing	No cultural material observed
Folk & Hammatt 1994b	Kekaha Town	Inventory Survey w/ Subsurface Testing	No cultural material observed
Masterson <i>et al.</i> 1994a	Kekaha Town	Inventory Survey w/ Subsurface Testing	2 Cultural layers (50-30-05-700, -703), 2 human burials (50-30-05-701, -702)
Masterson <i>et al.</i> 1994b	Proposed Agricultural Park near Barking Sands	Inventory Survey w/ Subsurface Testing	2 human burials at Limalooa (50-30-05-3650)
Hammatt 1996	Kekaha Town	Subsurface Testing	No cultural material observed
Heidel <i>et al.</i> 1997	Kekaha Town	Inventory Survey w/ Subsurface Testing	4 human burials (50-30-05-619)
Hammatt & Shideler 1999	Kekaha Town	Archaeological Monitoring	No cultural material observed

B. Swamp Lands

The swamp lands between the cliffs and the sand flats are now the level sugar fields of Kekaha. Draining of the once giant swamp for agriculture began in the late 1800s, and due to the decades of sugar cane cultivation archaeological site potential here is minimal. However, this does not mean that the Hawaiians did not use this land. Its fringes would be useful for taro, and water fowl must have been abundant at times. There are accounts of widespread seasonal flooding of these lands. It is a reminder of the adaptability of Hawaiian planters who employed a unique method of taro growing at *Mānā*, as related by Pukui:

As the plants grew, the rootlets were allowed to spread undisturbed, because they helped to hold the soil together. When the rainy season came, the whole area was flooded as far as *Kalamaitiki*, and it took weeks for the water to subside.

The farmers built rafts of sticks and rushes, then dived into the water. They worked the bases of the taro mounds free and lifted them carefully, so as not to disturb the soil, to the rafts where they were secured. The weight of the mounds submerged the rafts but permitted the taro stalks to grow above the water just as they did before the flood came. The rafts were tied together to form a large, floating field of taro (Pukui 1983:232-233).

C. Sandy Plain and Shoreline

The bulk of the archaeological studies in Kekaha have been done on the flat lands near the coast. Sand deposits between the swamp lands (now drained sugar fields) and the ocean have high potential for shoreline occupation and scattered human burials, particularly along the *mauka* fringes of the sand bar.

Human burials have been discovered in sand deposits in Waimea Town to the east of Kekaha (Cox 1975; Kikuchi 1985) and archaeological studies of sand areas have noted potential for burials even though none were immediately found (Ching 1982; McMahon 1988a, 1988b; Bondner 1977). Recent studies have tested larger areas for burials, at the north end of Kekaha Town for the proposed Kekaha Housing Project (Masterson *et al.* 1994a), in the proposed Kekaha Agricultural Park (Masterson *et al.* 1994b), the proposed landfill expansion (Folk and Hammatt 1993), and the Army National Guard rifle range (Folk *et al.* 1994a) (see Figure 8). In all of this acreage, only four human burials were found. Two burials (50-30-05-3650) were discovered at Limalooa in the proposed Kekaha Agricultural Park study area (Masterson *et al.* 1994b), and two burials were discovered near the shore at the north end of Kekaha Town, where new housing was proposed (Masterson *et al.* 1994a).

Masterson *et al.*'s (1994a) inventory survey of the Kekaha Housing project included the current project area. Extensive subsurface testing of the study area resulted in the discovery of two human burials (50-30-05-701, -702) as well as two buried cultural layers (50-30-05-700, -703) in the loose sands of the shoreline sand dunes, to the west of the current project area (Figure 9). Test trenches in the immediate vicinity of the current project area (Trenches 96-99) did not encounter any significant cultural deposits or human burials.

Additional subsurface testing of parcels in Kekaha town was undertaken by Hammatt (1996) and Heidel *et al.* (1997). No cultural material was observed by Hammatt (1996). Four human

burials (50-30-05-619) were discovered in sand deposits near the coast at the intersection of Io Road with Kaunali'i Highway, following informal interviews with local residents who suggested human burials may be present in the area (Hickel et al. 1997). Archaeological monitoring associated with the development of the parcel did not encounter any cultural material (Hamman and Shideler 1999).

Although Bennett recorded cave burials along the slopes and ridges it is also clear that sand burial was commonly practiced around Kekaha. Although human burials could occur scattered throughout the sandy plains it is predicted that the larger clusters of burials will be found at the mauka fringes of the sand bar, fringing onto the former marsh.

An existing public cemetery, covering nearly two acres, lies at the west end of Kekaha Town, at the mauka corner of Iwipolea Road and 'Aki'aloa Road. This cemetery was examined by Ida and Hamman (1992) during an inventory survey and sub-surface testing of an adjacent one-acre parcel. Tombstones show interments throughout the last fifty years in the main part of the cemetery. However, at the northern end are older style graves marked by rectangular stone and stone-lined earthen mounds. It could be that this cemetery was in use well in the late 1800s and perhaps even before.

Closer to the shoreline would have been the fishing oriented settlements now represented by cultural layers buried in backshore sand deposits. There were probably also occasional fishponds and saltpans. The occurrence of Hawaiian activity along the shoreline would be strongly influenced by the location of suitable canoe landings. For example, pu'u pu'u pa'a kai was a canoe landing mauka of the sugar mill with a large settlement (Knudsen and Noble 1945:50). In short, we can divide the traditional Hawaiian settlement of the Kekaha region into 5 zones (Table 2).

1. Ridges above the cliff for dryland agriculture, forest gathering, and religious structures;
2. Narrow valleys and slope bases with intermittent streams, narrow alluvial terraces and some permanent springs. These areas supported taro growing and permanent habitation. The steep slopes of these valleys would contain burial caves. House sites were reported to be plentiful and closely spaced;
3. The swamp and marshlands, the fringes of which would have supported taro farming and fishponds and which were probably an important source of waterfowl.
4. The mauka part of the sand plain would be the preferred location for human burial;
5. Along the shoreline - the fishing camps and the settlements would be clustered around canoe landings with a few small pu'u one fishponds and many sail pans.

Table 2 Traditional Hawaiian Settlement Patterns in Kekaha

ZONE	ENVIRONMENT	RESOURCES	TYPE OF SITES
Zone 1	Ridges and slopes	Kula land, forest products, dry land cultigens	Heiau, burials on slopes
Zone 2	Narrow valleys and slope base	Intermittent streams, springs, taro, sugar cane	Lo'i, permanent habitations, heiau, and terraces
Zone 3	Marsh lands	Taro, sugarcane, fowl, fish	Fishponds, taro lo'i on marsh edges
Zone 4	Sand plain, mauka portion	Coconuts	Clustered burials
Zone 5	Sand plain, makai portion	Coconuts, marine resources, soil	Fishing camps, saltpans, canoe landings, isolated burials

D. The Edge Effect

Perhaps the essence of the dynamic relationship between the Hawaiians and their environment in this fairly unique area is not in terms of a narrow perception of coping with a hot harsh land, but in terms of a concept known in ecology as the "edge effect" or use of ecotones (an ecotone being a transition area between two ecological communities). The most productive environment is that at the edge of two ecological zones. The boundaries between environments in Kekaha are sharply defined rather than transitional and most importantly there is much land occurring along these edges between environmental zones. This phenomenon serves to increase options and access to resources for human subsistence and can do much to explain the presence of a particularly flourishing community as reported in historic and archaeological sources.

#### IV. COMMUNITY CONTACT PROCESS

Throughout the course of this assessment, an effort was made to contact and consult with Hawaiian cultural organizations, government agencies, and individuals who might have knowledge and/or concerns about traditional cultural resources, practices and beliefs specifically related to the Kēkaha cable landing project area. This effort was made by letter, e-mail, telephone or in-person contact. In the majority of cases, letters - along with a map and aerial photograph of the project area - were mailed with the following text:

In collaboration with the engineering firm of Parsons Brinckerhoff Quade and Douglas (PB), Cultural Surveys Hawai'i (CSH) is conducting a Cultural Impact Assessment for Sandwīch Isles Communications, Inc. (SIC). SIC is building the telecommunications infrastructure for the Department of Hawaiian Home Lands (DHHL). The SIC network will include an underground fiber optic line and landing within and offshore of DHHL property in Kēkaha, Kaua'i. The purpose of the assessment is to determine if there will be any impacts to traditional cultural practices by the proposed cable landing. The cultural assessment is being done in conjunction with Environmental Assessments on Resources (EA). A map of the proposed undertaking and a statement from the developer are enclosed for your reference.

The purpose of this assessment is to identify any traditional cultural practices associated with the project area, past or present. We are seeking your kōkua and guidance regarding the following aspects of our study:

1. General history and present and past land use of the study area.
2. Knowledge of cultural sites which may be impacted by the project, for example historic sites, archaeological sites, and burials.
3. Knowledge of traditional gathering practices in the study area, both past and on-going.
4. Cultural associations with the study area through legends, traditional use or otherwise.
5. Referrals of kāpuna or anyone else who might be willing to share their general cultural knowledge of the study area.
6. Any other cultural concerns the community might have related to cultural practices in the nearby area.

The focus of this study is to document the potential impacts to cultural practices or resources of the proposed SIC fiber optic cable landing undertaking. We ask that you limit your responses to this specific topic.

RECEIVED AS FOLLOWS

Attempts were made to contact twenty-nine individuals who are either residents or former residents of the area, or who represent cultural organizations and government agencies (see Table 3 below). The organizations and agencies include: the Office of Hawaiian Affairs, the Kaua'i Historic Preservation Review Commission, the Burials Program of the State Historic Preservation Division, and the Culture and History Branch of the State Historic Preservation Division.

Table 3

Name	Affiliation	Comments
Abeloa Ka Ahemana	Hawaiian civic organization	
Alana, Keipo	Hanalei Resident/Kaua'i Archeologist	Dave referral; consented to be interviewed
Azala Elizabeth	Hanalei Resident	
Benjamin, Ili	Educator	
Dudwell, Andrew	Kaua'i Health Heritage Corridor Committee	
Gasileo, Kani	QLCC-Kaua'i Unit	
Holi, Wilma	Educator	
Iida, Ron	Royal Order of Kamehameha, Kuamant'i Chapter No. 3	
Kama, Gracie H.	Kaua'i Island Burial Council	
Kanohi, Richard	West Kaua'i resident	
Kanoho, Ears	State Representative 13 <sup>th</sup> District	
Kaohi, Akiba	Director, West Kaua'i Visitor Center	Dave referral; consented to be interviewed
Kaohi, Lionel	West Kaua'i resident	
Kanaka, Arabella, France	Office of Hawaiian Affairs/Kaua'i Island Burial Council	
Kapulehi, Kani	State Historic Preservation Division/Cultural Historian	

V. KAMA'ĀINA INTERVIEWS

Presented below are summaries and excerpts of the three kama'āina informant interviews conducted for this cultural impact assessment. The summaries and excerpts focus on the information in the interviews most pertinent to land uses and traditional cultural resources, practices and beliefs related to the Kekaha cable landing\* project area. Full transcripts of the interviews are located in the appendices at the end of this assessment.

**A. Kaiipo Akana**  
 Kaiipo Akana was born in Waimea, Kaua'i in 1934. During the 1940s, his family resided in Kekaha. A lifelong West Kaua'i resident, Mr. Akana's involvement in Hawaiian cultural affairs includes service on the Kaua'i Native Islands Burial Council. He is currently employed by Cultural Surveys Hawai'i as a field and lab technician on the Kaho'olawe Island Ordinance Clearance project. In 1994, he participated in Cultural Surveys Hawai'i's inventory survey of a parcel that included the current project area (Masterson et al. 1994a). Mr. Akana was interviewed at his home on Kaua'i on May 19, 2003.

Mr. Akana's family moved to Kekaha "about 1942" and lived there until 1946 or '47:

*We moved to the outskirts of Kekaha which is referred to as the Hawaiian Camp area. We moved to Kekaha right where the St. Theresa's School is. We lived right there on the beach about a mile and a half from where the actual project area is going to be...*

*Most Hawaiians lived in that camp. There were other nationalities too. Mixed. But it was referred to as Hawaiian Camp because mostly Hawaiians lived in that camp.*

*Some of the houses were plantation and others were privately-owned homes in that camp area. It was on the west side of Kekaha School. Right on the end of Kekaha School, west of that, from there on to the end of the road was considered Hawaiian Camp. Behind the Hawaiian Camp, during the war, was all a military camp. All the way out to where the beach is. And all the way to this project area on Akiaola Road was all military.*

*All the time there was non-plantation people [living in Hawaiian Camp]. But most of the people that lived in that area worked for the plantation. A few families worked for the county. Like my dad did. Or worked on the base, for the military base, during the war. But I would say, from the beginning, most of the people worked for the sugar plantation.*

Asked to estimate the size of Hawaiian Camp, Mr. Akana remembers:

*It extended west from the Hawaiian Cemetery to the present Akiaola Road. Beyond Akiaola there was nothing. There was no housing beyond here [Akiaola Road]. This is where the sugar plantation used as a dumping ground for their bagasse and sugar cane waste. And right around here on Akiaola used to be the county dump. And all this area behind the cemetery there was no housing. It used to be military, when I was growing up, all the way out to the Catholic school. Just*

Name	Affiliation	Comments
Kikuchi, William Pils	Kaua'i Archeologist	
Lauritzen, Mike	DLNR land agent	
Lovell, Carol	Kaua'i Museum	
Lovell-Oshiro, Cheryl	Kaua'i Resident	
Markell, Ke'iana	Details Program, State Historic Preservation Division	
McBlowney, Holly	State Historic Preservation Division	
McMahon, Nancy	State Historic Preservation Division, Kaua'i Archeologist	
Perry, Warren	Boy's Order of Kamehameha, Kamehameha Chapter 3	
Revelman, Mary	Kaua'i Historical Society	Assisted with maps and historical documentation
Rogers, Lucille	Ala Uka, Inc./Ke Ola Pono No Ni Kipuka	
Sommers, Molly	Kaua'i Community College	
Trenbath, Heleah	Cultural practitioner	
Tsuchiya, Rick	Kaua'i Historic Preservation Review Commission	Responded, gave referrals
Yes, Peter	Office of Hawaiian Affairs	Responded, gave referrals

Referrals given by the individuals and organizations contacted resulted in interviews with three West Kaua'i residents - Kaiipo Akana, Alelia Kaohi, and Tenuo Oshiro - who have personal knowledge and specific concerns related to traditional cultural practices in the vicinity of the Kekaha cable landing project area. Apart from the interviewees, the others contacted made no claim to specific knowledge of traditional cultural resources, practices, beliefs or related concerns within the cable landing project area.

RECEIVED AS FOLLOWS

## Community Contact Process

past the Hawaiian Camp was Kekaha School. All the beachfront area, there was nothing.

Mr. Akana further described the beachfront area outside the Hawaiian Camp:

*There were no homes. Things that grew there was the hau. All along the beach area, all the way down to Akiakoa (Road). Beyond Akiakoa there was nothing. After the military left, after 1945, all the military buildings that were there were absorbed by the plantation people. The plantation people took [the military buildings] and they built more homes and camps. I guess the military gave [the buildings] to the community, the residents who wanted to take the wood and [other materials].*

Mr. Akana states that the sand beach was much wider in the 1940s:

*As I remember there was no highway in the front around the beach at that time [in the early 1940s]. There was no highway. The sand extended, the beach extended, about a quarter- to a half-a-mile out from our house. There was a small dune and on the dune there were hau trees along the beach line. Actually, where you see the waves breaking right now, that's where the beach used to be. [The military put a road from just outside of Waimea, alongside the beach, headed for Barking Sands. Before that the road went up toward the pali side - Waianawa and Kamailewa - and then ended up in Mānā itself]*

*At that time, most of the places that are considered fishing areas now actually were sand. Where we lived, before they put the road in, from my house we had to walk about a quarter- to a half-a-mile out before we got to the shoreline. Over a small dune. So what you see today is actually not what was there when I was growing up. It's completely different.*

*At my memory tells me, the sand extended way out there [close to the reef] and there was hau bushes in the front. Actually the hau bushes grew up on this dune and the beach was after that.*

He dates the erosion of the beach to the late 1950s with the construction of the Kikioala Small Boat Harbor:

*Most of the sand that was [eroded] from there happened after they made that boat harbor. I'm trying to think now, they have a point over there, Oomanoa Point, which is just down the road from St. Theresa's School. Then the Kikioala Boat Harbor. My guess is [the erosion] started when that boat harbor was constructed. The beach area started changing. Oftentimes, it will bring a lot of sand back. And then, after stormy weather, it will take all the sand away again. But that was what I remember, living on the beach over there.*

Mr. Akana remembers people fishing off the beach fronting his family home and in the vicinity of the current project area during the 1940s. Fishing continues into the present day:

*They still fish. Mostly shoreline fishing. Casting from the shoreline. You always see people all along this beach here. Everyday, weekdays and weekends. You'll see people parked there and casting lines out there. So I would say, because of the reefs out there, that there's still good fishing in the area.*

## Community Contact Process

A family member told Mr. Akana what Kekaha was like in traditional Hawaiian times before the plantation:

*From what I learned from my great-grandmother, on my father's side of the family, she told me that in old Hawaiian times that was all beach land before, where Kekaha is now, and people used to live [more muska] around Pōhī, Kamailewa, and Waianawa. But below [makai of these areas] nobody lived there because it was all beach. And toward Mānā it was all swamp land.*

Mr. Akana has not heard any traditions or legends focused specifically on Kekaha. He does not recall seeing any surface archaeological sites in Kekaha in the vicinity of the project area:

*If there were any they probably were disturbed previously to us moving to Kekaha. But I hardly think there would be any because, as I can remember from way back, I was told this was all beach land before [the 20<sup>th</sup> century].*

However, there is a possibility that burials are present in the area:

*They might [be present]. [Mr. Akana discusses the 1994 archaeological survey of a parcel which included the current project area that he participated in:] You know we did the survey of this whole back area. I think we found three burials, two or three burials in the sand.*

## B. Aletha Kaohi

Aletha Kawelakawahinoholimaloa Goodwin Kaohi was born (in 1930) and raised in Waimea, Kaua'i. She is the manager and Hawaiian culture resource advisor at the West Kona Visitor Center in Waimea. Mrs. Kaohi was interviewed at the visitor center on May 21, 2003. Mrs. Kaohi's first recollections of Kekaha date to her childhood:

*Because I grew up in Waimea, Kekaha is very much a part of Waimea. They did everything together. I don't recall that they had any large stores, when I grew up, in Kekaha. Maybe Kuraemoto Store was the only store that I could think of. And maybe some small Chinese shop. But other than that, most of the [Kekaha] people came to Waimea. There were no hotels. There was no financial institution in Kekaha. It was mainly a plantation town. So Waimea was really the hub and this outlying community [at Kekaha] still came to Waimea for the essentials. There are families in Kekaha like the Kilauano family. Aipoolani family that originally lived out in Mānā. And when they were displaced from the properties there because of Knudsen's becoming the konohiki, they had to move to Kekaha. They were very active in Hawaiian affairs like Kamelameha Day. My family was, too, so we had a lot of interaction with them. So Kekaha was like an extended part of Waimea.*

Mrs. Kaohi spoke of the "Hawaiian Camp" at Kekaha:

*The plantation set up these camps [where] mostly Hawaiians lived. That's where the Kilauano lived. They're probably one of the old-time families of Kekaha - Kilauano, Aipolani. And they're all related. These people all came from Mānā. The Kaiwas - they all came from Mānā. So they all lived within the same block [sized area]. Right where the school is - where Kekaha School is - west of Kekaha*

Community Contact Process

Mrs. Kaohi commented on burial concerns related to Kekaha and the project area:

...There must have been families that lived there because I know when they did the Kekaha Gardens, they did come across some skeletal remains. But, you know, at that time the laws were not that stringent as today - that you have to call an archaeologist, right? So I don't even know what happened after that...

...Hawaiian Homes went in during the '50s, I believe. That's west of where this [project area] is. I don't recall, when Hawaiian Homes went in, that [burials] were encountered. This was all kiawe trees, at that time. So, as long as you're not disturbing it, there's nothing going to be said about [burials]. But when the Kekaha Gardens went in, that's when I heard that [burials] were encountered.

I've just heard that Hawaiian Homes is going to be expanding. They're going to open up more Hawaiian Home Lands and it's toward the Mānā area. And I know that this project is mainly going to enhance the Hawaiian Homes communities there. So the expansion is great but I just have a gut feeling that they're going to come across a lot of burials in that area. Because it's sandy and I believe it had a fairly large population there. It might have been a fishing village. Because, on the outskirts, as they were doing the Kekaha Gardens they began to come across some skeletal remains. I just think that expanding the area for the Hawaiians would be great and they just have to be sensitive. If they come across [burials] just treat them with respect and the Burial Council needs to come in and take care of it. Some people get very upset and want to leave it there. If the Hawaiians knew that this was going to be developed they would have buried everybody in one place. But it was very common to bury than on your property. And now that the property is being developed, take [a burial] out respectfully - to me that's okay. You just have to treat the 'iwi with great respect.

Asked for her concerns about the cable landing project and its impact on the culture of the area, Mrs. Kaohi observed:

My concern is because the beach is very populated now - a lot of our visitors as well as the local people. I drove out there a couple of evenings ago because I just wanted to see what it was like. It was a Friday evening and there local people camping all along the beach - five, six families out there camping on that stretch. So my concern is: is [the cable line] going to be buried? Is it going to be unseen? Is it going to disturb the area? Is it installed so that those who are sunbathing are not going to receive any [harmful emissions]? Those are some my questions. How does it affect the area [in ways] that you can't see? Does it emit anything out that would affect people who sunbathe there?

I hope whatever is [constructed] to house whatever equipment [is installed for the project] has an aesthetic look, that it blends and doesn't stand out like a sore thumb. Especially if it can be seen from the ocean. Because that

Community Contact Process

School. And then across the road there were more Hawaiians. So now Hawaiian Homes has extended back toward the ocean side.

Asked to estimate the number of Hawaiian people in Kekaha in the 1930s and 40s, Mrs. Kaohi noted:

I cannot guess because they're all related. So you have Kaiwaa. You have Kilauea. You have Aipohani. And these, again, have plenty offspring. Akia is part of that. You have the Moore [family]. His last name was Moore but they're Hawaiians. It took up almost an entire [block] from the school to Kekaha Gardens. So if you go back there now you see tracts of land. There was Kaiwa, Kilauea. Maybe about twelve, thirteen families. I'm just guessing. But you've got to remember that each family has multiplied. And the Hawaiian cemetery is right there too. And they're all buried in there. There was one parent family and then you've got all these others. So thirteen, fourteen. I don't know. To me there were plenty. You have to remember: to the eyes of a young child, everything looks so big.

Mrs. Kaohi recalled the subsistence activities of Kekaha folks and the environmental constraints they had to deal with:

They did a lot of fishing...there was not a lot of water - Kekaha is a very arid area. You have to remember it's a plainland. So they go in and they drain the land so that they can cultivate it. So then there's no water for [the Hawaiians] to plant taro. And they were accustomed to planting taro out in Mānā, close to the poi and also on these little ridges. So they cleared some properties further out into the Mānā area because Kekaha could not [provide] that kind of resource. The families still went out to Mānā because they had burial grounds in the sand dunes there, which they now call Queen's Pond, toward the base. South of Queen's Pond, the families still had [burial] grounds and they maintained them. And family buried up in the caves. So Kekaha didn't have, what we would call, all the resources. Very little water. Unless you went up to Waiawa. Now Waiawa, Knudsen had the lease on that. So you didn't have many resources. I don't know about other gathering. Mostly it was fishing.

While Mrs. Kaohi does not know if people were fishing off the beach specifically in the location of the present project area, she described general fishing practices in Kekaha:

But I know they did fishing [in Kekaha] and part of it, they could have gone out on canoes and do deep-sea fishing. But [shoreline fishing] was throw net. They didn't do pole [fishing]. Mostly, it was throw net or go out and hukilau.

Mrs. Kaohi does not remember any surface archaeological sites or historical sites in the vicinity of the project area. She recalls that portion of Kekaha as "being real sandy, covered with kiawe trees." She also does not recall any legends, stories or traditions associated with Kekaha. However, Mrs. Kaohi did note that songs have been written about the area, including one "about the 'i'iili bird. That's about the plovers and that refers to Kekaha. Because that's where the 'i'iili birds would come - on the beach there, in that area. Of course, you know, it was not developed, like now, so there used to be flocks of 'i'iili birds."



RECEIVED AS FOLLOWS

Community Contact Process

would be really ugly to have a monstrous building that would draw quick attention to it. But if they can blend it in or have foliage that would camouflage it - just the aesthetic look - so that it doesn't ruin whatever is there already.

C. Teruo Oshiro

Teruo Oshiro was born in 1927 at Koloa, Kauai. In 1933, his family moved to Kekaha where his father worked for Kekaha Sugar Company. Mr. Oshiro grew up in Kekaha and, following military service in World War II, worked for Kekaha Sugar until 1961. He then worked at the Kōke'e missile tracking station for 27 years. Presently retired, Mr. Oshiro continues to live in Kekaha. He was interviewed on May 20, 2003 at the Kekaha Neighborhood Center.

Mr. Oshiro described where his family lived in Kekaha and the appearance of the landscape in the vicinity of the present project area:

*Before, in our days, the camps were all divided: Hawaiian Camp, Kuroji Camp, Hoole Camp. I lived in Kuroji Camp, right by the theater. The theater is gone now but right over there I used to live. I lived there for quite some time. When I came back from the Army we had to move someplace else.*

*Well, this area was all kiawe trees. And I remember there was an old Filipino man who used to take care the rubbish dump. He had a big cart with big wagon wheels, and a mule. But now they got a big nice dump. You just drive up, dump things. But those were the days when the rubbish was all dumped over here. At least they made some improvement. They got low-income housing come up over here.*

Asked about the number of Hawaiian families in Kekaha during the 1930s and '40s, Mr. Oshiro recalled:

*Well, I tell you, they had quite a few Hawaiians. But they were kinda scattered. You say Hawaiian Camp but it was scattered.*

Because of the low plantation wages ("\$1.27 one day - not one hour - one day") Kekaha people also hunted and fished for their food. As for poi:

*Well, they had some taro patches over here in Kanalewa, Limaloa, where Gaspar used to live. Where the pump was. Oh, Andy guys used to raise taro. I went to his taro patch [to] get taro.*

Mr. Oshiro was a fisherman in his youth and continues to fish today. He described fishing in his youth and some of the Kekaha mentors who guided him:

*We caught only whatever we needed. Well, if you had anything extra you shared with the other guys. The neighbors were really happy because they weren't in a position to get fish. I was lucky because I had the connection with Joe Kunalama. He was the best [fisherman] over here. And next to him was Anderson Kilauano. I was bog boy for the two guys so I know. I know. When they catch fish they really catch fish. I was lucky because they*

Community Contact Process

took me on the boat. I used to be the smallest boy over there. Helping, all that. They appreciated me because I could do something. And I appreciated them because they took care of me. That's how it was - back and forth.

Mr. Oshiro described the hukilau net fishing that occurred off the Kekaha coastline, including the area fronting the present project area:

*I tell you, this area here before - These days, from here, somebody up on the hill look for where get fish. Now, it's so modern: they get a plane flying. But for us, in the old days, they had the one guy, the spotter, he had his special rock spot. And then they call all the guys, get the nets and go out. Then they set the nets.*

*All over here [including the area makai of the project area]. You see, wherever the fish is.*

He notes, however, that the fish were more plentiful - west of the present project area - where the plantation ditch emptied into the ocean:

*But, like I say, like here [where the plantation ditch drains into the ocean] that's where [the fish] want to come back to. So the fish used to come close by where the fresh water goes out. So, it depends - anywhere over here. But, I say, [the fish] like the fresh water. In the old days you couldn't hold back anything. Anything come from the mountain it go right out to the ocean. But now these guys stop 'em, lock up this and that. That's why they get lots of problems.*

Mr. Oshiro was asked if the ocean makai of the present project area had any special fishing, diving or reef areas:

*As far as diving over there, not much. I used to dive more toward the Mānā side, the ditch area [where the ditch emptied into the ocean]. Right inside here [where the ditch emptied] get the reef over here. I used to work up Kōke'e. We see: "Ooh, the water nice today." Take my spear and go down. Get lobster.*

Mr. Oshiro spoke of the changes in the Kekaha community following the closing of the plantation:

*Well, I tell you, like I say, before I used to know every person living in Kekaha. Where they lived, where the father and mother work or whatever. Today, it's changed so much. Lot of these outside haoles. Who own this house here? Who own this house here? All haoles. And they pay big bucks for 'em. Like us we cannot afford that kind. If they stay, make house and stay, it's all right. But they make house, they sell 'em. That selling price is so high. So it bring up the other guys' property tax and all that. But who can buy all those things already? It's only the outside guys. They come from the Mainland. They like stay here. Oh, the beach is close by. They have something already and they get the money*

*for buy so they buy. They get the bucks. They going retire here, all right. But they sell the house and then what? They go someplace else again.*

*...The plantation went down, no more work, no more money. And that's the only guys get the money they can build.*

*...the kids all go. That's the thing. The kids should stay and do all the rest of the stuff. But no can because the kids they no can stand this kind life. They like fast life. Go here. Go there. Get mixed up in the traffic and go.*

Mr. Oshiro does not recall seeing or hearing of any traditional burials in the vicinity of the project area. He was asked for any concerns over the impact of the fiber optic line on fishing in the area:

*The only fishing [concern] is that the abule will come around here. You see the abule like this area over here. But then, before, me and Benny [Nakaahiki] and our crew, we used to catch plenty abule over here. But what stop us now is the airplane. [The commercial fishermen with the airplane spotters] are the ones that are catching all the fish over here.*

Summing up any general concerns he might have about the cultural impact of the project, Mr. Oshiro stated:

*The thing is, I look for progress. If it's progress for the Hawaiians it's all well and good. As far as fishing, it's not going to bother nobody because this an open area and it's not where only you can go over there. It's open for everybody and so it's okay.*

#### VI. ASSESSMENT OF FIBER OPTIC CABLE GAP AREAS

The existing Sandwich Iles fiber optic cable line currently runs west along Kaunualii Highway to the intersection of 'Alae Rd. In order to connect the existing line to the proposed cable landing site at 'Aki'aloa Rd., the fiber optic cable "gap areas" must be addressed through additional subsurface cable installation. Trenching is proposed west along Kaunualii Highway from 'Alae Rd. to 'Aki'aloa Rd., as well as north along 'Aki'aloa Rd. and west along Ulihi Rd. (Figure 10). The proposed trenching would occur along existing roads in soils listed as Dune Land (DL) and Jaucas Loamy Fine Sand, 0 to 8 percent slopes (JIB) (Footnote et al. 1972).

The three interviewees were asked for any cultural concerns regarding this additional subsurface cable installation. The only concern mentioned was the possibility of encountering human remains in Dune and Jaucas series soils. This concern may be addressed through on-site archaeological monitoring for all trenching associated with the fiber optic cable gap areas.

RECEIVED AS FOLLOWS

RECEIVED AS FOLLOWS

VII. TRADITIONAL CULTURAL PRACTICES IN KEKAHA AND THE CABLE LANDING PROJECT AREA

Reviewing the information provided by the elements of this cultural impact assessment - historical documentation, archaeological research, and kama'aina interviews - there emerges a more detailed picture of the traditional landscape of Kekaha and the current project area.

Permanent habitation areas were mainly among the mauka foothills, at the bases of the shore-facing cliffs. Extending up the gulches were agricultural areas watered by rainfall and intermittent streams. This has been confirmed by the archaeological investigations of Bennett (1931:103) and Sinoto (1978:2-6).

Makai of the foothills were fishponds and cultivated wetlands fed by springs. Beyond this was the great swamp, then the broad stretch of the sand lands which continued to the shoreline. Fishing camps and other temporary habitation areas existed on the beach, and in the inland stretches of the sand there were burials.

This scenario was likely in place at the time of first western contact and remained relatively undisturbed throughout most of the 1800s.

Since then, much physical evidence of this traditional Hawaiian landscape has been obliterated by commercial agriculture and other operations. The foothills and wetland areas have been extensively planted in cane, livestock has been run up the gulches, and even the beach areas have been much disturbed by massive shoreline stabilization projects.

In 1994 Masterson et al. (1994a) conducted an inventory survey with subsurface testing which covered the current project area. No surface sites were located. Extensive subsurface testing throughout the project area revealed two areas containing buried cultural layers (50-30-05-700, -703) and two human burials (50-30-05-701, -702).

All three of the kama'aina interviewed for this cultural impact assessment described the current project area as a portion of the sand dunes of Kekaha, covered in kiawe and hau, back in the 1930s and '40s when they first experienced the area. Two of the interviewees mentioned the burials that have already been encountered in sand. Makai of the cable landing site, the interviewees noted observing or participating in various fishing activities including: pole fishing from the shore, diving, throw net casting, and hukilau.

Based on the above documentation, traditional cultural practices associated with the current project area would include, on shore, temporary fishing camps with associated activity areas and human interment, and, offshore, fishing.

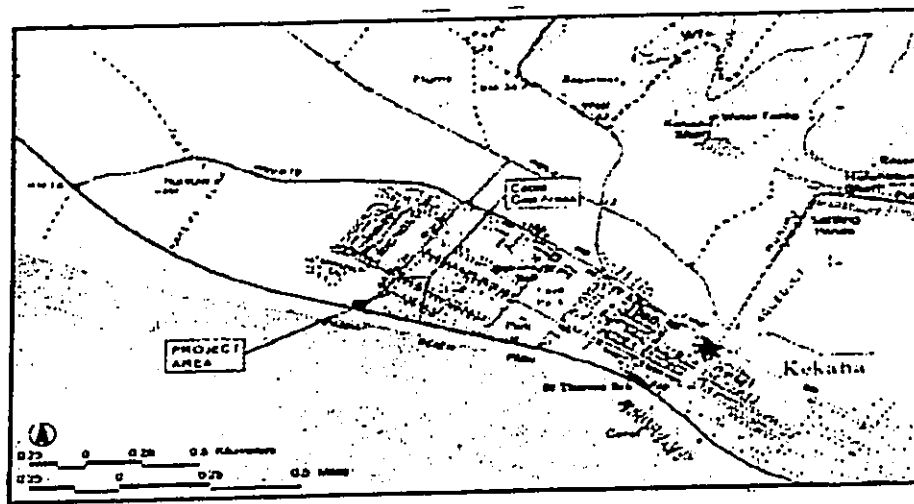


Figure 10 USGS GS Map Showing the Location of Proposed Trenching Associated with Fiber Optic Cable Gap Areas.

RECEIVED AS FOLLOWS

Summary and Recommendations

VIII. SUMMARY AND RECOMMENDATIONS

A. Summary

The background historical and archaeological findings examined for this cultural impact assessment indicate that, in traditional Hawaiian times, the current Kekaha cable landing project area was within a stretch of sand dunes between the ocean and Kekaha's permanent settlement areas located at the mauka foothills. Traditional cultural practices typically associated with such sand dunes include fishing camps with associated activity areas and human interment.

For most of the 20th century, ethnic camps for Kekaha Sugar Company workers occupied much of this part of Kekaha, though the current project area itself appears never to have been built upon.

Formal interviews were conducted with three knowledgeable West Kaua'i informants: Aieha Kaohi (Waimea kupauna and manager of the West Kaua'i Visitors Center), Teruo Oshiro (Kekaha resident, fisherman, and former plantation employee), and Kaijo Akana (West Kaua'i kama'aina, Kekaha resident in the 1940s, and former member of the Kaua'i Burial Council). These kama'aina confirmed that, back in the 1930s and '40s, the project area was recall the project area as portion of the sand dune and kiawe landscape outside the plantation camps. The interviewees noted various fishing activities that took place (and continue to take place) muskai of the project area during the '30s and '40s.

B. Recommendations

The specific concerns related to cultural issues noted by the three interviewees include:

1. The possibility that burials may be encountered during excavation for the project.
2. A concern that the installation of the cable and cable facilities does not detract from or destroy the beauty of the area.
3. A concern that the cable is free of harmful emissions.
4. The only traditional cultural practice associated with this section of Kekaha was fishing. The concern is that installation of the cable does not affect the reef and fishing resources along the coast.

It is recommended that these concerns be resolved through consultation and coordination with the Kekaha community. If the concerns are addressed, the Kekaha cable installation should not have any adverse impact upon native Hawaiian cultural resources, beliefs and practices.

References

IX. REFERENCES

- Bennett, Wendell C.  
1931 *The Archaeology of Kaua'i*, Bishop Museum Bulletin 80, Honolulu.
- Board of Commissioners  
1929 *Indices of Awards by the Board of Commissioners to Quiet Land Titles in the Hawaiian Islands*, Native Register and Native Testimony, Hawaii State Archives, Honolulu.
- Bordner, Richard M.  
1977 *Cultural Reconnaissance Report for Kekaha Beach Shore Protection, Kekaha, Kona, Kaua'i, State of Hawaii*, Archaeological Research Center Hawaii, Inc., Lawa'i.
- Char, Tin-Yuke and Wai Jane Char  
1979 *Chinese Historic Sites and Pioneer Families of Kauai*, Hawaii Chinese History Center, Inc., Honolulu.
- Ching, Francis K.W.  
1982 *Archaeological Reconnaissance of 3 Sites for Proposed Kauai Central Sanitary Landfill Project, Kekaha, Kipu, and Kumuakua, Kauai Island TMK 1-2-02-1, 9, 21, 40, 3-4-06-12; and 4-7-04-1*, Archaeological Research Center Hawaii, Inc., Lawa'i.
- Cox, David Walter  
1975 *Burials and Other Archaeological Observations, Waimea Town Sewerage System, Phase II, Waimea, Kona, Kaua'i, Hawaii*, Archaeological Research Center Hawaii, Inc., Lawa'i.
- Dixon, George  
1968 *A Voyage Round the World: But More Particularly to the North-West Coast of America*, Da Capo Press, New York.
- Evans, T. J. K.  
1921 *Kekaha Cane and Pasture Lands, Waimea, Kona, Kauai (Map)*, Hawaii Territory Survey, Walter E. Wall, Surveyor.
- Folk, William H. and Hallett H. Hammett  
1993 *Archaeological Inventory Survey and Subsurface Testing at the Kekaha Phase II Landfill Site (TMK 1-2-02-9)*, Cultural Surveys Hawaii, Kailua, HI.

RECEIVED AS FOLLOWS

References

- Folk, William H. and Hallett H. Hammatt  
1994a Archaeological Inventory Survey and Subsurface Testing at the Hawaii Army National Guard Firing Range at Kekaha, Kona I. (TMK 1-2-02:21). with Historical Research by Gerald K. Ika, Cultural Surveys Hawaii, Kailua, HI.
- 1994b Archaeological Inventory Survey and Sub-surface Testing of Houselots on 2.5 Acres at Kekaha, Kona I. (TMK 1-3-04:6&15) with an Historical and Cultural Overview by Gerald Ika, Cultural Surveys Hawaii, Kailua, HI.
- Footo, Donald E., E.L. Hill, S. Nakamura and F. Stephens  
1972 Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii, U.S. Dept. of Agriculture, U.S. Government Printing Office, Washington, D.C.
- Giambelluca, Thomas W., Michael A. Nullet and Thomas A. Schroeder  
1986 Rainfall Atlas of Hawaii. Department of Land and Natural Resources, Honolulu, HI.
- Gmy, James W., surveyor  
1875 "Boundary of the Ahupua'a of Waimea" surveyor's notes included in No. 28 Certificate of Boundaries, Land of Waimea District of Waimea, Island of Kauai, Decision rendered: July 10, 1875 by Duncan McBryde, Commissioner of Boundaries for the Island of Kauai.
- Hammatt, Hallett H.  
1996 Letter Report on Archaeological Subsurface Testing of an Approximately one-acre parcel (TMK 1-3-03:50), Kekaha, Kona I. Cultural Surveys Hawaii, Kailua, HI.
- Hammatt, Hallett H. and David W. Shideler  
1999 An Archaeological Monitoring Report at a 6-Acre Parcel in Kekaha, Ahupua'a of Waimea, Kona District, Island of Kauai (TMK 1-3-03:15, 19, 23). Cultural Surveys Hawaii, Kailua, HI.
- Handy, E.S. Craighill and Elizabeth G. Handy  
1972 Native Planters in Old Hawaii: Their Life, Lore, and Environment, Bishop Museum Bulletin 233, Honolulu.
- Heidel, Melody J., William H. Folk and Hallett H. Hammatt  
1997 Archaeological Inventory Survey and Sub-surface Testing of House Lots on a 6-Acre Parcel at Kekaha, Island of Kauai, (TMK 1-3-03:15, 19, 23), with an Historical and Cultural Overview by Gerald Ika, Cultural Surveys, Hawaii, Kailua, HI.

40

References

- Hofgaard, Christopher B.  
1991 "The Story of Piilani," *The Kauai Papers*, Kauai Historical society, Lihue.
- Ika, Gerald and Hallett H. Hammatt  
1992 Archaeological Inventory Survey with Sub-surface Testing of a One-Acre Lot, Kekaha, Kona I. (TMK 1-3-02:2 lots 86A and 86B), Cultural Surveys Hawaii, Kailua, HI.
- Imlay, L. E.  
1891 Map of Kauai compiled from Government Surveys and Private Surveys of Land Belonging to Gay and Robinson, Tracing by H.E. Newton in 1903.
- Joesting, Edward  
1984 Kauai: The Separate Kingdom, University of Hawaii Press and Kauai Museum Association, Ltd., Honolulu.
- Kelly, Marion  
1971 Kekaha: 'Aina Molo'o: Historical Survey and Background of Kaloko and Kaki'o ahupua'a, North Kona, Hawaii, B.P. Bishop Museum Department of Anthropology Report, 71-2, Honolulu.
- Kikuchi, William K.  
1985 The Waimea Twelve-Inch Transmission Main, Waimea Intake Towards Waimea Town, Waimea, Island of Kauai.
- Knudsen, Eric A.  
1991 "Early Days at Waiawa," *The Kauai Papers*, Kauai Historical society, Lihue.
- Knudsen, Eric A. and Gurte P. Noble  
1945 *Kanaka of Kauai*, Tongg Publishing Co., Honolulu.
- Knudsen, Valdenar  
1866 Letter to John Dominis, Commissioner of Lands for the Crown and Land Agent, Dated August 1, 1866, Hawaii State Archives.
- Lydgate, John M.  
1991 "William E. Rowell's Reminiscences of Waimea," *The Kauai Papers*, Kauai Historical Society, Lihue.
- Macdonald, G.A. and A.T. Abbott  
1974 *Volcanoes in the Sea*, University of Hawaii Press, Honolulu.

41

RECEIVED AS FOLLOWS

References

Wenkam, Robert  
1977 *Kauai: Hawaii's Garden Island*, Randy MacNally, New York.

References

- Malo, David  
1951 *Hawaiian Antiquities (Moolioo Hawaii)*, Translated from the Hawaiian by Nathaniel B. Emerson, 1898, Bishop Museum Special Publication, No. 2, 2nd edition, Honolulu.
- Masterson, Jan, Hallett H. Hammett, William H. Folk and Gerald K. Iida  
1984a *Archaeological Inventory Survey of Kekaha Housing Project (TMK 1-2-12:38, 1-2-02:34 & 38)*, Cultural Surveys Hawaii (Revised Jan 94).
- Masterson, Jan A., William H. Folk, Hallett H. Hammett  
1984b *Archaeological Inventory Survey and Sub-surface Testing of the Proposed Kekaha Agricultural Park in 137 Acres at Kekaha, Kauai*, (TMK 1-2-02:1 portion), Cultural Surveys Hawaii, Kailua, HI.
- McMahon, Nancy  
1988a *Field Inspection of Sand Mining Activities at Kawaiele, Kauai*, TMK 1-2-02:1, SHPD, Honolulu.
- McMahon, Nancy  
1988b *Field Check of Northrup King Digging, Mana, Waimea, Kauai*, TMK 1-2-02:40, SHPD, Honolulu.
- Pukui, Mary Kawena  
1983 *Olelo No'ona: Hawaiian Proverbs and Poetical Sayings*, Bishop Museum Special Publication No. 71, Bishop Museum Press, Honolulu.
- Pukui, Mary K., Samuel H. Elbert and Esther Mookini  
1974 *Place Names of Hawaii*, University of Hawaii Press, Honolulu.
- Sinolo, Akihiko  
1978 *Cultural Reconnaissance of Rock Borrow Areas Near Kekaha, Kauai, Hawaii*, Department of Anthropology, Bishop Museum, Honolulu.
- Spear, Robert L.  
1992 *Letter Report Concerning Monitoring for the Sinkles Shrimp Co., Ltd., Kekaha, Waimea Kauai*, (TMK: 1-2-02:22), Scientific Consultant Services Inc., Honolulu, HI.
- Thrum, Thomas G.  
1908 "Kekaha - Waimea Ditch," *The Hawaiian Annual for 1908*, Honolulu.
- Von Holst, Ida Elizabeth Knudsen  
1985 *Stories of Long Ago Nihoa, Kauai, Oahu, Daughters of Hawaii*, Honolulu.

RECEIVED AS FOLLOWS

Appendix A Kaiipo Akana Transcript

Oftentimes, it will bring a lot of sand back. And then, after stormy weather, it will take all the sand away again. But that was what I remember, living on the beach over there.

CSH: Do you remember approximately when the harbor was constructed?

KA: In the '50s. I think it was constructed in 1958 or '59. Around that time.

CSH: Was it around the same time that the road was constructed?

KA: The road was constructed somewhere around 1944. During the war.

CSH: So at the time the road was constructed the beach extended much further out?

KA: Yes.

CSH: You mentioned Hawaiian Camp. What people lived there?

KA: Most Hawaiians lived in that camp. There were other nationalities too. Mixed. But it was referred to as Hawaiian Camp because mostly Hawaiians lived in that camp.

CSH: Was it a plantation camp?

KA: No. Some of the houses were plantation and others were privately-owned homes in that camp area. It was on the west side of Kekaha School. Right on the end of Kekaha School, west of that, from there on to the end of the road was considered Hawaiian Camp. Behind the Hawaiian Camp, during the war, was all a military camp. All the way out to where the beach is. And all the way to this project area on Akaola Road was all military.

CSH: Do you have any idea how long Hawaiian Camp had been established over there?

KA: It had been there since the plantation-era days. I would say early 1900s.

CSH: Did it start off as a plantation camp?

KA: It could have.

CSH: And then evolved into a neighborhood with non-plantation people also living there?

KA: Yeah. All the time there was non-plantation people. But most of the people that lived in that area worked for the plantation. A few families worked for the county. Like my dad did. Or worked on the base, for the military base, during the war. But I would say, from the beginning, most of the people worked for the sugar plantation.

CSH: Were the houses mostly plantation-style?

KA: You know the houses that the plantation people lived in were mostly built plantation-style. And the houses like the one we lived in were kind of different. You could almost tell it was different from the plantation style. Some of the old plantation-style houses are still there, in that area, in Kekaha.

CSH: Did you ever hear any legends, any stories about that area when you were growing up?

KA: Not in that area. I haven't heard anything. There may be [legends and stories] but I haven't heard. That area, from the beach to where is considered Hawaiian Camp, was totally disturbed by the military when they were building camps there. So, if there was anything there before the military moved there, I have no idea.

CSH: That area is all sand?

Appendix A Kaiipo Akana Transcript

APPENDIX A: KAIPO AKANA TRANSCRIPT

Kaiipo Akana (identified as KA in the transcript below) was interviewed by Cultural Surveys Hawai'i (CSH) on May 19, 2003.

CSH: Can we start with your background on Kaula and the Waimea area?

KA: I was born in Waimea in 1934. I'm Kaiipo Akana. I grew up in Waimea, in the valley. Then, later on, my family moved to Kekaha.

CSH: What year was that?

KA: We moved to Kekaha about 1942.

CSH: So after World War II started?

KA: After the war started, yeah, we moved to Kekaha. We moved to the outskirts of Kekaha which is referred to as the Hawaiian Camp area. We moved to Kekaha right where the St. Theresa's School is. We lived right there on the beach about a mile and a half from where the actual project area is going to be. As I remember there was no highway in the front around the beach at that time. There was no highway. The sand extended, the beach extended, about a quarter- to a half-a-mile out from our house. There was a small dune and on the dune there were *low* trees along the beach line. Actually, where you see the waves breaking right now, that's where the beach used to be. And after they made the Kikioa Boat Harbor area, the erosion of the beach started happening. But before that the military put a road from just outside of Waimea, alongside the beach, headed for Daring Sands. Before that the road went up toward the *poi* side - Waiawa and Kaunalewa - and then ended up in Mānā itself.

I don't know much about fishing and areas of that place. I just know that fishermen always fished along the shoreline, as they do now. Even when the sand extended about a quarter- to a half-a-mile out.

CSH: So you're talking about major erosion.

KA: Major erosion. There was a huge beach that went all the way down to almost Kokole Point. All that area was a beach area.

CSH: So *makai* of the present project area, too, there was much more beach?

KA: Yes. At that time, most of the places that are considered fishing areas now actually were sand. Where we lived, before they put the road in, from my house we had to walk about a quarter- to a half-a-mile out before we got to the shoreline. Over a small dune. So what you see today is actually not what was there when I was growing up. It's completely different.

CSH: The erosion happened after the construction of the Kikioa Boat Harbor?

KA: Most of the sand that was [eroded] from there happened after they made that boat harbor. I'm trying to think now, they have a point over there, Oomano Point, which is just down the road from St. Theresa's School. Then the Kikioa Boat harbor. My guess is [the erosion] started when that boat harbor was constructed. The beach area started changing.

Appendix A Kaijoo Akana Transcript

KA: It's all sand. From what I learned from my great-grandmother, on my father's side of the family, she told me that in old Hawaiian times that was all beach land before, where Kekaha is now, and people used to live [more mauka] around Pōkī'i, Kaulalewa, and Waiawa. But below [makai of these areas] nobody lived there because it was all beach. And toward Mānā it was all swamp land.

CSH: So the actual settlements were more mauka. Do you remember, during the time your family lived at Kekaha, if there had been much ground disturbance for things like underground utilities?

KA: Underground utilities? I don't know. There were power lines on poles. Maybe for water lines, that might have been underground.

CSH: Were there water lines at that time?

KA: When we lived there, yeah, there was water.

CSH: So that was underground?

KA: Yeah. There were two kinds of water. They had what we referred to as "ditch water" that the plantation used for irrigation and they connected so people could irrigate their gardens and stuff like that. And then they had what they called "drinking water". Most of what we referred to as "ditch water" was outside the house. Any faucet that was outside the house was considered "ditch water". So we never drank the water from outside. We always went in and drank water from either the wash area or in the house. And everything outside is considered "ditch water."

CSH: Can you approximate how big an area Hawaiian Camp took up?

KA: It extended west from the Hawaiian Cemetery to the present Akialoa Road. Beyond Akialoa there was nothing. There was no housing beyond here [Akialoa Road]. This is where the sugar plantation used as a dumping ground for their bagasse and sugar cane waste. And right around here on Akialoa used to be the county dump. And all this area behind the cemetery there was no housing. It used to be military, when I was growing up, all the way out to the Catholic school. Just past the Hawaiian Camp was Kekaha School. All the beachfront area, there was nothing.

CSH: What was there?

KA: There were no homes. Things that grew there was the *hau*. All along the beach area, all the way down to Akialoa [Road]. Beyond Akialoa there was nothing. After the military left, after 1945, all the military buildings that were there were absorbed by the plantation people. The plantation people took [the military buildings] and they built more homes and camps. I guess the military gave [the buildings] to the community, the residents who wanted to take the wood and [other materials].

CSH: What kinds of structures did the military leave?

KA: Barracks for housing men. And of course during the war all along the beach was barbed wire. Rows and rows of barbed wire all around the island. But as far as I could see, from Waimea to Kekaha to Mānā, it was all barbed wire, huge barbed wire. And then there were what we used to call pillboxes. Those were bunkers that the military used along the shoreline. I think there was one bunker right by the Catholic school and another one

Appendix A Kaijoo Akana Transcript

farther down between the Kekaha School and Kalaiki. And all those bunkers were manned by military people.

CSH: Do you know where the barbed wire was, in relation to today's beachfront?

KA: The barbed wire would be out here somewhere [in the ocean]. [Mr. Akana discusses the more extensive beach area at Kekaha that he recalls during his youth.] From where we lived we had to walk quite a distance out [to reach the shoreline]. And there was some dunes right here [makai of his house], then no sand, and then the beach. Right on the outside of the dunes, towards the beach, was all the barbed wire.

CSH: Could you estimate the distance from your house out to the shoreline?

KA: About a quarter of a mile. At least. You know I cannot say the boat harbor actually caused all of the erosion but it caused most of the erosion. Because, before that boat harbor went in, we had a lot of beach access out there. From where we were living, at our house, you stepped out in the front [where the present road is] and you had quite a distance to the beach.

CSH: During the war, when the barbed wire was up, could people go fishing?

KA: Yeah, they could go fishing but it was limited to daylight hours. And at night there was blackout.

CSH: The barbed wire was continuous?

KA: It was pretty much continuous.

CSH: How did people get out to the shore to fish?

KA: I think where they would go out was where the bunkers were, if the military would let them. But I'm not positive about that because, as I remember, we could only go to the barbed wire.

CSH: What do you remember about the ocean and the beach outside of your house?

KA: Reefs. There were reefs out there. I remember that, where the waves are breaking right now, there's a reef right there. And the sand extended almost out to there, pretty much to there.

CSH: What do you remember happening out in this area after the war, after the barbed wire was removed? Do you remember what people were doing out here? Were there any specific ocean activities that you remember?

KA: Fishing. Right where the reef is. As my memory tells me, the sand extended way out there [close to the reef] and there was *hau* bushes in the front. Actually the *hau* bushes grew up on this dune and the beach was after that.

CSH: How long were you folks living out there?

KA: Until about 1947 or '46.

CSH: So after the war your family moved away?

KA: Yeah, back to Waimea.

CSH: But you returned to Kekaha to visit?



KA: Yeah. Most of my friends were in Kekaha. We grew up together so I spent a lot of time in Kekaha. So I'm quite familiar with Kekaha and the area where I grew up.

CSH: Did you ever hear of any burials in the sand near the present project area?

KA: Not this area. The burials came out further down. Ko'opuho area.

CSH: Do you think burials might also be present around the project area?

KA: They might. [Mr. Akana discusses a 1994 archaeological survey of a parcel which included the present project area by Cultural Surveys Hawaii that he participated in.] You know we did the survey of this whole back area. I think we found three burials, two or three burials in the sand.

CSH: So you believe there could be burials in the present project area?

KA: Possibility.

CSH: Did you hear of any surface archaeological sites in the Kekaha area?

KA: No. If there were any they probably were disturbed previously to us moving to Kekaha. But I hardly think there would be any because, as I can remember from way back, I was told this was all beach land before [the 20<sup>th</sup> century].

CSH: In more recent times, since the beach has eroded and since the highway has formed the boundary between the beach and Kekaha houselots, do people still fish out in this area?

KA: They still fish. Mostly shoreline fishing. Casting from the shoreline. You always see people all along this beach here. Everyday. Weekdays and weekends. You'll see people parked there and casting lines out there. So I would say, because of the reefs out there, that there's still good fishing in the area.

CSH: Do you have any concerns, as a *kama'aina* of this area, about this cable project?

KA: Personally I don't have any concerns.

CSH: Are you concerned that the project might disturb any fishing patterns, disturb any special fishing areas of the local residents?

KA: I don't know because that's beyond what I know about the place. If I hadn't been part of that archaeological survey I would hesitate to say I don't have any concerns. But because I was involved in the survey of the place and we did several trenches, anywhere from three to five meters long and about three meters deep. We found basically beach sand and we found midden which tells me that used to be shoreline before. But as far as any other archaeological concerns I don't have any.

CSH: And, to review, you mentioned that your great-grandmother told you that -

KA: She had heard that the main community of people lived along Pōki'i, Waiawa, Kaunalewa. And beyond [makai of these areas] it was all beach area. And beyond that [further west] was swamp lands of Mānā. I don't think it was like that during her lifetime but she did mention to me the stories that that [Mānā area] was all under water.

CSH: Thank you for this interview.

## APPENDIX B: ALETHA KAOHI TRANSCRIPT

Aletha Kawelukawahinehoholoolimāloa Goodwin Kaohi (identified as AK in the transcript below) was interviewed by Cultural Surveys Hawaii (CSH) at the West Kona Visitor Center on May 21, 2003.

CSH: May we start with your first memories of the Kekaha area?

AK: Because I grew up in Waianea, Kekaha is very much a part of Waianea. They did everything together. I don't recall that they had any large stores, when I grew up, in Kekaha. Maybe Kuramoto Store was the only store that I could think of. And maybe some small Chinese shop. But other than that, most of the [Kekaha] people came to Waianea. There were no banks. There was no financial institution in Kekaha. It was mainly a plantation town. So Waianea was really the hub and this outlying community [at Kekaha] still came to Waianea for the essentials. There are families in Kekaha like the Kilauna family, Aipoalani family that originally lived out in Mānā. And when they were displaced from the properties there because of Knudsen's becoming the *konohiki*, they had to move to Kekaha. They were very active in Hawaiian affairs like Kamehameha Day. My family was, too, so we had a lot of interaction with them. So Kekaha was like an extended part of Waianea.

CSH: I've heard mention of a Hawaiian Camp in Kekaha. Was that where -

AK: -- the Kilauanos lived. The plantation set up these camps [where] mostly Hawaiians lived. That's where the Kilauanos lived. They're probably one of the old-time families of Kekaha—Kilauna, Aipoalani. And they're all related. These people all came from Mānā. The Kuis -- they all came from Mānā. So they all lived within the same block [-sized area]. Right where the school is -- where Kekaha School is -- west of Kekaha School. And then across the road there were more Hawaiians. So now Hawaiian Homes has extended back toward the ocean side.

CSH: So in the time that you remember, as a child, there were plantation ethnic camps in that area?

AK: Yes. But they just called that the Hawaiian Camp.

CSH: Were Kekaha folks, at that time, making use of the area resources for their food, their subsistence?

AK: They did a lot of fishing. I know the Kilauanos, because there was not a lot of water -- Kekaha is a very arid area. You have to remember it's a plantation. So they go in and they drain the land so that they can cultivate it. So then there's no water for [the Hawaiians] to plant taro. And they were accustomed to planting taro out in Mānā, close to the *pali* and also on these little rafts. So they leased some properties further out into the Mānā area because Kekaha could not

RECEIVED AS FOLLOWS

RECEIVED AS FOLLOWS

- AK: Yes, Sand.
- CSH: I've heard of burials being exposed in sand deposits in Kekaha. Do you remember hearing of burials in this project area portion of Kekaha?
- AK: No. Hawaiian Homes went in during the '50s, I believe. That's west of where this [project area] is. I don't recall, when Hawaiian Homes went in, that [burials were encountered]. This was all *kiawe* trees, at that time. So, as long as you're not disturbing it, there's nothing going to be said about [burials]. But when the Kekaha Gardens went in, that's when I heard that [burials were encountered].
- CSH: I've heard that there was a plantation dump in the vicinity of the project area, where the plantation would dump waste materials. Did you hear about that?
- AK: I think that whole area had waste. They had to clear that out. I cannot tell you the specific area but I know they used to just call it the Kekaha Dump. Everybody was just dumping their stuff there but I don't know the extent.
- CSH: Did you ever hear of any surface archaeological sites, historical sites in the vicinity of the project area?
- AK: No. I just remember it as being real sandy, covered with *kiawe* trees. When they went in to do the Hawaiian Homes, it was *kiawe* trees, just real sandy.
- CSH: Perhaps we can discuss any concerns you may have about this specific project and how it might impact the area?
- AK: My concern is because the beach is very populated now - a lot of our visitors as well as the local people. I drove out there a couple of evenings ago because I just wanted to see what it was like. It was a Friday evening and there local people camping all along the beach - five, six families out there camping on that stretch. So my concern is: [the cable line] going to be buried? Is it going to be unseen? Is it going to disturb the area? Is it insulated so that those who are sunbathing are not going to receive any [harmful radiation]? Those are some my questions. How does it affect the area [in ways] that you can't see? Does it emit anything out that would affect people who sunbathe there? That's pretty much my main concern.
- CSH: As someone who is involved in the Hawaiian community and culture, do you have any other concerns about any other impacts on the Kekaha area by this project?
- AK: I hope whatever is [constructed] to house whatever equipment [is installed for the project] has an aesthetic look, that it blends and doesn't stand out like a sore thumb. Especially if it can be seen from the ocean. Because that would be really ugly to have a monstrous building that would draw quick attention to it. But if they can blend it in or have foliage that would camouflage it - just the aesthetic look - so that it doesn't ruin whatever is there already.
- CSH: Do you know of any concerns among the Hawaiian community in the area that, while not directly affected by this project, should be made known to the project planners and developers?

- [provide] that kind of resource. The families still went out to Mānā because they had burial grounds in the sand dunes there, which they now call Queen's Pond, toward the base. South of Queen's Pond, the families still had [burial grounds] and they maintained them. And family buried up in the caves. So Kekaha didn't have, what we would call, all the resources. Very little water. Unless you went up to Waiawa. Now Waiawa, Knudsen had the lease on that. So you didn't have many resources. I don't know about other gathering. Mostly it was fishing.
- CSH: Do you remember if folks were fishing of the beach near the present project area?
- AK: I don't really know what the beach is like out there. I never went to the beach as a youngster, in that area. Further down, where you can see lots of rocks, that was because of erosion that they had to put that there. I don't really know whether it's reef out there. And that would determine the kind of fishing. So I don't really know if it has reef. But I know they did fishing [in Kekaha] and part of it, they could have gone out on canoes and do deep-sea fishing. But [shoreline fishing] was throw net. They didn't do pole [fishing]. Mostly, it was throw net or go out and *hukilau*. But I really cannot answer you on that. I don't know the beach itself.
- CSH: Did you ever hear of any legends, stories, or traditions about this project area portion of Kekaha?
- AK: Not particularly, any legends on Kekaha. But I know that songs have been written. About the *'i'i'i'i* bird. That's about the plovers and that refers to Kekaha. Because that's where the *'i'i'i'i* birds would come - on the beach there, in that area. Of course, you know, it was not developed, like now, so there used to be flocks of *'i'i'i'i* birds. I really don't know of any legends in that area. There must have been families that lived there because I know when they did the Kekaha Gardens, they did come across some skeletal remains. But, you know, at that time the laws were not that stringent as today - that you have to call an archaeologist, right? So I don't even know what happened after that. No, I cannot help you with that.
- CSH: When you talk about the Hawaiian families - can you guess about how big the Hawaiian community in Kekaha was in the '30s, '40s? Number of people or of families?
- AK: I cannot guess because they're all related. So you have Kaiwa. You have Kilaunoi. You have Aipolani. And these, again, have plenty offspring. Akia is part of that. You have the Moore [family]. His last name was Moore but they're Hawaiians. It took up almost an entire [block] from the school to Kekaha Gardens. So if you go back there now you see tracts of land. There was Kaiwa, Kilaunoi. Maybe about twelve, thirteen families. I'm just guessing. But you've got to remember that each family has multiplied. And the Hawaiian cemetery is right there too. And they're all buried in there. There was one parent family and then you've got all these others. So thirteen, fourteen. I don't know. To me there were plenty. You have to remember: to the eyes of a young child, everything looks so big.
- CSH: You spoke about burials. Did you remember Kekaha as a sandy area?

AK: I've just heard that Hawaiian Homes is going to be expanding. They're going to open up more Hawaiian Home Lands and it's toward the Mānā area. And I know that this project is mainly going to enhance the Hawaiian Homes communities there. So the expansion is great but I just have a gut feeling that they're going to come across a lot of burials in that area. Because it's sandy and I believe it had a fairly large population there. It might have been a fishing village. Because, on the outskirts, as they were doing the Kekaha Gardens they began to come across some skeletal remains. I just think that expanding the area for the Hawaiians would be great and they just have to be sensitive. If they come across [burials] just treat them with respect and the Burial Council needs to come in and take care of it. Some people get very upset and want to leave it there. If the Hawaiians knew that this was going to be developed they would have buried everybody in one place. But it was very common to bury them on your property. And now that the property is being developed, take [a burial] out respectfully – to me that's okay. You just have to treat the 'iwi with great respect.

CSH: Thank you for this interview.

## APPENDIX C: TERUO OSHIRO TRANSCRIPT

Teruo Oshiro (identified as TO in the transcript below) was interviewed by Cultural Surveys Hawai'i (CSH) on May 20, 2003 at the Kekaha Neighborhood Center. Knipo Akana (KA) also participated in the interview.

CSH: Can you tell us something about your background in Kekaha and Kaula? When were you born?

TO: Well, first of all, I was born in Kōloa in 1927. In 1933, when they had that big slide in the economy, we moved from there to Kekaha. My father worked for the plantation. And we've been plantation people from that time on. I consider myself an old-timer because [I'm] seventy-six already, going on seventy-seven.

CSH: So your family moved here in '33. Your father worked for the plantation.

TO: I went to Kekaha School here and then I went to Wainea. In 1945, when I graduated, I was taken by the Army and I spent three years overseas in Japan where I got to see how other people live, how devastated a land like Japan was, how the people were trying to get back to normal life. After three years of that I got a pretty good idea of how living was in war years. When I came back the plantation was supposed to give me back my job. So I stayed with the plantation until 1961 when they decided they were going to have a radar station up there [at Kōke'e]. So they were looking for people that were interested in going to school for radar. So, at that time, I was in the Army Guard and I asked for leave to go school. And I was one of the guys that were picked. So I said okay, I'll take a chance and go. So they sent me to Mississippi. There I got a look at the other side of the world too, where the black people live, and how they treat them. Oh, my goodness, this was real terrible. Actually we got by pretty good because coming from Hawai'i they considered us foreigners. So that's okay, we got by. Finished school and when I came back they hired me at Kōke'e. So I spent twenty-six years up at Kōke'e. Well, government employees, they retire you at sixty. So when my sixtieth birthday came along they said you're out. So I've been out since 1986. Doing odds and ends, just trying to keep myself healthy. So, in the meantime my parents all passed away and all the kids grew up and went to the mainland, here and there. My brother and I are the only ones left here. He has a home in Ele'ele. In 2000, I crossed the Wainea Bridge, found a lady on the other side, and we got married.

CSH: When you first came to Kekaha, where did your family live?

TO: Before, in our days, the camps were all divided: Hawaiian Camp, Kuroji Camp, Haole Camp. I lived in Kuroji Camp, right by the theater. The theater is gone now but right over there I used to live. I lived there for quite some time. When I came back from the Army we had to move someplace else.

RECEIVED AS FOLLOWS

RECEIVED AS FOLLOWS

Appendix C: Teruo Oshiro Transcript

- CSH: Kaipo recalls, when he was living here, that the beach went much further out at that time. Do you recall what the beach was like in the '30s and '40s?
- TO: Well, you know it changes all the time. That's why you get confused. Like the other day I was out here. This tourist said: "Oh, your beach is so nice. It's stretched out." Well, I told him, right now we've got a nice beach and it stretches out all the way down here. Sometimes it goes almost close to the road here. He was kind of shocked. Well, I know because I live here. He don't know. He only sees the good part of it.
- KA: Do you think that after they put in the Kikioia Boat Harbor that some of the sand that used to be here ran away?
- TO: I look at [the boat harbor] as improvement over there. But, somehow the current and all those things that come together and the sand - Because this sand here always moving either one way or the other. So sometimes get lot of sand here and other times it's way up to the road. But I wondered: where the hell is the sand going? Because I travel from here all the way to Polihale and I see the changes and all that. But sometimes I see the sand move that way. But even down here now you can see black sand and white sand. You see: how come this place get black sand? You dig, get black sand. What was originally there: black sand or white sand? I don't know but there's two kinds over there. So, evidently, with the tide and the changes the sand moved, then came back or whatever. Then too you get these ditches going out. Every time we get a big rain the plantation open up the ditches. It was all right but they made so much improvement in all those years. Before, the beaches used to run on their own.
- CSH: Maybe we can look more closely at the beach area fronting the project area on Alaloa Road.
- TO: I tell you, this area here before - Those dyes, from here, somebody up on the hill look for where get fish. Now, it's so modern: they get a plane flying. But for us, in the old days, they had the one guy, the spotter, he had his special rock spot. And then they call all the guys, get the nets and go out. Then they set the nets.
- CSH: So *hukilau*?
- TO: All over here [including the area *makai* of the project area]. You see, wherever the fish is. But, like I say, like here [where the plantation ditch drains into the ocean] that's where [the fish] want to come back to. So the fish used to come close by where the fresh water goes out. So, it depends - anywhere over here. But, I say, [the fish] like the fresh water. In the old days you couldn't hold back anything. Anything come from the mountain it go right out to the ocean. But now these guys stop 'em, lock up this and that. That's why they get lots of problems.
- CSH: Since you've retired have you noticed any changes in the ocean activities Kekaha folks are doing out here?
- TO: Well, I really don't know the exact changes. But, for me, I think that since the environmentalists came in the place over here has gone down. Why? Because there's no fresh water going out. And, the fish, they like the fresh water. And they like all the dirt that go out with 'em, where they can hide. Now there's all

55

Appendix C: Teruo Oshiro Transcript

- CSH: So in the '30s and '40s your family lived in Kuroji Camp. Can you describe what this area looked like at that time?
- TO: Well, this area was all *kinwe* trees. And I remember there was an old Filipino man who used to take care the rubbish dump. He had a big cart with big wagon wheels, and a mule. But now they got a big nice dump. You just drive up, dump things. But those were the days when the rubbish was all dumped over here. At least they made some improvement. They got low-income housing come up over here.
- KA: Do you remember the Army camp used to be in here too?
- TO: They used to get all kind small shacks inside there.
- KA: In this area behind Hawaiian Camp.
- TO: Yeah. And then they had some in Pōki'i too.
- KA: Behind Kaiwa's place was all military camp buildings.
- TO: Well, I don't think it was all but was outside area. And before the Hawaiians used to - That's their old place over there: had Kaiwa, had Old Man Naumu - all the old houses over there. Palaka.
- When they made this road [along the coast to Māna] over here, it really helped everybody because that road over there [*maika*] was terrible: narrow and only dirt road all the way to Māna.
- CSH: You used to go fishing when you were growing up?
- TO: Yeah.
- KA: You still go fishing.
- TO: I still do but I think I'm going downhill too because it's been a long time. And now that they put in so much restrictions: you cannot catch this, you cannot catch that. Before, hey, I goin' down the beach, do my thing, whatever I catch bring home. But now they tell you you cannot catch *no!* Why? Oh, they get a season. Oh, they get a season now? They get the size for catch. What is this now? Why deprive us old-timers of all the things that we used to do? What are the young guys doing now? They not preserving anything for us. We preserved for them but nothing come back for us. So I'm kind of disappointed with that. I like to go down the beach when I want to. Do my thing.
- We caught only whatever we needed. Well, if you had anything extra you shared with the other guys. The neighbors were really happy because they weren't in a position to get fish. I was lucky because I had the connection with Joe Kumalama. He was the best [fisherman] over here. And next to him was Anderson Kilauno. I was big boy for the two guys so I know. I know. When they catch fish they really catch fish. I was lucky because they took me on the boat. I used to be the smallest boy over there. Helping, all that. They appreciated me because I could do something. And I appreciated them because they took care of me. That's how it was - back and forth.

54

RECEIVED AS FOLLOWS

Appendix C: Tenuo Oshiro Transcript

clean water and they put all kind regulations: do not catch this and that. But they no more the small little babies. No more fish around here now. You ask all the fishermen.

CSH: So you don't see as many people fishing out here now?

TO: They get a few hard-core guys that go out almost every day but me, I always ask: "How's the fish biting?" No more. Well, you gotta try another day.

CSH: So up to the '40s, the '50s fishing was still good?

TO: Oh, yeah, was good, was very good. Well, anyway, until the old guys passed away. The thing too is, after the war, you couldn't get four-wheel [drive] vehicles to go down the beach and all that. So it was kind of hard. Somehow we got the guys from Honolulu to send the first four-wheel vehicles, Jeeps, over. Four hundred fifty dollars was hard to come by, those days. Second-hand kind vehicle. I was one of the guys that was able to get one. That's how me and Benny [Nakaahiki] used to fish all the time. He had big family. Same thing with me. I had big family. Nine of us in our house. And he had quite a few too. And we go during the night, we go catch *nehu* in the base. But those days wasn't the base. Anytime you want to go, we go. Get the vehicle. That's the main thing. Gas was cheaper than now. But we survived all those things. And the kids, they want to eat, they want to eat fish. Fish and poi. That's okay. That was the old days. As far as I know Benny for the longest of time, his father and mother was alive. I used to go to their house every time. So all those years I know him. But that's one guy, he respect me because I had the Jeep at that time and we've been fishing together and we clicked all the way. So, I was lucky because at least we had the transportation and the know-how to survive. Because I think fish was important to us. And then came the time when [Benny Naka'ahiki] went into *hukilau*. First guy he call is me. So I come down. Call a few more guys, load up the boat, make everything ready. Soon as we get the boat in the water, we're going. We was doing pretty good. But you see when we go that kind fishing, we always give away. So, when we come home, Eileen, she's the head, I tell: "Eileen, take care of the crew." About eight or ten guys is the crew. "You take care these guys here. You figure how many other guys that went out with us, you make their share first. When you finished then you make our share." When we're *you* our share, we clean up. We're the first to go and the last to leave. Good but sometime we come home, eight, nine o'clock, we have to go deliver fish. I gotta go Waimoa. I get friends, you know. I give the old lady. They feel happy because they don't have fisherman now because the old man went die.

As I say, I got in contact with all the good [fishermen]. So pick up a little from here, a little bit from there. The only thing now I'm sliding down the hill and hard to put brake. And then too, like I say, with all the rules and regulations that's what's hurting me.

KA: You lived around that area where this fiber optic cable is coming in: do you remember at any time that there were burials found in that area?

56

Appendix C: Tenuo Oshiro Transcript

TO: This side [toward the Kekaha Park], yeah, in the *kiawe* trees and someplace around here they had.

CSH: That's another concern, possible traditional burials, especially in sandy areas like Kekaha. Do you remember anything, especially around Akiakou Road?

TO: Well, you see, it was all rubbish pile before. So, you know, they don't use [for] burial there.

KA: It was sugar cane trash: whenever they grind they just stack it up behind where the Kekaha Gardens is [now]. And then there used to be the old bowling alley back there. But did you ever hear that there are burials from very old times there?

TO: I never heard anything.

KA: When we did the [archaeological inventory] survey behind the Kekaha Gardens, we found burials. Just behind where that fiber optic cable is coming in. So we're concerned there might be other burials in that area where this cable is coming in. You didn't hear anything about that? Hawaiians were kind of famous for burying their dead in dunes. But Kokole Point, this side, you ever hear of any burials?

TO: No. I guess they must have been doing something else at that time but I never did hear the guys go down the beach for any burials.

KA: Even when the tides come up, there's shifting sands, you never did see any bones on the beaches?

TO: No.

CSH: The dump even extended into the current project area?

TO: Yeah.

CSH: So during the time that you first knew the project area it was already covered over with trash and nothing buried in the sand [like human remains] would have been exposed?

TO: Yeah. Well, you know, they must have buried before or what but in our time I didn't see any burial.

KA: Benny's father, he used to drive the trash truck, take 'em down, and we used to call him Uncle Charley Bum. He used to tell us that certain places outside this area over here had burials before. But we were wondering if you, yourself, had any kind of stories about burials in this area over here. Because, during the war, never had all these houses over here. It was all *kiawe*. And not only *kiawe* but it also had *hau* bushes too. And the pig pen over here. And the Catholic school wasn't there. Had only the old Catholic church.

TO: Over there was all waste land. And had one big *hau* bush. And had the track over here.

CSH: Horse track?

TO: Racehorse, right over here. Kekaha had Filipino guy and Waimoa had Chung. They *huki huki* who had the better horse and Waimoa won.

57

RECEIVED AS FOLLOWS

Appendix C: Teruo Oshiro Transcript

- KA: Do you know if there's any fishing grounds over here [in the ocean *malal* of the current project area]? Fishing grounds, diving, reefs?
- TO: As far as diving over there, not much. I used to dive more toward the Mānā side, the ditch area [where the ditch emptied into the ocean]. Right inside here [where the ditch emptied] get the reef over here. I used to work up Kōke'e. We see: "Ooh, the water nice today." Take my spear and go down. Get lobster.
- KA: Close to the area where the fiber optic cable is going to come in?
- TO: No, little bit this side [towards Mānā] we used to dive.
- CSH: So you don't know of anything special in this area where the fiber optic cable is coming in?
- TO: No.
- CSH: So your diving was more west toward Mānā?
- TO: Yeah, right around here [pointing to area near mouth of ditch on an aerial photograph of Kekaha].
- KA: What about when the sands used to shift? Cover all the *puka* [lobster holes]?
- TO: Well, that's how they moved, see. When the place is all covered they move this way or that way. Go out.
- KA: And then come back?
- TO: Yeah, when the shifting sand change again they go back, find their own house.
- KA: What about nowadays? Still get lobster?
- TO: Get lobster but I don't go too often because closed season and all that.
- KA: So with the fiber optic line coming up there, you don't think it will impact any kind of fishing area?
- TO: The only fishing [concern] is that the *akule* will come around here. You see the *akule* like this area over here. But then, before, me and Benny and our crew, we used to catch plenty *akule* over here. But what stop us now is the airplane. [The commercial fishermen with the airplane spotters] are the ones that are catching all the fish over here.
- KA: The difference between you folks and the people that come catch the fish with the airplane and the boat is that you gave your catch away, you shared, then they sold.
- TO: Big difference right there. Because, like us, we're more friends and families. So I always told Eileen be sure you count everybody and you check 'em off the list. But we had a system where you try to catch everyone [of those participating in the fishing]. Then, if you come easy you get a full share. If you come little late you get little bit less. But it was all split out.
- KA: You and Benny were always known as the kind of person that always shared.

58

Appendix C: Teruo Oshiro Transcript

- TO: No matter how much we catch, it all goes to the crew and to the public. You come and help us, you get your share.
- CSH: Do you know about how many Hawaiian families were living here in Kekaha during the '30s and '40s?
- TO: Well, I tell you, they had quite a few Hawaiians. But they were kinda scattered. You say Hawaiian Camp but it was scattered. Same thing like the Japanese now. Before we had one pile Okinawans out here. And I'm one of them. [Among the Okinawans] we help out each other. But then [people] start moving to Honolulu, go here and there. Now, one Oshiro over here.
- KA: Do you remember when they had the Coca-Cola Park over there? They had one place where they used to play volleyball, over there, by the Monnon church, on the other side of the road. And they used to call 'em Coca-Cola Park. But trying to name the people that used to live in that area - Do you remember where the old Tom Takahashi house used to be? The old house when he first came from Ni'ihau? And Malia and Tom used to live across from the Kekaha School. Do you remember that? And right next to 'em that's where they used to refer to Coca-Cola Park. We used to go over there play volleyball.
- TO: That's where Charlie Olsen used to stay? He had one big lot over there. And George Hilo was over here. Eddie Hilo was the hunter.
- KA: And further down was Paicka. And then old man Naunuu - Henry.
- TO: Henry Naunuu. He had one shack over there. He stay by himself.
- KA: We lived across the road. I had George Moore. And Eddie Kapaahu lived right next to us. And then Oshiro. Do you know any other Hawaiians besides the Aipolani, the Kitauanos? Furtados? Edith Furtado was Ni'ihau girl before. And then Benny Naka ahiki folks. The Perry family. Because I lived in Hawaiian Camp I knew a lot of them. I was telling [the CSH interviewer] that when we used to go through different camps - and across the mill over there used to be Spanish Camp - that we had to - except for Haole Camp, we could go through Haole Camp - but other camps sometimes we get challenged by the guys in the camp.
- TO: Well, that's their turf. You know why? You always going to get a challenge. You play softball, basketball, everything is challenge. Anyway, we used to challenge Mill Camp and Kuroji Camp. Haole Camp we challenged them over there too. But each area had their own team.
- KA: The only difference during those days was that if you came from another part of Kaula and you came over here make trouble, you goin' get trouble from everybody over here. They all goin' gang up on you.
- CSH: Did Kekaha people mostly stay in Kekaha or did they work much outside the area?
- TO: Well, during the plantation days everybody had a job because they hire everybody around the place. And if you're not lazy, you're going to work, you're going to find a job. Then, a few would go outside and work. But mostly right here.

59

RECEIVED AS FOLLOWS

Appendix C: Tenuo Oshiro Transcript

KA: The Kilauanos used to raise two boys: Kamaka and Lono. Those are some of the Hawaiian names that I remember in this area.

CSH: Were the Hawaiian families in Kekaha from way back?

TO: Most of them were until the second, third generation die off and then some of them go. The ones that left behind, only few.

CSH: So when you were a kid here, the older Hawaiian people were from families with roots in Kekaha?

TO: Yeah.

KA: The Ajolani's, Kilauanos -- all old time families. The Moore family, George Moore family.

TO: George Moore: he was the tractor boss over here. He passed away.

KA: Oh, Sam Fong used to live over here someplace too.

CSH: What changes have you noticed in the Kekaha community since the '60s?

TO: Well, I tell you, like I say, before I used to know every person living in Kekaha. Where they lived, where the father and mother work, or whatever. Today, it's changed so much. Lot of these outside haoles. Who own this house here? Who own this house here? All haoles. And they pay big bucks for 'em. Like us we cannot afford that kind. If they stay, make house and stay, it's all right. But they make house, they sell 'em. That selling price is so high. So it bring up the other guys' property tax and all that. But who can buy all those things already? It's only the outside guys. They come from the Mainland. They like stay here. Oh, the beach is close by. They have something already and they get the money for buy so they buy. They get the bucks. They going retire here, all right. But they sell the house and then what? They go someplace else again.

CSH: When did it start changing?

TO: Because the plantation went down.

CSH: After the plantation --

TO: Yeah. Most of that. The plantation went down, no more work, no more money. And that's the only guys get the money they can build.

CSH: And the local people had to start moving away?

TO: Well, the kids all go. That's the thing. The kids should stay and do all the rest of the stuff. But no can because the kids they no can stand this kind life. They like fast life. Go here. Go there. Get mixed up in the traffic and go. I rather live where I like live. And more so because I passed my good days already.

KA: Country boy.

TO: Yeah, strictly country boy.

CSH: Perhaps we can close with any concerns you might have about this project and how it might affect anything in this area?

61

Appendix C: Tenuo Oshiro Transcript

KA: You know this area they called Hawaiian Camp: the camp had other nationalities too, yeah?

TO: Yeah.

KA: I remember Morales family.

TO: Yeah.

KA: Oh, the Kua family used to live in here too.

TO: George Ho'opi'i. Vidinha.

KA: That's right. Andrew. And Andrew at the time made a good name for himself because he went to go play major league baseball.

TO: He was something.

CSH: So how did Kekaha people, during the '30s and '40s, get their food? Fishing? Hunting?

TO: Yeah. Because I tell you when I was working plantation in the '50s like that -- \$1.27 one day. 1945, it was, \$1.27 one day -- not one hour -- one day.

CSH: Where did people get their poi from?

TO: Well, they had some taro patches over here in Kanalewa, Limaloo, where Gaspar used to live. Where the pump was. Oh, Andy guys used to raise taro. I went to his taro patch [to] get taro.

CSH: So you were able to get everything from out here by hunting, fishing?

TO: Oh, yeah. This was as a regular living. But you had to put in a little bit extra time because it's not just I'm going to take this. You gotta go look for 'em. You gotta sweat. But, that's the part. You work hard you can get a little bit extra. Like the other guys: you work plantation, that's all you do, *po'u*. What they do at home? Make garden. That's all. They no more nothing else. But, like us, we had little bit outside activities. That was the good part of it.

CSH: So you had the contact with the Hawaiian people for the fishing and --

TO: Well, you see, I was lucky because I befriended Kūmalama. He wanted someone like me because I was around doing this and that and somehow he got into liking me. So I was lucky.

KA: You remember the old man Kūmalama? I used to stop by his place over there. Talk story with the old man. He used to tell me a lot of history about the ocean. He was a good fisherman too. That's how the boys learned how to fish, including Mokihana.

TO: Well, Mokihana now he learn from his father. But like Mokihana guys they was more into hunting. Like us, was more the fishing side.

CSH: What kinds of vehicles did people around here have in the '30s and '40s?

TO: Well, those that could afford could get but that was only the upper crust that can buy cars.

60

RECEIVED AS FOLLOWS

Appendix C: Teruo Oshiro Transcript

TO: No. The thing is, I look for progress. If it's progress for the Hawaiians it's all well and good. As far as fishing, it's not going to bother nobody because this an open area and it's not where only you can go over there. It's open for everybody and so it's okay. So I hope I've contributed.

CSH: Thank you for this interview.



RECEIVED AS FOLLOWS

ARCHAEOLOGICAL INVENTORY SURVEY IN SUPPORT  
OF THE PROPOSED SANDWICH ISLES FIBER OPTIC  
CABLE LANDING AT 'AKIALOA ROAD, KEKAHA,  
WAIMEA AHUPUA'A, KONA DISTRICT, ISLAND OF KAUAI

(TMK 1-3-001:999)

by

Todd Tulchin, B.S.

and

Hallett H. Hammett, Ph.D.

with an Historical and Cultural Overview

by

Gerald Ida, B.A.

Prepared for

Parsons, Brinckerhoff, Quade and Douglas, Inc.

by

Cultural Surveys Hawaii, Inc.

August 2003

Table of Contents

TABLE OF CONTENTS

I. INTRODUCTION.....	1
A. Project Background.....	1
B. Project Area Description.....	1
C. Scope of Work.....	1
D. Methods.....	5
II. HISTORICAL BACKGROUND.....	7
A. Introduction and Setting.....	7
B. The Ahupua'a of Kekaha.....	7
C. The Place Name: Kekaha.....	9
D. 1797 to 1850.....	9
E. 1850 to 1900.....	11
F. Rice Cultivation.....	16
G. Sugar.....	16
III. PREVIOUS ARCHAEOLOGICAL RESEARCH.....	17
A. Narrow Valleys and Ridges.....	17
B. Swamp Lands.....	20
C. Sandy Plain and Shoreline.....	20
D. The Edge Effect.....	23
IV. SETTLEMENT PATTERN SUMMARY AND PREDICTIVE MODEL.....	24
V. SURVEY AND TESTING RESULTS.....	25
VI. ASSESSMENT OF FIBER OPTIC CABLE GAP AREAS.....	29
VII. CONCLUSIONS.....	31
VIII. REFERENCES CITED.....	32

I. INTRODUCTION

A. Project Background

At the request of Parsons, Brinckerhoff, Quade, and Douglas, Cultural Surveys Hawai'i, Inc. performed an archaeological inventory survey in support of the Proposed Sandwich Isles Fiber Optic Cable Landing near the intersection of 'Aki'aloa Road with Kaunua'i Highway. The marine cable landing project involves the installation of undersea fiber optic cables and a terrestrial cable manhole.

The project will involve the use of horizontal directional drilling to bore from a drill site near the intersection of 'Aki'aloa Road with Kaunua'i Highway to a point approximately 3700 ft. (1128 m) offshore Kekaha, Kaua'i. The cable line will be drilled approximately 25 ft (8 m) beneath the shoreline to an ocean depth of 60 ft. (18 m) and will have a minimum diameter of 4 in. (10 cm). The only permanent surface structure to be constructed as part of this project is a manhole which will be located in Kaunua'i Highway.

The current project area (Figures 1-3) was a portion of a larger inventory survey conducted on some 89 acres (Masterson *et al.* 1994a). The survey resulted in the documentation of four sites including two subsurface cultural layers (50-30-05-700, 703) and two human burials (50-30-05-701, -702). Testing in the immediate vicinity of the presently proposed drilling locale did not encounter any historic properties.

B. Project Area Description

The project area is located approximately 130 ft. (40 m) mauka of the shoreline at Kekaha Beach Park, near the intersection of 'Aki'aloa Road with Kaunua'i Highway, Kekaha, Waimea *Ahupua'a*, Kona District, Island of Kaua'i (TMK 1-3-001:999) (Figures 1-3).

The elevation within the project area ranges from approximately 12-14 ft (3-4 m) AMSL. Soils within the project area are listed as Dune Land (DL) and Jaucas Loamy Fine Sand, 0 to 8 percent slopes (JB) (Foote *et al.* 1972). Dune Land "consists of hills and ridges of sand-sized particles drifted and piled by wind" (*Ibid.*:29). Jaucas Series soil "consists of excessively drained, calcareous soils that occur as narrow strips on coastal plains, adjacent to the ocean" (*Ibid.*:48).

Vegetation along this arid coast is sparse. With 20 in. (500 mm) or less of rain annually (Giambelluca *et al.* 1986), only the hardiest plants adapted to the coastal environments can thrive in this zone. The vegetation is typical of dry seashore environments in Hawai'i and is dominated by alien species. The proposed drilling site is mostly exposed sand with no vegetation. There are a few clumps of grass, but no trees. The tree line (*kiawe* trees) is situated some 100 ft. (30 m) mauka (north) of the drilling locale.

The permanent manhole for the fiber optic cable infrastructure will be within Kaunua'i Highway, just *makai* (south) of the drilling locale.

C. Scope of Work

The following scope of work for the archaeological inventory survey was designed to meet and comply with State and County requirements:

LIST OF FIGURES

Figure 1	USGS Topographic Map, Kekaha Quad, showing the location of the project area.....	2
Figure 2	Portion of TMK 1-2-02, showing the location of the project area.....	3
Figure 3	Aerial Photograph (2000), showing the location of the project area.....	4
Figure 4	L.E. Imlay Map of Gay and Robinson Lands, Kekaha Area, 1891, showing the approximate location of the project area..... Error! Bookmark not defined.	
Figure 5	T.J. Evans Map of Kekaha Cane and Pasture Lands, circa 1921. Note the location of L.C.A. 5362.....	12
Figure 6	TMK 1-3-05, showing the area of L.C.A. 5362 (Naumu). Note the presence of the fish pond.....	13
Figure 7	G.O. Smith 1912 Map of the Island of Kaua'i, showing the Māna Plain and its swamplands, and the approximate location of the project area.....	15
Figure 8	Previous Archaeological Studies in the Kekaha Area.....	18
Figure 9	Map of Kekaha Housing Project Study Area (Masterson <i>et al.</i> 1994a), showing the location of excavated trenches and identified sites.....	21
Figure 10	Location of Test Trench #1, Pre-Excavation Photo, View to South.....	26
Figure 11	Test Trench #1 Stratigraphic Profile.....	26
Figure 12	Test Trench #1 Stratigraphic Profile Photo.....	27
Figure 13	USGS Map Showing the Location of Proposed Trenching Associated with Fiber Optic Cable Gap Areas.....	30

LIST OF TABLES

Table 1	Previous Archaeological Studies in the Kekaha Area.....	19
Table 2	Traditional Hawaiian Settlement Patterns in Kekaha.....	23

RECEIVED AS FOLLOWS

Introduction

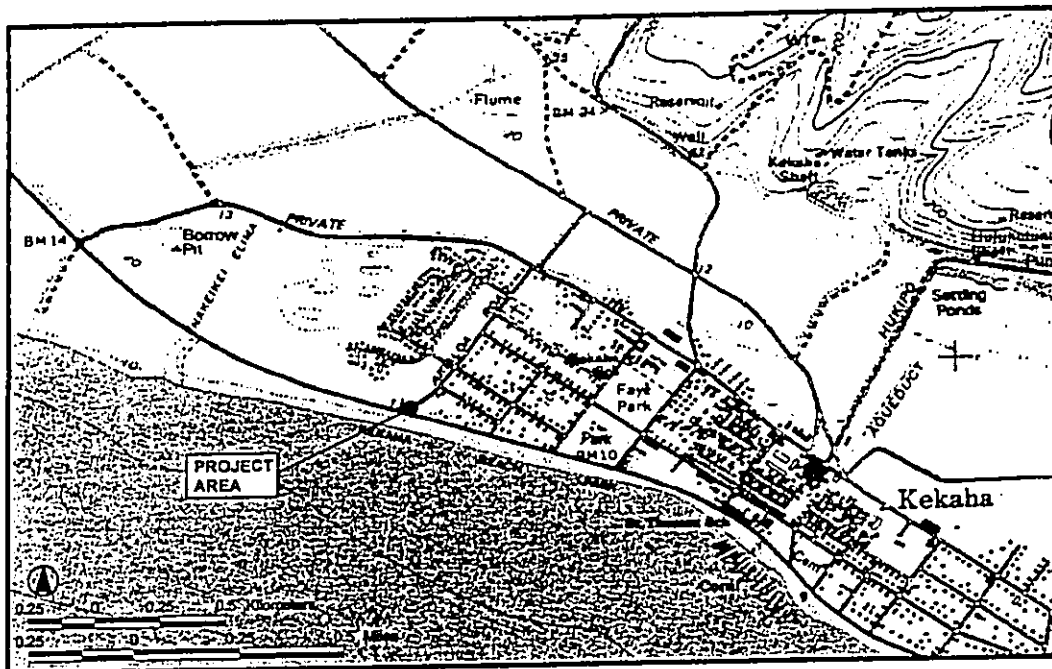


Figure 1 USGS Topographic Map, Kekaha Quad, showing the location of the project area.

2

Introduction

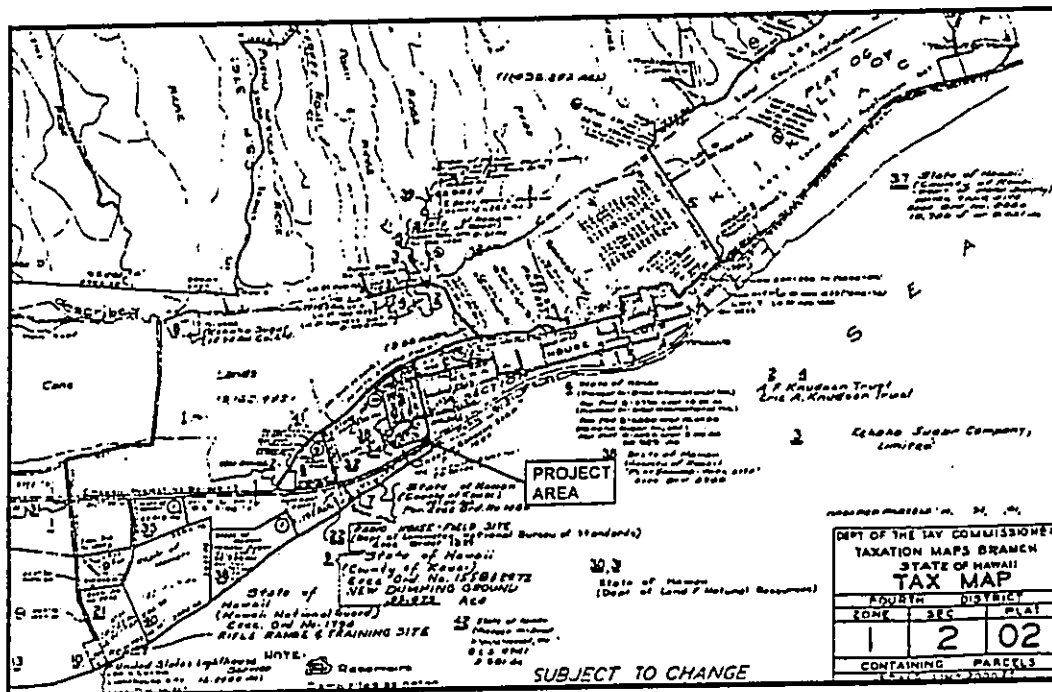


Figure 2 Portion of TMK 1-2-02, showing the location of the project area

3

RECEIVED AS FOLLOWS

Introduction

1. Detailed historical research to include study of archival sources, historic maps, Land Commission Award documents and previous archaeological reports to construct a history of land use and to determine if archaeological sites have been recorded on or near this property.
2. Field inspection of the project area to identify any surface archaeological features and to investigate and assess the potential for impact to such sites. All identified sites would be located, described, and mapped with evaluation of function, interrelationships, and significance. Documentation will include photographs and scale drawings of selected sites and complexes. All sites will be assigned State site numbers.
3. As warranted by the results of the field inspection, limited excavation to evaluate the potential for subsurface cultural deposits. This excavation will be done by hand or through mechanized excavation. Excavations will be documented with standard archaeological techniques.
4. If subsurface deposits are located, limited analysis of recovered materials will be called for.
5. Prepare a survey report which will include the following:
  - a. A topographic map, if available, of the survey area showing all archaeological sites and site areas;
  - b. Description of all archaeological sites with selected photographs, scale drawings, and discussions of function;
  - c. Historical and archaeological background sections summarizing prehistoric and historic land use as they relate to the archaeological features;
  - d. A summary of site categories and their significance in an archaeological and historic context;
  - e. Recommendations based on all information generated which will specify what steps should be taken to mitigate impact of development on archaeological resources - such as data recovery (excavation) and preservation of specific areas. These recommendations will be developed in consultation with the client and the State agencies.

This scope of work also includes full coordination with the State Historic Preservation Division (SHPD) relating to archaeological matters. This coordination takes place after consent of the owner or representatives.

D. Methods

Background research included a review of previous archaeological studies on file at the State Historic Preservation Division, a review of geology and cultural history documents at Hamilton Library at the University of Hawai'i, the Hawai'i State Archives, the Mission House Museum Library, the Hawai'i Public Library, and the Archives of the Bishop Museum. Further research included a study of historic photographs at the Hawai'i State Archives and the Archives of the Bishop Museum, a study of historic maps at the Hawai'i State Archives and the Archives of the Bishop Museum, and a study of historic maps at the Survey Office of the Department of

Introduction

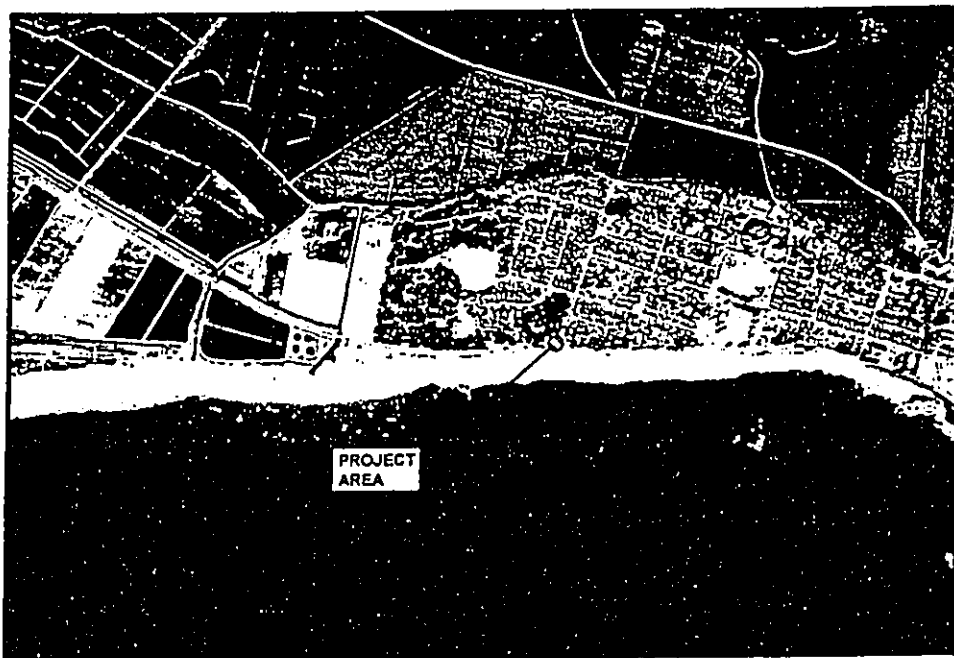


Figure 3 Aerial Photograph (2000), showing the location of the project area.

RECEIVED AS FOLLOWS

#### Introduction

Accounting and General Services. Information on Land Commission Awards was accessed through Waipuna Aina Corporation's *Māhala* Data Base ([www.waipuna.com](http://www.waipuna.com)).

A complete pedestrian inspection of the project area was accomplished through systematic sweeps. Subsurface testing was accomplished through the use of a backhoe for a single trench excavation. The trench was documented with a scale section profile, photographs, and standard sediment descriptions. Sediment descriptions included characterizations of Munsell color designations, compactness, texture, structure, inclusions, cultural material present, and boundary distinctness and topography.

#### Historical Background

### II. HISTORICAL BACKGROUND

#### A. Introduction and Setting

Kekaha is a locality in the *āhupuaʻa* of Waimea on the southwest side of the island of Kauaʻi, part of the old district or *moʻo* of Kōnā, the Waimea *āhupuaʻa* is by far the largest on the island, comprising 92,646 acres and accounting for more than a quarter of the total land area of Kauaʻi. It encompasses all of the Waimea River Canyon area, the uplands of Kōkeʻe, the high swampy plateau of Alakaʻi, and the northwestern coastal valleys of Nūʻaloʻo and Mīlōiʻi (Gray 1875: 140-146).

On the southwestern leeward coast, a broad, flat plain stretches between the Waimea River delta and Pūhale to the west. It is here that Kekaha is located, backed on the *mauka* side by steep low cliffs and a series of small valleys and gulches.

The Waimea *āhupuaʻa* is composed of several regions which are very different in climate and terrain. These differences essentially dictated the kinds of resources that were available, and hence had much to do with the way the *āhupuaʻa* was settled by prehistoric Hawaiians. The well-watered valley and delta of the Waimea River were ingeniously developed and engineered for wetland agriculture, and represents the epitome of the typical Hawaiian and Kauaʻi-type valley settlement (Handy and Handy 1972:393-397).

In contrast, Kekaha and other settlements on the Mānā plain suffered from a definite lack of fresh surface water. The *mauka* gulches had only intermittent stream flows, and water sources were primarily springs along the base of the cliffs. For this reason, this portion of the region will focus mainly on the specific area of Kekaha and not attempt to cover the entire *āhupuaʻa* of Waimea.

#### B. The *āhupuaʻa* of Kekaha

Although the Boundary Commission officially surveyed and set the bounds of the *āhupuaʻa* of Waimea in 1875, as generally described previously, there are a few sources which contradict this, maintaining that Kekaha was a separate *āhupuaʻa*.

Testimony in the mid-1800s that supports the native land claim of R. Naumu refers to the "Kekaha *āhupuaʻa*" in describing the properties (Board of Commissioners 1929: Native Testimony, n.d. Vol. 11:15).

Valdemar Knudsen, an early *hauke* settler in the area, also refers to the "*āhupuaʻa* of Kekaha" in a letter to John Dominis, Commissioner of Crown Lands (Knudsen 1866:3). A late 19th century map (Inlay 1891) shows a pie-shaped land section that is labeled "Kekaha," indicated by a dotted line boundary that encompasses the area from the top of Waiake ridge to the shoreline (Figure 4).

Handy and Handy (1972:427) implies that Kekaha as well as Pūhale and Mānā were individual *āhupuaʻa* of Waimea, though the reasoning for this is not given. However, the native land claim of Eia Lihau for the land of Waiʻawa, just west of Kekaha, concedes that this area was indeed part of the *āhupuaʻa* of Waimea (Board of Commissioners 1929: Native Register 1848: Vol. 9:244).

RECEIVED AS FOLLOWS

Historical Background

Admittedly, it is unusual for a single *ahupua'a* to occupy such a large percentage of the land area of a major Hawaiian island. It could easily be argued that the comparatively low agricultural productivity of the Mānā plain, due to the scarcity of water, is the basis for its inclusion into Wainaea.

However, the same cannot be said for the well watered valleys of Nu'āiolo and Miloli'i, both of which could easily support typical and self-contained valley settlements of perhaps small but stable populations.

It could also be speculated that Wainaea, being one of the two areas of the island that traditionally was the domain of the high chiefs (the other being Waitoa), commanded the resources of the large upland region of Kōkē'e and Alaka'i, among them the large *koa* trees out of which the hulls of canoes were hewn, and forest birds which supplied the leathers for cloaks, capes, and other items associated with the *ali'i*.

It is quite possible that at one time, Wainaea was divided into several smaller *ahupua'a*, perhaps before the *Māhala*, or even in pre-contact times.

C. The Place Name: Kekaha

Pukui *et al.* (1974:106) gives the literal translation of Kekaha as "the place." However, Handy and Handy's (1972:54) definition gives more insight as to the descriptiveness of the place name.

Kaha was a special term applied to areas facing the shore but not favorable for planting. Kekaha in Kūna, Hawaii, was one so named, and Kekaha on Kauai another.

Kelly (1971:2) describes Kekaha on the island of Hawaii as '*āina molo'o* or "dry land," and indeed the same could be said of Kekaha, Kauai if one considered the area's low annual rainfall and lack of perpetual streams. Kekaha, however, was not void of water or of a prehistoric population that made use of the local resources.

D. 1797 to 1850

A thorough search of major Hawaiian myths and legends found no mention of Kekaha, but the first western description of the place comes only nine years into the post-contact era. William Beresford was the supercargo on board the British ship *Queen Charlotte* under Captain George Dixon, which along with the *King George*, captained by Nathaniel Portlock, sailed on an exploratory voyage to the northwest coast of America. In 1798, both ships wintered in Hawaii, spending much time off Wainaea, Kauai. On one of the several shore outings, Beresford visited nearby Kekaha, which he called "A Tappa" (Dixon 1908:124-126).

Having frequently heard our people who had been on shore speak of a village, called by the natives A Tappa, where a great number of people were commonly employed in manufacturing cloth, curiosity prompted me to walk to that place first, as I found it was not more than three miles distant, so that I could easily get back by Tyleira's dinner time.

Historical Background

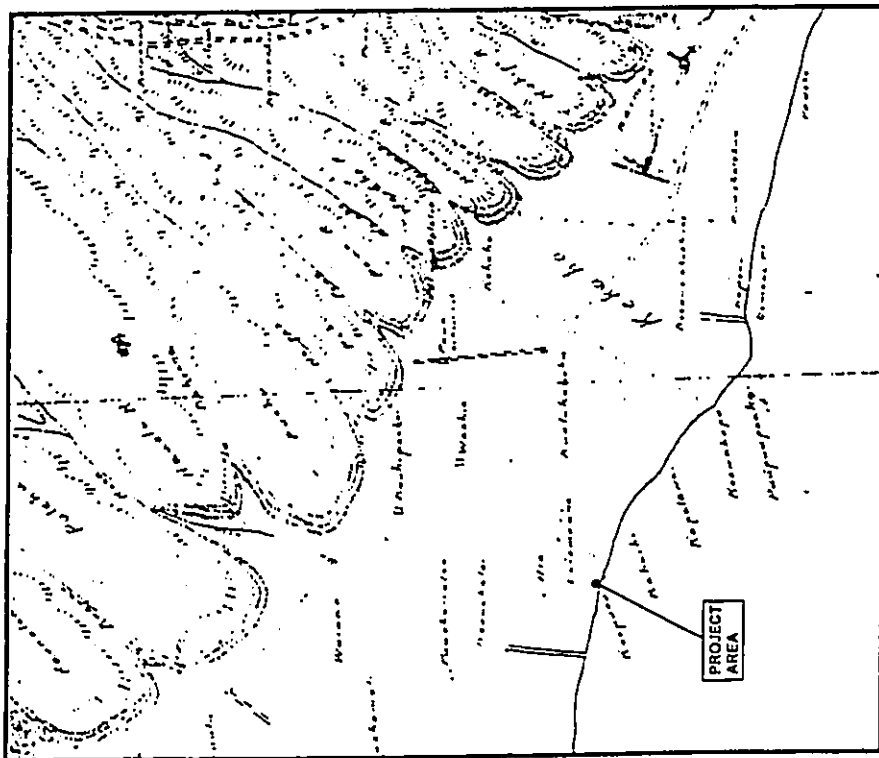


Figure 4 L.E. Inlay Map of Gay and Robinson Lands, Kekaha Area, 1891, showing the approximate location of the project area.

## Historical Background

The country, from the place where we landed to A Tappa is tolerably level, and for the space of two miles, very dry. The soil here is a light red earth, and with property cultivation, would produce excellent potatoes, or any thing that suits a dry soil; but at present, it is entirely covered with long coarse grass: the inhabitants, I suppose, finding plenty of ground near their habitations, more conveniently situated for their various purposes. So far, the space from the beach to the foot of the mountains is about two miles in breadth; but from hence to A Tappa, it grows gradually narrower, till it terminates in a long sandy point, which I have already observed, is the West extreme of Wynne Bay.

A Tappa is a pretty large village, situated behind a long row of cocconut trees, which afford the inhabitants a most excellent shelter from the scorching heat of the noonday sun. Amongst these cocoa-trees is a good deal of wet swampy ground, which is well laid out in plantations of taro and sugar cane.

I had laid my account in seeing their method of manufacturing cloth; but here I was mistaken. A number of our people, prompted by the same curiosity as myself, were got to A Tappa before, where "Labour stood suspended as we passed." The people looked eagerly about us, some asking us to repose ourselves under the shady branches of trees planted about their doors; other running to the trees for cocconut and presenting them to us with every mark of kindness and good nature; in short, every inhabitant of the village was fully employed, either in relieving our wants, or gratifying their curiosity in looking at us.

The day being very sultry, we walked leisurely back, and I returned by a different path from that I had taken, in going to A Tappa. On examining the grass, which in most places is higher than the knee, I found it no altogether of a rough coarse sort, but intermixed with various sorts of flowers, together with different grasses, of the meadow kind; so that I have no doubt, with proper management, it would make excellent hay.

Beresford's remark that the dry soil conditions in the area would be most suitable for potatoes is in line with Handy and Handy's (1972:410) assertion that the sweet potato was probably the prime staple of the village, rather than taro because of the limited water resources.

While Beresford described taro, sugarcane, and cocconut being cultivated in Kekaha, no mention is made of wauke, the inner bark of which is the raw material for making kapa or bark cloth. This seems curious in light of his statement that cloth making was a major activity of the village and the main purpose of his trek there was to observe this process.

Due to the climatic conditions, the Mānā plain was probably not a prime wauke growing area (Handy and Handy 1972:209). However, Beresford did note on a later excursion through the lower Waimea Valley that "cloth mulberry" trees were numerous around the house sites there (Dixon 1968:134). It may be likely that there was some sort of trade going on between the residents of Waimea and Kekaha, involving the raw material and the labor that turned it into cloth.

## Historical Background

Native claims for land made to the Board of Commissioners to Quiet Land titles in 1848 also sheds some light as to settlement and land use in the area during the early historic period. Only three claims were made in and nearby Kekaha.

Kaema (No. 8841) claimed a house lot, six *lo'i* and some *kūka* land near the base of the *pa'i* at Pōkī'i, about a mile north of Kekaha (Board of Commissioners 1929; Native Register 1848; Vol. 9:397). Elia I. Iau (No. 6698) claimed all the land of Wai'awa (just west of Pōkī'i), most of which was unused *kūka*, but included a restricted fishery. This claim was never awarded (Board of Commissioners 1929; Native Testimony, Vol 11:155).

The only one to claim land actually in Kekaha was B. Naumu (No. 5386). Mentioned here are *lo'i*, a house lot, salt bed (*ūpūpū'ūka*) and a *mafihihi* called Kupenu. Naumu developed the *lo'i* in 1844, stating that it was previously overgrown land (Board of Commissioners 1929; Native Testimony, Vol 11:146).

An 1891 map of West Kaunā'i by L.E. Inlay (See Figure 4) shows Kapenu as a stream that entered the ocean just east of 'O'ōnanō Point. A later 1921 map by Evans does not show the stream, but places one of Naumu's awarded lots in the same area near the shore (Figure 5). He was also awarded a parcel in Kekaha at the base of the *mafihihi*-facing *pa'i* of Hūtūlunūt Ridge.

Interestingly, Evans' 1921 map shows an irregular-shaped depression occupying the southeast corner of Naumu's beach lot. In a more recent map tax map (Figure 6), this same depression is labeled a fishpond, and was probably of the *pa'i* type. Naumu makes no mention of such in his claim, as he or his heirs probably developed the pond in a later historic period. The fishpond is located approximately 1.7 miles (2.7 km) east of the project area.

## E. 1850 to 1900

Most of the historical accounts of Kekaha during this period are the result of letters, papers, and books authored by Valdemar Knudsen and his immediate offspring, Eric A. Knudsen and Ida Elizabeth Knudsen Von Holt. Knudsen came to Hawai'i from Norway via the mainland where he had business dealings. He settled at Wai'awa in 1854 as a rancher, agriculturalist and later, sugar planter.

Knudsen took over the lease of government land there from Archibald Archer and a Mr. Gruben. The two men were involved in a failing tobacco farming enterprise. Associated with them was a Mr. Clifford who made cigars (Lydgate 1991:92).

Eventually Knudsen controlled the entire district, excluding *kākauna* lands, from Nū'alolo to Waimea, including all the *mauka* area (Knudsen and Noble 1945:35). In this post-*Māhele* era, he held the title of *kaunohi*, and Hawaiians with no *kākauna* of their own who lived in the district, reportedly numbering three to four hundred people, worked for Knudsen three days out of the month as "rental" payment (Von Holt 1985:61).

As a side note, among the employees on Knudsen's ranch was a young Hawaiian from Kekaha named Kō'olau who would later become famous as the leprosy "outlaw" who defied banishment to the leper settlement at Kalaupapa, Mōloka'i and successfully held off a siege by government troops on his refuge in Kalalau Valley on the Nāpali coast of Kaunā'i (Hoffgaard 1991:108-109).

Knudsen described Kekaha as "a low marsh land, full of fish ponds and cocconut-trees, but the ponds are overgrown with hullfishes and would cost more than they are worth to bring in order.

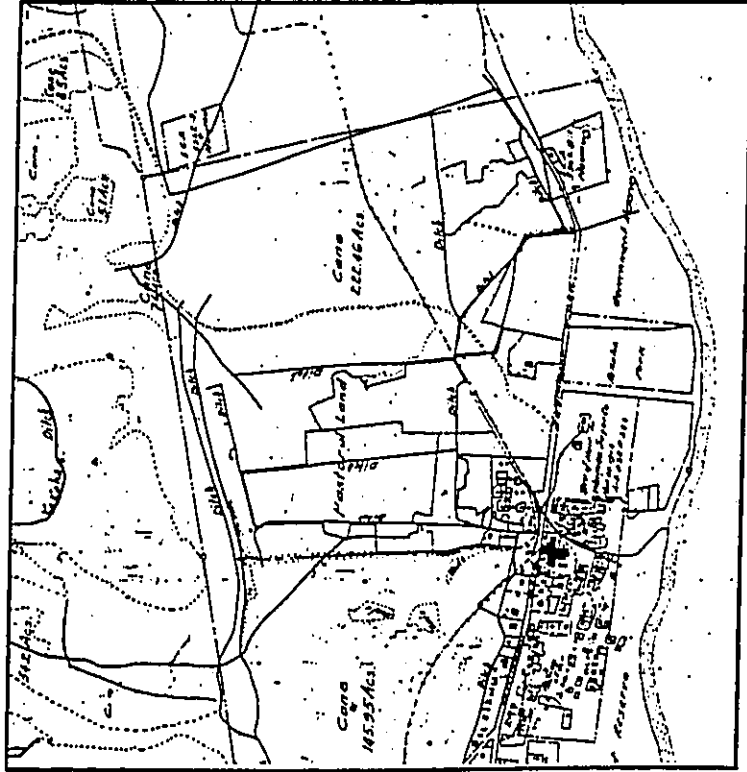


Figure 5 T.J. Evans Map of Kekaha Cane and Pasture Lands, circa 1921. Note the location of L.C.A. 5362.

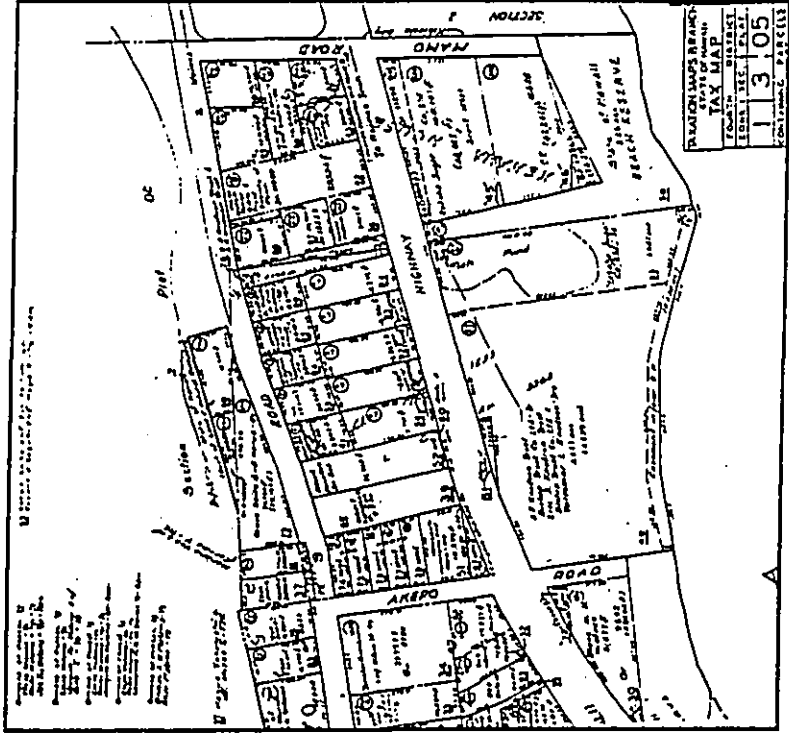


Figure 6 TMK 1-3-05, showing the area of L.C.A. 5362 (Naumu). Note the presence of the fish pond.

RECEIVED AS FOLLOWS



RECEIVED AS FOLLOWS

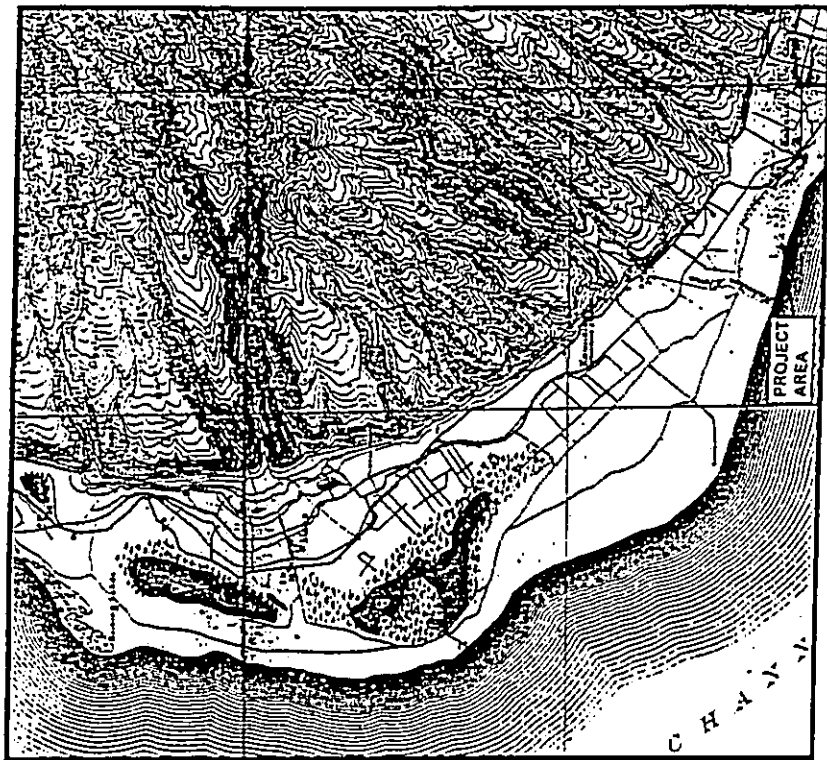


Figure 7 G.O. Smith 1912 Map of the Island of Kanaʻi, showing the Mānā Plain and its swamplands, and the approximate location of the project area.

I tried once and it cost me circa \$200.00. - There is not much grazing lands belonging to Kekaha and it is chiefly pili grass" (Knudsen 1866:104).  
Valdemar's son Eric, later made this observation (Knudsen 1991:98):

From Waimea towards Mana there were no trees, no fences, no cane, all was open country; along the taro patches of Kekaha and Pōkii grew quite a number of coconuts. The mango trees were planted by my father. Numbers of Hawaiians lived about Kekaha and Pōkii, where there were springs and taro land. Then the land was bare again until you reached Waiawa. Above the road in Pōkii, where the cane loaders now stand, was a row of thatched houses and the natives planted a lot of tobacco.

Evidently the area had changed little since Beresford's visit in 1787.

The perpetual swamplands of the plain apparently were greatly enlarged during periods of heavy winter rains. It was possible on these occasions to paddle a canoe from Mānā to Waimea on this inland waterway (Figure 7) (Knudsen 1991:99; Von Holt 1985:77-78).

Waterfowl present in the wetlands provided a food resource for the area residents. Among them the kōloa and especially the 'ai'ae and ā'e'o (kukūlā'e'o) were numerous (Von Holt 1985:78). All three were traditionally caught and consumed by the Hawaiians (Malo 1951:39).

Kekaha was watered by a spring called Kauhika located at the base of the *pōli*. The spring had a fishpond, then taro *lu'i* and rice fields before flowing into the swamp (Knudsen and Noble 1945:62).

Most of the residents also lived in this area, near the water source and cultivatable lands. An anecdotal description is given by Eric Knudsen (1991:101, 102):

A row of grass houses extended all the way along the foothills from Waimea to Mana. Every house site had a name. To find a man you had to find his house name. The natives seemed to know every name and would keep sending you along until you finally came to the spot you were looking for.

At certain hours all the women sat in their houses and beat tapa cloth and as they beat they talked to one another in a tapa beater's code. They could send a message with great speed from Waimea to Mana. When the men returned from the mountains with fire wood or canoes, the woman that saw them at once tapped out the news and it flew from house to house with the result that every man, when he came home, found his house in order and no surprised visitors hanging around. The men tried to learn this secret code but never did, though an old man at Mana told my father that the men had tried for years to learn the secrets of the tapa code but were never able to do so.

The grass houses were all built in one general design - one big living room and two doors - one on each side and opposite to one another. One day my father noticed that all were built with their gable-ends east and west and the doors facing the ocean and the hills. He asked one of the men why that was so and he replied, "Why, you know that Po, the abode of the dead, lies under the ocean just outside Pōhāhā, where the cliffs and the ocean meet, and the spirits of the dead must go there. As the spirits wander along their way to Po, they will go around the gable-end of a house but if the house stood facing the other way, the spirits would walk straight through and it would be very disagreeable to have a spirit walk past you as you were eating your meal. "In fact," he continued, "we can always tell when a battle has been fought by the number of spirits passing at the same time."

Between the swamp and the shoreline was a broad sand deposit, likely inhabited by fishermen on the *makai* side. The only canoe landing at Pū'upu'upa akai ("salt piled in heaps") was through the reef on the shore directly *makai* of the sugar mill. A "large settlement" was there with "cane sheds lining the beach" (Knudsen and Noble 1945:50).

#### F. Rice Cultivation

Commercial rice growing came to the Kekaha-Mānā plain in the 1860s. The area's most prolific planter was Leong Pah On, a Chinese immigrant (Joesting 1984:206).

Pah On started farming in Waimea Valley and eventually met Valdemar Knudsen who allowed him to cultivate the swamplands. He imported Chinese laborers, drained the swamps with ditches brought in water buffaloes and eventually acquired more land. At his peak he had about 600 acres in rice throughout Mānā, Kekaha and Waimea (Char and Chiar 1979:21).

Pah On's enterprise ended suddenly in 1922. The leases on government lands were expiring and H. P. Faye, manager of the Kekaha Sugar Co. convinced Pah On not to bid on new leases and let the sugar company take over control of the land. In return Kekaha Sugar would sub-lease the rice fields back to Pah On. The successful rice grower could have easily out-bid the sugar concern, but agreed to the plan. When Kekaha Sugar secured the leases its board of directors overruled Faye and denied any subleases to Pah On (Char and Chiar 1979:22).

#### G. Sugar

The Reciprocity Treat of 1876 between the United States and Hawai'i gave impetus for the expansion of the sugar industry throughout the islands. The first commercial cane in the Kekaha area was planted in 1878 near Pōki'i by Knudsen and a partner, Christian L'Orange. Hans P. Faye, Knudsen's nephew, was brought in as another grower, and it was he who dug the first artesian wells in the islands at Kekaha. With steady but still small water source investors showed interest and the Kekaha Sugar Co. was incorporated in 1898 (Wenkam 1977:63; Joesting 1984:216-217). The mill was set up on the sand lands of Kekaha at the *makai* edge of the swamp, its foundations set deep into the underlying coral (Knudsen and Noble 1945:161-162).

The Kekaha Sugar Co. saw expansion after 1907 when the construction of the plantation's major irrigation ditch was completed. The engineering feat brought water to the area from eight miles up the Waimea River via a series of ditches, flumes, tunnels, and siphons (Thrum 1908:158-159).

### III. PREVIOUS ARCHAEOLOGICAL RESEARCH

There have been few large-scale systematic archaeological surveys in the Kekaha area. However, a sizeable number of small-scale studies have covered a variety of terrain and elevations in Kekaha (Figure 8; Table 1). The following summary of previous research is divided into five environmental zones.

#### A. Narrow Valleys and Ridges

Wendell Bennett, in his 1931 *Survey of Kūia'i* (Bennett 1931), recorded major prehistoric sites in the vicinity of Kekaha (Sites 11-16). These are listed by Bennett as:

Site 11-Makahoe *heiau* and village site, on Niu ridge, Kaunalewa. A small, platform village shrine. Thrum describes the village as "four and one-half miles from the coast and at an altitude of 1200 feet. This village had about 0.5 acres of taro land besides the dry crops to depend on." On the inland side of Niu ridge, small valleys are found with small streams and a few taro terraces. Petroglyphs were reported for this area.

Site 12-Hooneenu *heiau*, along the ditch line inland from the government road near the center of Kaunalewa ridge.

Site 13-Burial caves, on Kaunalewa ridge.

Site 14-Two small *heiau*, near Waiawa, described by Thrum as a 12 by 20-foot shrine, and an 18 by 28-foot shrine.

Site 15-House sites and taro terraces, in Waiawa valley. Some taro lines may still be seen in lower Waiawa valley. Many house sites are in evidence. They consist for the most part of leveled ground, faced in front with stone, or merely outlined with stone.

Site 16-Hauola *heiau*, in Hōea valley at the base of Hauola ridge.

Site 17-Burial caves, on Pokii ridge (Bennett 1932:102-103).

Bennett provides greater detail on these sites in his text, but the important point is that it shows habitation evidence in small valleys dissecting Niu Ridge, as well as on the ridge itself. Waiawa Valley contains "many" house sites and associated *lano lo'i*, and *heiau* appear both in valleys and on ridges.

Bennett's survey apparently predicated at least some of the land impact associated with sugar growing and was early enough to record sites at the base of the Waimea slope, allowing us to take note of the former importance of this area during pre-contact times.

The Bishop Museum returned to the bases of these narrow valleys overlooking present day Kekaha Town during a study for potential rock borrow areas for the Corps of Engineers (Sinoto 1978). Archaeological sites were noted in Waiake, Pawa, Waipao, Waiawa, Kūkaani and Ii'ea. These sites survived in spite of the heavy impact of sugar activities and grazing, and provide reinforcement for this particular zone edging on the Kekaha flats as being a focus of permanent Hawaiian habitation with a steady supply of water from springs.

RECEIVED AS FOLLOWS

Previous Archaeological Research

**Table 1 Previous Archaeological Studies in the Kekaha Area.**

Study	Location	Type	Findings
Bennett 1931	Island Wide Survey incl. Kekaha	Recordation of Major Prehistoric Sites	Described 7 sites in the Kekaha area incl. <i>Heiau</i> , burial caves, habitation features, agricultural features
Borcher 1977	Kekaha Beach Park	Reconnaissance Survey	No cultural material observed
Sinolo 1978	Valleys <i>Mauka</i> of Kekaha Town	Reconnaissance Survey	Sites located in valleys of Waiakea, Pawa, Waipuu, Waiawa, Kahoana, and Ho'en
Ching 1982	Proposed Landfill Site near Barking Sands	Reconnaissance Survey	No cultural material observed
Ida & Hammatt 1992	Kekaha Town Cemetery	Inventory Survey w/ Subsurface Testing	No pre-modern cultural material observed
Spain 1992	West of Kekaha Town	Archaeological Monitoring	No cultural material observed
Folk & Hammatt 1993	Proposed Landfill Expansion near Barking Sands	Inventory Survey w/ Subsurface Testing	No cultural material observed
Folk & Hammatt 1994a	National Guard Rifle Range near Barking Sands	Inventory Survey w/ Subsurface Testing	No cultural material observed
Folk & Hammatt 1994b	Kekaha Town	Inventory Survey w/ Subsurface Testing	No cultural material observed
Masters et al. 1994b	Kekaha Town	Inventory Survey w/ Subsurface Testing	2 Cultural layers (50-30-05-700, -703), 2 human burials (50-30-05-701, -702)
Masterson et al. 1994b	Proposed Agricultural Park near Barking Sands	Inventory Survey w/ Subsurface Testing	2 human burials at Limaloa (50-30-05-3650)
Hammatt 1996	Kekaha Town	Subsurface Testing	No cultural material observed
Heidel et al. 1997	Kekaha Town	Inventory Survey w/ Subsurface Testing	4 human burials (50-30-05-619)
Hammatt & Shideler 1999	Kekaha Town	Archaeological Monitoring	No cultural material observed

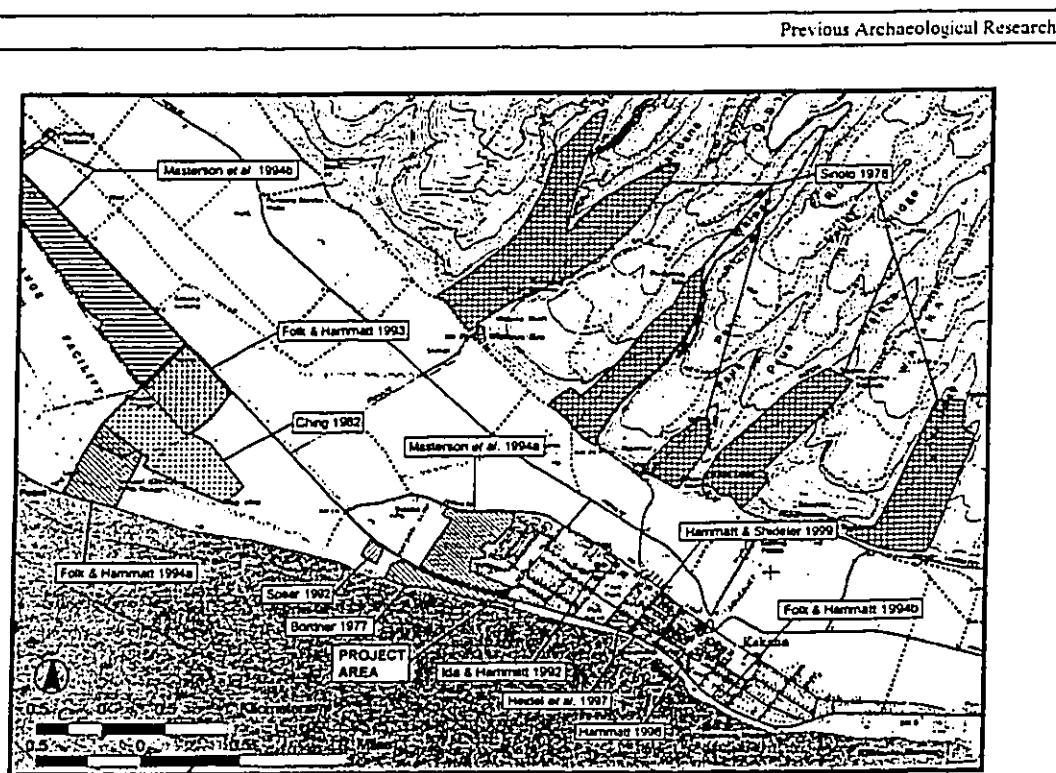


Figure 8 Previous Archaeological Studies in the Kekaha Area.

**B. Swamp Lands**

The swamp lands between the cliffs and the sand flats are now the level sugar fields of Kekaha. Draining of the once giant swamp for agriculture began in the late 1800s, and due to the decades of sugar cane cultivation archaeological site potential here is minimal. However, it does not mean that the Hawaiians did not use this land. Its fringes would be useful for taro, and water flow must have been abundant at times. There are accounts of widespread seasonal flooding of these lands. It is a reminder of the adaptability of Hawaiian planters who employed a unique method of taro growing at Mānā, as related by Pukui:

As the plants grew, the raftslets were allowed to spread undisturbed, because they helped to hold the soil together. When the rainy season came, the whole area was flooded as far as Kalanailiiki, and it took weeks for the water to subside.

The farmers built rafts of sticks and rushes, then dived into the water. They worked the bases of the taro mounts free and lifted them carefully, so as not to disturb the soil, to the rafts where they were secured. The weight of the mounts submerged the rafts but permitted the taro stalks to grow above the water just as they did before the flood came. The rafts were tied together to form a large, floating field of taro (Pukui 1983:232-233).

**C. Sandy Plain and Shoreline**

The bulk of the archaeological studies in Kekaha have been done on the flat lands near the coast. Sand deposits between the swamp lands (now drained sugar fields) and the ocean have high potential for shoreline occupation and scattered human burials, particularly along the mauka fringes of the sand bar.

Human burials have been discovered in sand deposits in Wainaea Town to the east of Kekaha (Cox 1975; Kikuchi 1985) and archaeological studies of sand areas have noted potential for burials even though none were immediately found (Cling 1982; McMahon 1988a, 1988b; Bordner 1977). Recent studies have tested larger areas for burials, at the north end of Kekaha Town for the proposed Kekaha Housing Project (Masterson *et al.* 1994a), in the proposed Kekaha Agricultural Park (Masterson *et al.* 1994b), the proposed landfill expansion (Folk and Hamnett 1993), and the Army National Guard rifle range (Folk *et al.* 1994a) (see Figure 8). In all of this acreage, only four human burials were found. Two burials (50-30-05-3650) were discovered at Limaloo in the proposed Kekaha Agricultural Park study area (Masterson *et al.* 1994b), and two burials were discovered near the shore at the north end of Kekaha Town, where new housing was proposed (Masterson *et al.* 1994a).

Masterson *et al.*'s (1994a) inventory survey of the Kekaha Housing project included the current project area. Extensive subsurface testing of the study area resulted in the discovery of two human burials (50-30-05-701, -702) as well as two buried cultural layers (50-30-05-700, -703) in the loose sands of the shoreline sand dunes, to the west of the current project area (Figure 9). Test trenches in the immediate vicinity of the current project area (Trenches 96-99) did not encounter any significant cultural deposits or human burials.

Additional subsurface testing of parcels in Kekaha town was undertaken by Hamnett (1996) and Heidel *et al.* (1997). No cultural material was observed by Hamnett (1996). Four human

RECEIVED AS FOLLOWS

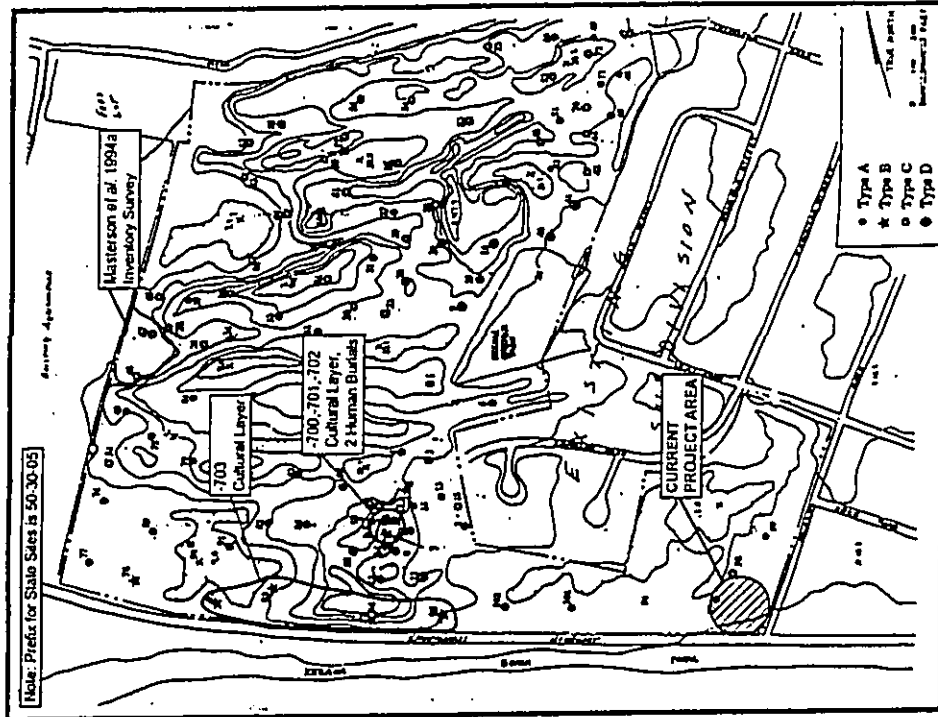


Figure 9 Map of Kekaha Housing Project Study Area (Masterson *et al.* 1994a), showing the location of excavated trenches and identified sites.

burials (50-30-05-619) were discovered in sand deposits near the coast at the intersection of Io Road with Kaunualo'i Highway, following informal interviews with local residents who suggested human burials may be present in the area (Heidel *et al.* 1997). Archaeological monitoring associated with the development of the parcel did not encounter any cultural material (Hamann and Shideler 1999).

Although Bennett recorded cave burials along the slopes and ridges it is also clear that sand burial was commonly practiced around Kekaha. Although human burials could occur scattered throughout the sandy plains it is predicted that the larger clusters of burials will be found at the *maka* fringes of the sand bar, fringing onto the former marsh.

An existing public cemetery, covering nearly two acres, lies at the west end of Kekaha Town, at the *maka* corner of Iwipolena Road and 'Akiaka Road. This cemetery was examined by Ila and Hamann (1992) during an inventory survey and sub-surface testing of an adjacent one-acre parcel. Tombstones show interments throughout the last fifty years in the main part of the cemetery. However, at the northern end are older style graves marked by rectangular stone and stone-lined earthen mounds. It could be that this cemetery was in use well in the late 1800s and perhaps even before.

Closer to the shoreline would have been the fishing oriented settlements now represented by cultural layers buried in backshore sand deposits. There were probably also occasional fishponds and saltpans. The occurrence of Hawaiian activity along the shoreline would be strongly influenced by the location of suitable canoe landings. For example, *pu'u pu'u pu'u* was a canoe landing *maka* of the sugar mill with a large settlement (Knaudsen and Noble 1945:50). In short, we can divide the traditional Hawaiian settlement of the Kekaha region into 5 zones (Table 2):

1. Ridges above the cliff for dryland agriculture, forest gathering, and religious structures;
2. Narrow valleys and slope bases with intermittent streams, narrow alluvial terraces, and some permanent springs. These areas supported taro growing and permanent habitation. The steep slopes of these valleys would contain burial caves. House sites were reported to be plentiful and closely spaced;
3. The swamp and marshlands, the fringes of which would have supported taro farming and fishponds and which were probably an important source of waterfowl.
4. The *maka* part of the sand plain would be the preferred location for human burial;
5. Along the shoreline - the fishing camps and the settlements would be clustered around canoe landings with a few small *pu'u pu'u* fishponds and many salt pans.

Table 2 Traditional Hawaiian Settlement Patterns in Kekaha

ZONE	ENVIRONMENT	RESOURCES	TYPE OF SITES
Zone 1	Ridges and slopes	Kula land, forest products, dry land cultigens	<i>Ikeia</i> , burials on slopes
Zone 2	Narrow valleys and slope base	Intermittent streams, springs, taro, sugar cane	<i>Lo'i</i> , permanent habitations, <i>Ikeia</i> , and terraces
Zone 3	Marsh lands	Taro, sugarcane, fowl, fish	Fishponds, taro <i>lo'i</i> on marsh edges
Zone 4	Sand plain, <i>maka</i> portion	Cocoanuts	Clustered burials
Zone 5	Sand plain, <i>maka</i> portion	Cocoanuts, marine resources, salt	Fishing camps, saltpans, canoe landings, isolated burials

#### D. The Edge Effect

Perhaps the essence of the dynamic relationship between the Hawaiians and their environment in this fairly unique area is not in terms of a narrow perception of coping with a lot harsh land, but in terms of a concept known in ecology as the "edge effect" or use of ecotones (an ecotone being a transition area between two ecological communities). The most productive environment is that at the edge of two ecological zones. The boundaries between environments in Kekaha are sharply defined rather than transitional and most importantly there is much land occurring along these edges between environmental zones. This phenomenon serves to increase options and access to resources for human subsistence and can do much to explain the presence of a particularly flourishing community as reported in historic and archaeological sources.

#### IV. SETTLEMENT PATTERN SUMMARY AND PREDICTIVE MODEL.

A settlement pattern emerges through the study of historical material concerning the Kekaha area.

Permanent habitation areas were mainly among the *mauka* foothills, at the bases of the shore-facing cliffs. Extending up the gulches were agricultural areas watered by rainfall and intermittent streams. This has been confirmed by the archaeological investigations of Bennett (1931:103) and Sinoto (1978:2-6).

*Makai* of the foothills were fishponds and cultivated wetlands fed by springs. Beyond this was the great swamp, then the broad stretch of the sand lands which continued to the shoreline. Fishing camps and other temporary habitation areas existed on the beach, and in the inland stretches of the sand there were burials.

This scenario was likely in place at the time of first western contact and remained relatively undisturbed throughout most of the 1800s.

Since then, much physical evidence of this settlement pattern has been obliterated by commercial agriculture and other operations. The foothills and wetland areas have been extensively planted in cane, livestock has been run up the gulches, and even the beach areas have been much disturbed by massive shoreline stabilization projects.

In 1994 Mastersun *et al.* (1994a) conducted an inventory survey with subsurface testing which covered the current project area. No surface sites were located. Extensive subsurface testing throughout the project area revealed two areas containing buried cultural layers (50-30-05-700, -703) and two human burials (50-30-05-701, -702). It was suggested that additional human burials may be present due to the close proximity between the two discovered burials. Site -703 is located approximately 750 ft. (230 m) west of the current project area. Sites -700, -701, and -702 are located approximately 900 ft. (275 m) northwest of the current project area (see Figure 9). Subsurface testing in the immediate vicinity of the current project area (Trenches 96-99) did not encounter any significant cultural deposits or human burials.

Based on the settlement patterns and the results of previous archaeological research, anticipated site types would include a subsurface cultural layer and human burials. However, in four backhoe trenches in close proximity to the proposed drilling locale, no cultural materials were encountered.

#### V. SURVEY AND TESTING RESULTS

A complete pedestrian inspection of the project area was completed on July 15, 2003 by two CSH archaeologists, Douglas Northwick, B.A. and Brian Colin, B.A., under the general direction of Hallett H. Hamnath, Ph.D. No surface historic properties were observed. Subsurface testing was undertaken to determine the presence of any significant subsurface historic properties, such as a cultural layer or human remains. Testing consisted of a single backhoe trench excavation at the location of the proposed drill site (Figure 10). A specific trench description and summary follows:

Test Trench #1  
 Orientation: 278° TN  
 Maximum Length: 3 m  
 Maximum Width: 3 m  
 Maximum Depth: 2 m  
 (See Figures 11 and 12)

Strata	Depth (cmbs)	Description
Stratum I	0-15	(dry) 10YR 7/3 (very pale brown), loose, fine marine sand; structureless; non-plastic; no cementation; plentiful roots and rootlets; includes modern garbage; no cultural material observed; A-Horizon; Lower Boundary (LB) is abrupt, smooth.
Stratum IIa	15-40	(dry) 10YR 4/4 (dark yellowish brown) and 10YR 7/2 (light gray), slightly hard, fine marine sand; mechanically graded; structureless; non-plastic; weak cementation; includes charcoal flecks, marine shells, basalt boulders and cobbles; LB is abrupt, irregular.
Stratum IIb	40-70/95	(dry) 10YR 4/4 (dark yellowish brown) and 10YR 7/2 (light gray), slightly hard fine marine sand; mechanically graded; structureless; non-plastic; weak cementation; includes charcoal flecks, marine shells; LB is abrupt, irregular.
Stratum III	70/95-200	(dry) 10YR 8/2 (white), loose, fine marine sand; structureless; non-plastic; no cementation; no cultural material observed.

RECEIVED AS FOLLOWS

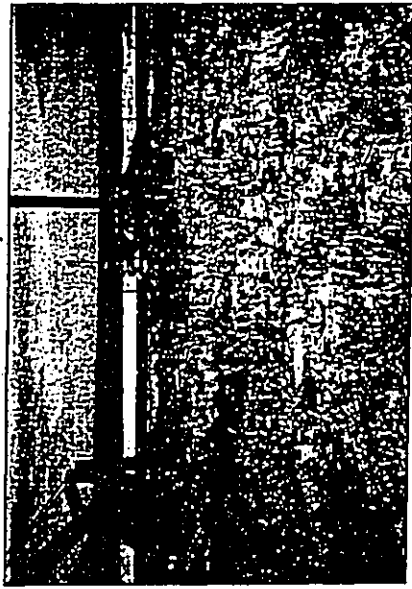


Figure 10 Location of Test Trench #1, Pre-Excavation Photo, View to South.

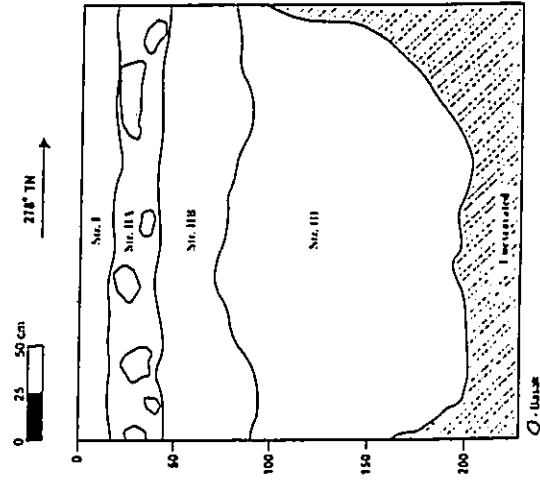


Figure 11 Test Trench #1 Stratigraphic Profile



Figure 12 Test Trench #1 Stratigraphic Profile Photo.

RECEIVED AS FOLLOWS

## Summary

Test Trench #1 was excavated at the location of the proposed drill site. The excavation did not encounter any significant cultural materials. The stratigraphic sequence revealed by the test trench was as follows:

Stratum I consisted of an A-horizon made up of loose, wind blown beach sand held together by the roots of overlying grasses and shrubs. Stratum I sediments are those having undergone accretion deposition post-Hurricane Iniki. Modern garbage was observed in throughout Stratum I. Stratum IIA consisted of mottled and marbled marine sand with basalt boulders and cobbles scattered throughout the layer. Stratum IIA was characterized as a mechanically graded sediment produced by strong wave action during Hurricane Iniki. Stratum IIB was similar to Stratum IIA, though it lacked basalt boulders and cobbles. Stratum III consisted of clean, undisturbed beach sand. Fine layers of sorted sands were observed throughout Stratum III.

## VI. ASSESSMENT OF FIBER OPTIC CABLE GAP AREAS

The existing Sandwich Isles fiber optic cable line currently runs west along Kaunuali'i Highway to the intersection of 'Alae Rd. In order to connect the existing line to the proposed cable landing site at 'Aki'ala Rd., the fiber optic cable "gap areas" must be addressed through additional subsurface cable installation. Trenching is proposed west along Kaunuali'i Highway from 'Alae Rd. to 'Aki'ala Rd., as well as north along 'Aki'ala Rd. and west along Uli'i Rd. (Figure 13).

The proposed trenching would occur along existing roads in soils listed as Dune Land (DL) and Jaucas Loamy Fine Sand, 0 to 8 percent slopes (JFB) (Poore *et al.*, 1972). Due to the possibility of encountering human remains in Dune and Jaucas series soils, as well as previous documentation of human burials in the vicinity of the current project area, on-site archaeological monitoring is recommended for all trenching associated with the fiber optic cable gap areas.

RECEIVED AS FOLLOWS



RECEIVED AS FOLLOWS

**VII. CONCLUSIONS**

Field investigation of the 'Akiakoa Road drill site project area indicated a lack of any significant surface or subsurface historic properties. Subsurface testing consisted of a single backhoe test trench at the proposed drilling location. Based on the background studies and fieldwork completed as part of this project, it is anticipated that the horizontal directional drilling associated with the Sandwich Isles Fiber Optic Cable Landing project will have no effect on any significant historic properties.

Additional trenching for the installation of fiber optic cables to address "gap areas" is proposed along portions of Kaunualii Highway, 'Akiakoa Road, and Ujili Road. On-site archaeological monitoring is recommended for all additional subsurface work associated with the Sandwich Isles Fiber Optic Cable Landing project.

Assessment of Fiber Optic Cable Gap Areas

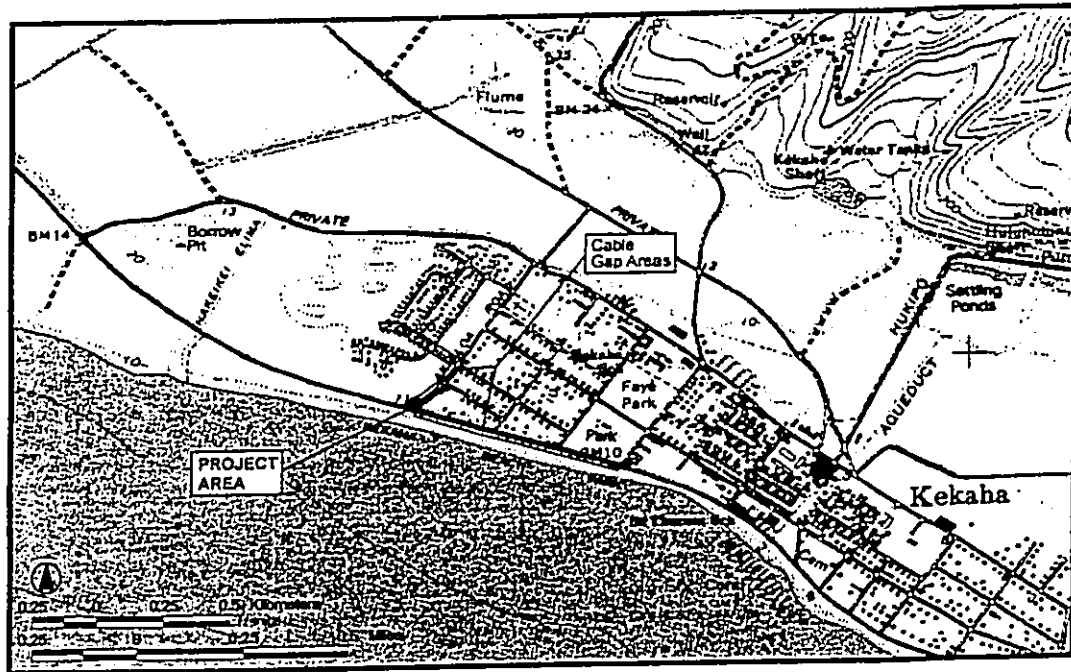


Figure 13 USGS Map Showing the Location of Proposed Trenching Associated with Fiber Optic Cable Gap Areas.

RECEIVED AS FOLLOWS

References Cited

VIII. REFERENCES CITED

- Bennett, Wendell C.  
1931 *The Archaeology of Kauai*, Bishop Museum Bulletin 80, Honolulu.
- Bond of Commissioners  
1929 *Judices of Awards by the Board of Commissioners to Quiet Land Titles in the Hawaiian Islands*, Native Register and Native Testimony, Hawaii State Archives, Honolulu.
- Bordner, Richard M.  
1977 *Cultural Reconnaissance Report for Kekaha Beach Shore Protection*, Kekaha, Kona, Kauai, State of Hawaii, Archaeological Research Center Hawaii, Inc., Lawai.
- Char, Tin-Yuke and Wai Jane Char  
1979 *Chinese Historic Sites and Pioneer Families of Kauai*, Hawaii Chinese History Center, Inc., Honolulu.
- Ching, Francis K. W.  
1982 *Archaeological Reconnaissance of 3 Sites for Proposed Kauai Central Sanitary Landfill Project*, Kekaha, Kipi, and Kikumuku, Kauai Island TMK 1-2-02-1, 9, 21, 40; 3-4-06-12; and 4-7-04-1, Archaeological Research Center Hawaii, Inc., Lawai.
- Cox, David Walter  
1975 *Burials and Other Archaeological Observations, Wainaea Town Sewerage System, Phase II*, Wainaea, Kona, Kauai, Hawaii, Archaeological Research Center Hawaii, Inc., Lawai.
- Dixon, George  
1968 *A Voyage Round the World: But More Particularly to the North-West Coast of America*, Da Capo Press, New York.
- Evans, T. J. K.  
1921 *Kekaha Cane and Pasture Lands, Wainaea, Kona, Kauai (Map)*, Hawaii Territory Survey, Walter E. Wall, Surveyor.
- Folk, William H. and Hallett H. Hamnatt  
1993 *Archaeological Inventory Survey and Subsurface Testing at the Kekaha Phase II Landfill Site (TMK 1-2-02-9)*, Cultural Surveys Hawaii, Kailua, HI.

References Cited

- Folk, William H. and Hallett H. Hamnatt  
1994a *Archaeological Inventory Survey and Subsurface Testing at the Hawaii Army National Guard Firing Range at Kekaha, Kauai (TMK 1-2-02-21)*, with Historical Research by Gerald K. Ika, Cultural Surveys Hawaii, Kailua, HI.
- 1994b *Archaeological Inventory Survey and Sub-surface Testing of House Lots on 2.5 Acres at Kekaha, Kauai (TMK 1-3-04-0515) with an Historical and Cultural Overview* by Gerald Ika, Cultural Surveys Hawaii, Kailua, HI.
- Foote, Donald E., E. L. Hill, S. Nakamura and F. Stephens  
1972 *Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii*, U.S. Dept. of Agriculture, U.S. Government Printing Office, Washington, D.C.
- Giambelluca, Thomas W., Michael A. Nuglet and Thomas A. Schroeder  
1986 *Rainfall Atlas of Hawaii*, Department of Land and Natural Resources, Honolulu, HI.
- Gray, James W., surveyor  
1875 "Boundary of the Ahupuaa of Wainaea" surveyor's notes included in No. 28 *Certificate of Boundaries, Land of Wainaea, District of Wainaea, Island of Kauai*, Decision rendered: July 10, 1875 by Duncan McBryde, Commissioner of Boundaries for the Island of Kauai.
- Hamnatt, Hallett H.  
1996 *Letter Report on Archaeological Subsurface Testing of an Approximately one-acre parcel (TMK 1-3-03-30), Kekaha, Kauai*, Cultural Surveys Hawaii, Kailua, HI.
- Hamnatt, Hallett H. and David W. Shideler  
1999 *An Archaeological Monitoring Report at a 6-Acre Parcel in Kekaha, Ahupua'a of Wainaea, Kona District, Island of Kauai (TMK 1-3-03-15, 19, 23)*, Cultural Surveys Hawaii, Kailua, HI.
- Handy, E.S. Craighill and Elizabeth G. Handy  
1972 *Native Planners in Old Hawaii: Their Life, Lore, and Environment*, Bishop Museum Bulletin 233, Honolulu.
- Heidel, Melody J., William H. Folk and Hallett H. Hamnatt  
1997 *Archaeological Inventory Survey and Sub-surface Testing of House Lots on a 6-Acre Parcel at Kekaha, Island of Kauai (TMK 1-3-03-15, 19, 23)*, with an Historical and Cultural Overview by Gerald Ika, Cultural Surveys, Hawaii, Kailua, HI.

RECEIVED AS FOLLOWS

References Cited

- Hoffgard, Christopher B.  
1991 "The Story of Piliuni." *The Kauai Papers*, Kauai Historical Society, Lihue.
- Ida, Gerald and Hallett H. Hammatt  
1992 *Archaeological Inventory Survey with Sub-surface Testing of a One-Acre Lot, Kekaha, Kauai (TMK 1-2-02:2 lots 86A and 86B)*, Cultural Surveys Hawaii, Kailua, HI.
- Inlay, L. E.  
1891 *Map of Kauai compiled from Government Surveys and Private Surveys of Land Belonging to Gay and Robinson*, Tracing by H.E. Newton in 1903.
- Joesting, Edward  
1984 *Kauai: The Separate Kingdom*, University of Hawaii Press and Kauai Museum Association, Ltd., Honolulu.
- Kelly, Marian  
1971 *Kekaha: Aina Molo'a: Historical Survey and Background of Kaloko and Kukia ahupua'a, North Kona, Hawaii*, B.P. Bishop Museum Department of Anthropology Report, 71-2, Honolulu.
- Kikuchi, William K.  
1985 *The Waiimea Twelve-Inch Transmission Main, Waiimea Intake Towards Waiimea Town, Waiimea, Island of Kauai*.
- Knudsen, Eric A.  
1991 "Early Days at Waiawa." *The Kauai Papers*, Kauai Historical Society, Lihue.
- Knudsen, Eric A. and Gunne P. Noble  
1945 *Kamaka of Kauai*, Tongg Publishing Co., Honolulu.
- Knudsen, Valdemar  
1866 *Letter to John Dominis, Commissioner of Lands for the Crown and Land Agent*, Dated August 1, 1866, Hawaii State Archives.
- Lydgate, John M.  
1991 "William E. Rowell's Reminiscences of Waiimea." *The Kauai Papers*, Kauai Historical Society, Lihue.
- Macdonald, G.A. and A.T. Abbott  
1974 *Volcanoes in the Sea*, University of Hawaii Press, Honolulu.
- Malo, David  
1951 *Hawaiian Antiquities (Mooolelo Hawaii)*, Translated from the Hawaiian by Nathaniel B. Emerson, 1898, *Bishop Museum Special Publication*, No. 2, 2nd edition, Honolulu.

References Cited

- Masterson, Ian, Hallett H. Hammatt, William H. Folk and Gerald K. Ibs  
1994a *Archaeological Inventory Survey of Kekaha Hoisting Project (TMK 1-2-12:38, 1-2-02:22, 34 & 38)*, Cultural Surveys Hawaii (Revised Jan 94).
- Masterson, Ian A., William H. Folk, Hallett H. Hammatt  
1994b *Archaeological Inventory Survey and Sub-surface Testing of the Proposed Kekaha Agricultural Park in 137 Acres at Kekaha, Kauai (TMK 1-2-02:1 position)*, Cultural Surveys Hawaii, Kailua, HI.
- McMahon, Nancy  
1988a *Field Inspection of Sand Mining Activities at Kawaietele, Kauai, TMK 1-2-02:1, SH1P1*, Honolulu.
- McMahon, Nancy  
1988b *Field Check of Northrup King Digging, Manua, Waiimea, Kauai, TMK 1-2-02:40, SH1P2*, Honolulu.
- Pukui, Mary Kawena  
1983 *Olelo No'ou: Hawaiian Proverbs and Poetical Sayings*, Bishop Museum Special Publication No 71, Bishop Museum Press, Honolulu.
- Pukui, Mary K., Samuel H. Elbert and Esther Mookini  
1974 *Place Names of Hawaii*, University of Hawaii Press, Honolulu.
- Sinoto, Akihiko  
1978 *Cultural Reconnaissance of Rock Borrow Areas Near Kekaha, Kauai, Hawaii*, Department of Anthropology, Bishop Museum, Honolulu.
- Spear, Robert L.  
1992 *Letter Report Concerning Monitoring for the Sunkiss Striping Co., Ltd., Kekaha, Waiimea Kauai (TMK: 1-2-02:22)*, Scientific Consultant Services Inc., Honolulu, HI.
- Thrum, Thomas G.  
1908 "Kekaha - Waiimea Ditch." *The Hawaiian Annual for 1908*, Honolulu.
- Von Holt, Ida Elizabeth Knudsen  
1985 *Stories of Long Ago Niihau, Kauai, Oahu, Daughters of Hawaii*, Honolulu.
- Wenkam, Robert  
1977 *Kauai: Hawaii's Garden Island*, Rando MacNally, New York.

**CULTURAL SURVEYS HAWAII, INC.**  
 Archaeological and Cultural Impact Studies  
 Halsett H. Hammatt, Ph.D., President  
 733 N. Kalanooa Avenue  
 Kailua, Hawaii 96734  
 (808) 262-3972 Fax: (808) 262-4950  
 Email: [info@culturalsurveys.com](mailto:info@culturalsurveys.com)  
[www.culturalsurveys.com](http://www.culturalsurveys.com)

Aloha Collette

Here are summaries of the concerns expressed by the community members I have contacted for the Mākaha and Sandy Beach cultural impact assessments.

**Mākaha Cultural Impact Assessment**

I contacted twenty-five area *kūpuna* and *kama'iāina*. The main concern that was brought up was how will the project affect the ocean resources. Specific questions raised by individuals included: Will the cable emit any harmful electric waves? Will any cable emissions have a harmful effect on fish and reef animals? Will installation of the cable harm or destroy the reef itself?

People in the community are also angry about the existing cable line at Mākaha Beach which protrudes out of the sand and which is a safety hazard. They are concerned that the proposed cable project will be similarly disruptive to the beach.

An additional concern is that if and when this cable project is undertaken, a cultural monitor should be present during all excavation activities in case any inadvertent finds are encountered.

**Sandy Beach Cultural Impact Assessment**

I am still in the process of making contacts about the Sandy Beach project. Unlike Mākaha, there is no long-time community or neighborhood surrounding Sandy Beach. I have made contact with residents of Waimānalo and Hawaii Kai. So far, no one has expressed any specific concern about the cable project at Sandy Beach. I will be going out to Sandy Beach soon to talk to any old-time fishermen or other beach-goers who might have some concerns.

Attached are lists of contacts for each job. I hope these summaries are helpful.

Mahalo,

Kēhaulani

RECEIVED AS FOLLOWS

**Mākaha**  
**Table Community Contacts and Comments**

Key:

Y=Yes

N=No

A=Attempted (at least 3 attempts were made to contact individual, with no response)

S=Some knowledge of project area

D=Declined to comment

U=Unable to contact, i.e., no phone or forwarding address, phone number unknown

NAME	AFFILIATION	CONTACTED	KNOWLEDGABLE OF PROJECT AREA	COMMENTS
Ai'a, William and Melva	Wai'anac Harbor Master	Y	Y	He has no problem with the fiber optic line. The line is in 60 feet of water and will not affect fishing. Made referrals
Aiu, Dr. Pua	Office of Hawaiian Affairs	Y	Y	
Awana, Karen	Wai'anac Coast Neighborhood Board No. 24	A		
Cope, Aggie	Wai'anac Coast Culture and Arts	A		
DeSoto, Frenchy	Wai'anac Coast Archaeological Preservation Committee	Y	Y	She is concerned about the effect the drilling will have on the coral and also made a referral.
Enos, Eric	Cultural Learning Center at Ka'ala	A		
Gabbard, Mike	City Council	A		
Greenwood, Alice	Wai'anac Kūpuna	Y	Y	Made referral
Hanabusa, Colleen	Senator	Y	Y	Made referrals
Ka'aukuahiwi, Shonnan	Na Keiki O Kamo'i Canoe	Y	Y	Made referral

RECEIVED AS FOLLOWS

Maunaloa (Sandy Beach)

Table 1 Community Contacts and Comments

NAME	AFFILIATION	CONTACTED	KNOWLEDGABLE OF PROJECT AREA	COMMENTS
Kahanu, Hina	Club Kumu	Y	Y	Made referral and also spoke of legends. Interviewed on 5-21-03
Kimani, Waller	Wai'anae Kupuna	Y	Y	No knowledge of project area
Kearno, Maylene	Wai'anae Ahupua'a Council, President	Y	N	Left messages
Kila, Glen	Koa Mana Resources	A	-	Made referral
Lapilior, Armitage, Nettie	Wai'anae Coast Coalition	Y	S	Made referral
Maldonado, Eddie	Local resident	Y	Y	Made referral
Markell, Kai	SHPD Burials staff	Y	S	No knowledge of area
McEldowney, Holly	SHPD	Y	Y	Talk to lipuna in the area.
Ornellas, Landis	Hui Malama	Y	S	Talk to the Council of Māhala. This area was use for the homeless in the late 70's and early 80's
Pelekai, Gwendolyn	Oahu Island Burial Council	Y	S	Made referral
Puu, Mei	Māhala Beach Lifeguard	Y	Y	Concerned that it will have the same negative effect as the existing line. Left message
Rezentes, Cynthia	Wai'anae Coast Neighborhood Board #24	A	-	He does not gather plants in that area
Raposa, Henry and Moana	La'u Lapa'u Practitioner	Y	S	Will get back to us.
Shimabukuro, Maile	House Rep	Y	-	Interviewed on 7-23-03
Silva, Albert	Wai'anae Coast Neighborhood Board #24	Y	Y	

NAME	AFFILIATION	CONTACTED	KNOWLEDGABLE OF PROJECT AREA	COMMENTS
Aila, Ku'ulei	Waimānalo Hawaiian Civic Club	Y	S	Made referral
Aiu, Pua	Office of Hawaiian Affairs	Y	S	Made referral
Davis, Ray	Local fisherman	Y	S	Made referral and is concerned about the reef. He used the area for fishing. He said there is a lot of fish in that area.
Crozier, Bobo	Waimānalo resident	Y	Y	Made referral
Fanal, Brain	Windward Casting Club	Y	Y	Good fishing and venue
Henderson, Renny	Raised in Waimānalo	Y	Y	Kalama Valley was all pig farmers, and there was a bar named <i>Okoie Ma Luna</i> near the road
Hawaii Fishing News	Contact: Chuck	Y	S	Made referral
Ho, Wilson	Waimānalo Neighborhood Board	Y	S	Made referral
Kekoa	Waimānalo resident and Sandy Beach Lifeguard	Y	Y	Made referral and will talk to his tūtu and get back to us.

RECEIVED AS FOLLOWS

McElDowney, Holly	SHPD	Y	Y	Made referral
Kaupiko, Lukela John	Hui Nalu Canoe Club	Y	N	No comment
Kealoha, Alma	Kupuna	Y	Y	Made referral
Kini, Kalei	Oahu Island Burial Council	Y	S	He spoke about the different type's of <i>limu</i> in that area, and made a referral
Rodgers, T. Charlie	Hawaii Kai Neighborhood Board	Y	N	No comment and no problem with the cable line
Slom, Sam	Slate Senate	A		
Wong, Tony and Donna	Local residents	Y	Y	They will get back to us.
Wright, Agnes Kainoa	Waimanalo Hawaiian Civic Club	A		

RECEIVED AS FOLLOWS

CULTURAL IMPACT ASSESSMENT FOR  
THE PROPOSED SANDWICH ISLES FIBER OPTIC CABLE  
LANDING AT KILI DRIVE, MAKAIHA AHUPUA'A,  
WAI'ANAE DISTRICT, ISLAND OF O'AHU  
(TMK 8-1-01)

by  
Kéhaulani Souza, B.A.  
and  
Hallett H. Hamman, Ph.D.  
Prepared for  
Parsons, Brinckerhoff, Quade and Douglas, Inc.

by  
Cultural Surveys Hawai'i, Inc.  
September 2003

Table of Contents

TABLE OF CONTENTS

I. INTRODUCTION.....	4
A. Project Background.....	4
B. Project Area Description.....	4
C. Scope of Work.....	5
D. Methods.....	5
II. HISTORICAL BACKGROUND.....	11
A. Pre Contact to early 1800's.....	11
Wai'anae District.....	11
Makaha Ahupua'a.....	11
B. Māhele and Land Commission Award Documentation.....	12
C. 1850-1900.....	14
D. 1900 to Present.....	14
E. Alterations to the Wai'anae Coastline (1880-1930).....	15
F. Kili Drive.....	16
III. PREVIOUS ARCHAEOLOGICAL RESEARCH.....	17
A. Previous Archaeological Studies in Makaha Ahupua'a.....	17
B. Previously Recorded Sites in the Vicinity of the Project Area.....	24
IV. RESULTS OF COMMUNITY CONSULTATION.....	26
V. BACKGROUNDS OF KAMA'ĪMA INTERVIEWEES.....	29
Waller Kamana.....	29
Richard "Buffalo" Keulana.....	29
Albert Hollis Silva.....	29
VI. TRADITIONAL PRACTICES and mo'olelo OF MAKaha.....	30
A. Legends.....	30
B. Trails.....	33
C. Ocean Resources.....	35
D. Native Gathering of Plants.....	38
E. Surfing.....	38
F. Burials.....	39

RECEIVED AS FOLLOWS

Table of Contents	
Introduction	
LIST OF FIGURES	
Figure 1	USGS 7.5 Minute Series Topographic Map, Wai'anae Quadrangle, Showing the Location of the Project Area.....7
Figure 2	Portion of TMK 8-4-02, Showing the Location of the Project Area.....8
Figure 3	Aerial Photograph, Showing the Location of the Project Area.....9
Figure 4	USGS Topographic Map, Wai'anae Quadrangle, O'ahu, Showing Location of Gap Area.....10
Figure 5	Previous Archaeological Studies in Mākaha Ahupua'a.....18
Figure 6	Previously Identified Archaeological Sites in Coastal Mākaha Ahupua'a.....25
Figure 7	Trails of Leeward O'ahu as Described by 'Ūi. Map by Paul Rockwood. ('Ūi, 1959:96).....34

Table of Contents	
LIST OF TABLES	
Table 1	Land Commission Claims in Mākaha Ahupua'a.....13
Table 2	Previously Archaeological Studies in Mākaha Ahupua'a.....19
Table 3	Previously Identified Archaeological Sites in Coastal Mākaha Ahupua'a.....24

Table of Contents	
VII. SUMMARY AND RECOMMENDATIONS	
A. Summary	40
B. Recommendations	40
VIII. REFERENCES CITED	
APPENDIX A	41
APPENDIX B	47
	51



**C. Scope of Work**

The following scope of work was proposed for the satisfying requirements related Cultural Impact Assessments:

- 1) Examination of historical documents, Land Commission Awards, historic maps, with the specific purpose of identifying traditional Hawaiian activities including gathering of plant, animal and other resources or agricultural pursuits as may be indicated in the historic record.
- 2) A review of the existing archaeological information pertaining to the sites on the property as they may allow us to reconstruct traditional land use activities and identify and describe the cultural resources, practices and beliefs associated with the parcel and identify present uses, if appropriate.
- 3) Conduct oral interviews with persons knowledgeable about the historic and traditional practices in the project area and region. Several formal and informal interviews were conducted.
- 4) Preparation of a report on items 1-3 summarizing the information gathered related to traditional practices and land use. The report assess the impact of the proposed action on the cultural practices and features identified.

This scope of work also includes full coordination with the State Historic Preservation Division (SHPD), and the City and County of Honolulu relating to archaeological matters. This coordination takes place after consent of the owner or representatives.

**D. Methods**

Background research included a review of previous archaeological studies on file at the State Historic Preservation Division, a review of geology and cultural history documents at Hamilton Library at the University of Hawai'i, the Hawai'i State Archives, the Mission House Museum Library, the Hawai'i Public Library, and the Archives of the Bishop Museum. Further research included a study of historic photographs at the Hawai'i State Archives and the Archives of the Bishop Museum, a study of historic maps at the Hawai'i State Archives and the Archives of the Bishop Museum, and a study of historic maps at the Survey Office of the Department of Accounting and General Services. Information on Land Commission Awards was accessed through Waipahoana's *Māhele* Data Base ([www.waipahoana.com](http://www.waipahoana.com)).

Hawaiian organizations, agencies and community members were contacted in order to identify potentially knowledgeable individuals with cultural expertise and/or knowledge of the study area and the surrounding vicinity. A discussion of the consultation process can be found in the following section on "Community Consultations". Please refer to Table 4 for a complete list of individuals and organizations contacted.

Oral interviews were conducted between May 2003 and July 2003 and subsequently transcribed. The informants were given the opportunity to read through the transcription and edit it. Then they signed an "Authorization for Release" form giving permission to Cultural Surveys Hawai'i, Inc. for the interviews to be used as part of this study. Excerpts from the interviews are

**1. INTRODUCTION**

**A. Project Background**

At the request of Parsons, Brinckerhoff, Quade and Douglas, Cultural Surveys Hawai'i, Inc. performed a Cultural Impact Assessment for the Proposed Sandwich Isles Fiber Optic Cable Landing at Kili Drive, Māhala, O'ahu. The marine cable landing project involves the installation of undersea fiber optic cables and a terrestrial cable manhole.

The project will involve the use of horizontal directional drilling to bore from a drill site near the intersection of Kili Drive with Farrington Highway to a point approximately 3500 ft. (1067 m) offshore Māhala, O'ahu. The cable line will be drilled 30 ft (9 m) beneath the shoreline to an ocean depth of 60 ft. (18 m) and will have a minimum diameter of 4 in. (10 cm). The only permanent surface structure to be constructed specific to the landing infrastructure is a manhole which will be located in Farrington Highway.

The proposed terrestrial sandwich isles fiber optic cable line will be within Farrington Highway corridor. In order to connect the terrestrial line to the proposed cable landing site at Kili Dr., a "gap area" must be addressed through additional subsurface cable installation. The 'gap area' is the segment of Farrington Hwy. from Wai'anae Valley Rd. to Kili Dr. (Figure 4).

**B. Project Area Description**

The project area is located approximately 300 ft. (150 m) *mauka* of the shoreline at Māhala Beach Park, at the intersection of Kili Drive and Farrington Highway, Māhala Ahupua'a, Wai'anae District, Island of O'ahu (TRNK 8-1-01) (Figures 1-3).

Soils within the project area consist of Haleiwa Silty Clay, 0 to 2 Percent Slopes (HcA) near the intersection of Kili Drive with Farrington Highway. Haleiwa Silty Clay is described as a moderate to poorly drained clay occurring in alluvial fans and drainage ways (Foot et al. 1972). The elevation at the project area is approximately 20 ft. (6 m) AMSL.

Rainfall is less than 20 in. (500 mm) annually along the coast with winter storms being the major source of precipitation. December through February are the relatively wet months for the region (Armstrong 1973).

Vegetation along this arid coast is sparse. With 20 in. (500 mm) or less of rain annually, only the hardiest plants adapted to the coastal environments can thrive in this zone. The vegetation is typical of dry seashore environments in Hawai'i and is dominated by alien species. Indigenous species include *hau* (*Hibiscus tiliaceus*), *kou* (*Cordia subcordata*), *kamani* (*Calophyllum inophyllum*), *naupaka* or *naupaka kahakai* (*Scaevola sericea*), *pa'u o Hi'iaka* (*Jacquemontia ovalifolia sandwicensis*), the native beach morning glory or *pohuehue* (*Pourea pes-caprae*) and the coconut or *nui* (*Cocos nucifera*). Introduced species found bordering Farrington Highway include sea grape (*Coccoloba uvifera*), *kiawe* trees (*Prosopis pallida*), Madagascar Olive trees (*Norundia emarginata*), and *kou haole* (*Leucaena leucocephala*). *Kiawe*, *kou haole*, and various grasses were dominant within the project area.

RECEIVED AS FOLLOWS

Introduction

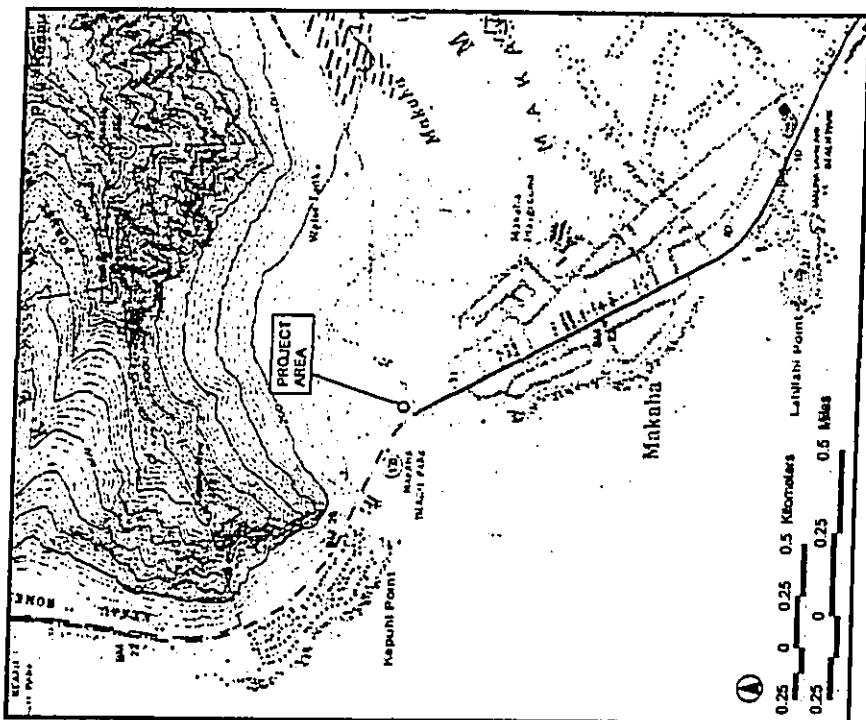


Figure 1 USGS 7.5 Minute Series Topographic Map, Wai'anae Quadrangle, Showing the Location of the Project Area.

Introduction

used throughout this report, wherever applicable. The full transcripts of the interviews are appended to this report as Appendix A & B.

RECEIVED AS FOLLOWS

Introduction



Figure 3 Aerial Photograph, Showing the Location of the Project Area.

Introduction

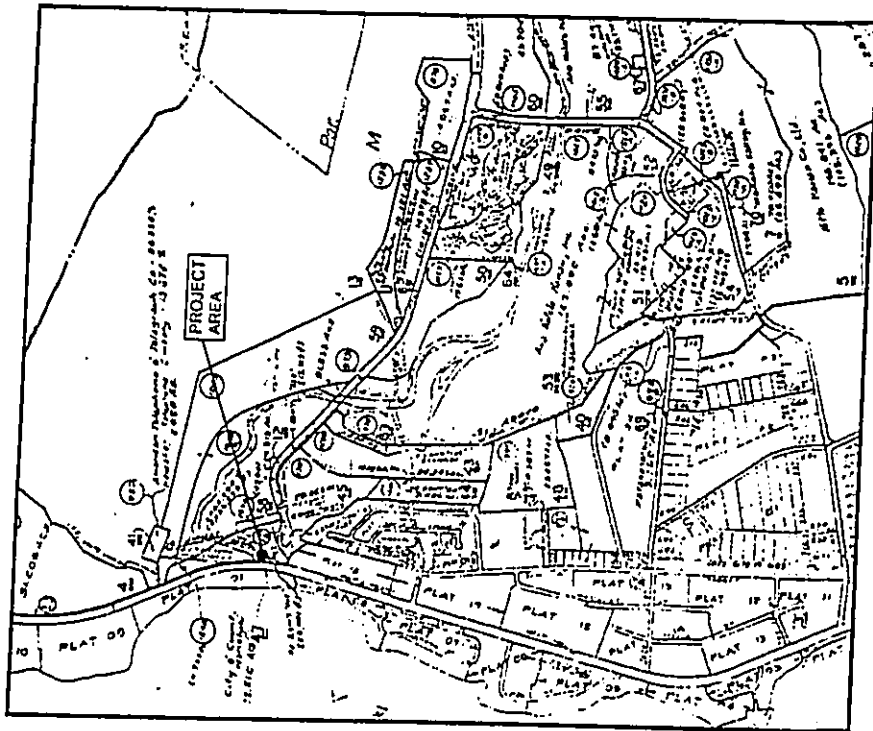


Figure 2 Portion of TMK 8-4-02, Showing the Location of the Project Area.

RECEIVED AS FOLLOWS

II. HISTORICAL BACKGROUND

A. Pre Contact to early 1800's

Wai'anae District

The origin of the name Wai'anae is thought to be connected to the richness of the waters off Wai'anae's coast: wai - water and 'anae - large mullet (in Sterling and Summers 1978). Several accounts attest to the abundance of fish from Wai'anae waters (Wilkes 1845; Pukui et al. 1974). In 1840, Wilkes makes the following comment: "The natives are much occupied in catching and drying fish, which is made a profitable business, by taking them to Oahu, where they command a ready sale" (Wilkes 1845:81-82).

Traditional accounts of Wai'anae portray a land of dual personality: a refuge for the dispossessed and an area inhabited by the rebellious and outlaws. Certain landmarks in Wai'anae attest to this dichotomy. Kawiwi, a mountain between Wai'anae and Mākaha Ahupua'a, was dedicated as a refuge by priests during times of war (McAllister 1933; Kamukau 1961). Pōkai'i Bay was used as a school administered by the exiled high class priests and kahuna who took refuge in Wai'anae after Kamehameha Nui gained control of O'ahu (in Sterling and Summers 1978:68). It was also near Pōkai'i Bay, at a place named Pu'u Kāhea, that the eighteenth-century prophet and kahuna mii of O'ahu, Ka'opulupulu, made his last famous prophecy before he was killed in Po'olua (in Sterling and Summers 1978:71). In contrast, other places in Wai'anae were famed for their inhospitability.

Certainly, the environmental conditions along the Wai'anae Coast played a part in shaping Wai'anae people. Vancouver, the first explorer to describe this coast in 1793, describes the Wai'anae Coast as "composed of one barren rocky waste, nearly destitute of verdure, cultivation or inhabitants..." (Vancouver 1798:217).

The 'ōku'u epidemic of 1804 (thought to be cholera) undoubtedly had a major effect on the native population, not only in Wai'anae, but throughout the rest of the islands as well. John Papa 'I'i relates that the 'ōku'u "broke out, decimating the armies of Kamehameha I" (on O'ahu) (1983:16). Other diseases also took their toll. The combined census for the Wai'anae and 'Ewa Districts in 1831-1832 was 5,883 (Schmitt 1977:12). Twenty years later, the combined census for the two districts was 2,451.

Another early historic period foreign influence which greatly impacted Hawaiian culture and the traditional lifestyle was the sandalwood trade. In an effort to acquire western goods, ships, guns, and ammunition, the chiefs had acquired massive debts to the American merchants (I'i 1983:155). These debts were paid off in shiploads of sandalwood. When Kamehameha found out how valuable the sandalwood trees were, he ordered the people not to let the felled trees fall on the young saplings, to ensure their protection for future trade (Kamakau 1992:209-210).

Mākaha Ahupua'a

Earliest accounts specific to Mākaha describe a good sized inland settlement and a smaller coastal settlement (Green 1980). These accounts correlate well with a sketch drawn by

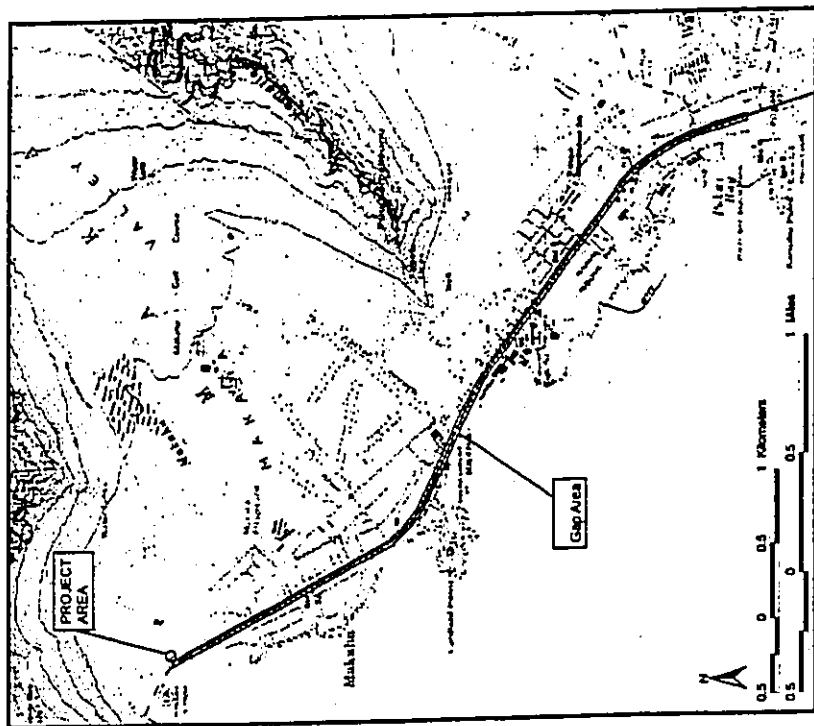


Figure 4 USGS Topographic Map, Wai'anae Quadrangle, O'ahu, Showing Location of Gap Area

RECEIVED AS FOLLOWS

Historical Background

Bingham in 1826 depicting only six houses along the Mākaha coastline. Green (1980:20-21) describes Mākaha's coastal settlement as "restricted to a hamlet in a small grove of coconut trees on the Kea'u side of the valley, some other scattered houses, a few coconut trees along the beach, and a brackish water pool that served as a fish pond, at the mouth of the Mākaha Stream."

At the boundary between Mākaha and Wai'anae *Ahupua'a* lies Mauna Lahilahi, a striking pinnacle jutting out of the water. Vancouver describes Mauna Lahilahi as "a high rock, remarkable for its projecting from a sandy beach." He also describes a village located south of Mauna Lahilahi situated in a grove of coconuts (Vancouver 1798:219). This village is Kamaile, which Green (1980:8) likens to a miniature *ahupua'a* "with the beach and fishery in front and the well watered taro lands just behind." A fresh water spring, Keko'o, gave life to this land and allowed for the existence of one of the largest populations on the Wai'anae Coast. The present project area would have been south of the coastal settlement in the relatively low site density shoreline environment.

B. *Māhale* and Land Commission Award Documentation

The Organic Acts of 1845 and 1846 initiated the process of the *Māhale* - the division of Hawaiian lands - which introduced private property into Hawaiian society. In 1848, the crown and the *ali'i* (royalty) received their land titles. *Kūleana* awards for individual parcels within the *ahupua'a* were subsequently granted in 1850. Mākaha *Ahupua'a* had 13 claims of which 7 were awarded (Table 1). Six of the seven Mākaha Land Commission Awards (LCAs) were located inland attesting to the importance of the inland settlement. The seventh Mākaha LCA claims a *muliwai* as its western boundary. According to Fukui and Elbert (1957: 236) a *muliwai* refers to a "river, river mouth; pool near mouth of a stream, as behind a sand bar, enlarged by ocean water left there by high tide; estuary." The reference to it as a boundary suggests this LCA was probably situated near the coast. Two unawarded claims also mention the *muliwai* as their boundary. The *muliwai* is north of the present drilling site.

Table 1 Land Commission Claims in Mākaha *Ahupua'a*

Land Claim #	Claimant	'Illi	Land Use	Landscape Feature	Awarded
877	Kama/Kuana for Poomano, wife	Kapuaa		Surrounded by lands of Alapai	1 ap.; 1,387 Ac (also Hotel St. & Waianae awards)
8728	Inaole (no name)	Laukini	house	stream on 2 sides	No
8763	Kanakaa	Iloole	'ili		No
9689	Nahina	Kekio	16 lo'i house lot	kahawai, muliwai on west	1 ap.; 957 Ac.
9859	Napoe	Aheka'i/Laukini/Mooiti	17 lo'i (mo'o) & kula house	pali on N. Kalia ma on N., kula & stream on E, stream on S. Muliwai on W.	No
9860	Kalia	Loulanwaa	house	in kahawai (stream valley) of Mākaha, lau, muliwai on W.	No
9861	Nahina, see above	Kekio			No
9862	Kanehaku	Kekio/Mooiki			
9863	Kala	Waikani/Kahueiki/Kapuaa		stream on S. pali(s) & stream land of Alapai	1 ap.; (Kaliti) 1,346 Ac
9864	Kapea	Laukini	19 lo'i kula	pali	1 ap.; 1,217 Ac
10613	PAKI, Abner	<i>Ahupua'a</i>			Apapa S; 4,933 Acres
10923	Uniu	Mākaha		stream on Eland of Kalia on S, pali on W.	1 ap.; .522 Ac. 1 ap.; .576 Ac.
10923B	Alapai	Kapuaa	2 lo'i & kula	pali on E, kahawai on W.	1 ap.; .52 Ac.

Historical Background

## Historical Background

Mākaha Valley was under sugar cane cultivation. The plantation utilized large tracks of Luuluai, Wai'anae and Mākaha Valley. In 1884, newspaper accounts note 7 1/2 miles of track laid which included Mākaha and in 1899, increased the length with 3 more miles of track. The manager's report for 1900 described the plantation as having some 400 acres of new land cleared, fenced and planted two miles of railroad and nearly three miles of flumes have been laid to said lands (Condé and Best 1973:357). For a half century, Mākaha was predominantly sugarcane fields, but by 1946, the manager's report announced the plans to liquidate the property because of the additional increase in wage rates, making the operations no longer profitable (Condé and Best 1973:358).

The lack of water resources played a role in Wai'anae Sugar Company's low profitability. In the 1930's, Wai'anae Plantation sold out to American Factors Ltd. (Ainfac, Inc.). American Factors Ltd. initiated a geologic study of the ground water in the mountain ridges in the back of Mākaha and Wai'anae Valleys. The study indicated that tunneling for water would be successful, but before tunneling could commence, World War II came about and plans were put on hold (Green, 1980). In 1945, American Factors Ltd. contracted the firm of James W. Glover, Ltd. to tunnel into a ridge in the back of Mākaha Valley. The completed tunnel (i.e. Glover Tunnel) was 4200 ft. long and upon completion had a daily water capacity of 700,000 gallons. The water made available was mainly used for the irrigation of sugar. In 1946, Wai'anae Plantation announced in the *Honolulu Advertiser* (Friday, Oct 18, 1946) that it planned to liquidate its nearly 10,000 acres of land. The day before, news of the impending sale was circulated among the investors at the Honolulu Stock Exchange. One of the investors was Chin Ho Ho.

"The unorthodox Ho had started his Capital Investment Company only the year before with a bankroll of less than \$200,000, much of it the life savings of plantation workers. He was known as a friend of the little man, an eager disciple of economic growth, and an upstart" (McGrath *et al.* 1973:145)

Chin Ho managed to broker the deal the following day, by 2 p.m., when the Wai'anae Plantation sold the Mākaha lands to the Capital Investment Corporation, which stills maintains ownership of much of Mākaha Valley. There was an attempt to convert the sugar lands back to ranching but the perennial problem of water continued. Parts of the property were sold off as beach lots, shopping centers and house lots. Many of the former plantation workers bought house lots. Chin Ho also put his personal investment into Mākaha and initiated resort development including a luxury hotel and in 1969, the Mākaha Valley Golf Club, an 18-hole course with tennis courts, restaurant and other golf facilities was opened for local and tourist use (McGrath *et al.* 1973:146-163). Numerous other small scale agricultural interests were pursued during this time period including coffee, rice and watermelons (Ladd and Yen 1972). Water from Glover Tunnel was now used to water Mākaha Valley farms, and the lush grounds of the Mākaha Inn and Country Club, and its associated golf course.

## E. Alterations to the Wai'anae Coastline (1880-1930)

Prior to the 1880's, the Wai'anae coastline may not have undergone much alteration. The old coastal trail probably followed the natural contours of the local topography. With the introduction of horses, cattle, and wagons in the nineteenth century, many of the coastal trails were widened and graded to accommodate these new introductions. However, the changes

## Historical Background

Land use information for the Mākaha LCAs is sparse. *Lo'i* lands and *kula* lands were an important part of sustenance. Aside from these general land specifications, however there is mention of *maui*, ponds, and land for raising *niao*. The *maui* and ponds are recorded in association with the *ʻiʻi* of Kamaile suggesting the claimant was claiming land in neighboring Wai'anae *Aliupuaʻu* in addition to the Mākaha claim. *Mao* refers to an introduced species of "cotton" (*Gossypium barbadense* or *Gossypium hirsutum*) which was commercially grown in Hawaii beginning the early part of the nineteenth century, although it never did become an important industry (Wagner *et al.*, 1990: 876). *Mā*'u generally does well in hot, arid environments and Mākaha would have been a suitable climate for such an industry. The claim was made by Abner Paki father of Bernice Pauahi, who received the entire *aliupuaʻu* of Mākaha.

Kuho'ohēhēi (Abner) Paki was given Mākaha *Aliupuaʻu* by Liliha after her husband, Boki, disappeared in 1829 (Green, 1980). Although individuals several are recorded to have charge over Mākaha including Awa, Kanepaiki "chief of the Pearl River", and the present "King", A. Paki felt entitled to the entire *aliupuaʻu* of Mākaha. It is uncertain how much of his claim he was granted. Whatever the case, it is suggested Paki was able to wield a certain amount of control over the residents of Mākaha during the Māhele resulting in the limited number of Land Commission Awards applications. The number of taxpaying adult males in 1855 numbered 39 suggesting there were more families living and working the Mākaha lands (Barrere 1970: 7). That was reflected in Māhele awards.

Based on mahele Documents Mākaha's primary settlement was inland where waters from Mākaha Stream could support *lo'i* and *kula* cultivars. Although there is evidence for settlement along the shore, for the most part, this was limited to scattered, isolated residents. The only "cluster" of habitation structures was concentrated near Mākaha Beach, near the Kea'au side of Mākaha where there is also reference to a fishpond. The present project area would be south of that cluster, on the Wai'anae Valley side of the *mauiwai*.

## C. 1850-1900

By ancient custom, the sea for a mile off the shores belonged to the *aliupuaʻu* as part of its resources. The ruling chief could prohibit the taking of a certain fish or he could prohibit all fishing at specific times. Paki filed two such prohibitions, one in 1852, for the taking of *ke'e* or octopus (*Polyopus* sp.) and the other in 1854 for the taking of *ōpēka* (*Decapodites pinnulatus*) (Barrere in Green 1980:7).

In 1855, Chief Paki died, and the administrators of his estate sold his Mākaha lands to James Robinson and Co. Later, in 1862, one of the partners, Owen Jones Holt, bought out the shares of the others (Ladd and Yen 1972). The Holt family dominated the economic, land-use and social scene in Mākaha from this time until the end of the nineteenth century. During the height of the Holt family dynasty, from about 1887 to 1899, the Holt Ranch raised horses, cattle, pigs, goats and peacocks (Ladd and Yen, 1972:4). Mākaha Coffee Company also made its way into the Valley, buying up land for coffee cultivation, although they never became a prosperous industry. Upon Holt's death in 1862, the lands went into trust for his children.

## D. 1900 to Present

The Holt Ranch began selling off its land in the early 1900's (Ladd and Yen, 1972). In 1908, the Wai'anae Sugar Company moved into Mākaha and by 1923, virtually all of lower

III. PREVIOUS ARCHAEOLOGICAL RESEARCH

A. Previous Archaeological Studies in Mākaha *Ahiupua'a*

A number of archaeological studies have been carried out in Mākaha *Ahiupua'a* (Figure 5, Table 2), beginning with McAllister's (1933) island-wide survey in which he describes seven sites in Mākaha *Ahiupua'a*.

State site 50-80-07-169 is a complex of rock-faced terraces for irrigated taro cultivation located "two-thirds the way up the valley" and shown on McAllister's O'ahu site map as on the northwest side of the valley approximately 800 m northwest of Kāne ʻĀki Heiau.

State site 50-80-07-170 is Kāne ʻĀki Heiau which has been preserved and reconstructed.

State site 50-80-07-171 is another set of extensive once irrigated taro terraces, with some rock facings 6 ft. in height, and is reported as "half-way up Mākaha Valley and on the Honolulu side of the stream" and is shown on McAllister's O'ahu site map as approximately 400 m south of Kāne ʻĀki Heiau. Green (1980) reported that this site was not relocated and had been destroyed but Neller (1984) relocated and described the damaged site.

State site 50-80-07-172 is described as a stone platform, is interpreted as a possible shrine, and is shown on McAllister's O'ahu site map as approximately 600 m south of Kāne ʻĀki Heiau. Green (1980) reported that this site was not relocated and had been destroyed but Neller (1984) relocated and described the damaged site.

State site 50-80-07-173 is described as the "probable location" of a large rock reported in 1839 by E. O. Hall as "two or three miles distance" past the settlement at Pukaha (Pu'u Kahoa) that was once an object of worship. This sacrificial stone was reported by Hall as "in no peculiar sense striking" and "as undignified as any other hump or inanimate matter along the road." It is unclear whether McAllister actually saw this stone which Hall describes as "lying at the foot of a frightful precipice several hundred feet in height" but McAllister's map appears to locate it in the flats in the central seaward portion of the valley.

State site 50-80-07-174, Laukinui Heiau, was described as "the important one (heiau) in Mākaha Valley", and said to be so old as to have been built by the menehune. McAllister places this site in the vicinity of Kepuhi Point and his description of the heiau incorporating a "coral outcrop" and "an amazing amount of coral" fits that locale. State site 50-80-07-175 known as Mōlōlōkai is located at the base of the ridge between Kea'au and Mākaha on the seaside of the road. This site was described as two pits where early cannibals had come to wash the defleshed bodies of their victims at high tide. Associated with this site were said to be two prominent stones, a Pōlaku O Kāne on the Mākaha side and a Pōlaku O Kaula on the Kea'au side.

probably consisted of superficial alterations to the existing trails and did not entail major realignments. Kuykendall (1933:26) describes mid-nineteenth century road work: "Road making as practiced in Hawaii in the middle of the nineteenth century was a very superficial operation, in most places consisting of little more than clearing a right of way, doing a little rough grading, and supplying bridges of a sort where they could not be dispensed with." The first real alteration to the Wai'anae coastline probably came with the growth of the Wai'anae Sugar Company. The company cultivated cane in three valleys - Mākaha, Wai'anae, and Luakalei - and to more easily transport their cane to the dock and to the mill at Wai'anae Kai, a railroad was constructed in 1880. The construction of the railroad would have had an impact on the natural features in the area, such as the sand dunes, as well as the human-made features, particularly the fishponds and saltponds maintained in the coastal zone. Additional alteration to the Wai'anae coastline occurred in the late nineteenth century with the extension of Dillingham's O.R. & L. rail line into the Leeward Coast. One reporter writes a glowing story of the railroad trip to Wai'anae at its opening on July 4, 1895:

For nine miles the road runs within a stone's throw of the ocean and under the shadow of the Wai'anae Range. With the surf breaking now on the sand beach and now dashing high on the rocks on one side, and with the sharp crags and the mountains interspersed with valleys on the other, patrons of the road are treated to some of the most magnificent scenery the country affords (in Krauss 1973:56).

This report suggests the railroad hugged the ocean during a good portion of the trip. The mechanics of railroads demanded considerable alterations to natural landscapes in order to make them feasible for transport, including less curves and hills. A 1912 map of the Government Bell Road illustrates the alignment of the old Government Road which was probably a modified version of the original coastal trail, and the alignment of the proposed Government Bell Road which would parallel the O.R. & L. alignment. After the Bell Road was completed, further roadwork was carried out in the 1930s on what was called the "Wai'anae Road" (D.O.T. 1923 Plans for Wai'anae Road later named Farrington Highway).

F. Kili Drive

Kili Drive was built ca. 1970s to provide additional access into Mākaha Valley. The additional access was necessary due to the increased population related to residential, golf resort, and condominium development in the valley.

RECEIVED AS FOLLOWS

Table 2 Previous Archaeological Studies in Mākaha Ahupua'a

Study	Location	Type of Study	Findings
McAlister 1933	Inland-wide	Inland-wide Survey	Describes 7 sites within Mākaha Ahupua'a
Green 1969	Large expanse of the central valley	Mākaha Historical Report 1	Presents documentation and analysis of remains
Green 1970	Large expanse of the central valley	Mākaha Historical Report 2	Presents results of excavations including 16 carbon dates going back to circa AD 1200.
Ladd & Yen 1972	Large expanse of the central valley	Mākaha Historical Report 3	Presents results of excavations
Ladd 1973	Large expanse of the central valley	Mākaha Historical Report 4	Presents results of excavations
Green 1980	Large expanse of the central valley	Mākaha Historical Report 5 - Summary	Summary of Archaeological Data and Cultural History
Bordner 1981	Corridor in valley floor <i>maka</i> of Kāne'iki Hiau	Surface Survey	Notes numerous sites, mostly agricultural
Bordner 1983	Corridor in valley floor <i>maka</i> of Kāne'iki Hiau	Surface Survey	Notes numerous sites, mostly agricultural
Kennedy 1983	Elevation of 1072 feet in the valley floor, 2 km. <i>maka</i> of Kāne'iki Hiau	Well Monitoring Report	Observed no buried features or artifacts
Neller 1984	Central Valley (Site Area -997)	Archaeological Reconnaissance Survey	Identifies unreported sites, and re-analysis several sites
Hammatt <i>et al.</i> 1985	West side of valley (Site Area 776)	Archaeological Reconnaissance Survey	Identifies numerous natural terraces assoc. with dryland agriculture

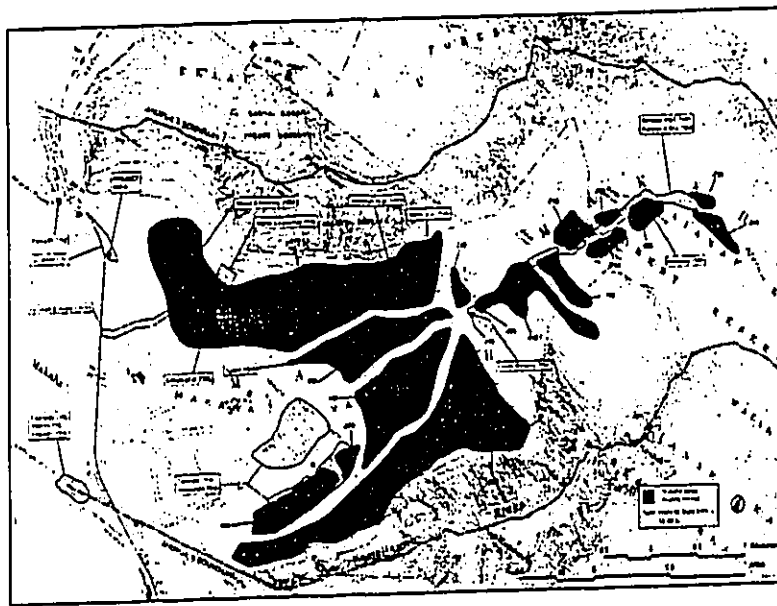


Figure 5. Previous Archaeological Studies in Mākaha Ahupua'a.



RECEIVED AS FOLLOWS

Previous Archaeological Research

Fields Masonry 1997	Kāne'āki Heiau	Heiau Report	Presents background, a restoration plan & an account of restoration work
Magnuson 1997	Upper Mākaha Valley	Archaeological Review	Presents an overview & summary of previous studies
Maty 1999	Central valley	Limited Consultation Study	Presents a historical overview and consultation with knowledgeable parties
Elmore et al. 2000	South side of Kili Drive (Site area - 776)	Archaeological Inventory Survey	Identified three features poss. assoc. with dry-land ag. and/or habitation
Moore Kennedy 2000	North side of Kili Drive (Site area - 776)	Archaeological Inventory Survey	Identified two features poss. assoc. with dry-land ag.

The Mākaha Valley Historical Project (Green 1969, 1970, 1980; Ladd and Yen 1972; and Ladd 1973), involving fieldwork conducted between 1968 and 1970, studied most all of Mākaha Valley. However, as Neiler (1984:1) noted sites were lumped into large geographical districts and most of the valley was only surveyed at the reconnaissance level. The Mākaha Valley Historical Project research was unique in that it was funded by private enterprise without legal compulsion and the investigations covered parts of the valley beyond those due for development. More than 600 archaeological features were recorded in the upper valley and 1,131 features were recorded in the lower valley. The coastal strip and the central lower valley were not included because of previous development. Excavations were undertaken at thirty separate structural features including ten field shelters, four stone mounds, three stepped-stone platforms, three house enclosures, two storage pits, a clearing, a site thought to be a shrine, a *heiau*, a pond field terrace system, a habitation feature, two historic house platforms, and a modern curbed foundation. Carbon dating indicated settlement as early as the 13th century. Settlement was focused on the primary water source, Mākaha Stream. Subsequently, with increased population expansion into *kūlo* lands occurred. By the 16<sup>th</sup> century the expansion occurred in the "upper valley" with changes in subsistence to irrigated taro system (i.e. to 7XGreen 1980:75).

Richard Bordner (1981) carried out a survey of a linear project area up the middle of the valley floor inland of Kāne'āki Heiau in support of road widening and well placement projects. This corridor ran through several site areas designated during the Mākaha Valley Historical Project. Descriptions of sites are by proximity to site mapping points. Bordner (1981:D-22) concludes "the entire Mākaha Valley was utilized for agricultural production in the most intensive way, such that all areas capable of it were undoubtedly utilized for crop production." This study occasioned two reviews by Roger C. Green and Matthew Spriggs resulting in Bordner's preparing "Mākaha Valley Well III - V Re-Survey" (1983) and writing "Appendix B: Response to M. Spriggs Review of Mākaha Wells" (n.d.).

Previous Archaeological Research

West central side of the valley	Archaeological Survey	Identified four sites including four stone platforms, a U-shaped habitation enclosure, a terrace and a wall. Some 17 test pits were excavated
Barrera Jr. 1986	Archaeological Investigations	Identifies five archaeological sites
Kennedy 1986	Affidavits of brief oral histories	Accounts note the general sacredness of Mauna Lahilahi & the good fishing
Ahlo 1986; Kim 1986; Rio 1986; Simons 1986	Archaeological Survey & Testing	Relocates Kennedy's five sites and describes eleven more. Reports eight carbon dates
Komori 1987	Mapping Project	Ties in previously identified sites, focus on sites -764 & -77, emphasis on dryland ag.
Bordner & Cox 1988	Archaeological Inventory Survey	Identified a terrace assoc. with dry-land ag. and/or habitation
Donham 1990	Burial report	Describes remains of 2+ individuals, artifacts & sites
Kawachi 1990	Archaeological Inventory Survey (synopsis)	Identified a terrace assoc. with dry-land ag. and/or habitation
Rosendahl 1990	Archaeological Inventory Survey	Identified a linear earthen berm understood as associated with commercial sugar cane cultivation
Hammatt & Robins 1991	Burial Report	1 burial? "First in this particular area"
Kawachi 1992	Archaeological Investigations	No historic features were located.
Moore & Kennedy 1994	Archaeological Inventory Survey	A cultural layer, a pond/welland area remains of structures associated with the O. R. & L. Railroad, & a bridge foundation
Cleghorn 1997	Archaeological Inventory Survey	

## Previous Archaeological Research

Kennedy (1983) produced an archaeological monitoring report on work at a 100 m long strip near "Well IV" at an elevation of 1072 feet in the valley floor, two kilometers inland from Kāneʻāki Hāiau. He saw no evidence of buried features or artifacts.

Earl Neiler (1984) of the State Historic Preservation Division went back into the area designated as Site Area 997 "to clear up various deficiencies in the published reports and unpublished site data" and to re-examine various "puzzling inconsistencies." He relocated sites previously reported as destroyed (McAlister sites 171 & 172), identified unreported sites, and re-analyzed several sites studied during the Mākaala Valley Historical Project.

Hanunui, Shideler and Borthwick (1985) carried out an archaeological reconnaissance survey of a 3,000 foot long corridor on the west side of central Mākaala Valley in the 776 site area, documenting numerous modifications of natural terraces for dry land agriculture. Ten archaeological sites (1 wall, 2 habitation sites, and 7 agricultural sites) were recorded.

Barrera, Jr. (1986) carried out an archaeological survey of a mid valley well site on the west central side of the valley. The project area appears to have included a corridor approximately 600 m long and 30 m wide and a proposed reservoir site 90 m in diameter. He identified four sites including four stone platforms (Site -1465), a U-shape habitation enclosure (Site -1466), a terrace (Site -1467) and a wall (Site -1468). Some 17 test pits were excavated but virtually nothing was found.

Kennedy (1986) carried out archaeological investigations focused on the north (Mākaala) side of Mauna Lahilahi identifying five sites including a possible shrine, a *kou*, a linear pile and an enclosure.

Komori (1987) carried out archaeological survey and testing at Mauna Lahilahi relocating Kennedy's (1986) five sites and an additional eleven sites including petroglyphs, enclosures, terraces, rock shelters & midden, and lithic scatters. He reports eight radiocarbon dates rather lightly in the AD 1300 to 1650 period.

Bordner & Cox (1988) carried out a mapping project on the upper valley floor inland of Kāneʻāki Hāiau. While much of the focus of this study was more accurately locating sites previously identified during the Mākaala Valley Historical Project, their findings suggest that the relative importance of dry-land, non-irrigated agriculture had previously been underestimated.

Douham (1990) and Rosendahl (1990) carried out an archaeological inventory survey of two discrete but adjacent parcels for a total of approximately 130 acres in the south central portion of the valley. Douham identified a terrace associated with dry-land agriculture and/or habitation.

Hanunui and Robins (1991) carried out an archaeological inventory survey of an approximately 4,600 ft. long route of a proposed 20-inch water main extending northeast from Farrington Highway up Water Street and then continuing northeast to and across Kili Drive. They documented a single historic property Site 50-80-07-4363. Site -4363 was described as "a linear earthen berm ... buttressed along its stream side with cobbles and boulders" (Hanunui & Robins 1991). The berm was interpreted as having been "associated with the historic sugarcane cultivation" (*ibid.*). Based on historic maps, the berm probably represents an old ditch alignment. The ditch alignment was probably altered during construction of the adjacent golf courses and presently functions as a flood control structure, protecting housing downslope. Subsurface testing within the corridor encountered nothing of archaeological significance.

## Previous Archaeological Research

Carol Kawachi (1992) of the State Historic Preservation Division wrote a memorandum on "Mākaala Burials Exposed by Hurricane 'Iniki' (documenting burials) eroding out of a lot at 84-325 Mākau Street. This was a pit burial, approximately 50 cm below the surface extending 1.5 m. long exposed from a sand bank by Hurricane 'Iniki. The burial was reported to have included staghorn coral at major joints and a possible shell *nihou pūloa*."

Moore and Kennedy (1994) carried out archaeological investigations on the northwest side of the valley for a proposed reservoir at 242 ft. elevation. The access corridor and reservoir site covered approximately eleven acres. No historic features were located.

Fields Masonry documented stabilization and restoration of Kāneʻāki Hāiau carried out in 1996 (1997 documentation by Emily Pagliaro). Prior restoration efforts had been carried out in 1970.

Magnuson (1997) carried out a preliminary archaeological review of upper Mākaala Valley for a proposed water line replacement project. This was primarily an archaeological literature review providing an overview of sites.

In 1997, test excavations associated with the inventory survey conducted for the "New Mākaala Beach Park Comfort Station and Parking Area" *mauka* of Farrington Highway by Cleghorn identified a cultural layer present in an area approximately 80 m. *mauka* of Farrington Highway near the entrance to Kili Drive. Radiocarbon analysis indicated an age range of A.D. 1440-1690. The deposit was suggested to be "evidence of a small encampment near the coast" (Cleghorn 1997:32). He also indicates the possible importance of a pond/wetland area just *mauka* of the highway at Mākaala Beach Park: "This pond and wetland may have offered rich resources for the Hawaiians of the area, and the pond may have been used as an inland fishpond during the prehistoric and early historic eras" (*ibid.* 1997:33). Also present in the area are remains of structures associated with the O. R. & L. Railroad (State site 50-80-12-9714). Cleghorn indicates the presence of a bridge foundation located in an unnamed stream just north of Kili Drive, *makaui* of the highway (*ibid.* 1997:11).

Maly (1999) carried out a "Limited Consultation Study with Members of the Hawaiian Community in Wai'anae" in support of the Mauna 'Ōlu Water System. Several interviewees deferred to Mr. Lanūis Onielias (a co-founder of the organization *Hui Mālama o Kāneʻāki Hāiau*) as a cultural expert for mid-valley Mākaala. Concerns for continuing community consultation were expressed.

Elmore, Moore, and Kennedy (2000) carried out an archaeological inventory survey of an approximately 19.6 acre parcel located on the south side of Kili Drive and just west of the condominiums in a portion of the previously identified site area 50-80-07-776. A total of eight features were identified. Five of these were determined to be modern disturbances while the other three were thought to be possible traditional Hawaiian dry-land agricultural and/or habitation features.

Moore and Kennedy (2000) carried out an archaeological inventory survey of an approximately 20-acre parcel located on the north side of Kili Drive in a portion of the previously identified site area 50-80-07-776. A total of twelve features were identified. Ten of these were determined to be modern disturbances while the other two were thought to be possible traditional Hawaiian dry-land agricultural features.

RECEIVED AS FOLLOWS

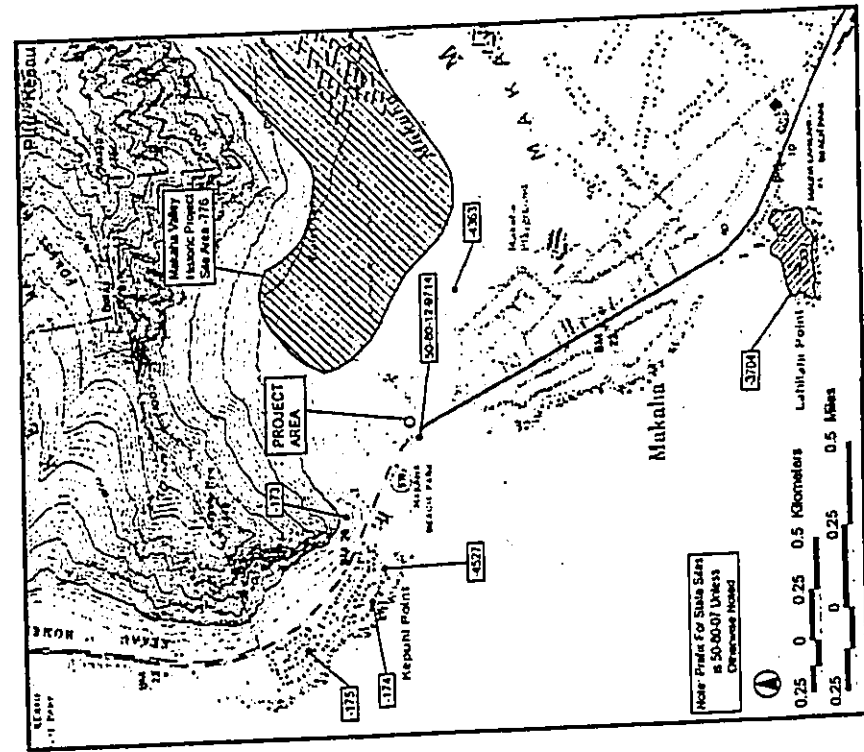


Figure 6 Previously Identified Archaeological Sites in Coastal Makaha Ahupua'a

B. Previously Recorded Sites in the Vicinity of the Project Area

Table 3 Previously Identified Archaeological Sites in Coastal Makaha Ahupua'a

50-80-07-173	Probable Location of Rock Spoken of by Hall (McAllister 1933) "called...Pukaha...an object of worship, and to which sacrifices were offered in former times. (3 miles from Pukaha) a large rock...in no particular sense striking"
50-80-07-174	Laukiniu Heiau (McAllister 1933) Low walls inclose, on three sides, what appear to be two low stone-paved platforms...Just to the south of the inclosure a coral outcrop forms a natural platform which was undoubtedly part of the heiau...The heiau is so old as to be accredited to the menehunes and said to have been the important one in Makaha Valley, though not nearly so pretentious or well-preserved as that of Kaneaki.
50-80-07-175	Mololokai (McAllister 1933) Two small pits on the makai side of the old road that were said to have been used by a group of cannibals who would place the defleshed bodies of their victims in these pits for cleaning by the high tide. Located at the foot of the ridge between Keanu and Makaha Valleys. Now buried/destroyed.
50-80-07-776	Makaha Valley Historic Project Site Area -776 Various prehistoric and historic sites including field shelters, stone mounds, stone platforms, habitation enclosures, storage pits, habitation features, and dry land agricultural features.
50-80-07-3704	Mauna Laulahi (Kennedy 1986; Komori 1987; Kawachi 1990) A natural promontory at the southern end of Makaha Valley. Subsurface cultural deposits, evidence of marine and religious activities and stone tool production, petroglyphs and crevice burials all included under one site designation.
50-80-07-4363	Historic Sugarcane -Related Berm (Hammatt and Robins 1991)
50-80-07-4527	Burial at 84-325 Makuu St. (Kawachi 1992) Pit burial, approximately 50cm below the surface extending 1.5 meters long. Exposed from sand bank by Hurricane Iniki. Included sugarcane coral at major joints and a possible shell niho palaoa.
50-80-12-9714	Remains of O.R.&L. Railroad (National/Hawai'i Historic Register 1975) Runs along the makai side of Farrington Highway. The railroad is listed on the National Register Of Historic Places.

RECEIVED AS FOLLOWS

Survey Results

Table 4 Community Contacts and Comments

NAME	AFFILIATION	CONTACTED	KNOWLEDGABLE OF PROJECT AREA	COMMENTS
Alia, William and Melva	Wai'anae Harbor Master	Y	Y	He has no problem with the fiber optic line. The line is in 60 feet of water and will not affect fishing. Made referrals
Aiu, Dr. Pua	Office of Hawaiian Affairs	Y	Y	Made referrals
Awala, Karen	Wai'anae Coast Neighborhood Board No. 24	A	-	Left messages
Cope, Aggie	Wai'anae Coast Culture and Arts	Y	S	She has no problem with the project.
DeSoto, Frenchy	Wai'anae Coast Archaeological Preservation Committee	Y	Y	She is concerned about the effect the drilling will have on the coral and also made a referral.
Eries, Eric	Cultural Learning Center at Ka'ala	A	-	Left message
Gabbard, Mike	City Council	A	-	Left message
Greenwood, Alice	Wai'anae Kūpuna	Y	Y	Made referral
Hanabusa, Colleen	Sciator	Y	Y	Made referrals
Ka'aukuhiwi, Shannan	Na Keiki O Kama'i Canoe Club	Y	Y	Made referral
Kalananu, Hina	Kumu	Y	Y	Made referral and also spoke of legends interviewed on 5-21-03
Kamana, Walter	Wai'anae Kūpuna	Y	Y	Interviewed on 5-21-03

Key:  
Y=Yes  
N=No  
A=Attempted (at least 3 attempts were made to contact individual, with no response)  
S=Some knowledge of project area  
D=Declined to comment  
U=Unable to contact, i.e., no phone or forwarding address, phone number unknown

Survey Results

IV. RESULTS OF COMMUNITY CONSULTATION

Throughout the course of this study, an effort was made to contact and consult with Hawaiian cultural organizations, government agencies, and individuals who might have knowledge of and/or concerns about traditional cultural practices specifically related to the project area. This effort was made by letter, e-mail, telephone or in-person contact. In the majority of cases, letters along with a map of the project area were mailed with the following text:

In collaboration with Parsons Brinckerhoff, Quade and Douglas Inc., Cultural Surveys Hawaii is conducting a Cultural Impact Assessment for the proposed Sandwich Isles Fiber Optic Cable Landing at Kili Drive, Māhaha Ahupua'a, Wai'anae District, O'ahu (TMK:8-1-01). A map and a preliminary land use overview are enclosed for your information.

The purpose of this assessment is to identify any traditional cultural practices associated with the project area, past or present. We are seeking your *kōhina* and guidance regarding the following aspects of our study:

1. General history and present and past land use of the study area.
2. Knowledge of cultural sites which may be impacted by the project - for example, historic sites, archaeological sites, and burials.
3. Knowledge of traditional gathering practices in the study area—both past and on-going.
4. Cultural associations with the study area through legends, traditional use or otherwise.
5. Referrals of *kūpuna* or anyone else who might be willing to share their general cultural knowledge of the study area.
6. Any other cultural concerns the community might have related to cultural practices in the Māhaha area.

The individuals, organizations, and agencies contacted and the results of any consultation are presented in Table 4. The three individuals listed who were interviewed for this study were all recommended by others on the contact list as having personal knowledge - whether through residence, professional association, or cultural association of the project area, in particular, as well as Māhaha and Wai'anae Ahupua'a.

The major concern expressed by the community members contacted and/or interviewed for this assessment was their previous experience with a telecommunication cable installation project at Māhaha Beach Park. This cable becomes exposed during seasonal high surf, creating a safety hazard on the beach. They are concerned that this current project does not create a similar hazard.

Additionally, Walter Kamana is concerned about possibly hazardous emissions from the cable line: "...by putting this line inside there the electricity might ... change the [fishing] ground."

RECEIVED AS FOLLOWS

Backgrounds of Kama'āina Interviews

V. BACKGROUNDS OF KAMA'ĀINA INTERVIEWEES

Kama'āina and kūpuna with knowledge of the Māhaha area were interviewed for this assessment. Three of the interviewees-Walter Kamana, Buffalo Keaulana and Albert Silva, participated in formal interview sessions that were taped and transcribed. Full transcripts of the interviews are located at the end of this study. Information provided by the interviewees is incorporated in the traditional practices section of this assessment.

Walter Kamana

Mr. Kamana was born in Māhaha in 1937 and raised in Māhaha valley. He was raised in the old Hawaiian style by his grandparents, from whom he learned to live off the land. Mr. Kamana is well-known for his expertise in fishing and his knowledge of *limu* along the Nāhākūli and Wai'anae Coast. Mr. Kamana's knowledge of legends was passed down to him by *kūpuna* around him. He is an active member in the Wai'anae community.

Richard "Buffalo" Keaulana

Mr. Keaulana, who is often referred to as Buffalo, is a legendary waterman. He was born in 1934. He spent most of his life surfing, fishing and diving along the Wai'anae coast with his favorite being Māhaha Beach. Māhaha is an outdoor classroom for him to educate people on the importance of respecting the ocean. At one time he was appointed head lifeguard of Māhaha Beach and also caretaker of the park.

Albert Hollis Silva

Albert Hollis Silva, a local cowboy, was born in 1929 and raised along the Wai'anae Coast. He was a rancher for twenty-seven years at Ohikilolo Ranch. Mr. Silva is also an active community member who was chair of the Wai'anae Neighborhood Board. He is still very active in the community and always willing to help perpetuate the Hawaiian culture.

Survey Results

Interviewee	Wai'anae Coast Neighborhood Board	A	Y	N	Left message
Kaopua, John	Wai'anae Coast Neighborhood Board	Y		N	No knowledge of project area
Kamano, Maylene	Wai'anae Ahupua'a Council, President	Y		Y	Interviewed on 7/20/03
Keaulana, Buffalo	Legendary Waterman, local resident	A			Left messages
Kila, Glen	Koa Mana Resources	Y		S	Made referral
Lapilio-Armistage, Nettie	Wai'anae Coast Coalition	Y		Y	He feels that the existing line at Māhaha Beach Park is a safety hazard, and a made referral
Maldonado, Eddie	Local resident	Y		S	No knowledge of area
Markell, Kai	Director of Burials Program	Y		Y	Made referral
Napoka, Naïhan	History and Cultural Branch of SHPD	Y		S	Talk to the Council of Māhaha. This area was use for the homeless in the late 70's and early 80's
Ornelas, Landis	Hui Malama	Y		S	Made referral
Pelekaï, Gwendolyn	Oahu Island Burial Council	Y		Y	Concerned that it will have the same safety hazard as the existing lines at Māhaha Beach Park
Puu, Mel	Māhaha Beach Lifeguard	Y		Y	Left message
Reznicek, Cynthia	Wai'anae Coast Neighborhood Board #24	Y		S	He does not gather plants in that area
Raposa, Henry and Moana	La'u Lapa'au Practitioner	Y		Y	Did not get back to us.
Shimabukuro, Maile	House Rep	Y		Y	Interviewed on 7-23-03
Silva, Albert	Wai'anae Coast Neighborhood Board #24	Y		Y	

Makaha then carried his entire catch to the rainbows and deep in the valley and offered it to Ke Anuenue. Deeply touched, she sent gentle rains to the parched earth of the great Waianae Valley. She was impressed by the selection of seafood that was offered her but was disappointed by the quality of the *poi, ma'i'a* (banana) and *ralu* (sweet potato) which were dry and stringy. She demanded to know why since she was so accustomed to good quality fruits. She was told that it was because of the lack of rainfall in the valley.

Ke Anuenue became enamored with Makaha and from then on her double rainbow would appear in Makaha's *kūleona* (land area) and gentle rains would fall on Waianae so the people could enjoy lush bananas and an abundance of taro.

The people built a heiau in honor of Ke Anuenue and Makaha but Ke Anuenue refused the honor and named the entire valley, Makaha, by which it is now known (Edward Iopa Kealanahale, 1975).

One of the many legends concerning Makaha has to do with robbers and cannibals as the following attests:

Long ago there lived here a group of people who are said to have been very fond of human flesh. At high altitude on each side of the ridge (separating Makaha from Keau), guards were stationed to watch for people crossing this narrow stretch of land between the mountains and the sea. On the Makaha side, they watched from a prominent stone known as Pohaku o Kane, on the Keau side, from a stone known as Pohaku o Kaneloa. The individual who passed here was in constant danger of death, for on each side of the trail men lay in wait for the signal of the watcher. If a group of persons approached, too many to be overcome by these cannibalistic peoples, the guards called out to the men hidden below, "*Moaakai*" (high tide); but if, as frequently happened, only two or three people were approaching the watchers called "*Mololokai*" (low tide). The individuals were then attacked and the bodies taken to two small caves on the seaside of the road. Here the flesh is said to have been removed and the bones, skin, and blood left in the holes, which at high tide, were washed clean by the sea. McAllister in 1933 (site #175)

In the *ahupua'a* of Makaha there are accounts of a talking stone on the hill of Mololokai, and two small pits on the sea side of the road at Kupuhi Point:

"... We rode to the plain of Kumanomano, ... and it is said of the place, the teeth of the sun is sharp at Kumanomano. Makaha rose above like a rain cloud. We passed in front of a famous hill Mololokai. We saw the talking stone standing there (Haleiwa Hotel) [about Leilono]." (Kookos, August 11, 1899 IN Sterling and Summers 1978:79)

VI. TRADITIONAL PRACTICES AND MO'OLELO OF MAKAHA

This section will express the different types of traditional practices, cultural resources and Mo'olelo associated with Makaha. Excerpts from interviews are incorporated throughout this section where applicable.

A. Legends

Makaha Ahupua'a

The literal translation of Makaha is fierce (Pukui *et al.* 1974:139). A legend of how Makaha received its name written by Edward Iopa Kealanahale:

Long ago, there lived in this valley a handsome young chief named Makaha. His skill as a fisherman gained island-wide attention which eventually reached the ears of Ke Anuenue (the rainbow), the goddess of rain, who lived in upper Maunaloa Valley.

She was so intrigued that she sent her trusted winged friend, Etepaio, to investigate Makaha. Etepaio returned with exciting stories of Makaha's daring and skills.

The next morning, Ke Anuenue created an awe-inspiring double rainbow which arched from Maunaloa Valley to this valley, from where she and her retinue could watch Makaha perform his daring feats at the ocean.

The people of the Waianae Valley were petrified by that magnificent rainbow that ended in this unnamed valley where Makaha lived.

Knowing that Ke Anuenue was watching, they prayed that she would bring them the much needed gentle rains and not the harsh storms she could create when displeased.

Makaha, aware of her presence, scaled Mauna Lahilahi and called loudly to his *aumakua* (his ancestral spirit) Mano ai Kanaka, the most vicious of man-eating sharks. As Mano ai Kanaka glided in from the ocean, Makaha dived from the rocky pinnacle, emerged on Mano ai Kanaka's back and rode with regal grandeur.

As the two disappeared into the depths, the sea became calm. Suddenly Makaha seemed to be everywhere along the rocky coast gracefully tempting death. Then, just as suddenly, Makaha seemed to skin the ocean as Mano ai Kanaka carried him to shore.

Traditional Practices and Mo'olelo of Makaha

In Ii'i'aka's Address to Cape Kaena she mentions Makaha as she travels along the sunny coast as she stands at the top of the Pōhāken Pass looking back she sings a song (Emerson 1965:157):

Kaena's profile fleets through the calm,  
With flanks ablaze in the sunlight-  
A furnace-heat like Kilauea;  
Ke-awa-ula swelters in heat;  
Kohola -lele revives in the breeze  
That breath from the sea, Kai-a-ulu.  
Fierce glows the sun of Makua;  
How it quivers at Ohiki-lele-  
'Tis the Sun-god's dance o'er the plain,  
A roll of dance at Makaha.  
The sun-tooth is sharp at Kumano;  
Life comes again to Maile ridge,  
When the Sun-god enshrouds his fang.  
The Plain Waio'o is sunburned and scorched;  
Kua-iwa revives with the nightfall;  
Waiauae is consoled by the breeze  
Kai-a-ulu and waves its coco fronds;  
Kane-pu-ni's fearful of sunstroke (e)  
A truce, now, to toil and fatigue:  
We plunge in the Lua-lei water  
And feel the kind breeze of Kona,  
The cooling breath of the goddess,  
As it stirs the leaves of ilima.  
The radiant heat scorches the breast  
While I sidle and slip and climb  
Up one steep hill then another,  
Thus gain I at last Moa-ula,  
The summit of Poha-kea.  
There stand I and gaze overseas

Traditional Practices and Mo'olelo of Makaha

To Hilo, where lie my dewy-cold  
Forest preserves of Ichua

That reach to the sea in Puna-  
My Ichua that enroof Kuki'i.

*Menehune* are mentioned in Makaha in the story of Kekupua's Canoe, in Hawaiian Folk Tales by Thos. G. Thurum (1998). The *menehune* constructed a canoe for chief Kaka'e who lived in Wahiawa, for his wife to travel to Tahiti. Kekupua was the chief's main man who went to Makaha to pull the canoe down to the ocean.

Albert Silva shares his memories of stories his mother would tell:

CSH: Did your mother tell you any *mo'olelo's* about them?  
AS: Yeah the one that she told us was, they call out in Hawaiian "who goes there" you no translated and they ask "how many of you" and if there was one oh fresh meall! But that's the truth.

Makaha is depicted in legends as a dry area that is always in need of rain where the quality of the *poi, mai'o* and sweet potato are "dry and stringy".

B. Trails

John Papa 'I'i describes a network of Leeward O'ahu trails which in early historic times crossed the Waianae Range, allowing passage from Central O'ahu through Pōhāken Pass and Kolekole Pass as well as Pu'u Kapolei to the Waianae district. There was another trail called Kunaipo that went through Makaha (Figure 7).

The stronghold of Kawiwi was part of a mountain ridge lying between Waianae and Makaha and overlooking Kamaile. The trail Kunaipo, went down to the farms of Makaha and the homes of that land. A branch trail which led up Mount Kaala and looking down on Waialua and Mokuia could be used to go down to those levels land. It was customary to have dwelling places along the mountain trails that led downward from here into Kamaile, as well as along the beach trail of Makaha.

There were many houses at Makaha, where a fine circle of sand provided a landing place for fleets of fishing canoes. The trail which passed by this sandy bar was the one from Pu'u Kapolei, which had joined the beach trail from Puuloa and from Waimanalo ('I'i, 1973:96-98).

Additionally, as noted earlier, the coastal trail is referenced in a *mo'olelo* telling of the cannibals waylaying travelers in Makaha. This trail has evolved through the horse-and- buggy era to the present Farrington Highway. It should also be noted that 'I'i's description of "many houses at Makaha" contradicts other accounts of sparse settlements in pre-contact Makaha.

In summary, while the present project area is located immediately *makai* of the traditional coastal trail there is no documentation that it has any specific association with the trail.

RECEIVED AS FOLLOWS

C. Ocean Resources

As we 'Talked Story' with numerous members of the community of Māhala and invited people to help us, it soon became apparent that the ocean fronting the study area has been an integral part of people's lives for generations and holds a special place in people's hearts. For many of the kīpuna in this area growing up in Māhala or along the coast the ocean was the main source of sustenance, and many folks described having to know the tides and moon phases in order to fish daily and keep food on the table. Fishing, gathering, as well as surfing, was a way of life. Walter Kanaana was raised along the Waikāne coast fishing to help sustain his 'ohana from day to day. He stressed the importance of knowing the moon and the tides of each month.

WK: I lived in Māhala until the age of 13 years old and then I came out.

CSH: Where did you live?

WK: Well from there we moved to you know where the bank is now you know where they call Ohikilolo you know that place was not called Ohikilolo. Ohikilolo is way down yet before you enter into Māhala where Barking Sands. The name of the real place where you see people paint purple sacks the real name is Pōhākuna. The long reef and that pu'u right there that's a fish ko'o that's why the rock stay there. Pōhākuna is a blowhole, the guys go broke 'um and everything. Keawaula were the rubbish pile was at Yokohama's you go there and half the beach and that's called Keawaula. Okay where the people dive off they said that was Hercules that the name of that valley was called Nanau it was home of the Penau's you know they use to fly and catch small bugs so Hawaiians use to call them, instead of calling them Penau they call them Nanau that was the name of that place. Keawaula, Nanau, then somebody came up with the place Hālenohālu that's Ohikilolo that's the place where people call it Māhala. Why the Hawaiians gave the name Ohikilolo was because white sand crabs you know the ghost crabs, and the flying fish.

CSH: Oh the Malolo?

WK: Yeah. The Malolo. So every time they use to swarm in that area the Hawaiians use to burn big bon fires. When I was small, my grandfather on my father's side would burn big bon fires. I use to look at that and think that was stupid, what the hell you burning that. Then all the people use to get the net ready. Sometimes two or three days the fire would burn, the fire was drawing the pile of fish. So, *akūle* use to come around, so the *akūle* would come in maybe one day two days. Then they use to go out they use to make the net with *ohu* or *olona*, or whatever or *hau* bush they had to soak them in water before they put 'um on the canoe. You know it wasn't like today we have modified lead. They had rocks that the people and the ladies pick up. That was tied on the rope line to the *hūhūhū* bag, you know the grass bag. So when the fish came in it wasn't what the Hawaiians call *ahi* wild you know they were *ūka*, they were tame. So, what they did was they had the mules to pull 'um in, cause it was a sand bay. Every time they needed the *akūle* that's what they did they burn the fire. Last year they got the fish *ko'o* operating. The fish would come home certain times and they would be ready. They train their fish to come to the *ko'o*. So, every time the Hawaiians say if the

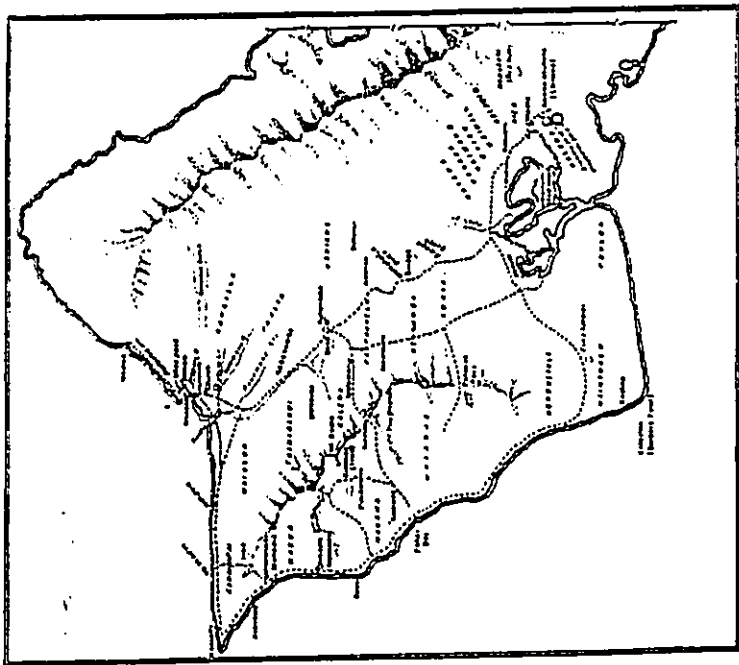


Figure 7 Trails of Leeward O'ahu as Described by 'Ō'Ō. Map by Paul Rockwood. (1999)



RECEIVED AS FOLLOWS

Traditional Practices and Mo'olelo of Māhaka

the law about no can catch *moi*. I said you guys never make the law about the pond guys selling in the market. I said I don't sell in the market, I use it for home use. I said you like give me a ticket give me a ticket I going fight. He said I going give you a warning I said I no like one warning I want the ticket.

Albert Silva is another interesting and knowledgeable person who was raised on the Wai'anae coast. Mr. Silva was a cowboy but utilized ocean resources as an additional source of food and recreation.

He mentions fishing in streams and in the ocean:

CSH: You know the stream near the project area did people fish in it?

AS: Oh yes they caught *awa awa*, *āhiōhōhō*, certain stages of the *āhōhōhō* before the big waters come they come in when the high tide. Then they get trapped inside and then they have a storm and it rains the sand breaks and then they go back. Wai'anae had a big one, before they put the jetty in that was a big one.

AS: ...A lot of *hukilau* fishing was done there a lot of the people are gone now. Over there good fishing and then further down towards Wai'anae good *moi* tole, you know the churning water oh good *moi* hole. Then *limu* my mollusc use to pick *limu*. You know did not have any houses in Māhaka.

Buffalo Keaulana also expressed his passion for old fishing techniques that was often used along the Wai'anae coast as well as different types of fish caught.

CSH: Can you talk about the Ka'ena side of Kīli drive from as far back as you can remember?

BK: There was nothing the only people who was there were the people in the army you know they had tents and shacks. They had the cable cars out there, Albert Silva he would know! Kīli drive was a farm with corn and banana trees and there was a road going up. I cannot say anything else I think it's a great idea. We went fishing for certain things. You know you see the reef over there (looking towards Ka'ena Point) people use to *Lau Lau* is a row of stringers then they pull the rope. Then where the channel is they put a big high net then they pull the net, this is good for that. Usually get three or five schools of fish like *manini*, *kula*, 'ō'io, *Pūpio*. You know I don't see no problem.

CSH: So basically it's not going to affect fishing, surfing, it might even make fishing better!

BK: You see the cables they laid out there, there is a lot of fish hanging around the cable *lako* and *manini*. You no had plenty Japanese, Chinese, Filipino in Hawaii every weekend they would jump on the train and go down Yokohama and go fish. You know get another Hawaiian name for that Yeah.

CSH: Oh Keawaula.

Based on the interviewees we can see that this coast is notable for abundant varieties of fish and *limu*. The ocean was and still is a way of life, it was the 'ice box' for the people in the community. Having an ocean and a stream full of fish has helped sustain the life style of the

Traditional Practices and Mo'olelo of Māhaka

fish was *manene* or icky because they were carrying eggs. So, they had to come home to lay them in the *poi*, you know the rolling stone. Certain time you going see the black stone the *limu* stone, get plenty *puka* in it. So, the *akule* use to come home and swim and lay there eggs on the rock. When the *akule* was you lay their eggs they went on and would continue down the line. By the time they reach inside here where they called well before it wasn't called Wai'anae it was called 'Aiea because of the home of the big mullet. When I was small boy I had to know my seasons of fishing, had to know when I had to go get my fish for my grandfather and grandmother so that they can survive and I can survive. I eat taro, I eat poi, but it's not like today grind fine they called it *po'oi*.

CSH: So did they do the same fishing techniques as they did in Nānākuli?

WK: Yeah they did that there was the house of the 'ō'io but that was also the house of the 'āhi 'cause there was *ōpēhi* that came over there.

CSH: So this could affect the 'ō'io, 'āhi, and the 'ōpēhi?

WK: And the *akule* on this side, so would affect us you know what I mean. Well it's up to the fishermen if they like the thing go there can. But why they no bring up by Maunalahihā.

CSH: Same thing Maunalahihā.

WK: Yeah but that area is sanctuary so you no can troll out there that much. The buoy is out here and the fishing boat is way out over here and when you get here you are facing Māhaka you out half and half by Kepuhi and Māhaka. So now because of the over use of this area the fishermen once and awhile catch an 'āhi. They now go to the buoy 'cause the buckets and chains make noise so much the fish has to grow *ma'ā* to that *ko'ā*. The Hawaiians use to say it was the rip tide that the cuttlefish and the small bone fish they call it *kakakaha*. The people use to think that was the baby sword fish 'cause of the nose but it was called *kakakaha*. Hawaiians use to say when that use to come plenty then the big fish would come home and they should be in already. Ok that *ko'ā* runs from here to what they call Keau Beach Park from Kepuhi all the way to Lahilahi that the two *ko'ā's*. The next one is from Māhaka to half way outside Yokohama the end Ka'ena. On the other side is called Kawiatapai so that *ko'ā* comes from Wainaea and Hale'īwa. So when you go outside there you go half way between Kaula and rough sea but this is the only good *ko'ā* that feeds all this other *ko'ā* they got to come through here before they go through. The next one is going be Mā'ili they going stop because Barber's Point they no stop anymore

CSH: Where do you throw net at?

WK: Yeah all in that area (Māhaka). You see Māhaka all this side and this side is all *moi* place. So certain time like May the ending of June going open *moi*. So I catch *moi* during the close session but now it's open and all these houses came up here there is very few of the *moi* holes open people swim people dive. I use eight throw nets I throw in one hole and I leave the net it all depends how many holes get. If get five holes I use five nets. Then sometimes I catch *moi* and I walking up and the warden-I go back to my old Hawaiian religion and I say guess who made

RECEIVED AS FOLLOWS

Traditional Practices and Mo'olelo of Māhaha

Buffalo Keaulana the living legend of Māhaha was raised along the Wai'anae coast and has a strong passion for this area:

BK: ..... And the guys that help 'um are the guy's who surf there Bussy, Pat Curran. I surf there but not when the thing closing out I surf there, I am spoiled I like to see a good wave that has not ended.

CSH: Where is your favorite place to surf?

BK: Right here in Māhaha. Māhaha is the best place to surf, you have the channel and the wave comes from that end you see the white water going on that side coming that way.

Māhaha is the jewel of the Wai'anae coast people come from all over the world to see the big waves at Māhaha Beach. Icons like Buffalo, Rusty and Brian Keaulana along with Reil Sun have evolved out of this famous surf spot. Buffalo often referred to as the legendary waterman started the Big Board Surfing Classic in 1977 to help maintain and further the development of the Hawaiian culture. By doing this he has helped sustain and promote the old ways and pass on this knowledge to the *keiki's*. This will help the children of today and tomorrow understand their culture roots so strongly rooted in nature. For all these reasons it is so vital to preserve this natural class room so that the *kūpuna* can pass on their *mana'o* and keep the Hawaiian culture alive.

In summary, what Buffalo is saying is that at Māhaha Surf Beach and its natural environment is critical to perpetuating Hawaiian culture and teaching the following generations respect for the ocean. Thus no project should negatively impact Māhaha Surf Beach.

F. Burials

There is no documentation of any burials within the project area. The closest known burial was documented on Makau Street about a 1/2 mile west of the project area (see Figure 6, site -4527). However, Albert Silva is concerned that there is still a slight possibility of encountering something significant:

AS: No I see no problem. The only concern that I have is that you can have a monitor a Keiki Hanau O Ka Aina so that we maintain our culture and don't bring a *malahini*

Traditional Practices and Mo'olelo of Māhaha

community. The people in the community studied and became knowledgeable of how to catch the different types of fish. Additionally as I mentioned that Māhaha was a "landing place for fleets of fishing canoes". *Makai* of the project area was and continues to be an area for the gathering of ocean resources.

D. Native Gathering of Plants

There is no documentation of any plant gathering practices associated with in the project area. None of the individuals contacted for this study mentioned any such practices.

E. Surfing

Surfing (*Pae I Ka Nalu*) is not a new sport it was one of the most popular sports in the old days of Hawaii. It is said that Hawaiians would leave home, and work when they would hear the call "*Ua pi'i mai ka nalu!*" "Surf's up!" There was even a Hawaiian god that they would pray to bring on the required waves, *Lū'amsomao*. Fronting the project area is Māhaha Beach, which is famous for its great surfing. The following are different versions of chants to call forth the waves Gutmanis 1983:

'Alo, 'alo po'ipu  
'Iuka I ka pohuehue  
Ka ipu nui lawe mai  
Ka ipu iki waiho aku  
Come break together,  
Run up to the pohuehue vines  
Bring the big wind calabash  
Leave behind the small.

Ku mai! Ku mai!  
Ka nalu nui mai kahiki mai  
'Alo po'ipu  
Ku mai I ka pohuehue  
Hui Kaiko'o loa  
Arise! Arise!  
Great surfs from Kahiki  
Waves break together!  
Rise with the pohuehue  
Well up, raging surf

Ku mai, ku mai  
Ka ale nui mai Kahiki mai  
Ka ipu nui lawe mai  
Ka ipu iki waiho aku  
Ho'a'e, ho'a'e iluna  
I ka pohuehue  
Ka ipu nui lawe mai  
Ka ipu iki waiho aku  
Stand, stand  
Waves from Kahiki  
Bring the large wind-gourd  
Leave the small one.  
Go, go up to the beach  
Morning glory  
Bring the large wind-gourd  
Leave the small one.

VII. SUMMARY AND RECOMMENDATIONS

A. Summary

Historical background research for the Kili Drive project area, in the Mākaha uncovered no specific documentation of traditional cultural practices within the project area itself. In the surrounding area, however, background research indicated dry land agriculture, habitation, a *heiau*, a pond, terrace, *lo'i* system in Mākaha Valley. Previous archaeological research specific to the project area identified a cultural layer present in an area approximately 80 meters *mauka* of Farrington Highway and 65-75 meters north of the proposed cable landing drilling site (Cleghorn 1997). The presence of prehistoric cultural deposits was considered "evidence of a small encampment near the coast" (Cleghorn 1997:32). Cleghorn also indicates the possible importance of a pond/wetland area just *mauka* of the Highway and north of the drilling locale: "This pond and wetland may have offered rich resources for the Hawaiians of the area, and the pond may have been used as an inland fishpond during the prehistoric and early historic eras" (Cleghorn 1997:33). Recent subsurface testing for the project area included two auger holes with no significant finds (Tulchin *et al* 2003).

Albert Silva, one of the *kupuna*, was interviewed for this assessment mentioned that in the past there was fishing use of the stream that abuts the project area, for different varieties of fish such as *awa awa*, *aholehole*. There was no documentation of any other cultural practices (former or on-going), archaeological sites, trails, or burials within the project area. However *maka'i* of the project area at Mākaha Beach there was intensive usage for fishing, diving, canoeing and surfing. The community feels that there should be no adverse effect on any of the on-going activities in the surrounding area as other cable lines have caused problems in the past. As for the gap areas (Wai'anae Valley Road to Kili Dr.) the main concern was encountering any inadvertent burials and traffic control. This gap area has recently been dug up for the replacement of the new water line with no archaeological finds.

B. Recommendations

The specific concerns related to cultural issues noted by the interviewees as well as people consulted include:

1. The possibility that burials may be encountered during excavation for the project. This concern was mentioned by Albert Silva.
2. A concern that the cable is free of harmful emissions.
3. The traditional ocean activities associated with this section of Mākaha such as fishing, diving, canoeing, and surfing not be impacted. The concern is that installation of the cable could affect the reef and fishing resources along with surfing through out the coast.
4. There is concern that the cable line does not create a safety hazard on the beach.

It is recommended that these concerns be resolved through consultation and coordination with the Mākaha community. If the concerns are addressed, the Mākaha cable installation should not have any adverse impact upon native Hawaiian cultural resources, beliefs and practices.

VIII. REFERENCES CITED

Ahlo, Henry Keanu, Agnes Kim, Emma Rio and Josephine Simmons  
1986 *Mauna Lahihai: Oral Histories* (TMK 8-4-01:8, 9), Honolulu, HI.

Armstrong, Warwick, Ed.  
1973 *Atlas of Hawaii*, University of Hawaii Press, Honolulu, HI.

Barrera, William, Jr.  
1986 *Makaha Valley, Oahu: Archaeological Survey of Midvalley Wellsite, (TMK 8-4-02:1)*, Chiniago, Inc., Honolulu, HI.

Barrere, Dorothy B.  
1970 "Survey of Historical Materials Pertaining to Mākaha Valley, in Mākaha Valley Historical Project", R.C. Green (Ed.) *Pacific Anthropological Records* 10, Bishop Museum, Honolulu, HI.

Bordner, Richard M.  
1981 *Archaeological Surface Survey Makaha Wells Appendix D*

1983 *Makaha Valley Well III-V Re-survey*, City and County of Honolulu, Board of Water Supply, Honolulu, HI.

Bordner, Richard and David W. Cox  
1988 *Upper Makaha Valley Mapping Project, Unit 1: Sites 764 and 996 and Unit 2: Site 771*, Social Research Systems Co-op, Honolulu, HI.

Cleghorn, Paul L.  
1996 *The Results of An Archaeological Inventory Survey in Coastal Mākaha, Wai'anae, O'ahu, Hawaii (TMK 8-4-2:47)*, Pacific Legacy, Inc. 332 Uluniu Street, Kailua, HI.

Condé, Jesse C. and Gerald M. Best  
1973 *Sugar Trains, Narrow Gauge Rails of Hawaii*, Glenwood Publishers, Felton, CA.

Cordy, Ross  
1998 *Ku Moku O Wai'anae: He Mo'olelo O Ka Wa Kuhika*, State Historic Preservation Division, State of Hawaii, Honolulu, HI.

Donham, Theresa K.  
1990 *Archaeological Inventory Survey, Makaha Valley Planned Development-Housing (PD-H) Site, Land of Mākaha, Wai'anae District, Land of Oahu (TMK 8-0-4-02:7)*, Letter Report PHRI, Hilo, HI.

- Douglas, Michele T.  
1991 *Report on a Child's Skeleton Recovered From the Beach at Māhaka Surfside Apartments*. TMK: 8-5-17-07. State Historic Preservation Division, DLNR, Honolulu, HI.
- Douglas, Michele Toomay and Michael Pietrusewsky  
1988 *Human Remains at Māhaka Beach, Māhaka, O'ahu*. TMK 8-5-17-08. Site 80-07-4064. Police Report, Medical Examiner's Report and Physical Anthropologist's Report, UII-Manoa, Honolulu, HI.
- Elmore, Michelle, James R. Moore and Joseph Kennedy  
2000 *An Archaeological Inventory Survey Report for TMK: 8-4-02-30 Located in Māhaka Ahupua'a, Wai'anae District, Island of O'ahu*. Archaeological Consultants of the Pacific, Inc., Honolulu, HI.
- Footc, Donald E., E.L. Hill, S. Nakamura and F. Stephens  
1972 *Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii*. U.S. Dept. of Agriculture, U.S. Government Printing Office, Washington, D.C.
- Green, Roger C.  
1969 *Māhaka Valley Historical Project: Interim Report No. 1*. Pacific Anthropological Records 4, Bishop Museum, Honolulu.
- 1970 *Māhaka Valley Historical Project: Interim Report No. 2*. Green, Roger C. (ed.) *Pacific Anthropological Records*, No. 2, Bishop Museum, Honolulu, HI.
- 1980 *Māhaka Before A.D. 1880*. Māhaka Valley Historical Project Summary Report No. 5. Pacific Anthropological Records No. 31, Dept. of Anthropology, Bishop Museum, Honolulu, HI.
- Gutmanis, June  
1983 *No Pule Kohiko Ancient Hawaiian Prayers*. Editions Limited Honolulu.
- Hammatt, Hallett H. and Jennifer Robins  
1991 *An Archaeological Inventory Survey for the Proposed Kili Drive/Water Street 20 Inch Watermain, Māhaka, Wai'anae, O'ahu*. Cultural Surveys Hawaii, Kailua, HI.
- Hammatt, Hallett H. and David Shideler  
2001 *Archaeological Monitoring Plan for Board of Water Supply Work on Ten Residential Streets, Māhaka Ahupua'a* (TMK: 8-4-03, 05-08, 11, 12, 14 & 16) and *Wai'anae Ahupua'a* (TMK: 8-5-16) District of Wai'anae, Island of O'ahu. Cultural Surveys Hawaii, Kailua, HI.
- Hammatt, Hallett H., David W. Shideler and Douglas Kahanele Borhwick  
1985 *Reconnaissance Survey of the Proposed Māhaka Mid-Valley Well, Māhaka, Wai'anae, O'ahu*. Cultural Surveys Hawaii, Kailua, HI.
- Ti, John Papa  
1959 *Fragments of Hawaiian History (Pukii Translation)*. Bishop Museum Press, Honolulu, HI.
- Jourdane, Elaine  
1995 *Inadvertent Discovery of Human Remains at Māhaka Surfside Condominiums, Māhaka, Wai'anae, Oahu*. State Historic Preservation Division, DLNR, Honolulu, HI.
- Kamakau, Samuel Manaiakalani  
1961 *Ruling Chiefs of Hawaii*. The Kanemeha Schools Press, Honolulu, HI.
- 1992 *Ruling Chiefs of Hawaii (Revised Edition)*. The Kanemeha Schools Press, Honolulu, HI.
- Kawachi, Carol T.  
1979 *Māhaka Surfside Burial: Artifacts, Kamailie, Wai'anae, O'ahu*. TMK: 8-5-17-005. State Site No. 80-07-4064. State Historic Preservation Department, DLNR, Honolulu, HI.
- 1980 *Mauna Lahilahi Crevice Burials Māhaka, Wai'anae, O'ahu*. State Historic Preservation Division, DLNR, Honolulu, HI.
- 1992 *Memo Report: Māhaka Burials Exposed by Hurricane Iniki*. TMK 8-4-09-5. Site 50-80-07-4377, SIPO, Honolulu, HI.
- Kalanahale, Edward Iopa  
1975 *A Legend: How Māhaka got its Name*
- Kennedy, Joseph  
1986 *Archaeological Investigations at Mauna Lahilahi, Wai'anae, Island of O'ahu*. (TMK 8-4-1:8 & 9; 8-4-3:11, 8-4-4:1,3 & 9). Archaeological Consultants of Hawaii, Inc., Honolulu, HI.
- 1983 *An Archaeological Monitoring Report at Well IV, Māhaka Valley, Oahu* (TMK 8-4-02). Archaeological Consultants of Hawaii, Inc., Honolulu, HI.
- Kumori, Eric  
1987 *Archaeological Survey and Testing at Mauna Lahilahi, Wai'anae District, Island of O'ahu*. Dept. of Anthropology, Bishop Museum, Honolulu, HI.

RECEIVED AS FOLLOWS

- Knauss, B.  
1973 *Historic Waianae: A Place of Kings. Island Heritage*. Honolulu, HI.
- Kuykendall, Ralph S.  
1967 *The Hawaiian Kingdom, Volume 3*. U. H. Press, Honolulu, HI.
- 1953 *The Hawaiian Kingdom, Volume 2 1834-1874*. University of Hawaii Press, Honolulu, HI.
- Ladd, Edmund J.  
1970 *Test Excavations of Three Stepped Platforms in Mākaha Valley Historical Project, Interim Report 2*. Bishop Museum, Honolulu, HI.
- 1973 "Mākaha Valley Historical Project". *Interim Report No. 4, Pacific Anthropological Records No. 19*, Department of Anthropology, Bishop Museum, Honolulu, HI.
- Ladd, Edmund J. and D.E. Yen (Eds)  
1972 *Mākaha Valley Historical Project, Interim Report No. 3, Pacific Anthropological Records, No. 18*. Bishop Museum, Honolulu, HI.
- Magnuson, Coral  
1997 *A Preliminary Archaeological Review of Upper Mākaha Valley, O'ahu, Hawaii*. IARIJ, Honolulu, HI.
- Maly, Kapa  
1999 *A Limited Consultation Study with Members of the Hawaiian Community in Waianae: Conducted in Conjunction with Proposed Repair Work on a Portion of the Mauna Olu Water System - Mākaha Valley, Island of O'ahu*. Kumu Pono Associates, Honolulu, HI.
- McAllister, J. Gilbert  
1933 *Archaeology of Oahu*. B.P. Bishop Museum Bull. 104. Honolulu.
- McGrath, E. J., Jr., K. M. Brewer and Robert Knuss  
1973 *Historic Waianae, A Place of Kings, Island Heritage Ltd., Norfolk Island, Australia*.
- Moore, James R. and Joseph Kennedy  
2000 *An Archaeological Inventory Survey Report for a Portion of TMK: 8-4-02: 38 Located in Mākaha Ahupua'a, Waianae District, Island of O'ahu*. Archaeological Consultants of the Pacific, Inc., Honolulu, HI.

- 1994 *Archaeological Investigations for the Board of Water Supply's Proposed Mākaha 242 Reservoir site Located at TMK: 8-4-02:11 (Lot 1236) in Mākaha Ahupua'a, Waianae District, on the Island of Oahu. (TMK 8-4-02)*. Archaeological Consultants of Hawaii, Inc. Haleiwa, HI.
- Neller, East  
1984 *An Archaeological Reconnaissance Survey of Site Area 997 Mākaha Valley, O'ahu, HI. (TMK 8-4-02:2, 14)*.
- Perzinski, David and Hallett H. Hannatt  
1999 *Archaeological Assessment of the Proposed AT&T Cable Project from Mākaha Cable Station to Keawa'ula Cable Station, Waianae, O'ahu, Hawaii*. Cultural Surveys Hawaii, Kailua.
- Fukui, Mary Kawena and Samuel H. Elbert  
1986 *Hawaiian Dictionary, 2nd Edition*. University of Hawaii Press, Honolulu, HI.
- Fukui, Mary K., Samuel H. Elbert, and Ester T. Mookini  
1974 *Place Names in Hawaii*. Honolulu. University Press of Hawaii
- Schmitt, Robert C.  
1977 *Historical Statistics of Hawaii*. The University of Hawaii Press, Honolulu, HI.
- Shideler, David W., Creed, Victoria S., Borthwick, Douglas F., and Hannatt, Hallett H.  
2001 *Archaeological Assessment for the Proposed 360 Fiber Optic Cable Project, Mākaha Ahupua'a, Waianae District, Island of O'ahu (TMK: 8-4-01--09, 11, 13-18)*. Cultural Surveys Hawaii, Kailua, HI.
- Shideler, David W., David Perzinski, and Hallett H. Hannatt  
1999 *Archaeological Monitoring Plan for the AT&T Cable Project from Mākaha Cable Station to Keawa'ula Cable Station, Ahupua'a of Mākaha, Kea'au, 'Ōhikilalo, Mākaha & Kahanahāhiki, Waianae, O'ahu, Hawaii*. Cultural Surveys Hawaii, Kailua, HI.
- Sterling, Elspeth P. and Catherine C. Sunners (comp.)  
1978 *Sites of O'ahu, Dept. of Anthropology*. B.P. Bishop Museum, Honolulu.
- Vancouver, George  
1798 *A Voyage of Discovery to the North Pacific Ocean and Round the World Performed in the Years 1790-95*, 3 Volumes, G.G. and J. Robinson and J. Edwards, London, England.
- Wagner, Warren L., Derral R. Hietist and S.H. Solimer  
1990 *Manual of the Flowering Plants of Hawaii*. 2 Volumes. University of Hawaii Press, Honolulu, HI.

Waihona 'Alina Corp.  
2000  
The Mahale Database, www.waihona.com

Wilkes, Charles  
1845  
*Narrative of the United States Exploring Expedition, During the Years 1838,  
1839, 1840, 1841, 1842, 5 Volumes, Lea and Blanchard, Philadelphia, PA.*

APPENDIX A  
Walter Kamana

Appendix

CSII: We are here with Walter Kamana talking about Mākaha.

CSII: What is your full name?

WK: Well if I go back to my full Hawaiian name, because I was *hana'i* by my grandmother yeah. So my fathers name was Puukapookakalia Kamana. So when my Grandmother registered me, my full name was I had half of my fathers name and half of her name and my mom's name was Mod Melciaka she had a long Hawaiian name. She married my father they cut it short they jus when call 'um Kamana. Then when they past away I had to go make everything, so when I got the birth certificate. They asked are you Kukakalakamana and then they said who is Kanauikauka and uh another Hawaiian was put together. I said I get three long Hawaiian names I no can right um all. So because I knew my - you see us Hawaiians we get problems even till today. Even if we get an Ali'i blood line but it's only for great unu's or great grandmother so when you are born your bloodline is thinned out. The generation of the Ali'i is no longer there. That's what I was telling the people, you come, you see me today, you me, you get long Ali'i line, we get the long Ali'i new style yeah. I said why we came from the old ways to the new ways.

CSII: So you lived in Mākua?

WK: I lived in Mākua until the age of 13 years old and then I came out.

CSII: Where did you live?

WK: Well from there we moved to you know where the bank is now, you know where they call Ohiukilolo you know that place was not called Ohiukilolo. Ohiukilolo is way down yet before you enter into Mākua where Barking Sands. The name of the real place where you see people paint purple socks the real name is Pōlakuna. The long reef and that Pu'u right there that's a fish *ko'u* that's why the rock say there. Pōlakuna is a blowhole, the guys go broke 'um and everything. Keawaula was were the rubbish pile was at Yokohama's you go there and lull the beach and that's called Keawaula. Okay where the people dive off they said that was Hercules that the name of that valley was called *Mōnau* it was home of the Penau's, you know they use to fly and catch small bugs so Hawaiians use to call them, instead of calling them Penau they call them Nanau that was the name of

RECEIVED AS FOLLOWS

RECEIVED AS FOLLOWS

that place. Keawaia, Nauau, than somebody came up with the place Halemoahu that's Ohikilolo that's the place where people call is Mākuā. Why the Hawaiians gave the name Ohikilolo was because white sand crabs you know the ghost crabs, and the flying fish.

CSH: Oh the Malolo?

WK: Yeah. The Malolo. So every time they use to swarm in that area the Hawaiians use to burn big bon fires. When I was small, my grandfather on my father's side would burn big bon fires. I use to look at that and think that was stupid, what the hell you burning that. Then all the people use to get the net ready. Sometimes two or three days the fire would burn, the fire was drawing the pile of fish. So, *akūle* use to come around, so the *akūle* would come in maybe one day two days. Then they use to go out they use to make the net with *ahū* or *olona*, or whatever or *hau* bush the bush they had to soak them in water before they put 'um on the canoe. You know it wasn't like today we have modified lead. They had rocks that the people and the ladies pick up. That was tied on the rope line to the huluhulu begs, you know the grass bag. So when the fish came in it wasn't what the Hawaiians call *ahū* wild you know they were *laka*, they were tame. So, what they did was they had the mules to pull 'um in, cause it was a sand bag. Every time they needed the *akūle* that's what they did they burn the fire. Last year they got the fish *ko'u* operating. The fish would come home certain times and they would be ready. They train their fish to come to the *ko'a*. So, every time the Hawaiians say if the fish was *manene* or itchy because they were carrying eggs. So, they had to come home to lay them in the *po'uhū*, you know the rolling stone. Certain time you going see the black stone the *limu* stone, get plenty *puka* in it. So, the *akūle* use to come home and swarm and lay there eggs on the rock. When the *akūle* was *pa'u* lay their eggs they went on and would continue down the line. By the time they reach inside here where they called well before it wasn't called *Wai'anae* it was called *Aneka* because of the home of the big mullet. When I was small boy I had to know my seasons of fishing, had to know when I had to go get my fish for my grandfather and grandmother so that they can survive and I can survive. I eat taro, I eat poi, but it's not like today grind fine they called it *pa'i'izi*.

CSH: So did they do the same fishing techniques as they did in Nānākūli?

WK: Yeah they did that there was the house of the 'ō'io but that was also the house of the 'ulii 'cause there was 'ōpele that came over there.

CSH: So this could affect the 'ō'io, 'ulii, and the 'ōpele?

WK: And the *akūle* on this side, so would affect us you know what I mean. Well it's up to the fishermen if they like the thing go there can. But why they no bring up by Maunaloahāhā.

CSH: Same thing Maunaloahāhā.

WK: Yeah but that area is sanctuary so you no can troll out there that much. The buoy is out here and the fishing boat is way out over here and when you get here you are facing Mākuā you out half and half by Kepuhi and Mākuā. So now because of the over use of this area the fishermen once and awhile catch an 'ulii. They now go to the buoy 'cause the buckles and chains make noise so much the fish has to grow *ina'a* to that *ko'a*. The Hawaiians use to say it was the tipple that the cuttlefish and the small bone fish they call it *kūhaka*. The people use to think that was the baby sword fish 'cause of the nose but it was called *kūhaka*. Hawaiians use to say when that use to come plenty then the big fish would come home and they should be in already. Ok that *ko'u* runs from here to what they call Keaua Beach Park from Kepuhi all the way to Lahilahi that the two *ko'a*'s. The next one is from Mākuā to half way outside Yokolama the end *Ka'ena*. On the other side is called Kawihāpai so that *ko'a* comes from Wāināna and Hale'iwa. So when you go outside there you go half way between Kāua'i and rough sea but this is the only good *ko'a* that feeds all this other *ko'a* they got to come through here before they go through. The next one is going be *Mā'i'i* they going stop because Barber's Point they no stop anymore.

CSH: We use to catch fish over there but we don't catch anymore?

WK: No more because of the oil tankers.

CSH: Yeah that's there new hook up place now.

WK: We chartered a boat and we caught but not what I would think we would pick up marlin, but we picked up *kuwekewa*, *nāhāmāhi*. But you say now coming in the 'ulii but by putting this line inside there the electricity might kill more I mean not kill up but change the ground.

CSH: Okay but this one does not omit electricity.

WK: The problem is if you change the fish to a different section. You know they going start 60 feet in here and then they going end 60 feet out here kind of hard. You know it's gradually deep already it slope. So you know they might come up early no way they going turn the pipe unless they dig one survey the land under the water. So it is possible that it can happen.

RECEIVED AS FOLLOWS

APPENDIX B  
Albert Silva

CSH: Can you talk about how your family ties into the Wai'anae area?

AS: Well the whole coast. Well in previous times the Wai'anae people did not go towards Honolulu the Wai'anae people went towards Waialua you know *Ka'ena*, you know you go around or over the *pali*. Then to Waialua that was the way the Wai'anae people would get excess supplies. The development of Honolulu started you know the commerce and all that then the people started to go the other way. Like prior to when the plantation came here everything was Waialua. Hale'iwa you know that area. So this time when the plantation started they put a road. You know most everything to Wai'anae like when they started the mill the plantation mill they started to grow sugar. They came from Pōka'i Bay they had a pier there, they built the pier there so they could bring in supplies so that was Wai'anae beginning. So that was Wai'anae's beginning. Then later on, well consider this, the distance between Wai'anae and Honolulu. You know Honolulu for supplies was the closest for whatever taro or whatever. Waialua was a lot closer. So the one famous place is Kawaihapai that was the water hole you know like Kawaihapai you know about that yeah! So Wai'anae people and Mākaha when they went that way that was there water hole.

CSH: You know I am working on another project which is in Kawaihapai.

AS: Oh you should go talk to this guy Alincila. He is from that area.

CSH: Oh yeah he is the one who wrote the book about the *mo'uleo's*.

AS: Yeah. I think he is a teacher at Kamehameha. Yeah he's Waialua. There are other people but I don't think that they are aware of the different important places. I know that he know I read what he wrote it's so accurate. He is Waialua. Ohana and he know Kawaihapai in fact I think that a part of Kawaihapai was his families land. Kawai is water and Hapai is the parent to carry the water from there to make it around Ka'ena especially coming back, but going you had the water from maybe some places within Mākaha and then they go around the point then there are couple places upon Kuokala but the hiking is harder you know the walk is harder. But there was water holes up there you know like springs. People left *pu's* you know to catch the water so that when somebody or who ever went they could drink and then continue. So there is one two springs that I knew of up on top of Kuokala.

CSH: Do you know if anyone gathers anything like for medicinal purposes?

WK: No you remember when they moved the homeless out of Mākua and then they went behind the land. They went in the back in these flats. So in between the mountain and the water tank the one above. This place had a Hawaiian use to have all goats all farmland. They use to gather plants way up by the hole. I went fishing I caught 8 *mahimahi* I had to steer like this, my boy was with me. I came in and every body was like oh where you went! You know all the fishermen no like tell the spot. I when hit a dead whale outside so I when flag 'um. Had all kinds in there they was all eating. First time I ever caught that much *inanimahi*. We still go but only when get party. When I go out I push 'um.

CSH: Where do you throw net at?

WK: Yeah all in that area (Mākaha). You see Mākaha all this side and this side is all *mo'i* place. So certain time like May the ending of June going open *mo'i*. So I catch *mo'i* during the close session but now it's open and all these houses came up here there is very few of the *mo'i* holes open people swim people dive. I use eight throw nets I throw in one hole and I leave the net it all depends how many holes get. If get five holes I use five nets. Then sometimes I catch *mo'i* and I walking up and the warden-I go back to my old Hawaiian religion and I say guess who made the law about no can catch *mo'i*. I said you guy's never make the law about the pond guys selling in the market. I said I don't sell in the market. I use it for home use. I said you like give me a ticket give me a ticket I going fight. He said I going give you a warning I said I no like one warning I want the ticket.

CSH: Mahalo uncle for your time.



RECEIVED AS FOLLOWS

Appendix

Kahana.

CSH: There must have been a lot of stories about that?

AS: Oh Yeah. You know I did not read a lot, well I read this book by my uncle Jim but this person does not even know how to fish never fished one day in his life. McCandless. He described how they came to Hawai'i well it started with James Campbell. They say that well Jim and My father saved James Campbell. James Campbell was abducted in San Francisco. My grandfather and his four brothers Frank, Johnny, they worked for the plantation developing water they new about wells, so this guy Whyte he was so important person with the Hawaiian kingdom. They did not take money they took shares. They went to Maui, Hawai'i I don't think they went to Kaua'i. The opportunities were here like Aiea, Waiāluā, down in Kahuku, and around Kahana. They brought the water all the way from Kahana to Waipahu. That's the kind of beginnings I have, you know the stories around. You know I am no better then no body else. Proper caring for a job. One thing I am not happy about is that this certain company they use the *ahupua'a* as a label as a means to overcome responsibility that are important in order to comply with law. The *ahupua'a* idea is actually with out credit they area just using the name *ahupua'a* it's a very distinguished and the Konoliki or who ever is in that *ahupua'a* is not a person from New York City transferred over here and that's what they are doing. It's like if I say I am a fisherman and I belong to this You know you have the *maifaiine* and you have the *kama'iina* you can not be both.

CSH: When you were growing up what do you remember about the project area?

AS: The road was *mauka* where the road is now it was realigned it is straight now, it use to be *mauka*. You know more on Kili drive and ran along the edge cause the *mauka* side of that stream and across the stream above not on the lower side but above. About 100 yards maybe further and then went across. Before that area did not have a bridge you came from *mauka* and then you swung around and got on to the, well just about to where the road is now. So the road went more along the bank then is *huli* (turned) and came across here. Then it came to where the road is now (Makaha).

CSH: Did they ever find anything in this area?

AS: No!

CSH: Who farmed that area?

Appendix

When you get to Mākuu and then you get to the top there is this area where the water drips. So they had two places, but this is my ancestral home

you know, and I am not claiming to know more then anyone, but I just uh know that there are important places here. First of all the respect to the *iwi* be consistent that is very, very, very important. You know the Hawaiians and all of Polynesia believes that the spirit remains in the *iwi* but other cultures they think nothing. It's not like the Hawaiians you make the *mana* is in the bones the *iwi*. You know Waiāluā had a lot of supplies and was a highly populated place a lot of resources like taro, banana. They had a lot of stories my mother told us the stories I did not make up the stories no way.

CSH: So what is your full name?

AS: Albert Hollis Silva. The funny part is that Hollis was my first name. Until an uncle past away then they gave me- I was born in 1929 and before I went to school they put Albert as my first name to honour my uncle Polynestians they do that.

CSH: Where were you born and raised?

AS: In Waiāmae. I was born and raised right behind the police station now. The one coconut tree you see now I planted that when I was 14 years old.

CSH: No way!!

AS: Yeah. Go take a look at it. My mother was from Waiāmae and my father was from Kōhala. He was Portuguese and French, his father was half French. Oh I had good parents they were very considerate.

CSH: What was your mother's name?

AS: Annie Kalipo McCandless.

CSH: Are the McCandless and the Holt family related?

AS: No. McCandless was well drillers so the sugar can have water for irrigation. You know Waiāhole ditch, my grandfather was the brain child for that ditch from

RECEIVED AS FOLLOWS

Appendix

AS: Yeah. You know but up in Wai'anae but not in Mākaha. A lot of people bury in the yard next to the house, close to the family. If you go to Samoa you see that. You know when we were young we use to go to Mākua this area was good fishing all the time. A lot of *hukilau* fishing was done there a lot of the people are gone now. Over there good fishing and then further down towards Wai'anae good *moi* hole, you know the turning water oh good *moi* hole. Then *limu* my mother use to pick *limu*. You know did not have any houses in Mākaha. Just that one house here and at Kamali Camp where they had that pump the water pump. They had plantation houses there you know where the Board of Water of Supply has a pump there now. If you look on the hill you can see the remnants of the flume system that water the pump water to the flume and then it flows inside Wai'anae Valley. Then through the mountain Pu'upape che'e went through there inside Luaualei Radio Station then all the way to Mikiloa. Hakimo road is where the flume came from they had a couple reservoir called Nui li'i, small coconuts. The coast guard had some trees in that area at Nui li'i; where the reservoir was they had a coast guard station there I saw the trees small coconut. So the water went in to this reservoir then they open the gate you know get the water go out certain time all the way to Mikiloa, Hakimo road all that was sugarcane. That's where my grandfather and his brothers they dug a well and the water was hot water. So I don't know where the exact location is but I read a book the memories of the McCandless brothers. In it said that they came across a hot well. The McCandless brothers are the one's that turned the records over to the territory of Hawaii of all the wells that they drilled and the water levels. So they provided information. Now getting back to this area here there was a pump there inside that area. They use to pump water for the plantation and they had another pump by water street brackish water to irrigate the sugarcane. If the water was too salty they would just add more water from *mauka* to reduce the salt. I recommend that a monitor a *keiki* *hanau o ka āina* is given that responsibility you know to be present not only on paper but be present as an observant, you know just increase any thing might occur will be given consideration. You know my ancestors go hundreds of years back. So the *hewa* is our ancestors are the one who built it. Like the one down in Mākua that Ukaniפו that is our ancestor who built that, that is our lineage. It's not a coincidence that we are so concerned about the *iwā*. I was born in 1929 and from when I was a child we use to go to Mākua. Before they had the bridges you know, by the second bridge you know in the ditch you go down in the river and you come back up. You know by the first bridge did not have a bridge and we went around and then came Mākua down where Ohikiolo is. You know what Ohiki is crab but when they put in the paved road it stopped the crabs from crawling.

CSH: So you were a rancher?

55

Appendix

AS: The plantation. Then maybe right around here is the building, the underground building. There was a house here (near the Mākaha bathroom) Charlie Holt. He owned the Holist land you know where the apartment building is. He owned all that land up to the underground building is. I think it was 1939 when they started this road project. Then that's when they put the asphalt, oh not asphalt they use to call it macadam. That was the first they called it macadam they put layers of rock, coarse rock and you know they rolled it then they put tar they melted tar.

CSH: Were there a lot of changes in the project area?

AS: No not too much, they planted sugarcane there for a long time, the cane was good, good sugarcane, us kids we new.

CSH: Some one said there were homeless over there before.

AS: No, oh *manuka* over here yeah Frank Fasi, they put water pipes to help the people to help the parks.

CSH: So basically no one lived over here, did any one use this area for burial grounds?

AS: No. And if they use it for burials they did not bury like that they bury them in the sand. Two place on the *pāli* or in the sand. No burials but like in Ohikiolo you know get high surf the remains show up, but over there never had any none that I know of.

CSH: What about anyone gathering plants for medicine use?

AS: Well before time they had the war people my mother told me about that they were canabites.

CSH: Did your mother tell you any *mo'olelo*'s about them?

AS: Yeah the one that she told us was, they call out in Hawaiian "who goes there" you no translated and they ask "how many of you" and if there was one oh fresh meat! But that's the truth.

CSH: Did your mother talk about night marchers?

54

RECEIVED AS FOLLOWS

Appendix

AS: Yeah I was always interested in horses. I ranched in there for twenty-seven years and it got too expensive the land tax 40 something thousand. The landowners pass that on to me.

CSH: Do you know anyone else that I could talk to who would be knowledgeable about this area?

AS: Well Charlie Holt.

CSH: Where does he live?

AS: He lives Kapalama below Kamehameha School. The only other person is well, they all *make* already. You know the cowboys use to fish in the *muliwai* in Māhūa. Māhūa had two of the best *muliwai*. Oh yeah they had Sam Puhale who was the head fisherman. They had a system when certain times it would get low he would go in that *muliwai* so now they make a big deal about it.

CSH: You know the stream near the project area did people fish in it?

AS: Oh yes they caught *awa awa*, *āhōlehole*, certain stages of the *āholehole* before the big waters come they come in when the high tide. Then they get trapped inside and then they have a storm and it rains the sand brake and then they go back. Wai'anae had a big one, before they put the jetty in that was a big one.

CSH: Did you dive outside of Māhūa area?

AS: Not to much in Māhūa and the reason was my mother did not like us to swim or dive around Māhūa that water the undertow is bad. So the Hawaiian did not go any place to fish and if you are a beginner worse yet don't go. You know when you are a youngster you don't go where the big boy's go. You better say away from there or you going *make*. You know every time we would go some place different we take sticks from shore and throw the stick in the water and watch where the stick is going. You know two three sticks in the water, cause one stick not going tell you the story. So we watch the stick and where that stick going. You know that's my beginning you watch that stick or you going *make*. Do you have any other questions?

CSH: Well you don't see a problem so.

AS: No I see no problem. The only concern that I have is that you can have a monitor a Keiki Hanau O Ka Aina so that we maintain our culture and don't bring a *malahini*. You know ever chance to maintain the culture we should take advantage of that and that is where I am coming from.

CSH: Mahalo for your time Mr. Silva.

RECEIVED AS FOLLOWS

ARCHAEOLOGICAL INVENTORY SURVEY IN SUPPORT  
OF THE PROPOSED SANDWICH ISLES FIBER OPTIC CABLE  
LANDING AT KILI DRIVE, MĀKAHA, *AHUPUA*'A,  
WAI'ANAE DISTRICT, ISLAND OF O'AHU

(DMK 8-4-02:47 por.)

by  
Todd Tutchin, D.S.  
and  
Hallett H. Hamman, Ph.D.  
Prepared for  
Parsons, Brinckerhoff, Quade and Douglas, Inc.

by  
Cultural Surveys Hawai'i, Inc.  
August 2003

Table of Contents

TABLE OF CONTENTS

I.	INTRODUCTION.....	1
A.	Project Background.....	1
B.	Project Area Description.....	1
C.	Scope of Work.....	1
D.	Methods.....	5
II.	HISTORICAL BACKGROUND.....	7
A.	Pre Contact to early 1800's Wai'anae District.....	7
	Mākahe <i>Ahupua</i> 'a.....	7
B.	Mākahe and Land Commission Award Documentation.....	8
C.	1850-1900.....	10
D.	1900 to Present.....	10
E.	Alterations to the Wai'anae Coastline (1880-1930).....	11
F.	Kili Drive.....	12
III.	PREVIOUS ARCHAEOLOGICAL RESEARCH.....	13
A.	Previous Archaeological Studies in Mākahe <i>Ahupua</i> 'a.....	13
B.	Previously Recorded Sites in the Vicinity of the Project Area.....	20
IV.	SETTLEMENT PATTERN SUMMARY AND PREDICTIVE MODEL.....	22
V.	SURVEY AND TESTING RESULTS.....	23
VI.	ASSESSMENT OF FIBER OPTIC CABLE GAP AREAS.....	25
VII.	CONCLUSIONS.....	27
VIII.	REFERENCES CITED.....	28

RECEIVED AS FOLLOWS

LIST OF FIGURES

Figure 1	USGS 7.5 Minute Series Topographic Map, Wai'anae Quadrangle, Showing the Location of the Project Area.....	2
Figure 2	Portion of TMK 8-4-02, Showing the Location of the Project Area.....	3
Figure 3	Aerial Photograph, Showing the Location of the Project Area.....	4
Figure 4	Previous Archaeological Studies in Mākaha <i>Ahupua'a</i> .....	14
Figure 5	Previously Identified Archaeological Sites in Coastal Mākaha <i>Ahupua'a</i> .....	21
Figure 6	Photo Showing Geotechnical Boring at the Location of the Proposed Drill Site.....	24
Figure 7	USGS Map Showing the Location of Proposed Trenching Associated with Fiber Optic Cable Gap Area.....	26

LIST OF TABLES

Table 1	Land Commission Claims in Mākaha <i>Ahupua'a</i> .....	9
Table 2	Previous Archaeological Studies in Mākaha <i>Ahupua'a</i> .....	15
Table 3	Previously Identified Archaeological Sites in Coastal Mākaha <i>Ahupua'a</i> .....	20

1. INTRODUCTION

A. Project Background

At the request of Parsons, Brinckerhoff, Quade and Douglas, Cultural Surveys Hawai'i, Inc. performed an archaeological inventory survey in support of the Proposed Sandwich Isles Fiber Optic Cable Landing at Kili Drive. The marine cable landing project involves the installation of undersea fiber optic cables and a terrestrial cable manhole.

The project will involve the use of horizontal directional drilling to bore from a drill site near the intersection of Kili Drive with Farrington Highway to a point approximately 3500 ft. (1067 m) offshore Mākaha, O'ahu. The cable line will be drilled 30 ft. (9 m) beneath the shoreline to an ocean depth of 60 ft. (18 m) and will have a minimum diameter of 4 in. (10 cm). The only permanent surface structure to be constructed as part of this project is a manhole which will be located in Farrington Highway.

B. Project Area Description

The project area is located approximately 500 ft. (150 m) *nunika* of the shoreline at Mākaha Beach Park, at the intersection of Kili Drive with Farrington Highway, Mākaha *Ahupua'a*, Wai'anae District, Island of O'ahu (TMK 8-4-02:47 por.) (Figures 1-3).

Soils within the project area consist of Haleiwa Silty Clay, 0 to 2 Percent Slopes (HeA) near the intersection of Kili Drive with Farrington Highway. Haleiwa Silty Clay is described as a moderate to poorly drained clay occurring in alluvial fans and drainage ways (Fuale *et al.* 1972). The elevation at the project area is approximately 20 ft. (6 m) AMSL.

Rainfall is less than 20 in. (500 mm) annually along the coast with winter storms being the major source of precipitation. December through February are the relatively wet months for the region (Annstrong 1973).

Vegetation along this arid coast is sparse. With 20 in. (500 mm) or less of rain annually, only the hardiest plants adapted to the coastal environments can thrive in this zone. The vegetation is typical of dry seashore environments in Hawai'i and is dominated by alien species. Indigenous species include *hou* (*Hibiscus tiliaceus*), *kou* (*Cordia subcordata*), *kamam* (*Cratogeomys inoplyllum*), *naupaka* or *naupaka kuluakut* (*Scaevola sericea*), *pa'u o Hi'iaka* (*Jacquemontia ovalifolia sandwicensis*), the native beach morning glory or *pohinahine* (*Ipomoea pes-caprae*) and the coconut or *niu* (*Coccoloba niuifera*). Introduced species found bordering the Farrington Highway include sea grape (*Coccoloba niuifera*), *kiawe* trees (*Prosopis pallida*), Mādagascari Olive trees (*Moroneia emarginata*), and *kou haole* (*Leucaena leucocephala*). *Kiawe*, *kou haole*, and various grasses were dominant within the project area.

C. Scope of Work

The following scope of work for the archaeological inventory survey was designed to meet and comply with State and County requirements:

1. Detailed historical research to include study of archival sources, historic maps, Land Commission Award documents and previous archaeological reports to construct a



history of land use and to determine if archaeological sites have been recorded on or near this property.

2. Field inspection of the project area to identify any surface archaeological features and to investigate and assess the potential for impact to such sites. All identified sites would be located, described, and mapped with evaluation of function, interrelationships, and significance. Documentation will include photographs and scale drawings of selected sites and complexes. All sites will be assigned State site numbers.
3. As warranted by the results of the field inspection, limited excavation to evaluate the potential for subsurface cultural deposits. This excavation will be done by hand or through mechanized excavation. Excavations will be documented with standard archaeological techniques.
4. If subsurface deposits are located, limited analysis of recovered materials will be called for.
5. Prepare a survey report which will include the following:
  - a. A topographic map, if available, of the survey area showing all archaeological sites and site areas;
  - b. Description of all archaeological sites with selected photographs, scale drawings, and discussions of function;
  - c. Historical and archaeological background sections summarizing prehistoric and historic land use as they relate to the archaeological features;
  - d. A summary of site categories and their significance in an archaeological and historic context;
  - e. Recommendations based on all information generated which will specify what steps should be taken to mitigate impact of development on archaeological resources - such as data recovery (excavation) and preservation of specific areas. These recommendations will be developed in consultation with the client and the State agencies.

This scope of work also includes full coordination with the State Historic Preservation Division (SHIPD), and the City and County of Honolulu relating to archaeological matters. This coordination takes place after consent of the owner or representatives.

**D. Methods**

Background research included a review of previous archaeological studies on file at the State Historic Preservation Division, a review of geology and cultural history documents at Hamilton Library at the University of Hawai'i, the Hawai'i State Archives, the Mission House Museum Library, the Hawai'i Public Library, and the Archives of the Bishop Museum. Further research included a study of historic photographs at the Hawai'i State Archives and the Archives of the Bishop Museum, a study of historic maps at the Hawai'i State Archives and the Archives of the Bishop Museum, and a study of historic maps at the Survey Office of the Department of Accounting and General Services. Information on Land Commission Awards was accessed through Waiohona Area Corporation's *Māhele* Data Base ([www.waiohona.com](http://www.waiohona.com)).

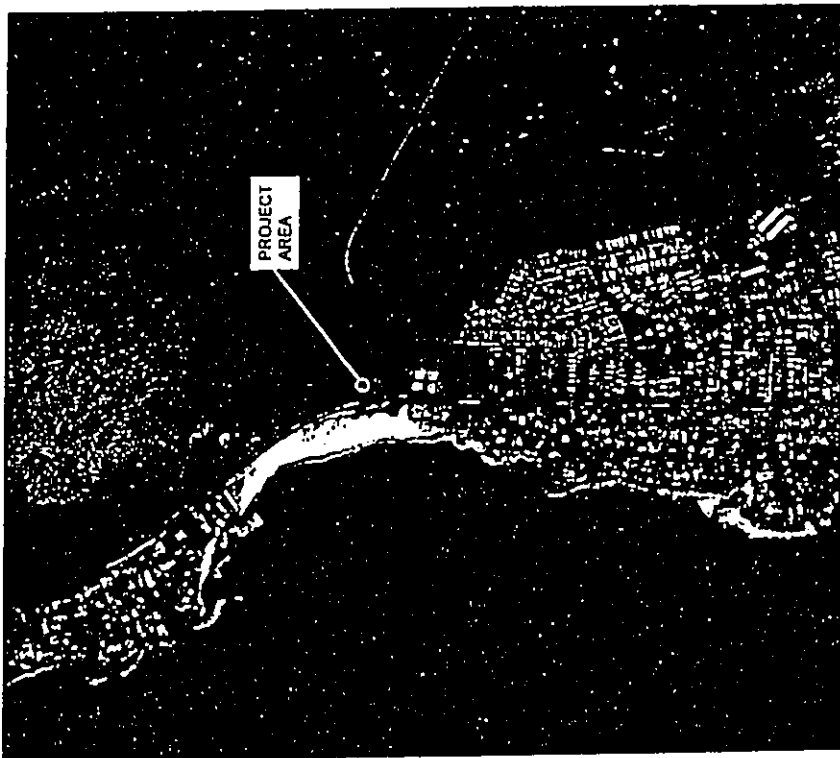


Figure 3 Aerial Photograph, Showing the Location of the Project Area.

RECEIVED AS FOLLOWS

II. HISTORICAL BACKGROUND

A. Pre Contact to early 1800's

Wai'anae District

The origin of the name Wai'anae is thought to be connected to the richness of the waters off Wai'anae's coast: *wai* - water and *anae* - large mullet (in Sterling and Summers 1978). Several accounts attest to the abundance of fish from Wai'anae waters (Wilkes 1845; Pukini *et al.* 1974). In 1840, Wilkes makes the following comment: "The natives are much occupied in catching and drying fish, which is made a profitable business, by taking them to Oahu, where they command a ready sale" (Wilkes 1845:81-82). Traditional accounts of Wai'anae portray a land of dual personality: a refuge for the dispossessed and an area inhabited by the rebellious and outlaws. Certain landmarks in Wai'anae attest to this dichotomy. Kawiwi, a mountain between Wai'anae and Mākaha *Ahupua'a*, was dedicated as a refuge by priests during times of war (McAllister 1933; Kamakau 1961). Pōka'i Bay was used as a school administered by the exiled high class priests and *kahunas* who took refuge in Wai'anae after Kamehameha Nui gained control of O'ahu (in Sterling and Summers 1978:68). It was also near Pōka'i Bay, at a place named Pu'u Kāhā, that the eighteenth-century prophet and *kahunas* *nui* of O'ahu, Kā'opulupu, made his last famous prophecy before he was killed in Po'ohia (in Sterling and Summers 1978:71). In contrast, other places in Wai'anae were famed for their inhospitality.

Certainly, the marginal environmental conditions along the Wai'anae Coast may have played a part in shaping Wai'anae people. Vancouver, the first explorer to describe this coast in 1793, describes the Wai'anae Coast as "composed of one barren rocky waste, nearly destitute of verdure, cultivation or inhabitants..." (Vancouver 1798:217).

The 'ōka'i epidemic of 1804 (thought to be cholera) undoubtedly had a major effect on the native population, not only in Wai'anae, but throughout the rest of the islands as well. John Papa 'Ūi relates that the 'ōka'i "broke out, decimating the armies of Kamehameha I" (in O'ahu) (1983:16). Other diseases also took their toll. The combined census for the Wai'anae and 'Ewa Districts in 1831-1832 was 5,883 (Schmitt 1977:12). Twenty years later, the combined census for the two districts was 2,451.

Another foreign influence which greatly impacted Hawaiian culture and the traditional lifestyle was the sandalwood trade. In an effort to acquire western goods, ships, guns, and ammunition, the chiefs had acquired massive debts to the American merchants (Ūi 1983:155). These debts were paid off in shiploads of sandalwood. When Kamehameha found out how valuable the sandalwood trees were, he ordered the people not to let the felled trees fall on the young saplings, to ensure their protection for future trade (Kamakau 1992:209-210).

Mākaha Ahupua'a

The literal translation of Mākaha is fierce (Pukini *et al.* 1974:139) and it was the traditional home of robbers and cannibals as the following attests:

Long ago there lived here a group of people who are said to have been very fond of human flesh. At high altitude on each side of the ridge [separating Mākaha from Keaul], guards were stationed to watch for people crossing this narrow

A complete pedestrian inspection of the project area, was accomplished through systematic sweeps. Subsurface testing consisted of archaeological monitoring of geotechnical boring by Geolabs-Hawaii.



stretch of land between the mountains and the sea. On the Mākaha side, they watched from a prominent stone known as Pōlaku o Kane, on the Keau side, from a stone known as Pōlaku o Kaneleoa. The individual who passed here was in constant danger of death, for on each side of the trail men lay in wait for the signal of the watcher. If a group of persons approached, too many to be overcome by these cannibalistic peoples, the guards called out to the men hidden below, "Moanakai" (high tide); but if, as frequently happened, only two or three people were approaching the watchers called "Mololokai" (low tide). The individuals were then attacked and the bodies taken to two small caves on the sea side of the road. Here the flesh is said to have been removed and the bones, skin, and blood left in the holes, which at high tide, were washed clean by the sea.

For many years these people preyed upon the traveler until at one time men from Kāua'i, hairless men (Olohe) came to this beach. They were attacked by these cannibals but defeated them, killing the entire colony. Since then the region has been safe for traveling. (McAllister 1933:121)

Earliest accounts specific to Mākaha describe a good-sized inland settlement with a school and a smaller coastal settlement with no school (Green, 1980). These accounts correlate well with a sketch drawn by Bingham in 1826 depicting only six houses along the Mākaha coastline. Green (1980: 20-21) describes Mākaha's coastal settlement as "restricted to a hamlet in a small grove of coconut trees on the Keau side of the valley, some other scattered houses, a few coconut trees along the beach, and a brackish-water pool that served as a fish-pond, at the mouth of the Mākaha Stream."

Waiānae presented a drastically different setting. At the boundary between Mākaha and Waiānae *Ahupua'a* lies Mauna Lāhūlāhi, a striking pinnacle jutting out of the water. Vancouver describes Mauna Lāhūlāhi as "a high rock, remarkable for its projecting from a sandy beach." A fresh-water spring, Keke'o, gave life to the nearby land of Kamāle and allowed for the existence of the largest population on the Waiānae Coast. The water from this source also became important later during sugarcane plantation era. In Mākaha, the settlement was concentrated inland where more water was available.

**B. Māhele and Land Commission Award Documentation**

The Organic Acts of 1845 and 1846 initiated the process of the *Māhele* - the division of Hawaiian lands - which introduced private property into Hawaiian society. In 1848, the crown and the *ali'i* (royalty) received their land titles *Kūka'ania* awards for individual parcels within the *ahupua'a* were subsequently granted in 1850. Mākaha *Ahupua'a* had 13 claims of which 7 were awarded (Table 1). Six of the seven Mākaha Land Commission Awards (LCAs) were located inland attesting to the importance of the inland settlement. The seventh Mākaha LCA claims a *mūliwāi* as its western boundary. According to Pukui and Elbert (1957: 236) a *mūliwāi* refers to a "river, river mouth; pool near mouth of a stream, as behind a sand bar, enlarged by ocean water left there by high tide; estuary." The reference to it as a boundary suggests this LCA was probably situated near the coast. Two unawarded claims also mention the *mūliwāi* as their boundary.

RECEIVED AS FOLLOWS

Table 1 Land Commission Claims in Mākaha *Ahupua'a*

Land Claim #	Claimant	'Ili	Land Use	Landscaping Esignature	Awarded
877	Kaana/Kaana for Poomano, wife	Kapuaa		surrounded by lands of Alapai	1 ap.; 1.587 Acs (also Hotel St. & Waiānae awards)
8228	Inaale (no name)	Laukīni	house	stream on 3 sides	No
8703	Kanakaa	Huaole	ʻiʻi		No
9689	Nahina	Kekio	16 to 17 house lot	Kahawai, <i>mūliwāi</i> on west	1 ap.; .957 Ac.
9859	Napoe	Alakaa/ Laukīni Mooiki	17 to 1 (ma'i) & kula house	<i>pūli</i> on N. Kalua ma on N., kula & stream on E. stream on S. Muliwai on W.	No
9860	Kahua	Laulauwa	house	in <i>kahawai</i> (stream valley) of Mākaha, hau, <i>mūliwāi</i> on W.	No
9861	Nahina, see above	Kekio			No
9862	Kanehaku	Kekio Mooiki			
9863	Kala	Waikani Kahueiki Kapuaa		stream on S. <i>pūli</i> (s) & stream land of Alapai	1 ap.; (Kalihi) 1.346 Acs
9864	Kapea	Laukīni	19 to 17 kula	<i>pūli</i>	1 ap.; 1.217 Acs
10613	Paki, Abner	<i>Ahupua'a</i>			Apuaa S: 4,933 Acres
10923	Uniu	Mākaha		stream on E. land of Kalua on S. <i>pūli</i> on N.	1 ap.; .522 Ac.
10923B	Alapai	Kapuaa	2 to 1 & kula	<i>pūli</i> on E. <i>kahawai</i> on N.	1 ap.; .576 Ac. 1 ap.; .52 Ac.

## Historical Background

Land use information for the Mākaha LCAs is sparse. *Lo'i* lands and *Aula* lands were an important part of sustenance. Aside from these general land specifications, there is only mention of *maui*, ponds, and land for raising *maui*. The *maui* and ponds are recorded in association with the *ʻiʻi* of Kamaile suggesting the claimant was claiming land in neighboring Waiʻanae. *Ahiupiaʻa* in addition to the Mākaha claim. *Mao* refers to an introduced species of "cotton" (*Gossypium hirsutum* or *Gossypium hirsutum*) which was commercially grown in Hawaii beginning the early part of the nineteenth century, although it never did become an important industry (Wagner *et al.*, 1990: 876). *Mao* generally does well in hot, arid environments and Mākaha would have been a suitable climate for such an industry. The claim was made by Abner Paki who also claimed the entire *Ahiupiaʻa* of Mākaha indicating, perhaps, his aspirations to cultivate *maui* as a profitable venture as well as his status in Mākaha.

Kuho'ohelihu (Abner) Paki was given Mākaha *Ahiupiaʻa* by Liliha after her husband, Boki, disappeared in 1829 (Green, 1980). Although several are recorded to have clanged over Mākaha including Aua, Kanepaiki "chief of the Pearl River", and the present "King", A. Paki felt entitled to the entire *Ahiupiaʻa* of Mākaha. It is uncertain how much of his claim he was granted. Whatever the case, it is suggested Paki was able to wield a certain amount of control over the residents of Mākaha during the Māhele resulting in the limited number of land applications. The number of taxpaying adult males in 1855 numbered 39 indicating that there were several families living and working the Mākaha lands (Barrere 1970: 7). This is not reflected in the Māhele documents.

Mākaha's primary settlement was inland where waters from Mākaha Stream could support *lo'i* and *kula* cultivars. Although there is evidence for settlement along the shore, for the most part this was limited to scattered, isolated houses. The only real "cluster" of habitation structures was concentrated near Mākaha Beach or near the Kea au end of Mākaha where there is also reference to a fishpond.

## C. 1850-1900

By ancient custom, the sea for a mile off the shores belonged to the *Ahiupiaʻa* as part of its resources. The ruling chief could prohibit the taking of a certain fish or he could prohibit all fishing at specific times. Paki filed two such prohibitions, one in 1852, for the taking of *ʻiʻeʻe* or octopus (*Polydora* sp.) and the other in 1854 for the taking of *ʻōpeʻu* (*Decapod pinnulatus*) (Barrere in Green 1980:7).

In 1855, Chief Paki died, and the administrators of his estate sold his Mākaha lands to James Robinson and Co. Later, in 1862, one of the partners, Owen Jones Holt, bought out the shares of the others (Ladd and Yen 1972). The Holt family dominated the economic, land-use and social scene in Mākaha from this time until the end of the nineteenth century. During the height of the Holt family dynasty, from about 1887 to 1899, the Holt Ranch raised horses, cattle, pigs, goats and peacocks (Ladd and Yen, 1972:4). Mākaha Coffee Company also made its way into the Valley, buying up land for coffee cultivation, although they never became a prosperous industry. Upon Holt's death in 1862, the lands went into trust for his children.

## D. 1900 to Present

The Holt Ranch began selling off its land in the early 1900s (Ladd and Yen, 1972). In 1908, the Waiʻanae Sugar Company moved into Mākaha and by 1923, all of lower Mākaha Valley was

## Historical Background

owned and operated by Waiʻanae Sugar Plantation. The plantation covered most of the valleys of Lāhulālei, Waiʻanae and Mākaha. In 1884, newspaper accounts note 7 1/2 miles of track laid which included Mākaha and in 1899, increased the length with 3 more miles of track. The manager's report for 1900 described the plantation as having some 400 acres of new land cleared, fenced and planted, two miles of railroad and nearly three miles of flumes have been laid to said lands (Condit and Best 1973:357). The cane was loaded on trains and sent to Honolulu by Oahu public railroad, to the mill. For a half century, Mākaha was predominantly sugarcane fields, but by 1946, the manager's report announced the plans to liquidate the property because of the additional increase in wage rates, making the operations no longer profitable (Condit and Best 1973:358).

Lack of water also undoubtedly played a role in Mākaha Valley's and Waiʻanae Sugar Company's profitability. In the 1930's, Waiʻanae Plantation sold out to American Factors Ltd. (Amfac, Inc.). American Factors Ltd. initiated a geologic study of the ground water in the mountain ridges in the back of Mākaha and Waiʻanae Valleys, which revealed positive results that tunneling for water would be successful, but before tunneling could commence, World War II came about and plans were put on hold (Green, 1970). In 1945, American Factors Ltd. contracted the firm of James W. Glover, Ltd. to tunnel in the ridge. The completed tunnel (i.e. Glover Tunnel) was 4200 ft. long and upon completion had a daily water capacity of 700,000 gallons. The water made available was mainly used for the irrigation of sugar. In 1946, Waiʻanae Plantation announced in the *Honolulu Advertiser* (Friday, Oct 18, 1946) that it planned to liquidate its nearly 10,000 acres of land. The day before, news of the impending sale was circulated among the investors at the Honolulu Stock Exchange. One of the investors was Chin Hui.

"The unorthodox Ho had started his Capital Investment Company only the year before with a bankroll of less than \$200,000, much of it the life savings of plantation workers. He was known as a friend of the little man, an eager disciple of economic growth, and an upstart" (McGrath *et al.* 1973:145)

He managed to broker the total deal the following day by 2 p.m. when the Waiʻanae Plantation sold the Mākaha lands to the Capital Investment Corporation, which still maintains ownership of much of Mākaha Valley. There was some attempt to convert the sugar lands back to ranching but the perennial problem of water continued. Parts of the property were sold off as beach lots, shopping centers and house lots. Many of the former plantation workers bought house lots. Chin Hui also put his personal investment into Mākaha and initiated resort development including a luxury hotel and in 1969, the Mākaha Valley Golf Club, an 18-hole course with tennis courts, restaurant and other golf facilities was opened for local and tourist use (McGrath *et al.* 1973:146-163). Numerous other small scale agricultural interests were pursued during this time period including coffee, rice and watermelons (Ladd and Yen 1972). Water from Glover Tunnel was now used to water Mākaha Valley farms, and the lush grounds of the Mākaha Inn and Country Club, and its associated golf course.

## E. Alterations to the Waiʻanae Coastline (1880-1930)

Prior to the 1880s, the Waiʻanae coastline may not have undergone much alteration. The old coastal trail probably followed the natural contours of the local topography. With the introduction of horses, cattle, and wagons in the nineteenth century, many of the coastal trails were widened and graded to accommodate these new introductions. However, the changes

## III. PREVIOUS ARCHAEOLOGICAL RESEARCH

A. Previous Archaeological Studies in Mākaha *Alupua*'a

A number of archaeological studies have been carried out in Mākaha *Alupua*'a (Figure 4, Table 2), beginning with McAllister's (1933) island-wide survey in which he describes seven sites in Mākaha *Alupua*'a.

State site 50-80-07-169 is a complex of rock-faced terraces for irrigated taro cultivation located "two-thirds the way up the valley" and shown on McAllister's O'ahu site map as on the northwest side of the valley approximately 800 m northwest of Kāne'āki Heiau.

State site 50-80-07-170 is Kāne'āki Heiau which has been preserved and reconstructed.

State site 50-80-07-171 is another set of extensive once irrigated taro terraces, with some rock facings 6 ft. in height, and is reported as "half-way up Mākaha Valley and on the Honolulu side of the stream" and is shown on McAllister's O'ahu site map as approximately 400 m south of Kāne'āki Heiau. Green (1980) reported that this site was not relocated and had been destroyed but Neller (1984) relocated and described the damaged site.

State site 50-80-07-172 is described as a stone platform, is interpreted as a possible shrine, and is shown on McAllister's O'ahu site map as approximately 600 m south of Kāne'āki Heiau. Green (1980) reported that this site was not relocated and had been destroyed but Neller (1984) relocated and described the damaged site.

State site 50-80-07-173 is described as the "probable location" of a large rock reported in 1839 by E. O. Hall as "two or three miles distance" past the settlement at Pukaha (Pu'u Kahoa) that was once an object of worship. This sacrificial stone was reported by Hall as "in no peculiar sense striking" and "as undignified as any other hump or inanimate matter along the road." It is unclear whether McAllister actually saw this stone which Hall describes as "lying at the foot of a frightful precipice several hundred feet in height" but McAllister's map appears to locate it in the flats in the central seaward portion of the valley.

State site 50-80-07-174, Laukini Heiau, was described as "the important one [Heiau] in Mākaha Valley", and said to be so old as to have been built by the menehune. McAllister places this site in the vicinity of Kepihi Point and his description of the *Heiau* incorporating a "coral outcrop" and "an amazing amount of coral" fits that locale. State site 50-80-07-175 known as Motolokai is located at the base of the ridge between Kea'au and Mākaha on the seaside of the road. This site was described as two pits where early cannibals had come to wash the defleshed bodies of their victims at high tide. Associated with this site were said to be two prominent stones, a *pohaku o kāne* on the Mākaha side and a *pōhaku o Kanaloa* on the Kea'au side.

probably consisted of superficial alterations to the existing trails and did not entail major realignments. Kuykendall (1953:26) describes mid-nineteenth century road work: "Road making as practiced in Hawaii in the middle of the nineteenth century was a very superficial operation, in most places consisting of little more than clearing a right of way, doing a little rough grading, and supplying bridges of a sort where they could not be dispensed with." The first real alteration to the Wai'anae coastline probably came with the growth of the Wai'anae Sugar Company. The company cultivated cane in three valleys - Mākaha, Wai'anae, and Luahalei - and to more easily transport their cane to the dock and to the mill at Wai'anae Kai, a railroad was constructed in 1880. The construction of the railroad would have had an impact on the natural features in the area, such as the sand dunes, as well as the human-made features, particularly the fishponds and saltponds maintained in the coastal zone. Possibly the greatest alteration to the Wai'anae coastline occurred in the late nineteenth century with the extension of Dillingham's O.R. & L. rail line into the Leeward Coast. One reporter writes a glowing story of the railroad trip to Wai'anae at its opening on July 4, 1895:

For nine miles the road runs within a stone's throw of the ocean and under the shadow of the Wai'anae Range. With the surf breaking now on the sand beach and now dashing high on the rocks on one side, and with the sharp crags and the mountains interspersed with valleys on the other, patrons of the road are treated to some of the most magnificent scenery the country affords (in Krauss 1973:56).

This report suggests the railroad hugs the ocean during a good portion of the trip. The mechanics of railways demanded considerable alterations to natural landscapes in order to make them feasible for transport, including less curves and hills. A 1912 map of the Government Belt Road illustrates the alignment of the old Government Road which is probably a modified version of the original coastal trail, and the alignment of the proposed Government Belt Road which parallels the O.R. & L. alignment, a more direct route. After the Belt Road was completed, further roadwork was carried out in the 1930s on what was called the "Wai'anae Road" (D.O.T. 1923 Plans for Wai'anae Road). This work mostly followed the Government Belt Road alignment of 1912.

## F. Kili Drive

Kili Drive was built ca. 1970s to provide additional access into Mākaha Valley. The additional access was necessary due to the increased population related to residential, golf resort, and condominium development in the valley.

RECEIVED AS FOLLOWS

Table 2 Previous Archaeological Studies in Mākaha Ahupua'a

Study	Location	Type of Study	Findings
McAllister 1933	Island-wide	Island-wide Survey	Describes 7 sites within Mākaha Ahupua'a
Green 1969	Large expanse of the central valley	Mākaha Valley Historical Project Report 1	Presents historical documentation and analysis of remains
Green 1970	Large expanse of the central valley	Mākaha Valley Historical Project Report 2	Presents results of excavations including 16 carbon dates going back to circa AD 1200.
Ladd & Yen 1972	Large expanse of the central valley	Mākaha Valley Historical Project Report 3	Presents results of excavations
Ladd 1973	Large expanse of the central valley	Mākaha Valley Historical Project Report 4	Presents results of excavations
Green 1980	Large expanse of the central valley	Mākaha Valley Historical Project Report 5 - Summary	Summary of Archaeological Data and Cultural History
Bordner 1981	Corridor in valley floor <i>mauka</i> of Kāne'āki Heiau	Surface Survey	Notes numerous sites, mostly agricultural
Bordner 1983	Corridor in valley floor <i>mauka</i> of Kāne'āki Heiau	Surface Survey	Notes numerous sites, mostly agricultural
Kennedy 1983	elevation of 1072 feet in the valley floor, 2 km. <i>mauka</i> of Kāne'āki Heiau	Well Monitoring Report	Observed no buried features or artifacts
Neller 1984	Central Valley (Site Area -997)	Archaeological Reconnaissance Survey	Identifies unreported sites, and re-analysis several sites
Hammatt <i>et al.</i> 1985	West side of valley (Site Area 716)	Archaeological Reconnaissance Survey	Identifies numerous modified natural terraces assoc. with dryland agriculture

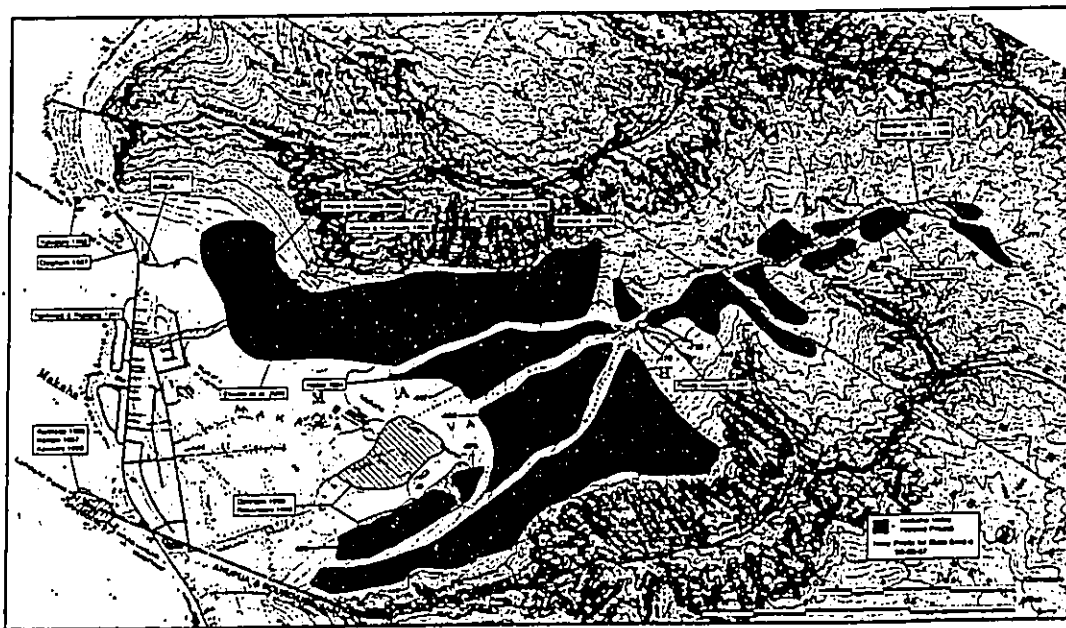


Figure 4 Previous Archaeological Studies in Mākaha Ahupua'a

RECEIVED AS FOLLOWS

Previous Archaeological Research

Fields Masonry 1997	Kāne'āki Heiau	Heiau Restoration Report	Presents background, a restoration plan & an account of restoration work
Magnuson 1997	Upper Mākaha Valley	Archaeological Review	Presents an overview & summary of previous studies
Malý 1999	Central valley	Limited Consultation Study	Presents a historical overview and consultation with knowledgeable parties
Elmore <i>et al.</i> 2000	South side of Kili Drive (Site area - 776)	Archaeological Inventory Survey	Identified three features poss. assoc. with dry-land ag. and/or habitation
Moore & Kennedy 2000	North side of Kili Drive (Site area - 776)	Archaeological Inventory Survey	Identified two features poss. assoc. with dry-land ag.

The Mākaha Valley Historical Project (Green 1969, 1970, 1980; Ladd and Yen 1972; and Ladd 1973), involving fieldwork conducted between 1968 and 1970, studied most all of Mākaha Valley. However, as Neller (1984:1) noted sites were lumped into large geographical districts and most of the valley was only surveyed at the reconnaissance level. The Mākaha Valley Historical Project research was unique in that it was funded by private enterprise without legal compulsion and the investigations covered parts of the valley beyond those due for development. More than 600 archaeological features were recorded in the upper valley and 1,131 features were recorded in the lower valley. The coastal strip and the central lower valley were not included because of previous development. Excavations were undertaken at thirty separate structural features including ten field shelters, four stone mounds, three stepped-stone platforms, three house enclosures, two storage pits, a clearing, a site thought to be a shrine, a *heiau*, a pond field terrace system, a habitation feature, two historic house platforms, and a modern curbed foundation. Carbon dating indicated settlement as early as the 13th century. Settlement was focused on the primary water source, Mākaha Stream. Subsequently, with increased population expansion into *kuia* lands occurred. By the 16<sup>th</sup> century the expansion occurred in the "upper valley" with changes in subsistence to irrigated taro system (*i.e. fa'ia'i*) (Green 1980:75).

Richard Borden (1981) carried out a survey of a linear project area up the middle of the valley floor inland of Kāne'āki Heiau in support of road widening and well placement projects. This corridor ran through several site areas designated during the Mākaha Valley Historical Project. Descriptions of sites are by proximity to site mapping points. Borden (1981:221) concludes "the entire Mākaha Valley was utilized for agricultural production in the most intensive way, such that all areas capable of it were undoubtedly utilized for crop production." This study accessioned two reviews by Roger C. Green and Matthew Spriggs resulting in Borden's preparing "Mākaha Valley Well III - V Re-Survey" (1983) and writing "Appendix B: Response to M. Spriggs Review of Mākaha Wells" (n. d.).

Previous Archaeological Research

Barrera Jr. 1986	West central side of the valley	Archaeological Survey	Identified four sites including four stone platforms, a U-shape habitation enclosure, a terrace and a wall. Some 17 test pits were excavated
Kennedy 1986	Mauna Lahilahi	Archaeological Investigations	Identifies five archaeological sites
Ahlo 1986; Kim 1986; Rio 1986; Simmons 1986	Mauna Lahilahi	Affidavits of brief oral histories	Accounts note the general sacredness of Mauna Lahilahi & the good fishing
Komori 1987	Mauna Lahilahi	Archaeological Survey & Testing	Relocates Kennedy's five sites and describes eleven more. Reports eight carbon dates
Borden & Cox 1988	Upper valley valley floor	Mapping Project	Ties in previously identified sites, focus on sites -764 & -77, emphasis on dryland ag.
Donham 1990	Two areas on southeast side of the valley	Archaeological Inventory Survey	Identified a terrace assoc. with dry-land ag. and/or habitation
Kawachi 1990	Mauna Lahilahi	Burial report	Describes remains of 2+ individuals, artifacts & sites
Rosendahl 1990	Two areas on southeast side of the valley	Archaeological Inventory Survey (synopsis)	Identified a terrace assoc. with dry-land ag. and/or habitation
Hammatt & Robins 1991	Water Street/ Kili Drive Area	Archaeological Inventory Survey	Identified a linear earthen berm understood as associated with commercial sugar cane cultivation
Kawachi 1992	84-325 Makau St., Kepuhi Point	Burial Report	1 burial? "First in this particular area"
Moore & Kennedy 1994	Northwest side of the valley, 242 ft. ul.	Archaeological Investigations	No historic features were located.
Clegthorn 1997	Mauka of Farrington Hwy, north of Kili Drive	Archaeological Inventory Survey	A cultural layer, a pond/wetland area remains of structures associated with the O. R. & L. Railroad, & a bridge foundation

RECEIVED AS FOLLOWS

Previous Archaeological Research

Kennedy (1983) produced an archaeological monitoring report on work at a 100 m long strip near "Wall IV" at an elevation of 1072 feet in the valley floor, two kilometers inland from Kāneʻāki Heiau. He saw no evidence of buried features or artifacts.

Earl Neller (1984) of the State Historic Preservation Division went back into the area designated as Site Area 997 "to clear up various deficiencies in the published reports and unpublished site data" and to re-examine various "puzzling inconsistencies." He relocated sites previously reported as destroyed (McAllister sites 171 & 172), identified unreported sites, and re-analyzed several sites studied during the Mākaha Valley Historical Project.

Hannant, Shideler and Northwick (1985) carried out an archaeological reconnaissance survey of a 3,000 foot long corridor on the west side of central Mākaha Valley in the 776 site area, documenting numerous modifications of natural terraces for dry land agriculture. Ten archaeological sites (1 wall, 2 habitation sites, and 7 agricultural sites) were recorded.

Barra, Jr. (1986) carried out an archaeological survey of a mid valley well site on the west central side of the valley. The project area appears to have included a corridor approximately 600 m long and 30 m wide and a proposed reservoir site 90 m in diameter. He identified four sites including four stone platforms (Site -1465), a U-shape habitation enclosure (Site -1466), a terrace (Site -1467) and a wall (Site -1468). Some 17 test pits were excavated but virtually nothing was found.

Kennedy (1986) carried out archaeological investigations focused on the north (Mākaha) side of Mauna Lāhilahe identifying five sites including a possible shrine, a *low*, a linear pile and an enclosure.

Komori (1987) carried out archaeological survey and testing at Mauna Lāhilahe relocating Kennedy's (1986) five sites and an additional eleven sites including petroglyphs, enclosures, terraces, rock shelters & midden, and lithic scatters. He reports eight radiocarbon dates rather tightly in the AD 1300 to 1650 period.

Bordner & Cox (1988) carried out a mapping project on the upper valley floor inland of Kāneʻāki Heiau. While much of the focus of this study was more accurately locating sites previously identified during the Mākaha Valley Historical Project, their findings suggest that the relative importance of dry-land, non-irrigated agriculture had previously been underestimated.

Doutham (1990) and Rosendahl (1990) carried out an archaeological inventory survey of two discrete but adjacent parcels for a total of approximately 130 acres in the south central portion of the valley. Doutham identified a terrace associated with dry-land agriculture and/or habitation.

Hannant and Robins (1991) carried out an archaeological inventory survey of an approximately 4,600 ft. long route of a proposed 20-inch water main extending northeast from Farrington Highway up Water Street and then continuing northeast to and across Kili Drive. They documented a single historic property Site 50-80-07-1363. Site -4363 was described as "a linear earthen berm ... buttressed along its stream side with cobbles and boulders" (Hannant & Robins 1991). The berm was interpreted as having been "associated with the historic sugarcane cultivation" (*ibid.*). Based on historic maps, the berm probably represents an old ditch alignment. The ditch alignment was probably altered during construction of the adjacent golf courses and presently functions as a flood control structure, protecting housing downslope. Subsurface testing within the corridor encountered nothing of archaeological significance.

Previous Archaeological Research

Carol Kawachi (1992) of the State Historic Preservation Division wrote a memorandum on "Mākaha Burials Exposed by Hurricane Iniki" documenting burial(s) eroding out of a lot at 84-325 Makua Street. This was a pit burial, approximately 50 cm below the surface extending 1.5 m. long exposed from a sand bank by Hurricane Iniki. The burial was reported to have included a slough coral at major joints and a possible shell *milua palliata*.

Moore and Kennedy (1994) carried out archaeological investigations on the northwest side of the valley for a proposed reservoir at 242 ft. elevation. The access corridor and reservoir site covered approximately eleven acres. No historic features were located.

Fields Masonry documented stabilization and restoration of Kāneʻāki Heiau carried out in 1996 (1997 documentation by Emily Pagliaro). Prior restoration efforts had been carried out in 1970.

Magnuson (1997) carried out a preliminary archaeological review of upper Mākaha Valley apparently for a proposed water line replacement project. This was primarily an archaeological literature review providing an overview of sites.

In 1997, test excavations associated with the inventory survey conducted for the "New Mākaha Beach Park Comfort Station and Parking Area" mauka of Farrington Highway by Cleghorn identified a cultural layer present in an area approximately 80 m. mauka of Farrington Highway near the entrance to Kili Drive. Radiocarbon analysis indicated an age range of A.D. 1440-1690. The deposit was suggested to be "evidence of a small encampment near the coast" (Cleghorn 1997:32). He also indicates the possible importance of a pond/wetland area just mauka of the Highway at Mākaha Beach Park: "This pond and wetland may have offered rich resources for the Hawaiians of the area, and the pond may have been used as an inland fishpond during the prehistoric and early historic eras" (*ibid.* 1997:33). Also present in the area are remains of structures associated with the O. R. & L. Railroad (State site 50-80-12-9714). Cleghorn indicates the presence of a bridge foundation located in an unnamed stream just north of Kili Drive, mauka of the highway (*ibid.* 1997:11).

Maly (1999) carried out a "Limited Consultation Study with Members of the Hawaiian Community in Waiʻanae" in support of the Mauna Olu Water System. Several interviewees deferred to Mr. Landis Omellas (a co-founder of the organization *Hui Mālama o Kāneʻāki Heiau*) as a cultural expert for mid-valley Mākaha. Concerns for continuing community consultation were expressed.

Elmore, Moore, and Kennedy (2000) carried out an archaeological inventory survey of an approximately 19.6 acre parcel located on the south side of Kili Drive and just west of the condominiums in a portion of the previously identified site area 50-80-07-776. A total of eight features were identified. Five of these were determined to be modern disturbances while the other three were thought to be possible traditional Hawaiian dry-land agricultural and/or habitation features.

Moore and Kennedy (2000) carried out an archaeological inventory survey of an approximately 20-acre parcel located on the north side of Kili Drive in a portion of the previously identified site area 50-80-07-776. A total of twelve features were identified. Ten of these were determined to be modern disturbances while the other two were thought to be possible traditional Hawaiian dry-land agricultural features.

RECEIVED AS FOLLOWS

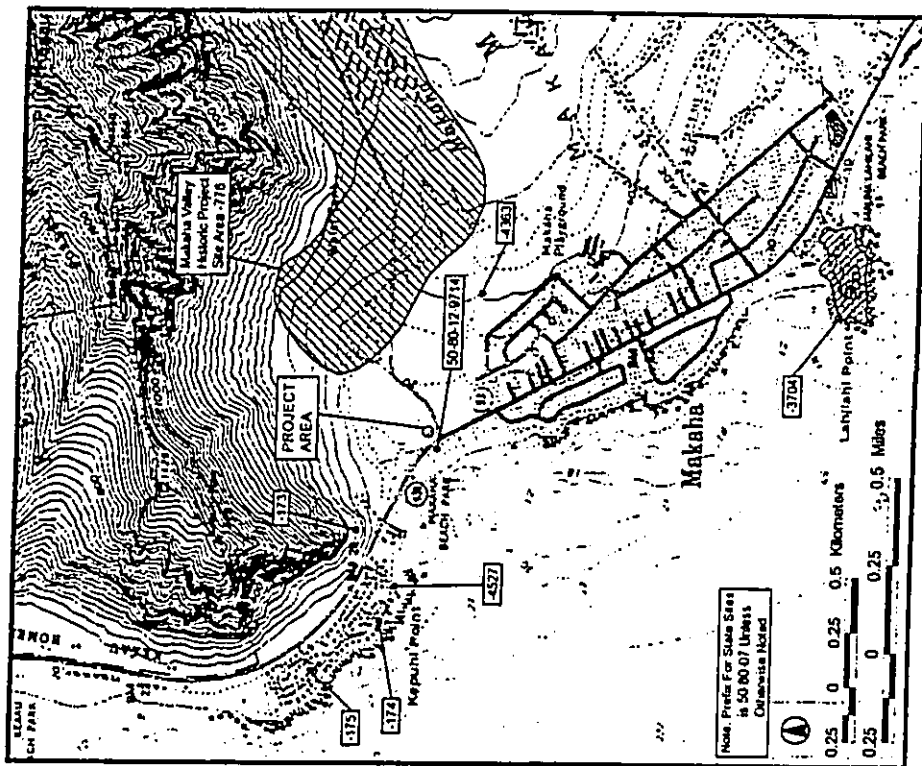


Figure 5 Previously Identified Archaeological Sites in Coastal Makaha, *Aloha*

B. Previously Recorded Sites in the Vicinity of the Project Area

Table 3	Previously Identified Archaeological Sites in Coastal Makaha, <i>Aloha</i>
50-80-07-173	Probable Location of Heiau Spoken of by Trail (McAllister 1933) "called ...Pukalica...an object of worship, and to which sacrifices were offered in former times. (3 miles from Pukalica) a large rock...in no particular sense striking"
50-80-07-174	Laukūnui Heiau (McAllister 1933) Low walls inclose, on three sides, what appear to be two low stone-paved platforms...Just to the south of the inclosure a coral outcrop forms a natural platform which was undoubtedly part of the heiau...The heiau is so old as to be accredited to the menhūnes and said to have been the important one in Mākaha Valley, though not nearly so pretentious or well-preserved as that of Kaneohe.
50-80-07-175	Mololokal (McAllister 1933) Two small pits on the <i>makāhi</i> side of the old road that were said to have been used by a group of cannibals who would place the defleshed bodies of their victims in these pits for cleaning by the high tide. Located at the foot of the ridge between Keau and Mākaha Valleys. Now buried/destroyed.
50-80-07-776	Mākaha Valley Historic Project Site Area -776 Various prehistoric and historic sites including field shelters, stone mounds, stone platforms, habitation enclosures, storage pits, habitation features, and dry land agricultural features.
50-80-07-3704	Mauna Labialahi (Kennedy 1986; Komori 1987; Kawachi 1990) A natural promontory at the southern end of Mākaha Valley. Subsurface cultural deposits, evidence of marine and religious activities and stone tool production, petroglyphs and crevice burials all included under one site designation.
50-80-07-4363	Historic Sugarcane-Related Berm (Hamnatt and Robins 1991)
50-80-07-4527	Burial at 84-325 Makau St. (Kawachi 1992) Pit burial, approximately 50cm below the surface extending 1.5 meters long. Exposed from sand bank by Hurricane 'Iniki. Included staghorn coral at major joints and a possible shell mounds.
50-80-12-9714	Remains of O.R.&L. Railroad (National/Hawai'i Historic Register 1975) Runs along the <i>makāhi</i> side of Farrington Highway. The railroad is listed on the National Register Of Historic Places.

V. SURVEY AND TESTING RESULTS

A complete pedestrian inspection of the project area was completed on April 28, 2003, by two CSH archaeologists, Douglas Borthwick, B.A. and Kehau Souza, B. A. under the general direction of Hallett H. Hammit, Ph.D. No surface historic properties were observed. Subsurface testing consisted of archaeological monitoring of geotechnical boring undertaken by Geolabs-Hawaii. Geotechnical boring consisted of two excavations, Boring O-9 at the location of the proposed drill site, and Boring O-10 immediately *maka* of Farrington Hwy., using an auger (Figure 6). No cultural material was observed during boring activities. The stratigraphic sequence for each test bore, provided by Geolabs Hawaii, is as follows:

Site	Depth (m)	Description
Boring O-9	0-2.1	Hard to stiff clayey silt (alluvium)
	2.1-6.6	Soft to medium hard coral formation
	3.4	Water table
Boring O-10	0-2.7	Medium dense sand (fill)
	2.7-3.5	Dense sand with gravel and cobbles
	3.5-7.5	Hard coral formation
	7.5-8.8	Dense sandy gravel (reef detritus)
	8.8-9.4	very stiff silty clay (alluvium)
	9.4-10.2	Soft coral formation
	10.2-13.0	Very stiff silty clay with sand (marine clay)
2.7	Water table	



Figure 6 Photo Showing Geotechnical Boring at the Location of the Proposed Drill Site.

RECEIVED AS FOLLOWS



#### VI. ASSESSMENT OF FIBER OPTIC CABLE GAP AREAS

The existing Sandwich Isles fiber optic cable line currently runs west along Farrington Highway to the intersection of Wai'anue Valley Rd. In order to connect the existing line to the proposed cable landing site at Kili Dr., the fiber optic cable "gap area" must be must be addressed through additional subsurface cable installation. Trenching is proposed west along Farrington Hwy. from Wai'anue Valley Rd. to Kili Dr. (Figure 7).

The proposed trenching would occur along existing roads in various soil types. From east to west, these include Pulehu Clay Loam (P+L) near Pōka'i Bay, Coral Outcrop (CR), Mokuieia Clay (Mtb) near Wai'anue High School, Hanalei Silty Clay (HnA), Waiatus Silty Clay (WKA) near Mauna Lahilahi, Mamala Stony Silty Clay Loam (MnCL), and Haleiwa Silty Clay (HeA) (Foote *et al.* 1972). In addition, Farrington Hwy. parallels Beach Sand (BS) in several areas along the cable gap area.

Based on the possibility of inadvertently impacting historic sites including encountering human burials, a monitoring plan was reviewed and accepted by SHPD for trenching along portions of Farrington Hwy., including the gap area of the current project from Kaulawaha Rd. near Wai'anue High School to Kili Dr. (Bushman *et al.* 2002). Recent archaeological monitoring for the Board of Water Supply work along Farrington Hwy from Kaulawaha Rd. to Jade St. did not encounter any significant cultural material or human burials (Tulchin and Hammit, in progress). Recent archaeological monitoring has also been completed for trenching along residential streets *mauka* and *makai* of Farrington Hwy. from Jade St. to Kili Dr., in which no human burials were encountered (Pacific Legacy, in progress).

However, human burials have been discovered in the vicinity of the gap area near Kepuhi Point (Site -4527), at Mauna Lahilahi (Site -3704), near the Makaha Surfside Apartments (Site -4064), at Wai'anue Regional Park (Site -3967), as well as in the Pōka'i Bay area. Previous archaeological investigations associated with the Wai'anue Army Recreation Center at Pōka'i Bay (Site 50-Oa-C3-23) discovered at least 30 human burials (Riford 1984; Hammatt *et al.* 1984; Schilz *et al.* 1994). A single human burial was also encountered during excavations in sandy soils in a parcel near the corner of Farrington Hwy. and Bayview St.

Due to the possibility of encountering significant cultural material or human remains in sandy soils, as well as previous documentation of human burials in the vicinity of the proposed trenching, on-site archaeological monitoring is recommended for all trenching associated with the fiber optic cable gap area.

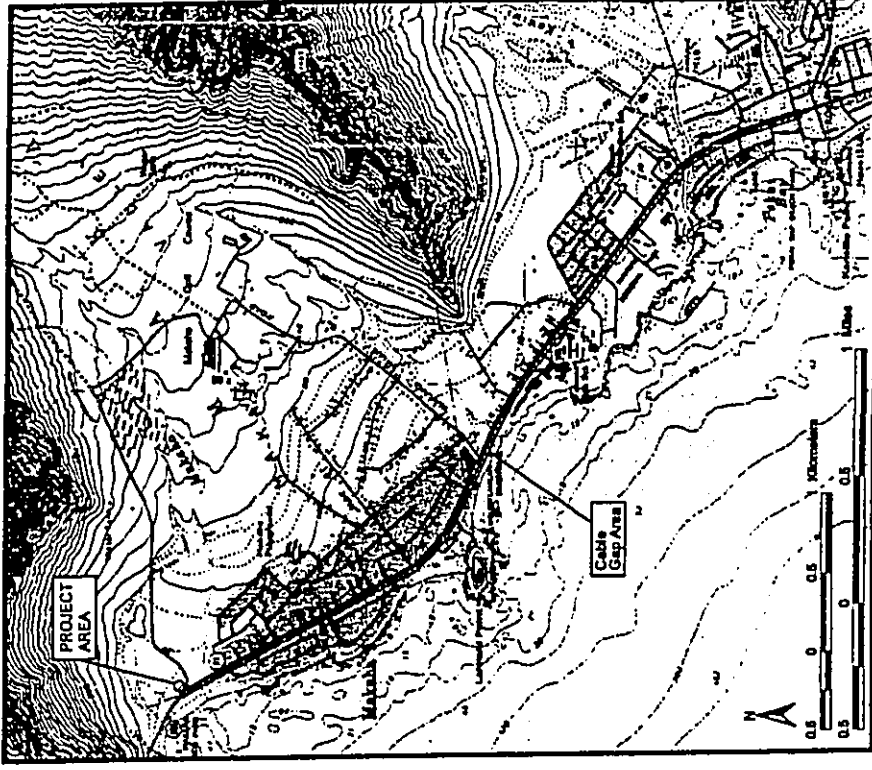


Figure 7 USGS Map Showing the Location of Proposed Trenching Associated with Fiber Optic Cable Gap Area.

RECEIVED AS FOLLOWS

RECEIVED AS FOLLOWS

Conclusions

VII. CONCLUSIONS

Field investigation of the Kili Drive drill site project area indicated a lack of any significant surface or subsurface historic properties. Subsurface testing consisted of archaeological monitoring of two geotechnical boring excavations. Based on the background studies and fieldwork completed as part of this project, it is anticipated that the horizontal directional drilling associated with the Sandwich Isles Fiber Optic Cable Landing project will have no effect on any significant historic properties.

Additional trenching for the installation of fiber optic cables to address the "gap area" is proposed along Farrington Highway from Wai'anae Valley Road to Kili Drive. Due to the possibility of encountering significant cultural materials including human burials, as well as community sensitivity to burial issues, on-site archaeological monitoring is recommended for all additional subsurface work associated with the Sandwich Isles Fiber Optic Cable Landing project.

References Cited

VIII. REFERENCES CITED

- Ahlo, Henry Keam, Agnes Kim, Emma Rio and Josephine Simmons  
1986 *Maua Lahihai: Oral Histories (TMK 8-4-01-8, 9)*, Honolulu, HI.
- Armstrong, Warwick, Ed.  
1973 *Atlas of Hawaii*, University of Hawaii Press, Honolulu, HI.
- Barrera, William, Jr.  
1986 *Makaha Valley, Oahu: Archaeological Survey of Muihvalley Wellsite, (TMK 8-4-02-1)*, Chingago, Inc., Honolulu, HI.
- Barrere, Dorothy B.  
1970 "Survey of Historical Materials Pertaining to Makaha Valley, in Makaha Valley Historical Project", R.C. Green (Ed.) *Pacific Anthropological Records* 10, Bishop Museum, Honolulu, HI.
- Bordner, Richard M.  
1981 *Archaeological Surface Survey Makaha Wells Appendix D*  
1983 *Makaha Valley Well III-V Re-survey*, City and County of Honolulu, Board of Water Supply, Honolulu, HI.
- Bordner, Richard and David W. Cox  
1988 *Upper Makaha Valley Mapping Project, Unit I: Sites 764 and 996 and Unit 2: Site 771*, Social Research Systems Co-op, Honolulu, HI.
- Bushnell, Kristina W., Bryce Myers and Hallett H. Hammat  
2002 *Archaeological Monitoring Plan for Board of Water Supply Work along Farrington Highway, Makaha (TMK: 8-4-01-09, 11-13-18), Wai'anae (TMK: 8-5-02, 14-18, 23), Luualalei (TMK: 8-8-06-08, 17, 26, 31, 33, 34), Manakuli (TMK: 8-0-01, 02, 05-17), and Honouliuli ahupua'a (TMK: 9-2-03), Districts of Wai'anae and Ewa, Island of Oahu, Cultural Surveys Hawaii, Inc., Kailua, HI.*
- Cieghorn, Paul L.  
1996 *The Results of An Archaeological Inventory Survey in Coastal Makaha, Wai'anae, Oahu, Hawaii (TMK 8-4-2-47)*, Pacific Legacy, Inc. 332 Ulunui Street, Kailua, HI.
- Condé, Jesse C. and Gerald M. Best  
1973 *Sugar Trains, Narrow Gauge Rails of Hawaii*, Glenwood Publishers, Felton, CA.
- Cordy, Ross  
1998 *Ka Moku O Wai'anae: He Mo'olelo O Ka Wa Kohiko*, State Historic Preservation Division, State of Hawaii, Honolulu, HI.
- Donham, Theresa K.  
1990 *Archaeological Inventory Survey, Makaha Valley Planned Development-Housing (PD-H) Site, Land of Makaha, Wai'anae District, Land of Oahu (TMK 8-0-4-02-7)*, Letter Report PHRI, Hilo, HI.
- Douglas, Michele T.  
1991 *Report on a Child's Skeleton Recovered From the Beach at Makaha Surfside Apartments TMK: 8-5-17-07*, State Historic Preservation Division, DLNR, Honolulu, HI.
- Douglas, Michele Toomay and Michael Pictusewsky

RECEIVED AS FOLLOWS

References Cited

- 1979 *Mākaha Surfside Burial: Artifacts, Kamailie, Wai'anae, O'ahu, TMK: 8-5-17-005, State Site No. 80-07-4064.* State Historic Preservation Department, DLNR, Honolulu, HI.
- 1990 *Mauna Lahilahi Crevice Burials Mākaha, Wai'anae, O'ahu, State Historic Preservation Division, DLNR, Honolulu, HI.*
- 1992 *Memo Report: Mākaha Burials Exposed by Hurricane Iniki, TMK 8-4-09:5, Site 50-80-07-4527, SHPO, Honolulu, HI.*
- Kennedy, Joseph  
1986 *Archaeological Investigations at Mauna Lahilahi, Wai'anae, Island of O'ahu, (TMK 8-4-1:8 & 9; 8-4-3:11, 8-4-4:1.5 & 9), Archaeological Consultants of Hawaii, Inc., Honolulu, HI.*
- 1983 *An Archaeological Monitoring Report at Well IV, Mākaha Valley, Oahu (TMK 8-4-02), Archaeological Consultants of Hawaii, Inc., Honolulu, HI.*
- Komori, Eric  
1987 *Archaeological Survey and Testing at Mauna Lahilahi, Wai'anae District, Island of O'ahu, Dept. of Anthropology, Bishop Museum, Honolulu, HI.*
- Krauss, B.  
1973 *Historic Waianae: A Place of Kings. Island Heritage: Honolulu, HI.*
- Kuykendall, Ralph S.  
1967 *The Hawaiian Kingdom, Volume 3, U. H. Press, Honolulu, HI.*
- 1953 *The Hawaiian Kingdom, Volume 2 1854-1874, University of Hawaii Press, Honolulu, HI.*
- Ladd, Edmund J.  
1970 *Test Excavations of Three Stepped Platforms in Mākaha Valley Historical Project, Interim Report 2, Bishop Museum, Honolulu, HI.*
- 1973 *"Mākaha Valley Historical Project", Interim Report No. 4, Pacific Anthropological Records No. 19, Department of Anthropology, Bishop Museum, Honolulu, HI.*
- Ladd, Edmund J. and D.E. Yen, (Eds)  
1972 *Mākaha Valley Historical Project, Interim Report No. 3, Pacific Anthropological Records, No. 18, Bishop Museum, Honolulu, HI.*
- Magnuson, Coral  
1997 *A Preliminary Archaeological Review of Upper Mākaha Valley, O'ahu, Hawaii, IARU, Honolulu, HI.*
- Maly, Kepe  
1999 *A Limited Consultation Study with Members of the Hawaiian Community in Wai'anae: Conducted in Conjunction with Proposed Repair Work on a Portion of the Mauna 'Olu Water System - Mākaha Valley, Island of O'ahu.* Kumu Pono Associates, Honolulu, HI.
- McAllister, J. Gilbert  
1933 *Archaeology of Oahu.* B.P. Bishop Museum Bull. 104. Honolulu.
- McGrath, E. J., Jr., K. M. Brewer and Robert Krauss  
1973 *Historic Wai'anae, A Place of Kings, Island Heritage Ltd., Norfolk Island, Australia.*
- Moore, James R. and Joseph Kennedy

References Cited

- 1988 *Human Remains at Mākaha Beach, Mākaha, O'ahu, TMK 8-5-17-08, Site 80-07-4064, Police Report, Medical Examiner's Report and Physical Anthropologist's Report, UH-Manoa, Honolulu, HI.*
- Elmore, Michelle, James R. Moore and Joseph Kennedy  
2000 *An Archaeological Inventory Survey Report for TMK: 8-4-02:50 Located in Mākaha Ahupua'a, Waianae District, Island of O'ahu, Archaeological Consultants of the Pacific, Inc., Honolulu, HI.*
- Footle, Donald E., E.L. Hill, S. Nakamura and F. Stephens  
1972 *Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii, U.S. Dept. of Agriculture, U.S. Government Printing Office, Washington, D.C.*
- Green, Roger C.  
1969 *Mākaha Valley Historical Project: Interim Report No. 1, Pacific Anthropological Records 4, Bishop Museum, Honolulu.*
- 1970 *"Mākaha Valley Historical Project: Interim Report No. 2, Green, Roger C. (ed.) Pacific Anthropological Records, No. 2, Bishop Museum, Honolulu, HI.*
- 1980 *"Mākaha Before A.D. 1880. Mākaha Valley Historical Project Summary Report No. 5," Pacific Anthropological Records No. 31, Dept. of Anthropology, Bishop Museum, Honolulu, HI.*
- Hammatt, Hallett H. and Jennifer Robins  
1991 *An Archaeological Inventory Survey for the Proposed Kili Drive/Water Street 20 inch Watermain, Mākaha, Wai'anae, O'ahu, Cultural Surveys Hawaii, Kailua, HI.*
- Hammatt, Hallett H. and David Shideler  
2001 *Archaeological Monitoring Plan for Board of Water Supply Work on Ten Residential Streets, Mākaha Ahupua'a (TMK: 8-4-03, 85-08, 11, 12, 14 & 16) and Wai'anae Ahupua'a (TMK: 8-5-16) District of Wai'anae, Island of O'ahu, Cultural Surveys Hawaii, Kailua, HI*
- Hammatt, Hallett H., David W. Shideler and Douglas Kabanele Borhwick  
1985 *Reconnaissance Survey of the Proposed Mākaha Mid-Valley Well, Mākaha, Wai'anae, O'ahu, Cultural Surveys Hawaii, Kailua, HI.*
- Hammatt, Hallett H., Douglas F. Borhwick, and David Shideler  
1985 *Archaeological Excavations at the Wai'anae Army Recreation Center, Pōka'i Bay, Wai'anae, O'ahu, Cultural Surveys Hawaii, Kailua, HI.*
- 'Ū, John Papa  
1959 *Fragments of Hawaiian History (Pukui Translation), Bishop Museum Press, Honolulu, HI.*
- Jourdane, Elaine  
1995 *Inadvertent Discovery of Human Remains at Mākaha Surfside Condominiums, Mākaha, Waianae, Oahu, State Historic Preservation Division, DLNR, Honolulu, HI.*
- Kamakau, Samuel Manaiakalani  
1961 *Ruling Chiefs of Hawaii: The Kamehameha Schools Press, Honolulu, HI.*
- 1992 *Ruling Chiefs of Hawaii (Revised Edition), The Kamehameha Schools Press, Honolulu, HI.*
- Kawachi, Carol T.

RECEIVED AS FOLLOWS

References Cited

- 2000 The Mahele Database, www.waihona.com  
Wilkes, Charles  
1845 *Narrative of the United States Exploring Expedition, During the Years 1838, 1839, 1840, 1841, 1842, 5 Volumes, Lea and Blanchard, Philadelphia, PA.*

References Cited

- 2000 *An Archaeological Inventory Survey Report for a Portion of TMK: 8-4-02: 58 Located in Makaha Ahupua'a, Wai'anae District, Island of O'ahu, Archaeological Consultants of the Pacific, Inc., Honolulu, HI.*
- 1994 *Archaeological Investigations for the Board of Water Supply's Proposed Makaha Wai'anae District, on the Island of Oahu, (TMK 8-4-02:11 (Lot 1236) in Makaha Ahupua'a, Consultants of Hawaii, Inc, Haleiwa, HI.*
- Neller, Earl  
1984 *An Archaeological Reconnaissance Survey of Site Area 997 Makaha Valley, O'ahu, HI. (TMK 8-4-02:2, 14).*
- Perzinski, David and Hallett H. Hammatt  
1999 *Archaeological Assessment of the Proposed AT&T Cable Project from Makaha Cable Station to Keawa'ula Cable Station, Wai'anae, O'ahu, Hawaii', Cultural Surveys Hawaii, Kailua*
- Pukui, Mary Kawena and Samuel H. Elbert  
1986 *Hawaiian Dictionary, 2nd Edition, University of Hawaii Press, Honolulu, HI.*
- Pukui, Mary K., Samuel H. Elbert, and Ester T. Mookini  
1974 *Place Names in Hawaii. Honolulu. University Press of Hawaii*
- Riford, Mary F.  
1984 *Report of Archaeological consulting Services During Repair of Sewer Lines at Wai'anae Army Recreation Center, O'ahu. Ms. on file, Anthropology Department, Bernice P. Bishop Museum, Honolulu, HI.*
- Schmitt, Robert C.  
1977 *Historical Statistics of Hawaii, The University of Hawaii Press, Honolulu, HI.*
- Shideler, David W., Creed, Victoria S., Borthwick, Douglas F., and Hammatt, Hallett H.  
2001 *Archaeological Assessment for the Proposed 360 Fiber Optic Cable Project, Makaha Ahupua'a, Wai'anae District, Island of O'ahu (TMK: 8-4-01-09, 11, 13-18), Cultural Surveys Hawaii, Kailua, HI.*
- Shideler, David W., David Perzinski, and Hallett H. Hammatt  
1999 *Archaeological Monitoring Plan for the AT&T Cable project from Makaha Cable Station to Keawa'ula Cable Station, Ahupua'a of Makaha, Kea'au, 'Ohikilolo, Makua & Kahanahāiki, Wai'anae, O'ahu, Hawaii', Cultural Surveys Hawaii, Kailua, HI.*
- Sterling, Elspeth P. and Catherine C. Summers (comp.)  
1978 *Sites of O'ahu, Dept. of Anthropology, B.P. Bishop Museum, Honolulu. Vancouver, George*
- 1798 *A Voyage of Discovery to the North Pacific Ocean and Round the World Performed in the Years 1790-95, 3 Volumes, G.G. and J. Robinson and J. Edwards, London, England.*
- Wagner, Warren L., Derral R. Herbst and S.H. Sommer  
1990 *Manual of the Flowering Plants of Hawaii', 2 Volumes, University of Hawaii Press, Honolulu, HI.*
- Waihona 'Aina Corp.

RECEIVED AS FOLLOWS

**Māhaka**  
**CULTURAL SURVEYS HAWAII, INC.**  
 Archaeological and Cultural Impact Studies  
 Hallett H. Hammatt, Ph.D., President  
 733 N. Kalaheo Avenue  
 Kailua, Hawaii 96734  
 (808) 262-9972 Fax: (808) 262-4950  
 Email: [info@culturalsurveys.com](mailto:info@culturalsurveys.com)  
[www.culturalsurveys.com](http://www.culturalsurveys.com)

**Aloha Collette**

Here are summaries of the concerns expressed by the community members I have contacted for the Māhaka and Sandy Beach cultural impact assessments.

**Māhaka Cultural Impact Assessment**

I contacted twenty-five area *kūpuna* and *kama'āina*. The main concern that was brought up was how will the project affect the ocean resources. Specific questions raised by individuals included: Will the cable emit any harmful electric waves? Will any cable emissions have a harmful effect on fish and reef animals? Will installation of the cable harm or destroy the reef itself?

People in the community are also angry about the existing cable line at Māhaka Beach which protrudes out of the sand and which is a safety hazard. They are concerned that the proposed cable project will be similarly disruptive to the beach.

An additional concern is that if and when this cable project is undertaken, a cultural monitor should be present during all excavation activities in case any inadvertent finds are encountered.

**Sandy Beach Cultural Impact Assessment**

I am still in the process of making contacts about the Sandy Beach project. Unlike Māhaka, there is no long-time community or neighborhood surrounding Sandy Beach. I have made contact with residents of Waimānalo and Hawaii Kai. So far, no one has expressed any specific concern about the cable project at Sandy Beach. I will be going out to Sandy Beach soon to talk to any old-time fishermen or other beach-goers who might have some concerns.

Attached are lists of contacts for each job. I hope these summaries are helpful.

Mahalo,  
 Kēhauiani

**Table Community Contacts and Comments**

**Key:**  
 Y=Yes  
 N=No  
 A=Attempted (at least 3 attempts were made to contact individual, with no response)  
 S=Some knowledge of project area  
 D=Declined to comment  
 U=Unable to contact, i.e., no phone or forwarding address, phone number unknown

NAME	AFFILIATION	CONTACTED	KNOWLEDGABLE OF PROJECT AREA	COMMENTS
Aila, William and Melva	Wai'anae Harbor Master	Y	Y	He has no problem with the fiber optic line. The line is in 60 feet of water and will not affect fishing.
Aiu, Dr. Pua	Office of Hawaiian Affairs	Y	Y	Made referrals
Awana, Karen	Wai'anae Coast Neighborhood Board No. 74	A		
Cope, Aggie	Wai'anae Coast Culture and Arts	A		
De-Soa, Frenchy	Wai'anae Coast Archaeological Preservation Committee	Y	Y	She is concerned about the effect the drilling will have on the coral and also made a referral.
Enos, Eric	Cultural Learning Center at Ka'ala	A		
Gabbard, Mike	City Council	A		
Greenwood, Alice	Wai'anae Kūpuna	Y	Y	Made referral
Hanabusa, Colleen	Senator	Y	Y	Made referrals
Ka'aukuhiwi, Shannan	Na Keiki O Kamo'i Canoe	Y	Y	Made referral

RECEIVED AS FOLLOWS

Maunaloa (Sandy Beach)

Table 1 Community Contacts and Comments

NAME	AFFILIATION	CONTACTED	KNOWLEDGABLE OF PROJECT AREA	COMMENTS
Kahanu, Hina	Club - Kumu	Y	Y	Made referral and also spoke of legends.
Kamañ, Walter	Wai'anae Kupuna	Y	Y	Interviewed on 5-21-03
Kcimo, Maylene	Wai'anae Ahupua'a Council/President	Y	N	No knowledge of project area
Killa, Glen	Koa Mana Resources	A	-	Left messages
Lapillig, Armalage, Neilie	Wai'anae Coast Coalition	Y	S	Made referral
Maldonado, Eddie	Local resident	Y	Y	Made referral
Markell, Kai	SHPD Burials staff	Y	S	No knowledge of area
McElbowney, Holly	SHPD	Y	Y	Talk to <i>kupuna</i> in the area.
Omelias, Landis	Hui Malama	Y	S	Talk to the Council of Mākaha. This area was use for the homeless in the late 70's and early 80's
Pelekai, Gwendolyn	Oahu Island Burial Council Mākaha Beach Lifeguard	Y	S	Made referral
Rezenes, Cynthia	Wai'anae Coast Neighborhood Board #24	Y	Y	Concerned that it will have the same negative effect as the existing line.
Raposa, Henry and Moana	La'au Lapa'au Practitioner	Y	S	Left message
Shimabukuro, Maile	House Rep	Y	Y	He does not gather plants in that area
Silva, Albert	Wai'anae Coast Neighborhood Board #24	Y	Y	Will get back to us.
				Interviewed on 7-23-03

NAME	AFFILIATION	CONTACTED	KNOWLEDGABLE OF PROJECT AREA	COMMENTS
Aila, Ku'ulci	Waimānalo Hawaiian Civic Club	Y	S	Made referral
Aiu, Pua	Offices of Hawaiian Affairs	Y	S	Made referral
Davis, Ray	Local fisherman	Y	S	Made referral and is concerned about the reef.
Crosier, Bobo	Waimānalo resident	Y	Y	He used the area for fishing. He said there is a lot of fish in that area.
Funai, Brain	Windward Casting Club	Y	Y	Made referral
Henderson, Renny	Raised in Waimānalo	Y	Y	Good fishing for <i>moi, o'io</i> and <i>renue</i>
Hawaii Fishing News Hō, Wilson Kekoa	Contact: Chuck Waimānalo Neighborhood Board	Y	S	Kalama Valley was all pig farmers, and there was a bar named <i>Olole Ma Luma</i> near the road
Holt, Lamakani	Waimānalo resident and Sandy Beach Lifeguard	Y	Y	Made referral and will talk to his <i>tutu</i> and get back to us.

RECEIVED AS FOLLOWS

Maunaloa (Sandy Beach)

Table 1 Community Contacts and Comments

NAME	AFFILIATION	CONTACTED	KNOWLEDGABLE OF PROJECT AREA	COMMENTS
Kahanu, Hina	Club - Kumu	Y	Y	Made referral and also spoke of legends.
Kamali, Walter	Wai'anae Kupuna	Y	Y	Interviewed on 5-21-03
Kcemo, Maylene	Wai'anae Ahupua'a Council, President	Y	N	No knowledge of project area
Kila, Glen	Koa Mana Resources	A	-	Left messages
Lapilio- Armilage, Nettie	Wai'anae Coast Coalition	Y	S	Made referral
Maldoado, Eddie	Local resident	Y	Y	Made referral
Marcell, Kai	SHPD Burials staff	Y	S	No knowledge of area
McEldowney, Holly	SHPD	Y	Y	Talk to <i>kupuna</i> in the area.
Omellas, Landis	Hui Malama	Y	S	Talk to the Council of Makaha. This area was use for the homeless in the late 70's and early 80's
Pelehai, Gwendolyn	Oahu Island Buntal Council	Y	S	Made referral
Puu, Mel	Makaha Beach Lifeguard	Y	Y	Concerned that it will have the same negative effect as the existing line.
Rezentes, Cynthia	Wai'anae Coast Neighborhood Board #24	A	-	Left message
Raposa, Henry and Moana	Lai'au Lapa'au Practitioner	Y	S	He does not gather plants in that area
Shimabukuro, Maile	House Rep	Y	-	Will get back to us.
Silva, Albert	Wai'anae Coast Neighborhood Board #24	Y	Y	Interviewed on 7-23-03

NAME	AFFILIATION	CONTACTED	KNOWLEDGABLE OF PROJECT AREA	COMMENTS
Aiia, Ku'ulci	Waimanalo Hawaiian Civic Club	Y	S	Made referral
Aiu, Pua	Office of Hawaiian Affairs	Y	S	Made referral
Davis, Ray	Local fisherman	Y	S	Made referral and is concerned about the reef.
Crosier, Bobo	Waimanalo resident	Y	Y	He used the area for fishing. He said there is a lot of fish in that area.
Punai, Brain	Windward Casting Club	Y	Y	Made referral
Henderson, Renny	Raised in Waimanalo	Y	Y	Good fishing for <i>moi, o'io</i> and <i>nene</i>
Hawaii Fishing News Ho, Wilson Kekoa	Contact: Chuck	Y	S	Kalama Valley was all pig farmers, and there was a bar named <i>Okole Ma Luwa</i> near the road
Holt, Lamakani	Waimanalo Neighborhood Board	Y	S	Made referral
	Waimanalo resident and Sandy Beach Lifeguard	Y	Y	Made referral and will talk to his tuu and get back to us.

RECEIVED AS FOLLOWS

McElDowney, Holly	SHPD	Y	Y	Made referral
Kaupiko, Lukela John	Hui Nalu Canoe Club	Y	N	No comment
Kaaloha, Alma	Kupuna	Y	Y	Made referral
Kini, Kalci	Oahu Island Burial Council	Y	S	He spoke about the different type's of <i>limu</i> in that area, and made a referral
Rodgers, T. Charlie	Hawaii Kai Neighborhood Board	Y	N	No comment and no problem with the cable line
Storn, Sam	State Senate	A		
Wong, Tony and Donna	Local residents	Y	Y	They will get back to us.
Wright, Agnes Kainoa	Waimanalo Hawaiian Civic Club	A		



RECEIVED AS FOLLOWS

Table of Contents

TABLE OF CONTENTS

I.	INTRODUCTION.....	3
A.	Project Background.....	3
B.	Project Area Description.....	3
C.	Scope of Work.....	3
D.	Methods.....	7
II.	HISTORICAL BACKGROUND.....	8
E.	Early Historic Period.....	8
F.	Mid-1800s to 1900.....	11
G.	Early 1900s To The Present.....	13
III.	PREVIOUS ARCHAEOLOGICAL RESEARCH.....	17
IV.	RESULTS OF COMMUNITY CONSULTATION.....	20
V.	RESULTS OF CONTACTS.....	21
VI.	BACKGROUNDS OF <i>KAMA'AIWA</i> INTERVIEWEES.....	23
	Helen Kapiliani Sanborn Davis.....	23
	Ralph 'Hana' Hanaka.....	23
VII.	TRADITIONS OF MAUNALUA.....	24
A.	Mythological and Traditional Accounts.....	24
B.	Ocean Resources.....	26
C.	Surfing.....	28
D.	Burials.....	30
VIII.	SUMMARY AND RECOMMENDATIONS.....	32
A.	Summary.....	32
B.	Recommendations.....	33
IX.	REFERENCES CITED.....	34

CULTURAL IMPACT ASSESSMENT FOR THE  
PROPOSED SANDWICH ISLES FIBER OPTIC CABLE  
LANDING WITHIN SANDY BEACH PARK,  
*AHUPUA'A* OF MAUNALUA, ISLAND OF O'AHU  
(TMK 3-9-12:02)

by

Kéhaulani E. Souza, B.A.,  
Douglas F. Bothwick, B.A.,

&

Hallett Hamamoto, Ph.D.

Prepared for

Parsons, Bronkshoff, Quade and Douglass

by

Cultural Surveys Hawai'i, Inc.  
October 2003

RECEIVED AS FOLLOWS

I. INTRODUCTION

A. Project Background

The proposed East O'ahu Sandwich Isles Communication (SIC) Cable Landing site is located within Sandy Beach Park, Maunaloa *Ahiupua'a*, Kona District, O'ahu Island. (TMK 3-9-12-02) (Figures 1-3). The proposed cable landing will come ashore near the Makapu'u (east) side entrance to Sandy Beach Park and then extend underground to Kalani'ana'ole Highway. The proposed SIC cable landing is planned for a site that already contains fiber optic cable landing infrastructure. Archaeological research and monitoring related to the previous fiber optic cable landing construction documented no historic properties, which was one of the factors in the choice of this particular landing site for the SIC project.

B. Project Area Description

The proposed Sandy Beach Park fiber optic cable landing site is a 20 ft (6 m) corridor within the eastern section of the beach park, then parallels Kalani'ana'ole Hwy to Kealahou Road.

The project area consists of a portion of Sandy Beach Park and the adjoining Kalani'ana'ole Highway on the coastline of Kalama Valley, *Ahiupua'a* of Maunaloa. This particular segment of Sandy Beach Park is known as Wāwāmalu Beach.

The elevation within the project area ranges from approximately 0-10 ft AMSL. The sediments in the project area are of the Jaucas (JaC) Sand series and Rock Land (RkL) series. (Foote *et al.* 1972). Rock outcrops account for about 50% of the project area. Jaucas Sand is an excessively-drained sediment with rapid permeability. The project area receives approximately 24 in (600 mm) of rainfall annually (Giambelluca *et al.* 1986:86).

C. Scope of Work

The following scope of work was proposed for the satisfying requirements related to Hawaiian customary and traditional rights and their applicability to the project area:

- 1) Examination of historical documents, Land Commission Awards, historic maps, with the specific purpose of identifying traditional Hawaiian activities including gathering of plant, animal and other resources or agricultural pursuits as may be indicated in the historic record.
- 2) A review of the existing archaeological information pertaining to the sites on the property as they may allow us to reconstruct traditional land use activities and identify and describe the cultural resources, practices and beliefs associated with the parcel and identify present uses, if appropriate.
- 3) Conduct oral interviews with persons knowledgeable about the historic and traditional practices in the project area and region. We anticipate several formal interviews and more informal interviews.
- 4) Preparation of a report on items 1-3 summarizing the information gathered related to traditional practices and land use. The report assess the impact of the proposed action on the cultural practices and features identified.

**LIST OF FIGURES**

Figure 1 USGS Topographic Map, Koko Head Quad, showing the location of the project area.....4

Figure 2 TMK 3-9-12, showing the location of the project area.....5

Figure 3 Aerial photograph showing the location of the project area.....6

Figure 4 Photo showing the Sandy Beach Park shoreline in the area of the proposed fiber optic cable landing.....31

Figure 5 Photo showing the Sandy Beach Park access road in the area of the proposed fiber optic cable landing.....31

**LIST OF TABLES**

Table 1 Previous Archaeological Studies in the Vicinity of the Project Area.....19

Table 2 Community Contacts and Comments.....21

RECEIVED AS FOLLOWS

Introduction

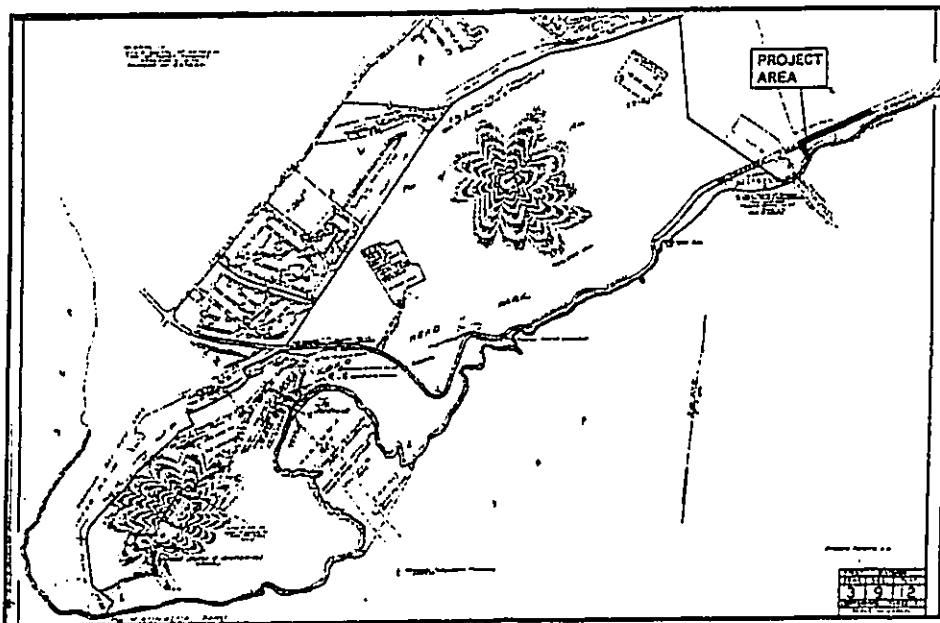


Figure 2 TMK 3-9-12, showing the location of the project area.

5

Introduction

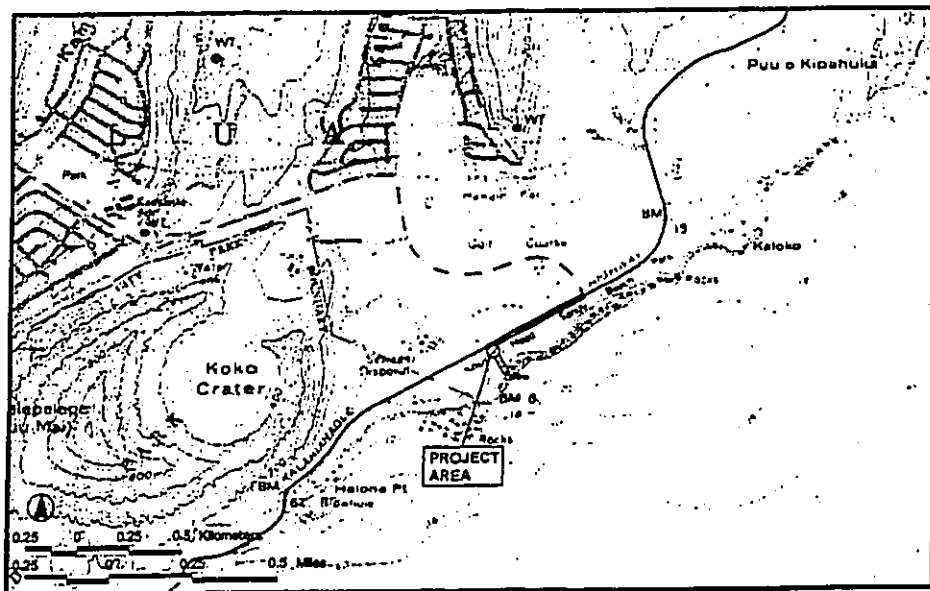


Figure 1 USGS Topographic Map, Koko Head Quad, showing the location of the project area.

4

RECEIVED AS FOLLOWS

Introduction

This scope of work also includes full coordination with the State Historic Preservation Division (SHIPD), and the City and County of Honolulu relating to archaeological matters. This coordination takes place after consent of the owner or representatives.

D. Methods

Background research included a review of previous archaeological studies on file at the State Historic Preservation Division of the Department of Land and Natural Resources, a review of geology and cultural history documents at Hamilton Library at the University of Hawai'i, the Hawai'i State Archives, the Mission House Museum Library, the Hawai'i Public Library, and the Archives of the Bishop Museum. Further research included a study of historic photographs at the Hawai'i State Archives and the Archives of the Bishop Museum, a study of historic maps at the Hawai'i State Archives and the Archives of the Bishop Museum, and a study of historic maps at the Survey Office of the Department of Accounting and General Services.

Information on Land Commission Awards was accessed through Waihoona Xina Corporation's Midfield Data Base (Waihoona Xina Corporation ([www.waihoona.com](http://www.waihoona.com))). A complete surface survey of the project area was conducted by Douglas Borthwick on November 4, 2002. The proposed cable landing manhole locale and the proposed cable routes within the beach park and along Kalani'ana'ole Highway were observed, recorded appropriately, and photographed.

Hawaiian organizations, agencies and community members were contacted in order to identify potentially knowledgeable individuals with cultural expertise and for knowledge of the study area and the surrounding vicinity. A discussion of the consultation process can be found in the following section on "Community Consultations". Please refer to Table 2 for a complete list of individuals and organizations contacted.

Oral interviews were conducted between June 2003 and July 2003 and subsequently transcribed. The informants were given the opportunity to read through the transcription and edit it. Then they signed an "Authorization for Release" form giving permission to Cultural Surveys Hawai'i, Inc. for the interviews to be used as part of this study. Excerpts from the interviews are used throughout this report, wherever applicable. The full transcripts of the interviews will be appended to this report as Appendix A, & B the release is given to us.

Introduction

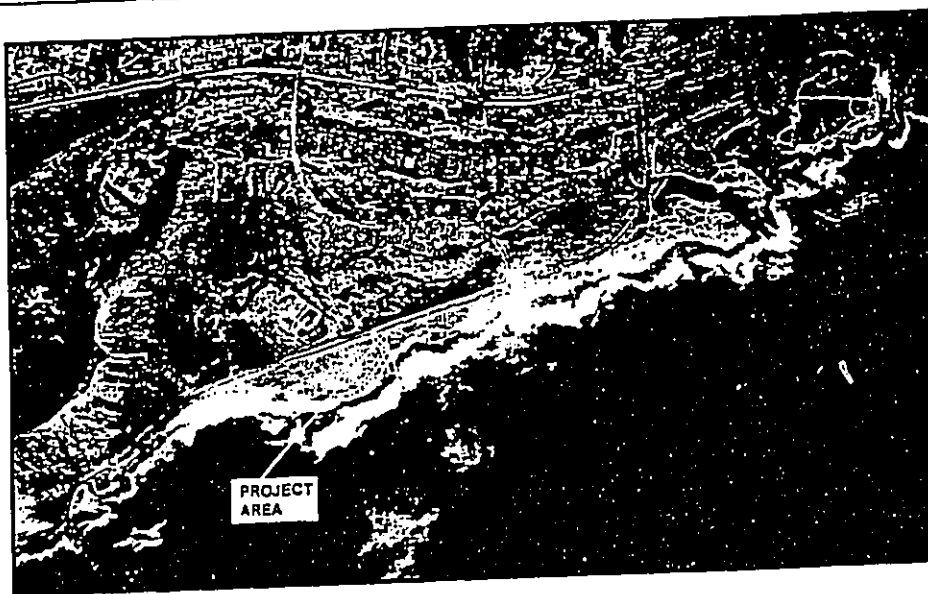


Figure 3 Aerial photograph showing the location of the project area.

## Historical Background

Kahakii died in 1794, splitting his kingdom between his sons Kalanikutule and Kaep. Kalanikutule briefly ruled O'ahu and Molohe'i before being defeated by Kamehameha in 1795 at the battle of Nu'uunu. Following this conquest Kamehameha followed custom and made a tour of the island he had conquered. Concerned that the productivity of the land be restored rapidly after the disruption of war, Kamehameha is said to have worked on several fishponds during his tour, including the Kuapa Fishpond at Maunaloa. Kamehameha did this to demonstrate to his people the importance of hard work and productivity (Takemoto 1975:16). One account cited in Handy and Handy (1972:485) describes the route that Kamehameha took in his work tour of the O'ahu. "... Kamehameha and his followers left Kailua and proceeded on to Waimanalo. From Waimanalo they went to Makapu'u and from there to Honolulu".

Kamehameha gave the 'iwi of Maunaloa to his faithful warrior Kuuileiani. However Kuuileiani lost his lands due to the indiscretions of his wife and Maunaloa reverted to Kamehameha's control (Takemoto 1975:19). Kamehameha next gave Maunaloa to his father-in-law Ke'eamoku (father of Ka'ahumanu). Ke'eamoku died in an epidemic (thought to be cholera) that passed through Maunaloa in 1804 (*Ibid.*). The population of Maunaloa including the eastern coastal area of O'ahu, may have been reduced drastically during this epidemic (Schmitt 1968:24 cited in Kelly *et al.* 1984:25). Following Ke'eamoku's death the ownership of Maunaloa passed on to Ka'ahumanu, his daughter. It was during this period that the land ownership of Maunaloa became tied to the title of premier. Ka'ahumanu passed the land ownership and title of premier to Kinau, a daughter of Kamehameha. Kinau in turn passed on both the land of Maunaloa and the title of premier to her daughter, Victoria Kamaunani (Takemoto 1975:20). It was Victoria Kamaunani who secured the land title of the 'iwi of Maunaloa during the Mahele.

John I'i, a member of Kamehameha's court, visited Maunaloa sometime around 1810. Traveling aboard the ship *Apuakehau* from Honolulu to the island of Hawaii, I'i stopped at Kawahoa--the landing at Maunaloa Bay that was a common stop-over point for inter-island and circle-island navigation at this time (I'i 1983:108). I'i also discusses the old trails systems extant on O'ahu "about" the year 1810. Regarding the route to southeast O'ahu from Honolulu, I'i notes several trails that met at "the sand and go along Kalia and so on to Maunaloa, to the sea of Kuko, to Makapu'u, and so on" (I'i 1983:94). Undoubtedly the route ran through Maunaloa, through Keakikipapa Valley, to Waimanalo via the cliff at the Waimanalo Gap. There are several accounts of early missionaries taking this route in their tours of O'ahu.

Gilbert Mathison most likely followed this same route during his excursion around the island of O'ahu in 1821. William Maunaloa he noted the large salt water lake (Kuapa Fishpond) around which he saw scattered approximately 100 huts. The people of the area were described as fishermen (Takemoto 1975:17).

In July and August of 1826 Ka'ahumanu made a tour of the island of O'ahu to talk with her subjects and preach the new Christian religion. In her company was the missionary Hiram Bingham, along with 200-300 other people. Bingham described the journey as follows:

"Avaling myself of the facilities thus afforded for our work, I made the tour with them [Ka'ahumanu's entourage], employing a month to good advantage, giving

## Historical Background

## II. HISTORICAL BACKGROUND

The history of Maunaloa has been well documented by the work of Marion Kelly (Kelly *et al.* 1984) and Anne Takemoto (1975). The following is a brief overview of the mythological accounts, oral traditions, and history of Maunaloa.

## E. Early Historic Period

During the inter-island warfare that preceded Kamehameha's unification of the Hawaiian archipelago, Maunaloa's natural harbors of Hanalei and Koko (Maunaloa Bay) were considered vulnerable points in the defense of O'ahu. Alapai, the 18th century *ali'i nui* of the island of Hawaii attempted an attack of O'ahu. After his warriors were driven back, first at Waikiki, then at Waialae, and then at Koko, Alapai's troops were beaten a final time at Hanalei Bay (Kamakau 1961:71 cited in Takemoto 1975:12). Following this successful defense of O'ahu, O'ahu's rulers maintained the rulership of their island for a number of years. However, in 1783, Kahakii, the King of Maui, defeated the forces of the ruler of O'ahu in a battle at Honolulu and took control of the island (*Ibid.*).

It was during the rule of Kahakii that the first Europeans landed and traded at Maunaloa. On June 1st, 1786 the English ships *King George* and *Queen Charlotte*, under the commands of captains Nathaniel Portlock and George Dixon, respectively, anchored in Maunaloa Bay. The next day in quest of water, Portlock and Dixon went ashore near Koko Head. They found a small, insufficient spring in the dry landscape 50 yards back from the coast--and were told that any substantial fresh water sources were a considerable distance westward. Traveling by boat northward from the first landing, Portlock and Dixon landed on a sand beach, where they were told that water sources were further to the west. Setting off on foot to the west along the beach with a guide, the landing party came up against a "salt water river" that stopped their progress along the coast. This salt water river is likely the waterway between Kuapa Fish Pond and Maunaloa Bay (Takemoto 1975:13-15). Returning to the boats, the landing party experienced difficult passages through the reef and trouble with waves. The captains realized too great an effort would be required to water at this location. Water was eventually purchased around Diamond Head, in Honolulu (*Ibid.*).

Informants told Portlock that Honolulu was a more populous, more productive place where plenty of hogs and vegetables could be obtained. However, because Portlock already had his needed supply of water, the ships remained in Maunaloa until June 5th (*Ibid.*). Portlock described the Maunaloa landing site as follows: "the low land and valleys being in a high state of cultivation, and crowded with plantations of taro, sweet potatoes, sugar cane, and interspersed with a great number of cocoa-nut trees" (Portlock 1968:74 cited in Takemoto 1975:14). Portlock and Dixon returned in November of the same year to a less hospitable welcome. Until King Kahakii's official visit the ships were placed under *tabu* and no commerce or visitors to the ships were allowed. A priest warned Portlock that Kahakii was considering attacking the ships. Kahakii was dissuaded by a demonstration of the power of the ship's guns. Following Kahakii's arms lesson, Portlock observed the demolition of a *heiau* on the shore--the same structure he had watched being constructed before his encounter with Kahakii. It appeared that Kahakii's plans for the structure were abandoned once he appraised the fighting potential of Portlock and Dixon's ships (Takemoto 1975:15).

RECEIVED AS FOLLOWS

Historical Background

"According to the last surviving *Lonaniana* of Maunaloa, sweet potatoes were grown in the small valleys, such as Kamilonui, as well as on the coastal plain. The plain below Kamiloiki and Kealakipapa was known as Ke-kula-o-Kamauiwai. This was the famous potato-planting place from which came the potatoes traded to ships that anchored off Haliatone in whaling days. The village at this place, traces of which may still be seen, was called *Wawanihu*" (Handy "Hawaiian Planter" Vol. 1, p. 155 cited in Sterling and Summers 1978:257).

Another similar village was located in Wainimalo, at the current site of Sea Life Park referred to as Kaupo, its proper name according to an official Bishop Estate map was Koanapou (McAllister 1933:193). Kelly (*et al.* 1984:25) suggests this village shared the cultivation lands of Kealakipapa Valley and coastal plain below with the inhabitants of Wainimalo, Kaho'ohalahai, and Ka'ili'i. Certainly the trail up the Makapu'u cliff at the Wainimalo gap would have provided easy access to these agricultural lands. When McAllister visited the ruins Kaupo/Koanapou in 1930 his informants said the village had been built during the small pox epidemic of 1853 (McAllister 1933:193). Kelly suggests, because of the sites excellent location and resources for a traditional Hawaiian village, that the village was abandoned during the early part of the 19th century and only re-inhabited in 1853 during the small pox epidemic (Kelly *et al.* 1984:25).

In the early historic period, the victualing trade was the life's blood for many traditional Hawaiian settlements, including those at Maunaloa. It maintained resident populations in areas that would have otherwise become depopulated under the dual effects of epidemics and the relocation of inhabitants to growing towns such as Honolulu (a fate that seems to have befallen Kaupo village). When the victualing trade gave out--settlement in these regions declined. By the early 1850s the hey-day of whaling was passing. In 1852 the Hawaiian government passed legislation requiring all foreign vessels to call at Honolulu where they could be taxed. This further reduced the number of ships that pulled in at smaller landing sites such as those at Maunaloa (Jones 1996:21; Takemoto 1975:20). "It is clear that Maunaloa lost much of its population and economic independence as an agricultural *ili* with the end of the whaling ships" (Takemoto 1975:25).

The depopulation of Maunaloa by the mid-18th century preceded and facilitated the replacement of traditional Hawaiian land use with ranching and commercial fishing.

F. Mid-1800s to 1900

After the mid-1800s, Maunaloa became predominantly ranch land for the next 80 years. Land ownership and land use rights were complicated through much of this period by numerous leases, frequent litigation, and the frequent deaths of land holders and/or lease-holders (Takemoto 1975:27).

Prior to the Mahele, the land of Maunaloa was part of the lands held by the premier. Ka'ahunanu had passed the land and title to Kinanu, who had in turn passed them on to Victoria Kamamalu (Takemoto 1975:20). On April 7, 1854, Kama'ehu was granted Land Commission Award 7713, the land title to Maunaloa. No *Ai'ikeua* land grants were awarded within this

Historical Background

my attention chiefly to preaching, and the care and establishment of schools, and reading the Scriptures . . . Several horses, two wagons, and two canoes, constituted the principal accommodations, as vehicles for parts of the company, much of the way. Most of the company travelled on foot, some making the whole circuit, of about one hundred and thirty miles, and some but smaller portions of it, as we passed round from Honolulu to the east, north, west, and south, then to the east again. . . . We spent a Sabbath at Kaneohe, and passed through Palikoolau . . . " (Bingham 1847:294-295)

From this account it is clear that Ka'ahunanu's party passed through Maunaloa and continued on through Wainimalo to reach Kane'ohu, where, after spending the Sabbath, they crossed the Ko'ohau Mountains via the Nu'uunu Pali. Unfortunately, no mention was made of the settlement and population of Maunaloa, or the Kealakipapa Road, although the party most certainly observed them. This testimony does indicate that this route around the southeast end of O'ahu was a commonly traveled one.

Levi Chamberlain made two tours of O'ahu (1826 and 1828) to inspect and bolster the newly founded mission schools. On Chamberlain's first trip around the island, he approached the settlement at Kuapa Fishpond (called Keawaawa) from Makapu'u. Chamberlain did address 30 people at what must have been a sizable village at Kuapa Fishpond (Handy and Handy 1972:483). Chamberlain suggests that during his visit much of the population was away cutting sandalwood, although Maunaloa had little in the way of sandalwood resources (Takemoto 1975:17). On his second trip, Chamberlain approached Maunaloa from Waialeale. His descriptions indicate Maunaloa was once populous. However, based on the decrease in student enrollment in the mission school over a four year period, the community was undergoing steady depopulation (Takemoto 1975:17-18).

During Chamberlain's first tour of O'ahu he described the road way or path at Kealakipapa leading down from the Wainimalo Gap (McAllister's site 3):

"(Leaving Makapu'u to cross Maunaloa) After descending gradually some distance over a raised walk formed of rocks and pieces of lava brought together for the natives the road took a turn in a west-south-west direction giving into the sea on the left and a ridge of barren hills on the right . . ." (Levi Chamberlain, "Trip around Oahu in 1826" cited in Sterling and Summers 1978:260).

Once the sandalwood gave out, economic activities of Hawaiian settlements focused on the cultivation of crops that could be exchanged with the foreign sailing vessels--in particular those of the whaling industry which had its boom period from 1820-1850 (Jones 1996:20; Takemoto 1975:18). Maunaloa was no exception. At least two settlements were active as anchorage and provisioning sites for foreign vessels in the early 19th century. Wainaloa village was located at Queen's Beach and exploited the famous sweet potato agricultural land of Kealakipapa Valley for cash/barter crops. At Kuapa Fishpond, Keawaawa village also raised trade crops for the whaling and trade vessels that anchored off Maunaloa for provisions.

Historical Background

overall land award--another indication that population may have declined drastically by the time of the Mahele.

In 1856, all of Maunaloa, except for the Kuapa Fishpond, was leased to William Webster--the government employee and land surveyor who had surveyed the region five years earlier and produced the region's first map. Webster used the land for ranching, adding it to the other lease hold land he used for ranching in Waialalo. When Webster died in 1864, the remainder of his Maunaloa lease was taken over by Manuel Paiko, who was leasing the adjacent lands at Kuliouou. Maunaloa continued to be used as ranch land.

Victoria Kamamalu mortgaged her lands in Maunaloa to Charles Bishop in order to pay off accumulated debts. When Kamamalu died in 1866, it fell to her father, Kekuanoa, to pay off the debts and the mortgage in order to be awarded the title to Maunaloa (Jones 1996:22-23; Takemoto 1975:21). With the death of Kekuanoa, the land of Maunaloa passed into the hands of Lot Kamehameha V. When Lot died without a will, the probate court decided that his half sister, Ruth Keelikolani, would inherit his entire land holdings. When Ruth died in 1883 Maunaloa was passed down to Bernice Pauahi Bishop. Bernice Pauahi Bishop was the last surviving Kamehameha and as a result inherited all of the Kamehameha lands, becoming the largest land-holder in the Kingdom of Hawai'i. When Bernice Pauahi Bishop died in 1884 her husband Charles Bishop, followed her will and set up the Bishop Estate Trust, of which Maunaloa became a part (Takemoto 1975:21-23). Maunaloa continued to be used as ranch land throughout this period.

The fishing rights to the Kuapa Fishpond and Maunaloa's offshore fishing grounds were important resources that were leased out to various parties from the time Victoria Kamamalu obtained the land title to Maunaloa. The Kuapa Fishpond was leased in 1856 at a high yearly sum for the time, indicating the value placed on fishing resources. The offshore fishing rights were leased and sold to various individuals until 1900 when Territorial and United States legislation began deconstructing the legality of the traditional idea of ownership of offshore fishing rights. It is clear from the high lease rates for the time period that the fishing resources of Maunaloa were productive and highly valued (Takemoto 1975:21-27).

The population of Maunaloa continued to decline during this period. Tax records show that in 1855 there were 38 households with 98 people living in Maunaloa. This fairly large population owned 68 houses as well as horses, mules and dogs. In 1860, Maunaloa had lost over half its population and held only 16 households. By 1870, there were only 6 households and population bottomed out in 1880 with only 4 households. This depopulation is undoubtedly the result, at least in part, of resettlement of inhabitants in more economically viable areas. These decreases in the number of households were accompanied by reductions in the numbers of horses, mules, and dogs--indicating a relatively impoverished population compared to the 1855 inhabitants of Maunaloa. In 1900, population had risen once again, however it is clear that traditional settlement and land use had been largely, if not entirely, replaced by ranching and commercial fishing activities (Takemoto 1975:24-25). Takemoto states:

"By 1900, Maunaloa Ranch and Yit Lee Company, who owned a big fishing complex, employed most of the inhabitants. Maunaloa Ranch had over 1500 head

Historical Background

of cattle, ten oxen, sixty-four horses, thirteen mules and six pigs roaming throughout Maunaloa. Five Chinese families were working for the Dairons (who held the lease for Maunaloa at the time), probably as ranch hands. Five other Chinese families worked for Yit Lee. The eight Hawaiian families on the land, including one blind man, were truck farmers of some sort since all but two owned carts used for bringing goods to Honolulu... Thus by the turn of the century most families in the *ili* were ranch hands, fishermen, or truck farmers living a relatively quiet life in an area which would be considered the country (1975:25)."

Maunaloa, from 1850 to 1900, witnessed the decline of traditional Hawaiian settlement, land use, and population and the rise of commercial ranching and fishing. Although no *Kulcuna* land grants were awarded within Maunaloa during the Mahele--the 1855 tax records indicate that it was populated and appeared to enjoy a degree of prosperity. Maunaloa's prosperity and population drastically declined until 1900, when tax records show an upturn of both based on commercial fishing and ranching.

G. Early 1900s To The Present

Maunaloa became more closely tied to the modern world after 1900. In 1906, the luxury steamer *Manchuria* ran aground off Waialalo. The result of the outcry that followed was the construction, in 1909, of the Makapu'u lighthouse--which then and now contains the largest magnifying lens of all U.S. lighthouses (Dean 1991:Part 14). In 1914, the Marconi Wireless Telegraph Company of America built a receiving station on the slopes of Koko Head on land that was leased from the Bishop Estate for 50 years. The station was built to receive messages 24-hours a day from San Francisco and was billed as the most powerful wireless station in the world. The station linked the Hawaiian Islands with the mainland and Asia on a 24-hour basis. Early in the 1920s, the Marconi station was taken over by the Radio Corporation of America and was used for transmission (Takemoto 1975:28).

Agriculture, in the form of truck farming and an agricultural school, increased in Maunaloa after the turn of the century. The Kamehameha School for boys ran an agricultural farm in Halaioune Valley with 45 acres for vegetables and 200 acres for livestock (Jones 1996:27). Truck farmers increased in number in the area as well, providing hogs, flowers, lettuce and other vegetables for the growing population of Honolulu. Much of the area around Kuapa Fishpond was occupied by truck farmers by the 1930s, and this type of farming would expand (Kelly *et al* 1984:47). By 1959 this truck farming community of over 170 families was producing 60 percent of Oahu's hogs and a similar percentage of flowers and lettuce (Takemoto 1975:28).

Maunaloa Ranch controlled most of the land of Maunaloa outside of the Kuapa Pond. From its inception in 1900 until it closed in 1926, over 1500 cattle made up the ranch's stock (Jones 1996:23). In 1920, the Maunaloa Ranch sublet parcels to the Honolulu Honey Company, Ltd., which had 8 apiaries. The ranch land also had charcoal makers harvesting *kiawe* during this time (Kelly *et al*. 1984:47).

The Maunaloa Ranch Co. closed in 1926 and their subletters were given direct leases from the land owner, Bishop Estate. Alan Davis and others were given a ranching lease in 1932. They started the Wāwāmalu Ranch. The Davis home and swimming pool were constructed near

Historical Background

the shore at Ka'i'i'i, while various ranch infrastructure, such as corrals, walls, and water tanks was situated at Kaloko (Kelly *et al.* 1984:56).

"The Alan Davis ranch house at Kaloko was the easternmost private residence on O'ahu during the 1930s and 1940s, until its destruction in the 1946 tsunami. Ranching didn't prove profitable enough, so the subsisting of Maunaloa land for truck and flower farms, chicken farms, and piggeries was expanded. Pig farmers and other were pushed out of the Hawaii Kai area and moved over the hill back of Koko Crater and into Kahana and Wāwāmalu Valleys. As farmers were evicted from other communities, such as when Wai'ale-Kamala, Waiūpe, and Niu were urbanized, more of them moved to Maunaloa with short-term leases" (Kelly *et al.* 1984:56).

The construction of Kalaniana'ole Highway through Maunaloa was finally completed in 1932, when the last stretch of road from Wainānalo to Wāwāmalu was completed. The bridge at Wāwāmalu was constructed in 1931. The coastal portions of this alignment of Kalaniana'ole Highway from Sandy Beach to Kaloko were washed out by the 1946 tsunami. The highway was reconstructed slightly further inland, with a new bridge at Wāwāmalu, between 1946 and 1948. Previous to the completion of Kalaniana'ole Highway through Maunaloa, there were unimproved roads that provided access to this easternmost part of O'ahu. These roads offered access to the primary resources/destinations within Maunaloa at this time period (just after the turn of the century). Roads to the coast undoubtedly were used for fishing and other marine exploitation. The roads also provided access for ranching, facilitating the construction and maintenance of needed infrastructure such as water tanks and fences. Finally, the lighthouse access road was important for communication with and resupply of the lighthouse caretaker and his family living out on Makapu'u Head.

In 1942 the Federal Aviation Administration receiver station was constructed in Wāwāmalu at the current location of the *makai* portions of the Hawaii Kai golf course. This facility allowed point to point communication with stations as far away as Samoa, Guam, and Tokyo. Known as the "Kaloko" facility it was moved to Moloka'i in 1962 (Kelly *et al.* 1984:56). The tsunami of 1946 was one of many that undoubtedly affected the coastal sections of Maunaloa to varying degrees. Previous to 1946, tsunami of similar scale occurred in 1837, April 2, 1868, and 1877. These tsunami are among the nearly 40 tsunami that were recorded to hit Hawai'i, with effects ranging from none to severe, between 1819 and 1946 (Shepard *et al.* 1950:400-1). Tsunami are known to scour coastlines by both washing material landward with the incoming waves as well as washing material seaward with the retreating waves. Coastal vegetation, coastline formation, and the force of the wave are some of the factors which influence the destructive force of tsunami (Shepard *et al.* 1950:460-2). At Queen's Beach the 1946 tsunami consisted of as many as 5 waves, which appeared to increase in destructive force. The following are descriptions of the destructive force of the tsunami in the vicinity of Queen's Beach--included are descriptions of the destruction of the Wāwāmalu Ranch buildings.

"On the north side of Makapu'u Head the highwater mark was 37 feet above normal, the highest for Oahu . . . At Kaiboko, a mile southwest of Makapu'u Point, the water rose only 15 feet but demolished a group of houses just inland from the

Historical Background

beach. In spite of the high seas which are characteristic of this area, the water came in rather gently, at least in the first two waves. Mr. A. S. Davis, whose home there was destroyed, waded to his armpits ahead of the advancing second wave, holding a picture above his head. This suggests that no great turbulence existed in this wave. The wreckage indicates that later waves probably were more violent. The houses were swept away and left as a heap of debris against a row of trees 500 feet inland. Southwest toward Koko Head the heights reached by the waves were greater, attaining a height of 31 feet near the famous Blow Hole. Much of the road was washed out in the area. The steep sand beach was greatly eroded, and a series of steep cusps with truncated ends was left" (Shepard *et al.* 1950:423).

"On April 1, 1946, one of the most destructive tsunami ever to hit the Hawaiian Islands destroyed the Wāwāmalu ranchhouse and several other neighboring buildings. On that morning, fortunately, all members of the Davis family were awake, preparing to leave for school or work. Mr. Davis had just finished shaving when he heard water rustling against the steel fence in his yard. He realized immediately that something was wrong and suspected a tsunami. His suspicions proved to be correct. The *paniolo* on the ranch drove his wife and baby up to Makapu'u Gap, and Mr. Davis followed in another car with his young daughter, Nancy. Then, between the third and fourth waves, Mr. Davis returned alone to his home, to make sure that everyone had vacated the area, to try and save the family's pets, and to salvage his personal belongings. The interior of the house was already a shambles and, as he was picking his way through the interior, the pointing banging on the wall, and ran for the road, wading knee-deep through turbulent water. He was so startled that he grabbed the object nearest him, a safety of the gap. He and his family watched the next wave totally demolish their house and roll up almost the entire length of Kealakipapa Valley. Fearing that the succeeding waves might wash up the entire length of the valley and spill through the gap into Makapu'u Beach, the whole group drove up to the lighthouse at the very top of Makapu'u Bluff" (Clark 1977:23).

With the devastating power to uproot portions of the paved road between Sandy Beach and Wāwāmalu, to destroy and push inland 500 feet the house and outbuildings of Wāwāmalu Ranch, and to inundate portions of Kealakipapa Valley, it is clear that the 1946 tsunami had sufficient force to damage and even obliterate the surface and subsurface archaeological remains of the Sandy Beach area.

Between 1932 and 1946, as has been noted earlier, ranching was less and less economically viable at Wāwāmalu Ranch. Increasingly ranch land was sublet to truck farmers, who were being displaced by the expansion eastward of Honolulu and its suburbs. This trend continued until 1959 when fewer leases were awarded and old leases were not renewed.

In 1959 the Hawaii Kai Development Corporation, a subsidiary of Kaiser Industries, received the development rights for Bishop Estate property in Maunaloa and the development of



RECEIVED AS FOLLOWS

Previous Archaeological Research

III. PREVIOUS ARCHAEOLOGICAL RESEARCH

The first archaeological survey in Maunaloa was conducted by McAllister (1933) in 1930. As part of his 9-month, island wide, archaeological survey of Oahu, McAllister located, mapped, and described 49 archaeological sites in the Maunaloa region. McAllister described sites of traditional Hawaiian origin as well as historic sites related to activities such as ranching and road construction. The traditional sites documented in the vicinity of the current project area, though none were located within the current project area, include: fishing shrimps, or *ku'ia*, a likely *ku'ia* remnant, house sites, a canoe house, and enclosures (historic ranching structures). These site and functional types documented by McAllister are typical of traditional Hawaiian coastal settlements, which generally had habitation near the marine resources being exploited, religious structures for supernatural assistance in fishing and other daily activities, canoe houses near natural landing sites, and burials and agricultural features adjacent to the settlement. The historic or historically utilized sites described by McAllister were sometimes traditional sites or features that were utilized or re-utilized, sometimes with changes in function or form, in the historic period.

It is clear from McAllister's site descriptions that settlement in the region prior to European contact was well established--if not exactly thriving. The archaeological documentation by McAllister correlates well with the mythological and traditional accounts of settlement in the area--i.e. the area was populated by coastal dwellers who harvested the sea and grew their crops on the plains and into the valleys of Maunaloa. From historical accounts and documents it is evident that change came about in the region with western contact. This change was noted by McAllister in terms of changing structural forms, rock stealing from older habitation sites, and the building of large enclosures for ranching.

Various archaeological studies have been conducted in the Maunaloa area following the survey by McAllister, including studies in the vicinity of the current project area (Table 1). However, the subsequent archaeological research was conducted following the 1946 tsunami. The tsunami is believed to have cleared the coastal areas of Maunaloa of any surface historic properties.

J.G. McAllister's survey was done prior to the 1946 tidal wave, and based on the number and type of sites he recorded elsewhere in Maunaloa, it would appear that had there been any surface sites at Sandy Beach, he would have recorded them. Subsurface testing within the park and adjacent to Kalani'ano'ole Highway also indicated the absence of subsurface cultural deposits (Bortolwick and Hamnatt 1992; Kennedy and Denham 1992).

Subsurface testing along the vehicle log barrier within Sandy Beach Park indicated an absence of subsurface cultural deposits in the eastern portion of the park adjacent to Kalani'ano'ole Hwy. \*No material of archaeological significance was found in any of the trenches and it is believed that modern highway construction and beach park landscaping, as well as excavating for water and electric lines has disturbed the upper portion of sand deposits that may once have contained archaeological material" (Hamnatt 1987). However, Hamnatt does suggest that "remnants of prehistoric sites may survive in other areas along this coast" (*ibid.*).

Historical Back ground

the planned community of Hawaii Kai began (Kelly *et al.* 1984:vi). Kuapa Fishpond was dredged to a consistent depth of six feet and dredge material was used to construct and reclaim land masses in the former swampy landscape. Large portions of former fishpond and ranch land were graded and prepared for construction of housing developments, golf courses, and shopping centers.

Since the 1960s Maunaloa has been part of the fast-paced urbanization of O'ahu. The Kuapa Pond, Kamilonui, and Kamiloiki areas are generally defined as Hawaii Kai. The Kalana Valley portion of Maunaloa includes housing and a golf course. Ridge top subdivisions are also progressing with Marine's Ridge (i.e. Kaluanui Ridge) and Kamehame Ridge. Sandy Beach Park, which was acquired from Bishop Estate in 1928, includes such improvements as parking lots, comfort stations, and landscaped areas. The improvements were begun in the 1960s. Presently Sandy Beach Park is one of the most heavily utilized beach parks on O'ahu.

Archaeological researchers, associated with the proposed eastward expansion of Sandy Beach Park, excavated 34 backhoe trenches and 50 auger holes. Backhoe excavation and augering were done in areas of active beach, as well as areas adjacent to park roadways and Kalani Anole Highway. Areas tested included sections in which the proposed fiber optic cable line will be located. The extensive testing by Archaeological Consultants did not discover "any significant historic remains" (Kennedy and Denham 1992:66). This was attributed "primarily to the building of the original and realigned Kalani Anole Highway" and tsunami action (*ibid*:1). In 1997, McDermott *et al.* conducted an archaeological inventory survey of the Queen's Beach area, immediately to the east of the current project area. A complete surface survey and subsurface testing did not encounter any cultural materials. The only site located was an historic road remnant (site 50-80-15-03).

Specific to the present project area was the archaeological assessment for the existing fiber optic cable landing at Sandy Beach (Borthwick and Hammit 1992). No cultural resources were identified in essentially the same corridor. Monitoring of the actual cable landing construction activities did not result in any finds.

RECEIVED AS FOLLOWS

Table 1 Previous Archaeological Studies in the Vicinity of the Project Area

Study	Location	Type	Findings
McAllister, J. Gilbert 1933	Maunaloa	Broad survey of sites	Various sites in Maunaloa, including house sites, <i>ko'u</i> , and enclosures
Takemoto <i>et al.</i> 1975	Kuapa Pond	Historical/cultural overview	Sites that Maunaloa area was not heavily populated in prehistoric times. Notes most of McAllister's sites were destroyed.
Kelly <i>et al.</i> 1984	Queen's Beach	Cultural resource overview	Located 3 of McAllister's Sites within Kealahou Valley
Hammit 1987	Sandy Beach	Assessment / subsurface testing	No cultural material observed
Kennedy and Denham 1992	Sandy Beach	Survey w/ subsurface testing	No cultural material observed
Borthwick and Hammit 1992	Sandy Beach	Assessment w/ subsurface testing	No cultural material observed
McDermott <i>et al.</i> 1997	Queen's Beach	Inventory Survey w/ subsurface testing	Located Site -50-80-15-03 (historic road remnant)

## IV. RESULTS OF COMMUNITY CONSULTATION

Throughout the course of this study, an effort was made to contact and consult with Hawaiian cultural organizations, government agencies, and individuals who might have knowledge of and/or concerns about traditional cultural practices specifically related to the project area. This effort was made by letter, e-mail, telephone or in-person contact. In the majority of cases, letters along with a map of the project area were mailed with the following text:

In collaboration with Wilson Okamoto & Associates, Inc. Cultural Surveys Hawaii is conducting a Cultural Impact Assessment for the proposed Sandwich Isles Fiber Optic Cable Landing at Maunaloa *Ahipua'a* District, O'ahu (TMK:3-9-12:02). A map and a preliminary land use overview were enclosed.

The purpose of this assessment is to identify any traditional cultural practices associated with the project area, past or present. We are seeking your *kōkua* and guidance regarding the following aspects of our study:

1. General history and present and past land use of the study area.
2. Knowledge of cultural sites which may be impacted by the project - for example, historic sites, archaeological sites, and burials.
3. Knowledge of traditional gathering practices in the study area - both past and on-going.
4. Cultural associations with the study area through legends, traditional use or otherwise.
5. Referrals of *hipuna* or anyone else who might be willing to share their general cultural knowledge of the study area.
6. Any other cultural concerns the community might have related to cultural practices in the Sandy Beach area.

The individuals, organizations, and agencies attempted to be contacted and the results of any consultation are presented in the table below. The two individuals listed who were interviewed for this study were all recommended by others on the contact list as having some personal knowledge - whether through residence, professional association, or cultural association

## V. RESULTS OF CONTACTS

Table 2 Community Contacts and Comments

Key:

Y=Yes

N=No

A=Attempted (at least 3 attempts were made to contact individual, with no response)

S=Some knowledge of project area

D=Declined to comment

U=Unable to contact, i.e., no phone or forwarding address, phone number unknown

NAME	AFFILIATION	CONTACTED	KNOWLEDGABLE OF PROJECT AREA	COMMENTS
Ayau, Butch	Local fisherman	Y	Y	He uses the area for fishing and diving. Made referral.
Aila, Ku'ulci	Waimānalo Hawaiian Civic Club	Y	S	Made referral
Aiu, Pua	Office of Hawaiian Affairs	Y	S	Made referral
Crosier, Bobo	Waimānalo resident	Y	Y	He used the area for fishing. He said there is a lot of fish in that area. Made referral
Davis, Ray	Local Fisherman	Y	S	He was throwing net in the area and caught <i>manini</i> , and other small reef fish. He does not see a problem with the cable line. Made referral
Erwin, Peter	Sandy Beach Lifeguard	Y	S	Left message
Phil Esterman	Save Sandy Beach Coalition	A	-	Good fishing for <i>mo'i, oia</i> and <i>reine</i>
Funai, Brain	Windward Casting Club	Y	Y	Left message
Goto, Rajih	Water Safety	Y	-	

RECEIVED AS FOLLOWS

RECEIVED AS FOLLOWS

Backgrounds of Kama'āina Interviewees

VI. BACKGROUNDS OF KAMA'ĀINA INTERVIEWEES

Kama'āina and kīpuna with knowledge of the Maunaloa area were interviewed for this assessment. The two interviewees were Helen Davis, and Ralph 'Hana' Hana'lei.

Helen Kapilliani Sanborn Davis

Helen Davis was born in Lihue, Kaua'i on September 22, 1907. She was raised in Hana'lei and later moved to Oahu to attend Punahoe. Mrs. Davis later married Alan Davis and lived at Wāwānalu Ranch near the present project area in the 40's and 50's. She has recently written a book about her life.

Ralph 'Hana' Hana'lei

Ralph Hana'lei is also known as Hana. He was born in 1929 on the island of O'ahu. Mr. Hana'lei attended Kaimuki High School and later became a Waikiki Beach Boy. He would visit Makapu'u and Sandy Beach area for fishing and diving. He is also an avid canoe paddler.

Results of Contacts

Henderson, Renny	Raised in Waimānalo	Y	Y	Kalana Valley was all pig farmers, and there was a bar named Okole Ma Luna near the road
Hewitt, Melvin	Parker Ranch Trustee, raised in Waimānalo	Y	Y	There was a lot of fish along the coast as well as <i>limu</i> , he also made referral
Ho, Wilson Kekoa	Waimānalo Neighborhood Board	Y	S	Made referral
Holi, Lamakani	Sandy Beach Lifeguard and resident of Waimānalo	Y	Y	Made referral
Hawai Fishing News	Contact: Chuck	Y	S	Made referral
Kaupiko, Lukela John	Hui Nalu Canoe Club	Y	-	No comment
Keoloha, Alma Kimi, Kalei	Kīpuna Oahu Island Burial Council	Y	Y	Made referral
Logan, David	Lifeguard	Y	S	He spoke about the different type's of <i>limu</i> in that area, and made a referral.
Nopoka, Nathan	Cultural and History Branch SHIPD	Y	Y	Made referral
Rodgers, T. Charlie	Hawai Kai Neighborhood Board	Y	N	He spoke about Pete's canoe landing site and made referral.
Slom, Sam	State Senate	Y	S	No comment and no problem with the cable line
Wong, Tony and Donna	Local residents	Y	Y	Never got back to us
Wright, Agnes Kainoa	Waimānalo Hawaiian Civic Club	A	-	They will get back to us. Left message

wasting Hi'iaka's gift of an *uhu* fish. Her brother, in failing to reach his sister before the sun came up, was subsequently turned to stone (Sterling and Summers 1978:260).

Hi'iaka was also involved with two *kupua* (supernatural beings) associated with the Makapu'u area, Makapu'u and Malei. Makapu'u was a supernatural woman of frightening appearance because of her many glowing eyes (Makapu'u means literally 'hill beginning' or 'bulging eye' (Pukui *et al.* 1974)). In one account Hi'iaka was traveling to O'ahu in a canoe with companions. When the canoe passed Makapu'u Point and was nearing the shore at Waimānalo, the *kupua* Makapu'u was sighted on the beach by the men on board. Although Hi'iaka invited all to have a meal with her friend Makapu'u, the men were too frightened and only willing to land on the Kona side of Makapu'u Point where they left Hi'iaka as they hurried away. Hi'iaka had to walk to Makapu'u, who had prepared a meal for them (Sterling and Summers 1978:257-258). Legend has it that the *kupua* Makapu'u came from Kahiki with the famous priest Pa'ao (Sterling and Summers 1978:258, quoting Green 1926:21). Another legend identifies Makapu'u as one of two sisters that came to O'ahu with the Kaua'i chief, Moikeha when he came from Kahiki (Kelly *et al.* 1984:4).

Malei is another female *kupua* associated with the Makapu'u area. She "assumed various bodily forms" and was associated with the *uhu* fish (Sterling and Summers 1978:258). The Malei stone was originally placed in the Waimānalo Gap overlooking Makapu'u. According to one legend, the Malei stone was placed at Makapu'u by Ai'ai, the son of the famous fish god, Ku'ula (Kelly *et al.* 1984:4).

"From Makapu'u to Hanalei Bay, the *uhu* fish multiplied under her (Malei's) care. When she was established on this land all the chiefs and commoners went to give offerings of leis made of *lipou* seaweed. They were placed on the stone Malei with prayers. The fisherman were lucky on these beaches and Malei was happy with her leis of *lipou* seaweed. . . . The stone Malei remained there for a long time at Makapu'u. The fisherman of Waimānalo constantly ascended the cliff at Makapu'u" (Sterling and Summers 1978:259).

According to legend, the Malei stone stood over Makapu'u until it was removed by John Cummings and taken to his house during the time of King Kalākaua. With Cummings' death the stone was returned only to be removed or thrown into the sea by a Makapu'u lighthouse keeper who died not long after (Kelly *et al.* 1984:4-5). By the time of McAllister's visit (1930) only a cement foundation remnant was visible at the previous location of the Malei stone (McAllister 1933:58-59).

Legend credits Hi'iaka with giving the *kupua* Makapu'u and Malei encouragement and advice. The region of Kākapapa Valley and Makapu'u lacked vegetable foods, which had to be supplied from adjacent Waimānalo. Hi'iaka encouraged the legendary women Malei and Makapu'u to cultivate the plain by planting sweet potatoes to relieve their hunger (Sterling and Summers 1978:257-258).

Maunaloa was traditionally "an *ihii* of the *ahupua'a* of Waimānalo and originally belonged to Ko'olaupoko district" (Sterling and Summers 1978:257). As a part of Ko'olaupoko,

### VII. TRADITIONS OF MAUNALUA

This section will express the different types of traditional practices, cultural resources and Mo'olelo associated with Maunaloa. Excerpts from interviews are incorporated throughout this section where applicable.

#### A. Mythological and Traditional Accounts

"Mauna-lua"—literally "two mountains" (Pukui *et al.* 1981:149) probably refers to Koko Head and Koko Crater, the prominent volcano remnants that dominate the landscape. It seems only fitting that the mythology of a region named after its two prominent volcanoes would contain references to the volcano goddess Pele. The mythical activities of Pele and her youngest sister Hi'iaka are the basis for many of the landmarks and place names in Maunaloa (Takemoto 1975:6). According to tradition, Pele and her supernatural brothers and sisters came to Hawai'i and began searching throughout the islands for a home. After investigating all of the islands, Pele eventually settled at Kīlauea on the island of Hawai'i. Being the goddess of fire and volcanoes, Pele was in constant strife with the god of forests and growing things, Kamapua'a. Maunaloa, as a more arid region, would be the domain of Pele, and the adjacent windward region of Ko'olaupoko would have been the domain of Kamapua'a (Kelly *et al.* 1984:23).

One mythical account of the inter-deity strife between Pele and Kamapua'a is tied to Koko Crater. Pele was once attacked by Kamapua'a near Kalapana, Hawai'i. In order to save Pele from being raped, Pele's sister Hi'iaka sent her *kohe iefe*, or flying vagina, as a lure to distract Kamapua'a and lead him away from the scene of the attack. The ploy worked and Kamapua'a followed the lure to Koko Crater, O'ahu, where it left an imprint, giving the volcano remnant its name, *Kohetepepe*, literally, vagina labia minor (Pukui *et al.* 1974:115 cited in Kelly *et al.* 1984:23).

Another Maunaloa location specifically tied to Pele mythology was a stone called *Kōwa'ōpepe*, "Pele's Canoe." Originally located on the Honolulu side of the Davis ranch house (at Kaloa), this rock had the mark from Pele's canoe when she landed after the Pele migration came to Maunaloa (Sterling and Summers 1978:260). The stone was washed away by the 1946 tsunami. Pele battled and conquered Namaka-o-Kaha'i, another goddess. The Namaka-o-Kaha'i stone at Hanalei Bay was left by the defeated goddess—but the landmark has since disappeared. "The stone was covered with dregs of *awa*, a narcotic drink made by chewing roots and used in religious ceremonies, which gave the dark stone a florescent glow in the night" (Summers and Sterling 1962:46 cited in Takemoto 1975:6).

At the southern end of Kapali o Kāmpoa stands the large geologic formation known as Pele's Chair or Pele's Throne. Clearly visible on its promontory, from a distance this natural formation looks like a throne and is said to be one of the places from which Pele departed O'ahu for other islands (James 1991:42).

Pele's youngest sister Hi'iaka, plays further roles in Maunaloa mythology. Before the 1946 tsunami, between Makapu'u Point and the Davis ranch house, were a set of stones. The story goes that the site of the "balancing stone" was made up of the lithified remains of a brother and sister from Maui who incurred the wrath of Hi'iaka. The woman was turned to stone first for

Traditions of Maunaloa

CSH: Did your Hawaiian neighbor Kanihohani pick *limu*?

ID: Sure he did *limu kohu*.

We did not come across anyone picking *limu* at this time but that does not mean that people do not gather *limu* today around the project area.

Ralph Hanalei and his family would go down to Sandy Beach area to gather *opihiki*:

RH: Well Kalamā was the appropriate name. We use to pick *opihiki*, dive.

CSH: What about *limu*?

RH: Not too much because it was rough.

CSH: Did your grandmother or anyone talk about things in that area?

RH: Well there was not much talk about stuff in that area. There were not much out there in Makapu'u and Kalamā Valley. It was trip just to go to Kailua you know to just go up the Pali it was an all day trip. We had the old cars you know the one with the wooden wheel. When we would come back we would not come up the Pali we would go all the way around.

CSH: So tell me a typical day going around Makapu'u side?

RH: It was a long trip the only thing you could see was bush all the way around.

An avid fisherman, diver, and body surfing who spends time along the Ka Iwi Coast shares the different types of fish that their family would gather:

....At Sandy Beach the difference is there's not a wide fringing reef that's shallow for people to dive in or be safe within and do all kinds of fishing. It's a gradual slope out to the Moloka'i channel there's a big open ocean. So again equipment, the types you know having no face mask, having no fins, not having the rubber for slings and stuff like that you tended not to dive in this type of open ocean environment. As equipment got better and everybody started getting masks and fins and everything pretty soon areas changed the areas of Sandy Beach, the Blow Hole, outside Hanalei Bay you know people were then starting to access those areas in the late 40's and early 50's. Pushing the limits of their new equipment. And started banging some big fish, you know spearing big *'uhua* and those kinds of things but the shallows reefs of Bellows and Kailua had the lobster holes and the *meripachi* holes and those kinds of things so it's different than you know the more open water kinds of things that you find at Sandy Beach.

Once they made the park it increased the traffic of body surfing, fishing and diving traffic at Sandy Beach because now you can just drive right to the edge of the beach and get out of the car and your at the beach. .... But in diving lots of people dove

Traditions of Maunaloa

Maunaloa surely had a trail that connected it with Waimanalo. The earliest communication between these two regions would have been through Kealakipapa Valley and down the Waimanalo Gap. Kealakipapa means literally "paved road", the road from Wāwāmalu to

Makapu'u (Pukui *et al.* 1974). This name implies that the Kealakipapa road (McAllister's site 3) could possibly be of prehistoric origin. Pukui (cited in Sterling and Summers 1978:260) believed the road was pre-European. Described as Kealanuikipapa, Pukui states that "an *alii* who lived at Wāwāmalu had the road built. He made the people who annoyed him build the road."

As *hi'ika* travels around Makapu'u she addresses herself to Makapu'u in a chant:

Noho ana Makapu'u i ka lae      Makapu'u dwells at the headland  
He waiho a ke akua polloi      Wife to the God Starvation  
Poloi 'aiolo make i ka polloi e-e      Hunger and death from starvation

Most of the legends that mention Maunaloa are about female deities. Pele, the goddess of the volcano has an encounter with Kaupua'a, as well as remnants of a canoe landing near Sandy Beach Park and a large rock that is said to be Pele's Throne. Maunaloa translated literal means two volcanoes. *Hi'ika* the sister of Pele is also mentioned along with two other deities Makapu'u and Maieai suggesting that this area has strong female ties to the land.

B. Ocean Resources

*Limu*

When this project started it was hard to find people who were knowledgeable about Sandy Beach area as we did few people spoke about the gathering of *limu*. Mr. Kalei Kimi was kind enough to send a response pertaining to the project area:

As I indicated, my grandparents moved onto the Waimanalo Homesteads about 1940, and an uncle still lives on the original homestead. In those days the ocean at Waimanalo was very very productive. Right off shore there were coral heads, coral reefs, and plenty of *limu* and fish. Occasionally, my family (grandma, grandpa, my mother and uncles) would go to Sandy Beach to gather *limu*. On the Allen Davis side of your project area my family would gather *waiwaihole*, *lipo'epo'e*, *tipa*, *manuca* and other varieties of *limu*. Also at the rocky ledges right past the beach area of Sandy Beach, and toward the blow hole, they would gather *limu kohu*. I'm aware that our family continued to gather *limu* in the area through the mid 1970's.

Mrs. Helan Davis also spoke about her Hawaiian neighbors at Wāwāmalu Ranch who use to gather *limu*.

CSH: Were there a lot of fishermen that came into the area?

ID: We kicked them out! Where we lived we did not allow them to fish. David Smith he was a great fisherman. He would throw net.

RECEIVED AS FOLLOWS

Traditions of Maunaloa

*Ku mai! Ku mai!*  
*Ka nalu nui mai kahiki mai*  
*'Alo pa' i pu*  
*Ku mai! Ku pohuehue*  
*Hui Kaiko'o loa*

*Ku mai, ku mai*  
*Ka nalu nui mai Kahiki mai*  
*Ka ipu nui lawe mai*  
*Ka ipu iki iwaihu aku*  
*Ho'a'e, ho'a'e ihuna*  
*I ka pohuehue*  
*Ku ipu nui lawe mai*  
*Ka ipu iki iwaihu aku*

*Arikel Arikel*  
 Great surfs from Kahiki  
 Waves break together!  
 Rise with the pohuehue  
 Well up, raging surf

*Stand, stand*  
 Waves from Kahiki  
 Bring the large wind-gourd  
 Leave the small one.  
 Go, go up to the beach  
 Morning glory  
 Bring the large wind-gourd  
 Leave the small one.

Sandy Beach is one of the most dangerous places to surf on the island of O'ahu. A regular at Sandy's expresses how technology has increased the amount of people at Sandy Beach:

So at Sandy Beach you'll find the regulars out there early in the morning and late in the evening when the crowds are building or the crowds are dying that's when the regulars are out there. And you get to have people that body surf Makapu'u regularly and people who body surf Sandy and they are very different kinds of breaks and different kinds of people you know that end up over there. And at Sandy Beach there wasn't any bathtubs no water no nothing. It was really just Koa Hiale and sand into where people drove quite a bit and just parked in the Koa Hiale. It wasn't long after that though that they paved the parking lot and put in the bath houses probably right at the late 60's also. And at that time they did quite a bit of bulldozing and created the big lawn areas that we see now. First off they just built the first bath house the closest one to the blow hole side and then eventually they built the other one and you know essentially Sandy Beach was much more utilized later than Makapu'u. And a lot of that, has to do with the equipment or lack of pretty much before World War II you know before the mid 40's because no one had fins really so the style of body surfing was much more the rolling breakers of say Makapu'u, or Bellows or places like that versus the sharp shore break and the tube ride, that came later at Sandy Beach..... So you know it was an area where young energetic lifeguards got a good start and it's obviously as we know one of the most dangerous if not the most dangerous beach in the entire state in terms of volume of people, people getting hurt etc. Because of the type of shore break action that it is at Sandy Beach is kind of broken down into surf areas with the area closest to the Blow Hole called Chambers and then you have Center Peak and next come Cobbles and then you have Half Point and then you have Full Point. And each of those has kind of a different little surf style and you know for the regulars there's certain guys that you know that surf at chambers virtually all the time no matter what's going on or people that take over center peak you know when it's happening etc. etc.. So Half Point and Full Point those aren't beach breaks those are over shallow reefs with a lot of current again the equipment the

Traditions of Maunaloa

along that coast right off again a little bit different from the barrier or fringing reefs you know of Bellows and Kailua but good diving it does have a relatively gentle slope out to the channel and lots of fish come in off of the channel so there's both reef fish and palagic fish as resources, people have always picked *opihii*, what's the purple one? The *ha'uki'uki* you know those are along that coast too. And of course kind of the most famous fishing along there is called Bamboo Ridge which is just town side, Hanamaia Bay side of the blow hole and obviously Bamboo Ridge because the bamboo pole well obviously their equipment has gotten a lot better and I doubt that you find to many bamboo poles at Bamboo Ridge anymore but that doesn't mean that people aren't pulling up big fish out of there which they did before. . . We would generally look for, so we were red fish you know looking for holes *menpochi*, *kumu* but occasionally we'd shoot an *uhu* or something like that actually out there I was never lucky enough to get *papio* or *'ulua* but we saw them as the rarer and you know that kind of thing but mainly just again reef fish specifically after *kumu* and *menpochi* and those kinds of fish generally.

So good fishing and one of the things to about Sandy Beach that I always liked was that virtually never ever having Portuguese Man -o- war or other kind of stinging jelly fish where anywhere on the windward coast, Makapu you can get stung Hanamaia Bay now has box jelly fish and you know so far because of this kind of open ocean and stuff blowing by you don't get 'em hanging out at Sandy Beach so I mean very rarely do you see a Portuguese Man-O-War or something like that at Sandy Beach....

Maunaloa is an area well known for its ocean resources, *imiu*, and different varieties of fish, *uhu*, *palani*, and *kolo*, and other types of reef fish. There are legends of Maunaloa that talk about the *uhu* and *tinu*. The Kupua Maici placed a stone near Wainanalo to give offering for a good catch of *uhu*. Fronting the project area is great resource for gathering fish.

C. Surfing

Sandy Beach Park is well known for the most dangerous place to body surf on the island of O'ahu. There is a very strong rip current that has taken many lives through out the years. Surfing and body surfing is a big part of this area.

Surfing (*Pae I Ka Nalu*) is not a new sport it was one of the most popular sports in the old days of Hawaii. It is said that Hawaiians would leave home, and work when they would hear the call "*Ua pi' i mai ka nalu!*" "Surf's up!" There was even a Hawaiian god that they would pray to bring on the required waves, *La'amaomao*. Fronting the project area is Sandy Beach, which is famous for its great surfing. The following are different versions of chants to call forth the waves Gutmanis 1983:

*'Alo, 'alo pa' i pu*  
*'Iuka I ka pohuehue*  
*Ka ipu nui lawe mai*  
*Ka ipu iki iwaihu aku*

Come break together,  
 Run up to the pohuehue vines  
 Bring the big wind calabash  
 Leave behind the small.

Traditions of Maunaloa

steepness and the whole concept of tube riding that you know really came pronounced in the 60's and 70's and obviously the 80's and on but you know you get Jerry Lopez riding the big tube at Pipeline well you know the people who went from Makapu'u to Sandy Beach to Point Panic and eventually they start body surfing you know Pipeline and places on the north shore to. So again it's unique to its own special ways of course you can go down there any day of the week and see hundreds of people getting their necks broken or whatever. It's quite the hang out and again the development of the park with the restrooms and parking lot right on the beach has made it extremely popular.

Sandy Beach will always be the gathering place for its uniqueness in many ways. This area will always be known for its harsh shore break, and a place where people from all over the world gather.

D. Burials

There were no documented burials within the project area and no one consulted mentioned any burials. The closest burial to the project area is in Wāwānalu which is documented by SHPD.

Pictures of Project Area



Figure 4 Photo showing the Sandy Beach Park shoreline in the area of the proposed fiber optic cable landing.



Figure 5 Photo showing the Sandy Beach Park access road in the area of the proposed fiber optic cable landing.

RECEIVED AS FOLLOWS



RECEIVED AS FOLLOWS

Summary and Recommendations

Summary and Recommendations

VIII. SUMMARY AND RECOMMENDATIONS

A. Summary

Historical background research for the Sandy Beach project area, located in the Maunaloa project area itself. In the surrounding area, however, background research indicated dry land type agriculture within Kalama Valley and Kanioloiki Valleys. Previous archaeological research indicates a small fishing related hamlet to the East at Kaloko (McAllister 1913). Recent subsurface testing for the Eastward expansion of Sandy Beach Park included some backhoe trenches and 50 auger holes with no significant finds (Kennedy and Denham 1992). Archaeological research specific to the present proposed cable landing locale for an existing cable landing infrastructure also did not encounter any historic properties (Borthwick and Hanumatt 1992).

Maunaloa was associated through mythological accounts with the volcano goddess Pele and her sister Hi'iaka. The fishing off shore was famous for the *uhu* fish which were caught in abundance under the blessings of the *kupua* Malei. Although the agricultural resources of this drier region could not offer the diversity of nearby, well-watered Waimānalo, Maunaloa was famous for its sweet potato cultivation, which cured the hunger of its populations. Maunaloa was traditionally part of the district of Ko'olaupoko and Kealahou Valley was the communication route between the two regions. McAllister's site 3 road way, by Pukui's testimony, may be prehistoric in origin, built on the commands of an *alii* who lived at Wāwānalu.

The *kama'āina* and *kūpuna* interviewed or consulted for this assessment had no specific information on any cultural practices (former or on-going), archaeological sites, trails, or burials specific to the shoreline landing locale. The interviewees and individuals consulted mentioned that the overall this is a good thing as long as it does not affect the ocean resources. The ocean resources include fishing, and gathering *limu* along with surfing. Most of the people consulted who spoke about fishing said that this area was a great place for all types of fish and gathering *limu*.

Based on background and previous archaeological research, no historic properties are anticipated in the proposed Sandwich Isles Cable Landing site or the associated subsurface conduit to, and along Kalaniana'ole Highway.

B. Recommendations

The specific concerns related to cultural issues noted by the interviewees as well as people consulted include:

1. A concern that the cable is free of harmful emissions.
2. The traditional cultural practices associated with this section of Sandy Beach was fishing, diving, and surfing. The concern is that installation of the cable does not affect the reef and fishing resources along with surfing through out the coast.
3. The installation of the cable should not affect the Pele's landing site that is inbedded in the reef.

It is recommended that these concerns be resolved through consultation and coordination with the Maunaloa community. If the concerns are addressed, the Maunaloa cable installation should not have any adverse impact upon native Hawaiian cultural resources, beliefs and practices.

RECEIVED AS FOLLOWS

References Cited

- Bingham, Hiram  
1947. *A Residence of Twenty-One Years in the Sandwich Islands*. Huntington, Hartford CN., Conyers, N.Y. (Praeger Publisher, Hartford 1923)
- Borthwick, Douglas and Hallett H. Hamnatt  
1992. *Archaeological Assessment of the Proposed Fiber Optic Cable Landing for East O'ahu, Sandy Beach Park, Maunaloa, District of Honolulu, O'ahu (TMK 3-9-12:02)*. Cultural Surveys Hawai'i, Kailua, HI.
- Borthwick, Douglas, John Wineski, Rodney Chiojioji, and Hallett H. Hamnatt  
1998. *Archaeological Inventory Survey of Eight Areas Within the Koko Head Regional Park, Maunaloa Ahupua'a, Island of O'ahu (TMK 3-9-12:1, 2, 4, 6, 8, 9, 10, 12, 13, 14&16)*. Cultural Surveys Hawai'i, Kailua, HI.
- Clark, John R. K.  
1977. *The Beaches of O'ahu*, University of Hawaii Press, Honolulu, HI.
- Davis, Helen Kapilani  
2000. *Helen Kapilani Samborn Davis: Reminiscences of a life in the Islands*, Native Books, Honolulu HI
- Dean, Love  
1991. *The Lighthouses of Hawai'i*, University of Hawaii Press, Honolulu, HI.
- Footle, Donald E., E.L. Hill, S. Nakamura and F. Stephens  
1972. *Soil Survey of the Islands of Kaula, Oahu, Maui, Molokai and Lanai, State of Hawaii*, U.S. Dept. of Agriculture, U.S. Government Printing Office, Washington, D.C.
- Giambelluca, Thomas W., Michael A. Nullet and Thomas A. Schroeder  
1986. *Rainfall Atlas of Hawai'i*, Department of Land and Natural Resources, Honolulu, HI.
- Hammatt, Hallett H.  
1987. Letter to Mr. James Given re: *Subsurface Testing for Vehicular Log Barrier Koko Head Sandy Beach Park, Maunaloa O'ahu (TMK 3-9-12:2, 3-9, & 15-1, 19 and 20)*. Cultural Surveys Hawai'i, Kailua, HI.
- Handy, E.S. Craighill  
1940. *The Hawaiian Planter*. Volume 1, Bishop Museum, Bulletin No. 161., Honolulu.
- Handy, E.S. Craighill and Elizabeth G. Handy  
1972. *Native Planters in Old Hawaii: Their Life, Lore, and Environment*, B.P. Bishop Museum Bulletin 233, B.P. Bishop Museum, Honolulu, HI.

References Cited

- 'I'i, John Papa  
1983. *Fragments of Hawaiian History*, Revised, Bishop Museum Press, Honolulu, HI.
- James, Van  
1991. *Ancient Sites of O'ahu: A Guide to Hawaiian Archaeological Places of Interest*. Bishop Museum Press Honolulu, HI.
- Jones, Bruce A.  
1996. *Aspects of Inland Settlement in the Hawaii Kai Region: Results of an Archaeological Inventory Survey of Nine Parcels, Ahupua'a of Maunaloa, Honolulu District, Island of Oahu, (TMK: 3-9-8: Par. 13 and 3-9-10: Par. 1), Aki Sinoto Consulting, Honolulu, HI.*
- Kamakau, Samuel Manaiakalani  
1961. *Ruling Chiefs of Hawaii*, The Kanehahala Schools Press, Honolulu, HI.
- Kelly, Marion, Hiro Kurashima, and Aki Sinoto  
1984. *"Cultural Resources Overview for the Queens Beach Park Feasibility Study, Maunaloa, Kona, Oahu"*
- Kennedy, Joseph and Tim Denham  
1992. *Inventory Survey and Subsurface Testing Report for an extension of Sandy Beach Park at Waimanalo (Awaow-Maui), Island of Oahu, District of Ko'olaupoko, Maunaloa Ahupua'a, TMK: 3-9-10:2 & 3, 3-9-12:2 and 3-9-15:1, 19 & 20, ACH Inc., Haliwa, HI.*
- McDermott Matthew J., Douglas F. Borthwick, and Hallett H. Hamnatt  
1997. *Archaeological Inventory Survey of the 166-Acre Queen's Beach Project Area, Ahupua'a of Maunaloa, Island of O'ahu (TMK 3-9-11)*. Cultural Surveys Hawai'i, Kailua, HI.
- Pukui, Mary K., Samuel H. Elbert and Esther Mookini  
1974. *Place Names of Hawaii*. University of Hawaii Press, Honolulu.
- Shepard, F.P., G.A. Macdonald and D.C. Cox  
1930. *The Tsunami of April 1, 1946*, University of California Press, Berkeley, CA.
- Starling, Elisabeth P. and Catherine C. Summers  
1978. *Sites of O'ahu*. Dept. of Anthropology, B.P. Bishop Museum, Honolulu.
- Takemoto, Anne H., Pauline King Joeger, Marie-Ellen Fong Mitchell, and Cassandra E. Boreng  
1975. *"Historical/Cultural Essay Report on the Kuapa Pond Area"* by Anne H. Takemoto, Pauline King Joeger, Marie-Ellen Fong Mitchell, and Cassandra E. Boreng

RECEIVED AS FOLLOWS

ARCHAEOLOGICAL INVENTORY SURVEY FOR THE  
PROPOSED SANDWICH ISLES FIBER OPTIC CABLE  
LANDING WITHIN SANDY BEACH PARK,  
AHUPUAHA OF MAUNALUA, ISLAND OF OAHU

(TMK 3-9-12:02)

by

Douglas F. Bortolwick, B.A.,  
Jesse Yurek, B.A.,  
Todd Tulchin, B.S.,  
&  
Hallett Hammett, Ph.D.

Prepared for  
Parsons, Brinckerhoff, Quade and Douglas, Inc.

by  
Cultural Surveys Hawai'i, Inc.  
August 2003

Table of Contents

TABLE OF CONTENTS

I.	INTRODUCTION	1
A.	Project Background	1
B.	Project Area Description	1
C.	Scope of Work	1
D.	Methods	5
II.	HISTORICAL BACKGROUND	6
A.	Mythological and Traditional Accounts	6
B.	Early Historic Period	8
C.	Mid-1800s to 1900	11
D.	Early 1900s To The Present	13
III.	PREVIOUS ARCHAEOLOGICAL RESEARCH	16
IV.	PREDICTIVE MODEL	18
V.	SURVEY RESULTS	19
VI.	RECOMMENDATIONS	22
VII.	REFERENCES CITED	23

LIST OF FIGURES

List of Figures

Figure 1 USGS Topographic Map, Koko Head Quad, showing the location of the project area..... 2

Figure 2 TMK 3-9-12, showing the location of the project area..... 3

Figure 3 Aerial photograph showing the location of the project area..... 4

Figure 4 Photo showing the Sandy Beach Park shoreline in the area of the proposed fiber optic cable landing..... 20

Figure 5 Photo showing the Sandy Beach Park access road in the area of the proposed fiber optic cable landing..... 20

Figure 6 Photo showing Kalaniana'ole Highway from the Sandy Beach Park access road to Kealahou Avenue..... 21

Figure 7 Photo showing the existing fiber optic cable manhole in the Sandy Beach Park shoreline area..... 21

LIST OF TABLES

Table 1 Previous Archaeological Studies in the Vicinity of the Project Area..... 17

RECEIVED AS FOLLOWS

I. INTRODUCTION

A. Project Background

The proposed East O'ahu Sandwich Isles Communication (SIC) Cable Landing site is located within Sandy Beach Park, Maunaloa, *Hinai'a*, Kona District, O'ahu Island. (TMK 3-9-12-02) (Figures 1-3). The proposed cable landing will come ashore near the Makapu'u (east) side entrance to Sandy Beach Park and then extend underground to Kalaniana'ole Highway. The proposed SIC cable landing is planned for a site that already contains fiber optic cable landing infrastructure. Archaeological research and monitoring related to the previous fiber optic cable landing construction documented no historic properties, which was one of the factors in the choice of this particular landing site for the SIC project.

B. Project Area Description

The proposed Sandy Beach Park fiber optic cable landing site is a 20 ft (6 m) corridor within the eastern section of the beach park. The corridor includes an approximately 100 ft (30 m) section within the active beach zone, and then parallels existing roadways of the beach park and Kalaniana'ole Hwy.

The project area consists of a portion of Sandy Beach Park and the adjoining Kalaniana'ole Highway on the coastline of Kalanua Valley, *ahupua'a* of Nounahua. This particular segment of Sandy Beach Park is known as Wāwāmalu Beach.

The elevation within the project area ranges from approximately 0-10 ft. (0-3 m) A.M.S.L. The sediments in the project area are of the Jaucas Sand (JaC) series and Rock Land (RL) series. (Foote *et al.* 1972). Rock outcrops account for about 50% of the project area. Jaucas Sand is an excessively drained sediment with rapid permeability. The project area receives approximately 24 in. (600 mm) of rainfall annually (Giambelluca *et al.* 1986:86).

C. Scope of Work

The following scope of work for the archaeological inventory survey was designed to meet and comply with State and County requirements:

1. Detailed historical research to include study of archival sources, historic maps, Land Commission Award documents and previous archaeological reports to construct a history of land use and to determine if archaeological sites have been recorded on or near this property.
2. Field inspection of the project area to identify any surface archaeological features and to investigate and assess the potential for impact to such sites. All identified sites would be located, described, and mapped with evaluation of function, interrelationships, and significance. Documentation will include photographs and scale drawings of selected sites and complexes. All sites will be assigned State site numbers.
3. As warranted by the results of the field inspection, limited excavation to evaluate the potential for subsurface cultural deposits. This excavation will be done by hand or

RECEIVED AS FOLLOWS

Introduction

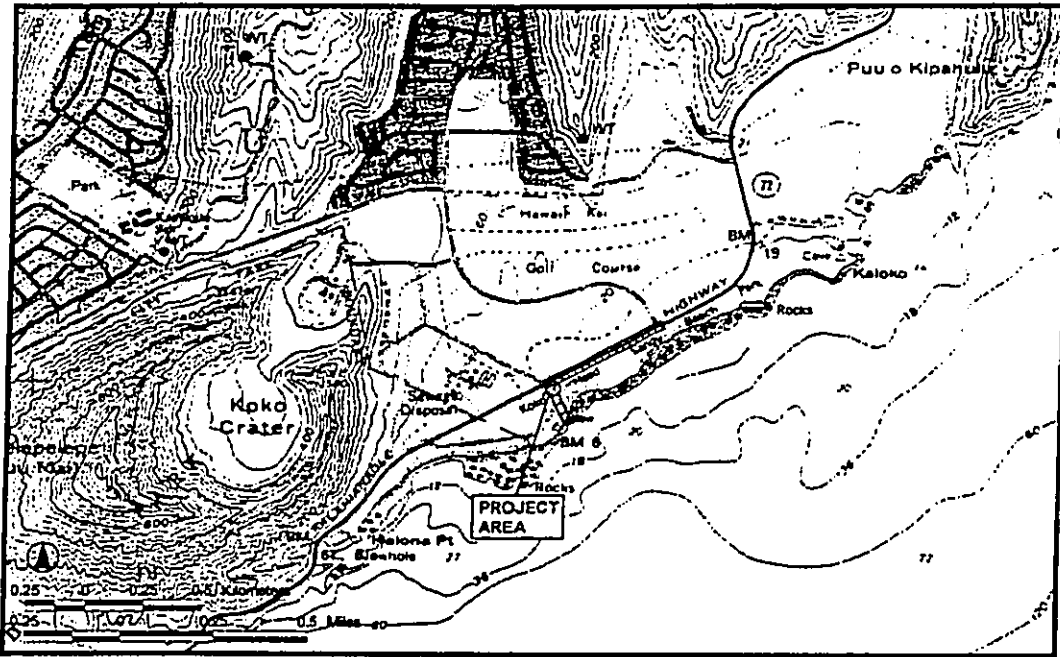


Figure 1 USGS Topographic Map, Koko Head Quad, showing the location of the project area.

2

Introduction

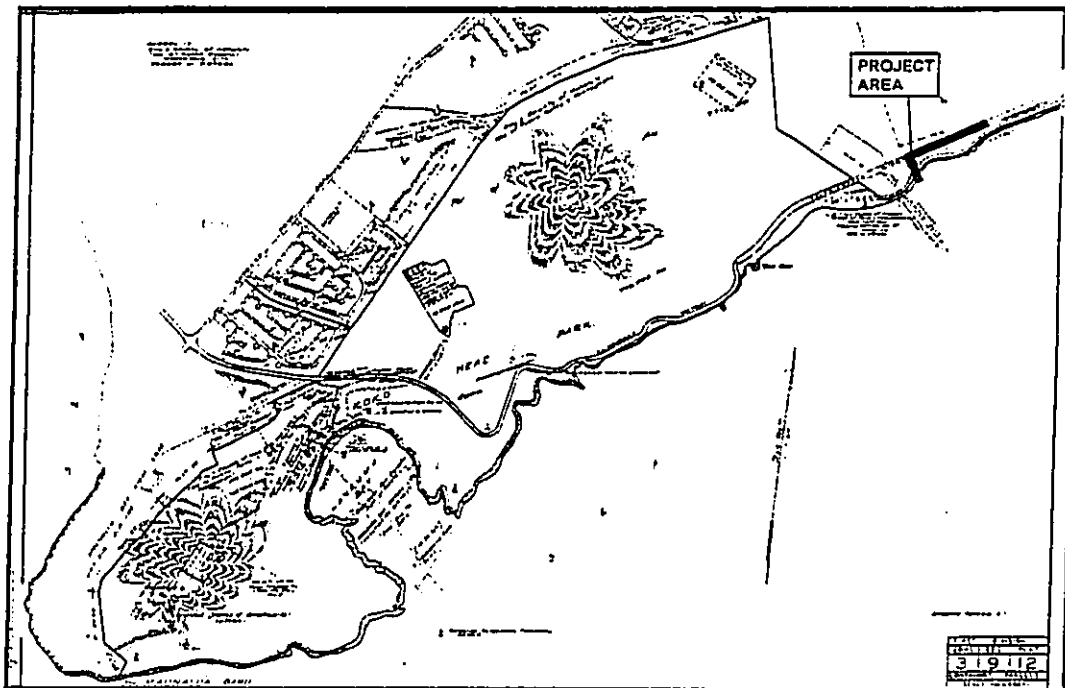


Figure 2 TMK 3-9-12, showing the location of the project area.

3

RECEIVED AS FOLLOWS

through mechanized excavation. Excavations will be documented with standard archaeological techniques.

4. If subsurface deposits are located, limited analysis of recovered materials will be called for.

5. Prepare a survey report which will include the following:

- a. A topographic map, if available, of the survey area showing all archaeological sites and site areas;
- b. Description of all archaeological sites with selected photographs, scale drawings, and discussions of function;
- c. Historical and archaeological background sections summarizing prehistoric and historic land use as they relate to the archaeological features;
- d. A summary of site categories and their significance in an archaeological and historic context;
- e. Recommendations based on all information generated which will specify what steps should be taken to mitigate impact of development on archaeological resources - such as data recovery (excavations) and preservation of specific areas. These recommendations will be developed in consultation with the client and the State agencies.

This scope of work also includes full coordination with the State Historic Preservation Division (SHIPD), and the City and County of Honolulu relating to archaeological matters. This coordination takes place after consent of the owner or representatives.

#### D. Methods

Background research included a review of previous archaeological studies on file at the State Historic Preservation Division of the Department of Land and Natural Resources, a review of geology and cultural history documents at Hamilton Library at the University of Hawaii, the Hawaii State Archives, the Mission House Museum Library, the Hawaii Public Library, and the Archives of the Bishop Museum. Further research included a study of historic photographs at the Hawaii State Archives and the Archives of the Bishop Museum, a study of historic maps at the Hawaii State Archives and the Archives of the Bishop Museum, and a study of historic maps at the Survey Office of the Department of Accounting and General Services.

Information on Land Commission Awards was accessed through Waialona Anna Corporation's *Māhala* Data Base (Waialona Anna Corporation ([www.waialona.com](http://www.waialona.com))).

A complete surface survey of the project area was conducted by Douglas Bondwick on November 4, 2002. The proposed cable landing manhole locale and the proposed cable routes within the beach park and along Kalanianaʻōhale Highway were observed, recorded appropriately, and photographed.

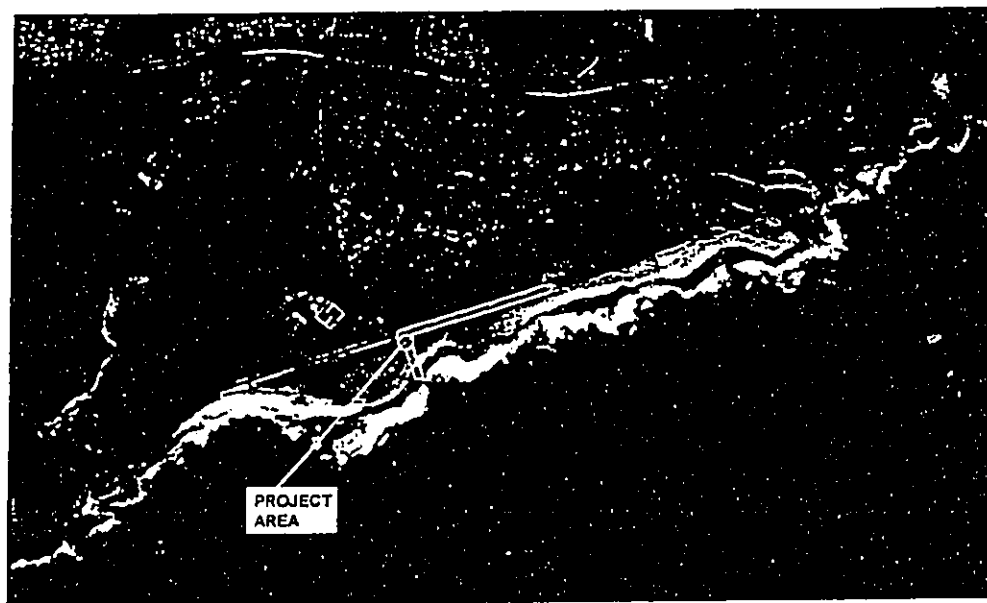


Figure 3 Aerial photograph showing the location of the project area.

RECEIVED AS FOLLOWS

Historical Background

wasting Hi'ika's gift of an *uhu* fish. Her brother, in failing to reach his sister before the sun came up, was subsequently turned to stone (Sterling and Summers 1978:260).

Hi'ika was also involved with two *kipua* (supernatural beings) associated with the Makapu'u area, Makapu'u and Malei. Makapu'u was a supernatural woman of frightening appearance because of her many glowing eyes. [Makapu'u means literally 'hill beginning' or 'bulging eye' (Pukui *et al.* 1974)]. In one account Hi'ika was traveling to O'ahu in a canoe with companions. When the canoe passed Makapu'u Point and was nearing the shore at Waimanalo, the *kipua* Makapu'u was sighted on the beach by the men on board. Although Hi'ika invited all to have a meal with her friend Makapu'u, the men were too frightened and only willing to land on the Kona side of Makapu'u Point where they left Hi'ika as they hurried away. Hi'ika had to walk to Makapu'u, who had prepared a meal for them (Sterling and Summers 1978:257-258). Legend has it that the *kipua* Makapu'u came from Kaliki with the famous priest Pa'ao (Sterling and Summers 1978:258, quoting Green 1926:21). Another legend identifies Makapu'u as one of two sisters that came to O'ahu with the Kawa'i chief, Moikeha when he came from Kaliki (Kelly *et al.* 1984:4).

Malei is another female *kipua* associated with the Makapu'u area. She "assumed various bodily forms" and was associated with the *uhu* fish (Sterling and Summers 1978:258). The Malei stone was originally placed in the Waimanalo Gap overlooking Makapu'u. According to one legend, the Malei stone was placed at Makapu'u by Ai'ai, the son of the famous fish god, Ku'ula (Kelly *et al.* 1984:4).

"From Makapu'u to Hanalei Bay, the *uhu* fish multiplied under her [Malei's] care. When she was established on this land all the chiefs and commoners went to give offerings of leis made of *lipua* seaweed. They were placed on the stone Malei with prayers. The fisherman were lucky on these beaches and Malei was happy with her leis of *lipua* seaweed. . . . The stone Malei remained there for a long time at Makapu'u. The fishermen of Waimanalo constantly ascended the cliff at Makapu'u" (Sterling and Summers 1978:259).

According to legend, the Malei stone stood over Makapu'u until it was removed by John Cummings and taken to his house during the time of King Kalakaua. With Cummings's death the stone was returned only to be removed or thrown into the sea by a Makapu'u lighthouse keeper who died not long after (Kelly *et al.* 1984:4-5). By the time of McAllister's visit (1930) only a cement foundation remnant was visible at the previous location of the Malei stone (McAllister 1933:58-59).

Legend credits Hi'ika with giving the *kipua* Makapu'u and Malei encouragement and advice. The region of Keelakipapa Valley and Makapu'u lacked vegetable foods, which had to be supplied from adjacent Waimanalo. Hi'ika encouraged the legendary women Malei and Makapu'u to cultivate the plain by planting sweet potatoes to relieve their hunger (Sterling and Summers 1978:257-258).

Maunaloa was traditionally "an *hi* of the *atupua*'u of Waimanalo and originally belonged to Ke'olapoko district" (Sterling and Summers 1978:257). As a part of Ke'olapoko, Maunaloa surely had a trail that connected it with Waimanalo. The easiest communication between these two regions would have been through Keelakipapa Valley and down the Waimanalo Gap. Keelakipapa means literally "paved road", the road from Waimanalo to Makapu'u (Pukui *et al.* 1974). This name implies that the Keelakipapa road (McAllister's site 3) could possibly be of

Historical Background

II. HISTORICAL BACKGROUND

The history of Maunaloa has been well documented by the work of Marion Kelly (Kelly *et al.* 1984) and Aime Takemoto (1975). The following is a brief overview of the mythological accounts, oral traditions, and history of Maunaloa.

A. Mythological and Traditional Accounts

"Maunaloa"--literally "two mountains" (Pukui *et al.* 1981:149) probably refers to Koko Head and Koko Crater. The prominent volcano remnants that dominate the landscape. It seems only fitting that the mythology of a region named after its two prominent volcanoes would contain references to the volcano goddess Pele. The mythical activities of Pele and her youngest sister Hi'ika are the basis for many of the landmarks and place names in Maunaloa (Takemoto 1975:6). According to tradition, Pele and her supernatural brothers and sisters came to Hawaii and began searching throughout the islands for a home. After investigating all of the islands, Pele eventually settled at Kilauea on the island of Hawaii. Being the goddess of fire and volcanoes, Pele was in constant strife with the god of forests and growing things, Kamaehu'a. Maunaloa, as a more arid region, would be the domain of Pele, and the adjacent windward region of Ko'olau would have been the domain of Kamaehu'a (Kelly *et al.* 1984:23).

One mythical account of the inter-deity strife between Pele and Kamaehu'a is tied to Koko Crater. Pele was once attacked by Kamaehu'a near Kalapana, Hawaii. In order to save Pele from being raped, Pele's sister Hi'ika sent her *kohe tele*, or flying vagina, as a lure to distract Kamaehu'a and lead him away from the scene of the attack. The ploy worked and Kamaehu'a followed the lure to Koko Crater, O'ahu, where it left an imprint, giving the volcano remnant its name, *Kohapelepele*, literally, vagina labia minor (Pukui *et al.* 1974:115 cited in Kelly *et al.* 1984:23).

Another Maunaloa location specifically tied to Pele mythology was a stone called *Kawa'upule*, "Pele's Canoe." Originally located on the Honolulu side of the Davis ranch house (at Kaloko), this rock had the mark from Pele's canoe when she landed after the Pele migration came to Maunaloa (Sterling and Summers 1978:260). The stone was washed away by the 1946 tsunami.

Pele battled and conquered Namaka-o-Kaha'i, another goddess. The Namaka-o-Kaha'i stone at Hanalei Bay was left by the defeated goddess--but the landmark has since disappeared. "The stone was covered with dregs of *awa*, a narcotic drink made by chewing roots and used in religious ceremonies, which gave the dark stone a florescent glow in the night" (Summers and Sterling 1962:46 cited in Takemoto 1975:6).

At the southern end of Kapali o Kama stands the large geologic formation known as Pele's Chair or Pele's Throne. Clearly visible on its promontory, from a distance this natural formation looks like a throne and is said to be one of the places from which Pele departed O'ahu for other islands (James 1991:42).

Pele's youngest sister Hi'ika, plays further roles in Maunaloa mythology. Before the 1946 tsunami, between Makapu'u Point and the Davis ranch house, were a set of stones. The story goes that the site of the "balancing stone" was made up of the identified remains of a brother and sister from Maui who incurred the wrath of Hi'ika. The woman was turned to stone first for

Historical Background

Portlock and Dixon returned in November of the same year to a less hospitable welcome. Until King Kamehameha's official visit the ships were placed under tabu and no commerce or visitors to the ships were allowed. A priest warned Portlock that Kamehameha was considering attacking the ships. Kamehameha was dissuaded by a demonstration of the power of the ship's guns. Following Kamehameha's arms lesson, Portlock observed the demolition of a *heiau* on the shore--the same structure he had watched being constructed before his encounter with Kamehameha. It appeared that Kamehameha's plans for the structure were abandoned once he appraised the fighting potential of Portlock and Dixon's ships (Takemoto 1975:15).

Kamehameha died in 1794, splitting his kingdom between his sons Kalanikupule and Kūao. Kalanikupule briefly ruled O'ahu and Molokai before being defeated by Kamehameha in 1795 at the battle of Nu'uanu. Following this conquest Kamehameha followed custom and made a tour of the island he had conquered. Concerned that the productivity of the land be restored rapidly after the disruption of war, Kamehameha is said to have worked on several fishponds during his tour, including the Kuapa Fishpond at Maunaloa. Kamehameha did this to demonstrate to his people the importance of hard work and productivity (Takemoto 1975:16). One account cited in Handy and Handy (1972:485) describes the route that Kamehameha took in his work tour of the O'ahu, "... Kamehameha and his followers left Kailua and proceeded on to Waimānalo. From Waimānalo they went to Makapuu and from there to Honolulu".

Kamehameha gave the *ʻiʻi* of Maunaloa to his faithful warrior Kūihelani. However Kūihelani lost his lands due to the indiscretions of his wife and Maunaloa reverted to Kamehameha's control (Takemoto 1975:19). Kamehameha next gave Maunaloa to his father-in-law Ke'eamoku (father of Ka'ahumanu). Ke'eamoku died in an epidemic (thought to be cholera) that passed through Maunaloa in 1804 (*Ibid.*). The population of Maunaloa including the eastern coastal area of O'ahu, may have been reduced drastically during this epidemic (Schmitt 1968:24 cited in Kelly *et al.* 1984:25). Following Ke'eamoku's death the ownership of Maunaloa passed on to Ka'ahumanu, his daughter. It was during this period that the land ownership of Maunaloa became tied to the title of premier. Ka'ahumanu passed the land ownership and title of premier to Kinau, a daughter of Kamehameha. Kinau in turn passed on both the land of Maunaloa and the title of premier to her daughter, Victoria Kaunamalu (Takemoto 1975:20). It was Victoria Kaunamalu who secured the land title of the *ʻiʻi* of Maunaloa during the Māhele.

John I'i, a member of Kamehameha's court, visited Maunaloa sometime around 1810. Traveling aboard the ship *Apuakehuanu* from Honolulu to the island of Hawaii, I'i stopped at Kawailoa--the landing at Maunaloa Bay that was a common stop-over point for inter-island and circle-island navigation at this time (I'i 1983:108). I'i also discusses the old trails systems extant on O'ahu "about" the year 1810. Regarding the route to southeast O'ahu from Honolulu I'i notes several trails that met at "the sand and go along Keahia and so on to Maunaloa, to the sea of Koko, to Makapuu, and so on" (I'i 1983:94). Undoubtedly the route ran through Maunaloa, through Kealahipapa Valley, to Waimānalo via the cliff at the Waimānalo Gap. There are several accounts of early missionaries taking this route in their tours of O'ahu.

Gilbert Mathison must likely followed this same route during his excursion around the island of O'ahu in 1821. Within Maunaloa he noted the large salt water lake (Kuapa Fishpond) around which he saw scattered approximately 100 huts. The people of the area were described as fishermen (Takemoto 1975:17).

Historical Background

preliterate origin. Pukui (cited in Sterling and Summers 1978:264) believed the road was pre-European. Described as Kealahipapa, Pukui states that "an *ali'i* who lived at Wāwānalu had the road built. He made the people who annoyed him build the road."

Summary

Maunaloa was associated through mythological accounts with the volcano goddess Pele and her sister Hi'aka. The fishing off shore was famous for the *ʻahi* fish which were caught in abundance under the blessings of the *kupua* Malei. Although the agricultural resources of this drier region could not offer the diversity of nearby, well-watered Waimānalo, Maunaloa was famous for its sweet potato cultivation, which cured the hunger of its populations. Maunaloa was traditionally part of the district of Ko'olaupoko and Kealahipapa Valley was the communication route between the two regions. McAllister's site 3 road way, by Pukui's testimony, may be prehistoric in origin, built on the commands of an *ali'i* who lived at Wāwānalu.

B. Early Historic Period

During the inter-island warfare that preceded Kamehameha's unification of the Hawaiian archipelago, Maunaloa's natural harbors of Hanaua and Koko (Maunaloa Bay) were considered vulnerable points in the defense of O'ahu. Alapai, the 18th century *ali'i nui* of the island of Hawaii attempted an attack of O'ahu. After his warriors were driven back, first at Waikiki, then at Waialae, and then at Koko, Alapai's troops were beaten a final time at Hanaua Bay (Kamakau 1961:71 cited in Takemoto 1975:12). Following this successful defense of O'ahu, O'ahu's rulers maintained the rulership of their island for a number of years. However, in 1783, Kamehameha, the King of Maui, defeated the forces of the ruler of O'ahu in a battle at Honolulu and took control of the island (*Ibid.*).

It was during the rule of Kamehameha that the first Europeans landed and traded at Maunaloa. On June 1st, 1786 the English ships *King George* and *Queen Charlotte*, under the commands of captains Nathaniel Portlock and George Dixon, respectively, anchored in Maunaloa Bay. The next day in quest of water, Portlock and Dixon went ashore near Koko Head. They found a small, insufficient spring in the dry landscape 50 yards back from the coast--and were told that any substantial fresh water sources were a considerable distance westward. Traveling by boat northward from the first landing, Portlock and Dixon landed on a sand beach, where they were told that water sources were further to the west. Setting off on foot to the west along the beach with a guide, the landing party came up against a "salt water river" that stopped their progress along the coast. This salt water river is likely the waterway between Kuapa Fish Pond and Maunaloa Bay (Takemoto 1975:13-15). Returning to the boats, the landing party experienced difficult passages through the reef and trouble with waves. The captains realized too great an effort would be required to water at this location. Water was eventually purchased around Diamond Head, in Honolulu (*Ibid.*).

Informants told Portlock that Honolulu was a more populous, more productive place where plenty of hogs and vegetables could be obtained. However, because Portlock already had his needed supply of water, the ships remained in Maunaloa until June 5th (*Ibid.*). Portlock described the Maunaloa landing site as follows: "the low land and valleys being in a high state of cultivation, and crowded with plantations of taro, sweet potatoes, sugar cane, and interspersed with a great number of cocoa-nut trees" (Portlock 1968:74 cited in Takemoto 1975:14).



RECEIVED AS FOLLOWS

Historical Background

"According to the last surviving *kūmāhine* of Maunaloa, sweet potatoes were grown in the small valleys, such as Kamihani, as well as on the coastal plain. The plain below Kamihani and Kealakipapa was known as Ke-kula-o-Kamāhāwai.

This was the famous potato-planting place from which came the potatoes traded to ships that anchored off Hālanone in whaling days. The village at this place, traces of which may still be seen, was called Wawāmalu" (Handy "Hawaiian Planter" Vol. 1, p. 155 cited in Sterling and Summers 1978:257).

Another similar village was located in Waimānalo, at the current site of Sea Life Park (see Jackson's 1884 map, Figure 11). Referred to as Kaupo, its proper name according to an official Bishop Estate map was Keapou (McAllister 1933:193). Kelly (*et al.* 1984:25) suggests this village shared the cultivation lands of Kealakipapa Valley and coastal plain below with the inhabitants of Wāwāmalu, Kahio'ohāhāi, and Ka'ili'i'i. Certainly the trail up the Makapu'u cliff at the Waimānalo gap would have provided easy access to these agricultural lands. When McAllister visited the ruins Kaupo/Keapou in 1930 his informants said the village had been built during the small pox epidemic of 1853 (McAllister 1933:193). Kelly suggests, because of the sites excellent location and resources for a traditional Hawaiian village, that the village was abandoned during the early part of the 19th century and only re-inhabited in 1853 during the small pox epidemic (Kelly *et al.* 1984:25).

In the early historic period, the victualing trade was the life's blood for many traditional Hawaiian settlements, including those at Maunaloa. It maintained resident populations in areas that would have otherwise become depopulated under the dual effects of epidemics and the relocation of inhabitants to growing towns such as Honolulu (a fate that seems to have befallen Kaupo village). When the victualing trade gave out--settlement in these regions declined. By the early 1850s the hey-day of whaling was passing. In 1852 the Hawaiian government passed legislation requiring all foreign vessels to call at Honolulu where they could be taxed. This further reduced the number of ships that pulled in at smaller landing sites such as those at Maunaloa (Jones 1996:24; Takemoto 1975:20). "It is clear that Maunaloa lost much of its population and economic independence as an agricultural *ifi* with the end of the whaling ships" (Takemoto 1975:25).

The depopulation of Maunaloa by the mid-18th century preceded and facilitated the replacement of traditional Hawaiian land use with ranching and commercial fishing.

C. Mid-1800s to 1900

After the mid-1800s, Maunaloa became predominantly ranch land for the next 80 years. Land ownership and land use rights were complicated through much of this period by numerous leases, frequent litigation, and the frequent deaths of land holders and/or lease-holders (Takemoto 1975:27).

Prior to the Mahele, the land of Maunaloa was part of the lands held by the premier. Ka'ahumanu had passed the land and title to Kīnuu, who had in turn passed them on to Victoria Kamaunala (Takemoto 1975:20). On April 7, 1854, Kamaunala was granted Land Commission Award 7713, the land title to Maunaloa. No *lifetennis* land grants were awarded within this overall land award--another indication that population may have declined drastically by the time of the Mahele.

Historical Background

In July and August of 1826 Ka'ahumanu made a tour of the island of O'ahu to talk with her subjects and preach the new Christian religion. In her company was the missionary Hiram Bingham, along with 260-300 other people. Bingham described the journey as follows:

"Awaiting myself of the facilities thus afforded for our work, I made the tour with them [Ka'ahumanu's entourage], employing a month to good advantage, giving my attention chiefly to preaching, and the care and establishment of schools, and reading the Scriptures . . . Several horses, two wagons, and two canoes, constituted the principal accommodations, as vehicles for parts of the company, much of the way. Most of the company travelled on foot, some making the whole circuit, of about one hundred and thirty miles, and some but smaller portions of it, as we passed round from Honolulu to the east, north, west, and south, then to the east again . . . We spent a Sabbath at Kaneohe, and passed through Paikoolau . . . " (Bingham 1847:294-295)

From this account it is clear that Ka'ahumanu's party passed through Maunaloa and continued on through Waimānalo to reach Kaneohe, where, after spending the Sabbath, they crossed the Ko'olau Mountains via the Nu'uau Pali. Unfortunately, no mention was made of the settlement and population of Maunaloa, or the Kealakipapa Road, although the party most certainly observed them. This testimony does indicate that this route around the southeast end of O'ahu was a commonly traveled one.

Levi Chamberlain made two tours of O'ahu (1826 and 1828) to inspect and bolster the newly founded mission schools. On Chamberlain's first trip around the island, he approached the settlement at Kuapa Fishpond (called Keawaawa) from Makapu'u. Chamberlain did address 30 people at what must have been a sizeable village at Kuapa Fishpond (Handy and Handy 1972:483). Chamberlain suggests that during his visit much of the population was away cutting sandalwood, although Maunaloa had little in the way of sandalwood resources (Takemoto 1975:17). On his second trip, Chamberlain approached Maunaloa from Waialeale. His descriptions indicate Maunaloa was once populous. However, based on the decrease in student enrollment in the mission school over a four year period, the community was undergoing steady depopulation (Takemoto 1975:17-18).

During Chamberlain's first tour of O'ahu he described the road way or path at Kealakipapa leading *Seawa* from the *Waimānalo* Gap (McAllister's site 3).

"Leaving Makapu'u to cross Maunaloa) After descending gradually some distance over a raised walk formed of rocks and pieces of lava brought together for the natives the road took a turn in a west-south-west direction giving me the sea on the left and a ridge of barren hills on the right . . ." (Levi Chamberlain, "Trip around Oahu in 1826" cited in Sterling and Summers 1978:260).

Once the sandalwood gave out, economic activities of Hawaiian settlements focused on the cultivation of crops that could be exchanged with the foreign sailing vessels--in particular those of the whaling industry which had its boom period from 1830-1850 (Jones 1996:20; Takemoto 1975:18). Maunaloa was no exception. At least two settlements were active as anchorage and provisioning sites for foreign vessels in the early 19th century. Wāwāmalu village was located at Queen's Beach and exploited the famous sweet potato agricultural land of Kealakipapa Valley for cash/barter crops. At Kuapa Fishpond, Keawaawa village also raised trade crops for the whaling and trade vessels that anchored off Maunaloa for provisions.

## Historical Background

In 1856, all of Maunaloa, except for the Kuapa Fishpond, was leased to William Webster—the government employee and land surveyor who had surveyed the region five years earlier and produced the region's first map. Webster used the land for ranching, adding it to the other lease field land he used for ranching in Waianānalo. When Webster died in 1864, the remainder of his Maunaloa lease was taken over by Manuel Paiko, who was leasing the adjacent lands at Kuliouou. Maunaloa continued to be used as ranch land.

Victoria Kamahele mortgaged her lands in Maunaloa to Charles Bishop in order to pay off accumulated debts. When Kamahele died in 1866, it fell to her father, Kekuanoa, to pay off the debts and the mortgage in order to be awarded the title to Maunaloa (Jones 1996:22-23; Takemoto 1975:21). With the death of Kekuanoa, the land of Maunaloa passed into the hands of Lot Kamehameha V. When Lot died without a will, the probate court decided that his half sister, Ruth Keelikohi, would inherit his entire land holdings. When Ruth died in 1883 Maunaloa was passed down to Bernice Pauahi Bishop. Bernice Pauahi Bishop was the last surviving Kamehameha and as a result inherited all of the Kamehameha lands, becoming the largest land-holder in the Kingdom of Hawai'i. When Bernice Pauahi Bishop died in 1884 her husband Charles Bishop, followed her will and set up the Bishop Estate Trust, of which Maunaloa became a part (Takemoto 1975:21-23). Maunaloa continued to be used as ranch land throughout this period.

The fishing rights to the Kuapa Fishpond and Maunaloa's offshore fishing grounds were important resources that were leased out to various parties from the time Victoria Kamahele obtained the land title to Maunaloa. The Kuapa Fishpond was leased in 1856 at a high yearly sum for the time, indicating the value placed on fishing resources. The offshore fishing rights were leased and sold to various individuals until 1900 when Territorial and United States legislation began deconstructing the legality of the traditional idea of ownership of offshore fishing rights. It is clear from the high lease rates for the time period that the fishing resources of Maunaloa were productive and highly valued (Takemoto 1975:21-27).

The population of Maunaloa continued to decline during this period. Tax records show that in 1855 there were 38 households with 98 people living in Maunaloa. This fairly large population owned 68 houses as well as horses, mules and dogs. In 1860, Maunaloa had lost over half its population and held only 16 households. By 1870, there were only 6 households and population bottomed out in 1880 with only 4 households. This depopulation is undoubtedly the result, at least in part, of resettlement of inhabitants in more economically viable areas. These decreases in the number of households were accompanied by reductions in the numbers of horses, mules, and dogs—indicating a relatively impoverished population compared to the 1855 inhabitants of Maunaloa. In 1900, population had risen once again, however it is clear that traditional settlement and land use had been largely, if not entirely, replaced by ranching and commercial fishing activities (Takemoto 1975:24-25). Takemoto states:

"By 1900, Maunaloa Ranch and Yit Lee Company, who owned a big fishing complex, employed most of the inhabitants. Maunaloa Ranch had over 1500 head of cattle, ten oxen, sixty-four horses, thirteen mules and six pigs roaming throughout Maunaloa. Five Chinese families were working for the Damons (who held the lease for Maunaloa at the time), probably as ranch hands. Five other Chinese families worked for Yit Lee. The eight Hawaiian families on the land, including one blind man, were truck farmers of some sort since all but two owned carts used for bringing goods to Honolulu. . . . Thus by the turn of the century

## Historical Background

most families in the *iti* were ranch hands, fishermen, or truck farmers living a relatively quiet life in an area which would be considered the country (1975:25)." Maunaloa, from 1850 to 1900, witnessed the decline of traditional Hawaiian settlement, land use, and population and the rise of commercial ranching and fishing. Although no *Kiikuna* land grants were awarded within Maunaloa during the Mahele—the 1855 tax records indicate that it was populated and appeared to enjoy a degree of prosperity. Maunaloa's prosperity and population drastically declined until 1900, when tax records show an upturn of both based on commercial fishing and ranching.

## D. Early 1900s To The Present

Maunaloa became more closely tied to the modern world after 1900. In 1906, the luxury steamer *Maunaloa* ran aground off Waianānalo. The result of the outcry that followed was the construction, in 1909, of the Makapu'u lighthouse—which then and now contains the largest magnifying lens of all U.S. lighthouses (Dean 1991:Part 14). In 1914, the Marconi Wireless Telegraph Company of America built a receiving station on the slopes of Koko Head on land that was leased from the Bishop Estate for 50 years. The station was built to receive messages 24-hours a day from San Francisco and was billed as the most powerful wireless station in the world. The station linked the Hawaiian Islands with the mainland and Asia on a 24-hour basis. Early in the 1920s, the Marconi station was taken over by the Radio Corporation of America and was used for transmission (Takemoto 1975:28).

Agriculture, in the form of truck farming and an agricultural school, increased in Maunaloa after the turn of the century. The Kamehameha School for boys ran an agricultural farm in Heleiaone Valley with 45 acres for vegetables and 200 acres for livestock (Jones 1996:27). Truck farmers increased in number in the area as well, providing hogs, flowers, lettuce and other vegetables for the growing population of Honolulu. Much of the area around Kuapa Fishpond was occupied by truck farmers by the 1930s and this type of farming would expand (Kelly *et al.* 1984:47). By 1959 this truck farming community of over 170 families was producing 60 percent of Oahu's hogs and a similar percentage of flowers and lettuce (Takemoto 1975:28).

Maunaloa Ranch controlled most of the land of Maunaloa outside of the Kuapa Pond. From its inception in 1900 until it closed in 1926, over 1500 cattle made up the ranch's stock (Jones 1996:23). In 1920, the Maunaloa Ranch sublet parcels to the Honolulu Haulage Company, Ltd., which had 8 apiaries. The ranch land also had charcoal makers harvesting *kinwe* during this time (Kelly *et al.* 1984:47).

The Maunaloa Ranch Co. closed in 1926 and their subletters were given direct leases from the land owner, Bishop Estate. Alan Davis and others were given a ranching lease in 1932. They started the Wāwāmalu Ranch. The Davis home and swimming pool were constructed near the shore at Ka'ili'i, while various ranch infrastructure, such as corrals, wall, and water tanks was situated at Kaloko (Kelly *et al.* 1984:56).

"The Alan Davis ranch house at Kaloko was the easternmost private residence on O'ahu during the 1930s and 1940s, until its destruction in the 1946 tsunami. Ranching didn't prove profitable enough, so the subleasing of Maunaloa land for truck and flower farms, chicken farms, and piggeries was expanded. Pig farmers and other were pushed out of the Hawaii Kai area and moved over the hill back of Koko Crater and into Kalama and Wāwāmalu Valleys. As farmers were evicted

## Historical Background

eroded, and a series of steep escarpments with truncated ends was left" (Shepard *et al.* 1950:423).

"On April 1, 1946, one of the most destructive tsunamis ever to hit the Hawaiian Islands destroyed the Wāwāmalu ranchhouse and several other neighboring buildings. On that morning, fortunately, all members of the Davis family were awake, preparing to leave for school or work. Mr. Davis had just finished shaving when he heard water rushing against the sisal fence in his yard. He realized immediately that something was wrong and suspected a tsunami. His suspicions proved to be correct. The *puniola* on the ranch drove his wife and baby up to Makapu'u Gap, and Mr. Davis followed in another car with his young daughter, Nancy. Then, between the third and fourth waves, Mr. Davis returned alone to his home, to make sure that everyone had vacated the area, to try and save the family's pets, and to salvage his personal belongings. The interior of the house was already a shambles and, as he was picking his way through the interior, the next wave struck. He was so startled that he grabbed the object nearest him, a painting hanging on the wall, and ran for the road, wading knee-deep through turbulent water. Soon after this wave receded, Mr. Davis once again reached the safety of the gap. He and his family watched the next wave totally demolish their house and roll up almost the entire length of Kealakekapa Valley. Fearing that the succeeding waves might wash up the entire length of the valley and spill through the gap into Makapu'u Beach, the whole group drove up to the lighthouse at the very top of Makapu'u Bluff" (Clark 1977:23).

With the devastating power to uproot portions of the paved road between Sandy Beach and Wāwāmalu, to destroy and push inland 500 feet the house and outbuildings of Wāwāmalu Ranch, and to inundate portions of Kealakekapa Valley, it is clear that the 1946 tsunami had sufficient force to damage and even obliterate the surface and subsurface archaeological remains of the Sandy Beach area.

Between 1932 and 1946, as has been noted earlier, ranching was less and less economically viable at Wāwāmalu Ranch. Increasingly ranch land was sublet to truck farmers, who were being displaced by the expansion eastward of Honolulu and its suburbs. This trend continued until 1959 when fewer leases were awarded and old leases were not renewed.

In 1959 the Hawaii Kai Development Corporation, a subsidiary of Kaiser Industries, received the development rights for Bishop Estate property in Maunaloa and the development of the planned community of Hawaii Kai began (Kelly *et al.* 1984:vi). Kuapa Fishpond was dredged to a consistent depth of six feet and dredge material was used to construct and reclaim land masses in the former swammy landscape. Large portions of former fishpond and ranch land were graded and prepared for construction of housing developments, golf courses, and shopping centers.

Since the 1960s Maunaloa has been part of the fast-paced urbanization of O'ahu. The Kuapa Point, Kanihonui, and Kanihonui areas are generally defined as Hawaii Kai. The Kalanua Valley portion of Maunaloa includes housing and a golf course. Ridge top subdivisions are also progressing with Mainer's Ridge (i.e. Kalanui Ridge) and Kaitiama Ridge. Sandy Beach Park, which was acquired from Bishop Estate in 1928, includes such improvements as parking lots, comfort stations, and landscaped areas. The improvements were begun in the 1960's. Presently Sandy Beach Park is one of the most heavily utilized beach parks on O'ahu.

## Historical Background

from other communities, such as when Wai'alea-Kamala, Wailupe, and Nihi were urbanized, more of them moved to Maunaloa with short-term leases" (Kelly *et al.* 1984:56).

The construction of Kalaniana'ole Highway through Maunaloa was finally completed in 1932, when the last stretch of road from Wāwāmalu to Wāwāmalu was completed. The bridge at Wāwāmalu was constructed in 1931. The coastal portions of this alignment of Kalaniana'ole Highway from Sandy Beach to Kaloko were washed out by the 1946 tsunami. The highway was reconstructed slightly further inland, with a new bridge at Wāwāmalu, between 1946 and 1948.

Previous to the completion of Kalaniana'ole Highway through Maunaloa, there were unimproved roads that provided access to this easternmost part of O'ahu. These roads offered access to the primary resources/activities within Maunaloa at this time period (just after the turn of the century). Roads to the coast undoubtedly were used for fishing and other marine exploitation. The roads also provided access for ranching, facilitating the construction and maintenance of needed infrastructure such as water tanks and fences. Finally, the lighthouse access road was important for communication with and resupply of the lighthouse caretaker and his family living out on Makapu'u Head.

In 1942 the Federal Aviation Administration receiver station was constructed in Wāwāmalu at the current location of the *maka'i* portions of the Hawaii Kai golf course. This facility allowed point to point communication with stations as far away as Samoa, Guam, and Tokyo. Known as the "Kaloko" facility it was moved to Mōkai'i in 1962 (Kelly *et al.* 1984:56).

The tsunami of 1946 was one of many that undoubtedly effected the coastal sections of Maunaloa to varying degrees. Previous to 1946, tsunami of similar scale occurred in 1837, April 2, 1868, and 1877. These tsunamis are among the nearly 40 tsunamis that were recorded to hit Hawaii'i, with effects ranging from none to severe, between 1819 and 1946 (Shepard *et al.* 1950:400-1). Tsunami are known to scour coastlines by both washing material landward with the rushing waves as well as washing material seaward with the retreating waves. Coastal vegetation, coastline formation, and the force of the wave are some of the factors which influence the destructive force of tsunami (Shepard *et al.* 1950:460-2). At Queen's Beach the 1946 tsunami consisted of as many as 5 waves, which appeared to increase in destructive force. The following are descriptions of the destructive force of the tsunami in the vicinity of Queen's Beach--included are descriptions of the destruction of the Wāwāmalu Ranch buildings.

"On the north side of Makapu'u Head the highwater mark was 37 feet above normal, the highest for Oahu . . . At Kaloko, a mile southwest of Makapu'u Point, the water rose only 15 feet but demolished a group of houses just inland from the beach. In spite of the high seas which are characteristic of this area, the water came in rather gently, at least in the first two waves. Mr. A. S. Davis, whose home there was destroyed, waded to his armpits ahead of the advancing second wave, holding a picture above his head. This suggests that no great turbulence existed in this wave. The wreckage indicates that later waves probably were more violent. The houses were swept away and left as a heap of debris against a row of trees 500 feet inland. Southwest toward Koko Head the heights reached by the waves were greater, attaining a height of 31 feet near the famous Blow Hole. Much of the road was washed out in the area. The steep sand beach was greatly

## III. PREVIOUS ARCHAEOLOGICAL RESEARCH

The first archaeological survey in Maunaloa was conducted by McAllister (1933) in 1930. As part of his 9-month, island wide, archaeological survey of Oahu, McAllister located, mapped, and described 49 archaeological sites in the Maunaloa region. McAllister described sites of traditional Hawaiian origin as well as historic sites related to activities such as ranching and road construction. The traditional sites documented in the vicinity of the current project area, though none were located within the current project area, include: fishing shrimps, or *ko'u*, a likely *heiau* remnant, house sites, a canoe house, and enclosures (historic ranching structures). These site and functional types documented by McAllister are typical of traditional Hawaiian coastal settlements, which generally had habitation near the marine resources being exploited, religious structures for supernatural assistance in fishing and other daily activities, canoe houses near natural landing sites, and burials and agricultural features adjacent to the settlement. The historic or historically utilized sites described by McAllister were sometimes traditional sites or features that were utilized or re-utilized, sometimes with changes in function or form, in the historic period.

It is clear from McAllister's site descriptions that settlement in the region prior to European contact was well established--if not exactly thriving. The archaeological documentation by McAllister correlates well with the mythological and traditional accounts of settlement in the area--i.e. the area was populated by coastal dwellers who harvested the sea and grew their crops on the plains and into the valleys of Maunaloa. From historical accounts and documents it is evident that change came about in the region with western contact. This change was noted by McAllister in terms of changing structural forms, rock stealing from other habitation sites, and the building of large enclosures for ranching.

Various archaeological studies have been conducted in the Maunaloa area following the survey by McAllister, including studies in the vicinity of the current project area (Table 1). However, the subsequent archaeological research was conducted following the 1946 tsunami. The tsunami is believed to have cleared the coastal areas of Maunaloa of any surface historic properties.

J.G. McAllister's survey was done prior to the 1946 tidal wave, and based on the number and type of sites he recorded elsewhere in Maunaloa, it would appear that had there been any surface sites at Sandy Beach, he would have recorded them. Subsurface testing within the park and adjacent to Kalani'ano'ole Highway also indicated the absence of subsurface cultural deposits (Borthwick and Hammat 1992; Kennedy and Denham 1992).

Subsurface testing along the vehicle log barrier within Sandy Beach Park indicated an absence of subsurface cultural deposits in the eastern portion of the park adjacent to Kalani'ano'ole Hwy. "No material of archaeological significance was found in any of the trenches and it is believed that modern highway construction and beach park landscaping, as well as excavating for water and electric lines has disturbed the upper portion of sand deposits that may once have contained archaeological material" (Hammat 1987). However, Hammat does suggest that "remnants of prehistoric sites may survive in other areas along this coast" (*Ibid.*).

Archaeological researchers, associated with the proposed eastward expansion of Sandy Beach Park, excavated 34 backhoe trenches and 50 auger holes. Backhoe excavation and augering were done in areas of active beach, as well as areas adjacent to park roadways and Kalani'ano'ole

Table 1 Previous Archaeological Studies in the Vicinity of the Project Area

Study	Location	Type	Findings
McAllister, J. Gibben 1933	Maunaloa	Broad survey of sites	Various sites in Maunaloa, including house sites, <i>ko'u</i> , and enclosures
Takenoto <i>et al.</i> 1975	Kuapua Pond	Historical/cultural overview	States that Maunaloa area was not heavily populated in prehistoric times. Notes most of McAllister's sites were destroyed.
Kelly <i>et al.</i> 1984	Queen's Beach	Cultural resource overview	Located 3 of McAllister's Sites within Kealakipapa Valley
Hammat 1987	Sandy Beach	Assessment / subsurface testing	No cultural material observed
Kennedy and Denham 1992	Sandy Beach	Survey w/ subsurface testing	No cultural material observed
Borthwick and Hammat 1992	Sandy Beach	Assessment w/ subsurface testing	No cultural material observed
McDermott <i>et al.</i> 1997	Queen's Beach	Inventory Survey w/ subsurface testing	Located Site 50-80-15-03 (historic road remnant)

Highway. Areas tested included sections in which the proposed fiber optic cable line will be located. The extensive testing by Archaeological Consultants did not discover "any significant historic remains" (Kennedy and Denham 1992:66). This was attributed "primarily to the building of the original and realigned Kalani'ano'ole Highways" and tsunami action (*Ibid.*).

In 1997, McDermott *et al.* conducted an archaeological inventory survey of the Queen's Beach area, immediately to the east of the current project area. A complete surface survey and subsurface testing did not encounter any cultural materials. The only site located was an historic road remnant (site 50-80-15-03).

Specific to the present project area was the archaeological assessment for the existing fiber optic cable landing at Sandy Beach (Borthwick and Hammat 1992). No cultural resources were identified in essentially the same corridor. Monitoring of the actual cable landing construction activities did not result in any finds.

RECEIVED AS FOLLOWS

V. SURVEY RESULTS

An archaeological inventory survey of the project area was conducted on November 4, 2002 by Douglas F. Borthwick, B.A.. The survey consisted of a complete surface inspection of the proposed cable landing manhole locale, cable route within the beach park, and the cable route along Kalani'ana'ole Highway to Kealahou Avenue (see Figures 1-3).

The shoreline area of the proposed cable landing, from the water line to the beach park access road, is an active beach zone (Figure 4). The park access road is a graded, asphalt-paved right-of-way with concrete curbing and a concrete culvert below the road near the proposed landing locale (Figure 5). The Kalani'ana'ole Highway portion of the proposed route is from the eastern (or Makapu'u side) entrance to Sandy Beach Park, extending to Kealahou Avenue. The right-of-way is a slightly elevated berm in this stretch of the highway, indicating grubbing, grading and filling activities during highway construction (Figure 6).

During the survey of the immediate shoreline area, the existing fiber optic cable manhole was observed (Figure 7). The existing fiber optic cable infrastructure was installed in 1992 with no impacts to cultural resources.

Also observed during the shoreline survey were two "ray net" and "spearfish" fishermen preparing to enter the water. They indicated that they were not "regulars" at this portion of Sandy Beach Park but came and fished "occasionally." They were unaware of the existing fiber optic cable infrastructure.

The proposed subsurface route of the cable within the beach park is in an area that has been modified significantly for roadway and beach park construction. The original (ca. 1930-1946) Kalani'ana'ole Highway alignment was further *maka'i ika'i* in the existing stretch of the highway. Remnants of the asphalted "old road" can still be seen within the beach park just East of the Makapu'u (East) side entrance to the park. The "old road" modified the landscape of the vicinity of the interior beach access road and proposed fiber optic cable route. The major tidal wave (tsunami) of 1946 did extensive damage to the highway and the Alan Davis Ranch at Kaloko (i.e. Queens Beach). The ranch was abandoned but the highway was realigned and rebuilt. Thus, another episode of major land modification occurred along the proposed cable route. In the 1960s, Sandy Beach Park was developed into what we see at the present time: paved roadways, comfort stations, grassed lawns and subsurface utilities, which represents another episode of major land modification. The above mentioned episodes of mechanical land modification were all evident during the survey.

No significant historic properties were identified within the proposed cable landing locale or the proposed route within the beach park and Kalani'ana'ole Highway. The landing locale is at the interface of the active beach zone and terrestrial alluvial soils.

IV. PREDICTIVE MODEL

Based on background and previous archaeological research, no historic properties are anticipated in the proposed Sandwith Isles Cable-Landing Site or the associated subsurface conduit to, and along Kalani'ana'ole Highway. Background research indicated dry land type agriculture within Kalama Valley and Kanihiki Valleys. Previous archaeological research indicates a small fishing related hamlet to the East at Kaloko (McAllister 1933). Recent subsurface testing for the Eastward expansion of Sandy Beach Park included some backhoe trenches and 50 auger holes with no significant finds (Kennedy and DeBlam 1992). Archaeological research specific to the present proposed cable landing locale for existing cable landing infrastructure also did not encounter any historic properties (Borthwick and Hammatt 1992).

RECEIVED AS FOLLOWS



Figure 6 Photo showing Kalamianacle Highway from the Sandy Beach Park access road to Kealahou Avenue.



Figure 7 Photo showing the existing fiber optic cable manhole in the Sandy Beach Park shoreline area.



Figure 4 Photo showing the Sandy Beach Park shoreline in the area of the proposed fiber optic cable landing.

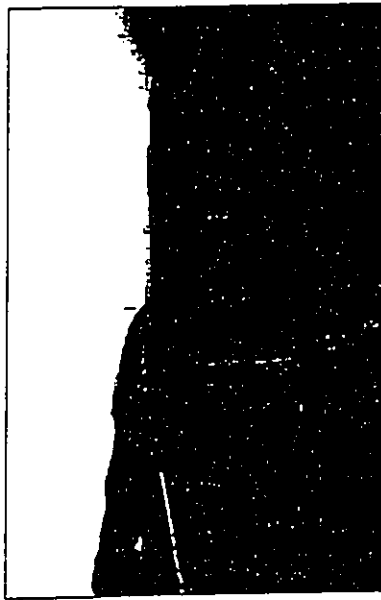


Figure 5 Photo showing the Sandy Beach Park access road in the area of the proposed fiber optic cable landing.

RECEIVED AS FOLLOWS

Recommendations

V. RECOMMENDATIONS

It is the opinion of CSH that the construction activities associated with the proposed SIC Fiber Optic Cable Landing project will have "no effect" on any cultural or historic properties in the project area. Based on the historic documentation regarding the devastating effects of the 1946 tsunami, the lack of cultural material observed in previous archaeological studies in the vicinity of the project area, the major mechanical alterations associated with road building and parks infrastructure, as well as the current surface survey conducted during this study, it is anticipated that no cultural material will be encountered.

Should historic remains such as artifacts, burials, concentrations of shell or charcoal be encountered during construction activities, work shall cease immediately in the immediate vicinity of the find, and the find shall be protected from further damage. The contractor shall immediately contact the State Historic Preservation Division (692-8015), which will assess the significance of the find and recommend an appropriate mitigation measure, if necessary.

References Cited

VI. REFERENCES CITED

- Bingham, Hiram  
1847 *A Residence of Twenty-One Years in the Sandwich Islands*, Huntington, Hartford  
CN., Convers, N.Y. [Praeger Publisher, Hartford 1822]
- Borthwick, Douglas and Hallett H. Hammatt  
1992 *Archaeological Assessment of the Proposed Fiber Optic Cable Landing for East Oahu, Sandy Beach Park, Maunaloa, District of Honolulu, Oahu (TMK 3-9-12:02)*. Cultural Surveys Hawai'i, Kailua, HI.
- Borthwick, Douglas, John Wineski, Rodney Chiojioji, and Hallett H. Hammatt  
1998 *Archaeological Inventory Survey of Eight Areas Within the Koko Head Regional Park, Maunaloa Ahupua'a, Island of Oahu (TMK 3-9-12:1, 2, 4, 6, 8, 9, 10, 12, 13, 14&16)*. Cultural Surveys Hawai'i, Kailua, HI.
- Clark, John R. K.  
1977 *The Beaches of Oahu*, University of Hawaii Press, Honolulu, HI.
- Dean, Love  
1991 *The Lighthouses of Hawaii*, University of Hawaii Press, Honolulu, HI.
- Foots, Donald E., E.L. Hill, S. Nakamura and F. Stephens  
1972 *Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii*, U.S. Dept. of Agriculture, U.S. Government Printing Office, Washington, D.C.
- Giambelluca, Thomas W., Michael A. Nullet and Thomas A. Schroeder  
1986 *Rainfall Atlas of Hawaii*, Department of Land and Natural Resources, Honolulu, HI.
- Hammatt, Hallett H.  
1987 Letter to Mr. James Given re: *Subsurface Testing for Vehicular Log Barrier Koko Head Sandy Beach Park, Maunaloa Oahu (TMK 3-0-12:2:3-9, & 15-1, 19 and 20)*. Cultural Surveys Hawai'i, Kailua, HI.
- Handy, E.S. Craighill  
1940 *The Hawaiian Planter*. Volume 1, Bishop Museum, Bulletin No. 161., Honolulu.
- Handy, E.S. Craighill and Elizabeth G. Handy  
1972 *Native Planters in Old Hawaii: Their Life, Lore, and Environment*, B.P. Bishop Museum Bulletin 233, B.P. Bishop Museum, Honolulu, HI.
- \*Ti, John Papa  
1983 *Fragments of Hawaiian History*. Revised, Bishop Museum Press, Honolulu, HI.

RECEIVED AS FOLLOWS

References Cited

- James, Van  
1991 *Ancient Sites of O'ahu: A Guide to Hawaiian Archaeological Places of Interest.*  
Bishop Museum Press Honolulu, HI.
- Jones, Bruce A.  
1996 *Aspects of Island Settlement in the Hawaii Kai Region: Results of an Archaeological Inventory Survey of Nine Parcels, Ahupua'a of Maunaloa, Honolulu District, Island of Oahu. (TMK: 3-9-8: Par. 13 and 3-9-10: Par. 1), Aki Sinoto Consulting, Honolulu, HI.*
- Kamakau, Samuel Manaiakalani  
1961 *Ruling Chiefs of Hawaii.* The Kamehameha Schools Press, Honolulu, HI.
- Kelly, Marion, Hiro Kurashima, and Aki Sinoto  
1984 "Cultural Resources Overview for the Queens Beach Park Feasibility Study."  
*Maunaloa, Kona, Oahu*
- Kennedy, Joseph and Tim Denham  
1992 *Inventory Survey and Subsurface Testing Report for an extension of Sandy Beach Park at Waimanalo (Awaunalo), Island of Oahu, District of Ko'olaupoko, Maunaloa Ahupua'a, TMK: 3-9-10:2 & 3, 3-9-12:2 and 3-9-15:1, 19 & 20, ACH Inc., Haleiwa, HI.*
- McDermott Matthew J., Douglas F. Borthwick, and Hallett H. Hammett  
1997 *Archaeological Inventory Survey of the 166-acre Queen's Beach Project Area, Ahupua'a of Maunaloa, Island of O'ahu (TMK 3-9-11).* Cultural Surveys Hawaii'i, Kailua, HI.
- Pukui, Mary K., Samuel H. Elbert and Esther Mookini  
1974 *Place Names of Hawaii.* University of Hawaii Press, Honolulu.
- Shepard, F.P., G.A. Macdonald and D.C. Cox  
1950 *The Tainani of April 1, 1946.* University of California Press, Berkeley, CA.
- Sterling, Elspeth P. and Catherine C. Sumners  
1978 *Sites of O'ahu.* Dept. of Anthropology, B.P. Bishop Museum, Honolulu.
- Takemoto, Anne H., Pauline King Joerger, Marie-Ellen Fong Mitchell, and Cassandra E. Barenz  
1975 *"Historical/Cultural Essay Report on the Kiupa Pond Area"* by Anne H. Takemoto, Pauline King Joerger, Marie-Ellen Fong Mitchell, and Cassandra E. Barenz



RECEIVED AS FOLLOWS

XAMANEK RESEARCHIES  
P.O. BOX 880131  
PUKALANI, MAUI, HI 96788  
Phone/Fax: 572-8900  
Phone/Fax: 572-6118

Parsons Brinckerhoff Quade & Douglas, Inc.  
Pacific Tower, Suite 3000  
1001 Bishop Street  
Honolulu, Hawaii 96813  
Fax: 808-528-2368

Attn.: Mr. Jason Yazawa

10 October 2003

Subject: Letter report on cultural impact assessment for the proposed Sandwich Isles Communications (SIC) fiber optics Oneali'i landing site at Oneali'i Homesteads, Makakupa'ia ahupua'a, Island of Moloka'i (TMK 5-4-06: 19).

Dear Mr. Yazawa,

Per your request, I am providing you with a memorandum regarding the cultural impact assessment for the proposed SIC landing site project at Oneali'i Homesteads on the island of Moloka'i. The study area is located *makai* (south) of Kamehameha V Highway and lies to the west of Ali'i Fishpond (Figure 1). The Department of Hawaiian Homelands (DHHL) currently owns the parcel that is adjacent and west of a portion of this fishpond. A possible extension of the wall of this fishpond forms much of the *makai* border of the DHHL property.<sup>1</sup> The level c. 1.5-acre portion of land is presently vacant and appears to have been impacted by land clearing activities in the past. However, several mature coconut or *niru* (*Cocos nucifera*) trees are located on the southeastern portion of the DHHL property.

In addition to the coconut trees, one abandoned concrete building and an apparent concrete trough are located on the southeastern portion of the parcel. The DHHL parcel is bounded by a private residence on the west, a private residence and a portion of the Ali'i Fishpond on the east, the ocean to the south, and the highway to the north.

The Oceanic Institute utilized this DHHL parcel as a staging area when the Institute carried out some restoration of the Ali'i fishpond in the 1970s. Some of the restoration activities apparently included dredging of the western section of the pond in c. 1972, as well as some limited aquaculture production. It appears that the dredging spoil

<sup>1</sup>This fishpond is identified as TMK 5-4-06: 25, and is owned by the State of Hawaii. This fishpond was previously designated State Inventory of Historic Places Number 50-60-02-133. The overall fishpond appears to be in generally fair to good condition, although the eastern portion of it has silted in.

<sup>2</sup>This wall terminates near the western side of the DHHL parcel where a possible drainage area, impacted by fill from an adjacent lot, runs along the western side of DHHL parcel.

was deposited on the parcel. It is assumed that the abandoned concrete building and trough are remnants from the Oceanic Institute's use of the parcel in the 1970s.

We conducted an archaeological assessment of the Area of Potential Effect (APE) in early 2003. In addition, we also monitored soil testing that Geolabs, Inc. carried out in the APE. This soil testing was monitored in order to obtain a subsurface sample of a portion of the APE project area. There was no evidence of an intact subsurface cultural layer located during the monitoring of the soil coring that was carried out. Results indicate that substantial amounts of apparently naturally deposited silty sand and coralline gravel are contained under the surface of the APE.

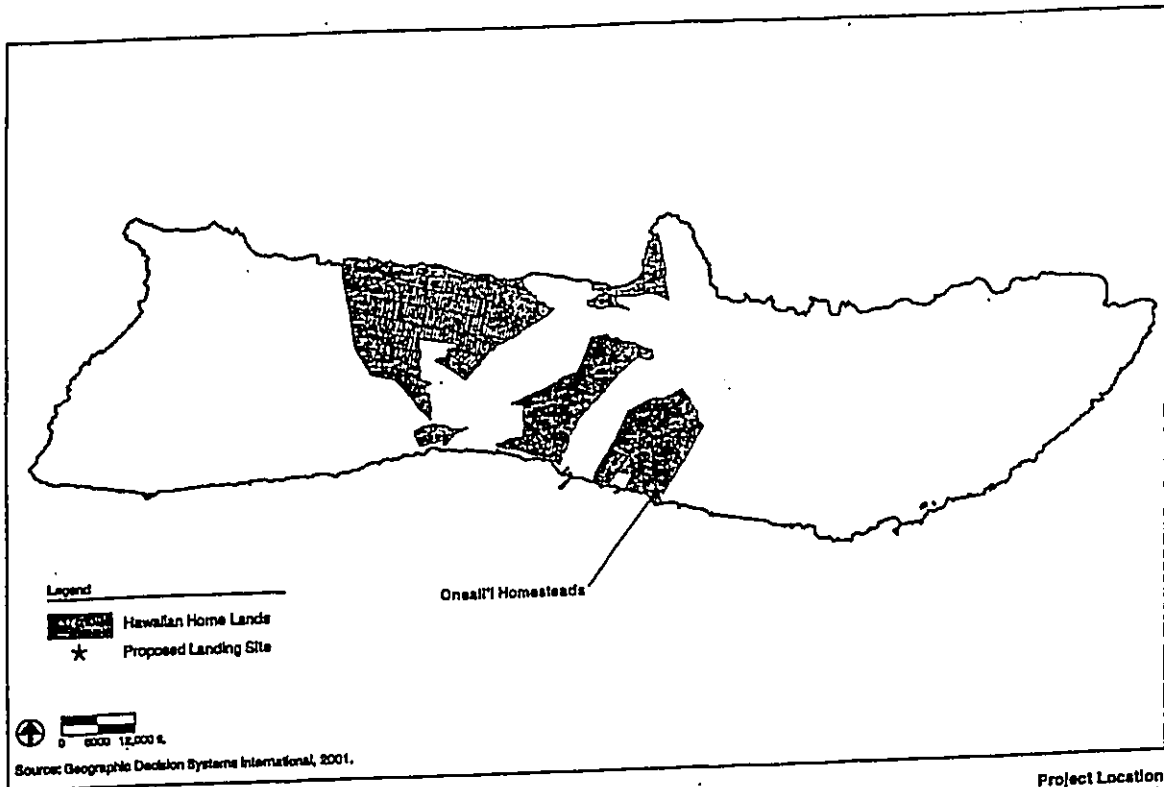
Sandwich Isles Communications proposes to utilize Horizontal Directional Drilling (HDD) to connect the Oneali'i Homesteads landing site with the offshore fiber optics link. The use of HDD technology will not block access to the bulk of the DHHL parcel or to the shoreline.

The proposed Oneali'i Homesteads landing site was chosen, because it was suggested by some members of the Moloka'i community during consultation that was carried out by Ho'aka on behalf of SIC. Mr. Walter Ritte, a well-known community figure and fishpond restoration enthusiast, suggested this location as did others, in part, because the proposed landing site is owned by the DHHL. However, it is important to note that Mr. Ritte has indicated that should a portion of this parcel be utilized as a fiber optics landing site, due care must be taken in order to avoid placement of the conduit under the Ali'i Fishpond wall.

The ocean essentially fronts the project area. The proposed Oneali'i Homesteads landing site APE will not block off access to the shoreline. However, at least one community leader, Mr. Walter Ritte has indicated that it is not appropriate to have the fiber optics line underlie the possible extension of the Ali'i Fishpond wall that fronts much of the DHHL parcel. Mr. Ritte has strongly recommended that the fiber optics conduit be placed near the western boundary of the DHHL parcel—in a possible drainage area that crosses the parcel in a north/south direction—in the event that this proposed location is chosen as a landing site. Placement of the conduit under this portion of the DHHL parcel will help to ensure that the fiber optics conduit will not undercut a section of the fishpond wall.

As noted above, SIC proposes to utilize Horizontal Directional Drilling (HDD) to connect the Oneali'i Homesteads landing site with the offshore link. The application of this technology will help avoid negative impacts to the nearby reef and coastline. In addition, the use of this technology will not block access to the bulk of the DHHL parcel or to the shoreline. Consequently, there are no anticipated negative impacts to traditional cultural practices such as gathering rights along the shoreline area. However, based on the location of the proposed landing site, additional archaeological work either in the form of monitoring or inventory survey will likely be required by the State Historic Preservation Division.

RECEIVED AS FOLLOWS



Project Location  
Sandwich Isles Communications Fiber-Optic Network  
Figure 1

 Sandwich Isles  
Communications, Inc.

In summary, it is recommended that the APE for the Oneali'i Homesteads landing site be shifted to the western side of the DHHL parcel. In addition, HDD should parallel the western boundary of the parcel, per Mr. Ritte's recommendation. This action will help to avoid underlayment of the fishpond wall. Finally, due care must be utilized in order to help ensure that shoreline access will not be hindered during onsite construction activities.

Please contact me should you have any questions regarding the above assessment letter report.

Sincerely,



Erik M. Fredericksen

**AN ARCHAEOLOGICAL ASSESSMENT OF A PORTION  
OF A PARCEL OF LAND IN MAKAKUPA'IA AHUPUA'A,  
ISLAND OF MOLOKA'I  
(TMK: 5-4-06:19)**

**INTRODUCTION**

Ms. Nami Ohtomo of Parsons Brinckerhoff Quade & Douglas, Inc. contacted Xamanek Researches during the late spring of 2001 about conducting archaeological work for a planned fiber optic network to service Department of Hawaiian Home Lands (DHHL) communities in Maui County, as well as the rest of the state. This project was to be part of a statewide fiber optics network that was planned for development by Sandwich Isles Communications, Inc. (SIC). The overall communications network would span approximately 1,500 miles over land and underwater. Because of the project's large size, it had been split into two portions—the terrestrial routes, and the various landing sites. Parsons Brinckerhoff Quade & Douglas, Inc. had been awarded the landing sites portion of the overall SIC project.

We were asked to submit a proposal for the County of Maui landing sites, which originally comprised 10 of the 17 of the state landing sites. Our proposal was subsequently accepted, and we were contracted to conduct the necessary archaeological studies for each of the proposed landing sites.<sup>1</sup>

The preliminary phase of the project began in late 2001 and early 2002 and involved evaluation of potential landing sites. Following field inspections of the proposed landing locations, Dr. Melissa Kirkendall, State Historic Preservation Division (SHPD) staff archaeologist for Maui and Lana'i, was contacted on several occasions regarding the appropriate work scope for the various Maui and Lana'i landing sites. In addition, Dr. Sara Collins of the SHPD O'ahu office was subsequently contacted about the Oneali'i Homesteads location on Moloka'i, after this coastal location was selected as a proposed landing site.

A meeting with Dr. Kirkendall, Mr. Jason Yazawa of Parsons Brinckerhoff Quade & Douglas, Inc., and Erik Fredericksen was held in January of 2003 on 8 of the 10 proposed County of Maui landing sites (i.e. those on Maui and Lana'i).<sup>2</sup> Mr. Yazawa later met with Dr. Collins at the SHPD O'ahu office in Kapolei on 5 February 2003 regarding the proposed Oneali'i Homesteads landing site on Moloka'i.

Prepared on behalf of:  
**Parsons Brinckerhoff Quade & Douglas, Inc.**  
Honolulu, Hawaii

Prepared by:  
**Xamanek Researches**  
Pukalani, Maui

**Erik M. Fredericksen**

08 October 2003

<sup>1</sup>The statewide total was subsequently reduced to 7, with 3 of these landing sites in Maui County. The revised landings for the County of Maui include the present study area on Moloka'i, and Po'olenalena Beach Park in Maikona, and the Waihiuli landing site on Maui (Figure 3).  
<sup>2</sup>It was subsequently determined that all 6 of the Maui sites and one of the two Lana'i sites would require inventory surveys, rather than archaeological assessments. This was determined to be subsequently modified to inventory surveys for the two remaining Maui sites—Waihiuli in Lahaina and Po'olenalena in Maikona.

RECEIVED AS FOLLOWS

Dr. Collins indicated at this O'ahu meeting that given the location of the proposed landing site, an archaeological assessment was likely sufficient. The Department of Hawaiian Homelands (DHHL) parcel that contains the proposed fiber optic landing site Area of Potential Effect (APE) lies adjacent to and west of Ali'i Fishpond (SIHP<sup>3</sup> No. 50-60-03-135). It appears that much of this DHHL parcel contains dredging spoil that was removed from the western half of the fishpond in the 1970s.<sup>4</sup>

SIC proposes to utilize Horizontal Directional Drilling (HDD) to connect the landside of the fiber optics cable network to the ocean side, which will lie some 1.3 km offshore (Figure 1).

The Onelii'i Homesteads landing site is located on the southern coast of Moloka'i in Makakupa'ia *Ahiupua'a*, Moloka'i District (Figures 1 and 2). The study area is currently vacant. The following report presents the results of our archaeological assessment of a portion of the DHHL parcel—TMK: 5-4-06:19.

## THE STUDY AREA

Erik Fredericksen visited this coastal property, which is owned by the Department of Hawaiian Homelands, on 27 January 2003. The c. 1.5 acre parcel lies in an area known as the Onelii'i Homesteads (Figures 1-3). The study area is adjacent to the western portion of Ali'i Fishpond. A possible extension of the wall of this fishpond forms much of the *makai* border of the DHHL property.<sup>5</sup> The study area was first visually inspected during a pedestrian walkover.

It was evident at the time of the surface inspection that the study area had been previously disturbed. During the walkover, scattered modern materials were observed on the surface. In addition, an abandoned structure and an apparent concrete trough were noted on the southeastern portion of the parcel.<sup>6</sup> The Oceanic Institute utilized the DHHL parcel in the 1970s as a staging area for aquaculture operations and some restoration work in the Ali'i Fishpond. Some of the restoration activities apparently included dredging of the western portion of the pond.<sup>7</sup> According to Dr. Sara Collins,

<sup>3</sup> SIHP = State Inventory of Historic Places

<sup>4</sup> The Oceanic Institute undertook some restoration efforts at Ali'i Fishpond during the 1970s.

<sup>5</sup> This wall terminates near the western side of the DHHL parcel where a possible drainage area, impacted by fill from an adjacent lot, runs along the western side of DHHL parcel.

<sup>6</sup> These relatively recent structures are located on the southeastern side of the study area.

<sup>7</sup> It is interesting to note that a 1998 paleoenvironmental study for fishpond restoration (Athens and Ward, September 1998) presumably did not include Ali'i Fishpond because of former dredging activity. This project was undertaken on behalf of the Office of Community Services of the Department of Labor and Industrial Relations of the State of Hawaii. This study focused on assessing the possible presence of sediments in 18 selected fishponds that could have a potential for paleoenvironmental coring investigation.

SIHPD Moloka'i staff archaeologist, the western portion of this fishpond was dredged in 1972 (personal communication, October 6, 2003). The concrete structure and trough are most likely associated with aquaculture operations that took place in the fishpond in the 1970s.

Finally, relatively recently imported fill material was noted on much of the exposed portions of the property. An inspection of an eroded area near the southwestern side of the parcel near the possible drainage area suggests that this fill is at least 40 cm thick.<sup>8</sup> The fill material present in an exposed portion of the bank near the shoreline was composed of reddish brown (5 YR 5/4) sandy silt. Possible dredging material was also noted on portions of the surface of the DHHL lot.<sup>9</sup>

Single-family residential properties to the east and west border the DHHL parcel, while Kamehameha V Highway forms the northern boundary and the ocean lies to the south. A possible extension of the Ali'i Fishpond wall forms part of the *makai* boundary of the subject parcel. The southern half of the project area contains numbers of mostly mature coconut or *niu* (*Cocos nucifera*) trees (Photos 2 and 3). In addition, a few *milo* (*Theplesia populnea*) and *hala* (*Pandanus tectorius*) trees were noted on and near this property. The western boundary area is relatively heavily vegetated, and appears to have been partially impacted by activities, possibly related to the construction of a nearby home. The rest of the vegetation observed on the parcel consisted of nonnative grasses and various annual weeds. Finally, several red mangroves (*Rhizophora mangle*) were noted along the southern portion of the project area among the rocks of the wall at the *makai* side of the DHHL parcel, as well as along the wall and in the interior of the fishpond itself (Photo 4).<sup>10</sup>

It is estimated that this relatively arid portion of Moloka'i receives between 15 and 20 inches of annual rainfall. Much of the coastal plain in the vicinity of the study area is composed of Mala Silty Clay (Foote et al., 1972). The DHHL parcel is composed of relatively level land that ranges from an estimated 3 to 5 ft AMSL (Photo 1).

<sup>8</sup> This possible drainage area remnant may help to channel upslope runoff from the general area to the ocean. It is interesting to note that there appears to be a remnant of a small, intermittent stream that lies to the north (vicinity) of Kamehameha V Highway, in the general vicinity of the study area.

<sup>9</sup> As previously noted, the Oceanic Institute apparently carried out some dredging of the western portion of the fishpond in the 1970s. The dredging spoil material appears to have been deposited on the study area.

<sup>10</sup> The eastern end of Ali'i Fishpond appears to have largely silted-in and contains quantities of mangrove trees.

RECEIVED AS FOLLOWS

systems. In addition, as mentioned above, at least one previously identified find of human remains was located at One Ali'i Park, which lies within 1 km to the southeast of the study area.

**Expected Site Types on Subject Parcel**

Given that the project area lies in close proximity to Ali'i Fishpond and has been modified by previous activities, we did not anticipate that any significant material culture remains would be present on the surface of the APE. However, it was considered possible that there could be subsurface precontact site remnants on the *mauka* (northern) portion of the parcel in the general vicinity of Kamehameha V Highway.

**FIELD METHODS**

As previously noted, a pedestrian inspection of the project area was undertaken on 27 January 2003. Surface visibility was generally fair to good because of surface vegetative cover. Written notes were kept and photographs were taken with a digital camera. Erik Fredericksen carried out the fieldwork and was also the project director for this assessment level study. There was no subsurface testing specifically conducted for this assessment study. However, two soil core tests were monitored and the results are briefly discussed below.

Geolabs, Inc. conducted the soil bore testing at this proposed landing site location with a truck mounted drilling rig (Photo 6). Erik Fredericksen monitored this testing and several soil samples from the two soil bores were recovered for later laboratory analysis. These samples were subsequently wet screened through 1/16-inch mesh at the Xumanek Researches lab in Pukalani. Hugh Coffin carried out laboratory work, and standard procedures were followed.

**RESULTS**

There were no significant material culture remains noted during the inspection of the surface of the DHHL parcel. While it remains somewhat unclear as to the precise age of the vacant concrete structure and the apparent trough, both likely date from the 1970s when the Oceanic Institute was utilizing the parcel as a staging area for aquaculture in Ali'i Fishpond. Both of these features lie on the southeastern part of the DHHL parcel.

**BACKGROUND INFORMATION**

**Previous Archaeology in the general area**

There has been no previously documented archaeological work carried out on the project area, which is owned by DHHL. The nearest known coastal non-fishpond site consists of human remains that were found c. 1 km southeast of the proposed landing site. These human remains were located during park improvement construction activities at the nearby One Ali'i Park in 1984 (Hao, 1984). While the finds were not fully documented, it appears that a possible minimum number of 3 individuals were encountered during construction excavations at the park. The recovered remains were reburied on the park grounds and marked with concrete uprights.

Studies *mauka* (north) of Kamehameha V Highway have documented temporary and permanent habitation areas, dry land agricultural areas, religious sites, possible burial areas, and rock quarries (Tuggle, 1993; Hommon and Ahlo, 1983). Some of these sites lie within 200 meters north (*mauka*) of the project area (Figure 4).

**Ali'i Fishpond (Site 135)**

As previously noted, the project area is located adjacent to and west of the large Ali'i Fishpond. A section of the southeastern DHHL parcel may possibly lie in a silted-in portion of this fishpond. The western section of this fishpond was inspected to where a sluice gate or *makaha* bisects the pond wall (Photo 5). This relatively narrow waterway contains the remains of two concrete and rock gate supports. It remains somewhat unclear how long ago these supports were constructed. The rock wall to the west of this *makaha* appears have been modified and widened, possibly during restoration efforts undertaken by the Oceanic Institute in the 1970s. The overall fishpond appears to be in generally fair to good condition, although the eastern portion has silted-in. This fishpond is identified as TMK 5-4-06: 25, and is owned by the State of Hawaii. As noted previously, the Oceanic Institute used the DHHL project area as a base of operations in the 1970s, while the institute was utilizing the pond for aquaculture production and undertaking some restoration activities.

**Settlement Pattern and Land Use**

Previous archaeological work in the general vicinity of the project area suggests that this arid portion of Moloka'i was utilized in later precontact times for habitation, possible agricultural production, coastal marine exploitation, fishpond aquaculture, and ceremonial purposes (Tuggle, 1993). Dry land agricultural activities took place inland of the coast, with the possible exception of coastal areas that were near larger drainage

**Soil Bores**

As previously mentioned, the soil testing was monitored. Geoloabs, Inc. utilized two soil bores for this landing site (Figure 2). Results suggest that probable fill in this portion of the DHHL parcel is up to 50 cm thick. There were no significant material culture remains noted during inspection of the soil core samples. Marine sand and sandy silt were present in both test locations to 3+ meters below the existing surface.

Several soil samples were taken from the upper c. 2 meters of each of the two soil bores. These samples were subsequently wet screened in the laboratory. There were no significant material culture remains present in either bore. Probable fill material was present in the upper 40-50 cm of the bores. Some fragments of modern bottle glass and crushed metal were noted in this upper material. Sand and sandy silt were present throughout much of the bore samples (Appendix A). There were numbers of pieces of waterworm coral and waterworm marine shell (typically whole) in this matrix. It is quite possible that much of the upper material is spoil from dredging activities that occurred in the western end of Ali'i Fishpond during the 1970s. The general depth of silty sand and coralline gravel deposits (over 4 meters) suggests at least the *maka'i* portion of the DHHL may be largely composed of the silted in fishpond.

**SUMMARY AND CONCLUSIONS**

Based on the results of the walkover and monitoring of the soil bore testing, it does not appear that significant material culture remains are contained on the *maka'i* portion of TMK: 2-5-4-06:19. However, it is important to note that a portion of the possible extension of the Ali'i Fishpond wall may extend around and form part of the border of the *maka'i* side of the DHHL parcel. This fishpond is a significant historic property, and will need to be avoided. It is also interesting to note that the remnants of an apparent intermittent stream are located to the northwest of the DHHL parcel across the highway. The possible drainage area that runs along the western portion of the property may represent a remnant of this small, intermittent stream.

In conclusion there were no significant material culture remains located in the proposed APE for the HDD. However, a possible extension of the Ali'i Fishpond wall, which functions essentially as a retaining wall between the land and the ocean lies *maka'i* of the APE. It is important to note that this possible extension of the fishpond wall forms the *maka'i* border of much of the project area. The fishpond qualifies for significance under multiple Federal and State historic preservation criteria, including Criterion "c"

(excellent example of a fishpond), Criterion "j" (information content), and Criterion "e" (traditional cultural value). As such, the *maka'i* boundary wall of the DHHL parcel likely qualifies for importance under one or more of the above significance criteria, as well.

**Mitigation Recommendations**

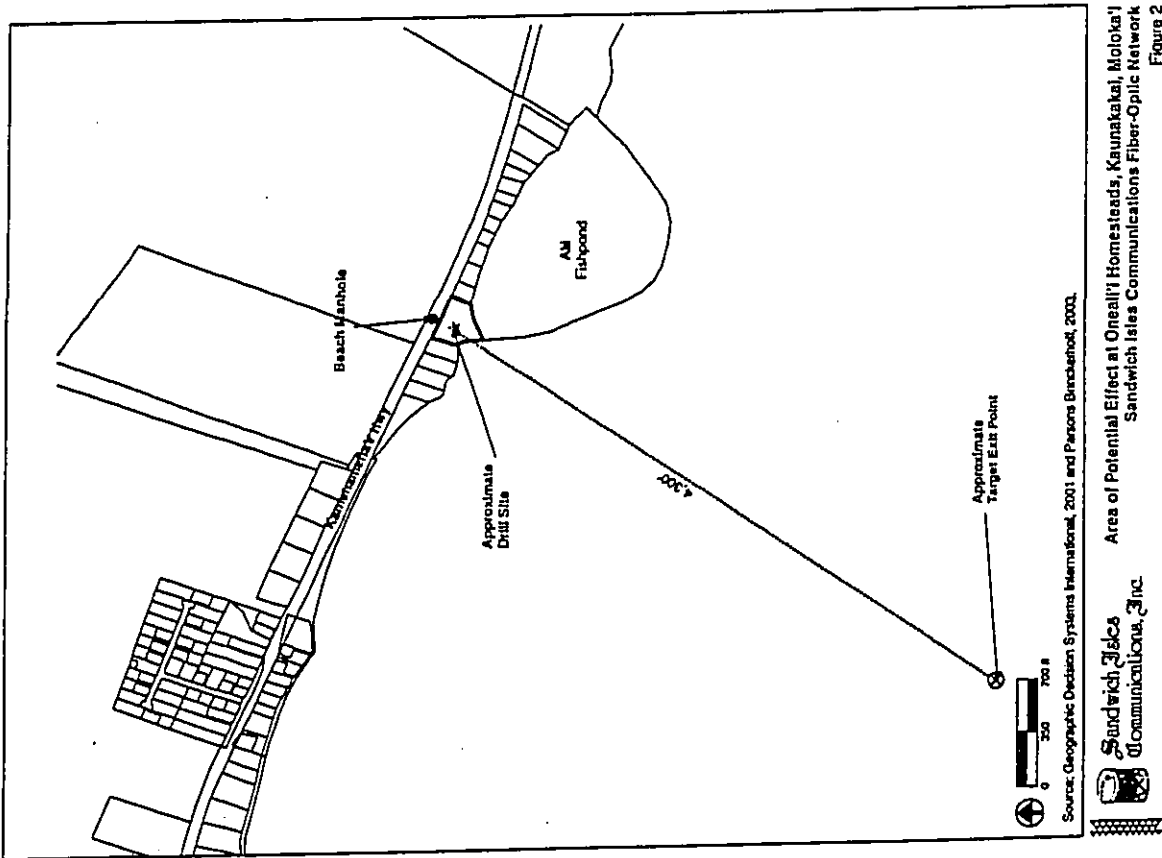
Given the location of the project area, it is recommended that archaeological monitoring take place during the HDD portion of this project that occurs on the subject parcel, if this landing site is approved. Due care will need to be exercised in order to not inadvertently impact the possible extension of the fishpond wall that is located on much of the *maka'i* portion of the DHHL property. At least one community leader, Mr. Walter Ritte has indicated that it is not appropriate to have the fiber optics line underlie this wall.<sup>11</sup> Mr. Ritte strongly recommended that the fiber optics conduit should be placed near the western boundary of the DHHL parcel—in the possible drainage area that crosses the parcel in a north/south direction—in the event that this location is chosen as a landing site.

It is recommended that the path of the HDD follow this possible drainage area that runs *maka'i/maka'i* along the western side of the DHHL parcel. The possible fishpond wall extension does not extend all the way to the adjacent residential parcel to the west. Placement of the fiber optic conduit (which is c. 4 inches or 10 cm in diameter) via the application of HDD in this western section of the project area will help to ensure that there are no negative impacts to the culturally significant Ali'i Fishpond. Given the size of the study area, the HDD rig should set up well back from the ocean, around midway to the highway.

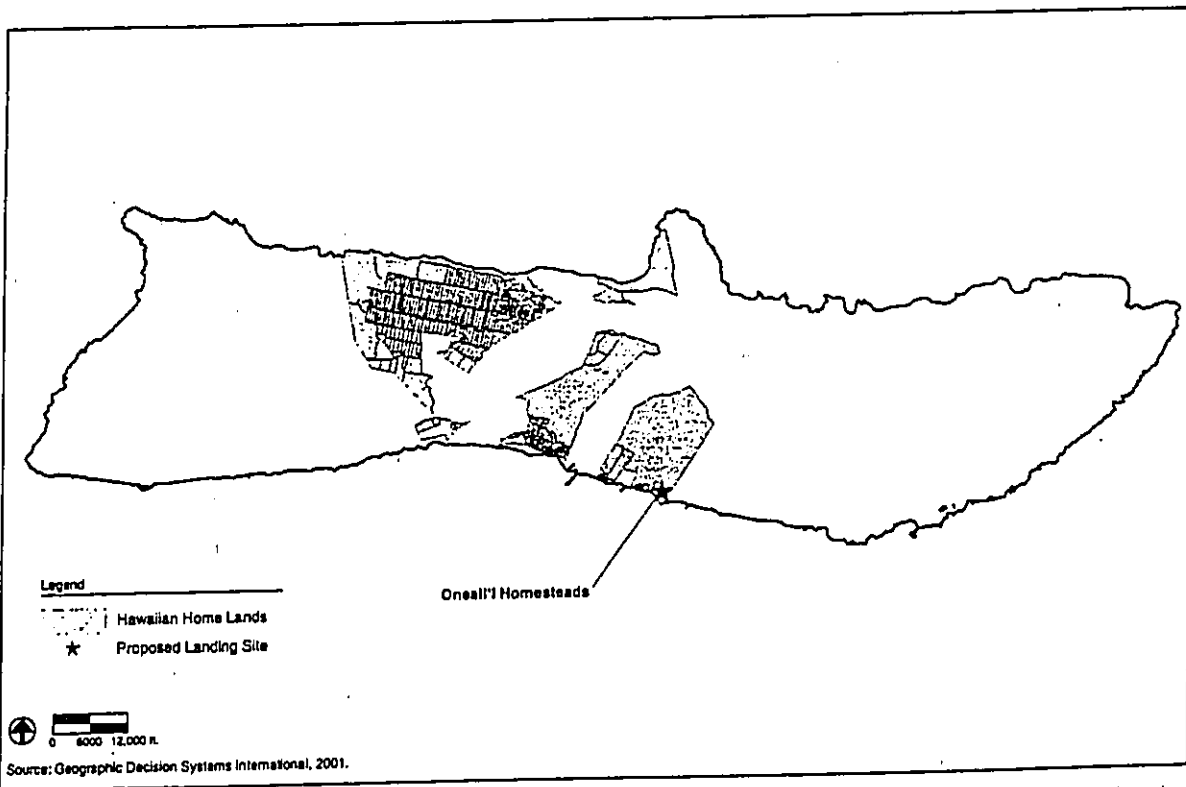
In addition, it is also recommended that the area between the HDD entry point and Kamehameha V Highway be monitored if HDD is utilized (i.e. the excavation of the entry pit). If a drilling spoils/slurry pit is utilized, an archaeological inventory survey concurrent with construction activities is recommended. This level of work is also recommended if the section between the HDD entry point and the manhole access cover for the fiber optics line on Kamehameha V Highway is excavated with a backhoe. Either form of mitigation is deemed necessary, because significant material culture remains may be present in the *maka'i* portion of the DHHL parcel (TMK 2-5-4-06:19). Lastly, access to the DHHL parcel should not be blocked off, in case members of the community wish to utilize the portion of the parcel that lies outside the construction staging area.

<sup>11</sup> Mr. Ritte has been actively involved in fishpond restoration activities on Molokai for several years.

RECEIVED AS FOLLOWS



Area of Potential Effect at Oneali'i Homesteads, Kaunakakai, Moloka'i  
Sandwich Isles Communications Fiber-Optic Network  
Sandwich Isles Communications, Inc.



Project Location  
Sandwich Isles Communications Fiber-Optic Network  
Figure 1

RECEIVED AS FOLLOWS

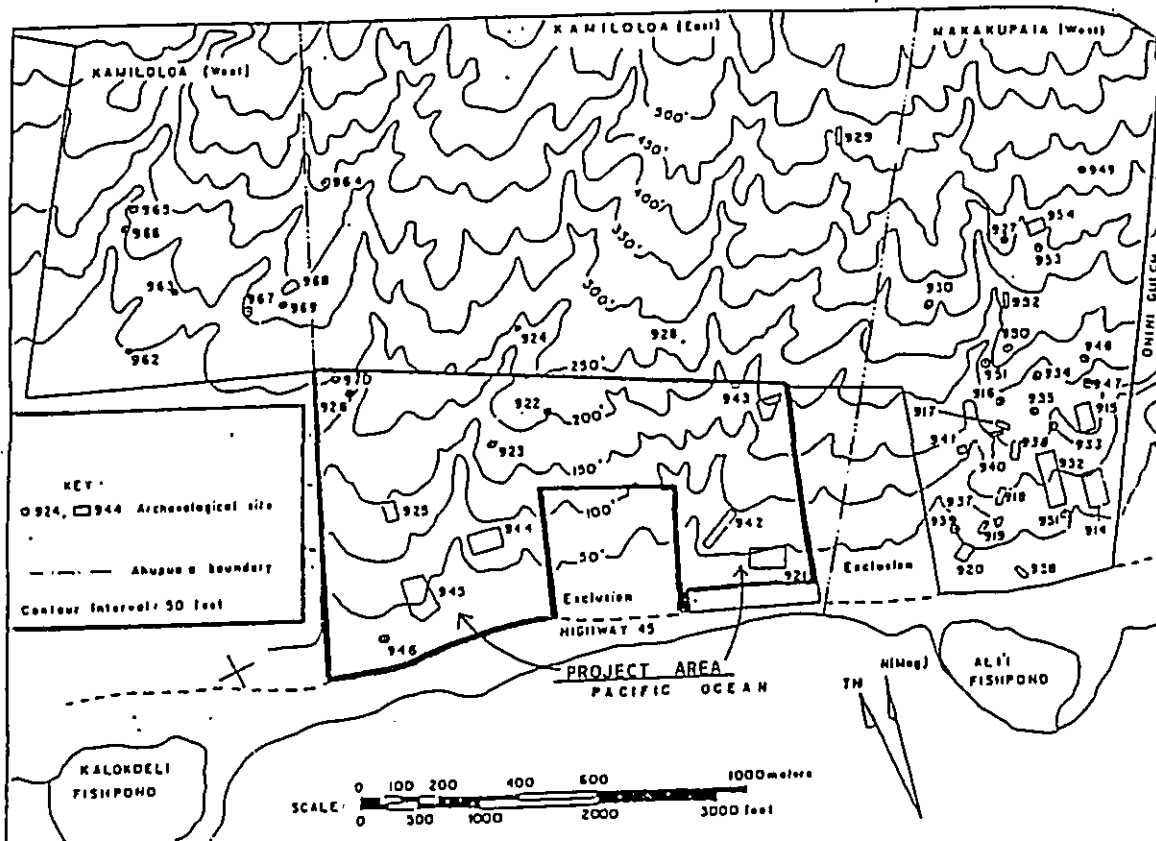
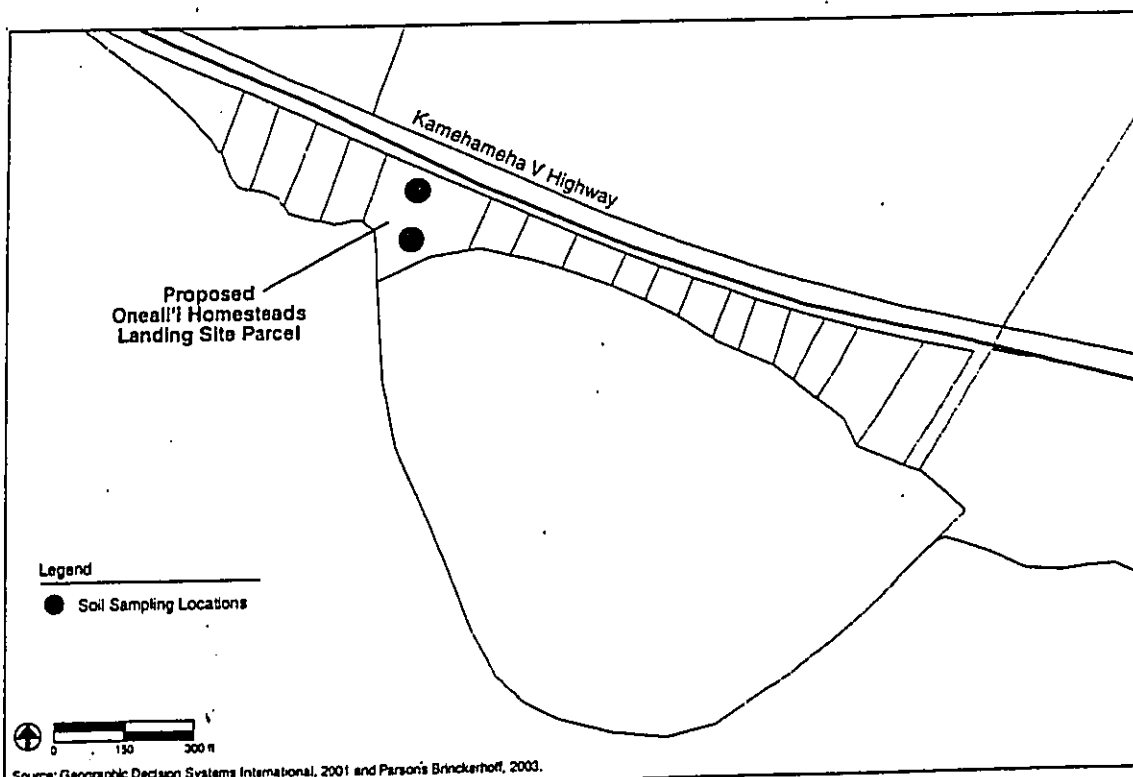


Figure 4 - Archaeological sites mauka of project area (reproduced from Tuggle, 1993).



Source: Geographic Decision Systems International, 2001 and Parson's Brinckerhoff, 2003.

**Sandwich Isles Communications, Inc.**

Existing Land Uses Near the Oneall'i Homesteads Landing Site  
 Sandwich Isles Communications Fiber Optic Network  
 Figure 3



RECEIVED AS FOLLOWS

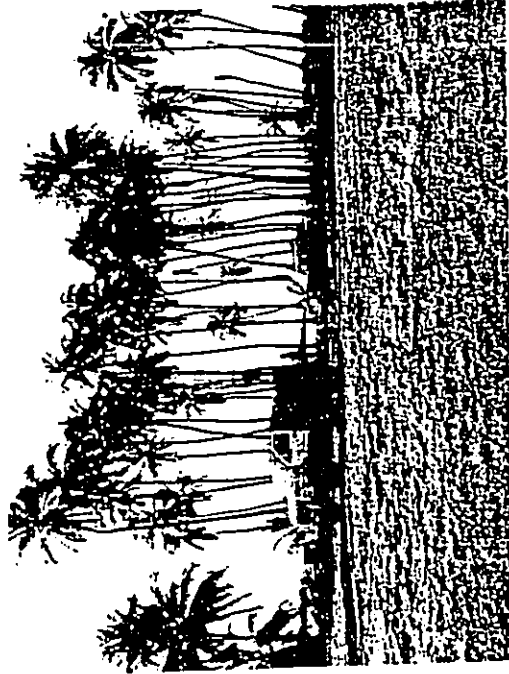


Photo 3 - View to the southeast showing drill rig. Soil bore 1 in process.



Photo 4 - View to the southeast across portion of fishpond sluice gate or *makaha*.



Photo 1 - View to the northeast across *manuka* half of project area. Kamehameha V Highway in background. Note gravel access road in foreground.



Photo 2 - View to the northwest of the project area—photo taken from fishpond sluice gate or *makaha*.

RECEIVED AS FOLLOWS

REFERENCES

- Athens, Stephen J., and Jerome V. Ward  
Sept. 1998 Paleoenvironmental Study for Fishpond Restoration Project, Island of Molokai. Prepared for Office of Community Services, State of Hawaii. Prepared by International Archaeological Research Institute, Inc., Honolulu.
- Foxe, D.E., E.L. Hill, S. Nakamura, and F. Stephens  
1972 Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii. U.S. Department of Agriculture, Soil Conservation Service. Washington D.C.
- Hao, Louis  
July, 1984 Burial Report: One Ali'i Park, Molokai, Hawaii. County of Maui.
- Hommon, Robert J. and Hamilton M. Ahlo  
1983 An Archaeological Survey of Selected Lands Proposed for Military Training near Kaunakakai, Island of Molokai, Hawaii. Science Management, Inc. Honolulu.
- Tuggle, H. David  
June 1993 Kamiloa Archaeology: Data Recovery and Site Inventory for a Portion of Kamiloa, Island of Molokai, Hawaii. International Archaeological Research Institute, Inc. Honolulu, Hawaii.




Photo 5 - View to the southeast—sluice gate or makaha in foreground.




Photo 6 - View to the southeast, showing drill rig and Ali'i Fishpond in background.

RECEIVED AS FOLLOWS

 <b>GEOLABS, INC.</b> Geotechnical Engineering		LANDING SITES FOR RURAL FIBER OPTIC LINES - PHASE II STATE OF HAWAII ( 6 ISLANDS )		Log of Boring <b>MO-1</b>		
Laboratory		Field		Approximate Ground Surface Elevation :		
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	ROD (%)	Penetration Resistance (Blows/ft)	Depth (feet)
	8	84				0
	14	67				2
	32					6
	7					10
	27					15
	25					20
						24
						30
						35
Description Tan-brown SAND with traces of silt, medium dense, moist USCS: SM						
Grey-white SANDY CORALLINE GRAVEL with silt, very loose USCS: GM						
grades to loose Boring terminated at 21.5 feet						
<b>DRAFT</b>						
Date Started: January 27, 2003 Date Completed: January 27, 2003		Water Level: 3.3 ft. 1/27/2003 1300 HRS		Plate		
Logged By: F. Meyer		Drill Rig: CME-65		A - 9		
Total Depth: 21.5 feet		Drilling Method: 4" Auger & 4" Casing				
Work Order: 4773-00(B)		Driving Energy: 140 lb. w., 30 in. drop				

APPENDIX A  
 Soil Bore Information  
 Geolabs, Inc.


RECEIVED AS FOLLOWS

 <b>GEOLABS, INC.</b> Geotechnical Engineering		LANDING SITES FOR RURAL FIBER OPTIC LINES - PHASE II STATE OF HAWAII ( 6 ISLANDS)		Log of Boring <b>MO-2</b>						
Laboratory		Field		Approximate Ground Surface Elevation:						
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	ROD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (in)	Depth (feet)	Sample	USCS	Description
UC= 13900 UC= 11800	33	81			16	2	2	SP-3M	SM	Dark brown and white SAND with some silt, organic material and rounded sand, medium dense, moist grades without organic material at 1 foot grades with gravel
	17	84			24		10		SM	Light gray SILTY SAND with some coralline gravel, very loose
	18				13		18		GM-GM	Grey-white SANDY CORALLINE GRAVEL with some silt, very loose
	38				2		20			grades to loose
	24				2		25			grades to very loose
	22		0		7		20		SM	Brown-grey SILTY SAND with coralline gravel and traces of shell fragments, loose
	34				4		20			Grey dense SILTY, moderately to slightly fractured, slightly weathered, very hard (basalt formation)
	38				6		20			
UC= 13700 UC= 14800			83	44	60/1"					

Date Started: January 27, 2003  
 Date Completed: January 28, 2003  
 Logged By: F. Meyer  
 Total Depth: 42 feet  
 Work Order: 4773-00(B)

Water Level: 1.2 ft. 1/28/2003 0752 HRS  
 1.4 ft. 1/28/2003 1427 HRS  
 Drill Rig: CME-65  
 Driving Method: 4" Auger & HQ Coring  
 Driving Energy: 140 lb. wt., 30 ft. drop

Plate  
**DRAFT**  
 A - 10.1

 <b>GEOLABS, INC.</b> Geotechnical Engineering		LANDING SITES FOR RURAL FIBER OPTIC LINES - PHASE II STATE OF HAWAII ( 6 ISLANDS)		Log of Boring <b>MO-2</b>						
Laboratory		Field		Description						
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	ROD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (in)	Depth (feet)	Sample	USCS	
UC= 13900 UC= 11800	47		0	19	40/5"		40		SM	Reddish brown SAND with some gravel, very dense (clinker)
							48			Boring terminated at 42 feet

Date Started: January 27, 2003  
 Date Completed: January 28, 2003  
 Logged By: F. Meyer  
 Total Depth: 42 feet  
 Work Order: 4773-00(B)

Water Level: 1.2 ft. 1/28/2003 0752 HRS  
 1.4 ft. 1/28/2003 1427 HRS  
 Drill Rig: CME-65  
 Driving Method: 4" Auger & HQ Coring  
 Driving Energy: 140 lb. wt., 30 ft. drop

Plate  
**DRAFT**  
 A - 10.2

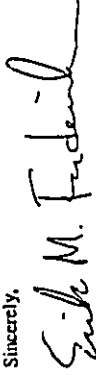
RECEIVED AS FOLLOWS

Wahikuli landing site lies to the southeast of Wahikuli Beach Park. Given that the vacant study area has been altered and does not lie on the coast, it is not anticipated that the project will impact any traditional cultural practices such as shoreline gathering rights. In addition, the nearby Beach Park has ample parking, which is available for anyone who wishes to fish for and/or gather marine resources along the coastline in the vicinity of the project area.

In the event that this location is approved as a landing site, it is my understanding that the Horizontal Directional Drilling (HDD) rig will set up on the parcel and may also drill from the *makai* shoulder of Honoapi'iiani Highway. Neither of these locations will block access to the ocean.

Please contact me should you have any questions regarding the above assessment.

Sincerely,



Erik M. Fredricksen

XAMANEK RESEARCHES  
P.O. BOX 880131  
PUKALANI, MAUI, HI 96788  
Phone/Fax: 572-8900  
Phone/Fax: 572-6118

Parsons Brinckerhoff Quade & Douglas, Inc.  
Pacific Tower, Suite 3000  
1001 Bishop Street  
Honolulu, Hawai'i 96813  
Fax: 808-528-2368

Attn.: Mr. Jason Yazawa

10 October 2003

Subject: Letter report on cultural impact assessment for the proposed Sandwich Isles Communications (SIC) fiber optics Wahikuli landing site at Labaina, Wahikuli *ahupua'a*, Labaina District, Maui (TMK 4-5-21: Parcel 15).

Dear Mr. Yazawa,

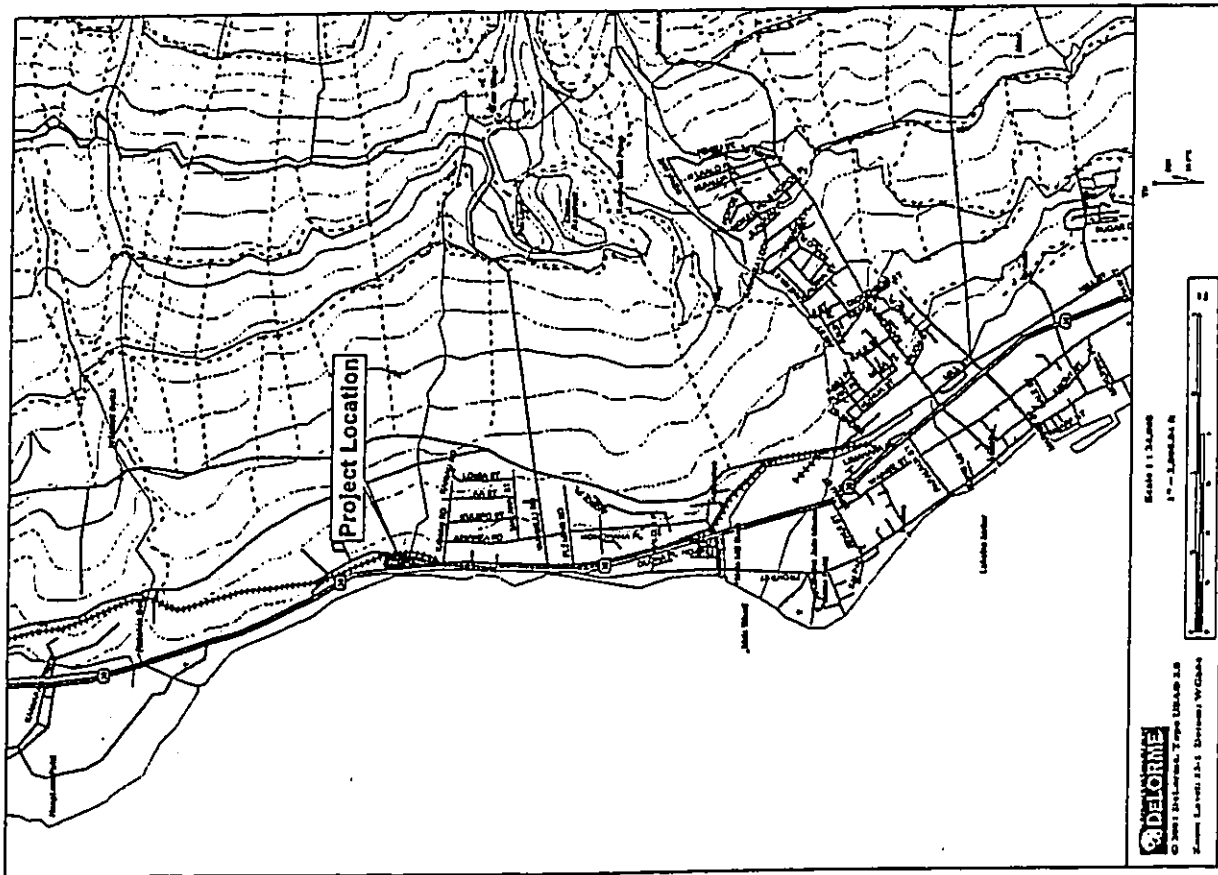
Per your request, I am providing you with a memorandum regarding the cultural assessment for the above proposed SIC landing site project at Wahikuli, Labaina, Maui. The study area lies *mauka* (East) of Honoapi'iiani Highway in the vicinity of the Labaina Post Office (Figure 1). This triangular and level c. 1-acre portion of land is currently vacant and appears to have been cleared at some point in the past. The parcel is owned by the State of Hawai'i (TMK 4-5-21: Parcel 15). It is bounded by a section of the Ka'anapali Railroad Sugar cane Train track to the east, Honoapi'iiani Highway to the west, and a drainage ditch to the north. This latter drainage feature lies on State land.

As you are aware, we carried out an archaeological inventory survey on the subject parcel in the summer of 2003. In addition, we also monitored soil testing that Geolabs, Inc. carried out on the study area. This soil testing was monitored per the direction of the State Historic Preservation Division (SHPD) and was carried out per the approved monitoring plan (Fredricksen, 2003). There was no evidence of an intact subsurface cultural layer located during either the monitoring program or the inventory survey. However, archaeological monitoring may likely be required, because this parcel lies in relatively close proximity to the coast.

Sandwich Isles Communications proposes to utilize Horizontal Directional Drilling (HDD) to connect the Wahikuli landing site with the offshore fiber optics link. The application of this technology will help avoid negative impacts to the nearby reef and coastline.

The ocean lies an estimated 30 meters (100 feet) west of the project area, with Honoapi'iiani Highway separating the study area from the shoreline. The proposed

RECEIVED AS FOLLOWS



RECEIVED AS FOLLOWS

AN ARCHAEOLOGICAL INVENTORY SURVEY  
OF THE PROPOSED SANDWICH ISLES  
COMMUNICATIONS, INC. FIBER OPTICS LANDING  
LOCATION NEAR THE LAHAINA POST OFFICE,  
WAHIKULI AHUPUA'A,  
LAHAINA DISTRICT, ISLAND OF MAUI  
(TMK: 4-5-21: 15)

ABSTRACT

Xamanek Researches carried out an archaeological inventory survey on a portion of land in Lahaina, Maui in May 2003. The project area is located in Waihikuli Ahupua'a, Lahaina District, Island of Maui (TMK: 4-5-21: 15). This location is being considered by Sandwich Isles Communications, Inc. as a possible landing site for a fiber optics network within the State of Hawaii.

The study area is composed of a portion of a vacant parcel, which lies to the south of the Lahaina Civic Center complex. A total of 7 backhoe trenches were used to sample this c. 1/2-acre portion of land. In addition, two soil core bores were monitored and these results were included in the inventory survey report.

During the course of testing mid-20<sup>th</sup> century and more recent cultural materials were located during subsurface sampling of the project area. There were no significant material culture remains or intact subsurface cultural layers encountered during testing on the subject parcel.

No further archaeological work is recommended for the project area, unless large slurry pit is excavated on the parcel. Should such a pit be required, archaeological monitoring is recommended for the project area, because of its coastal location.

Prepared on behalf of:

Parsons Brinkerhoff Quade & Douglas, Inc.  
Honolulu, Hawaii

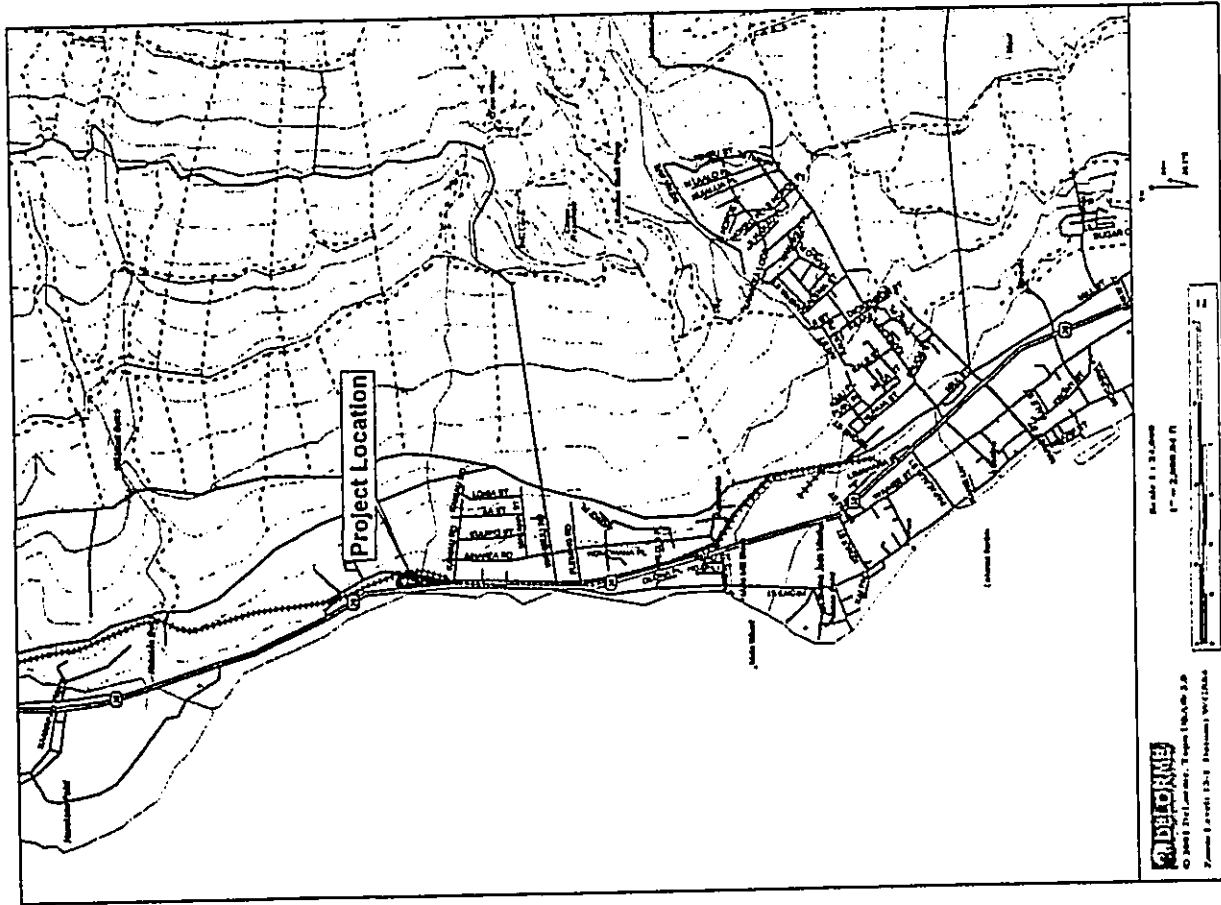
Prepared by:

Xamanek Researches  
Pukalani, Maui

Demaris L. Fredericksen  
Erik M. Fredericksen

July 18, 2003

RECEIVED AS FOLLOWS

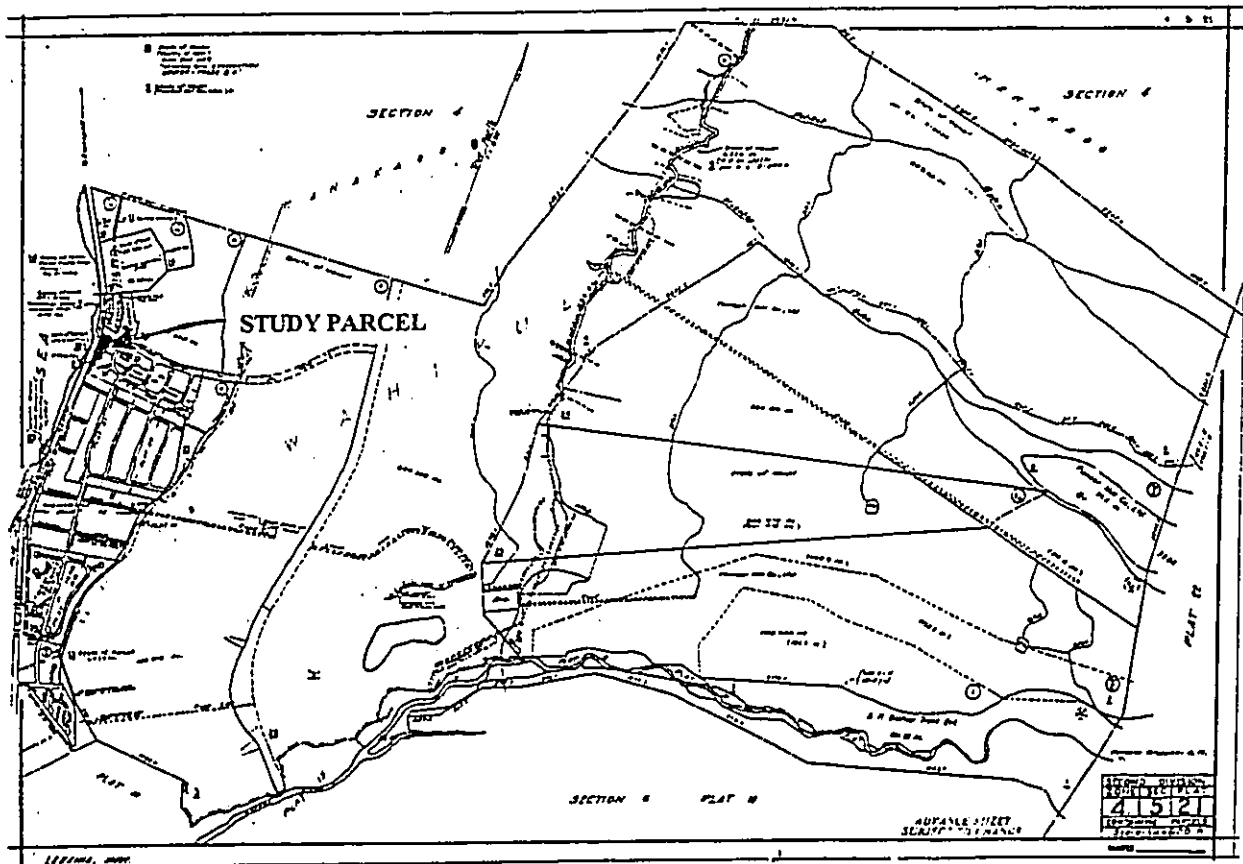


## Table of Contents

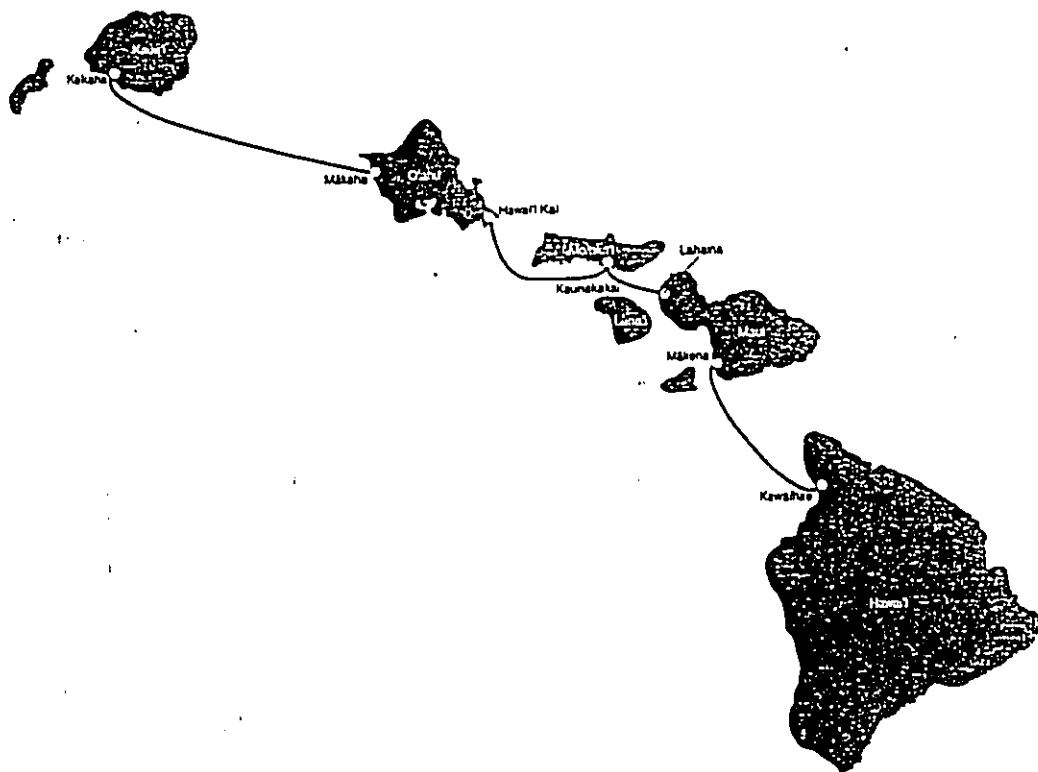
Map 1 - Topographic Map showing location of current study.....	1
Map 2 - State of Hawaii Tax Map.....	ii
Map 3 - Statewide fiber optics network proposed by SIC.....	iii
<b>INTRODUCTION</b> .....	1
<b>STUDY AREA</b> .....	2
Background Historical and Archaeological Information.....	3
Traditional history.....	3
Kamehamehas in Lahaina.....	4
Photo 1 - View of Moku'ula and Mokuhinia pond in 1910.....	7
The Mabel.....	11
Post-1830s.....	11
Photo 2 - Portion of Honokowai Ditch water system (Site 1591).....	14
<b>PREVIOUS ARCHAEOLOGICAL STUDIES TO THE NORTH</b> .....	15
Table 1 - Listing of Previous Archaeological studies in vicinity of project area.....	17
Previous archaeological work in Lahaina and environs.....	19
Mala and Kahona.....	19
Brick Palace of Kamehameha I.....	20
Hale Pi'ula.....	21
Other archaeological studies in Lahaina Town.....	21
Moku'ula.....	22
Loko o Mokuhinia and environs.....	23
Settlement Patterns.....	23
Expected Findings.....	24
<b>ARCHAEOLOGICAL METHODS</b> .....	25
Figure 1 - Present study area—proposed landing site.....	26
Figure 2 - Plan of project parcel showing locations of backhoe test trenches.....	27
<b>ARCHAEOLOGICAL RESULTS</b> .....	28
Soil test results.....	28
Photo 3 - General view to the north across project area.....	29
Backhoe Trenches.....	30
Figure 3 - east-southeast face profile of Backhoe Trench 1.....	30
Figure 4 - west face profile of Backhoe Trench 2.....	31
Photo 4 - View to the west of BT 2 excavation in process.....	31
Figure 5 - east face profile of Backhoe Trench 3.....	32
Figure 6 - east face profile of Backhoe Trench 4.....	33
Figure 7 - east face profile of Backhoe Trench 5.....	34
Photo 5 - View to the southeast of BT 5 excavation in process.....	34
Figure 8 - east face profile of Backhoe Trench 6.....	36
Photo 6 - View to the south of BT 6 excavation in process.....	37
Figure 9 - east face profile of Backhoe Trench 7.....	37
Table 2 - summary of backhoe trench results.....	38
<b>SUMMARY AND CONCLUSIONS</b> .....	40
Site Significance Evaluations.....	40
Mitigation Recommendations.....	41
<b>REFERENCES</b> .....	42




RECEIVED AS FOLLOWS



Map 2 - State of Hawaii Tax Map—Zone 4, Section 5, Plat 21.



 Sandwich Islands  
Communications, Inc.

Revision No. 6  
April 14, 2003

Proposed Submarine Cable Landing Sites  
for Sandwich Islands Communications Fiber Optic Network

Map 3 - Statewide fiber optics network proposed by Sandwich Islands  
Communications, Inc.

## INTRODUCTION

Ms. Nani Ohtomo of Parsons Brinckerhoff Quade & Douglas, Inc. contacted Xamanek Researches during the late spring of 2001 about conducting archaeological work for a planned fiber optic network to service Department of Hawaiian Home Lands (DHHL) communities in Maui County, as well as the rest of the state. This project was to be part of a statewide fiber optics network that was planned for development by Sandwith Isles Communications, Inc. (SIC). The overall communications network would span approximately 1,500 miles over land and underwater. Because of the project's large size, it had been split into two portions—the terrestrial routes, and the various landing sites. Parsons Brinckerhoff Quade & Douglas, Inc. had been awarded the landing sites portion of the overall SIC project.

We were asked to submit a proposal for the County of Maui landing sites, which would comprise 10 of the 17 of the state landing sites.<sup>1</sup> Our proposal was subsequently accepted, and we were contracted to conduct the necessary archaeological studies for each of the proposed landing sites.

The preliminary phase of the project began in late 2001 and early 2002 and involved evaluation of various potential landing sites. Following several field inspections of proposed landing locations, Dr. Melissa Kirkendall, State Historic Preservation Division (SHPD) staff archaeologist for Maui and Lana'i was contacted regarding the appropriate work scope for the various landing sites.

A meeting with Dr. Kirkendall, Mr. Jason Yazawa of Parsons Brinckerhoff Quade & Douglas, Inc., and Erik Fredericksen was held in January of 2003 on 8 of the 10 proposed County of Maui landing sites. Given the coastal location of all of the landing locations, it was determined that all 6 of the Maui sites and one of the two Lana'i sites would require inventory surveys, rather than archaeological assessments.<sup>2</sup>

<sup>1</sup> The state total was subsequently reduced to 7, with 3 of these in Maui County. The revised landings for the County of Maui include the present study area, Po'olenalena Beach Park in Makana, and the Ali'i Fishpond landing site on Moloka'i.

<sup>2</sup> The revised landings for the County of Maui were subsequently reduced to 3, including the present study area, Po'olenalena Beach Park in Makana, and the Ali'i Fishpond landing site on Moloka'i. (Map 3).

The basic purpose of an inventory survey is to determine and document what, if any, features of potential archaeological significance are present within a specified area. A second purpose is to determine the general function, distribution and date of potentially significant historic properties. From this a general significance assessment can be made, and appropriate mitigation measures proposed, given the nature of the intended development planned for the project area. The present inventory survey was carried out in accordance with the standards for archaeological inventory surveys and reports set down in the Hawaii Administrative Rules, Title 13, Department of Land and Natural Resources, Subtitle 13, State Historic Preservation Division Rules, Chapter 276 [Draft 8/26/02]. The following report presents the results of our inventory survey for the proposed SIC (Lahaina Post Office) Wahikuli landing site in Lahaina, Maui.

## THE STUDY AREA

The study area consists of approximately 1 acre of land, located just outside of Lahaina to the north. Rainfall is seasonal—most rain falling between November and April, coinciding with winter storms. While recent years have been drier, this region generally receives around 10 to 20 inches of annual precipitation. Temperatures are fairly constant throughout much of the year—usually in the 80s during the daytime, cooling to the 70s at night. The warmest month is August—the coolest January. The winds are dominated by the trade wind pattern and thermal differences. Generally, winds blow from the sea toward land in the daytime, and reverse direction during the night when the land cools.

Soils are of the Wahikuli series, and consist of well-drained soils developed in material weathered from basic igneous rock. They have been influenced to some extent by volcanic ash from local cinder cones. They are gently to moderately sloping. Elevations range from sea level to 600 feet. Soils specific to the project area are WdB—Wahikuli very stony silty clay, 3 to 7 percent slopes. Stones cover 3 to 15% of the surface (Footc, et al., 1972, plate 94 and p. 126).

Vegetation noted on the subject parcel at the time of our survey was dominated by non-native plant species. The vacant project area is relatively level, and is presently covered with non-native grasses and annual weeds. Several low native shrubs—*uhouoa* (*Waltheria americana*)—were also noted on the study area. The ocean lies an estimated 40 meters to the west of this proposed landing site location.

RECEIVED AS FOLLOWS

The project area essentially lies *mauka* (east) of Honoopi'iiani Highway and to the south of the Lahaina Post Office (Figure 1). The Ka'anapali Sugar Train track borders the triangular parcel along its *mauka* side. On the *makai* side of the Honoopi'iiani Highway, the narrow strip of sand behind a boulder seawall is identified as Hanakao'o Beach Park or Wahikuli Beach Park, depending on the map one is looking at.

The estimated elevations of this c. 1-acre parcel are 6 to 8 ft AMSL. The proposed landing site is located on a portion of a larger parcel of land that is owned by the State of Hawai'i (TMK: 4-5-21: 15). The project area lies in Wahikuli *ohupua'a*, Lahaina District, Maui, Island.

### Background Historical and Archaeological Information

The basic emphasis of the historical and archaeological background information portion of the present archaeological inventory survey report will:

- present a brief record of traditional accounts of happenings in this general area of Maui, along with historic information on the early post-contact period, post-1850s, and plantation period to recent times;
- pull together and briefly summarize previous archaeological work in done in the area by presenting the various studies in brief descriptive and tabular form;
- summarize the impact of historical land use on the project area—i.e. destruction of evidence of precontact cultural use; and
- present a general settlement pattern for the project area, and predict the kinds of finds that might be expected.

### Traditional history

The name—Lahaina—is said to refer to the "cruel sun"—which is probably a reference to the droughts that effected the surrounding area from time to time (Pukui et al., 1974, p. 127). In precontact times, Lahaina itself was apparently a garden-like area, with taro *lo'i*, ditches (*auwai*) and separating embankments creating a verdant landscape.

Brackish-water and fresh water ponds (*loko*), were also present—the largest and most significant of these is Loko o Mokuhiina.

Pakala which lies to the south of the present project area, was the home of many high ranked chiefs and later on, members of the Royal family. It is sometimes referred to as Kalua 'ehu (pit of the red one), which is in reference to the lizard goddess or *mo'o*, associated with the adjacent Loko o Mokuhiina. This lake was traditionally connected with the Pi'ilani family of Maui through the *mo'o*, or lizard—a deity or *'aumakua* that traditionally took female form.

The *mo'o* of Loko o Mokuhiina were known by several names. One name is Kihawahine. This is also the name of the Maui chiefess who was a daughter of Pi'ilani. Here could be part of the connection that establishes the link to the Pi'ilani family. Kihawahine was the older sister of Kiha-a-Pi'ilani, a future king of Maui. Their sister Pi'ikea married Umi-a-Liloa, the descendants of whom formed the royal line on the island of Hawai'i (Klieger et al., 1995, pp. 20-21). Kihawahine lived most likely in the latter part of the 16<sup>th</sup> century.<sup>3</sup>

Upon the death of Kiawahine, it is said that she was transformed into the *mo'o* named Mokuhiina. Kamakau (1991, p. 85) records that Chiefess Kihawahine was transformed into a *mo'o* named Kalanainu'u. Mary K. Pukui maintains that Kihawahine was deified and made a *mo'o* goddess after her death. This *mo'o* goddess became one of Kamehameha I's favorite goddesses, and served as a "land holder" deity (Klieger et al., 1995, p. 22). According to Kamakau (1991, p. 85) Kihawahine, as a *mo'o*, had the *kapu moe*, and was the *ataua* of the high chiefesses of Maui during Kamehameha I's time.

A possible representation of Kihawahine was recovered from the island of Hawai'i in 1885<sup>4</sup>. It is reported that Kamehameha I carried this image around the islands on the Makahiki circuit. The female image had bleached hair and was once decorated with feathers. Its eyes were inlaid with pearl shell, and human teeth lined the mouth. It is also stated that the image was wrapped in a turmeric-dyed *rapa* cloth (Klieger et al., 1995, p. 26).

### The Kamehamehas in Lahaina

In the latter part of the 18<sup>th</sup> century a series of battles intended to unify all of the islands ensued, seriously disrupting the landscape and lifestyle of many areas of the archipelago. Lahaina did not escape this destructive struggle. Klieger comments on the warfare (1995, et al., p. 14):

*"In the mid-eighteenth century, Alapa'i-mui of Hawai'i went to war against the O'ahu Mo'i Pehelohani on Maui, and focused his energies on Lahaina. The tactics were somewhat unusual—Alapa'i dried up the streams of Kawa'ula, Kahana, and Kahama (probably the sources of water for Mokuhiina), toppled the terraces and 'auwai,*

<sup>3</sup> Another factor linking the Pi'ilani family with Loko o Mokuhiina, is the location of Pi'ilani's residence, which lies directly *makai* (Klieger et al., 1995, p. 20-21)

<sup>4</sup> The image of Kihawahine was drawn by Robert C. Barnfield, and is shown in Klieger et al., 1995, p. 25.

RECEIVED AS FOLLOWS

and destroyed the productive capabilities of the lo'i system below (Kamakau 1992:74). It is not certain if Lahaina agriculture and aquaculture rebounded between the numerous battles for interisland supremacy. But years after Alapa'i's destructive path, Lahaina productivity still seemed marginal: Porlock confirmed in 1786 that western Maui had been devastated by the wars of unification (cited in Speakman 1978: 72-73). Lahaina then appears to have had little in the way of provisions to offer the passing explorers, perhaps much less to feed itself.<sup>5</sup>

In 1795, after defeating Maui ruler Kahekili at the battle of Kepaniwai in Iao Valley in 1790, Kamehameha returned to Lahaina to provision his war fleet before continuing on to conquer the islands of Molokai and Oahu. Kamakau (1992) described Kamehameha's fleet of war canoes as stretching from Laniupoko on the south, to Mala on the north. Finding Lahaina the ideal place to rest and rejuvenate while preparing for the invasion of Oahu, he set up the first capital of the Hawaii. Following the unification of those islands, between the years of 1798 and 1802, Kamehameha commissioned the construction of a "Brick Palace" which was built at Keawa'iki point in Lahaina. The building was reported to have been built by two foreigners—Mr. Miller and a man named "Black Jack" Keaka. They had been living on Oahu prior to Kamehameha's invasion of that island in 1796, and following the battle of Nuuanu, they joined his side. The "Brick Palace" structure was two stories in height, and measured 41 by 15 feet<sup>6</sup> on the outside.

Kamehameha used the "Brick Palace" as his encampment headquarters during his residence on Maui in the year of 1802, while waiting for the assembly of his fleet of war canoes to carry out the invasion of Kauai. Several historians suggest that the structure was built as a residence for Queen Kaahumanu, but she apparently refused to live in it. She instead preferred to live in a traditional *hale pili* located a few feet to the south. A retinue of about 1,000 people accompanied the King and Queen during their stay. Their encampment probably extended southward to Loko o Mokuhinia.

By this time Lahaina had rebuilt most of its war-ravaged infrastructure, and was once again productive. A large taro pondfield *mauka* (inland) of the "Brick Palace" produced this sacred food for the royalty, and is referred to as the Royal Taro Patch in several sources.<sup>7</sup>

After leaving Lahaina to wage an unsuccessful battle to gain control of Kauai, Kamehameha established his court in Honolulu. On several occasions he revisited Lahaina. In 1812, he stopped to collect tribute at the time of the Makahiki, and to appoint his brother-in-law Kahekili Ke'caumoku<sup>8</sup> as governor of Maui (Klieger et al., p. 17).

<sup>5</sup> Several historians gave the measurements as 40 by 20 feet. The actual measurements were established during archaeological excavations undertaken in 1965 (Fredericksen and Fredericksen, 1965).

<sup>6</sup> Akoni Akana, President of the Friends of Moku oia, and Hawaiian cultural specialist, says that the reference is because the King himself actually worked taro there, demonstrating to his people the value and sacredness of physical labor (personal communication, 1998).

<sup>7</sup> He was the brother of wives Ka'ahumanu and Kahi'ehemalie (Barrere, 1975, p. 23).

Captain Louis Claude Desaulles de Freycinet visited the encampment at Keawa'iki in 1819, shortly after the death of Kamehameha. He observed the following (Klieger et al., p. 17):

"We landed at Lahaina and immediately visited the water supply [probably Pahumamama Stream] and chose a suitable place to set up our observatory. The governor, Keaumoku, came with us, and allowed us to use the platform of a neighboring *marai* [hale], and of a red brick house to set up our instruments. The red brick house was built by Tamehameha, who had originally wanted it to be a store, but the construction was so defective that, hardly finished, it began to sag in plain view. To the south was the habitation of the priests, and right next to it, a *marai*, constructed on a platform of stones, forming a sort of platform on the beach. The governor made our observatory taboo, so that we would not be bothered by curious onlookers. [Freycinet 1827-1839]."

Lahaina was attractive to foreign ships because of the favorable anchoring conditions found in the Lahaina Roads. The first whaling ships anchored off Lahaina in 1819, and the provisioning of these ships soon became a lucrative new venture. Following a few years later, missionaries from New England were added to the mix, and the wheels of acculturation began to turn even more quickly. In 1832, the missionaries conducted a census stating the population of Lahaina at 4,028.

RECEIVED AS FOLLOWS

RECEIVED AS FOLLOWS

et al., p. 33). She was probably entombed at Halekamani, which was located near the beach in the royal compound of Pakala. The Reverend Hiram Bingham wrote that:

*"...her remains were deposited in a very tight stone and mud house. Around the house was built a stone wall from 6 to 12 feet thick, and from 4 to 10 feet high. This was a great work. The stones were all carried by hand, a distance of about a mile, and then laid in clay." [Ibid., p. 36]*

Other observers noted that mourners formed an encampment around the tomb, in an effort to remain close to the beloved queen. Kaumuali'i, the ruler of Kaua'i and husband of Kaahumanu, died in 1823. He had requested prior to his death that he be laid to rest beside his friend, Keopuolani. In 1825, when the bodies of Kamehameha II and his queen, Kamehameha, were returned to the islands following their deaths from measles in England, their coffins were taken ashore at Lahaina. Here they lay in state for a short time—next to the coffin containing the remains of the king's mother. The entourage was joined by Princess Nahie'ena'ena and Kauikeaouli, now King Kamehameha III, for the final funerary trip to Honolulu.

Princess Nahie'ena'ena lived near her mother's tomb, in Pa Halekamani, preferring Lahaina to the capitol in Honolulu. She was married at Waine'e Church in 1835 to her father's daughter's (half-sister Kiliwehi) son, a young Big Island chief named Lefeiohoku. Following her marriage she then moved to Honolulu, and soon became pregnant. Some said that the child was fathered by Kauikeaouli, as their marriage would have been customary had the missionary influence not been so pervasive. Nahie'ena'ena gave birth to a child who died shortly afterward. She never recovered from the pregnancy, birth and death of her child, and died herself on December 30, 1836. Her body was returned to Lahaina, and a stately funeral procession wound through the town ending at Halekamani. There her remains were deposited next to those of her mother (Klieger et al., p. 52).

Kamehameha III (Kauikeaouli) immediately began to construct a mausoleum for his beloved sister at Moku'ula, the royal island in Loko o Mokuhinia. When completed her remains and possibly those of her deceased child, along with the remains of Keopuolani and other ali'i, were relocated there. Kamehameha III lived on the island for the next eight years—distancing himself from the pressures of government that existed in Honolulu, and allowing others to attend to the affairs of state.

In 1837, a missionary wife named Andelsia Lee Conde wrote about the tomb at Moku'ula:

*"...The room was a large chamber elegantly furnished with chairs, tables and large mirrors set under them, beautiful china matting and a small organ upon which he played for our entertainment. Nearly in the center of the room was placed a bedstead nearly the magnitude of 3 common bedsteads. Upon which was a bed neatly spread, and upon this were placed the three coffins, side by side, most splendidly ornamented. Each of these corpses were enclosed in 3 coffins—the first zinc—the second lead and the third or outside one of wood. These were covered with scarlet silk velvet, put on with a*



Photo 1 - View of Moku'ula and Mokuhinia pond in c. 1910. Photo from the Hawaii State Archives (in Kupau, 2001, p. 62).

While Kamehameha I moved the center of government to Honolulu, other members of the royal family remained in Lahaina. Kamehameha I died in 1819 and his son, Liholiho was crowned Kamehameha II. Liholiho's mother, Keopuolani, the last of the female ali'i whose power was sacred, continued to reside in Lahaina. In 1823 she died at the age of 54. Prior to her death she had requested a Christian funeral—issuing the strongest prohibitions against all traditional funeral customs—save wailing (Klieger

*multitude of brass nails—gilded plates, with their names & c. upon them, and various gilded ornaments, that gave us almost the impression but that of a tomb. ...* [cited in *Ibid.*, p. 55]

King Kamehameha III eventually married Kalama, who bore him two sons, both of whom died somewhere between 1839 and 1842.<sup>8</sup> The sister of his new *aihane*, Keoni Ana (John Young II) bore Kamehameha III twin boys, although the two were not married in the Christian sense. One of the twins was Albert Kuniūkeka Kūka'ilimoku (1851-1903), the only royal child that survived infancy. Although raised by Queen Kalama, the grandson of Kamehameha I was treated with scorn by the Calvinist Christians, even though he served as a House representative in 1880 (*Ibid.*, p. 65).

In 1840, Kamehameha III began building a western-style coral-block "palace" called Hale Pū'ūla (House with the Iron Roof). A reference to the structure is found in Thurston's *Almanac* (1907, p. 173 IN Frederickson and Frederickson, 1988):

*"There was an attempt at a building of a so-called palace which answered for a time as the show place, a name which should properly attach itself to royalty. It was also occupied part of the time by the court of the kingdom. It was more of a curiosity than an adornment. It seemed out of place amid all the tropical profusion and exuberance of natural life to see this building intruding into the atmosphere. With some idea of making the building larger, they undertook to double its length and made a still further blotch on the landscape. Fortunately so far as beauty was concerned it was partly dismantled and never finished and remained quite a conspicuous figure on the beach. However, in later years, they had to transport its stones to the premises of the old far where they now appear in the government building which is much more in harmony with the surroundings."*

The *Polyesian*, in a July 25, 1840 article, reports that (*Ibid.*):

*"Lahaina contains many excellent and unoccupied houses which would find ready tenants could they be transported to Honolulu. The palace, as a huge graceless, incomplete, two-story building, encircled by a wide verandah... is a monument of a waste of government means which do credit to some old and dissolute monarchy verging to its downfall. Its site is the sandy beach, instead of as it might have been had taste been consulted, a quarter of a mile back, amid one of the many beautiful groves that give Lahaina so picturesquely an appearance. Mr. Baldwin's church and the adjoining house are most delightfully situated in this respect and are quite unique in their low ensemble, for Hawaiian scenery. The white turrets of the church peer through the trees most prettily. But this palace, on which work seems to be still going on, is on a scale to accommodate a population in itself, nearly as large of that of Lahaina. The interior is not only wretchedly arranged as to rooms, but positively mangled; special pains being manifest to prevent ventilation, and make as many ill-shaped and comfortless apartments as possible."*

<sup>8</sup> Named Keaweawe 'ūboakalani I and II, these were the last immediate family members of Kamehameha III to be placed in the tomb at Moku'ūla (Klieger et al., p. 65)

Judging from these comments, few were impressed with the building. By 1848 it was being used as a courthouse—until it was severely damaged by *kaauāla* winds in 1858. Some of the remaining stones and coral blocks were incorporated into the Lahaina Court House, which still stands in Lahaina overlooking the small boat harbor (Frederickson et al., 1988). Other coral blocks found their way into structures elsewhere in Lahaina.

In 1845 the royal court moved back to Honolulu. Kamehameha III took his trusted friend Keoni Ana and his wife, Julia Alapa'i<sup>9</sup> along with him. In that same year, upon the death of dowager Queen Kekauluohi—*hānai* mother of Queen Kalama and the last female *huhina nui*<sup>10</sup>—Kamehameha III appointed Keoni Ana *huhina nui* (Klieger et al., p. 69). When Keoni Ana became the Minister of Interior, he carried out the land reform known as the Mahele in 1848. King Kamehameha III died on December 16, 1854—leaving behind a constitutional government and a totally new land system (Klieger et al., p. 71).

#### Discussion

The significance and sacredness Lahaina was established long before the unification of the islands by Kamehameha I. The Pū'ilani family lived in the Lahaina area, *maka'i* of Loko o Mokuhinia, probably near the location of Kamehameha III's Hale Pū'ūla. Another connection to Mokuhinia comes with the legendary transformation of Pū'ilani's daughter into the *mo'o*, Kihawahine. This deity became the *'aumakua* of Kamehameha the Great, who probably carried an image of her with him as he traveled around the island at Makahiki time. Prior to the arrival of Kamehameha, Kahekiti had been ruler of all of the islands except for Hawaii. He maintained his home and royal court at Lahaina until his death in 1794.

After Kamehameha made Lahaina the capitol in 1802, the area between the point (Keawa'iki) on which he built the "Brick Palace", and Loko o Mokuhinia became the residences of chiefly families associated with the Kamehamehas.

The royal court moved to Honolulu, but Lahaina still remained an important place, especially after the succession of King Kamehameha III to the throne. During the tumultuous times following the deaths of Kamehameha I and II, Kamehameha III often retreated to Lahaina and Lake Mokuhinia and the royal island within the lake—Moku'ūla. On this island he built a mausoleum for his mother, sister, and other *ali'i* connected with the royal family.

<sup>9</sup> Julia Alapa'i is the granddaughter of Alapa'i-nui, the king of Hawaii who ravaged Lahaina in the mid-1700s.

<sup>10</sup> Kaahumanu was the first, followed by Kina'u. Kekauluohi was appointed *huhina nui* after the death of Kina'u in 1838. Kekauluohi was the daughter of Kabeleimale, who was a sister of Kaahumanu. Kabeleimale was married to Ulumakeihei Hoopili, the governor of Maui. Kekauluohi's father was a half-brother of Kamehameha I (Kame'elehewa, 1992, p. 125).

After the death of his sister, he remained in Lahaina until 1845, when the court was permanently moved to Honolulu. Lahaina continued to be the residence of important people throughout the 19<sup>th</sup> century. King David Kalakaua held title to property north of Loko o Mokuinia, and his heirs kept title to the land for two decades into the 20<sup>th</sup> century. William Charles Lunailo (later King Lunalilo) also held title to the property bordering on the lake.

#### The Mahele

During the 1840s, recognizing the declining population and the need for change in land tenure, the legislature acted on several resolutions that transformed the traditional land stewardship practices to the western style of land ownership by individuals. King Kamehameha III divided up the lands among the highest-ranking *ali'i* (chiefs), *konohiki* (land managers) and favored *haoles* (foreigners). One-third of the land would be retained by the king (crown lands)—another third went to 245 of the highest ranking *ali'i* (*konohiki* lands), and the remainder set aside for the *maka ainana*.

The entire *ahupua'a* of Hanakao'o (LCA 7715M) was awarded to Lot Kapuwaia (King Kamehameha V). He died intestate on December 11, 1872, and his half-sister Ruth Keelikolani was declared his heir. Another award, LCA 76 was to William Shaw, a prominent *haole* in Lahaina, who was rewarded for his loyalty to the Hawaiian Royalty by large sections of land in Kaanapali. When he died, his property became part of the Lahaina Sugar Company—later to be absorbed into Pioneer Mill Company.<sup>11</sup> Only 2 awards are listed for the *ahupua'a* of Waihikuli in the Indices of Land Commission Awards—LCA 477F to P. Keliipio is for 1 acre, 2 roads, 3 rods, and LCA 7724 is to Poholapu for 12 acres. The remainder of the land (some 2,194 acres) of Waihikuli was identified as Crown Land.

#### Post 1850s

The population of West Maui continued to decline in the second half of the 19<sup>th</sup> century. In 1846, a census of Lahaina was taken, and reported that there were 1062 native children under the age of 14—589 boys and 473 girls. Of native adults, there were 1198 men and 1185 women listed, totaling 2383. Also reported were 94 foreigners—88 men and 6 women; 7 boys and 11 girls under the age of 14. There were 882 grass houses, 155 adobe houses, and 59 of stone or wood (The Friend, June 1, 1846 IN Taylor 1928, pp. 56-57).

The Pacific whaling industry, which had fueled the Hawaiian economy during the 1840s, collapsed in the 1860s, prompted by the discovery of oil in Pennsylvania a decade

<sup>11</sup> Shaw's heirs conveyed land to Henry Tutton, Paul Isenberg and Walter Hiner and Lahaina Agriculture Company. This company became part of Pioneer Mill Company in 1882. Previous usage was for sugarcane cultivation and cattle pasture. William Shaw was reported to have been buried in the cemetery atop Black Rock (Pu'u Kaka'a), from which burials were removed at the time of the construction of the Sheraton-Maui in the 1960s. His remains were reinterred in Wai'ohu Cemetery in Lahaina, according to informants (Fredericksen, 1998).

or so earlier. Those who had worked in the support occupations that supplied whaling ships since the 1840s had to look elsewhere for their livelihood.

Beginning with the introduction of coffee in the 1840s, the importance of commercial production of single-crop agricultural products took on new status. Thrum (1876, pp. 46-48; IN Davis, 1977) noted that coffee was introduced and its cultivation expanded into favorable lands on Maui by the mid 1800s (1847-50). Although these locations were not specified, it is likely that they included the major leeward valleys of West Maui. By the 1860-1870s, a coffee blight had seriously disrupted coffee production, and coffee lands in the *kula* lands above the valleys began to shift over to the cultivation of sugar cane. However, the Government of the Hawaiian Republic continued to advocate the continued cultivation of coffee as late as 1896. By 1900, the production of coffee was so minimal, that it was not even recorded in the Hawaiian Almanac and Annual for that year (Ibid., pp. 8-9).

However, sugar—not coffee—became the dominant crop in this region of Maui by mid-century. In 1848, a sugar mill commenced operation in Lahaina—run by Judge A. W. Parsons. In 1854, a whaling vessel stopped in Lahaina on a return voyage from Tahiti, carrying 2 varieties of sugar cane common in Tahiti. These were given to the U.S. Consul in Lahaina, who planted them in his garden. One variety proved to be hardy and productive in the harsh Lahaina climate, becoming known later on as "Lahaina" cane. It was the predominant variety for the next 50 years (IRHP, 1974). In 1859, storeowner, Henry Dickenson began the Lahaina Sugar Company. In 1860, 3 partners<sup>12</sup> established Pioneer Mill Company, and then bought out the bankrupt Lahaina Sugar Company in 1863.

Another plantation was formed by Lot Kamehameha<sup>13</sup> (Lota Kapuwaia) and others in 1870. Although there is not specific mention of the location of the lands to be cultivated, it is very likely that they were part of LCA 7715M, the 3852-acre *ahupua'a* of Hanakao'o, which had been granted as an *ali'i* award to him in 1848. He also apparently leased Crown Lands in Waihikuli *ahupua'a* as well for sugarcane cultivation. He died intestate in December of 1872 and Princess Ruih, his half-sister, was declared heir to his lands. This event must have had a bearing on the operation of the plantation, which was sold to Pioneer Mill a few years later.<sup>14</sup>

H. Hackfeld became the agent for Pioneer Mill Company in 1877. In 1882, a railroad from the mill in Lahaina to a point north of Puukolii Village in Hanakao'o was begun. It ran the 5-mile distance at about 350 feet AMSL (Conde, p. 169). The steam driven rail engine could deliver 120 loads of cane each day, as opposed to 20 loads, hauled in carts pulled by 6 to 8 bullocks (Ibid.). The railroad continued to operate until 1952, when the job of hauling harvested sugarcane from the fields to the mill was taken

<sup>12</sup> James Campbell, Henry Tutton, and James Dunbar (Conde and Best, 1973, p. 252).

<sup>13</sup> King Kamehameha V, who ruled from 1863 to 1872, was the grandson of Kamehameha I, and was called "the last great chief of the olden type" (Day, 1984, p. 69).

<sup>14</sup> Pioneer Mill Co. dominated commercial sugarcane agricultural production in West Maui until it closed in 2001.

RECEIVED AS FOLLOWS

over by huge turntable trucks. Generally, the truck roads followed the old railroad route where possible.

In the heyday of sugar production, Pioneer Mill provided electricity, water, and medical care to not only its workers, but to the town of Lahaina. It ran the largest mercantile on Front Street—Lahaina Dry Goods. The building was said to have been built as a possible refuge for Kaiser Wilhelm, prior to World War I. Because of the fact that German nationals controlled it in 1917<sup>15</sup>, it was seized by the government and sold to Americans as America entered World War I. Quickly, the company was renamed American Factors, and later became known as Amlac, Inc.

In the early part of the 20<sup>th</sup> century, Pioneer Mill controlled c. 12,500 acres of land on the west side of Maui—lands which were considered some of the rockiest of the plantation lands in Hawaii. This rockiness is commented upon in Gilmore's The Hawaii Sugar Manual (1936: 200, IN Haun, 1999, p. 15):

*"Owing to the roughness of the terrain, very little cultivating is ever effected with implements drawn by either tractors or mules. Practically all is done with the hoe. Forty percent of the land is so completely covered with rocks that plowing is impossible, and preparing land for planting is done with pick and shovel. In these fields the rocks are cleared away and built into a series of stone walls from 5 to 6 feet apart and often 3 feet high.*

*These stone walls form the banks of the cane row; and between these walls the ground is softened up with pick and then planted. The soil in these areas, although extremely difficult to get at, is very fertile and yields as great as from 90 to 100 tons per acre can be secured off such fields.*

Another impact on the landscape associated with sugar production is related to water use. The plantation water system included man-made ditches, tunnels, pumps, reservoirs, intakes, wells, flumes, siphons, and various types of pipes to provide water for the growing sugarcane. The longest ditch in West Maui is the Honokohau Ditch, built between 1904 and 1913, which starts at Honokohau Stream intake and runs at about 700 feet elevation all the way south to Lahaina (Site 1591)—ending at Waiikuli Reservoir—*mauka* of the project location. The Honokohau Ditch is also extensive, and extends from Honokohau Stream to the same general area above the project area, at a higher elevation of c. 900 feet. This system was begun in 1917 with the construction of a 1.55 mile tunnel, which was c. 6 by 6 feet in diameter, and eventually was lined with concrete. It started at 1525 feet AMSL, and within a year it could feed the Honokohau water system with 50 mgd if needed. In the 1940s, Pioneer Mill lost the right-of-way for the first section of the main tunnel, and had to build a second tunnel on land that they owned outright. There are now 2 tunnel mouths sitting c. 30 feet apart at the Honokohau intake (Wilcox, 1995, p. 134).

Several reservoirs are present. These include Puukolii, Hanakao'o, and Homer Reservoirs to the north, and Waiikuli and Crater Reservoirs directly *mauka* of the project area. Puukolii Reservoir is a six-million gallon reservoir. Informants reported that they

<sup>15</sup> H. Hackfield and Company was the managing agent for Pioneer Mill at the time.

used to fish in the reservoir when they were children (Orr, 2002, p. 103). Hanakao'o Reservoir was also known as A-1 or #210, according to informants, because it was near A-1 land designation and Field #210 (Ibid., p. 104). It was built in the 1920s. Homer Reservoir was also built in the 1920s, was concrete lined and had a capacity of 23-million gallons. It "broke" in 1995, and when it was rebuilt it was considerably smaller—about 6 million gallons according to informants (Ibid.).

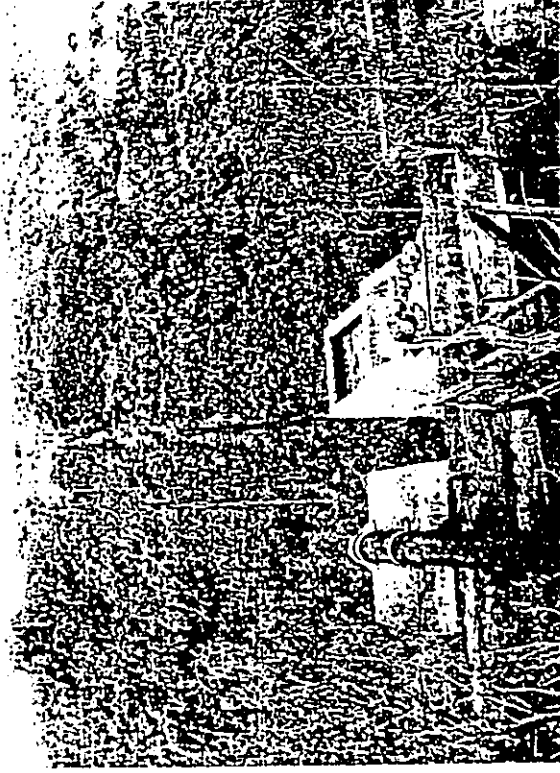


Photo 2 - This is a portion of the Honokohau Ditch water system (Site 1591) where it crosses Honokohau Gulch—view to the north.

More than a century of commercial agriculture created a completely different landscape. A water-delivery system essential to the success of sugarcane cultivation, turned the naturally arid *mauka* area into what appeared to be a lush green field when viewed from sea. A transportation system connected the far-flung fields to the mill in Lahaina. As mentioned before, Pioneer Mill operated a railroad system that ran from the mill in Lahaina north to Ka'anapali Landing and Napili, and to the south as far as Ukunehame. The railway passed on the *mauka* side of the present project area, and was abandoned in 1952 when the hauling of sugarcane to the Pioneer Mill factory in Lahaina was given over to trucks. A modern replica of the old sugarcane train runs along the



same general route but at a lower elevation, taking tourists for a nostalgic journey along the coast.

Another more recent development for tourists and locals alike is Waihikuli State Wayside Park (or Hanakao'o Beach Park), which is *makai* of the project area. It is described below:

"Waihikuli means 'noisy place' and is an alternate name of the ahupua'a of Mala which includes this park. Waihikuli State Wayside Park is one of the most popular beach parks in West Maui. It is usually crowded with picnickers, swimmers and sunbathers, especially on weekends and holidays. Waihikuli's popularity is undoubtedly due to its size, its good swimming conditions, its excellent facilities, and its proximity to Lahaina....Almost the entire shoreline is lined with a retaining wall composed of large boulders." (Clark, 1989, p. 60)

Other late 20<sup>th</sup> century changes to the immediate area of the present project location are the construction of the Lahaina Civic and Recreation Center, Lahaina Police and Fire Stations, Lahaina District Courthouse and the Lahaina Post Office.

In 2001, Pioneer Mill closed down—leaving many in Lahaina stunned by the abruptness of the move. The once lush appearing cane fields have since dried up and water is an issue of contention between Native Hawaiians wishing to maintain an ancient lifestyle in what remains of their communities, and large-land developers of luxury communities.

#### PREVIOUS ARCHAEOLOGICAL STUDIES TO THE NORTH OF THE OF PROJECT AREA

A number of archaeological studies have been undertaken in last 30 years, to the north of the project area (Davis, 1977; Hommon, 1982; Jensen, 1989, 1991; Jensen and Mehlichick, 1992; Graves, 1993; Fredericksen and Fredericksen, 2003—refer to Table 1). All conclude that the area has undergone severe degradation due to plantation agricultural practices over the last century. Generally, it is agreed that if any physical evidence of precontact land use remains undisturbed, it would be within the large *mauka* gulches such as Hanakao'o, Hahaione and Waihikuli, and Kahiona Gulches.

The streambeds in this part of Maui are noted as being areas in which *taro* was intensively cultivated during late precontact times. Relatively wide valley floors, and abundant water provided the ideal environment for this subsistence activity.

RECEIVED AS FOLLOWS

Jensen and Mehlichick (1992) make the point that Hanakao'o and adjoining ahupua'a have been heavily impacted by early historic and continuing agricultural activities. They conclude: "An unfortunate consequence was that any attempt to test 'ahupua'a-wide settlement model' was not possible" and that "it may never be possible to achieve a level of understanding for Hanakao'o comparable to that which has been achieved at other less severely affected areas on Maui." (Ibid., p. 4)

Graves (1993) continues along the same vein:

"One point which should be emphasized concerning the documentary information is the fact that a high percentage of sites in the Lahaina District generally, and Hanakao'o and adjacent ahupua'a in particular, have been lost to early historic and continuing agricultural activities. One consequence of this is that no studies have been attempted, to date, in which an ahupua'a-wide settlement model has been developed on the basis of a zonal study involving sites from coastal through upland zones. While some indirect information is available in the ethnographic and historic literature, it is not possible, to date, to adequately test or evaluate this information on the basis of archaeological data. In short, due to the large scale destruction of sites in this area, it may never be possible to achieve a level of understanding for Hanakao'o comparable to that for other, less severely affected, areas on Maui and elsewhere within the Hawaiian archipelago." (Graves, 1993, p. 3)

Several conclusions can be drawn from settlement models developed elsewhere on Maui, however. In the coastal zone, the occurrence of human burials is likely to be common in the sand dune areas, along with habitation sites. The former has proved to be the case in Ka'anapali—where hotels developed on the shoreline encountered numerous burials. Evidence of habitation sites in the coastal zone is more rare, however.

In the valleys that extend inland, agricultural sites, sometimes associated with permanent habitation sites would be expected, as well as rock overhang temporary habitation shelters. Petroglyphs—perhaps associated with *makai-mauka* trails—would also be expected. Previous archaeological studies have borne out this expectation.

In 1989, PHRI conducted an archaeological inventory of the 1,200-acre Lahaina Master Planned Project Site in Waihikuli ahupua'a, which surrounds the present project area (Jensen, 1989). Twelve sites containing 44 components were identified and recorded, 11 of which were newly located resources. These included overhangs or caves, platforms, walled enclosures, petroglyphs, graves, agricultural terraces, and a single historic agricultural road alignment. All of the sites are located in the gulches of Kahiona and Hahaione—*mauka* of the current study parcel.

In 2002, Xamanek Researches carried out an inventory survey of 2,700 acres of the Ka'anapali 2020 Development Project contained in Honokawai and Hanakao'o ahupua'a—north of the present project area. A total of 81 new sites were identified and recorded, and several previously numbered sites were relocated. The site types identified

# CORRECTION

THE PRECEDING DOCUMENT(S) HAS  
BEEN REPHOTOGRAPHED TO ASSURE  
LEGIBILITY  
SEE FRAME(S)  
IMMEDIATELY FOLLOWING

same general route but at a lower elevation, taking tourists for a nostalgic journey along the coast.

Another more recent development for tourists and locals alike is Waihikuli State Wayside Park (or Hanakao'o Beach Park), which is *makai* of the project area. It is described below:

"Waihikuli means 'noisy place' and is an alternate name of the ahupua'a of Mala which includes this park. Waihikuli State Wayside Park is one of the most popular beach parks in West Maui. It is usually crowded with picnickers, swimmers and sunbathers, especially on weekends and holidays. Waihikuli's popularity is undoubtedly due to its size, its good swimming conditions, its excellent facilities, and its proximity to Lahaina...Almost the entire shoreline is lined with a retaining wall composed of large boulders." (Clark, 1989, p. 60)

Other late 20<sup>th</sup> century changes to the immediate area of the present project location are the construction of the Lahaina Civic and Recreation Center, Lahaina Police and Fire Stations, Lahaina District Courthouse and the Lahaina Post Office.

In 2001, Pioneer Mill closed down—leaving many in Lahaina stunned by the abruptness of the move. The once lush appealing cane fields have since dried up and water is an issue of contention between Native Hawaiians wishing to maintain an ancient lifestyle in what remains of their communities, and large-land developers of luxury communities.

#### PREVIOUS ARCHAEOLOGICAL STUDIES TO THE NORTH OF THE OF PROJECT AREA

A number of archaeological studies have been undertaken in last 30 years, to the north of the project area (Davis, 1977; Honmon, 1982; Jensen, 1989, 1991; Jensen and Mehalchick, 1992; Graves, 1993; Fredericksen and Fredericksen, 2003—refer to Table 1). All conclude that the area has undergone severe degradation due to plantation agricultural practices over the last century. Generally, it is agreed that if any physical evidence of precontact land use remains undisturbed, it would be within the large *mauka* gulches such as Hanakao'o, Hahaakea and Waihikuli, and Kahoma Gulches.

The streambeds in this part of Maui are noted as being areas in which *taro* was intensively cultivated during late precontact times. Relatively wide valley floors, and abundant water provided the ideal environment for this subsistence activity.

Jensen and Mehalchick (1992) make the point that Hanakao'o and adjoining ahupua'a have been heavily impacted by early historic and continuing agricultural activities. They conclude: "An unfortunate consequence was that any attempt to test 'ahupua'a-wide settlement model' was not possible" and that "it may never be possible to achieve a level of understanding for Hanakao'o comparable to that which has been achieved at other less severely affected areas on Maui." (ibid., p. 4)

Graves (1993) continues along the same vein:

"One point which should be emphasized concerning the documentary information is the fact that a high percentage of sites in the Lahaina District generally, and Hanakao'o and adjacent ahupua'a in particular, have been lost to early historic and continuing agricultural activities. One consequence of this is that no studies have been attempted, to date, in which an ahupua'a-wide settlement model has been developed on the basis of a zonal study involving sites from coastal through upland zones. While some indirect information is available in the ethnographic and historic literature, it is not possible, to date, to adequately test or evaluate this information on the basis of archaeological data. In short, due to the large scale destruction of sites in this area, it may never be possible to achieve a level of understanding for Hanakao'o comparable to that for other, less severely affected, areas on Maui and elsewhere within the Hawaiian archipelago." (Graves, 1993, p. 3)

Several conclusions can be drawn from settlement models developed elsewhere on Maui, however. In the coastal zone, the occurrence of human burials is likely to be common in the sand dune areas, along with habitation sites. The former has proved to be the case in Ka'anapali—where hotels developed on the shoreline encountered numerous burials. Evidence of habitation sites in the coastal zone is more rare, however.

In the valleys that extend inland, agricultural sites, sometimes associated with permanent habitation sites would be expected, as well as rock overhang temporary habitation shelters. Petroglyphs—perhaps associated with *makai-mauka* trails—would also be expected. Previous archaeological studies have borne out this expectation.

In 1989, PHRI conducted an archaeological inventory of the 1,200-acre Lahaina Master Planned Project Site in Waihikuli ahupua'a, which surrounds the present project area (Jensen, 1989). Twelve sites containing 44 components were identified and recorded, 11 of which were newly located resources. These included overhangs or caves, platforms, walled enclosures, petroglyphs, graves, agricultural terraces, and a single historic agricultural road alignment. All of the sites are located in the gulches of Kahoma and Hahaakea—*mauka* of the current study parcel.

In 2002, Xamanek Researches carried out an inventory survey of 2,700 acres of the Ka'anapali 2020 Development Project contained in Honokowai and Hanakao'o ahupua'a—north of the present project area. A total of 81 new sites were identified and recorded, and several previously numbered sites were relocated. The site types identified

during the survey include single and multiple component dry land agricultural sites, and one large wet valley agricultural site in Honokowai Gulch. These agricultural sites are composed primarily of terraces. Other identified site types include temporary and more permanent habitation areas, several petroglyph panel sites, possible ceremonial areas and shrines, possible burial features, and plantation era sites. Radiocarbon dates from rock shelter overhangs yielded mid to late precontact dates, and some showed continued use into modern times. All of the precontact finds were located in the gulches that had not been cultivated during the plantation era (Fredericksen and Fredericksen, 2003).

**Table 1**  
**Listing of Previous Archaeological studies in vicinity of project area**

Date	Authors	Study area	Findings	Location
1931	Walker	Island wide survey of religious structures	Described those temples that remained in Lahaina	Lahaina area
1963	Fredericksen, D. and Fredericksen, W.	"Brick Palace" of Kamehameha I, Kawachi Point, Lahaina	Foundation measuring 13 by 41 feet—hand-made bricks	Lahaina
1970	Fredericksen and Fredericksen	Data recovery "Brick Palace" and preparation for display	"British Bond" brick laying techniques	Lahaina
1973	Homonan and Connolly	Statewide inventory	Complex—petroglyphs, rock shelter and irrigation ditch	Kahona Stream
1973	Homonan	Walk-through Reconnaissance Survey—Kahona Flood Control project		Kahona Stream
1978	Hammill	Monitoring Mala Wharf Boat Ramp		Mala Wharf
1978	Sixso	Mala		Kahona Stream
1980	Aho and Morganstein	Subsurface testing at Kahona Stream mouth		"Sawd Bin"—Hihakua Beach
1981	Kizu	Recon. Hihakua's Beach Park	Site 1204—grinding stone for adzes	Land directly north of Honohi'ihi'i Highway—Hihakua Gulch
1982	Homonan	Recon. North and South Beach Mauka—240 acres	Survey of 240 acres—10 sites: ag. complex, walls, historic roads, animal enclosure. Sites 2001 through 2010	Mala Wharf area
1988	Hiam	Kahona Flood Control Project	Alamahi Fishpond—historic bories, and precontact date AD 1260 to 1640	Kamehameha Iki Park—Lahaina
1988	Fredericksen, D. and Fredericksen, W.	Hale Pi'ula—coral building built by Kamehameha III	Coral-burning furnace to produce lime—building foundation probably under existing pavement	Lahaina town
1989-1990	Fredericksen and Fredericksen	Plantation Inn Swimming Pool—Lahainauna Street	Coral block—probably from Hale Pi'ula; scattered displaced	

Year	Author(s)	Study area	Findings	Location
1989	Fredericksen and Fredericksen	Aut. Site on Waieae Street, Lahaina town	Precontact artifacts	Lahaina town
1989	Jensen	Arch. Inventory survey of Lahaina Master Planned Site—1200 acres south of Honohi'ihi'i Hwy.	Historic artifacts—some traditional items mixed with early post-contact ones. 12 sites—overhangs, walled enclosures, platforms, ag. terraces, petroglyphs, possible burial	Waikuli'ohapewa'a
1992	Jensen	Arch. Inven. Survey of Honopiihahi realignment	Site 2410—Complex of habitation features Site 2489—ag. complex w/ probable burials Site 2490—ag. Complex. Site 2497—on ridge between 2 branches of Honokowai Stream. 3 backhoe trenches—no precontact materials—mostly fill	Hihakua Gulch
1993	D. Graves	Inven. Surv. Shizatae-Mauli Redevelopment Project	Remnants of island, 2 casket burials	Honokowai Gulch Pu'u Kaka'a
1995	Kilger, et al.	Moku'ua—Royal Tomb of Kamehameha III	Precontact habitation area—Site 4118	Lo'o-o Moku'ua-Lahaina
1996	Majie, et al.	Pikaele'i LCA—east shore of Lo'o-o Moku'ua	Precontact site remnant—Site 4690—AD 1475-1665. Coral block probably from Hale Pi'ula in LCA boundary wall	Lahaina
1999	Fredericksen, E. and Fredericksen, D.	Monitoring Report for Shearson-Mauli Redevelopment Project	Random finds of human skeletal remains—7 primary burials 2 burials, 2 precontact habitation sites, historic artifacts	Pu'u Kaka'a
1998	Fredericksen, D.	Monitoring of Front Street Improvements from Lahainauna Road to Shaw Street	Precontact site—AD 1470-1660	Front Street Lahaina
1999	Boethwick and Hamann	Lahaina Courthouse Inventory Survey	Precontact site—AD 1470-1660	Front Street
2001	Fredericksen, D. and Fredericksen, E.	Kamehameha III Elementary School monitoring program	Sites 4982-84, 5174—precontact sites with numerous burials; 17 pig tusk ivory beads for juvenile precontact artifacts	Location of LCA's belonging to Kamehameha III and Lanailo—Front and Canal Streets
2002	Fredericksen, E. and Fredericksen, D.	Front Street property, monitor of Lahaina Courthouse	Historic artifacts in subsurface refuse pit	Front Street
2003	Fredericksen and Fredericksen	Kaunapali 2070 Development Project	2,700 acres—81 previously unidentified sites scattered in 5 gulches—wet and dry agricultural sites, rock overhang shelters, ceremonial areas, plantation era sites.	Honokowai, Hanalei and Waikuli Hihakua Gulches

### Previous archaeological work in Lahaina and environs

To the south of the present project area is Lahaina—the former Capital of the Hawaiian kingdom. The first archaeological work around the Lahaina area was the inventory of religious structures compiled by Winslow Walker in 1929 and 1930 (Walker, 1931). He listed 4 *heiau* in the Lahaina environs—Wailehua *heiau*, located at Makia Beach in southern Lahaina (Site 6), Halekumukalani *heiau*, located in the Puhuehuni cane fields above Lahaina (Site 7), and Apahua *heiau* (Site 8) located in the cane fields above Waime'e, and Haluluokoaoa *heiau* (Site 11), located at the southeast corner of the so-called royal coconut grove at Mala.

Wailehua *heiau* is the structure that was dismantled at the death of Queen Keopuolani (Majors et al., 1996, p. 13). The stones were carried from its location at the shoreline to the tomb, Halekumukalani, which held the remains of the queen until they were repositioned in the mausoleum on Moku'ula. Wailehua *heiau* is described as measuring 130 by 80 feet in Thurum (1909), and was said to have been built by Kauihi-ai-mokukama, the son of Kekaulike, in or around 1738 (Walker, p. 109).

Halekumukalani *heiau* was a small sacrificial structure (*huakini*) in the cane fields above (*mauka*) of the Pioneer Mill Company railroad. It was totally destroyed at the time of Walker's survey (*ibid.*). Apahua *heiau* is another structure that has been totally destroyed by cane cultivation. According to Thurum, it was built by "... Hua-nui, about 50 years later than Hua-a-Pohaku-kaina (*ibid.*).

Haluluokoaoa *heiau* is described as "a large *heiau* for human sacrifice of which but few fragments of walls remain. There is some coral to be found in their construction, but most of the stone has been removed for rock ballast on the railroad. The site has been further cleared and leveled to make a playground, and what remains has been used for a dump of debris of every kind, and the whole is heavily overgrown with kiawe bushes (*ibid.*, p.114).

Walker does not mention the existence of the Alaloa ("Long Road") in this part of Maui, though portions of this trail that encircled the island remain intact elsewhere. Handy and Handy (1972, p. 490) mention that it was "obliterated in the Lahaina area and beyond by the cultivation of cane and pineapple".

### Mala and Kahoma

Proposed flood control improvements for Kahoma Stream were begun in the 1970's and resulted in several archaeological studies being undertaken (Connolly 1974, Hommon, 1973, Ahlo and Morganstein, 1980). Development of Mala Wharf Boat Launch Ramp also resulted in several archaeological studies, including those of Simolo (1975), Davis (1974) and Hamman (1978). The latter projects identified numerous burials, principally post-contact ones, located in the sand dunes inland of Mala Wharf.

In 1988, PIIRI undertook a subsurface reconnaissance survey in the vicinity of Alamithi Fishpond. Nineteen backhoe trenches yielded mainly historic bottles dating

from around the turn of the 20<sup>th</sup> century. In addition, radiocarbon samples returned precontact dates between AD1260 and 1640 (Haum, 1988, p. 17). It is interesting to note that precontact fishponds located in the Lahaina area were also used as repositories of late 19<sup>th</sup> and early 20<sup>th</sup> century rubbish.

### Brick Palace of Kamehamecha I

In 1965, Xamanek Researches (Frederickson and Frederickson, 1965) undertook a project to determine the nature and location of the "Brick Palace" of King Kamehamecha I on Keawa'iki point. With the aid of several historical documents, the location was narrowed to an area immediately *makai* of the Lahaina Library. A *heiau* was said to have existed near the mouth of Pahuamamama Stream, and probably served as the location for the structure. Finds from subsurface testing included the foundation of the brick building. It measured 41 feet by 15 feet.

The remaining brick walls were 1 to 4 courses in height, and the bricks had been arranged in what was called "British bond". The bricks were not imported, but rather manufactured of local clays, probably from the nearby taro pondfield, sometimes identified as the "Royal Taro Field". They were primitively fired, resulting in rather poor quality bricks—some under-fired and some over-fired. Shapes were not always consistent.

The structure was built on a stone platform, probably the unnamed *heiau*, which had been paved with small, waterworn pebbles. The bricks were bonded with a pinkish-colored, poor quality mortar, which was produced by burning coral to lime, and mixing that lime with beach sand and soil. Because of the lack of a solid foundation, the brick structure began to crack and sag, almost immediately after its completion. Consequently, to cover the cracks, the outside of the building was covered with a lime and sand plaster sometime in the 1820s or 30s.

The archaeological findings corroborated historical observations in terms of the general location, and the nature of the construction. However, the true size of the building was somewhat different from historical records, as most described the structure as measuring 20 by 40 feet.

In 1969 Xamanek Researches re-excavated the "Brick Palace" walls to determine what portions, if any, were still in a state of preservation that was good enough for public display. Additional excavation was also undertaken in the interior of the structure, in order to obtain additional archaeological details and information. Portions of the walls that were still reasonably intact were prepared for display. In the northwest corner of the structure there were 3 to 4 courses of brick that were still *in situ*, and in a good state of preservation. The brick laying technique used was "British Bond", characterized by created with 2 bricks running parallel and 2 brick horizontal. These were exhibited in an enclosure, which was covered with plexiglass. Unfortunately, the prevailing public attitude at that time was not focused on history or preservation, and within a few months of completion of the exhibit, vandals had broken the plexiglass dome covers, exposing

the contents. Subsequently, deterioration of the architectural remains of the palace within the display areas occurred (Fredericksen and Fredericksen, February 1970).

#### Hale Pi'ula

In 1988, Xamanek Researches had the opportunity to conduct subsurface testing at Armory Park—the general location of Hale Pi'ula, the large stone and coral-block "palace". King Kamehameha III began construction of this structure in 1840. Portions of the park that were covered with paved parking and buildings could not be tested at the time. The foundation of the structure was not located, but a large cairn containing masses of burned coral was located on the *maka'i* portion of the study parcel. This probably represented a "lime kiln" which produced the lime that was used in the construction of the building. It was predicted that the foundation of the building lies somewhere under either the concrete slab on which the modern buildings are situated, or under the parking lot near Front Street (Fredericksen et al., November 1988).

#### Other archaeological studies in Lahaina Town

Xamanek Researches has conducted two additional archaeological projects in central Lahaina—one on Lahaialuna Road (Plantation Inn Site, Fredericksen, et al., August 1989; March 1990) and another on the *maka'i* side of Waime'e Street near the intersection of Dickenson Street (Aus Site, Fredericksen et al., June 1989).

The Plantation Inn Site was found to be on former cane producing land, and had nearly a meter of topsoil that had been disturbed by this historic activity. A few precontact artifacts were recovered during monitoring for the excavation of the swimming pool, but it could not be determined whether they had been *in situ* at the time of their discovery. A large cube-shaped block of coral was also recovered, and is probably one that came from the ruins of Hale Pi'ula (Fredericksen et al., March 1990).

The Aus project (Site #50-50-03-1797) was primarily data recovery and the monitoring of a large excavation for the basement parking area of a business office building on TMK 4-6-09: 21. The finds were almost exclusively historic, and were analyzed and placed into 4 periods: Late 18<sup>th</sup>—Early 19<sup>th</sup> Century; Mid-to-Late 19<sup>th</sup> Century; Early 20<sup>th</sup> Century; and Recent. The earliest artifacts consisted of a mix of historic and indigenous artifacts that would be expected at that transitional time period. The indigenous artifacts include, *leho he'e* (octopus lures), a stone bowl probably used for preparing bait, and adze fragments. Mixed with these were fish debris, and 4 flared-lip case gin bottle portions. Also a hobnail-embossed ink well, typical of those used in the late-18<sup>th</sup> century, was recovered. It was in 2 pieces, each found in a different part of the study area. The other time periods were represented by bottles, porcelain and crockery, which were dated by style, trademarks and manufacture technique (Fredericksen et al., June 1989).

Archaeological subsurface testing for the Burger King restaurant, located between Luakini and Front Streets, was undertaken in 1989 (Kennedy, 1989). Historic artifacts from the 19<sup>th</sup> and 20<sup>th</sup> centuries, along with building materials were found, including a

RECEIVED AS FOLLOWS

coral block, a red brick, glass, ceramics and porcelain sherds. No precontact archaeological materials were found.

A monitoring program was carried out by Scientific Consulting Services during the Front Street Renovation project that was undertaken in 1997 and 1998 (McGerty, Dunn and Spear, October 1998). The project involved replacement of underground utilities, which required extensive subsurface disturbance. The entire project stretched from Lahaialuna Road to Shaw Street. In the sector that passed in front of the study property between Dickenson and Prison Streets, a pit feature—Site 4442—was located. This was interpreted as a precontact feature, based on recovered cultural material and context (ibid., p. 92). An historic map, the Duperry Map, indicated that the area in which this site was found was in *lalo* and *fo'i* in 1819 (ibid., p. 33).

In January 1999, during part of the restoration of the Lahaina Courthouse, an inventory survey was carried out by Cultural Survey Hawaii. An inventory survey had been requested by the Maui Cultural Resources Commission, and SHPD, prior to any subsurface disturbance. However, the process was not followed which resulted in monitoring being the original fieldwork at the site (Borthwick and Hammatt, May 1999 [Draft], p. 1). A subsurface testing phase was worked out and consisted of 4 backhoe trenches, sampling various areas of the Courthouse grounds. It had been assumed that the entire parcel consisted of historic fill. However, it was soon discovered that a precontact substratum was present, in which artifacts such as adzes, coral and urchin abraders, and volcanic glass were located. Radiometric dating placed this occupation at c. AD 1420 to 1660 (ibid., p. 44). The site is designated as Site 4754.

In July of 2000, Xamanek Researches began a monitoring program for the upgrading of electrical service for Kamehameha III Elementary School (Fredericksen and Fredericksen, November 2001). It had been presumed that the construction of the school had sufficiently impacted the subsurface of the site, that monitoring would suffice, rather than a more involved archaeological inventory survey.

With almost the first shovel full of excavated soil, subsurface cultural materials began to emerge, including human skeletal remains. Four sites were identified during monitoring (Sites 4982-84, and 5174). Sites 4982-4984 contained human skeletal material and *in situ* burials. Site 4983 contained a remnant of a habitation layer, as well. Also recovered from Site 4984 were 17 pig tusk ivory beads, which were part of a type of bracelet that was generally associated with persons of high rank and status. Radiocarbon dating placed these finds in the late precontact through early post-contact time frame. These sites are located on LCA 10806:77—Kamehameha III's plot, and LCA 5320:2, belonging to Asa (Iosua) Kaeo. Site 5174 consisted of an *ihii* pavement and refuse pit that probably dates to the 19<sup>th</sup> century, and may be associated with residences located on Lunailo's parcel (LCA 277).

#### Moku'ula

Extensive work was conducted in 1993, by Bishop Museum archaeologists Steve Clark and Paul Klieger. They initiated an archaeological inventory survey and test

excavations at the site of King Kamehameha III's residence and family tomb on the island of Moku'ula (Klieger et al., 1995). The abstract (ibid., p. xviii) states:

*"The site appears to have been very important to Kamehameha III, descended from both Maui and Hawai'i Island families. As few meters west of Moku'ula is the site of the Lahaina palace of the great Maui ma'ū Pi'ilani of the sixteenth century, as well as the official palace of Kamehameha III, Hale Pihila. Recent historical and archaeological inventory and survey research (Phase I) has rediscovered the location of Moku'ula under Malū'ula o Lefe Park. Archaeological excavations have shown that many architectural and other cultural features from the period of royal residence on Moku'ula are very well preserved. Data further indicate that although the fishpond of Moku'ula is most likely natural, having been in existence for thousands of years, the island appears to have been largely man-made, probably in the early nineteenth century."*

Human remains were located in three test units. The remains of an articulated human right foot were identified in a location about 50 meters south of the Royal Tomb on Moku'ula. The presence of metal nails suggests that it was contained in a coffin. Another possible casket burial was located directly within the tomb location. It was not tested to determine whether human remains were still present (Klieger and Clark, 1995).

#### Loko o Mokuhinia and environs

In 1995, the Bishop Museum conducted an inventory survey on a parcel located mauka of Loko o Mokuhinia (TMK: 4-6-07: 13). Surface and subsurface investigations located two sites—the buried remains of a habitation area and possible pondfield (Site 4118), and a plantation-style house possibly dating to 1908 (Site 4119), which was still occupied at the time of the inventory survey (Major et al., 1996). The subsurface habitation area produced domestic artifacts such as bottles, ceramic sherds and metal consistent with a late 19<sup>th</sup> or early 20<sup>th</sup> century house site (ibid., p. 57).

Another parcel, which lay on the northern shore of Loko o Mokuhinia was inventoried by Xamanek Researches in October 1998 (Fredericksen and Fredericksen, October 1999). Subsurface testing located a precontact site remnant (Site 50-50-03-4690) that yielded a radiometric date of occupation at between AD 1475 and 1665. An historic wall was also documented, and appears to have been a largely rebuilt LCA boundary wall—one of the few remaining in Lahaina. It also incorporated a coral block in its structure, which probably originated from Hale Pū'ula.

#### Settlement Patterns

This part of west Maui was much different in appearance in precontact times than it is today. There are numerous modified drainage systems in West Maui, that represent a likely pattern for in the Lahaina region. In the higher elevations within the valleys are lo'i and 'auwai systems, built and maintained for the production of taro. In the areas at lower elevations, where much of the moisture dissipated into large alluvial fans, dry land cultivation took place. Along the coast where settlements occurred, it appears that people concentrated on exploitation of marine resources. In Lahaina, several fishponds existed

23

as well. These inland ponds were formed because the sand beach deposits formed parallel to the shore and kept the run-off water from reaching the sea. Hawaiians took advantage of this natural feature, and utilized the ponds for the production of fish. Two of the prominent fishponds were Loko o Mokuhinia, and the smaller Loko Pūako, around which intensive taro and breadfruit cultivation occurred. Dotted among the fishponds and taro pondfields, on higher ground, were the homes of the people who worked the land. This strip is said to have extended for several leagues along the coast, and may have included the present study area.

In discussing the settlement patterns of Lahaina, Klieger et al. (1995) state:

*"We theorize that for most of Lahaina's past, the majority of habitation was along the beach, with secondary habitation/garden sites located inland along the shorelines of the fishponds. Intensive wetland taro production continued mauka of the coastline for about a kilometer or so (Klieger et al. 1995). Terraced fields continued up a few of the more prominent West Maui streams, and these lands probably included at least temporary habitation sites. Kūla or open areas along the lower slopes of the mountains were probably ideal for raising dryland taro and sweet potato."* (Major et al., 1996, p. 17)

In post-contact times, Lahaina became the center of the Hawaiian Monarchy. Kamehameha I spent time there, between battles of conquest. His son, Kamehameha III resided in Lahaina in preference to Honolulu. Kamehameha I's wife, the sacred Keopuolani and his daughter, Nahi'ema'ema were buried there. Many high status individuals connected with the monarchy in one way or another lived in Lahaina, even after the official capital of the kingdom was moved to Honolulu in 1845. King David Kalakaua and his heirs held title to a parcel, two decades into the 20<sup>th</sup> century.

With the introduction of sugarcane cultivation in the 1870s, and the importation of foreign labor to work in the plantation, the character of Lahaina changed. *Kūleana* land grants changed hands as plantation workers became affluent enough to purchase land from Hawaiians willing to sell thus transforming the Hawaiian system of social stratification. Social status began to be based on acquired wealth, rather than on birth and rank. The Chinese and Japanese laborers imported to work in the sugar industry settled in ethnic clusters throughout Lahaina. The sacred Lake Mokuhinia dried up as water was diverted to irrigate sugarcane production in the fields to the east, as Lahaina shifted to more of a commercial than governing center toward the latter half of the 19<sup>th</sup> century. Commercial development became the driving force that would continue and intensify through the 20<sup>th</sup> century.

#### Expected Findings

Based on our understanding of the prehistoric and post-contact land use of the project area, the expected findings could include possible precontact habitation sites in this near coastal area, possibly containing associated human burials. Given the proximity of the project area to the existing road, it was expected that the surface of the project area

24

RECEIVED AS FOLLOWS

had been impacted by previous earthmoving activities. However, the project area could possibly contain remnant subsurface precontact habitation layers and/or features associated with subsequent post-contact activities such as the plantation-era transportation network.

## ARCHAEOLOGICAL METHODS

This archaeological inventory survey was conducted during May 2003. The field team was made up of Jennifer Frey and Hugh Coffin. Erik Fredericksen was the principal investigator and coordinator for this project. Walter and Demaris Fredericksen were the senior advisors.

The inventory survey of the study area consisted of a pedestrian surface inspection; followed by subsurface backhoe investigation and evaluation. A total of 7 backhoe trenches were utilized to sample the triangular parcel in the general Area of Potential Effect (APE) (Figure 2). These trenches were c. 5.5 meters in length by 0.8 meter in width by up to 2 meters in depth, placed randomly in accessible areas that appeared to be the least disturbed. Mapping was carried out with metric tapes and a hand held compass.

In addition, Jennifer Frey monitored soil testing on the subject parcel that was conducted earlier on the 5<sup>th</sup> and 6<sup>th</sup> of May 2003.<sup>16</sup> The results of soil monitoring are also included in the following report.

<sup>16</sup> This monitoring was carried out per discussions with Dr. Melissa Kirtendahl of the SHPD Maui office. A monitoring plan was prepared for review prior to soil testing (Fredericksen, 11 April 2003). This plan was subsequently accepted in a 15 April letter from SHPD (DOC NO: 0304MK12).

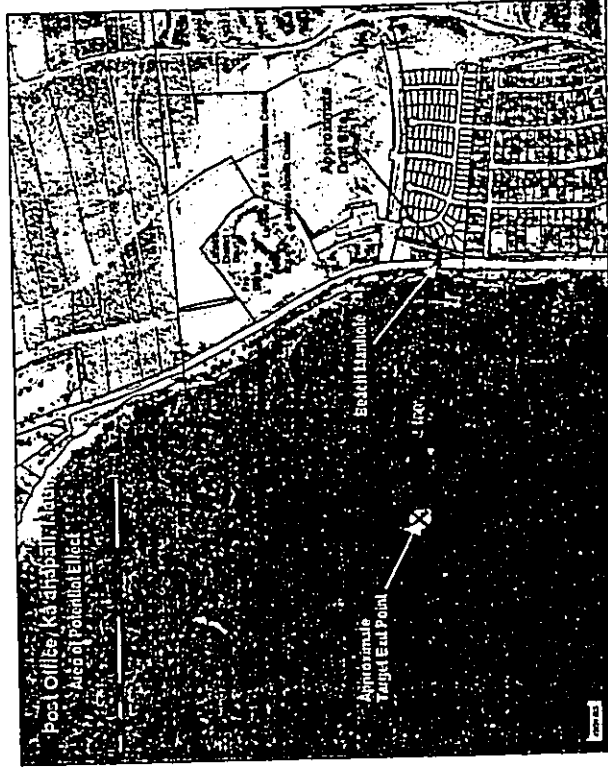


Figure 1 – Present study area—proposed landing site.



had been impacted by previous earthmoving activities. However, the project area could possibly contain remnant subsurface precontact habitation layers and/or features associated with subsequent post-contact activities such as the plantation-era transportation network.

## ARCHAEOLOGICAL METHODS

This archaeological inventory survey was conducted during May 2003. The field team was made up of Jennifer Frey and Hugh Coffin. Erik Fredericksen was the principal investigator and coordinator for this project. Walter and Demaris Fredericksen were the senior advisors.

The inventory survey of the study area consisted of a pedestrian surface inspection, followed by subsurface backhoe investigation and evaluation. A total of 7 backhoe trenches were utilized to sample the triangular parcel in the general Area of Potential Effect (APE) [Figure 2]. These trenches were c. 5.5 meters in length by 0.8 meter in width by up to 2 meters in depth, placed randomly in accessible areas that appeared to be the least disturbed. Mapping was carried out with metric tapes and a hand held compass.

In addition, Jennifer Frey monitored soil testing on the subject parcel that was conducted earlier on the 5<sup>th</sup> and 6<sup>th</sup> of May 2003.<sup>18</sup> The results of soil monitoring are also included in the following report.

<sup>18</sup> This monitoring was carried out per discussions with Dr. Melissa Kirkendall of the SHPD Maui office. A monitoring plan was prepared for review prior to soil testing (Fredericksen, 11 April 2003). This plan was subsequently accepted in a 15 April letter from SHPD (DOC NO: 0304MK12).

RECEIVED AS FOLLOWS

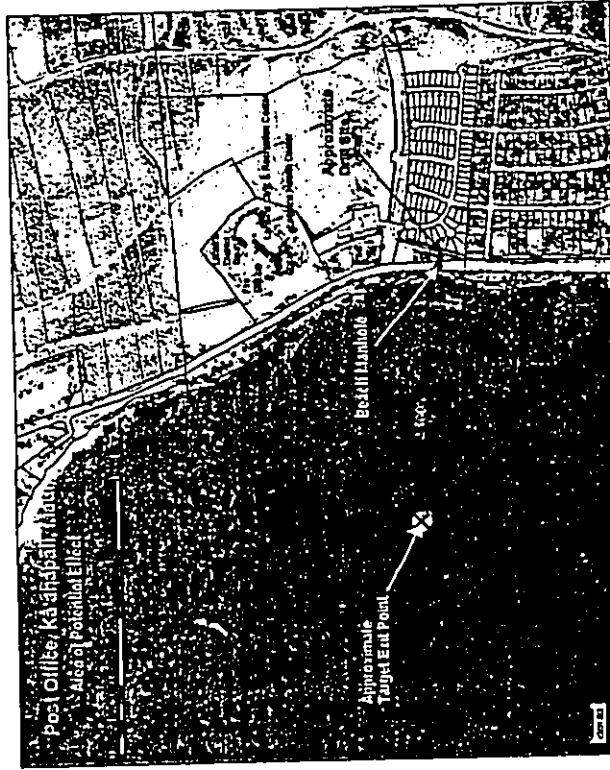


Figure 1 – Present study area—proposed landing site.

ARCHAEOLOGICAL RESULTS

As previously noted, this section of the report will present findings from the soil testing as well as our subsurface investigation of the parcel.

Soil test results

Geolabs, Inc. conducted soil testing on the project area on 5 and 6 May 2003. The monitoring program was conducted per the SHPD approved plan (Fredericksen, 11 April 2003). Jennifer Frey carried out the monitoring project. Two soil bores were drilled—one on the study parcel and one directly *makai* of Honoapi'iiani Highway (Figure 2; Photo 3). This soil testing was carried out in order to determine if this location is suitable for Horizontal Directional Drilling (HDD). The HDD methodology will include drilling from the subject parcel under Honoapi'iiani Highway, and c. 730 meters (2,400 feet) to the offshore submarine cable connection point (Figure 1). Each soil bore is briefly discussed below<sup>17</sup>.

Soil Bore 1 (Photo 3)

This first soil test location was on the subject parcel. This soil bore was a total of 20 feet (6 meters) deep. Four general sequences were recorded by Geolabs, Inc. during the soil test bore sampling process. These sequences included sandy clay and gravel between 0 and 3.5 feet (0 and 1.06 meters) below surface, basalt gravel with sand between 3.5 and 4.5 feet (1.06 and 1.37 meters) below surface, basalt formation between 4.5 and 11.5 feet (1.37 and 3.5 meters) below surface, and basalt gravel with sand between 11.5 and 20 feet (3.5 and 6.1 meters) below surface.

It was possible to inspect the back dirt during the soil coring process. This material was spot checked with 1/8 inch screen. Modern materials were noted in the first core sequence, along with one piece of waterworm coral.

Soil Bore 2

This second soil test was located on the *makai* side of Honoapi'iiani Highway, within 3 meters of the edge of pavement. This bore location was over twice as deep as Soil Bore 1.

A total of 6 bore sequences were recorded in this test location. Fine sand and basalt gravel were located between 0 and 7 feet (0 and 2.1 meters) below surface. A

<sup>17</sup> Soil bores were filled with concrete after completion of the testing.

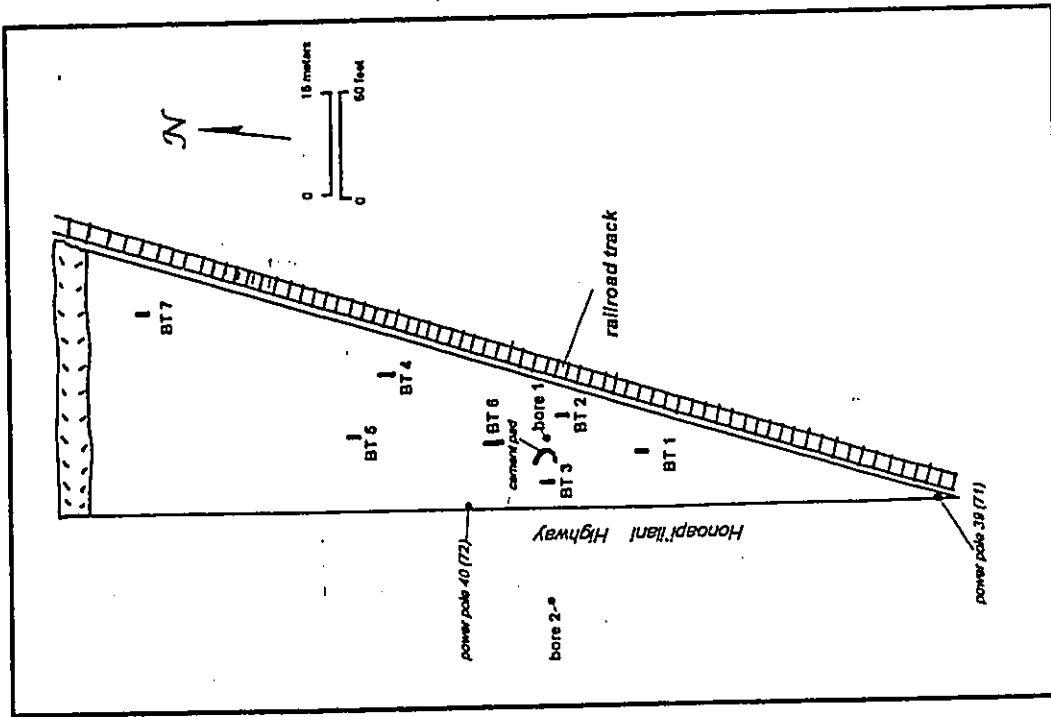


Figure 2 – plan of project parcel showing locations of backhoe test trenches.

relatively solid basalt formation was encountered between 7 and 11 feet (2.1 and 3.35 meters) below surface, followed by a void (possible lava tube) between 11 and 12 feet (3.35 and 3.66 meters) below surface. Basalt sand and gravel were next encountered between 12 and 14.5 feet (3.66 and 4.42 meters) below surface, followed by a basalt formation between 14.5 and 37 feet (4.42 and 11.28 meters) below surface. The final sequence located consisted of basalt gravel with sand between 37 and 41.5 feet (11.28 and 12.65 meters) below surface.

There were no significant material culture remains noted in the Soil Bore 2 sequence. Ground water was not encountered during this or the previous core sequence.

#### Discussion

Both soil bores were c. 4 inches (10 cm) in diameter. As mentioned above, there were no significant cultural materials located during the soil testing monitoring program. It is interesting to note that the ground water table was not encountered in either of the soil bores.

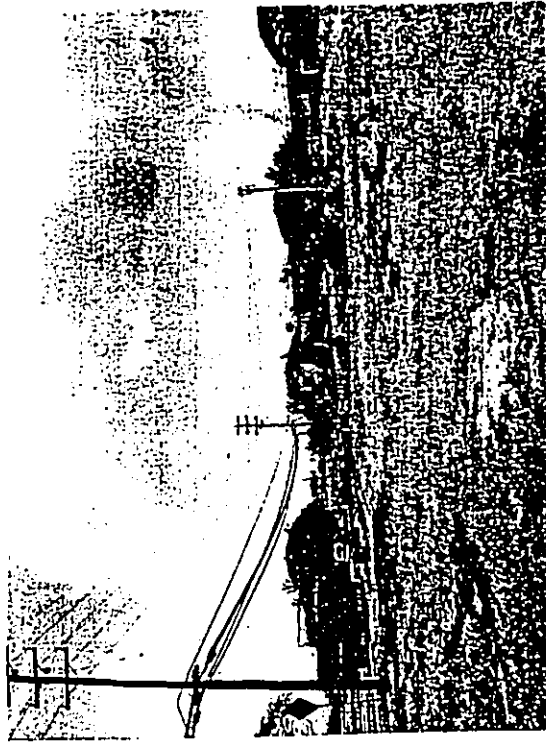


Photo 3 - General view to the north across the project area. Note soil bore 1 (concrete cover) in foreground.

29

#### Backhoe Trenches

There were a total of 7 backhoe trenches that were utilized to sample the project area (Figure 2). These trenches were typically 5.5 meters in length by 0.8 meter in width and ranged from 1.2 to 2.1 meters in depth. Our subsurface results are summarized in Table 1, and each backhoe trench is briefly discussed below.

#### Backhoe Trench 1 (Figure 3)

This first trench was excavated on the southern portion of the project area, c. 12 meters south of Soil Core 1. A total of 3 strata were located during subsurface testing.

Layer I (0-40 cmbs) consisted of dark reddish brown (5 YR 3/4) sandy silt. This slightly compact layer contained scattered modern materials such as brown bottle glass, metal, and concrete fragments.

Layer II (40-180 cmbs) was composed of dark reddish brown (5 YR 3/3) sandy silt with c. 50% weathered bedrock by volume. There were 3 pieces of subangular coral noted in this compact stratum. However, there were no recognizable material culture remains encountered during inspection of the trench profiles and the back dirt pile.

Layer III (180-2.00+ mbs) was made up of yellowish brown (10 YR 5/4) gravel and silt with weathered bedrock. This relatively loose layer did not appear to contain any material culture remains. The trench was terminated at bedrock.

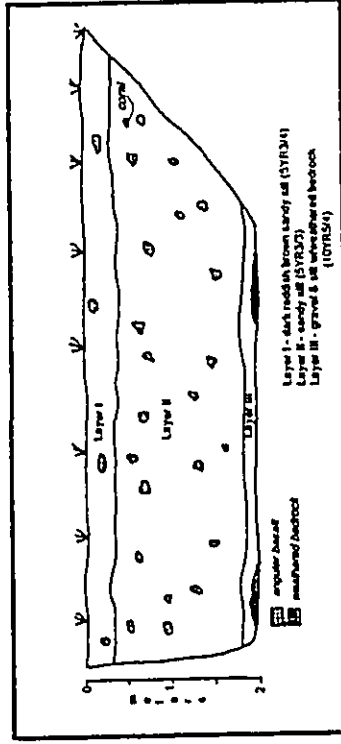


Figure 3 - east-southeast face profile of Backhoe Trench 1.

30

RECEIVED AS FOLLOWS

**Backhoe Trench 2 (Figure 4; Photo 4)**

This second trench was excavated to the east of Soil Bore 1 on the southern project area. A total of 3 layers were encountered during testing in this 1.75-meter deep trench.

Layer I (0-40 cmbs) was made up of dark reddish brown (5 YR 3/4) sandy silt. This slightly compact layer contained scattered modern cultural materials including brown and clear bottle glass, metal, and plastic.

Layer II (c. 35-90 cmbs) was composed of dark reddish brown (5 YR 3/3) sandy silt with c. 30% weathered bedrock fragments by volume. There were 3 pieces of subangular coral noted in this compact stratum. However, no other material culture remains were encountered during inspection of the trench profiles and the back dirt pile.

Layer III (80-1.75+ mbs) consisted of yellowish brown (10 YR 5/4) gravel and silt with weathered bedrock. This relatively loose layer did not appear to contain any cultural materials. Backhoe Trench 2 was terminated at bedrock.

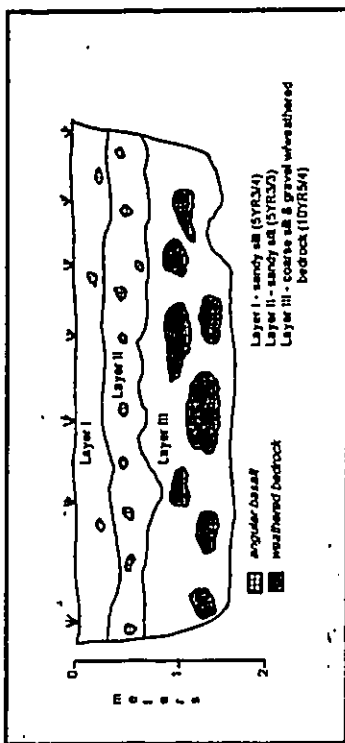


Figure 4 - west face profile of Backhoe Trench 2.

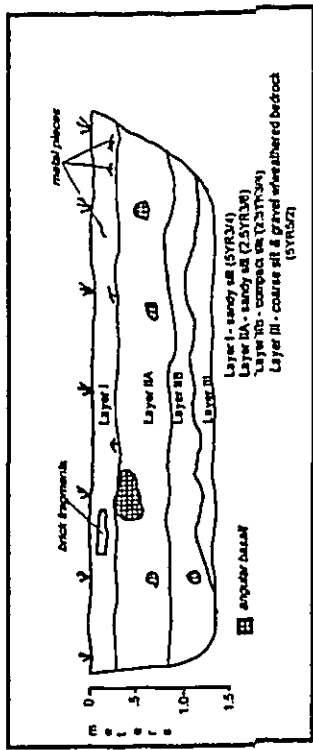
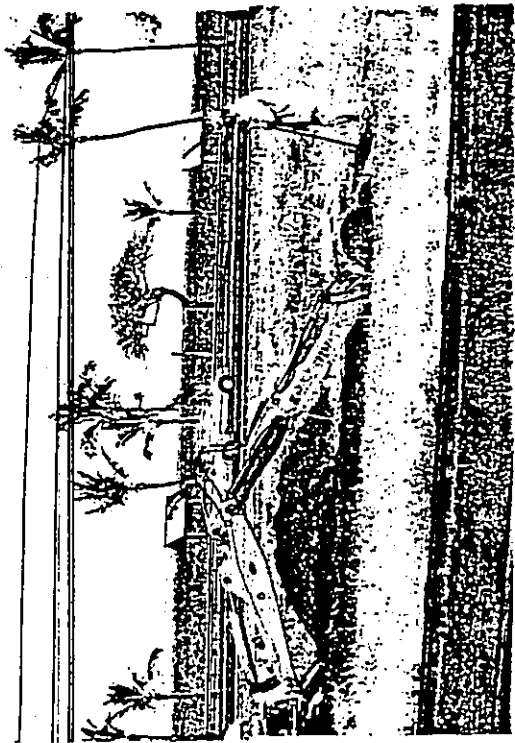


Figure 5 - east face profile of Backhoe Trench 3.

**Backhoe Trench 3 (Figure 5)**

This c. 1.4 meter deep subsurface test was placed to the west of Soil Bore 1 on the southern portion of the project area. There were a total of three strata present in this trench. However, Layer II was divided into two sub-layers—IA and IB.

Layer I (0-30 cmbs) consisted of dark reddish brown (5 YR 3/4) sandy silt. The upper portion of this compact stratum yielded several scattered brick fragments, a clear piece of bottle glass, and rusted metal fragments.

As noted above, this stratum was contained two sub-layers. Layer IIA (c. 30-90 cmbs) consisted of dark red (2.5 YR 3/6) silt and weathered bedrock. Layer IIB (c. 90-140+ cmbs) was made up of slightly loose dark reddish brown (2.5 YR 3/4) compact silt. There were a few semi-rounded pieces of coral recovered from Layer IIA. There were no material culture remains located in either sub-layer, suggesting that the unutilized coral may have been naturally deposited.

Layer III (c. 120-140 cmbs) was composed of reddish gray (5 YR 5/2) coarse silt and gravel. This loose stratum was sterile and overlaid bedrock.

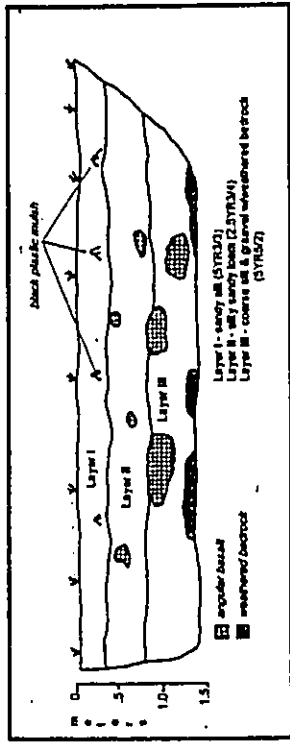


Figure 6 - east face profile of Backhoe Trench 4.

Backhoe Trench 4 (Figure 6)

This fourth trench was up to 1.4 meters in depth and was placed near the east central portion of the study area. The three common strata were noted in this trench.

Layer I (0-35 cmbs) was composed of slightly compact dark reddish brown (5 YR 3/3) sandy silt. This layer did not appear to contain any material culture remains in this location. However, one piece of unweathered coral was noted.

Layer II (35-80 cmbs) consisted of dark reddish brown (2.5 YR 3/4) silty sandy loam with weathered pieces of bedrock. While there was no evidence of a cultural layer, one piece of unweathered coral and one piece of white ceramic were found.

Layer III (c. 80-140 cmbs) was composed of reddish gray (5 YR 5/2) coarse silt and gravel and weathered bedrock. This loose stratum was sterile and BT 4 was abandoned at bedrock.

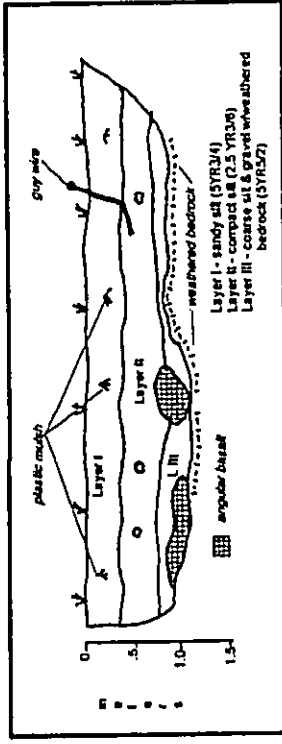


Figure 7 - east face profile of Backhoe Trench 5.



Photo 5 - View to the southeast of BT 5 excavation in process.

RECEIVED AS FOLLOWS

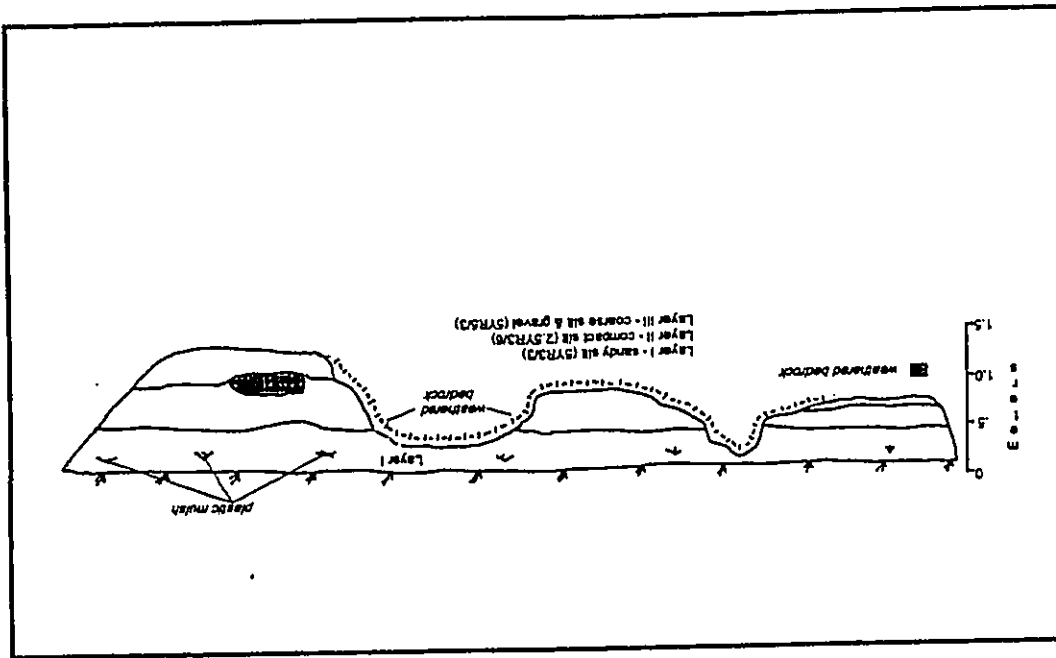


Figure 8 - east face profile of Backhoe Trench 6.

#### Backhoe Trench 5 (Figure 7; Photo 5)

This backhoe trench was located to the northwest of BT 4 and to the north of Soil Core 1. Encountered stratigraphy in this c. 1.1-meter deep trench consisted of the three common soil layers.

Layer I was up to 35 cm thick and was composed of dark reddish brown (5 YR 3/4) compact, sandy silt. One cowrie shell fragment and several pieces of black plastic agricultural mulch were located in this stratum.

Layer II (c. 35-95 cmbs) was made up of dark red (2.5 YR 3/6) silty sandy loam with weathered bedrock fragments. Modern material culture remains noted in a portion of this loose layer included rusted metal, a fire extinguisher, and cement and glass (possible window) fragments.

Layer III was encountered at c. 85 cmbs and consisted of reddish gray (5 YR 5/2) coarse silt and gravel with weathered bedrock. There were no material culture remains noted in this loose layer. Excavation was halted at bedrock at a maximum depth of 110 cmbs.

#### Backhoe Trench 6 (Figure 8; Photo 6)

This sixth backhoe trench was placed to the north of Soil Bore 1 and south of BT 5. The three common soil strata were present in BT 6, which was c. 110 cm deep.

Layer I (0-40 cmbs) was made up of dark reddish brown (5 YR 3/3) semi-compact, sandy silt. There were no material culture remains observed in this stratum.

Layer II (40-80 cmbs) dark red (2.5 YR 3/6) silty sandy loam w/ weathered bedrock. One piece of unweathered coral was noted in this layer.

Layer III (80-110 cmbs) reddish brown (5 YR 5/3) coarse silt and gravel and weathered bedrock. There were no cultural materials observed in this layer.

Layer I (0-25 cmbs) was composed of dark reddish brown (5 YR 3/3) semi-compact, sandy silt. Modern material remains recovered from this stratum included brown bottle glass and rusted metal.

Layer II (25-50 cmbs) consisted of dark red (2.5 YR 3/6) silty sandy loam w/ weathered bedrock. There were no cultural materials found in this slightly loose stratum.

Layer III (50-130 cmbs) was made up of reddish brown (5 YR 5/3) coarse silt and gravel with weathered bedrock. This loose layer appeared to be sterile. Excavation was halted at weathered bedrock.

**Discussion**

Recovered material culture remains consisted of relatively recently deposited items. However, it is interesting to note that several scattered pieces of coral were located in Layers I and II. It did not appear that these unutilized pieces of coral were associated with any significant material culture remains, such as an occupation or habitation area. In summary, there was no evidence of an intact cultural layer encountered during testing at this proposed cable-landing site.

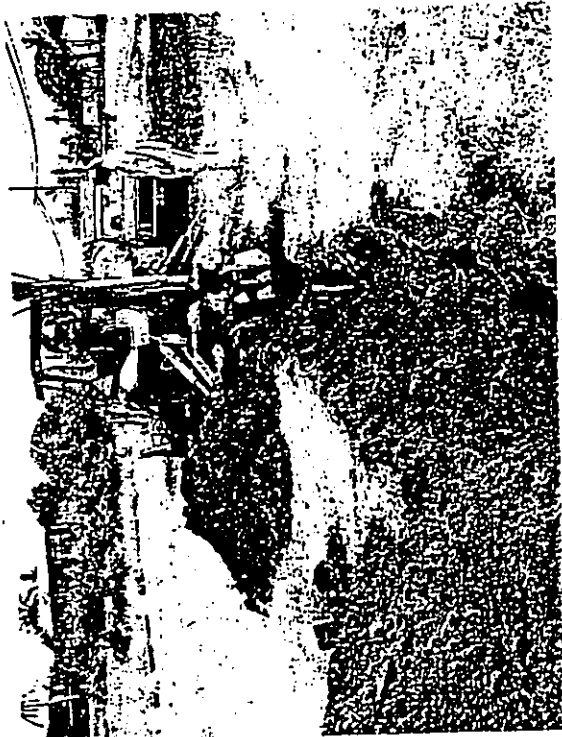


Photo 6 - View to the south of BT 6 excavation in process.

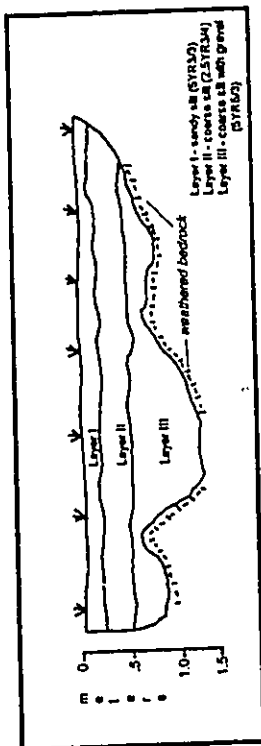


Figure 9 - east face profile of Backhoe Trench 7.

**Backhoe Trench 7 (Figure 9)**

This last backhoe test was located in relatively close proximity to the drainage ditch that forms the northern boundary of the project area. Backhoe Trench 7 was up to 130 cm in depth and contained the three common soil strata.

BT#	Dimensions L x D (m) <sup>11</sup>	Stratigraphy	cmbs	Remarks
1	3.30 x 2.00	Layer I: dark reddish brown (5 YR 3/4) sandy silt. Layer II: dark reddish brown (5 YR 3/3) sandy silt with c. 50% weathered bedrock by volume. Layer III: yellowish brown (10 YR 5/4) gravel and silt with weathered bedrock. Layer I: dark reddish brown (5 YR 3/4) sandy silt.	0-40 40-180 180+	Layer I: modern materials Layer II: 3 pieces of sub-angular coral Layer III: sterile materials Layer I: modern materials Layer II: sterile materials Layer III: sterile materials—brick fragments, bottle glass
2	5.50 x 1.75	Layer I: dark reddish brown (5 YR 3/3) sandy silt with c. 30% weathered bedrock by volume. Layer II: yellowish brown (10 YR 5/4) gravel and silt with weathered bedrock. Layer I: dark reddish brown (5 YR 3/4) sandy silt.	0-40 35-90 80-175+	Layer I: modern materials Layer II: sterile materials Layer III: sterile materials—brick fragments, bottle glass
3	5.50 x 1.40	Layer I: dark reddish brown (5 YR 3/4) sandy silt.	0-30 30-90	Layer I: modern materials—brick fragments, bottle glass

<sup>11</sup> Dimensions are in meters. L = length, D = depth. All trenches c. 70 cm in width.

RECEIVED AS FOLLOWS

**SUMMARY AND CONCLUSIONS**

A total of 7 backhoe trenches were utilized to investigate subsurface conditions at this proposed fiber optics landing site. In addition, we monitored the soil testing that was carried out by Geolabs, Inc. There was no evidence of an intact cultural layer located during testing at this proposed landing site. Recovered cultural materials included relatively recently deposited items such as bottle glass, rusted metal, broken concrete, plastic, etc. Several pieces of scattered coral were located during testing in Layers I and II on the project area. However, it did not appear that these unutilized pieces of coral were associated with any significant material culture remains, such as a coastal occupation or habitation area. In summary, there were no subsurface site remnants found during our inventory survey.

**Site Significance Evaluations**

The following significance evaluations are based on the Rules Governing Procedures for Historic Preservation Review (DLNR 1996; Chapter 275). According to these rules, a site must possess integrity of location, design, setting, materials, workmanship, feeling and association and shall meet one or more of the following criteria:

Criterion "a"—Be associated with events that have made an important contribution to the broad patterns of our history;

Criterion "b"—Be associated with the lives of persons important in our past;

Criterion "c"—Embodiment the distinctive characteristics of a type, period, or method of construction; represent the work of a master; or possess high artistic value;

Criterion "d"—Have yielded, or is likely to yield, important information for research on prehistory or history;

Criterion "e"—Have an important traditional cultural value to the native Hawaiian people or to another ethnic group of the state due to associations with traditional cultural practices once

	Layer IIA: dark red (2.5 YR 3/6) silt w/ weathered bedrock. Layer IIB: dark reddish brown (2.5 YR 3/4) compact silt. Layer IIC: reddish gray (5 YR 5/2) coarse silt and gravel. Layer I: dark reddish brown (5 YR 3/2) sandy silt. Layer II: dark reddish brown (2.5 YR 3/4) silty sandy loam w/ weathered bedrock. Layer III: reddish gray (5 YR 5/2) coarse silt and gravel and weathered bedrock. Layer I: dark reddish brown (5 YR 3/4) compact, sandy silt. Layer II: dark red (2.5 YR 3/6) silty sandy loam w/ weathered bedrock.	90-140+ 120-140+	Layer IIA: few semi-rounded coral pebbles Layers IIB and IIC: sterile Layer IIC: sterile Layer I: 1 piece of coral Layer II: 1 piece of coral and 1 piece ceramic fragment Layer III: sterile Layer I: corvrie shell fragment, black plastic Layer II: metal, fire extinguisher, cement and glass fragments Layer III: sterile Layer I: sterile Layer II: 1 piece of coral Layer III: sterile Layer I: brown bottle glass and metal Layer II: sterile Layer III: sterile
4	5.50 x 1.40	0-35 35-80 80-140+	
5	5.50 x 1.20	0-35 35-95 85-110+	
6	5.50 x 1.10	0-40 40-80 80-110+	
7	5.50 x 1.30	0-25 25-50 50-130+	



carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts.

Sites can be considered no longer significant when they qualify only under Criterion "d" and sufficient information has been collected from them during inventory survey level investigation.

As previously noted above, there was no surface or subsurface evidence of any intact cultural layers or significant material culture remains encountered during the inventory survey.

#### Mitigation Recommendations

As previously noted, there were no significant historic properties located during the archaeological inventory survey. No further archaeological work is recommended for the study area, unless a large slurry pit is excavated on the project area. Should such a pit be required, archaeological monitoring is recommended for the project area, because of its near coastal location.

#### REFERENCES

- Ahlo, H.M. and M.E. Morgenstein  
1980 *Archaeological Test Excavations Near the Mouth Area of Kohoona Stream, Lahaina, Maui.* Hawaii Marine Research, Inc. (Honolulu) Prepared for U.S. Corps of Engineers, Pacific Ocean Division, Honolulu.
- Barrett, Dorothy  
1975 *Walls of Pleasure for the Children of Kama.* Department of Anthropology: Bishop Museum, Honolulu.
- Borthwick, Douglas and Hallett H. Hammett  
May 1999 *Archaeological Investigations at Lahaina Court House, Lahaina District, Island of Maui (TMK: 4-6-01: 9), Preliminary Draft prepared for Mason Architects, by Cultural Surveys Hawaii.*
- Clark, J.  
1980 *The Beaches of Maui County.* University Press of Hawaii, Honolulu.
- Conde, Jesse C. and Gerald M. Best  
1973 *Sugar Trains: Narrow Gauge Rails of Hawaii.* Glenwood Publishers, Felton, CA.
- Davis, Burtell  
1974 *Preliminary Report, Mala Wharf Buriols, Phase I, Maui, Lahaina, Maui Island.* Archaeological Research Center, Hawaii, Inc., Lawai, Kauai.
- 1977 *Archaeological Surface Survey, Hanokowai Gulch, Kaanapali, Maui Island.* Archaeological Research Center Hawaii, Inc. (Maui SHPD partial Manuscript).
- Fredericksen, Dennis L.  
1998 *Monitoring Report for the Starbuck-Maui Redevelopment Project, Hanalei to Ahupua'a, Lahaina District, Maui Island (TMK 4-4-08: 03) Prepared for Kyo-ya Company, by Xamanek Researches, Pukalani, HI.*
- Fredericksen, Walter and Dennis L.  
1965 *Report on the Archaeological Excavation of the "Drick Palace" of King Kamehameha I at Lahaina, Maui, Hawaii, prepared for the Maui Historic Commission, Wailuku.*
- February 1970 *Final Report on the Preparation for Exhibit of King Kamehameha I's "Drick Palace" at Lahaina, Maui, Hawaii (Contract #1724), prepared for the County of Maui, County of Maui Planning Commission, Wailuku, Maui.*
- March 1990 *Archaeological Data Recovery Report on the Plantation Inn Site, Lahaina, Maui, Hawaii, prepared for Historic Sites Section, DLNR, by Xamanek Researches, Pukalani, Maui.*

RECEIVED AS FOLLOWS

- Fredericksen, Walter M., Demaris L. and Erik M.  
November 1988 Report on the Archaeological Inventory Survey at Historic Site #15, Lahaina, Maui, Hawaii, prepared for Ormond Kelley, AIA, Wailuku, by Xamanek Researches, Pukalani, Maui.
- June 1989 Archaeological Data Recovery Report on the Aist Site, Lahaina, Maui, Hawaii, prepared for Historic Sites Section, DLNR, by Xamanek Researches, Pukalani, Maui.
- August 1989 An Archaeological Inventory Survey of the Pimantia Inn Site, Lahaina, Maui, Hawaii, prepared for Century Investments, Inc., Lahaina, Hawaii by Xamanek Researches, Pukalani, Maui.
- Fredericksen, Demaris L., and Erik M.  
October 1999 Archaeological Inventory Survey (Phase 1) in the Ill of Palala, Puulo Ahupua'a, Lahaina District, Maui Island (TMK: 4-6-07: 7), prepared for JDI Ltd. Partners, Lahaina, HI., by Xamanek Researches, Pukalani, HI.
- November 2001 Archaeological Monitoring Report for the King Kamehameha III Elementary School Electrical System Upgrade Project, Puulo Ahupua'a, Lahaina District, Lahaina, Maui (TMK 4-6-02: 13 and 14). Prepared for Mr. Richard Olsen, Lite Electric Inc., Wailuku, Maui, by Xamanek Researches, Pukalani, HI.
- Fredericksen, Erik, and Demaris L.  
2002 Archaeological Inventory Survey Report for a Portion of Land in Puulo Ahupua'a, Lahaina District, Lahaina, Maui (TMK 4-6-08: 31 and 48), prepared for John Kean by Xamanek Researches, Pukalani, HI.
- January 2003 An Archaeological Inventory Survey of the Ka'opouli 2020 Project Area, Located in Hanalei and Hanalei Ahupua'a, Lahaina District, Island of Maui, TMK 4-4-02, 4-4-04, 4-4-05, 4-4-06, prepared for A. James Wriston, III, Ka'opouli Development Corporation, by Xamanek Researches, Pukalani, HI.
- Graves, Donna K.  
1993 Archaeological Inventory Survey, Sheraton-Maui Redevelopment Project, Hanalei, Lahaina District, Island of Maui. Prepared for Jelber, Hattert and Fee by PIHRI, Hilo, HI.
- Hammat, H.H.  
1978 Archaeological Investigation and Monitoring, Mala Wharf Boat-Launch Ramp Area, Lahaina, Maui, Archaeological Research Center Hawaii, Inc. Prepared for State of Hawaii-Water Transportation Facilities Division, Honolulu.
- Handy, E.S.C., and E.G. Handy  
1972 Native Planters in Old Hawaii, Bishop Museum Press, Honolulu.
- Hau, A.E.  
1988 Subsurface Archaeological Reconnaissance Survey, Lahaina Cannery Makai and Makua Parcels, Land of Moali, Lahaina District, Island of Maui, PIHRI, prepared for Hawaii Omoi Corp.
- 1999 Archaeological Inventory Survey of Kana'ia Development Parcel, Land of Puchehi'ia, Puhou, and Pala'ia, District of Lahaina, Island of Maui, prepared for Kauaia LLC, Kahului, HI, by PIHRI, Hilo, HI.
- Hammson, R.J.  
1973 Report of a Walk-Through Survey of Kohona Stream Flood Control Project Area, Department of Anthropology, B.P. Bishop Museum, Honolulu.
- 1982 Archaeological Reconnaissance Survey of the North Beach Moku and South Beach Moku Areas, Hanalei, Maui, prepared for Bell, Collins and Associates, Honolulu.
- Jensen, Peter M.  
1989 Archaeological Inventory Survey Lahaina Master Planer Project Site, Land of Waihihi, Lahaina District, Maui Island, prepared for State Finance and Development Corporation, PIHRI, Hilo, Hawaii.
- 1992 Archaeological Inventory Survey, Hanalei Highway Realignment Project Lahaina Bypass Section—Modified Corridor Alignment, Land of Hanalei, Hanalei, Waihihi, Puhou, Kula, Hanalei, Puhou, Puhou, Puhou, and Lanipoua, Lahaina District, Island of Maui, prepared for Michael T. Murokiyo, by PIHRI, Hilo, HI.
- Jensen, P. and G. Mahabick  
1992 Archaeological Inventory Survey of the Puukohli Village Area, Land of Hanalei, Lahaina District, Island of Maui, prepared for Amfac Property Investment Corp., by PIHRI, Hilo, HI.
- Kamakau, Samuel  
1991 Ka'opouli Kohilo: The People of Old, Bernice P. Bishop Museum Special Publication 51, Bishop Museum Press, Honolulu.
- Kame'eihewa, Lili'ala  
1992 Native Land and Foreign Desires, Bishop Museum Press, Honolulu.
- Kau, Charles  
1981 Archaeological Reconnaissance (Surface Survey) for Hanalei 'o (Hanalei) Beach Park.
- Kennedy, Joseph  
1989 Archaeological Report Concerning Subsurface Testing at TMK: 4-6-08: 12, Lahaina, Maui, Archaeological Consultants of Hawaii, Hanalei, HI.
- Klieger, Paul Christian, Susan A. Lebo, Heidi Lemstrom, Dennis Gosset, and Stephen Clark  
1995 Aloha 'ia: History and Archaeological Excavations at the Private Palace of King Kamehameha III in Lahaina, Maui. Prepared for Lahaina Restoration Foundation, Anthropology Department, Bishop Museum, Honolulu.
- Klieger, Paul Christian and Stephen D. Clark  
1995 Report on Human Burials at Site 50-50-03-2967, Moku 'ia, Lahaina, Maui. Prepared for DLNR, SHPD, Maui County Burial Council, by Anthropology Department, Bishop Museum.
- Kupau, Sumner  
2001 Exploring Historic Lahaina, Watermark Publishing, Honolulu.
- Major, Maurice, P. Christian Klieger, and Susan A. Lebo  
1996 Historical Background and Archaeological Testing at Pihalele, Kula in Lahaina, Maui: An Inventory Survey Report of LCA 310.3 (Royal Patent 1729.2, TMK [2] 4-6-07: 13), prepared for John Oda and Associates, Carson, California, by Anthropology Department, Bishop Museum, Honolulu.

RECEIVED AS FOLLOWS

- McGerty, Leann, Amy E. Dunn, and Robert L. Spear  
October 1998  
*Archaeological Monitoring Report for Front Street Improvements, Baker Street  
To Shaw Street, Lahaina, Maui, Hawaii (TRAC: 4-3-01, 2: 4-6-07, 08, 09).*  
Prepared for Kiewit Pacific, by Scientific Consultant Services, Inc., Honolulu,  
HI.
- Orr, Maria  
2002  
*Ka'unapali 2020 Cultural Impact Assessment, Ahupua'a of Honolulu,  
Hanalei a, Kahua, Wahi'aila, Districts of Ka'unapali & Lahaina, Maui Island  
Prepared for Kaunapali Development, Corp., Amfac Property Investment Corp.,  
Amfac Land Company, Ltd., Pioneer Mill Company.*
- Pukui, Mary K. and Samuel H. Elbert and Esther T. Mookini  
1974  
*Place Names of Hawaii*. Revised and enlarged. University Press of Hawaii,  
Honolulu.
- Sinoto, Aki  
1975  
*An archaeological Reconnaissance of the Mala Heaf Hoop-Launch Ramp Area,  
Lahaina, Maui*, Department of Anthropology, B.P. Bishop Museum, Honolulu.
- State Inventory of Historic Places  
1973  
Various Data Sheets
- Taylor A.P.  
1928  
*Lahaina: The Versailles of Old Hawaii*. Thirty-seventh Annual Report, Hawaii  
Historical Society, Honolulu.
- Walker, Winlow  
1931  
*Archaeology of Maui*, MS on file, Maui Historical Society, Wailuku, Maui.
- Wilcox, Carol  
1994  
*Sugar Water: Hawaii's Plantation Ditches*. University of Hawaii Press,  
Honolulu, HI.

RECEIVED AS FOLLOWS

XAMANEK RESEARCHIES  
P.O. BOX 880131  
PUKALANI, MAUI, HI 96788  
Phone/Fax: 572-8900  
Phone/Fax: 572-6118

Parsons Brinckerhoff Quade & Douglas, Inc.  
Pacific Tower, Suite 3000  
1001 Bishop Street  
Honolulu, Hawaii 96813  
Fax: 808-528-2368

Attn.: Mr. Jason Yazawa

06 November 2003

Subject: Letter report on a preliminary cultural impact assessment for the proposed Sandwich Isles Communications (SIC) fiber optics Po'olenalena Beach Park landing site at Makana, Keahou *ahupua'a*, Makawao District, Island of Maui (TMK 2-1-07: 72).

Dear Mr. Yazawa,

Per your request, I am providing you with a memorandum regarding a cultural impact assessment for the proposed SIC landing site project at Po'olenalena Beach Park, Makana, Maui. This letter report is preliminary, because it appears possible that the State Historic Preservation Division (SHPD) may require additional archaeological inventory survey work in the parking lot area of the park.

The study area lies *makai* (west) of Makana-Alanui Drive and is currently administered as a beach park by the County of Maui (Figures 1 and 2). This ocean front parcel is owned by the State of Hawaii. The beach park is approximately 1.5 acres in size and gently slopes from the east to the west. The estimated elevations of the overall park parcel range from c. 5 to 15 ft AMSL. The study area lies *makai* (west) of Makana-Alanui Drive and is composed of a portion of TMK 2-1-07: 072 (Figure 2). A private parcel bounds the study area to the north, while a private parcel and State land border it to the south. The ocean fronts the Park parcel along its western side.

#### Use of Horizontal Direction Drilling technology

Sandwich Isles Communications, Inc (SIC) proposes to utilize Horizontal Directional Drilling (HDD) to connect the Po'olenalena Beach Park landing site with the offshore fiber optics link. The offshore link will lie some 600 meters (2,000 feet) to the west of the proposed landing site in Makana. The HDD technology will be used to place a fiber optics conduit c. 15-25 feet under the surface of the Area of Potential Effect

(APE) that lies to the west of the beach access parking lot. A conventional backhoe trench will serve to connect the marine landing side HDD-installed fiber optics conduit with the terrestrial network along Makana-Alanui Drive.

The proposed APE will traverse the southwestern section of the Park parcel and cross under an existing beach access parking lot (Figure 2). Po'olenalena Beach Park lies in Keahou *ahupua'a*, Makawao District, on the leeward side of East Maui. The ocean lies an estimated 10-15 meters to the west of the APE for this proposed SIC landing site location.

Vegetation observed on the park parcel predominantly consists of non-native species. *Kiawe* (*Protopis pallida*) trees form the dominant over-story vegetation, while the surface of the parcel is thinly covered with non-native grasses and annual weeds. While not common, observed native plants include 'uhalua (*Waltheria americana*), 'iima (*Sida fallax*), beach morning glory or *pohuehue* (*Poinaea pes-caprae* subsp. *brasilensis*). In addition, an isolated *milo* (*Thespesia populnea*) tree was noted near the study area.

#### Inventory Survey

Xamanek Researches conducted the fieldwork portion of an archaeological inventory survey of the Area of Potential Effect *makai* of the parking lot in the summer of 2003 (Figure 3). One previously unrecorded subsurface historic property was identified during this inventory survey. The site has been designated SHIP<sup>1</sup> No. 50-50-14-5486. The tested portion of the site is interpreted as a precontact (i.e. before 1778) coastal habitation area that appears to have been utilized into early post-contact times. Recovered food midden remains and artifacts indicate that occupants of this site utilized marine resources and fashioned tools to harvest these resources. Several subsurface pit and posthole features as well as a portion of a waterworn pavement were located during the survey. All of these features indicate a habitation function for the site. While radiocarbon analysis results are pending, it appears likely that Site 5486 is a mid- to late precontact Native Hawaiian coastal habitation area.

#### Significance of Site 5486

Based on the results of the inventory survey, this recently identified site qualifies for importance under at least Criterion "d" of Federal and State historic preservation guidelines for its information content. While the overall extent of this newly identified site continues to be unclear, its proximity to Site 1362 (a *kauiate* or household complex with a *ko'o*) suggests that Site 5486 could also qualify for importance under Criterion "e" for its traditional cultural significance to Native Hawaiians. Site 5486 retains its

<sup>1</sup> SHIP = State Inventory of Historic Places

significance under Criterion "d" for its information content. Based on discussions with Dr. Melissa Kirkendall, SHPD Maui staff archaeologist, it appears that additional inventory level work will be required for the area to the east (*makai*) of the known extent of Site 3486. As previously noted, a beach access parking lot covers much of the eastern portion of Po'olenalena Beach Park.

#### Consultation with the Maui/Lana'i Islands Burial Council and SHPD

Our testing methodology at this proposed SIC landing site has been carried out per previous discussions with the Maui/Lana'i Islands Burial Council (MLIBC) and SHPD Maui staff archaeologist, Dr. Melissa Kirkendall. The MLIBC has previously indicated that it is concerned that HDD technology could cause a "sandwiching" effect in areas that may contain human burials. The use of this technology could in effect place a modern fiber optics conduit under unidentified burials. Members of the MLIBC feel that the placement of modern materials under Native Hawaiian burials is culturally inappropriate. Consequently, the Burial Council has indicated that it prefers that areas that may contain human burials—such as sand dunes—be pre-excavated to help ensure that the HDD-installed conduit is not inadvertently installed under a burial site.<sup>2</sup>

Sampling methodology on the *makai* portion of the APE at this SIC landing site has consisted of three phases: 1) auger tests; 2) controlled test excavation units; and 3) controlled mechanical excavation. The first two phases have been manually carried out, while the latter has conducted with a backhoe. The backhoe trench investigated the APE to the west of the beach access parking lot. Excavation of this trench was carried out at a controlled pace and utilized a backhoe bucket with a plate. The use of the plate in sand dune areas helps to reduce damage to unidentified burials that may be encountered during testing.

The above noted sampling methodology will also be utilized to test the beach access parking lot area. It is our understanding that the landside hook up trenching will follow the southern edge of the parking lot. The project surveyor will also shoot the path of the backhoe test trench in. This step has already occurred for the *makai* APE, and will help ensure that the actual installation of the fiber optics cable will only occur in a previously tested and cleared corridor, per the recommendation of the MLIBC.

Mr. Leslie Kuloloio of the MLIBC has visited the project area during the fieldwork portion of our inventory survey. Mr. Kuloloio has also indicated that he wishes to return to the project area when we continue with the survey of the APE that underlies the beach access parking lot. In addition to coordinating a site visit with Mr. Kuloloio, we will provide an update of our findings to the Burial Council, once we have received

<sup>2</sup> One human burial has been located c. 100 meters to the southeast of Po'olenalena Beach Park. This burial has been previously designated SHIP No. 50-50-14-5182.

the radiocarbon analysis information from Beta Analytic, Inc in Florida. This data will help to more accurately date the temporal occupation of the Site 3486 habitation area.

#### Beach use

As previously mentioned, the ocean fronts the study area. Members of the public utilize this popular beach for a variety of purposes such as fishing, recreation, and camping. Installation of the SIC fiber optics conduit at the proposed Po'olenalena Beach Park landing site will not block off access to the shoreline. However, it is important to note that there will be a temporary period of increased noise levels when the HDD rig is in operation. As previously mentioned, the park is a popular camping area, especially on weekends. The contractor should take appropriate measures to minimize the increased noise levels as much as possible. In addition, it is also important to note that due care should be taken during the landside hook up of the fiber optics network.

The existing beach access parking lot typically fills up in the afternoons. It is our understanding that the landside hook up will require trenching along the southern edge of the parking lot. This step will temporarily reduce the number of parking spaces that will be available to the public.

While the trenching through the beach access parking lot will temporarily reduce available parking spaces, it will not close off the parking lot. The connection with the terrestrial portion of the fiber optics system will require the placement of a manhole in the road right-of-way. The cover for this access will be flush with the roadside surface and resemble other iron manhole covers. The installation of this access box will not block off access to the parking area.

#### Summary

As noted above, SIC proposes to utilize Horizontal Directional Drilling (HDD) to connect the Po'olenalena Beach Park landing site with the offshore link. The application of this technology will help avoid negative impacts to the nearby reef and coastline. In addition, the use of this technology will not significantly block beach access. While the drilling rig will need to set up at the *makai* side of the parking lot, it will be possible for members of the public to walk by the rig or take one of several alternate ways down to the beach. As noted above, the trenching through the beach access parking lot will temporarily reduce available parking spaces. However, this action will not close off the area. The connection of the marine landing portion to the terrestrial portion of the fiber optics system will require the placement of a manhole in the road right-of-way of Makana-Alanui Drive. However, the placement of this service box will not prevent access to the beach parking area.

RECEIVED AS FOLLOWS

RECEIVED AS FOLLOWS

Given the level of accessibility to the Po'olenalena Beach Park area, the fiber optics project should have no negative impacts on traditional cultural practices such as gathering rights along the shoreline area. However, due care must be utilized in order to help ensure that shoreline access will not be hindered during onsite construction activities.

Please contact me should you have any questions regarding the above assessment letter report.

Sincerely,

Erik M. Fredericksen

XAMANEK RESEARCHES  
P.O. BOX 880131  
PUKALANI, MAUI, HI 96788  
Phone/Fax: 572-8900  
Phone/Fax: 572-6118

Parsons Brinckerhoff Quade & Douglas, Inc.  
Pacific Tower, Suite 3000  
1001 Bishop Street  
Honolulu, Hawaii 96813  
Fax: 808-528-2368

Attn.: Mr. Jason Yazawa

08 October 2003

Subject: Summary of archaeological findings for the proposed Sandwich Isles Communications (SIC) fiber optics project at the Po'olenalena Beach Park landing site, Makena, Makawao District, Maui (TMK 2-1-07: 72).

Per your recent request, I am providing you with a summary of our fieldwork findings for our inventory survey at the proposed SIC Po'olenalena Beach Park landing site. Please note that the following summary is preliminary and qualitative, rather than quantitative in nature.

#### Methods

Our testing methodology was discussed with Dr. Melissa Kirkendall during a project inspection. In addition, methodology was also discussed with members of the Maui/Lana'i Islands Burial Council (MLIBC). The series of 10 auger cores were utilized to initially assess the presence of any buried cultural layer. Three test units were used to obtain a sample of the subsurface site. Finally, a c. 42 meter long trench was excavated in order to help ensure that the fiber optics conduit will not overlie any burials that may be located in the proposed fiber optics HDD corridor.<sup>1</sup> Mapping was carried out with metric tapes and a hand held compass. In addition, the long backhoe trench was located on the project topographic map by the surveyor (Figure 1).<sup>2</sup>

The three test units were excavated using stratigraphic layers and arbitrary 10 centimeters levels were utilized in strata greater than 10 cm in thickness. All soil was screened through 1/8" inch mesh hardware cloth. Material culture remains were collected in the field for subsequent laboratory analysis. Standard laboratory procedures are being followed and no material culture remains, with the exception of 5 charcoal samples, will be transported off island. All radiocarbon samples with the exception of

<sup>1</sup> One human burial has been located on a nearby parcel located just to the south of the Po'olenalena Beach Park project area.

<sup>2</sup> This accurate location of the APE trench was carried out per the request of the Maui/Lana'i Islands Burial Council.

bulk soil samples were placed in aluminum foil in the field.<sup>3</sup> Selected samples will be processed and placed in aluminum foil, and sent to Beta Analytic, Inc. in Florida for radiometric analysis.

#### Results

During excavation, we encountered three cultural layers—Layers IIIa, IIIb, and V. The upper cultural deposit (Layer IIIa) was encountered essentially at the surface in TU 3 and at c. 75 cmbs in TU 1.

Layer IIIa, when present, ranges from 5-14 cm in thickness and is composed of brown (10 YR 4/4) silty sand. This layer appears to represent a late precontact to early post-contact coastal habitation sequence.<sup>4</sup> Food midden materials consisting of marine shellfish remains, sea urchin, and fish bone were also located in this layer. In addition, a few marine oriented artifacts were found.

Layer IIIb, when present, ranges from as little as 5 cm in thickness (i.e. western portion of backhoe trench) to as much as 75 cm in TU 1. This dark brown (10 YR 4/2) contains food midden materials such as substantial amounts of marine shellfish remains, sea urchin, and fish bone. Several marine resource related artifacts were found, including coral files and abraders. In addition, several subsurface features, primarily consisting of pits and postholes were also noted in this loose stratum. Some of these pit features are interpreted as fire hearths, while others appear to represent refuse pits. One possible waterworn pavement was located in the southeastern corner of TU 1. This layer is interpreted as a probable mid- to late precontact coastal habitation site.

Layer V is tentatively interpreted as an earlier occupation layer. This brown (10 YR 4/) sandy clay contains small amounts of food midden, primarily fish bone. It is important to note that this layer is very rocky. Consequently, cultural materials may have filtered down through this rock. A charcoal sample will help to date this stratum.

This subsurface coastal habitation site extends at least 25 meters *maka'i* from the existing parking lot. There was no evidence of the site found in the active beach strand zone. Ground water was located near the western end of the trench at 1.9 meters below the existing surface.

#### Site Significance

The following significance evaluations are based on the Rules Governing Procedures for Historic Preservation Review (DLNR 1996; Chapter 275). According to these rules, a site must possess integrity of location, design, setting, materials, workmanship, feeling and association and shall meet one or more of the following criteria:

<sup>3</sup> The bulk samples were placed in one-gallon plastic zip-lock bags. These samples were subsequently fluted for charcoal and screened for cultural materials.

<sup>4</sup> Two small pieces of copper were located in this loose stratum in TU 1.

RECEIVED AS FOLLOWS

RECEIVED AS FOLLOWS

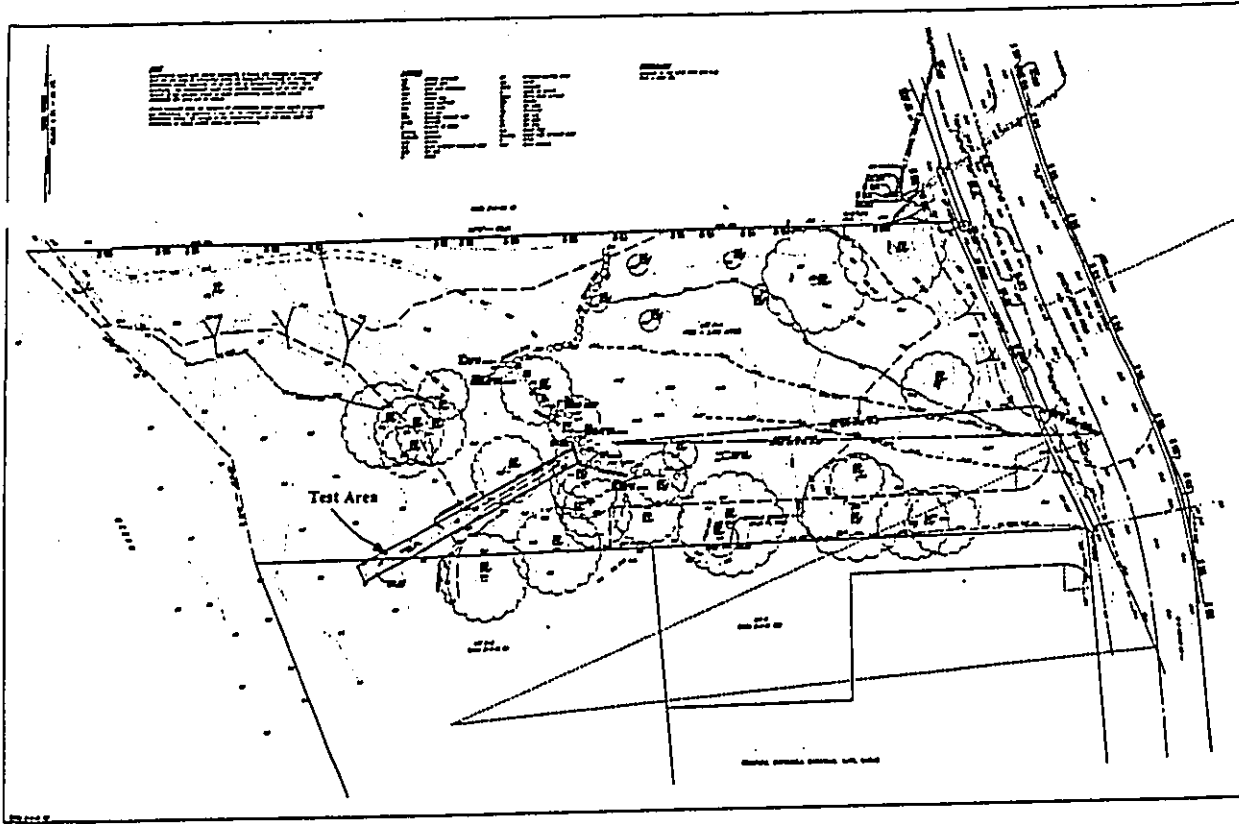


Figure 1 - Location of tested portion of APE at Po'olenalena Beach Park Landing Site.

Criterion "a"—Be associated with events that have made an important contribution to the broad patterns of our history.

Criterion "b"—Be associated with the lives of persons important in our past;

Criterion "c"—Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; or possess high artistic value;

Criterion "d"—Have yielded, or is likely to yield, important information for research on prehistory or history.

Criterion "e"—Have an important traditional cultural value to the native Hawaiian people or to another ethnic group of the state due to associations with traditional cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts.

Sites can be considered no longer significant when they qualify only under Criterion "d" and sufficient information has been collected from them during inventory survey level investigation.

Based on our interim results, this coastal habitation site qualifies for importance under at least Criterion "d" for its information content. Given the proximity of Site 50-14-1362 to the northeast of the tested portion of the APE, it remains possible that the newly identified site may be associated with this *kuahale* (household) complex. Should this be the case, then the site within the proposed fiber optics corridor pathway would also likely qualify for importance under Criterion "e" for its cultural significance.

#### Recommended Mitigation

Given the proximity of Site 1362 to the north as well as a previously identified burial on a parcel to the south, it appears that the State Historic Preservation Division will require data recovery work for the parking lot section of the project area. In the event that this level of work is formerly recommended by the SHPD, it may be necessary to conduct this data recovery work prior to construction activities. As with the area *maka* of the parking lot, it will also likely be necessary to have the tested corridor surveyed following the investigation.

Please contact me you have any questions regarding the above field summary.

Sincerely,

Erik M. Fredericksen



RECEIVED AS FOLLOWS

AN ARCHAEOLOGICAL INVENTORY SURVEY  
OF THE PROPOSED FIBER OPTICS LANDING  
LOCATION AT PO'OLENALENA BEACH PARK,  
KEAUHOU *ahupua'a*, HONUA'ULA *moku*,  
MAKAWAO DISTRICT,  
ISLAND OF MAUI (TMK: 2-1-07; por. 72)

ABSTRACT

Xamanek Researches conducted an archaeological inventory survey in 2003 on a coastal portion of land in Keauhou *ahupua'a*, Makawao District, Island of Maui (TMK 2-1-07: 072 [por.]). The inventory survey was carried out for part of a planned statewide fiber optics network that is currently under development by Sandwich Isles Communications, Inc. (SIC). The study area is located within Po'olenalena Beach Park on the south shore of Maui in Makana. The archaeological survey was conducted on behalf of Parsons Brinkerhoff Quade & Douglas, Inc., Honolulu.

The inventory survey was carried out for a portion of the planned SIC fiber optic network that will service Department of Hawaiian Home Lands (DHHL) communities in Maui County, as well as the rest of the state. Fieldwork for this inventory survey was carried out in May, June and July of 2003.

One previously unrecorded historic property was identified during the inventory survey. This site has been designated SHIP No. 50-50-14-5486. This site is interpreted as a precontact coastal habitation area that appears to have been utilized into early post-contact times. Recovered food midden and artifacts indicate that occupants of this site utilized marine resources and fashioned tools to harvest these resources. Several subsurface pit and posthole features as well as a portion of a waterworn pavement were located. All of these features indicate a habitation function for the site.

Based on the results of the inventory survey, Site 5486 qualifies for importance under at least Criterion "d" for its information content. The presence of an articulated dog burial (Feature BT1) associated with Layer IIIb suggests a possible ceremonial function as well. While the extent of Site 5486, continues to be unclear, its proximity to Site 1362 (a *kaohale* or household complex with a *ka'o*) suggests that this newly identified site could also qualify for importance under Criterion "e" for its traditional cultural significance to Native Hawaiians.

Site 5486 retains its significance under at least Criterion "d" for its information content. Based on discussions with Dr. Melissa Kirkendall, SHPD Maui and Lana'i islands staff archaeologist, additional inventory level work will be required for the area to the east (*mauka*) of the known extent of this site. This area is presently utilized as a beach access parking lot.

Prepared on behalf of:

Parsons Brinkerhoff Quade & Douglas, Inc.  
Honolulu, Hawaii

Prepared by:

Erik M. Fredericksen  
Demaris L. Fredericksen  
Xamanek Researches  
Fukalani, Maui

December 2, 2003

RECEIVED AS FOLLOWS

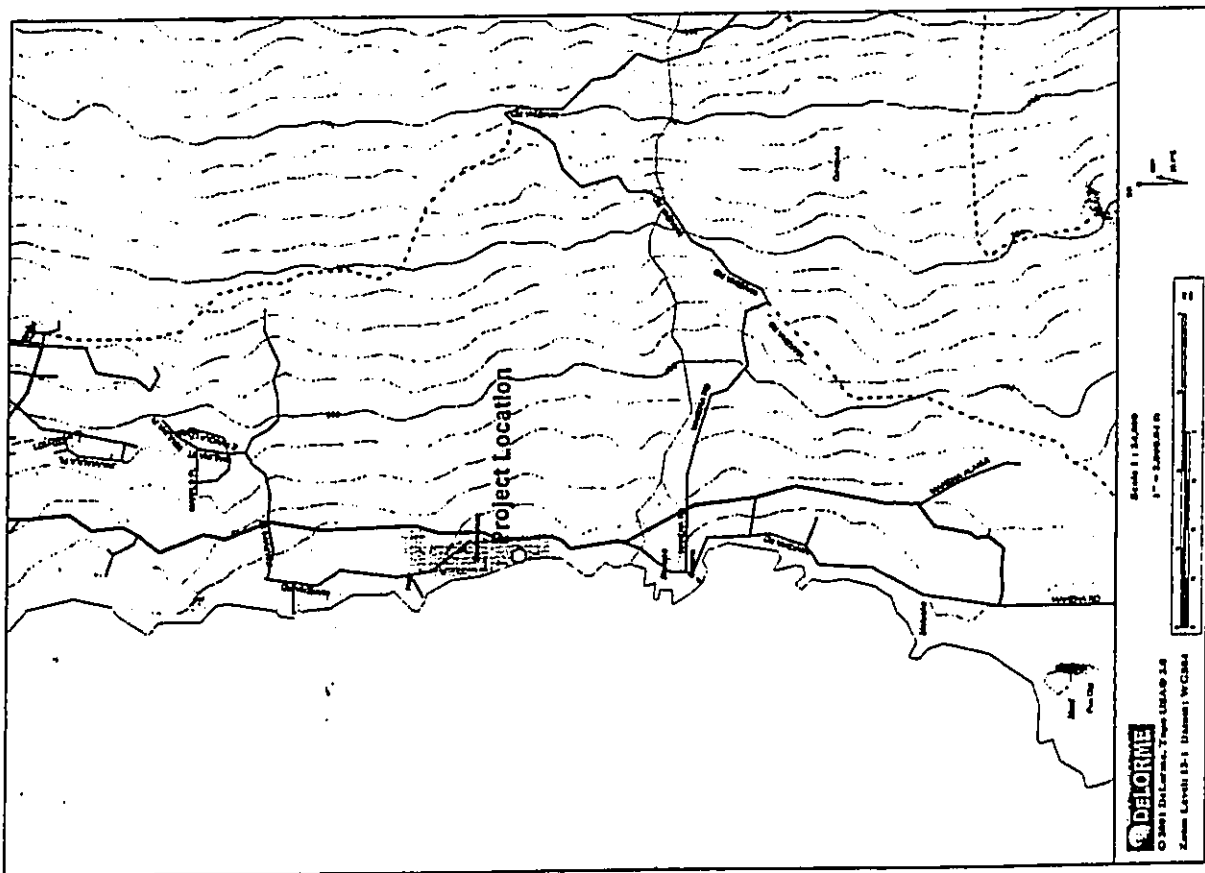
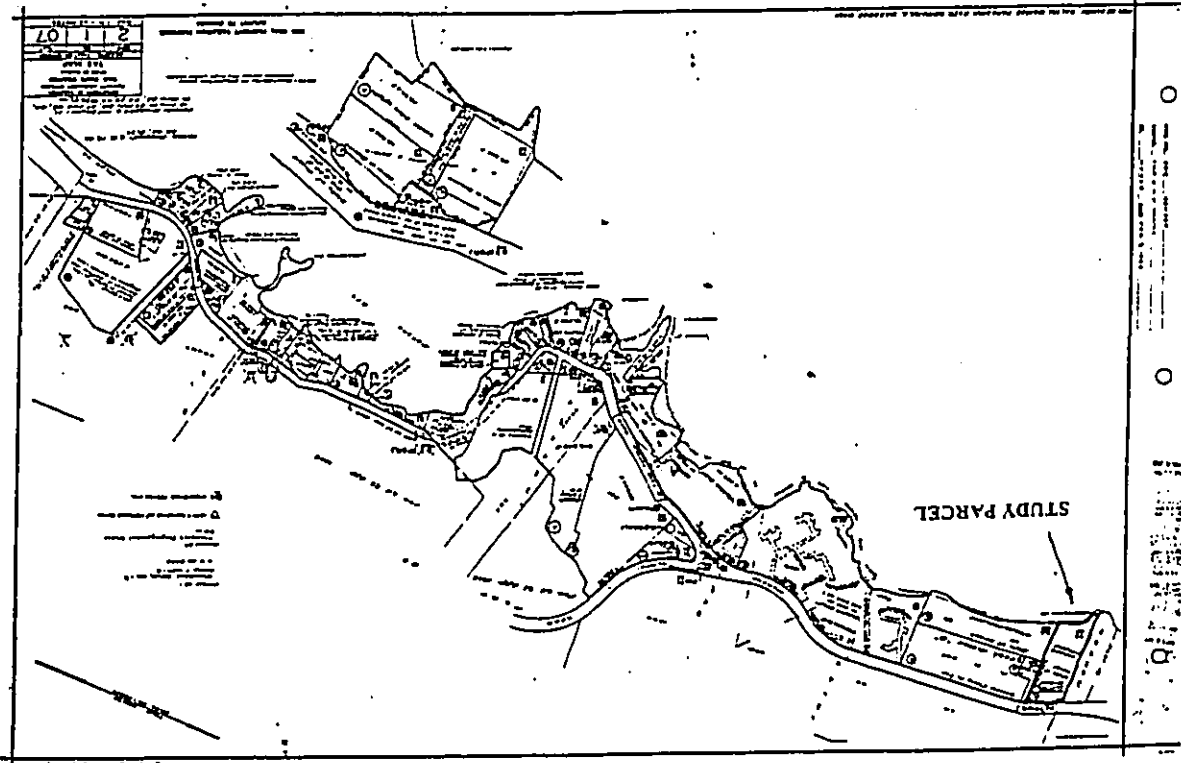
Data Analysis.....	50
Table 6—Radiometric Results.....	50
Table 7—Indigenous Artifacts Recovered.....	51
Photo 1—Urchin spine files.....	53
Photo 2—Coral tiberiderifiles.....	53
Figure 21—Frequency of artifact types.....	54
Table 8—Summary of Subsurface Results—TU 1.....	55
Table 9—Summary of Subsurface Results—TU 1 (continued).....	55
Table 10—Summary of TU 1 (continued).....	57
Table 11—Summary of Subsurface Findings—TU 1 Extension.....	58
Table 12—Summary of Subsurface Findings—TU 1 Extension (continued).....	59
Table 13—Summary of TU 1 Features.....	60
SUMMARY AND CONCLUSIONS.....	61
Site Significance Evaluations.....	62
Mitigation Recommendations.....	63
References.....	64
Appendix A—Radiometric Data.....	68
Appendix B—Soil Bore Test Results.....	75
Appendix C—Photographs.....	Appendix C1 through 12

Table of Contents

Map 1—Topographic map showing the location of the study area (Scale 1:24,000).....	iii
Map 2—State of Hawaii Tax Map, Zone 2, Section 1, Plat 7.....	iv
Map 3—Topographic map of study parcel, showing location of backhoe trench.....	v
INTRODUCTION.....	1
STUDY PARCEL.....	2
BACKGROUND RESEARCH.....	3
PREVIOUS ARCHAEOLOGICAL WORK.....	3
Table 1—Archaeological sites in vicinity of present study area.....	16
Figure 1—Archaeological sites located around the project area in 1993.....	17
Settlement Patterns and Expected Results.....	20
Figure 2—More recent archaeological studies in Makana area.....	21
ARCHAEOLOGICAL METHODS.....	22
Figure 3—Approximate location of backhoe trench on subject parcel.....	24
Figure 4—Test units and auger tests placed in approximate corridor tested with backhoe.....	24
ARCHAEOLOGICAL RESULTS.....	25
Table 2—Summary of Auger Test Results.....	25
Test Units 1-3.....	27
Figure 5—L-shaped profile of Test Unit 1, showing northern faces.....	28
Figure 6—L-shaped profile of southern wall faces of TU 1.....	29
Table 3—Summary of Test Unit 1 Features—Site 5486.....	33
Figure 7—L-shaped profile of Test Unit 2—east and south walls.....	35
Figure 8—L-shaped profile of TU 2—west and north walls.....	36
Table 4—Summary of Test Unit 2 Features.....	36
Figure 9—South and north wall profiles of TU 3.....	37
Figure 10—Schematic of Backhoe Trench 1, indicating Section 1-10 locations.....	38
Backhoe Trench in <i>moai</i> APE.....	38
Site 50-50-14-5486.....	39
Table 5—Summary of Backhoe Trench Features.....	42
Figure 11—Easternmost (makū) section (Section 1) of Backhoe Trench 1.....	43
Figure 12—Section 2 4-8.5 meters.....	44
Figure 13—Section 3—8.5 to 17.5 meters.....	44
Figure 14—Section 4—12.5 to 17.5 meters.....	45
Figure 15—Section 5—17.5 to 21.5 meters.....	45
Figure 16—Section 6—21.5 to 24.5 meters.....	46
Figure 17—Section 7—24.5 to 27.5 meters.....	46
Figure 18—Section 8—27.5 to 31.5 meters.....	47
Figure 19—Section 9—31.5 to 35.5 meters.....	47
Figure 20—Section 10—35.5 to 39.5 meters.....	48
Soil Test Results.....	49

RECEIVED AS FOLLOWS

Map 2 - State of Hawaii Tax Map, showing project location.



RECEIVED AS FOLLOWS

## INTRODUCTION

Ms. Nami Ohtomo, of Parsons Brinkerhoff Quade & Douglas, Inc., originally contacted Xamanek Researches during the late spring of 2001 about conducting archaeological work for a planned fiber optic network to service Department of Hawaiian Home Lands (DHHL) communities in Maui County, as well as the rest of the state. This project was to be part of a statewide fiber optics network that was planned for development by Sandwich Isles Communications, Inc. (SIC). The planned communications network would span approximately 1,500 miles over land and underwater. Because of this project's large size, it had been split into two portions—the terrestrial routes, and the various landing sites. Parsons Brinkerhoff Quade & Douglas, Inc. had been awarded the landing sites portion of the overall SIC project.

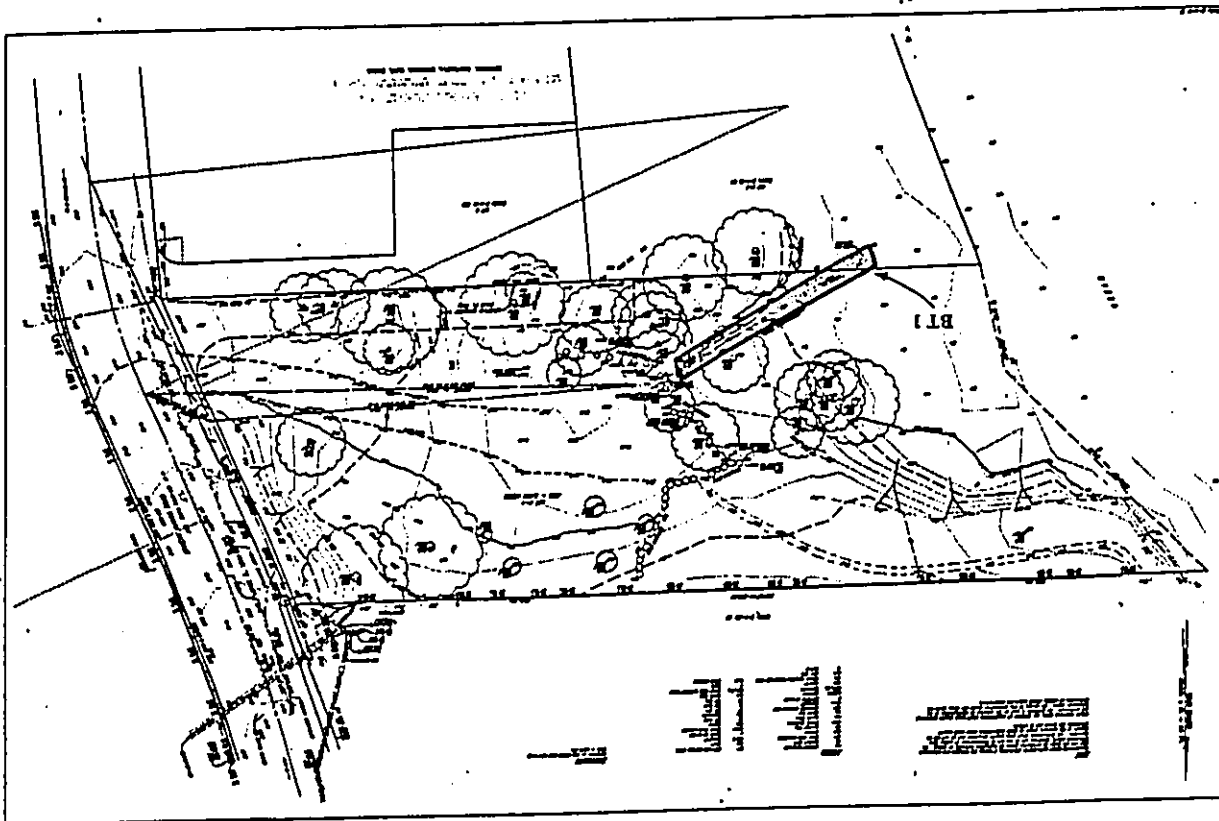
We were asked to submit a proposal for the County of Maui landing sites, which originally comprised 10 of the 17 of the Hawaii's landing sites.<sup>1</sup> Our proposal was subsequently accepted, and we were contracted to conduct the necessary archaeological studies for each of the proposed landing sites.

The preliminary phase of the project began in late 2001 and early 2002 and involved evaluation of various potential landing sites. Following several field inspections of proposed landing locations, Dr. Melissa Kirkendall, State Historic Preservation Division (SHPD) staff archaeologist for Maui and Lana'i was contacted regarding appropriate work scope for the various landing sites.

A meeting with Dr. Kirkendall was held in January of 2003 on 8 of the 10 proposed County of Maui landing sites. Given the coastal location of all of the landing locations, it was determined that all six of the planned Maui sites and one of the two Lana'i sites would require inventory surveys, rather than assessments. The following report presents the results of our inventory survey for the proposed SIC Po'olenalena Beach Park landing site in Makena.

<sup>1</sup> The state total was subsequently reduced to 7, with 3 of these in Maui County. The revised landings for the County of Maui include the present study area, the Waihi landing site in Lahaina, and the Ali'i Fishpond landing site on Molokai.

Map 3 - Topographic map showing location of tested portion of APF—Backhoe Trench #1.



## STUDY PARCEL

### Natural History

The project area lies *makai* (west) of Makena-Alanui Road and is composed of a portion of TMK 2-1-07: 072. A private parcel borders the study area to the north, while another private parcel and State land bound it to the south. The ocean borders the Park parcel on its western side. The estimated elevations of the c. 1-acre parcel range from c. 5 to 15 ft AMSL. The sampled portion of the proposed Area of Potential Effect (APE) traverses the southern section of the Park parcel, which consists of land that is owned by the State of Hawai'i, and administered by the County of Maui. Po'olenalena Beach Park lies in Keaouhou *ahupua'a*, Makawao District, Maui.

The project area lies on the southwest coast of Maui in Keaouhou *ahupua'a*. It is part of what the traditional district of Honua'ula, and the present district of Makawao. Soils present on this property are part of the Keaouhou-Makena Series and are composed of well-drained, rocky soils, and beach sand (Foots, et al., 1972).

The subject parcel is located on the coastline, along the eastern flank of Haleakala Volcano, and lies within its rain shadow. Estimated precipitation for this portion of Maui is less than 15 inches (380 mm.) per year (Juvic and Juvic, 1998). The project vegetation is typical of a coastal, dry forest community. Both alien and native plant species are present in this community. Coconut palms (*Cocos nucifera*) dot the vegetative cover. The most common alien species include *kiawe* (*Prosopis pallida*) trees, buffelgrass (*Cenchrus ciliaris*), *koa haole* (*Leucaena leucocephala*) shrubs, tree tobacco (*Nicotiana glauca*), and annual weeds.

While not common, observed native plants included *'uhaloa* (*Waltheria americana*), *'ilima* (*Sida fallax*), beach morning glory or *pohuehue* (*Ipomea pes-caprae* subsp. *brasilensis*). In addition, an isolated *mito* (*Thespesia populnea*) tree was noted near the study area.

The ocean lies an estimated 15 meters to the west of the end of tested portion of this landing site location. A long, gently sloping beach stretches from Halo Point to Po'olenalena Point<sup>1</sup> and southward for roughly another 0.5 kilometers. This coastal marine environment consists of coraline beach sands with underlying basaltic formations. The rocky coastal and near shore areas contain locally dense concentrations of marine life. These marine resources present in the vicinity of the project area would have been important to precontact Hawaiians as food resources. Members of the public heavily

<sup>1</sup>This point is sometimes referred to as *pepeleokopo*—meaning literally "dirty ear" in Hawaiian. The beach to the south used to be referred to as *Pepeleokopo Beach*—but is now called Po'olenalena Beach Park.

utilize this portion of the Makena coastline. It is a public park maintained by the County of Maui, and a favorite fishing and swimming spot today.

The tested portion of the APE ranges from an estimated 4 to 9 ft AMSL. Annual precipitation on this portion of leeward Maui is generally less than 30 inches, with the rains typically falling during the winter months. The temperature ranges from the mid-seventies to the mid-eighties, and is relatively constant throughout much of the year round (Juvic and Juvic, 1998).

## BACKGROUND RESEARCH

### Traditional History

There are few references in traditional literature to the Makena or Honua'ula region of the island of Maui. However, one reference is to be found in the "Myths of Sacred Hills", which is related in Beckwith (1970, pg. 189). Here she tells of the formation of Pu'u Ola'i, a prominent cinder cone which lies about 2.5 km. south along the coast:

"The two hills beyond Maalaea bay on Maui are named Pu'u-hele and Pu'u-o-kali. They are *mao* beings and their first child is a daughter born of Pu'u-o-kali and named Pu'u-o-inalua. She is placed on the sacred island of Kahoolawe, called at that time Kohe-maialama. She becomes the wife of the two sons of the *kahuna* of Hui, Kaakakai and Kaunahua, who take the form of birds and retreat to Hana-ula when the great drought comes and there alone rain falls. Pu'u-o-inalua takes Lohiau for her husband while he is living at Maalaea. Pele is angry and cuts her in two in the middle. The tail becomes the hill Pu'u-o-tai at Makena, and the head becomes the rock islet of Moiohiki."

Another reference is contained in Inez Ashdown's *Ke Alalao o Maui* (1970):

"Ancestors sailing over the broad ocean or fishing on sea or along shores feared nothing because they were guided as children beloved by the ancestral spirits residing in shark forms. The noted shark deity, Ka-la-hiki, was the one who led the first explorers. He would swim ahead of the fleet of canoes, point his head toward land and guide his mortal descendants safely to shore. ..."

RECEIVED AS FOLLOWS

"When becalmed people prayed to ...the guardian angles who could assume king (many forms). They could appear as a man, a bird, shark, or whatever form was most suitable for the work to be accomplished."

"The large cave beneath Pu'u O-lai between One-uli and Nau-paka beaches at Makana has ever been a sacred dwelling-place for these ancestral dieties (Ashdown 1970, p. 22).

E. S. Craighill Handy interviewed older informants concerning the Makana-Keone'o'io region which is paraphrased below (Handy and Handy, 1972, p. 147, in Bordner, 1995, pp. 91-92).

"At Keoneolo on the southern flank of Haleakala, which is a sweet-potato planting area on Maui, there is a story of a man who mistakenly prayed to Makali'i, a demigod whose name he had heard associated with bountiful provender, asking to give him fish. Makali'i (a name for the constellation Pleiades) finally appeared to him and told him that he could not give him fish. 'But,' said Makali'i, 'plant sweet potatoes,' and he advised that the planting be done in the months of Ika'wa, Welehu, and Makali'i (late October into January, the months of south winds and rains). If he did so, Makali'i promised him a crop of big potatoes. The man did as he was told and had a big crop. One potato was so big he could not dig it out. A hill at Keoneolo was formed by the earth he threw out in trying to dig it up."

The project area is located in the large section of southwest Maui called Honua'ula, which was a traditional moku, or district. The term, Honua'ula roughly describes a flatland (*honua*) which is distinctive for its red ('*ula*) dust. The name Honua'ula can thus be translated as "Red Earth". Prior to the introduction of cattle, dry land forest had extended much closer to the sea, and there was considerably more rainfall, according to informants. Hawaiians lived along the coasts wherever potable water could be found—either from brackish springs or submarine springs offshore (Handy and Handy, 1972, p. 147, in Bordner, 1995, p. 93).

#### Precontact Maui Chiefs

A brief history of the significant Maui chiefs is contained in Dorothy Barrere's work on Wailea, prepared in 1975. She relies heavily on the collection of traditions and chants collected by Judge Abraham Formander, who arrived in the Hawaiian Islands in 1842. He served as the circuit judge of Maui for more than 15 years.

Judge Formander's genealogical reckoning begins with Kamaloohua, who ruled over the greater part of Maui, probably in the 15<sup>th</sup> century (Barrere, p. 5). Three generations after him, his descendants—2 brothers named Kaka'e and Kaka'-alaneo—ruled jointly over Maui and Lana'i. The older Kaka'e's son was Kahakili I, who inherited the rule. Kahakili's son, Ka-wa-o-Kaohele succeeded his father as ruler. His sister's daughter, La'ie-lohelohe, married his son, Pi'ilani, linking the two branches of the senior line and establishing the dynastic line for the descendants of Pi'ilani (*ibid.*).

## RECEIVED AS FOLLOWS

Lono-a-Pi'ilani, the eldest son of Pi'ilani, succeeded his father, but his younger brother Kiha-a-Pi'ilani, with the help of their sister and her husband who was a paramount chief of Hawaii, wrested power from him. Kiha-a-Pi'ilani's eldest son, Kamalawalu, became the paramount chief of the island of Maui sometime in the 16<sup>th</sup> century. The island is still referred to as Maui-a-Kama, or Kamalawalu—and the people of Maui are his children—"the children of Kama" (*ibid.*, p. 1).

The fifth generation descendant of Kamalawalu to become ruler was Kekaulike. While his reign began peacefully following the pattern established by his ancestors, this changed with his decision to try to seize power from chiefs of the island of Hawaii. Unsuccessful in this quest, he retreated to Kaupo, Maui, intending to undertake another raid at a future date. However, his health failed and he chose a younger son, Kamehameha-nui, to succeed him, thus breaking the long pattern of primogeniture. There is some question as to how long Kamehameha-nui reigned—but upon his death his brother, Kahakili became the ruler of Maui (*ibid.*, pp. 7-9).

Samuel Kamakau (1992, p. 166) comments on Kahakili's appearance and demeanor:

"Kahakili was a famous chief, a tabu chief, one who ruled men, and was so sacred that whatever had touched his body was burned with fire softer he was through with it, so that no one else could use it). He was a famous leaper from a cliff into water (*litikang*), sometimes from a height of 500 or 600 feet or even higher, and he could climb cliffs which no other person could ascend. He elected to have his skin black: one half of his body from head to foot was tattooed black, and his face was tattooed black, and this became an established law with him: Any person taken in crime who passed his dark side, escaped with his life."

Kahakili's brother-in-law was Kalani'opu'u, a high chief from Hawaii. Almost continuous warfare occurred between these two leaders in the period from 1775 to 1782—until the time of the death of Kalani'opu'u (Barrere, p. 13). Kamakau tells of one battle in 1776, where Kalani'opu'u and his army landed at Keone'o'io:

"...their double canoes extending to Makana at Honua'ula. There they ravaged the countryside, and many of the people of Honua'ula fled to the bush. When Kahakili heard of the fighting at Honua'ula he got his forces together—chiefs, fighting men, and left-handed warriors whose sling-shots missed not a hair of the head or a blade of grass." (Kamakau, 1992, p. 85).

#### Post-contact Period

We know that it was during Kahakili's time that Europeans first came to Maui. On November 27, 1778 the ship's surgeon, David Samwell, notes his presence aboard Captain James Cook's ship, *Discovery*:

"In the afternoon Ka-he-kere [Kahakili] the King of this Island & of another which we saw to Leeward called Morotal came on board the *Discovery* in a large double

Canoe attended by a large Train dressed in red feathered Cloaks and Caps. As the Canoe approached the Ship one man stood up and waved his Cloak about his Head while the rest sung in concert much after the manner of the Ojibweians. The King & some of his Courtiers were taken into the cabin & some presents were made to them, he himself is a middle aged Man, is rather of a mean appearance, the Hair on each side of his head is cut short & a ridge left on the upper part from the forehead to the Occiput; this is a common Custom among all of these people, but each side of his head where the Hair was off was tattooed in lines forming half Circles which I never saw any other person have" (Somwell, in Beaglehole, 1967, 2:1151) (in Barrere, p. 11).

From this time hence, the ruling chiefs of Maui were to be part of the irrevocable change that was brought about by the meeting of two cultures.

Following the visit of Captain James Cook in 1778,<sup>1</sup> other European explorers showed up on the shores of Maui. The French captain Jean-Francois Galaup de La Perouse<sup>2</sup> visited Maui on May 29, 1790 and noted in his journal:

"At nine in the morning the point of Mowee bore west 15° north, and a small island also appeared... The aspect of the island of Mowee was delightful. I coasted along its shore at the distance of a league. It projects into the channel in the direction of south-west by west. We beheld water falling in cascades from the mountains, and running in streams to the sea. After having watered the habitations of the natives, which are so numerous that a space of three or four leagues may be taken for a single village: but all the huts are on the sea-coast, and the mountains are so near, that the habitable part of the island appeared to be less than half a league in depth. ...

The breeze had freshened, and we were running at the rate of two leagues an hour, which encouraged me in an endeavour before night to explore this part of the island as far as Morokine, near which I hoped to find an anchoring place sheltered from the trade winds. ... After having steered south-west by west, as far as the south-west point of the island of Mowee, I hauled to the west, and afterwards to the northwest, in order to gain the anchorage (Keoneoia) where the Astrolabe had already brought up in twenty-three fathoms, hard grey sand, about a mile from the shore. ...

The Indians of the villages of this part of the island hastened alongside in their canoes, bringing us articles of commerce, hogs, potatoes, bananas, roots of arum, which they call *lamo*, with clove and some other curiosities making part of their dress. I told them that I was *taboo*, a word which I had learned from the English accounts, and which was attended with all the success I expected. Mr. De Laugle, who had not taken the same precaution, had his decks in a instant crowded with a multitude of Indians. But they were so docile and so apprehensive of giving offense, that it was extremely easy to prevail on them to return to their boats. I had no idea of a people so mild and so attentive. ...

<sup>1</sup> Cook did not actually set foot upon the island of Maui.

<sup>2</sup> La Perouse was the name of a farm, which was one of his family's country properties. It is added this to his own name in later years, and when he attended court he was known as Comte de la Perouse (Dumasart, 1971, p. 151).

It was so late before our sails were hauled, that I was obliged to postpone going on shore at this place till the next day, where nothing could detain me but a convenient watering-place: but we had already observed, that this part of the coast as altogether destitute of running water, the slope of the mountains having directed the fall of all the rains towards the weather side. It is probably that the labour of a few days might be sufficient to supply the whole island with so valuable a necessary [sic] of life; but these Indians are not yet arrived at the requisite degree of industry, though in many other respects so greatly advanced. ...

At eight in the morning four boats belonging to the two frigates were ready to set off. ... About a hundred and twenty persons, men and women, waited for us on the shore. The soldiers, with their officers, landed first. We marked the space we wished to reserve to ourselves. ... These formalities made no impression on the natives. The women showed by the most expressive gestures, that there was no mark of kindness which they were not disposed to confer upon us; and the men, in the most respectful attitude, endeavoured to discover the motive of our visit, in order to anticipate our desires. Two Indians, who appeared to have some authority over the others, advanced, and with great gravity made a speech of considerable length, of which I did not understand a single word; and each offered me a present of a hog, which I accepted. In return, I gave them medals, hatchets and other pieces of iron, which were of incalculable value to them. ...

The soil of this island is entirely formed of decomposed lava, and other volcanic substances. The inhabitants have no other drink but a brackish water, obtained from shallow wells, which afford scarcely more than half a barrel a day. During our excursion we observed four small villages of about ten or twenty houses each, built and covered with straw in the same manner as those of our poorest peasants." (La Perouse, 1798: 341-351, in Barrere, pp. 15-18).

Meanwhile, the warfare between Kahakili and the Hawaiian chiefs continued. By 1786, Kamehameha of Hawaii was powerful enough to begin sending expeditions of warriors to the Maui districts of Hana and Kihahulu. These raids were repelled by the Maui forces. But by 1790, Kamehameha had further consolidated his power on Hawaii, and invaded Maui himself, leading a large army. Also with him were two Europeans, whom he had "detained" from foreign ships. One, Isaac Davis, was the sole survivor of the tender, *Fair American*, which had been captained by the son of Captain Simon Metcalf, the man responsible for the "massacre of Olowalu" in February of 1790. On the same day as the sinking of the *Fair American*, the boatswain of the elder Metcalf's ship, Eleanor, John Young, went ashore at Kealahou Bay, where he was held lest he relay the news of the death of the younger Metcalf and his crew. After a couple of days, the Eleanor sailed away without him (Barrere, p. 21).

The two young men, Davis and Young, became Kamehameha's advisors, particularly in the tactics of foreign warfare. When they accompanied Kamehameha's army to Maui in 1790, they brought along a cannon called *Lopaka*, which played a decisive part in the defeat of the Maui forces at the battle of Keapaniwa in Iao Valley. This proved to be the turning point for Kamehameha in his quest for the defeat of

Kahekili. Though still seen as the leader of Maui, Kahekili's power was on the wane following this horrendous battle.

Another historic reference to the Maui leader, Kahekili, comes from the journal of Captain George Vancouver, commander of the British surveying ships *Discovery* and *Chatham*, in which he reports on his March 1793 meeting with Kahekili in Lahaina:

"...his arrival [was not] attended by any accumulation in the number of natives on the shores or in the canoes about the vessels. He came boldly alongside, but entered the ship with a sort of partial confidence, accompanied by several chiefs who constantly attended him. His age, I suppose, must have exceeded sixty. He was greatly debilitated and emaciated, and from the colour of his skin I judged his feebleness to have been brought on by an excessive use of the *ava* [kava]. His faltering voice bespoke the decline of life, and his countenance, though furrowed by his years and irregularities, still preserved marks of his having been in his juvenile days a man of cheerful and pleasing manners, with a considerable degree of sensibility, which the iron hand of time had not entirely obliterated [1801, 3:305]." (in Barrere, p. 22).

The increasing presence of foreigners brought about extensive changes to the traditional culture. Kamehameha saw the *hoofe* as persons that could be manipulated in order to increase his power—but the relentless impact of foreign desires—particularly for land, slowly took these powers from the Hawaiian rulers.

In the historic period between 1831 and 1836, the Honou'ula District saw a severe population decline—believed to have been the result of both economics and disease. Those who remained in the district were primarily fishermen (Carpenter and Yent, 1995, p. 9). The population of the *mo'oa* of Honou'ula was 3,340 in 1831, and 1,911 in 1836. One visitor to Honou'ula in 1846 estimated that the population was only 80—and reported that long-time residents remembered it as having numbered as many as 2000 laboring men (Barrere, p. 22). Another estimate has the entire population of the Honou'ula District in 1853 as about 750, with the bulk concentrated along the coast north of Pu'u Oia'i in the Makana area (Carpenter and Yent, p. 9). Depopulation appears to have been greater in marginal, rural areas, due to both increased mortality and outmigration to developing port towns such as Lahaina (Bordner, 1995, p. 98).

#### Post-1850s

The Mahele of 1848, or division of lands, saw the transference of land titles from the king—Kamehameha III—to his subjects.<sup>3</sup> The *ahupua'a* of Keaunohou<sup>4</sup>, was awarded to Hoomanawanui by LCA 6715 in 1851. In 1856, he sold the land to James Makae for \$1000.00 (Ibid.). There are no commoner LCAs located on the study parcel. However, there are a few LCAs that are found on the inland portions of the Keaunohou

<sup>3</sup>The district of Honou'ula was one of 12 traditional districts, or *mo'oa*, of Maui. However, in 1839 it became part of Wailuku District for tax and judicial purposes, and in 1909 it was incorporated into the Makawao District (Barrere, p. 56).

<sup>4</sup>There are two adjacent land divisions called "Keaunohou". The 833-acre parcel was called "Hikihau Keaunohou" on the deed to James Makae. The parcel to the north was government-owned and portions of it were included in Royal Patent Grant 234 to Torbert and Wilcox (Barrere, 1975).

*ahupua'a*, clustered along the old government road, which were awarded for households, sweet potato lands, and Irish potato lands' (Barrere, p. 40).

Keawala'i Church, which lies about 1.5 km. south of the subject property was founded by the Wailuku Mission in 1854.<sup>5</sup> While preparing for the construction of the permanent stone structure, they built a meeting place of poles and *pili* thatching. The church, which was built in 1855 by the congregation, is 36 feet wide by 80 feet in length. There are no exterior buttresses, so to assure stability of the stone structure, the interior walls are thickened to a height of c. 3 feet. Wood posts set on lava blocks support the wood floor of the church. The time period between the 1850s and 1860s was a prosperous one for the congregation. In 1856 the Sunday School raised \$70 for the purchase of a church bell, to be placed in the belfry. The bell arrived in 1860, and was installed in 1862.<sup>6</sup> (Gowans, 1993, p. 125). In 1864 the church purchased the property on which it stood, for \$80.00. The man from whom it was purchased was named Mahoe, had gotten the land as part of Grant 835 (Donham, 1998, p. 7).

John Kukahiko (1834-1900) was the pastor of Keawala'i Church in the 1870s, and is buried in the family cemetery known locally as "Five Graves".<sup>7</sup> This landmark lies to the south of the project area.

#### Ulupalakua Ranch

The name Ulupalakua apparently comes from a legend that tells of 3 men who traveled to Hana from Wailuku. At Hana they were given breadfruit, which they carried on their backs as they journeyed home along a foot trail. While on their long trip, the breadfruit ripened, and henceforth the area of Honou'ula in which this occurred was known as Ulupalakua—"the breadfruit that ripened on the back." (Sterling, 1998, p. 231).

Sugarcane was the earliest commercially cultivated crop in Honou'ula, and the earliest recorded planters were M. J. Nowlton and S. D. Burrows. They had leased lands from Kamehameha III at Ulupalakua (Kaeco *ahupua'a*) in 1841, to "engage in the manufacture of sugar for the King at Honou'ula on Maui" (Sterling, p. 9 in Barrere, 1975). After only a few years, the king's agent informed Nowlton that the lease and other interests had been sold to Linton L. Torbert on October 2, 1845. Torbert was directed to "keep in order for the King" 50 acres of sugarcane. Nowlton was told to teach Torbert about cane and potato growing, and the manufacture of sugar and molasses (Ibid.). The overall holdings encompassed 2087 acres of land with growing cane, a mill and animal stock.

<sup>5</sup>During the Mahele period, a "poison boom" occurred in the Makana region. The 1848 gold rush in California created a great need for Irish Potatoes, and it was cheaper to import them from Hawaii than from other parts of the mainland. Native Hawaiians, as well as the *Ao'ao* plantations engaged in this lucrative production. Much of the cultivation took place at higher elevations, where more abundant rainfall was present.

<sup>6</sup>Theresa Dooban's research notes oral testimony contained in a 1908 article by R. B. Dodge, as saying the church was founded in 1823 in a great house near the present site of the stone structure (Dooban, 1994, p. 21).

<sup>7</sup>The belfry of the church collapsed, and was subsequently restored in 1968. Also at that time, the exterior walls were coated with concrete to protect it from the elements (Gowans, 1993, p. 125).

<sup>8</sup>The Kukahiko family has been associated with the Makana area for many generations.



Torbert's tenure on the property was marked with limited success.<sup>11</sup> He obtained Land Grants 233 and 234, which connected the ranch with Makana Landing, thus enabling the transportation to market of products produced on the ranch lands. Financial entanglements and a smallpox epidemic were two of the conditions that plagued him. To avoid bankruptcy in 1851, he assigned his accumulated holdings by trust deed to Captain James Makee, but continued to manage the operations on the property. He was one of those who grew Irish potatoes for the California Gold Rush trade during the "potato boom" era mentioned earlier. However, on January 19, 1856, the Torbert Plantation was placed on the auction block, by order of James Makee. The land was listed in *The Polynesian* as over 5,400 acres; 1 dwelling house 36 x 38 feet, wood, with grass roof, numerous other buildings with grass roofs, a primitive sugar mill, livestock and "all articles and appurtenances belonging to or appertaining to the plantation." [Sterling, p. 10, in Barrere, 1975] Captain Makee purchased the property at auction on January 23, 1856.

Captain Makee moved his family to the plantation in the fall of 1856. By 1864, he had built the place into "the most complete sugar plantation in the islands", grossing and estimated annual income of one hundred thousand dollars (Ibid.). He built a large New England style mansion, complete with a widow's walk, and resumed his holdings—Rose Ranch. A frequent guest at Rose Ranch was King Kalakaua. The roses which flourished in the gardens and along the walkways were so famous, that a deep pink variety named *Lokealani*, was chosen as the official flower of Maui, and its pink color the official color (Bartholomew, p. 118). Hundreds of peacocks roamed the premises adding to the unique qualities of the ranch.

Captain Makee also changed the upcountry landscape. Not only was native vegetation cleared for planting of sugar cane and cattle pasturage but in the 1860s, he began a coordinated program of creating shelter belts, accomplished by the planting of nearly 15,000 eucalyptus and pine trees to prevent soil erosion (*The Pacific Commercial Advertiser*, June 25, 1864; in Dobyns, 1988, p. 18). He also was responsible for making Makana one of Maui's busiest harbors, second only to Lahaina. Makana was a regular stop on the Honolulu to Hilo run.

While Makee planned to raise cattle as the primary activity of the ranch, he had 375 acres of sugarcane planted in 1861. The advent of the Civil War and the disruption of sugar sources in the West Indies created a strong market for Hawaiian sugar. He took advantage of the situation, and expanded his sugarcane acreage to about 1,000 acres. By 1864 he had in operation a steam-operated sugar mill with the most modern of engines, and an ingenious sugar recovery mechanism of his own invention. During the period between 1876-1878, Makee formed Makee Sugar Company on Kauai (with his friend, King Kalakaua) and assumed control of the Waiahe'e Sugar company on Maui.

Sugar continued to be the most profitable crop for the Rose Ranch until the severe drought of 1878. The Makee Plantation cut back on sugar cultivation, and the last crop

<sup>11</sup> The entire *ahupua'a* of Papa'eau, Waipae, and Keihiki were sold as part of Royal Patent Grant 234 to Linton Torbert and William Shocum Wilcox. Grant 234 covers 1,946 acres.

was milled at Ulupalakua mill in March of 1883. Cattle were turned onto the remaining cane fields and ranching became the dominant activity of this region<sup>12</sup> (Barrere, p. 50-59).

The Rose Ranch continued to prosper, and much has been written about the idyllic life led by Captain and Mrs. Makee, their 2 sons, and 6 daughters. The beautiful setting, pleasant coolness as compared to other more tropical locations, and the Makee's generous hospitality, made the ranch famous. They entertained the Royal Family on numerous occasions, as well as many other guests.

On September 16, 1879, Captain Makee died. Prior to his death, however, he had divided his property interests in Rose Ranch into eight shares—one for each of his 2 sons and 6 daughters. In March of 1886, the Makee family sold its holdings to James Isaac Dowsett of Honolulu, for the sum of \$84,500 (Thrum, 1925, in Barrere, p. 87). Mr. Dowsett had been in the plantation and cattle business on Oahu since 1850, and had been the first to import Angus cattle to the Hawaiian Islands. Dowsett's daughter, Phoebe, was married to the youngest Makee son, Charles. After Charles' death, she was to wed Dr. J. H. Raymond.

In 1900, Dr. and Mrs. J. H. (Phoebe) Raymond became the owners of the former Rose Ranch—and renamed it the Raymond Ranch. In 1901, they also acquired leasehold rights of Kahikinui Ranch, adding considerable acreage to their holdings. Dr. Raymond built a slaughterhouse<sup>13</sup>, cold storage plant, and boat landing at Keoneoio for the purpose of shipping beef to markets in Lahaina and Honolulu. The cargo ship, Makana, was used in this trade. Dr. Raymond worked to improve the breeding stock, by adding Hereford bulls to his herd, and culling down on the large numbers of wild cattle (Barrere, p. 70). He "went into grain culture on a large scale, and was active in urging the installation of the Kula pipeline as a further source of water." (Sterling, p. 11, in Barrere, 1975)

On January 1, 1923, Frank F. Baldwin bought the Raymond Ranch, and named it Ulupalakua Ranch—after the Hawaiian name for that area of Maui. At that time, the manager was Angus McPhee. In 1925, Frank's son, Edward H. K. Baldwin, took over the operation. Work on improvement of the breeding herd, and the culling of wild cattle was continued. Extensive fencing was undertaken. A slaughterhouse was built at Ulupalakua in 1929, and from that time on, Ulupalakua beef was processed at their cold storage plant in Kahului—thus abandoning the older facility located at Keoneoio (Ibid.).

<sup>12</sup> A note about cattle—they were first introduced to the Big Island by Captain George Vancouver in 1791. Later the same year he presented Keihiki with some goats, which were considered to be a valuable present. Vancouver requested that Kamehameha place a *Lepu* on the cattle for a period of ten years, at the end of which time, wild cattle roamed the mountain slopes of northern Hawaii. There is no record of when cattle were brought to Maui, but by 1845 there were so many running loose on the islands, that numerous complaints were lodged from people whose lands were being destroyed. Many Hawaiians were driven from their homes and fields. The legislature finally passed a joint resolution in 1846 providing penalties for those who allowed their animals to trespass on others' lands. Soon "cattle walls" became a prominent feature of the landscape (Barrere, pp. 52-53).

<sup>13</sup> The site of the old slaughterhouse at Keoneoio, associated with the Raymond Ranch, is thought to be on the present Carter Estate property. Mr. Edward Cheng, a long time Makana resident, recalls the slaughterhouse, but stated that it was in ruins around the address of World War II. Mr. Cheng's uncle, Mr. David Cheng, vaguely remembers the ruins prior to WWII. He thinks that much of the wooden structure may have been dismantled during the war.

The Baldwin's took great interest in raising fine horses and polo ponies, and continued to raise horses and cattle after the war. Edward Baldwin died in 1956, and his son, Gregory, took over management of the Ranch. The last turnover took place in 1963, when it was sold to Mr. Pardee C. Erdman, Jr. The Erdmans continue operation of Ulupalakua Ranch to the present. In 1977, a fire destroyed the Makee mansion, along with the cottage that had been used by King Kalakaua on his numerous visits. The remains of the foundation and chimney of the main house can be seen from the road passing through Ulupalakua. A winery is now present on ranch lands, and visitors daily stop to taste this latest product of upcountry Maui.

#### Makena Landing

Makena Landing, which is located on the coast ca. 1 km. south of the study area, served as the loading port for the Rose Ranch. In 1877, Makee began building a breakwater to develop the landing into a harbor, from which he could ship sugarcane. Makena was a regular stop in the Hilo to Honolulu run. However, the schedule of the inter-island ship was not regular.<sup>14</sup> Cargo from the ranch was brought down to the landing by oxcart, about the time that the ship would be due. Animal enclosures at the landing were most likely used to hold cattle until the ship arrived (Dobyns, 1988, p. 18).

The population decline that began in the mid-1800s reversed after the construction of Makena Harbor in 1878. A map from 1885 (Jackson Map, No. 1337) shows all of the structures along the bay. These include a "church and school; corral; the 'old sugar house'; a 'stone wall'; and nine houses, including a 'grass house,' 'large house near church,' 'small house,' 'white house,' 'small brown house,' 'large house,' 'large house,' 'white cottage,' and 'Kukahiko's house.'<sup>15</sup> (Dobyns, p. 19) The church referred to is Keawala'i Church, mentioned above, which was founded in 1832, and built in 1855. It remains one of the few surviving missionary churches on Maui. A cemetery occupies a portion of the churchyard.<sup>16</sup>

During the Raymond Ranch period, over a hundred families lived in the area around Makena. The development of Kahului Harbor in the 1920s, and the Baldwin's shift to Kahului cold storage facilities, closed down Makena Landing to commercial traffic, and caused families to move away from Makena. As well, the landing at Keone'o ceased to be used for commercial shipping.

<sup>14</sup> A cannon, located at the beach headquarters in Ulupalakua, would fire as the ship was sighted. The report could be heard down at Makena Landing, alerting parties there to prepare for the ship's arrival.

<sup>15</sup> John Kuhahila (1814-1900) was the pastor of the Makena Church (Keawala'i Congregational Church), and the first harbormaster of Makena Harbor (Dobyns, p. 18).

<sup>16</sup> The land grant, on which this settlement is located, was awarded to Mahoe (Grant #15) in 1832 by Kamehameha III. It consisted of 514 acres, and included all of the coastal portion of Keao ahupua'a, "as it had been modified by Torbert's plantation" (Donham, 1998, p. 16). It also included the fishpond at Aruakuhua Point, the Ilona's' school and church, the government landing and a store house (ibid., p. 17). Mahoe was considered to be the *lanohou* of Keao. The Torbert Plantation map (1848-1856) and the Alexander map (1856) show the Torbert road, coming down the mountain from the ranch, ending roughly in the vicinity of the study parcel (Maps 4 and 5) (ibid., pp. 18-19).

A discussion of the traditional coastal trail is presented by Yoklavich (1989, pp. A-4 to A-9). The precontact trail system included *mauka-makai* trails, which linked ecological zones within a single *ahupua'a*. The adjacent *ahupua'a* were connected by an encircling trail, used for communication and transportation, and also for the important ritual of annual tax collection—the *makahiki*—a clockwise procession around the island. Known as the *Aialoa*, or "Long Road", it was also used as a communication link between *ahupua'a* during times of warfare. According to Martha Fleming (Handy and Handy, 1972, p. 488), "From Olowalu travelers were ferried by canoe to Ma'alea, thence to Makena where the *Aialoa* followed the long sandy beach", suggesting that the trail, passed through Palaua and Keauhou. Although the exact alignment cannot be determined, Apple's research (1965, p. 23) reaffirms that it probably stayed relatively close to the shoreline. Later historic roads created for horses and wheeled vehicles were generally located further inland and tended to be straighter. The old Torbert Map of Makena (c. 1845-50) shows the road in Palaua *ahupua'a* running along the shore, and labels it "Aupuni Road"—meaning government road (Yoklavich, p. A-6). The economic center of Palaua and neighboring *ahupua'a* was located inland around the Ulupalakua Ranch area, from the middle of the 19<sup>th</sup> century until World War II. Makena Landing was established in the 1850s, and supplies that had been previously transported over the road were now landed at Makena, and carried inland to Ulupalakua. The coastal trail/road deteriorated due to lack of use, and Palaua, Keauhou and other *ahupua'a* saw a decline in population as well, until the 19<sup>th</sup> century "government road" was labeled a "horse trail" in the early 20<sup>th</sup> century (ibid., p. A-4).

The advent of World War II resulted in a moderate amount of military activity in this part of Maui. A concrete gun emplacement is present on the beach, just south of the Polo Beach Club (Site 4128), and about 750 meters north of the study parcel. Another concrete pad, which held an artillery weapon (Site 4673) was located in Makena to the south on Nahuna Point, overlooking the sea (Fredericksen and Fredericksen, October 1998). In addition, the top of a concrete pill-box is seasonally exposed on Palaua Beach c. 200 meters northwest of the subject parcel.<sup>17</sup> Finally, a local informant, Mr. Edward Chang, told Kelly (1987, pp. 59-60) that before World War II, the access across Palaua *ahupua'a* ran along the top of the beach berm and was used as a horse trail. During World War II, the army turned the horse trail "into a jeep road, following the path of the old walking trail, or Government Road". The present old Makena Road follows the road bulldozed by the army, and was paved in the 1950s (Yoklavich, p. A-4).

In the 1970s and 1980s, commercial development began to take place in this region of Maui. The Wailea Resort was planned and built, along with several golf courses and additional major hotels. In the mid-1990s, major tourist development slowed, and the focus shifted to smaller projects at prime locations along the coast. The current project would fall into this latter category.

<sup>17</sup> Site 50-50-14-4117.

## PREVIOUS ARCHAEOLOGICAL WORK

The island-wide survey work of Winslow Walker in 1931 identified only 6 *heiau* along the southwestern coast of Maui in Honua'ula District. The nearest ones lie to the south at Makana—Kalanii *heiau* (Site 196), and Pohakunahaha *heiau* (Site 197). To the north are 2 more *heiau* associated with Kalepolepo fishpond. None were recorded in Keaunohu.

Walker reported another religious site in this area of Maui—"The *heiau* of Nanahu on a point north of Makana Bay is really a *ko'a*. It is a low platform 21 by 23 feet on which pebbles and coral are found mixed with the sand. Present day natives declare it was a place to pray to the Fish God, so the earlier report that it was a '*heiau* for dead people' seems to be an error" (Walker 1931, p. 103). Elspeth Sterling interprets this site as being at Nahuua Point (Sterling, 1998, p. 231).<sup>14</sup>

In the late 1960s and 1970s, a number of archaeological studies were conducted in Palaua (to the north) by the Bishop Museum and other organizations (Kirch, 1969, 1970; Davis and Bordner, 1977a and 1977b; Walton, 1972). Numerous sites were identified, mostly in the coastal area. On 2 property to the north, locally identified as the "McCormack Property,"<sup>15</sup> a large cattle pen—circa 1885—was located (Site 1027). Precontact sites included Palaua *heiau* Complex (Site 1028) and Palaua Landing (Site 1029). On Halo Point, to the north of the present study parcel, Site 1030 has been described as a house site, a *ko'a*, an *ahupua'a* boundary shrine, and finally a possible burial by 4 different archaeological teams. Eventually this site was preserved as a *ko'a*, or fishing shrine (Kirch, 1970; Davis and Bordner, 1977a; and Shapiro and Haun, 1989).

In the 1980s and early 1990s, as the Waieala Resort began to be developed as a tourist destination area, additional studies were undertaken in the coastal and intermediate zones of Palaua (Bordner, 1980; Haun, 1987; Dicks and Haun, 1987; Jensen and Haun, 1989; Shapiro and Haun, 1989; Donham, 1990a, 1990b; Henry, Walker and Rosendahl, 1992; Toenjes, Nees, Cleghorn and Anderson, 1992; Fredericksen, 1995; Fredericksen and Fredericksen, 1995). No studies of inland habitation zone sites in Palaua and Keaunohu *ahupua'a* have been conducted. The studies that have been done in that

<sup>14</sup> This site was identified in an inventory survey conducted by Xamanek Researches, and assigned SIHP Site number 50-50-14-4324 (Fredericksen and Fredericksen, June 1998).  
<sup>15</sup> This 37-acre parcel lies on the *maui* side of the old Makana Road, and extends inland to Makana Alanui Road.

ecological zone have centered around a Hawaiian Home Lands development in Keaunohu and Waiohuli to the north (Brown and Haun, 1989).

All of the research suggests that in the *ahupua'a* of Palaua and Keaunohu permanent settlements were found along the coastal areas, followed by an inland intermediate zone that was sparsely utilized. Another habitation area was located inland at a higher elevation, where there was sufficient moisture to produce agricultural crops that would sustain more permanent habitation. These ecological zones were connected by a *malae-mauka* trail system, which probably followed the major gulches in the region, although no studies have been undertaken to verify this.

Donham (1990a, p. 7) concludes:

"In general, the findings of the above studies indicate extensive, but not necessarily intensive agricultural use of the coastal zone and the dry, immediate inland zone between Kihel and Makana. Temporary habitation features have been identified in both the inland and coastal zones, and permanent habitation sites have been identified primarily along the coast. Most of the analysis have concurred with the presumption that most, if not all, of the sites in the area date to the late prehistoric period. A few radiocarbon dates from coastal habitation sites have predated AD 1400; however, these are considered as tentative in some cases."

The work that Donham conducted at Site 2496, a c. 2 meter-deep coastal site located about 1.1 kilometers north of the present study area, pushed the time of habitation back considerably. Of 6 radiocarbon samples recovered from subsurface excavation, 1 returned an early date of AD 680 to AD 1070. Two other dates fell between AD 1260 and 1480. The remaining 3 samples that were analyzed, yielded dates between AD 1400 and AD 1739 (Donham, 1990a, p. 26). One historic burial—that of a child—was located on the study property. Further work by PIHR was undertaken to see if additional burials were present, but no additional ones were located (Henry, Walker and Rosendahl, 1992).

Xamanek Researches returned to Site 2496 in 1995 to undertake data recovery (Fredericksen, 1995; Fredericksen and Fredericksen, 1995). Over 20 radiocarbon samples were submitted to Beta Analytic, Inc. for analysis, and the intercept dates fall into the following date brackets: 2 samples returned dates of between BC 100 and AD 130; 5 samples fell between AD 1275 and AD 1300 (13<sup>th</sup> century); 8 samples clustered between AD 1395 and 1485 (15<sup>th</sup> century); and 6 samples were between AD 1535 to AD 1650 (16<sup>th</sup>, 17<sup>th</sup> century) (Fredericksen and Fredericksen, 1995). This research established the potential for very early habitation in this coastal strip of Palaua. Additionally, one precontact burial was found during subsurface testing in sand deposits—thereby reaffirming the belief that additional human burials are likely present in such coastal sand deposits.

A total of 12 test units and 7 test trenches were excavated during this data recovery project. Over 64 cubic meters of soil were excavated in the test excavations that ranged from 0.2 to 2.4 meters in depth. The portable remains found during data recovery indicated a strong marine focus. Large quantities of food midden such as shellfish, sea

urchin, and smaller amounts of fish, bird and mammal bone were recovered. The artifact assemblage includes coral tools such as abraders and files, a shell adz and worked shell, fishhook tabs and fishhooks, sea urchin spine files and tools, basalt tools, volcanic glass cores, numerous volcanic glass flakes, and several items of personal adornment.<sup>20</sup> Over 140 separate features were identified, and consisted primarily of postholes and pits, indicative of habitation activity. Portions of 5 habitation floors of compacted clay, some of which were paved with *ihii ihii* stones, were also found. A subsurface wall (1.6 meters below surface) yielded a date of AD 1205 to 1440. Another subsurface rock structure is possibly a portion of a house or *hale*, that is c. 250 to 300 years old.

The top of a large, well-built U-shaped wall was first noted during the earlier inventory survey by Donham (1990a). Subsequent data recovery work by Xamanek Researches revealed that this feature was c. 1.5-1.8 meters thick and c. 1 meter high by c. 21 meters long and 6 to 8 meters wide. It appears to have been associated with the 17<sup>th</sup> century occupation phase. Based on the total size and the nature of construction, this habitation enclosure may have been built for and utilized by a person of high status, such as a local chief, or *alii*.

One additional site on this property is a World War II gun emplacement bunker (Site 4128), which was connected to Makena Road by a bulldozed access roadway that had impacted portions of the 17<sup>th</sup> century wall feature on the property.

Two archaeological surveys have been conducted on 2 Palauca Beach properties located on the coastal strip located about 0.75 kilometers north of the present project area. These are identified as Lots 48 and 49. While no significant subsurface deposits were located during the survey on Lot 48 (Fredericksen and Fredericksen, September 1999), fairly deep dune and marine sand deposits on the Lot 49 to the north were found to contain human remains. Human skeletal remains were recovered which represented at least 2 individuals. The site was designated Site 50-50-14-4757 (Fredericksen, August 1999). Only precontact material cultural remains were found in association with the wave-impacted human skeletal materials.<sup>21</sup>

Table 1

Archaeological sites in vicinity of present study area

Site Number	Number of features	Remarks
1362	11 features	Platforms, walls, enclosure, terraced platform, <i>ko'a</i>
1361	1	Enclosure
2324	4	Retaining wall, 3 rock shelters
2326	1	Wall
2327, 2628	1	Wall - 350 meters long
2689	2	Platforms
2690	1	Enclosure
2691	1	Enclosure

<sup>20</sup> These include a finished *lei niho palauca* fashioned from a sea urchin spine, and several similar ornaments in various stages of manufacture. The presence of such artifacts, which symbolize high social rank, tends to further mark the site as one associated with the chiefly class.

<sup>21</sup> The inventory survey for this project was never completed.

2692	1	Wall
2693	20	Enclosure, C-shape, pavement, walls, terraced platform, platform mound
2694	29	Pavements, alignments, C-shapes, platforms, enclosures, walls
2695	6	Terraced platform, alignments, pits, cairns, L-shape
2696	7	Enclosures, terraced platforms
2325	3	Walls, enclosure, roadway
2329	3	Terraces
2330	2	C-shapes
2331	22	Terraces, mounds, depressions, enclosures, modified outcrops
2332	1	Platform remnant
2333	1	Modified outcrop
2334	10	Mounds, C-shapes, walls, pits, rock shelter
2335	37	Pavements, platforms, terraces, mounds, walls, rockshelter, lined beach
2336	3	Enclosure, wall, depression
2337	2	Wall remnant, depression
2338	1	Oval enclosure
2339	10	Terraces, rockshelter, enclosure
2340	10	Platform walls, terraces, platform, alignment
2341	3	Terraces, mound, wall
2342	1	Wall remnant
2343	4	Terraces, Enclosure, wall
2344	1	Illustrious water diversion
262	8	Enclosure, parallel alignments, terraces, wall, mounds
2345	4	C-shapes, enclosures, wall remnant
2346	6	Platform, enclosures, terraces, wall remnant
2347	12	Walls, enclosures, terraces, mounds, drainage
2348	2	Enclosure, platform
2349	50	Agricultural complex
2350	1	Rockshelter
2351	3	Terraces, alignment
2352	1	Enclosure
2353	7	Enclosures, terraces, rockshelters
2354	9	Enclosures, alignments, C-shapes, wall

(Gosser, Clark and Dixon, 1993, pp. 41-54)

Archaeological work in Keaunou *akupua'a*

The huge Waitea Project area is situated *mauka* of Po'olenalena Beach Landing Site. As mentioned above, archaeological studies have been conducted in the general area since 1969, and create a patchwork of findings in that area. However, the present study area was not included in any of these. On the adjacent property to the north—TMK 2-1-12: 15—a cluster of sites was identified during a study undertaken by the Bishop Museum. This study was an attempt to produce a comprehensive series of excavations covering the southern acreage and Lot 15 of the Waitea Resort Company, Ltd. (Gosser, Clark and Dixon, 1993).

Numerous sites were identified surrounding the present project area (Figure 1). On the adjacent northern property (TMK 2-1-12: 15), the most significant finding was Site 1362 which consisted of 11 features—Features A through K. These included platforms (A, O), wall (B), rock piles (C, F), alignments (D, I, J), terraced platform (E), and enclosures (H, K). Feature A platform was originally described by Kireh (1969) as a house foundation. The initial interpretation of Feature K as a *ko'a*, or fishing shrine was

RECEIVED AS FOLLOWS

confirmed during subsurface testing by the Bishop Museum team (*Ibid.*, p. 68). It may also have functioned as an earlier habitation feature. Xamanek Researches revisited this site in 1998, when the current dwellings were constructed. During a monitoring and limited data recovery project, one radiometric date was obtained which indicated that Site 1362 dated from AD 1425 to 1665, with an intercept date of AD 1495.

Scientific Consultant Services conducted an archaeological inventory survey on a parcel just *mauka* of the present study property [TMK: 2-1-07: 102]. Twenty-five shovel probes were used to test the subsurface conditions of this 26,000 square-foot parcel. A single site was identified—Site 4818—which consisted of an extant and remnant surface feature and an associated cultural deposit. "This site has been evaluated to be a temporary habitation associated with Proto historic times and also containing an historic wall component... Two charcoal samples gleaned from subsurface testing were submitted for radiocarbon dating. Briefly, one sample was evaluated as modern while the other, representing a modest cultural deposit, was associated with historic through more recent use of the area." [McGerty, Dega, and Spear, 2000, p. i]

Directly to the south of the aforementioned SCS study area, and inventory survey was completed on the 3.19-acre Chang family property [TMK: 2-1-07: 08] in 2003 by Island Archaeology (Lee-Greig, 2003). A total of 3 backhoe trenches, 8 shovel tests and 7 controlled test units were excavated during the subsurface testing phase. Three cultural surface features, 2 subsurface cultural deposits, and 1 burial were identified. One previously identified site, Site 4818, extended onto the study area, from the property located to the north. The portion present was a low to medium density cultural deposit, c. 40 cm thick. It contained material remains consistent with that of a traditional shoreline habitation. Cultural material included marine shell midden, sea urchin parts, fishbone, coral, basalt and volcanic glass flakes, a fishhook fragment, urchin spine filts, a coral abrader, and a hammerstone, as well as historic glass and metal fragments. This feature was dated at AD 1430 to 1530 and AD 1550 to 1750 (*Ibid.*, p. 4-1). Site 5414 consisted of a subsurface cultural deposit c. 20 cm in thickness, resembling the assemblage from Site 4818. Another radiocarbon date from this site produced a date range from AD 1660 to 1950. The third site, Site 5182 consisted of a human burial encountered in BT 1. It appeared that the entire burial was removed by the backhoe bucket. The location of the burial in a coastal sand dune suggested to the author that the individual was of Native Hawaiian ancestry. The remaining sites are historic features consisting of the wall portion of Site 4818 that extends from the adjacent property; and a retaining wall and fence line dating from the 1940s (Site 5431) [*Ibid.*, p. 4-2].

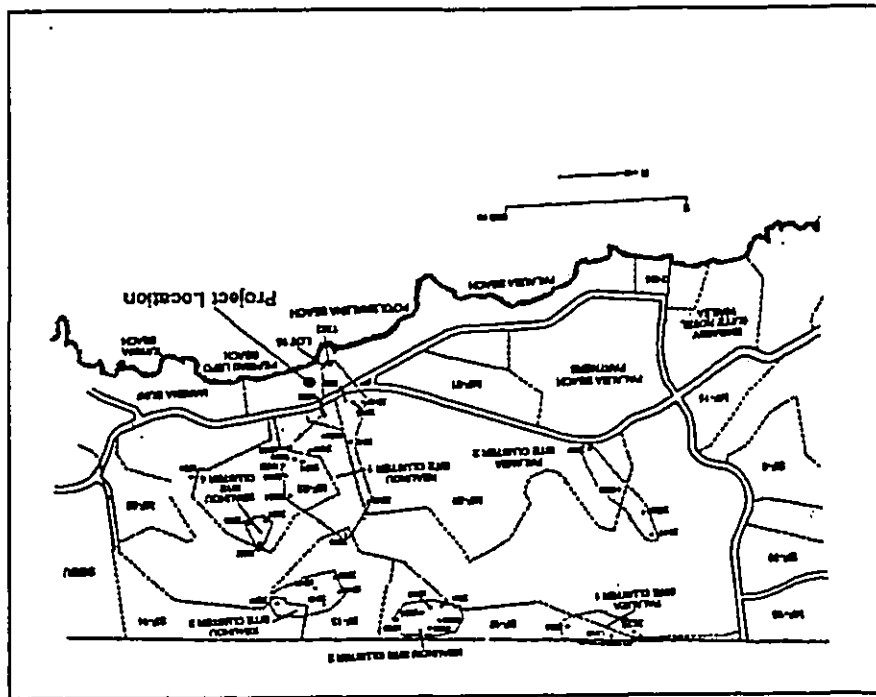


Figure 1 - Archaeological sites located around the project area in 1993 (after Gosser, Clark, and Ditesa, 1993, p. 63).

#### Settlement Patterns and Expected Results

The project area lies directly at the coastline. In this area of Maui, it has been established that precontact habitation sites dotted the shore. These were often accompanied by religious structures, and human burials. To the north, in Palaua

RECEIVED AS FOLLOWS

*ahupua'a*, a stratified habitation complex, Site 2496, dates back nearly 2000 years, with occupational phases following in the 13<sup>th</sup>, 15<sup>th</sup>, 16<sup>th</sup> and 17<sup>th</sup> centuries. This site also contained burials. Other coastal study parcels also revealed the presence of habitation and human burials. In *Keaunohu ahupua'a*, the adjacent parcel to the north, contains Site 1362, a complex of habitation features, platforms, terraces and a wall, along with a *ko'a*. It appears that this site continues on to the study parcel, as well. A radiocarbon date of AD 1425 to 1665 was recovered from this site. On the *mauka* side of the study parcel, a precontact habitation site remnant and a Native Hawaiian burial were also found.

Given this richness of the general area, we would expect to find cultural remains of a similar nature, that is subsurface cultural deposits, and possibly human burials in the sand dunes located above the path of the drilling corridor. Site 1362 also extends onto the study parcel from the property adjacent on the north, but that portion is not included in the survey area. As well, several previously identified sites (including a burial—Site 5182) to the south; lead us to suspect that subsurface precontact cultural layers and/or structures could be present on Po'olenalena Beach. Because of the proximity of the ocean, marine resource usage was a likely function for potential sites in the study area.

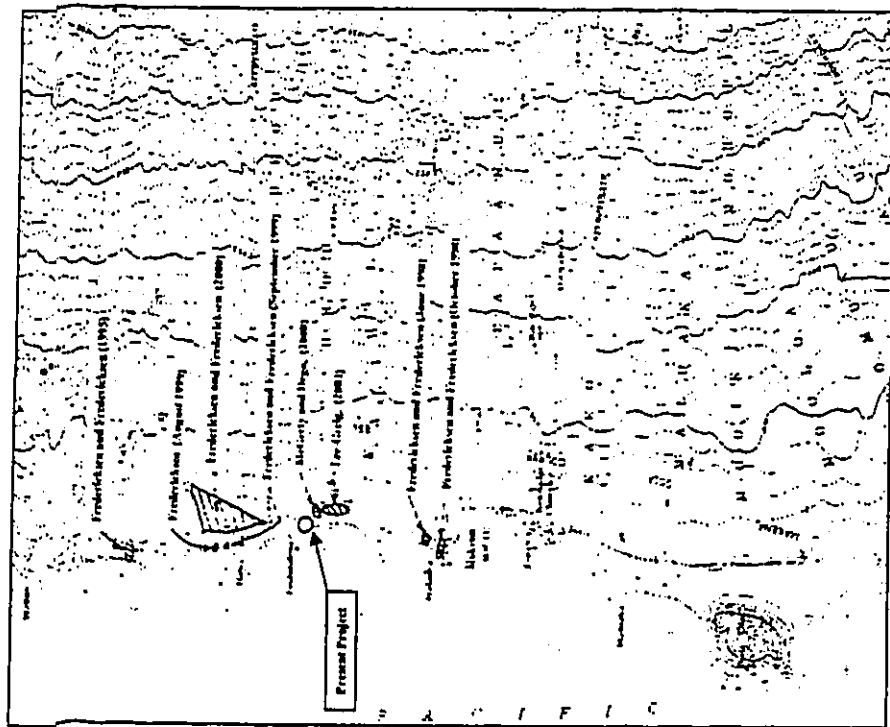


Figure 2 - More recent archaeological studies in Makana area. [Refer to Figure 1 for earlier studies]

## ARCHAEOLOGICAL METHODS

This archaeological inventory survey was conducted during May, June and July of 2003. The field team was made up of Jennifer Frey and Itugh Coffin. Erik Fredericksen was the project director and coordinator for this coastal inventory survey, and wrote the introductory portion of this report, the section dealing with the field data results, and the general conclusions. Jennifer Frey provided the field drawings and lab findings, and Dennis Fredericksen gathered the background information, digitized the figures, produced the tables and photos, and generally oversaw the completion of the final report. Walter Fredericksen acted as the senior advisor.

The inventory survey of the study area consisted of a pedestrian surface inspection, followed by subsurface investigation and evaluation. A total of 10 auger tests, 3 manual test units and 1 backhoe trench were utilized to sample the Area of Potential Effect (APE) (Figure 4). The test units were 2.0 by 1.0 meters by up to 1.95 meters in depth, while the trench was approximately 40 meters in length by 2+ meters in width and up to 2.4 meters in depth. The present study focused on the APE that lies to the *makai* (west) of the existing beach parking lot.

Sandwich Isles Communications, Inc. proposes to utilize Horizontal Directional Drilling (HDD) for the installation of the planned fiber optics conduit in this area. The HDD methodology in this SIC landing location will include drilling from the Po'olenalena Beach Park parcel to the west of the existing parking lot and then some 600 meters (2,000 feet) to the offshore submarine cable connection point.<sup>21</sup>

Testing methodology was discussed with Dr. Melissa Kirkendall during a prior inspection of the project area. In addition, methodology was also discussed with members of the Maui/Lana'i Islands Burial Council (MLIBC). The series of 10 auger cores were utilized to initially assess subsurface conditions and presence/absence of any buried cultural layer(s) within the *makai* portion of the APE. The test units were used to obtain a sample of a previously unidentified cultural deposit.<sup>22</sup> Finally, the long trench was excavated in order to help ensure that the planned fiber optics conduit will not underlie any human burials that might be located in the proposed fiber optics HDD corridor *makai* of the beach parking lot.<sup>23</sup> The backhoe trench was excavated with a plate

<sup>21</sup> The area to the east of the tested portion of the APE will be excavated with a backhoe, in order to hook up the marine side of the fiber optics conduit with the terrestrial portion of the SIC network.

<sup>22</sup> This cultural deposit has subsequently been designated SHIP No. 20-50-14-34486.

<sup>23</sup> The MLIBC has previously indicated that it is concerned that HDD technology can potentially cause a "sandwiching" effect in areas that may contain human burials. The use of this technology could, in effect,

across its bucket and at a controlled pace per previous discussions with SHPD and the Maui/Lana'i Islands Burial Council. This trench followed a bearing of 237 degrees magnetic and was excavated in stages, because of safety reasons.<sup>25</sup>

The three test units were excavated using stratigraphic layers and arbitrary 10 centimeters levels were utilized in strata greater than 10 cm in thickness. All soil was screened through 1/8" inch mesh hardware cloth. Material culture remains were collected in the field for subsequent laboratory analysis. Standard laboratory procedures were followed and no material culture remains, with the exception of 5 charcoal samples, were transported off island. All radiocarbon samples with the exception of bulk soil samples were placed in aluminum foil in the field.<sup>26</sup> The selected samples were subsequently processed and sent to Beta Analytic, Inc. in Florida for radiometric analysis.

Mapping was carried out with metric tapes and a hand held compass. In addition, the backhoe trench was located on the study area by the surveyor for the project—Control Point Surveying, Inc.<sup>27</sup> Photographs of the project area were recorded in a digital format.

place a modern fiber optics conduit under unidentified burials. Members of the MLIBC feel that the placement of modern materials under Native Hawaiian burials is culturally inappropriate. Consequently, the Burial Council has indicated that it prefers that areas that may contain human burials—such as sand dunes—be pre-excavated to help ensure that the HDD-installed conduit is not inadvertently placed under a burial site. In regards to the Po'olenalena Beach Park Landing site, one human burial has been located c. 100 meters to the southeast of the park. This burial has been previously designated SHIP No. 50-50-14-5182.

<sup>25</sup> The excavated portion of the trench was recorded and backfilled before the end of each field day, in order to minimize safety concerns at this busy beach park area.

<sup>26</sup> The bulk samples were placed in one-gallon plastic zip-lock bags. These samples were subsequently floated for charcoal and screened for cultural materials.

<sup>27</sup> This accurate location of the APE trench was carried out per the request of the Maui/Lana'i Islands Burial Council.

ARCHAEOLOGICAL RESULTS

This section of the report presents the findings from our investigation of the tested portion of the Area of Potential Effect (APE) for the Po olenalena Beach Park landing site. One previously unidentified cultural deposit was located during subsurface testing. This coastal habitation site has been designated SIIP<sup>24</sup> No. 50-50-14-5486. As noted earlier in this report, the inventory survey consisted of 3 levels of testing—auger cores, test units, and the long backhoe trench. Of the testing levels, the test units provided the most detailed information. The results for each of these sampling techniques are presented below.

We initially placed a series of 10 auger tests in the *makai* portion of the planned APE of the proposed landing site.<sup>25</sup> These tests were spaced about 4-5 meters apart and followed a bearing of 237 degrees magnetic. These tests were utilized to assess subsurface conditions throughout the *makai* portion of the APE. Material culture remains were located in essentially all test instances. Table 2 provides a summary of these subsurface tests.

In general, 2-3 soil layers were encountered in the auger cores. The uppermost layer typically consisted of yellowish brown (10 YR 5/4) sand that contained mostly recent material culture remains. Layer II was composed of light brown (10 YR 6/4) sand that contains marine shellfish remains, a coral abrader fragment, some possible lithic debris, and scattered charcoal. Layer III was made up of grayish brown (10 YR 5/2) sand that was charcoal stained. One coral file/abrader fragment was located in AT 6 (An. # 48). Other cultural materials included marine shellfish remains, fish and faunal bone, sea urchin and some possible lithic debris/fire cracked rock shatter.

It is important to note that vertical control was very difficult to maintain during the auger-sampling phase, because of the generally loose consistency of the sand. Consequently, it was determined that test units were necessary, in order to obtain better vertical as well as horizontal control.

<sup>24</sup> SIIP = State Inventory of Historic Places  
<sup>25</sup> The tested portion of the APE focused on the *makai* section of the landing site that will be underlain by the HDD-installed fiber optics duct line. The *maui* section of the APE lies in the access parking lot for Po olenalena Beach Park.

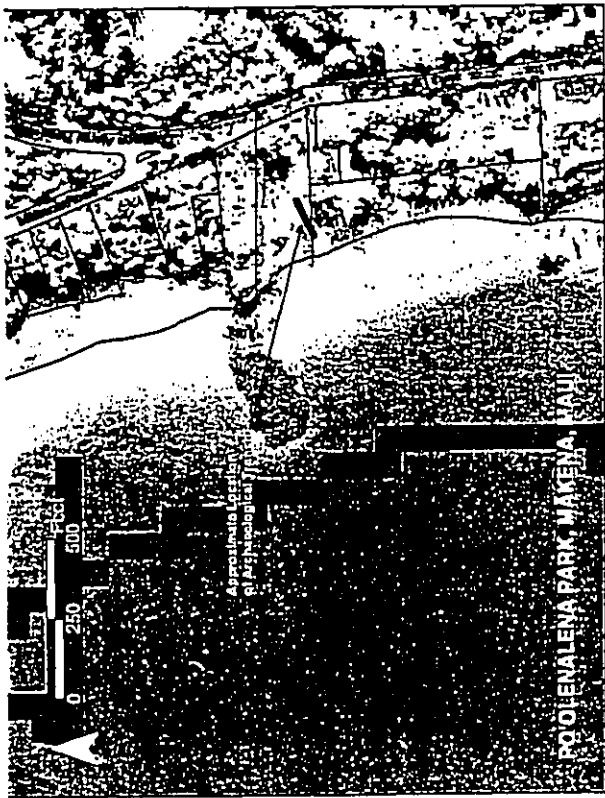


Figure 3 - Approximate location of backhoe trench on subject parcel.

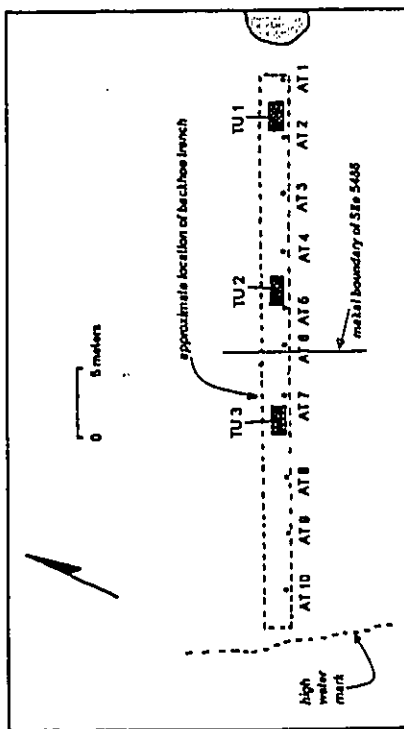


Figure 4 - Test units and auger tests placed in approximate corridor tested with backhoe trench.



RECEIVED AS FOLLOWS

ATB	Depth x Width	Stratigraphy	Combs <sup>1)</sup>	Remarks
1	90 x 15	Layer I: yellowish brown (10 YR 5/4), fine grain, very loose sand w/ <10% rock inclusion Layer II: light brown (10 YR 6/4), fine grained sand w/ <10% rock inclusion	0-15 15-90	Layer I: recent glass, small amounts of recent charcoal Layer II: small amounts of marine shell, coral, faunal bone, crab, water worn beach pebbles, coral sherd fragment (25-90 cmbs) [Art. # 46], volcanic glass flake (Art. # 47) in trace amount of charcoal, end at rock Layer I: aluminum, recent glass, sparse marine shell, recent charcoal Layer II: common marine shell, some coral, fibric debris and charcoal Layer III: common marine shell, charcoal, sparse fish bone, faunal bone, sea urchin body parts, fibric debris, end at rock
2	90 x 15	Layer I: yellowish brown (10 YR 5/4), fine grain, very loose sand w/ <10% rock inclusion Layer II: light brown (10 YR 6/4), fine grained sand w/ <5% rock inclusion Layer III: grayish brown (10 YR 5/2), fine grained loose sand	0-13 30-90 90-103	Layer I: recent bottle glass and charcoal Layer II: small amounts marine shell and charcoal Layer III: marine shell, coral, sparse fish bone and coral Layer I: recent glass, plastic, metal, sparse marine shell and charcoal Layer II: sparse marine shell, charcoal Layer III: sparse marine shell, angular coral, fish bone, charcoal
3	135 x 15	Layer I: yellowish brown (10 YR 6/4), fine grained sand w/ <5% rock inclusion Layer II: light brown (10 YR 6/4), fine grain semi-loose sand w/ <5% rock inclusion Layer III: grayish brown (10 YR 5/2), fine grained sand w/ <10% rock inclusion	0-17 17-45 45-135	Layer I: recent glass, aluminum and charcoal, sparse marine shell, coral and fibric debris Layer II: moderate marine shell, water worn and angular coral, fish bone Layer I: recent glass, charcoal, sparse marine shell Layer II: sparse angular coral, charcoal Layer III: small amounts marine shell, coral file fragment (c. 130-145 cmbs) [Art. # 48], beach flake [Art. # 49], low amounts of charcoal, end at rock
4	90 x 15	Layer I: yellowish brown (10 YR 5/4), fine grained very loose sand w/ <5% rock inclusion Layer II: light brown (10 YR 6/4), fine grain semi-loose sand w/ <5% rock inclusion Layer III: grayish brown (10 YR 5/2), fine grained, loose sand	0-10 10-30 30-90	Layer I: recent glass, aluminum and charcoal, sparse marine shell, coral and fibric debris Layer II: moderate marine shell, water worn and angular coral, fish bone Layer I: recent glass, charcoal, sparse marine shell Layer II: sparse angular coral, charcoal Layer III: small amounts marine shell, coral file fragment (c. 130-145 cmbs) [Art. # 48], beach flake [Art. # 49], low amounts of charcoal, end at rock
5	130 x 15	Layer I: yellowish brown (10 YR 5/4), fine grained sand w/ small amounts of rock Layer II: light brown (10 YR 6/4), fine grained sand, grading to coarse grained sand w/ 20% rock inclusion Layer III: yellowish brown (10 YR 5/4), fine grain very loose sand w/ <10% rock inclusion Layer IV: light brown (10 YR 6/4), fine grain semi-loose sand Layer V: grayish brown (10 YR 5/2), fine grained sand w/ <5% rock inclusion	0-47 47-150	Layer I: recent charcoal, sparse marine shell and bottle glass Layer II: sparse marine shell, charcoal
6	180 x 15	Layer I: yellowish brown (10 YR 5/4), fine grain very loose sand w/ <10% rock inclusion Layer II: light brown (10 YR 6/4), fine grain semi-loose sand Layer III: grayish brown (10 YR 5/2), fine grained sand w/ <5% rock inclusion	0-25 25-45 85-180	Layer I: recent charcoal, sparse marine shell and bottle glass Layer II: sparse marine shell, charcoal
7	185 x 15	Layer I: yellowish brown (10 YR 5/4), fine grain very loose sand Layer II: light brown (10 YR 6/4), fine	0-18 18-185	Layer I: recent charcoal, sparse marine shell and bottle glass Layer II: sparse marine shell, charcoal

Table 2  
Summary of Auger Test Results

<sup>1)</sup> Depths and widths in centimeters.  
<sup>2)</sup> cmbs = centimeters below surface

Test Units 1-3

Three test units were excavated in the *makai* portion of the APE and provided information on subsurface conditions in the area as well as the Site 5486 cultural deposit (Figure 4). During excavation, we encountered three cultural strata—Layers IIIa, IIIb, and V. The cultural deposit was located at c. 75 cmbs<sup>1)</sup> in TU 1, while a possible remnant of the deposit was encountered near the surface in TU 2 and TU 3. Test unit stratigraphy was somewhat similar in Test Units 1 and 2, while TU 3 essentially did not appear to contain an intact portion of the Site 5486 cultural deposit.<sup>2)</sup>

Test Unit 1 (Figures 5 & 6; Appendix C—Photos 2-7)

This first unit was excavated c. 2 meters west (*makai*) of the mostly unpaved beach access parking lot. This subsurface test was initially a 1.0 by 1.0 meter unit, but it was subsequently expanded to a 2 by 1 meter unit due to unstable conditions and for safety reasons. A total of 6 strata were encountered in TU 1 before excavation was halted at a maximum depth of 1.95 meters below surface (mbs).

Layer 1 (0-25 cmbs) was composed of yellowish brown (10 YR 5/4) sand. This very soft layer contained modern refuse such as brown and green bottle glass fragments, cigarette butts, aluminum foil, plastic, rusted metal fragments, a U.S. penny (1976), scattered marine shellfish remains, and recent bovine rib bone fragments. In addition, moderate amounts of scattered charcoal pieces from recent beach fires were found throughout this layer.<sup>3)</sup>

Layer II was encountered at c. 20 cmbs and extended up to 80 cmbs. This pale brown (10 YR 6/4) sand had a relatively loose consistency and was somewhat unstable.

<sup>1)</sup> cmbs = centimeters below surface

<sup>2)</sup> The near surface area in the vicinity of TU 3 has been extensively impacted by ongoing beach usage activities, especially camping and fishing. The remains of at least 6 separate beach fires were noted within the *makai* portion of the proposed APE during our inventory survey.

<sup>3)</sup> This recent charcoal was not collected.

Modern material culture remains such as monofilament fishing line, aluminum foil, 3 round head nails, small amounts of scattered charcoal (4.4 g), and one cut bone fragment were located in the upper 20-30 cm of this stratum. The lower 45-50 cm of this layer did not yield any material culture remains. The boundary with the underlying cultural layer was very distinct.

The upper portion of Layer III was located between 77 and 80 cmbs. This stratum was subsequently divided into 2 sub-layers—Layer IIIa and Layer IIIb. Both sub-layers contained quantities of indigenous material culture remains. However, Layer IIIa was only about 10 cm thick, while Layer IIIb was as much as 58 cm thick. Each sub-layer is discussed below.

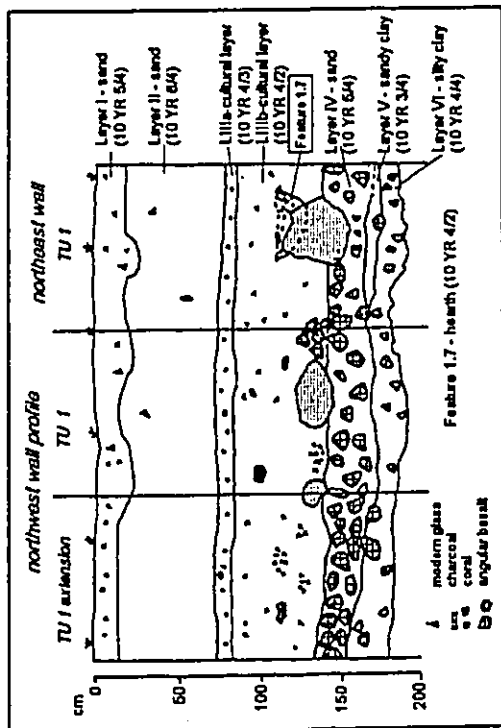


Figure 5 - L-shaped profile of Test Unit 1, showing northern wall faces.

Layer IIIa was composed of dark brown (10 YR 4/3) fine-grained sand. This semi-compact sub-layer extended from c. 77 to 87 cmbs. While this stratum was relatively thin, it contained quantities of indigenous material culture remains.<sup>31</sup> Materials interpreted as food midden included 241.7 g of marine shellfish remains, 69.4 g of sea urchin body parts, 0.1 g of crustacean (crab), 6.2 g of fish bone fragments, and 3.3 g of probable pig bone. Of the recovered marine shellfish remains, cowrie (*Cypraea spp.*) and pipipi (*Nerita picea*) were the most common, accounting for 45.5% and 29.4% of total, respectively. In addition, 7 indigenous formed artifacts were recovered, including 4 coral abraders, 1 urchin spine file, 1 utilized basalt flake and a piece of worked bone. The 4

<sup>31</sup> Per discussions with Dr. Kirkendall, 1/4" inch screen results are discussed. Analysis of 1/8" inch screened material will be discussed in an addendum report.

coral abraders (Artifacts #1, #2, #4, and #24) appear to have been well utilized. The sea urchin spine file (Artifact #5) was also well worn. The utilized basalt flake (Artifact #23) contained use wear, possibly for cutting/scraping. Artifact #25, the piece of worked bone, may represent a waste product of the fishhook manufacturing process. It is interesting to note that 1 piece of copper (Artifact #3) was also found in Layer IIIa. This small piece of metal is very corroded, and appears to have been associated with this cultural deposit. It may represent an early trade item such as an ornament (possible bead). One charcoal sample was taken from Layer IIIa between 120-125 cmbs (Beta #184386). This sample yielded a radiocarbon age of 140 +/- 60 BP, with calibrated results at 2 sigma of AD 1680 to 1950 (95% probability).<sup>32</sup> The boundary with Layer IIIb was relatively abrupt.

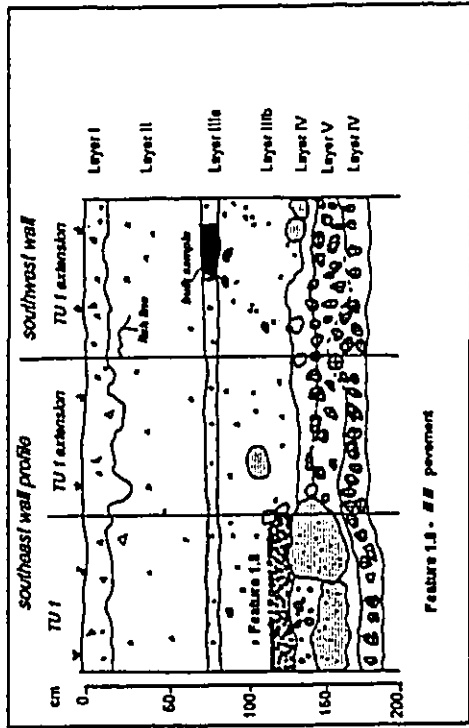


Figure 6 - L-shaped profile of southern wall faces of TU 1.

Layer IIIb consisted of dark brown (10 YR 4/2) sand and was encountered between 84 and 87 cmbs. This slightly compact to loose stratum contained substantial quantities of food midden materials and was up to 70 cm in depth (157 cmbs). Recovered material culture materials interpreted as food items included 1,373.9 g of marine shellfish remains, 542.6 g of sea urchin, 7.4 g of fish bone, 6.1 g of pig bone, and 1.2 g of bird bone. Of the recovered marine shellfish remains, cowrie (*Cypraea spp.*) and pipipi (*Nerita picea*) shells were again the most common, accounting for 40.4% and 16.3% of the shellfish total, respectively. A total of 138.5 g of scattered charcoal and 36.6 g of charred kukui nut were also located. Other non-food items included 17

<sup>32</sup> Sample #1 had intercept with the calibration curve at AD 1680, AD 1730, AD 1810, and AD 1930.

unworked flakes of volcanic glass, 41 pieces of lithic debitage, along with numbers of unworked coral pieces that were found in the screen.

In addition to the above cultural materials, 27 indigenous formed artifacts were recovered. These items included 14 coral abraders/fragments (Artifacts #6-9, 11, 12, 20, 29, 30-33, 36 and 37), 3 pieces of worked shell (Artifacts #10, 18 and 35), a utilized basalt flake (Artifact #13), a polished basalt flake (Artifact #21), 5 *puka* shells (#14, 15, 19, 26 and 27), 2 sea urchin files (Artifacts #16 and 28), and a bone fishhook tab (Artifact #34). The coral abraders appear to have been well utilized, and several appear to have been broken. The 2 sea urchin spine files were also well worn. The utilized basalt flake contained use wear, suggesting cutting and/or scraping usage. The polished flake (Artifact #21) may be a portion of an artifact such as an adz. Of the worked shell artifacts, 2 may be associated with the fishhook manufacturing process (Artifacts #10 and 18). Of the 2 shell artifacts, Artifact #18 appears to have been purposefully drilled. Artifact #34, the bone fishhook tab, may have been fashioned from human bone.

Two charcoal samples were recovered from Layer IIb and submitted to Beta Analytic, Inc. for analysis. Sample #2 (Beta # 184387) returned a radiocarbon age of 320 +/- 60 BP, with calibrated results at 2 sigma of AD 1440 to 1670 (95% probability).<sup>37</sup> Sample #3 (Beta # 184388) yielded a radiocarbon age of 370 +/- 60 BP, with calibrated results at 2 sigma of AD 1420 to 1660 (95% probability).<sup>38</sup>

Eight subsurface features—primarily consisting of pits and postholes, were also noted in Layer IIb of TU 1. Some of these pit features are interpreted as fire hearth remnants, while others appear to represent refuse pits. One waterworn pavement was located in the southeastern portion of the original 1.0 by 1.0 meter section of TU 1 and is discussed below along with the other subsurface features.

Feature 1.1 is interpreted as a possible posthole. The light brown (10 YR 6/3) feature was encountered at c. 93 cmbs and extended to 115 cmbs. The fill of this c. 16 cm wide feature contained 3 angular basalt pebbles, several small pieces of coral, 7.8 g of marine shellfish remains, and traces of sea urchin body parts and fishbone.

Feature 1.2 was composed of an irregularly shaped pit that measured 34 cm N/S by 28 cm E/W. The function of this grayish brown (10 YR 5/2) feature remains somewhat unclear. This feature is tentatively interpreted as a possible posthole. It extended from 87 cmbs to 106 cmbs.

Feature 1.3 is interpreted as a probable posthole. The fill of this c. 26 cm wide feature contained 3 angular basalt pebbles, several small pieces of coral, 7.8 g of marine shellfish remains, and traces of sea urchin body parts and fishbone. It was up to 26 cm in diameter, contained grayish brown (10 YR 5/2) fill and extended from 84 to 100 cmbs.

<sup>37</sup> Sample #2 was taken from Level 5 between 127-137 cmbs. This sample had intercepts with the calibration curve at AD 1510, AD 1560, and AD 1630.

<sup>38</sup> Sample #3 was obtained from the Feature 1.7 hearth remnant at c. 120-125 cmbs. This second sample intercepted the calibration curve at AD 1490.

Feature 1.4 consisted of a semi-circular pit that measured up to 43 cm in diameter in TU 1. Scattered food midden remains were recovered from the sampled portion of this pit. The portion contained in TU 1 extended from 89 to 113 cmbs. Recovered food midden materials included 22.5 g of marine shellfish remains, 2.6 g of fishbone, and 47.3 g of sea urchin body parts. In addition, 333.1 g of scattered charcoal, 3 pieces of unworked volcanic glass, 3 unworked basalt flakes, and numbers of coral pieces were located. This light grayish brown (10 YR 6/2) feature, which is interpreted as a probable refuse pit, appeared to extend to the northwest of the wall of TU 1.

Feature 1.5 was composed of a charcoal concentration that was semi-circular in plan view (c. 33 cm in diameter) and extended from 107 cmbs to 117 cmbs. This grayish brown (10 YR 5/2) feature is interpreted as a probable fire hearth remnant. This feature yielded low amounts of food midden remains (2.9 g) and 68.5 g of charcoal.

Feature 1.6 consisted of a small charcoal concentration that was circular in plan view (c. 15 cm in diameter) and extended from 101 cmbs to 112 cmbs. Recovered material culture remains included 1.5 g of marine shell, 3.0 g of sea urchin parts, 0.6 g of fish bone, and 26.8 g of scattered charcoal. This grayish brown (10 YR 5/2) feature is tentatively interpreted as a possible posthole remnant.

Feature 1.7 was located in the southern portion of TU 1 and is interpreted as a possible fire pit remnant. This grayish brown (10 YR 4/2) feature was irregularly shaped and appeared to extend to the northeast of TU 1. Feature 1.7 was up to 83 cm NE/SW by 52 cm SE/NW. Several fire-cracked rocks were noted in the fill of this pit. Scattered food midden remains included 0.9 g of marine shellfish, 1.6 g of sea urchin body parts, 55.8 g of scattered charcoal, 1 unworked flake of volcanic glass, 2 small pieces of coral, and 1 waterworn pebble. In addition, a possible fishhook tab (Artifact #18) was found at c. 110-112 cmbs. One charcoal sample was taken from this feature between 120-125 cmbs (Beta # 184388). This sample yielded a radiocarbon age of 370 +/- 60 BP, with calibrated results at 2 sigma of AD 1420 to 1660 (95% probability). Feature 1.7 extended from c. 104 cmbs to 127 cmbs.

Feature 1.8 (10 YR 4/3) consisted of a concentration of waterworn basalt pebbles and coral. This subsurface feature was located between 121 and 138 cmbs in the southeastern portion of Test Unit 1. This feature is interpreted as a probable occupation surface (approximately 50% waterworn pebbles and coral by volume). The pavement was visible in the southeastern face of TU 1 and appeared to extend for an unknown distance *mauka* (southeast) towards the beach access parking lot.

Most of the above features extended into the underlying stratum. In general, the very rocky nature of Layer IV hampered vertical control. It appears possible that some of the cultural materials present in this yellowish brown (10 YR 5/4) sand may have originated in the overlying Layer IIIb. In comparison with the overlying stratum, Layer IV (c. 139-155 cmbs) contained smaller amounts of material culture remains. A total of 21.4 g of shellfish, a trace of sea urchin (0.1 g), and mammal bone (0.1 g) were recovered. In addition, 20.1 g of fishbone were also located in the screen. Finally, one artifact, a polished basalt flake (Artifact #22) was also recovered from this very rocky

Table 3  
Summary of Test Unit 1 Features—Site 5486

TU 1	Depth & Width	Function	Color	Cmb	Remarks
1	22 x 18	Possible posthole	10 YR 6/3	93-113	Feature originates in Layer IIb, consists of indigenous materials.
2	19 x 34	Possible posthole	10 YR 5/2	87-106	Feature originates in Layer IIb, contains indigenous materials.
3	16 x 26	Posthole	10 YR 5/2	84-100	Feature originates in Layer IIb, contains indigenous materials.
4	24 x 43	Refuse pit	10 YR 6/2	89-113	Feature contains large amounts of scattered food midden and charcoal.
5	10 x 33	Hearth remnant	10 YR 5/2	107-117	Fire hearth remnant associated with Layer IIb, indigenous material remains.
6	11 x 15	Possible posthole remnant	10 YR 5/2	101-112	Possible posthole remnant associated with Layer IIb, indigenous materials.
7	23 x 43	Fire hearth	10 YR 4/2	104-127	Large fire hearth associated with Layer IIb. Radiocarbon age of 370 +/- 60 BP, with calibrated results at 2 sigma of AD 1420 to 1660 (93% probability).
8	17 x 60 <sup>d</sup>	Waterworn pavement	10 YR 4/3	122-138	Waterworn basalt and coral + c. 50% of excavated feature by volume.

Test Unit 2 (Figures 7 & 8; Appendix C, Photo 8)

This second unit was excavated c. 12 meters west (*maka*) of TU 1. As with TU 1, TU 2 was initially a 1.0 by 1.0 meter unit, but it too was subsequently expanded to a 2 by 1 meter unit because of safety concerns. It is important to note that this portion of Po'olenana Beach Park has been heavily impacted by beach goers and campers over numbers of years. Remnants of at least 4 recent beach fire pits were noted in the near vicinity of TU 2.<sup>4</sup> In addition, 2 tents were placed in relatively close proximity to this unit, which was marked off with orange construction fencing for safety purposes.<sup>4</sup>

A total of 3 strata were encountered in TU 2 before excavation was halted at a maximum depth of 1.6 mbs, due to very unstable subsurface conditions. During the course of excavation at this location, it became clear that this portion of the *maka* APE had been heavily altered by actions associated with recreational beach use. A remnant of

stratum. As noted above, it remains possible that some of the cultural materials may have originated in the overlying Layer IIIb.<sup>3</sup>

Layer V (c. 137 to 168 cmb) is tentatively interpreted as a slightly earlier occupation layer. This dark brown (10 YR 3/4) silty sandy clay contained modest amounts of food midden, such as 48.6 g of marine shellfish remains, 47.3 g of sea urchin body parts, 6.8 g of crab shell, a trace of bird bone (0.4 g), 7.1 g of mammal bone, and 25.4 g of fishbone. One indigenous tool, a sea urchin spine file (Artifact #39), was recovered from this rocky layer. In addition, 31.3 g of charcoal were located in Level I of this very rocky stratum. A charcoal sample was taken from this level between 135-140 cmb and submitted to Beta Analytical, Inc. in Florida for radiometric analysis. Sample #4 (Beta # 184389) yielded a radiocarbon age of 430 +/- 60 BP, with calibrated results at 2 sigma of AD 1410 to 1530 and AD 1550 to 1630 (95% probability).<sup>3</sup>

Layer VI was composed of dark yellowish brown (10 YR 4/4) silty clay. This slightly compact stratum was encountered between 162 and 172 cmb and extended to the bottom of the unit. This very rocky layer was essentially sterile. However, a trace amount of marine food midden was recovered from Level VI (c. 162-172 cmb), including 0.1 g of shellfish, 0.6 g of sea urchin, 1.5 g of crab shell, and 0.5 g of some unidentified bone. In addition, a small bone awl/pick (Artifact #40) was recovered from the upper portion of this very rocky layer. Excavation was halted at a maximum depth of 192 cmb.

Discussion

Three occupational sequences appear to be represented in the Site 5486 cultural deposit—Layers IIIa, IIIb, and V. Layer IIIa appears to represent a probable late precontact to early post-contact sequence, while Layer IIIb represents a mid- to late precontact occupation. Layer V, the deepest of the sequences yielded the lowest amounts of cultural materials, and may be slightly older than Layer IIIb. However, it is important to point out that the deeper Layer V deposit is in a very rocky substrate. The large quantity of material culture remains in Layer IIIb strongly suggests that this occupational sequence was the most intensive of the three. The presence of marine resource exploitation artifacts as well as quantities of marine-based food midden indicates a marine resource focus for the Site 5486 habitation area.

<sup>3</sup> The recovered fishbone material was typically very small (generally less than 10 mm in length/diameter).  
<sup>4</sup> Sample #4 was taken from Level I between 137-147 cmb, and had an intercept with the calibration curve at AD 1450.

<sup>1</sup> Depths and widths in centimeters.  
<sup>2</sup> Feature 1.8 pavement extends an unknown distance to the *maka* (southeast) of TU 1.  
<sup>3</sup> The nearest abandoned fire pit was noted c. 4 meters to the NW of TU 2.  
<sup>4</sup> The closest tent was pitched within 7 meters to the southwest of this test unit.

RECEIVED AS FOLLOWS

what was considered to be a heavily impacted portion of the Site 5486 cultural layer was found essentially at the surface in this section of the study area.<sup>43</sup>

An apparent mix of Layer I (yellowish brown (10 YR 5/4) sand), and Layer III (dark brown (10 YR 3/3) sand) extended up to 83 cm below the surface of this actively utilized portion of the Park.<sup>44</sup> This very soft layer contained modern refuse such as brown and green bottle glass fragments, cigarette butts, aluminum foil, plastic, rusted metal fragments, modern food remains (chicken and beef bones). In addition, recent and what appeared to be older marine shellfish remains were also noted, but not collected, because of the presence of modern cultural materials. Moderate amounts of scattered charcoal pieces from recent beach fires were found throughout much of this layer. Three recent fire pits were also located in this previously impacted layer, and extended up to 85 cmbs.

Feature 2.1 is interpreted as a recent beach fire pit. The grayish brown (10 YR 5/2) feature extended from near the surface to 75 cmbs. Modern material culture remains such as broken bottle glass, burned paper, and other trash was located. In addition, mixed marine shellfish remains and sea urchin body parts were also found.

Feature 2.2 is also interpreted as a recent beach fire pit. The dark grayish brown (10 YR 4/2) feature extended from just below the surface to c. 84 cmbs. Modern materials including bottle glass fragments, burned paper, and other refuse were located. In addition, mixed marine shellfish remains and sea urchin body parts were also found.

Feature 2.3 is interpreted as another recent beach fire pit. The grayish brown (10 YR 5/2) feature extended from the surface to 78 cmbs. Modern cultural materials such as bottle glass fragments, aluminum foil, and other trash were located. In addition, mixed marine shellfish remains, sea urchin body parts, and coral were also noted.

Feature 2.4 is interpreted as an older, but modern beach fire pit. The light grayish brown (10 YR 6/2) feature was truncated by overlying features and extended to c. 83 cmbs. Modern material culture remains included broken bottle glass, charred wood, and other refuse. In addition, mixed marine shellfish remains and sea urchin body parts were also found scattered in this pit.

Finally, 3 post-contact and 2 indigenous artifacts were recovered from this disturbed layer. The post-contact artifacts of interest included a piece of copper (Artifact #44), a fragment of a possible clay pipe stem (Artifact #45), and an older round head type nail (Artifact #42).<sup>45</sup> The 2 indigenous artifacts consisted of a *puka* shell ornament (Artifact #43) and a coral abrader (Artifact #41). In addition, 1 unutilized flake of volcanic glass and 1 utilized flake of basalt were found. It is important to note that all of the above artifacts were located during the screening process, and that modern material culture remains were also present.

<sup>43</sup> This speculation was confirmed when the backhoe trench was excavated across the *walot* portion of the APE.

<sup>44</sup> This portion of the APE lies in what one of 3 or 4 general pathways to the shoreline. This near beach area has experienced some human-induced erosion, due to all of the foot traffic.

<sup>45</sup> A similar piece of copper was located in Layer IIIA of TU 1 (Artifact #9).

Beach dune sand deposits were located around 80 cmbs, and extended to c. 115 cmbs in this unit. Layer IIa consisted of light yellowish brown (10 YR 6/4) sand. This very soft stratum was very unstable, and did not contain any material culture remains below the first 10 cm (i.e. 88 cmbs). A total of 11.3 g of scattered marine shellfish remains were noted, along with 2 pieces of recent brown bottle glass and a small piece of aluminum foil. The above cultural materials may well have been displaced from the overlying layer.

Layer IIb, a marine sand deposit, was encountered between 110 and 120 cmbs. This very pale brown (10 YR 7/4) coarse-grained sub-layer did not contain any material culture remains and extended to the bottom of TU 2. Excavation in this unit was abandoned at a maximum depth of 160 cmbs after several cave-ins occurred.

### Discussion

Excavation of TU 2 revealed what appeared to be a heavily impacted portion of the Site 5486 habitation deposit. The apparent remnant of Layer III was essentially exposed at the surface of this test unit. Evidence of relatively recent activities, likely associated with the excavation for recent beach bonfire pits was found in the upper portion of this unit. These actions appear to have heavily impacted this portion of the site. Two indigenous artifacts along with 3 post-contact artifacts were located, along with quantities of modern refuse.

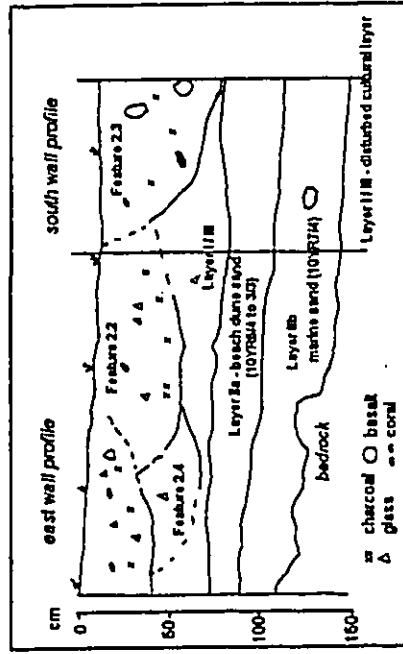


Figure 7 - L-shaped profile of Test Unit 2—east and south walls.

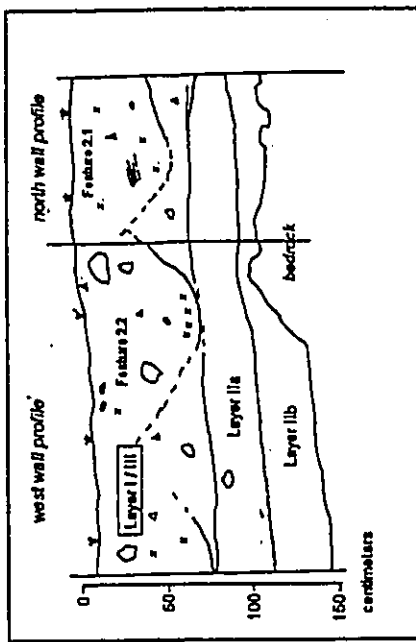


Figure 8 - L-shaped profile of TU2—west and north walls.

Table 4

Summary of Test Unit 2 Features—Site 5486

F. I.	Depth x Width	Feature	Color	Combs	Remarks
1	71x108	Recent beach fire pit	10 YR 5/2	2-75	Feature is recent, contains modern refuse as well as mixed probable Site 5486 remains.
2	81x124	Recent beach fire pit	10 YR 4/2	3-84	Feature is recent, contains modern items as well as mixed probable Site 5486 remains.
3	111x77	Recent beach fire pit	10 YR 5/2	1-78	Feature is recent, contains modern refuse with mixed probable Site 5486 remains.
4	61 x 89	Recent beach fire pit	10 YR 6/2	27-88	Feature is relatively recent, contains modern and indigenous materials. Truncated by Features 2.1 and 2.2.

Test Unit 3 (Figure 9; Appendix C, Photo 9)

This third subsurface test was located c. 5 meters west (*makai*) of TU 2. This unit was initially a 1.0 by 1.0 meter unit, but it was subsequently expanded to a 2 by 1 meter unit because of safety concerns. Two strata were encountered in TU 3 before it was halted at a maximum depth of 1.95 mbs, due to very unstable subsurface conditions and unit collapse.

Layer I (0-32 cmbs) was composed of grayish brown (10 YR 5/2) sand. This very soft layer contained modern refuse such as brown and green bottle glass fragments, cigarette butts, aluminum foil, plastic, scattered marine shellfish and sea urchin remains, and various chicken and beef bones. In addition, moderate amounts of scattered charcoal pieces from relatively recent beach fires were found throughout this layer.<sup>47</sup>

Layer IIa (30-162 cmbs) was composed of yellowish brown (10 YR 5/4) sand. This loose stratum contained moderate amounts of waterworn marine shellfish remains, sea urchin and coral. All of these waterworn materials appeared to have been naturally deposited. There were no significant material culture remains found in this unstable layer. A sub-layer of very coarse marine sand (Layer IIb) was located between 162 and 190 cmbs. The unit was abandoned at a maximum depth of 195 cmbs after it collapsed.

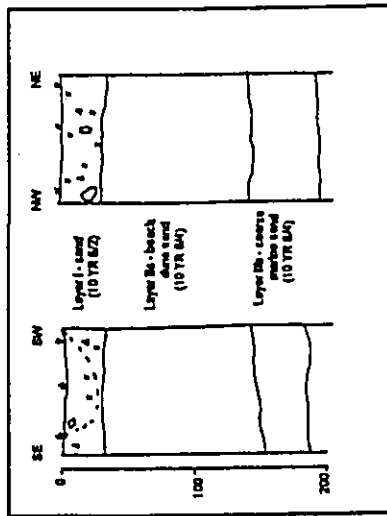


Figure 9 - South and north wall profiles of TU 3.

Discussion

There was no evidence of an intact cultural layer present in this most westward test unit. This portion of Po'olenalena Beach Park appears to have been extensively impacted by natural beach processes. As previously mentioned, it was not possible to excavate TU 3 beyond 1.95 mbs, due to very unstable subsurface conditions.<sup>47</sup>

<sup>47</sup> This near surface portion of the project area appears to have been extensively impacted by ongoing beach usage activities such as camping and fishing. The remains of at least 6 separate beach fires were noted in close proximity to the *makai* section of the APE during our inventory survey.  
<sup>48</sup> It was possible to only profile the southern and northern ends of this unit, because it collapsed in the center.

RECEIVED AS FOLLOWS

Site 50-50-14-5486

As previously noted, the backhoe trench was utilized to test the makai portion of the APE. The trench began c. 2.5 to the southwest of a large boulder that is one of many that are used to restrict vehicular access to the beach from the parking lot. The cultural deposit was located in the first trench section at its most *makai* end. The uppermost cultural layer (Layer IIIa) in this portion of the study area was capped by up to 75 cm of sand (i.e. Layers I and II). The brown (10 YR 4/3) sand—Layer IIIa—was a maximum of 14 cm thick and extended to the southwest (*makai*) for approximately 6.5 meters in the trench profile. There were no subsurface features present in the exposed portion of this thin sub-layer.

Layer IIIb was noted at a maximum depth of 85 cmbs in the northeastern most portion of the backhoe trench. This substantial cultural deposit was up to 74 cm thick in the APE. Scattered material culture remains were clearly visible in the dark brown (10 YR 4/2) sand deposit throughout the first c. 20 meters of the trench. The cultural deposit was essentially located at or very near the existing surface of the beach park after about 12 meters of trench had been excavated. The impact of recent activities was evident, and there was no evidence of Site 5484 beyond 22 meters in the c. 40-meter long trench.

Observed cultural materials in Layer IIIb included various marine shellfish species, sea urchin, coral pieces, fire-cracked rocks, a few waterworn pebbles (not in pavement concentration as in Feature 1.8 of TU 1), and scattered charcoal flecking. In addition, a total of 11 associated subsurface features were noted in this deposit, along with 5 recent and intrusive modern pits. See Table 5 for a summary of these features, and Figures 11-20 for section profiles. Each of these subsurface features is discussed below.

Feature BT-1 was located in the first section of excavated trench. This pit is associated with the Layer IIIb cultural deposit. This feature was noted in the southeastern wall of the backhoe trench, and excavation was halted to determine the nature of the bone that was visible in this pit, which extended from c. 104-143 cmbs and was c. 42 cm wide. This brown (10 YR 4/3) feature collapsed along with a portion of the trench wall before it could be fully recorded. After trench collapse was cleared, it was determined that Feature BT-1 represented a probable articulated dog (puppy) burial, rather than a refuse pit that contained food remains. This portion of the trench was carefully examined, and no remnant of the pit was found in the remaining portion of the trench wall.

Feature BT-2 was located c. 1.8 meters *makai* of Feature BT-1. This second subsurface feature extended from c. 84-114 cmbs and was up to 46 cm in width. The dark brown (10 YR 3/3) fill of this possible refuse pit contained scattered shellfish remains and several angular basalt cobbles and some sea urchin body parts. This portion of the trench collapsed during profile cleaning and evaluation.

Feature BT-3 was found in close proximity to Feature BT-2. This third feature is interpreted as a hearth remnant. This very dark brown (10 YR 2/2) bowl shaped lens extended from c. 93-110 cmbs and was up to 55 cm wide. A small amount (3.4 g) of charcoal was recovered from this feature, before the wall of the trench partially collapsed.

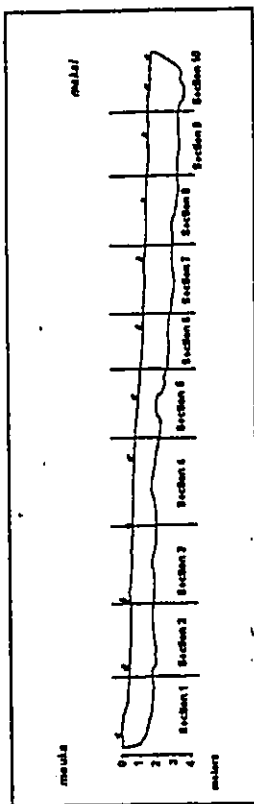


Figure 10 - Schematic of Backhoe Trench 1, indicating Section 1 through 10 profile locations.

Backhoe Trench in *makai* APE (Figures 10; 11-20; Appendix C; Photos 10-15)

As previously noted, a 39.5-meter long trench was excavated along the proposed APE for the HDD installation portion of this project. The backhoe trench investigated the APE to the west (*makai*) of the beach access parking lot, and followed a bearing of 237 degrees magnetic. The trench was excavated in stages, because of safety and park access reasons. As noted earlier in this report, the excavation of the trench was carried out at a controlled pace and utilized a backhoe bucket with a plate.<sup>24</sup>

While the trench was excavated at a controlled pace, it was challenging at times to maintain vertical control, because of very soft subsurface conditions. Several sections of the trench collapsed, during profile recording. In addition, it was also difficult to obtain bulk samples without vertical contamination from recent charcoal that was in the uppermost, loose layer. Nevertheless, it was possible to obtain a clearer understanding of site stratigraphy and the *makai* extent of the Site 5486 habitation area.

The Site 5486 cultural deposit was found to extend towards the ocean for about 22 meters of the trench. Evidence of post-contact disturbance activities was noted in different portions of the trench, and primarily consisted of relatively recent beach fire pits. The cultural deposit was capped with up to 70-80 cm of beach dune sand in the *makai* portion of the tested APE corridor. In contrast, the Site 5484 deposit was located near the existing surface around 12 meters along the trench going *makai* (southwest) of the beach access parking lot. There was no subsurface evidence of the site beyond the 22-meter point of the 39.5-meter long trench.

<sup>24</sup> The use of a plate in sand dune areas helps to reduce damage to unidentified burials and/or subsurface features that may be encountered during testing.

Feature BT-4 was located c. 2.8 meters to the southwest of Feature BT-3. This fire hearth extended from c. 75-92 cmbs and was a maximum of 108 cm in width. While this portion of the trench was somewhat unstable, it was possible to recover a radiocarbon sample of 16.8 g from this very dark grayish brown (10 YR 3/2) feature before the overlying wall partially collapsed. Observed material culture remains in this feature included marine shellfish, a pencil urchin spine, and fire-cracked rocks.

Feature BT-5 was essentially adjacent to the hearth noted above. The dark gray (10 YR 4/1) fill of Feature BT-5 contained some scattered marine shell remains, sea urchin body parts, and fishbone. Feature BT-5 extended from c. 64-103 cmbs and was up to 92 cm wide. This feature, which collapsed along with a section of the trench wall, is interpreted as a refuse pit.

Feature BT-6 is interpreted as a probable fire pit that was located in the 3<sup>rd</sup> section of trench. This subsurface feature contained several fire-cracked rocks, scattered marine shellfish remains and charcoal. The upper portion of this pit appeared to have been impacted, possibly by beach users. This very dark gray (10 YR 3/1) bowl-shaped feature extended from c. 16-59 cmbs and was up to 64 cm wide.

Feature BT-7 appeared to have been partially truncated by the placement of Feature BT-6 and a recent pit (BT-8). The function of Feature BT-7 (brown [10 YR 4/3]) remains somewhat unclear, although it could be a refuse pit. A few pieces of marine shellfish and scattered charcoal were noted in the profile before a portion of the trench collapsed. The feature extended from c. 28-56 cmbs. This truncated pit was a maximum of 58 cm wide.

Feature BT-8 appears to represent a relatively recent and intrusive beach fire pit. This large feature was located within 16 cm of the existing surface and was up to 70 cm in width and up to 50 cm deep (68 cmbs). This dark gray (10 YR 4/1) subsurface feature contained aluminum foil, brown bottle glass, chicken bones, fire-cracked rocks, and scattered charcoal.

Feature BT-9 was located just to the southwest of Feature BT-8 and is also interpreted as a relatively recent pit associated with beach use. The brown (10 YR 4/3) fill of this pit contained modern materials including charred paper, metal, broken bottles, aluminum foil, and plastic. This feature extended from c. 7-32 cmbs and was up to 64 cm in width.

Feature BT-10 was located in the fourth trench section, and is interpreted as another very recent beach fire pit. This large, gray (10 YR 5/1) pit essentially extended from the existing surface, truncated the Layer III cultural deposit, and continued into the underlying beach dune sand (Layer IIb). The large pit was up to 114 cm in width by up to 74 cm in depth. Feature BT-9 contained modern refuse such as broken bottle glass fragments, an aluminum beverage can, burned plastics, and some cut beef bone. This large feature also truncated an adjacent and relatively recent pit—Feature BT-10.

Feature BT-11 was noted adjacent to and *metal* of Feature BT-10. This 11<sup>th</sup> pit feature is interpreted as a relatively recent beach fire pit. Dimensions for this truncated pit were c. 50 cm in width by up to 56 cm in depth. This feature was a maximum of 8 cm below the existing surface in this portion of the APE. Recent materials noted in the fill of

this dark grayish brown (10 YR 4/2) pit included burned plastic, broken bottle glass and some aluminum foil.

Feature BT-12 is tentatively interpreted as a remnant pit that is associated with the Site 5486 cultural deposit. This grayish brown (10 YR 5/2) appears to represent a refuse pit. Observed portable remains included scattered marine shellfish, sea urchin body parts, and coral. As with other test locations, this portion of the trench was very unstable, and much of Feature BT-12 collapsed along with Features BT-13 through 15.

Feature BT-13 consisted of a recent fire hearth, which partially truncated Feature BT-12. This dark grayish brown (10 YR 4/1) basin-shaped feature extended from 7-21 cmbs and was up to 78 cm in width. Modern materials observed in the fill of this pit included broken bottle glass, plastic and aluminum foil.

Feature BT-14 was located adjacent to and *metal* of the recent fire hearth discussed above (i.e. Feature BT-13). This bowl-shaped pit extended from c. 4-45 cmbs and was a maximum of 70 cm in width. There were no modern materials noted in the light grayish brown (10 YR 6/2) fill of this feature. It is tentatively interpreted as a possible refuse pit that is associated with Site 5486.

Feature BT-15 was partially truncated by the adjacent feature. Material culture remains observed in the grayish brown (10 YR 5/2) fill of Feature BT-15 included marine shellfish, pencil urchin spines, coral, and some charcoal flecks. This pit was a maximum of 64 cm in width and extended from c. 3-43 cmbs. This subsurface feature is interpreted as a possible refuse pit.

Feature BT-16 was located in the 6<sup>th</sup> section of the trench, and essentially extended from near the surface to 144 cmbs. This dark grayish brown (10 YR 3/2) elongated feature consisted of a scatter of charcoal and sea urchin body parts. Two bulk samples were obtained to help date this feature. One of these charcoal samples was taken from this feature between 135-140 cmbs (Beta # 184390). This sample yielded a radiocarbon age of 20 ± 40 BP, with calibrated results at 2 sigma of AD 1710 to 1729, AD 1880 to 1910, and AD 1950± (95% probability).<sup>31</sup> Given the shape of this feature and its proximity to stratigraphy that appears to represent a more active section of the beach area, it appears possible that this feature may represent an impacted surface of a former beach dune slope.

<sup>31</sup> This sample intercepted the calibration curve at AD 1950.



Table S

Summary of Backhoe Trench Features—Site 5486

BT-	Depth x Width	Feature	Color	Combs	Remarks
1	39 x 42	Pit—dog burial	10 YR 4/3	104-143	Feature may have ceremonial function—articulated dog burial, in Layer IIIb. Trench section collapsed.
2	30 x 46	Refuse pit	10 YR 3/3	84-114	Refuse pit associated with Layer IIIb, indigenous materials.
3	17 x 35	Hearth remnant	10 YR 2/2	93-110	Small charcoal sample (3.4 g) obtained before trench section collapsed. In Layer IIIb.
4	17 x 108	Hearth	10 YR 3/2	75-92	A 16.8 g charcoal sample was retrieved before trench collapsed. Feature in Layer IIIb.
5	39 x 92	Refuse pit	10 YR 4/1	64-103	Refuse pit associated with Layer IIIb, indigenous material remains.
6	23 x 64	Fire pit	10 YR 3/1	36-59	Fire pit associated with Layer IIIb, indigenous materials. Upper portion of feature impacted by beach activities.
7	28 x 58	Possible refuse pit	10 YR 4/3	28-56	Possible refuse pit associated with Layer IIIb. Impacted by recent pit (Feature BT-8).
8	50 x 70	Recent beach fire pit	10 YR 4/1	16-66	Recent intrusive fire pit, modern material remains.
9	25 x 64	Recent refuse pit	10 YR 4/3	7-32	Recent refuse pit with modern materials. Impacts Layer IIIb.
10	74 x 114	Recent beach fire pit	10 YR 3/1	0-74	Recent fire pit with modern materials. Impacts Layer IIIb.
11	50 x 56	Recent beach fire pit	10 YR 4/2	8-44	Recent fire pit with modern materials. Impacts Layer IIIb.
12	38 x 51	Refuse pit remnant	10 YR 5/2	8-59	Refuse pit associated with Layer IIIb. Impacted by modern Features BT-11 and BT-13.
13	14 x 78	Recent fire hearth	10 YR 4/1	7-21	Feature in recent sand but impacted Layer IIIb as well as Feature BT-12.
14	41 x 70	Refuse pit	10 YR 6/2	4-43	Refuse pit associated with Layer IIIb, indigenous materials.
15	40 x 64	Refuse pit	10 YR 2/2	3-43	Refuse pit associated with Layer IIIb, indigenous materials. Impacted.
16	36 x 144	Elongated feature, possible former beach dune surface	10 YR 3/2	75-92	Radiocarbon age inconclusive, may represent former beach dune contact surface with ocean.

RECEIVED AS FOLLOWS

As previously mentioned, 5 intrusive features were noted in the *maka'i* portion of the trench where Layer IIIb was essentially exposed at or near the existing surface. Most of these features appear to represent modern beach fire pits. These relatively recent features appear to have impacted portions of the Layer IIIb Site 5486 cultural deposit.

Layer V dark brown (10 YR 3/4) silty sandy clay was noted in deeper sections of the trench. However, as mentioned earlier, subsurface conditions were quite unstable, and it was often not possible to obtain a clean trench face near the bottom of the excavation. Generally low amounts of material culture remains were noted in this stratum, which was typically 120-140 cm. Layer V was last noted near the end of Trench Section 5 (at about the 18 meter point).

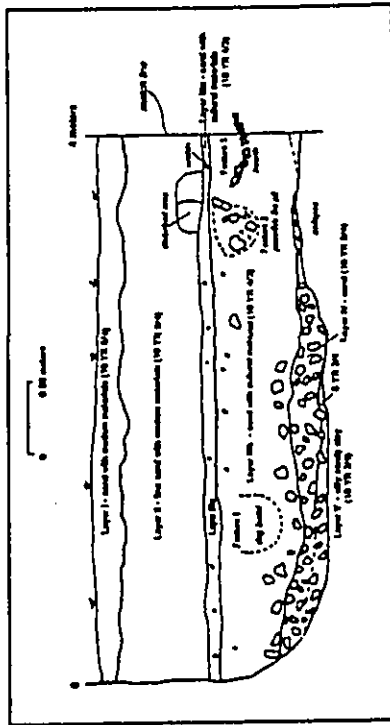


Figure 11 - Easternmost (*maka'i*) section (Section 1) of Backhoe Trench 1.

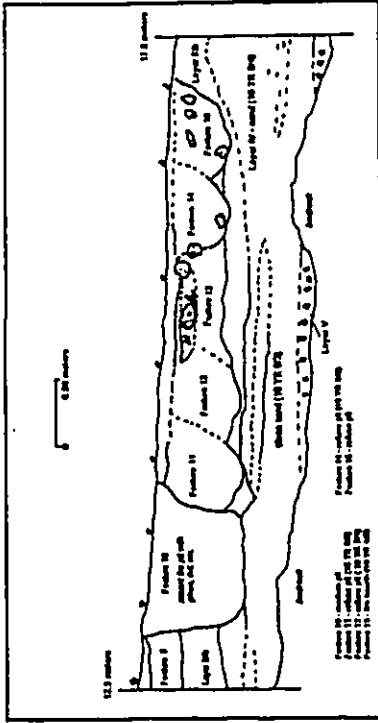


Figure 14 - Section 4 - 12.5 to 17.5 meters.

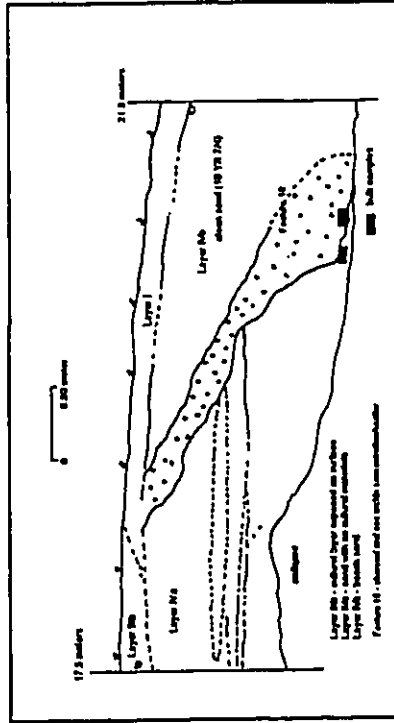


Figure 15 - Section 5 - 17.5 to 21.5 meters.

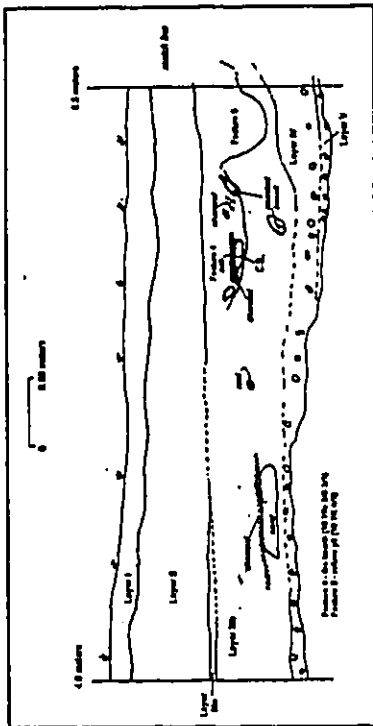


Figure 12 - Section 2 - 4 to 8.5 meters.

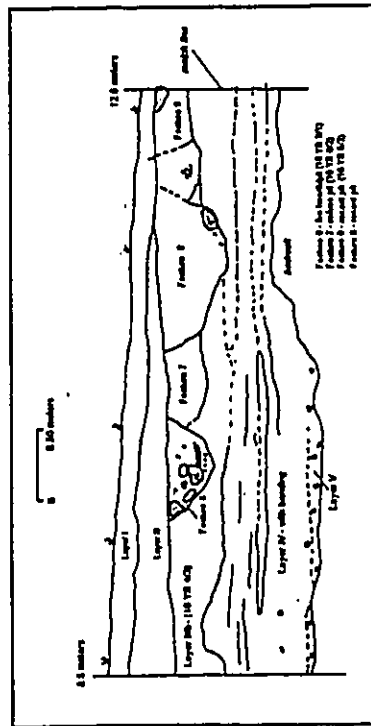


Figure 13 - Section 3 - 8.5 to 12.5 meters.

RECEIVED AS FOLLOWS

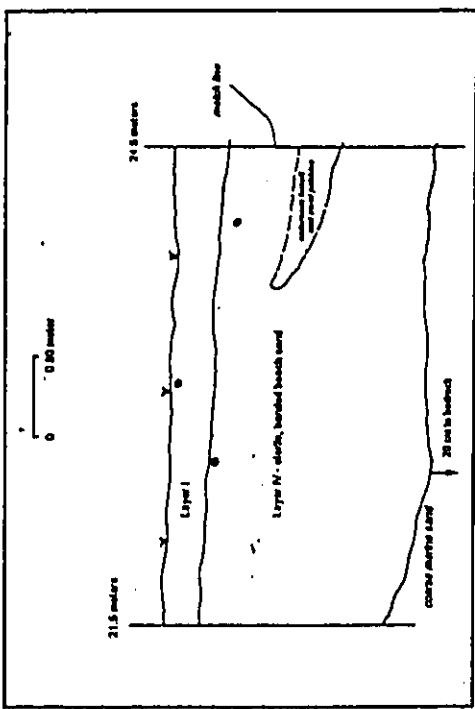


Figure 16 - Section 6 - 21.5 to 24.5 meters.

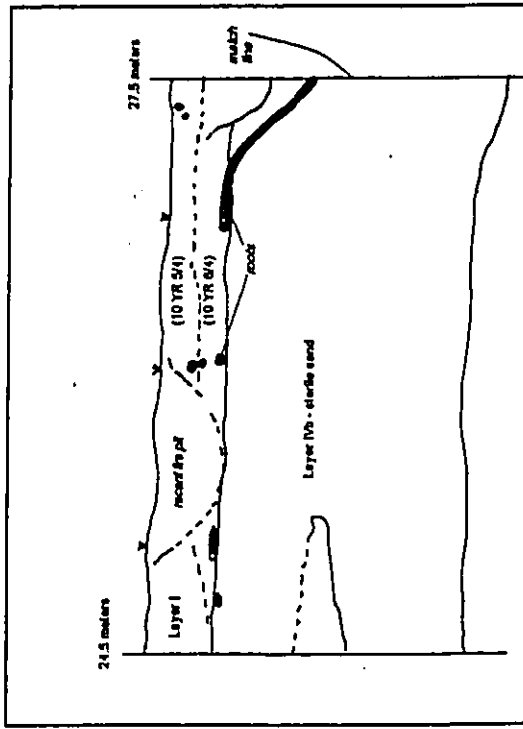


Figure 17 - Section 7 - 24.5 to 27.5 meters

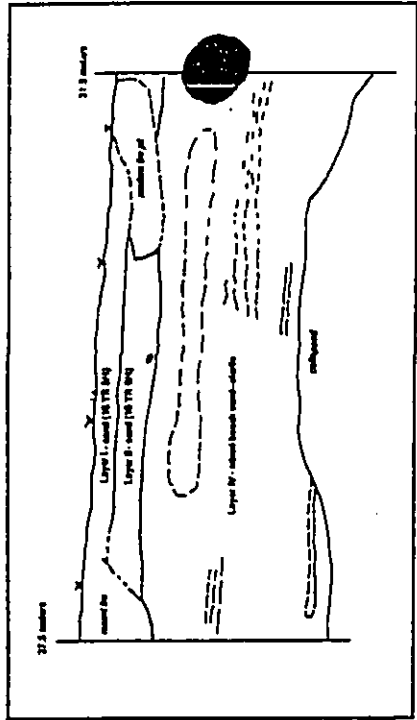


Figure 18 - Section 8 - 27.5 to 31.5 meters.

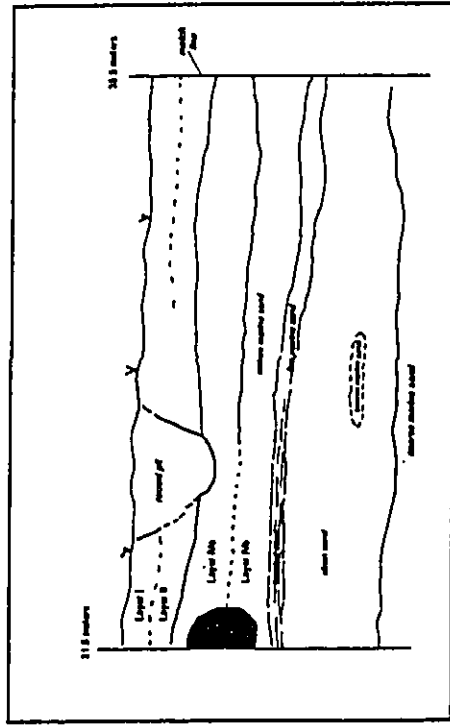


Figure 19 - Section 9 - 31.5 to 35.5 meters.

**Soil test results**

Geolabs, Inc. conducted soil testing on the project area on 14 January 2003. This soil testing was inadvertently carried out without any archaeological monitoring, in contrast to the Waihikuli landing site in Lahaina and the Oneali Homesteads landing site on Moloka'i. As with the other landing sites, the soil testing at Po'olenalena Beach Park was carried out in order to determine if this location is suitable for Horizontal Directional Drilling (HDD). As previously noted in the Methods section of this report, the HDD methodology in this location will include drilling from the APE to the west of the parking lot some 600 meters (2,000 feet) to the offshore submarine cable connection point. Two soil bores, designated M-3 and M-4, were carried out at the Park. Refer to Appendix B for the drill logs for each of these test bores.

**Bore M-3**

This first soil test was located in the parking lot of the Po'olenalena Beach Park. This soil bore was a total of 20 feet (6 meters) deep.

- Boring M-3: 0' - 3.5' Brown Sandy gravel (fill)
- 3.5' - 4.5' - Black and brown Basalt gravel with sand (clinker)
- 4.5' - 11.5' - Gray Basalt formation
- 11.5' - 20' Basalt gravel with sand (clinker)

**Bore M-4**

This second bore was also placed in the parking lot, but near the *makai* edge of it. This soil bore was a total of 41.5 feet (12.65 meters) deep.

- Boring M-4: 0' - 7' Fine sand and basalt gravel
- 7' - 11' - Basalt formation
- 11' - 12' - Void
- 12' - 14.5' - Basalt sand and gravel (Clinker)
- 14.5' - 37' - Basalt formation
- 37' - 41.5' - Basalt gravel with sand (Clinker)

Groundwater was not encountered in the borings at the time of Geolabs, Inc. field exploration.

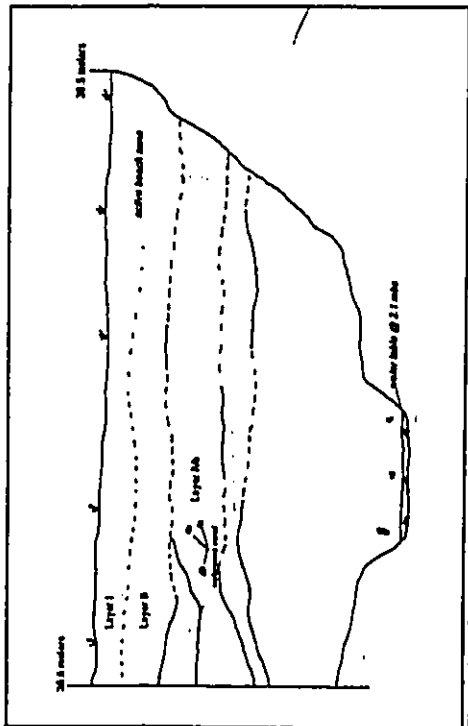


Figure 20 - Section 10 - 35.5 to 39.5 meters.

**Trench beyond 21.5 meters**

While the Site 5486 cultural deposit was not found beyond about the 21.5-meter point, the trench was nevertheless excavated to the 39.5 meter point. Stratigraphy encountered included an active surface layer that contained modern materials and naturally deposited marine and dune sand. The groundwater table was located near the *makai* end of the trench at c. 2.1 mbs.

**Discussion**

The Site 5486 cultural deposit—primarily Layer IIIb—was found in about 20 meters of the excavated trench. Layer IIIa was found to extend in only about the first 6.5 meters of the trench, while Layer V was noted in different portions of the trench as far southwest (*makai*) as c. 18 meters. As noted previously, this cultural deposit is interpreted as a portion of a coastal habitation site. The presence of marine resource exploitation artifacts as well as quantities of marine-based food midden and several subsurface refuse pits and hearths in Layer IIIb further reinforce a coastal resource focus for the Site 5486 habitation area.

It is interesting to note that several meters of the site (Layer IIIb) were found to lie at or near the existing surface, possibly exposed by natural and/or human induced erosion. Several recent pit features have impacted the Layer IIIb component of the site in the tested southwestern portion of the APE.

**Data Analysis**

Cultural material recovered from subsurface testing was sorted, weighed and measured in the laboratory by Jennifer Frey and Demaris Fredericksen completed the analysis.

Radiometric analysis of charcoal was done by Beta Analytic, Inc., of Miami, Florida. All submitted samples underwent regular radiocarbon analysis, with the exception of one sample that was too small. It was subjected to AMS (Accelerator Mass Spectrometry) analysis and is noted on the Table 6. For comparative purposes, dates obtained from studies adjacent to Po'olenalena Beach Park also are included on the table. Calibration of radiocarbon age to calendar years is illustrated in Appendix A.

The dates suggest that intensification of settlement in this area began in the 15<sup>th</sup> century, and continued into historic times.

**Table 6**  
Radiometric Results from Current Study Parcel  
And Adjacent Sites

Sample	Provenience	Weight	Radiocarbon age	Calibrated results ± sigma (95% probability)	Intercept date
#1 Beta # 184386	TU I, Layer IIIA, Level I, 77-87 cmbs	10.0 g	TMK 2-1-77 140 +/- 60 BP	AD 1680 to 1930	AD 1680 AD 1730 AD 1810 AD 1930 AD 1950
#2 Beta # 184387	TU I, Layer IIIB, Level 5, 127-137 cmbs	41.5 g	320 +/- 60 BP	AD 1440 to 1670	AD 1530 AD 1560 AD 1630
#3 Beta # 184388	TU I ex., Layer IIIB, Level 4, Feature 1.8, 120- 125 cmbs	38.9 g	370 +/- BP	AD 1420 to 1660	AD 1490
#4 Beta #	TU I ex., Layer V, Level I, 137-	16.3 g	430 +/- BP	AD 1410 to 1530 AD 1550 to 1630	AD 1450

Beta #	147 cmbs Backbone Trench, Feature 1.5, 135- 140 cmbs	6.5 g	20 +/- 40 BP	AD 1710 to 1729 AD 1840 to 1910 AD 1950 +	AD 1950
Beta # 126823	Site 1362		TMK: 2-1-72: 15 370 +/- 70 BP	AD 1423 to 1665	AD 1495
Beta # 167039	Site 5414	AMS	TMK: 2-1-87: 08 <sup>11</sup> 140 +/- 60 BP	AD 1660 to 1950	AD 1680 AD 1730 AD 1810 AD 1930 AD 1950
Beta # 167030	Site 4818	AMS	390 +/- 40 BP	AD 1430 to 1530 AD 1550 to 1630	AD 1470

**Artifacts**

A total of 45 formed, indigenous artifacts were recovered from subsurface excavations at Po'olenalena Beach Park, during the present archaeological inventory survey. Two copper fragments appear to be from early post-contact times, as well as an iron nail, and a possible clay pipe stem fragment (Layer IIIa in TU1, and disturbed Layer III in TU 2).

The most common artifacts were coral abraders/files, which numbered 22 (See Figure 18; Photo 2). Most were fragments of tips or shafts of long, slender files that would have been used in fishhook manufacture. Other artifacts included worked basalt, shell and bone, urchin spine files/abraders (Photo 1), and a probable human bone fishhook tab.

**Table 7**  
Indigenous Artifacts Recovered

TEST UNIT	LAYER/LEVEL FEATURE	ARTIFACT NUMBER	ARTIFACTS	L x W x H (mm.)	WEIGHT (g)
1	Layer IIIa	1	Coral abrader/file	16.8 x 14.8 x 8.5	1.3
		2	"	15.4 x 9.4 x 8.4	1.0
		3	Copper fragment	14.3 x 12.6 x 4.3	0.4
		4	Coral abrader/file	10.0 x 6.0 x 4.0	0.1
		5	Urchin spine abrader	9.0 x 5.0 x 4.5	0.1
	Layer IIIb, Level 1	6	Coral abrader/file	18.3 x 11.5 x 7.5	0.9
		7	"	12.1 x 7.6 x 7.1	0.3
		8	"	14.2 x 8.5 x 5.0	0.3

<sup>11</sup> AMS analysis because of small size. All other samples underwent radiometric analysis.  
<sup>12</sup> From Lee-O'Grig, 2003, p. E-3 through E-5.

RECEIVED AS FOLLOWS

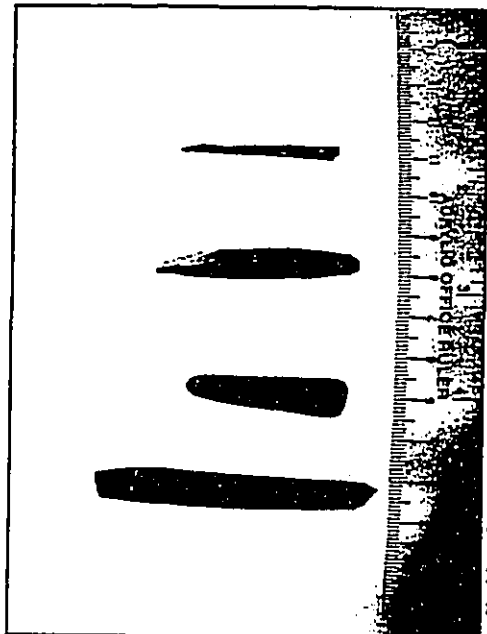


Photo 1 - Urchin spine files (#39, #16, #78); bone pick (#40)



Photo 2 - Coral abrader/files (#30, #31); top row (#8, #32); bottom row (#11, #6)

		9			20.4 x 12.6 x 8.0	1.6
		10	Worked shell		13.63 x 8.7 x 0.7	0.1
	Level 2	11	Coral abrader/file		17.2 x 13.6 x 8.9	1.3
	Level 4	12	Coral abrader/file		14.0 x 3.2 x 6.3	0.9
		13	Worked basalt flake		35.4 x 39.0 x 12.5	21.6
		14	"Puka" shell		15.4 x 13.7 x 6.3	1.6
		15			7.7 x 7.1 x 4.0	0.2
		16	Urchin spine file		39.5 x 10.0 x 8.8	2.0
	Level 5	17	Coral abrader/file		10.5 x 6.1 x 4.5	0.2
	Level 6	18	Drilled shell		25.2 x 19.4 x 9.8	3.8
		19	"Puka" shell		7.2 x 6.8 x 5.4	0.3
		20	Coral abrader/file		10.5 x 4.8 x 8.5	0.4
		21	Polished basalt flake		14.4 x 9.7 x 1.7	0.2
		22			9.5 x 8.5 x 1.5	0.2
		23	Worked basalt flake		62.1 x 58.5 x 30.1	144.7
TU 1		24	Coral abrader/file		13.9 x 8.0 x 7.5	0.3
Ex.		25	Possible worked bone		33.5 x 12.6 x 7.5	2.7
	Layer IIIb	26	"Puka" shell		5.1 x 4.3 x 1.6	0.1
	Level 1	27			5.4 x 4.3 x 0.8	<0.1
	Level 2	28	Urchin spine abrader		50.8 x 8.0 x 7.4	1.8
	Level 3	29	Coral abrader/file		20.5 x 12.4 x 11.9	2.4
		30			49.0 x 25.5 x 23.7	13.6
		31			40.6 x 12.0 x 23.7	3.9
		32			17.7 x 10.4 x 9.4	1.0
		33			15.2 x 8.2 x 8.1	0.3
	Level 4	34	Bone fishhook tab		34.0 x 22.1 x 3.1	1.8
	Level 5	35	Worked shell (Conus)		31.5 x 20.5 x 19.2	8.2
		36	Coral abrader/file		14.3 x 14.0 x 9.9	1.2
		37			9.3 x 13.7 x 6.0	0.7
	Layer IV	38	Possible utilized coral		120.5 x 49.5 x 45.5	221.0
	Layer V	39	Urchin spine abrader			
		40	Possible bone pick		40.5 x 4.1 x 2.5	0.3
		41	Coral abrader/file		20.1 x 18.4 x 6.8	2.0
	Layer I/II	42	"Iron nail"		22.8 x 8.9 x 8.9	1.4
		43	"Puka" shell		7.4 x 6.9 x 3.5	0.1
		44	Copper fragment		9.9 x 6.9 x 3.5	0.1
		45	Possible clay pipe stem		12.2 x 6.7 x 4.2	0.2
	75-90 cmbs	46	Coral abrader/file		8.6 x 10.3 x 5.1	0.3
		47	Utilized volcanic glass		9.0 x 7.2 x 2.2	0.1
	130-145 cmbs	48	Coral abrader/file		20.0 x 7.9 x 6.8	0.5
		49	Worked basalt flake		35.0 x 22.0 x 6.7	5.1

RECEIVED AS FOLLOWS

Table 8  
Summary of Subsurface Results - Test Unit 1

	Layer I	Layer II	Layer IIIA
	0-20 cm	20-90	Level 1 77-97 1/4" In.
GASTROPODA			
<i>Callaea</i> sp.	6.6		5.0
<i>Conus</i> sp.			4.9
<i>Cypraea</i> sp.	7.9	0.1	74.9
<i>Dryas</i> sp.			3.7
<i>Nodipecten</i> sp. <sup>M</sup>			0.4
<i>Littorina planada</i>	0.1		2.8
<i>Meria picea</i>	0.2		46.5
<i>Chama</i> sp. <sup>9</sup>			13.3
<i>Tellinidae</i> sp.			0.2
<i>Terridae</i> sp.			2.1
Turbo sandwicensis	2.2		9.9
Unidentified	1.6		3.0
BIVALVIA			
<i>Loggomon</i> sp.			1.9
<i>Brachidontes</i> sp.			0.7
Unidentified			0.5
EQUINOIDEA			
Sea urchin	0.1	0.3	25.1
Pencil urchin	0.1		23.3
CRAB		0.1	0.1
BONE			
Mammal	7.6	0.4	3.2
Fish			5.1
FLORAL			
Kakai nut shell			1.5
Charcoal		4.4	10.0
UNWORKED BASALT FLAKES (pieces)			(16) 34.7
UNWORKED VOLCANIC GLASS FLAKES (pieces)			(14) 4.4
UNWORKED CORAL (pieces)			(85) 24.5
WATERWORN PEBBLES (pieces)			(1) 7.0

<sup>M</sup> Scallops  
<sup>9</sup> Rock oysters

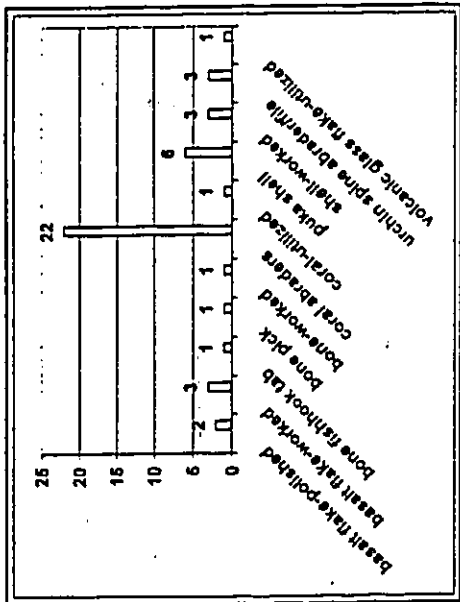


Figure 21 - Frequency of artifact types recovered from Site 5486.

Midden analysis

Portable remains were collected in the field. Screening was done with double, or nested 1/4" and 1/8" screens in the field. All of the 1/4" material was processed. However, due to time restraints, some of the material that was contained in the 1/8" screen was not analyzed. The initial observations showed a dramatic increase in urchin parts, primarily, while unidentified bivalve shell shatter, and charcoal showed some increase as might be expected. See Table 8, Layer IIIa, Level 1, and Table 11, TU 1 Extension, Layer IIIb, Level 1 tabulation below. Dr. Melissa Kirkendall had indicated that additional archaeological excavation would be necessary in the parking lot area at some point in the future, prior to construction activities at this landing site. At that time, analysis of the already collected 1/8" inch bulk samples will be completed, and the results reported, along with the new data in an addendum report. The results of the current analysis are included in the tables below.

The most abundant marine shellfish remains recovered were those of various cowrie species (*Cypraea* sp.). In Test Unit 1—from Layer IIIb, the richest cultural layer—a total of 542.2 g. this shellfish were found. The next most abundant remains were *pipipi* (*Meria picea*), totaling 224.1 g., followed by cone shell species (*Conus* sp.) [118.3 g.] and *opiti* (*Callana*) [51.7 g.].

FIRE-CRACKED ROCKS	(1) 145
ARTIFACTS	
Coral abrader	#1-2, #4
Urchin spine file	#5
HISTORIC MATERIAL	
Algal pieces	83 copper
Glass pieces	4.6
Nail	7.8

Weight in grams

Table 9

Summary of Subsurface Findings - Test Unit 1 (cont.)

	Layer IIIA					Level 6/7 137-153
	Level 1 87-97	Level 2 97-107	Level 3 107-117	Level 4 117-127	Level 5 127-137	
GASTROPODA						
Celana sp.	10.1	127	1.6	6.1	0.1	3.0
Conus sp.	11.3	18.5	97	34.1	3.2	4.0
Cypraea sp.	113.4	115.3	52.4	43.0	5.7	3.9
Dryas sp.	157	14.8				
Coch	227			28.5		
Littorina pinnata	4.7	22.0	2.4	0.8	0.4	
Nejila pika	41.9	71.5	24.2	10.1	0.4	0.9
Panaxis sp.			0.1			
Strombus sp.		0.8				
Tellinidae sp.	0.2		0.4	0.1		
Terebridae sp.			8.5	7.0	0.6	
Thalididae sp.	0.4					
Turbo sandwicensis	3.7					
Unidentified	5.9	13.9	6.2	20.9	5.4	7.5
BIVALVIA						
Loxosomus sp.	4.4	4.2	2.2	1.0		
Brachidontes sp.	4.3	4.3	0.2	0.1		
Unidentified	1.4	0.1				
ECHINOIDEA						
Sea urchin	42.7	41.0	22.5	19.8	1.3	2.5
Perell urchin	36.3	38.6	17.4	14.5	1.2	3.3
CRAB						
Unidentified	0.8	3.0	0.6			0.1
BONE						
Teeth, mammal						0.6
Bird						1.2
Mammal	3.3	2.8				
Fish		0.9		3.4	1.1	2.0
Shark tooth		0.1				
Unidentified	0.8		1.5	2.5	3.9	4.9
FLORAL						
Kohol nut shell					0.1	
Charcoal						41.5

UNWORKED BASALT FLAKES (pieces)	(10) 94.9	(23) 71.9	(7) 21.1	(5) 9.6	(1) 0.1
UNWORKED VOLCANIC GLASS FLAKES (pieces) <td>(5) 7.5</td> <td>(7) 5.1</td> <td>(3) 0.8</td> <td></td> <td>(2) 0.2</td>	(5) 7.5	(7) 5.1	(3) 0.8		(2) 0.2
UNWORKED CORAL (pieces) <td>(69) 148.2</td> <td>(39) 119.3</td> <td>(39) 148.0</td> <td>(20) 71.6</td> <td>(1) 0.1</td>	(69) 148.2	(39) 119.3	(39) 148.0	(20) 71.6	(1) 0.1
WATERWORN PEBBLES (pieces) <td>(11) 80.8</td> <td>(7) 91.3</td> <td>(7) 53.5</td> <td></td> <td></td>	(11) 80.8	(7) 91.3	(7) 53.5		
ARTIFACTS					
Coral abrader	#6-#9	#11		#12	#20
Polished beach flake					#21
Worked shell	#10				#18 drilled
Unfiled beach flake				#13	
"Pala" shell				#14-15	#19
Urchin spine file				#16	

Table 10

Summary of Subsurface Findings - Test Unit 1 (cont.)

	T.U. 1					T.U. 1 Extension		
	Layer IV 139-153	Layer V 155-165	Layer VI 165-175	Layer VII 70-80	Layer VIII 77-89	Layer I 0.7	Layer II 2.5	Layer IIIA 0.5
GASTROPODA								
Celana sp.						0.7	0.5	3.1
Conus sp.							2.5	3.6
Cypraea sp.	19.6	0.6		0.4				35.0
Dryas sp.								1.5
Littorina pinnata							0.3	1.5
Nejila pika		0.4	0.2	1.0	24.5			
Operculum							0.1	
Strombus sp.								0.1
Tellinidae sp.								0.2
Terebridae sp.								0.5
Thalididae sp.								0.6
Unidentified	1.1						0.4	
BIVALVIA								
Loxosomus sp.								1.1
Brachidontes sp.								0.2
Unidentified								
ECHINOIDEA								
Sea urchin	0.1	0.4	0.5	7.0	14.8			
Perell urchin				0.1	7.2			
CRAB								
Unidentified		1.0	1.8					
BONE								
Mammal	0.1	2.5	1.5		0.1			
Fish	20.1	1.4	1.0	0.2	1.0			
FLORAL								
Kohol nut shell								
Charcoal								34.4



RECEIVED AS FOLLOWS

	(37) 300	(66) 106.2	(34) 32.7	(36) 35.7	(8) 21.1	(8) 5.6
UNWORKED CORAL (pieces)						
WATERWORN PEBBLES (pieces)		(1) 7.2		(2) 8.9		
ARTIFACTS		#29	#30-33		#36-37	#38 Corium
Coral abrader						
Worked shell	#26-27					
"Pala" shell						
Worked bone						
Bone fishhook tab						
Urchin spine file	#28					

Table 12  
Summary of Subsurface Findings - Test Unit 1 Extension (cont.)

	Layer IV			Layer V			Layer VI	
	Level 1 125-137	Level 1 137-147	Level 2 147-157	Level 3 157-164	Level 4 167-171	Level 5 163-172		
<b>GASTROPODA</b>								
Cellana sp.		0.1		0.4				
Conus sp.		6.8	10.4					
Cypraea sp.		14.4						
Drupa sp.		0.1						
Littorina planata		0.7						
Nerita plicata		0.5						
Parusis sp.		0.1						
Sermyla sp.		1.2						
Thalidra sp.		1.5						
Unidentified		6.6						0.1
<b>BIVALVIA</b>								
Brachidontes sp.		0.4						
Unidentified		1.2						
<b>ECHINOIDEA</b>								
Sea urchin		42.2		0.3				0.6
Porcell urchin		3.9						
<b>CRAB</b>								
	0.1	2.1		1.8				1.5
<b>BONE</b>								
Bird		0.4						
Mammal		0.6		3.1				
Fish		20.0		3.0				
Unidentified		2.0		22.8				0.5
<b>FLORAL</b>								
Charcoal		31.3						
UNWORKED BASALT FLAKES (pieces)		(7) 3.9						
UNWORKED VOLCANIC GLASS FLAKES (pieces)			(6) 1.6					
UNWORKED CORAL (pieces)	(1) 2.6	(6) 4.1		(1) 0.4			(7) 1.3	
WATERWORN PEBBLES (pieces)								(1) 1.9

	(1) 25.9	(8) 12.5	(7) 19.2
UNWORKED BASALT FLAKES (pieces)			
UNWORKED CORAL (pieces)			
WATERWORN PEBBLES (pieces)		(1) 3.2	
BURNED CORAL			(58) 79.1
ARTIFACTS			#24
Coral abrader			
Polished basalt flake	#22		
Utilized basalt flake			#23
Worked bone			#25

Table 11  
Summary of Subsurface Findings - Test Unit 1 Extension (cont.)

	Layer III B					Levels 6 & 7	
	Level 1 87-97	Level 2 97-107	Level 3 107-117	Level 4 117-127	Level 5 127-137	Level 6 137-147	Level 7 137-157
<b>GASTROPODA</b>							
Cellana sp.	4.3	4.4	4.0	1.0	1.4	3.0	
Conus sp.	3.2	5.2	13.9	10.3	3.3	1.6	
Cypraea sp.	6.9	50.6	86.0	40.0	21.4	15.5	
Littorina planata	1.0	3.4	1.2	0.3	0.7		
Nerita plicata	18.4	18.9	18.0	11.1	5.4	0.3	
Tellinidae sp.	0.6	0.1	0.1	0.1			
Thalidra sp.	4.2	13.1	14.7	7.5	4.0		
Unidentified	3.4	4.5	7.1	6.4	5.3	7.2	
<b>BIVALVIA</b>							
Brachidontes sp.	4.4	7.7	4.0	4.5	0.9		
Unidentified	0.1	0.5		0.3	0.9		
<b>ECHINOIDEA</b>							
Sea urchin	48.1	26.6	20.0	16.3	18.5	4.8	
Porcell urchin	19.2	13.4	24.3	5.9	2.2	4.8	
<b>CRAB</b>							
	0.4	1.5	0.1		0.3	5.0	
<b>BONE</b>							
Bird							
Mammal		3.6				1.0	
Fish	0.7	2.1	1.0	1.2	1.0	20.0	
Shark teeth	(2) 0.2						
Unidentified	0.2	5.0		2.4	1.5	19.3	
<b>FLORAL</b>							
Kukul nut shell	0.1				0.2		
Charcoal							
UNWORKED BASALT FLAKES (pieces)	(7) 31.4		(11) 22.5	(5) 4.3		(2) 18.0	
UNWORKED CORAL (pieces)	(1) 0.7	(5) 0.2	(7) 4.7	(7) 1.6			
UNWORKED VOLCANIC GLASS FLAKES (pieces)							

SUMMARY AND CONCLUSIONS

One previously unidentified coastal habitation site was located during the archaeological inventory survey of the study area—the HDD portion of the APE at the proposed Po'olenalena Beach Park landing site. This habitation area has been designated SIIP No. 50-50-14-5486. Recovered food midden and artifacts indicate that occupants of this site utilized marine resources and fashioned tools to harvest these resources. Several subsurface pit and posthole features as well as a portion of a waterworn pavement were also located. All of these subsurface features indicate a habitation function for this coastal Native Hawaiian site. Three cultural layers were located during testing. Layer IIIa appears to represent a late precontact to early post-contact occupation sequence, while Layer IIIb appears to have been utilized in the mid- to late precontact period. A charcoal sample from Layer V yielded a radiocarbon date range near that of the 2 Layer IIIb samples. Five charcoal samples from the site yielded date ranges that indicate precontact usage, from as early as the 1400s (Layers IIIb and V) through early post-contact times (Layer IIIa).

A total of 19 subsurface features were found associated with Layer IIIb, including several refuse pits, fire hearths, postholes, a portion of a waterworn pavement (Feature 1.8), and an articulated dog burial (Feature BT-1). The presence of the pavement section suggests a possible habitation or a ceremonial function. The relatively close proximity of the articulated dog burial to the pavement further supports a possible ceremonial function. However, the given the limited study area—i.e. the APE for the fiber optics HDD corridor—it was not possible to explore this portion of Site 5486 in greater detail.

As previously noted, the inventory survey examined only the corridor for the proposed HDD action. During the course of the survey, it became apparent that the Site 5486 cultural deposit extends to the north, south, and east of the tested portion of the APE for the proposed fiber optics project. In particular, it appears likely that the site extends *mauka* under the existing beach access parking lot. This area will be impacted by backhoe trenching, in order to connect the marine fiber optics landing site into the planned terrestrial network along Makana-Alanui Road.

Radiocarbon date ranges obtained from Site 5486, correspond to dates found at Sites 4818 and 5414 to the southeast (Lee-Grigg, 2003) and Site 1362 to the north (See Table 6), suggesting that the site are contemporaneous. While some of the cultural materials from the above sites are similar to those recovered from Site 5486, there is not yet enough information to determine the extent of this newly identified site. The present inventory survey covered only a narrowly defined corridor—the *makai* portion of the

ARTIFACTS									
Coral sliver	#38								#40
Bone sw/peck									
Utchla spine file		#39							

Table 13

Summary of Subsurface Findings -- Test Unit 1 Features

	F-1.1	F-1.2	F-1.3	F-1.4	F-1.5	F-1.6	F-1.7
	91-115	87-106	84-100	89-113	107-117	101-112	97-107
GASTROPODA							
<i>Callina</i> sp.	0.1		2.2	1.5			
<i>Cypraea</i> sp.	7.5		6.9	0.4			
<i>Littorina pinnata</i>				9.1			0.4
<i>Nerita</i> sp.				0.1			
<i>Operculum</i>	0.1			0.1			
<i>Planaxis</i> sp.				0.9			
<i>Thalidra</i> sp.							
Turbo sand whorls			1.1		1.8		0.5
Unidentified	0.1						
BIVALVIA							
<i>Isognomon</i> sp.				0.5		0.6	
Unidentified				3.0		0.9	
ECHINOIDEA							
Sea urchin	0.3	0.1	23.0	4.5	1.5	3.0	1.6
Pencil urchin	0.1	1.8	0.6	2.8			
BONE							
Fish	0.4			2.6	0.2	0.6	
Unidentified					0.4		
FLORAL							
Kukui nut shell							
Charcoal		10.6	1.7	33.1	68.5	26.8	55.8
Unworked				(?) 6.3	(?) 7.5		
Basalt flakes							
Unworked							(?) 0.1
Volcanic glass flakes (pieces)				(?) 1.1			
Unworked				(?) 0.8	(?) 4.9	(?) 1.3	(?) 0.2
Coral (pieces)	(?) 5.1						
Unworked							
Waterworn pebbles (pieces)		(?) 3.9				(?) 1.1	(?) 2.7

APE. Consequently, it remains unclear whether Site 5486 is contiguous with one or more of the previously identified sites.

The SHPD (Doc. No. 0311MK08—November 26, 2003) has indicated that additional inventory level investigation will need to occur in the *mauka* portion of the fiber optics APE, which will cross the beach access parking lot. This subsequent investigation should yield additional information on the extent of Site 5486, and its relationship to the other known sites in the area.

#### Site Significance Evaluations

The following significance evaluations are based on the Rules Governing Procedures for Historic Preservation Review (DLNR 1996; Chapter 275). According to these rules, a site must possess integrity of location, design, setting, materials, workmanship, feeling and association and shall meet one or more of the following criteria:

Criterion "a"—Be associated with events that have made an important contribution to the broad patterns of our history;

Criterion "b"—Be associated with the lives of persons important in our past;

Criterion "c"—Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; or possess high artistic value;

Criterion "d"—Have yielded, or is likely to yield, important information for research on prehistory or history;

Criterion "e"—Have an important traditional cultural value to the native Hawaiian people or to another ethnic group of the state due to associations with traditional cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts.

Sites can be considered no longer significant when they qualify only under Criterion "d" and sufficient information has been collected from them during inventory survey level investigation.

Based on the results of this inventory survey, this coastal habitation site qualifies for importance under at least Criterion "d" for its information content. It is important to reiterate that an articulated dog burial, as well as a waterworn pavement are associated with Site 5486. The presence of these two subsurface features suggests that this site may have possible ceremonial components as well. Given the proximity of Site 50-14-1362 to the northeast of the tested portion of the APE, it remains possible that the newly identified site within the APE may be associated with the Site 1362 *kauhale* (household)

62

complex. Should this be the case, Site 5486 would also likely qualify for importance under Criterion "e" for its traditional cultural significance to Native Hawaiians.

#### Mitigation Recommendations

Given the proximity of Site 1362 to the north as well as a previously identified Native Hawaiian burial (Site 5182) on a parcel to the southeast, the State Historic Preservation Division has indicated that it will require additional inventory level work for the untested area to the east (*mauka*) of the proposed HDD installation corridor. As previously mentioned, the parking lot section of the study area will be excavated with a backhoe, in order to hook up the machine side of the fiber optics conduit with the terrestrial side of the network. This additional inventory level work is required by SHPD, because the extent of Site 5486 within the proposed SIC project area is not yet fully known. This inventory level work shall be done prior to construction activities. As with the area *makai* of the parking lot, it will also be necessary to have the tested corridor surveyed following the investigation.

63

RECEIVED AS FOLLOWS

## REFERENCES

- Apple, R.A. 1965  
*Ta'iti: From Strangers to Kerabatona*. Bishop Museum Press, Honolulu.
- Abdown, Inez 1970  
*Ke Aialoa o Maui: The Broad Highways of Maui*. Ace Printing Company.
- Barrere, Dorothy B. 1975  
*Wailea: Waters of Pleasure for the Children of Kama*. B. P. Bishop Museum, Honolulu.
- Barholomew, Gail and Biren Bailey 1994  
*Maui Kaniwekani: A Local History*. Mutual Publishing Co., Honolulu, HI.
- Blackwell, Martha 1970  
*Hawaiian Ethnobotany*. University of Hawaii Press, Honolulu, HI.
- Bordner, Richard 1980  
*Archaeological Reconnaissance of the Proposed Realignment of the Makana Coast Road: Update on alignment "C"*. Prepared for Environmental Impact Study Corp.
- 1995  
*Contexted Images of Place in a Multicultural Context: The Ahupua'a of Kenalo and A'ohi, Maui*. Ph. D. dissertation, Geography Department, University of Hawaii, Honolulu.
- Brown, R. and A.E. Haun 1989  
*Archaeological Inventory Survey, Kealea and Waialeale Subdivisions, Makana District, Maui (TMK: 2-2-02: 51, 56)*. Prepared for DHIHL by PHRI, Hilo, HI.
- Davis, B.D., and Richard Bordner 1977a  
*Archaeological Reconnaissance of the Makana Coast Road Realignment, Honouliuli, Island of Maui*. Archaeological Research Center Hawaii, Inc., for Environmental Impact Study Corp.
- 1977b  
*Archaeological Reconnaissance of the Proposed Realignment of the Makana Coast Road—Maui Alternative, Honouliuli, Island of Maui*. Archaeological Research Center Hawaii, Inc., for Environmental Impact Study Corporation.
- Dicks, A.M. and Alan Haun 1987  
*Intensive Archaeological Survey and Testing, Embassy Suites Hotel Site, Wailea Beach Resort, Land of Palaua, Makana District, Island of Maui (TMK: 2-1-08: 87)*. PHRI Report 338-082987. Prepared for Landmark Hotels and Group 70.
- Dobyns, Susan 1988  
*Archaeological Excavation in Coastal Area of Papa'ani, Waipoo, Kauihā, and Kenihau Ahupua'a, Maui Island, Hawaii*. Prepared for Makana Surf, Ltd., B.P. Bishop Museum, Department of Anthropology, Honolulu.
- Dobson, Theresa K. 1990a  
*Archaeological Inventory Survey, Palaua Development Parcel, Land of Palaua, Makana District, Island of Maui (TMK: 2-1-11: 3)*. PHRI Report 871-100890. Prepared for Kibara Development (Hawaii), Inc., Honolulu.
- 1990b  
*Archaeological Inventory Survey and Testing of a Potential Burial Feature, Palaua Subdivision Lot A, Land of Palaua, Makana District, Island of Maui*. PHRI Report 909-111090. Prepared for Murray Pacific Corp., Tacoma, Wash.
- 1998  
*Kenalo I Church (SHIP Site 50-50-14-1384): Makana, Honouliuli, Maui*. *Archaeological Survey and Testing of the North Yard Area (TMK: 2-1-07: 02)*. Prepared for the Board of Trustees, Keawala's Congregational Church—United Church of Christ, Makana, Maui.
- Dunmore, John 1991  
*Hua'li'ia in Pacific Navigation*. University of Hawaii Press, Honolulu.
- Foote, D.E., E.L. Hill, S. Nakamura and F. Stevens 1972  
*Soil Survey of the Islands of Kauai, Oahu, Maui and Molokai*. U.S. Department of Agriculture, Soil Conservation Service, Government Printing Office, Washington, D.C.
- Frederickson, Erik M. and Demaris L. 1995  
*Post-Field Work Summary and Preliminary Report on Data Recovery Work at Site 50-50-14-2496, Palaua Ahupua'a, Makana District, Maui Island*. Prepared for Dowling Company, Wailuku by Xamanek Researches, Pukalani, HI.
- June 1998  
*Archaeological Inventory Survey of the Kutahilo Property, a 1-acre parcel located in Makana, Maui (TMK: 2-1-07: 7 and 99), Papa'ani Ahupua'a, Honouliuli, Maui, Makana District, Maui Island*. Prepared for Hugh Farington, AIA, Kihikihi Maui, by Xamanek Researches, Pukalani, HI.
- October 1998  
*An Inventory Survey of a 0.3-acre Coastal Property (Lot 5C) in Makana, Maui, Papa'ani Ahupua'a, Honouliuli, Maui, Makana District, Maui Island (TMK: 2-1-07: 99)*. Prepared for Fred Loebberg, AIA, Hilo, Maui, by Xamanek Researches, Pukalani, HI.
- September 1999  
*An Archaeological Inventory Survey of a c. 1/2-acre Coastal Parcel on Palaua Beach, Honouliuli, Maui, Makana District, Maui Island (TMK: 2-1-11: 20)*. Prepared for Hugh Farington, AIA, Kihikihi, Maui, by Xamanek Researches, Pukalani, HI.
- Frederickson, Demaris 1995  
*Data Recovery Plan for Site 50-50-14-2496, Palaua Ahupua'a, Makana District, Maui Island (TMK: 2-1-11: 3)*. Prepared for SHIP-DLNR for Dowling Company, Inc., by Xamanek Researches, Pukalani.
- Frederickson, Erik M. August 1999  
*Memo on the Cultural Resources Present on a c. 1/2-acre Parcel of Land on Palaua Beach, Makana, Maui Island (TMK: 2-1-11: 19)*. Prepared at the request of Kai Makani, SHIPDBP.
- Govans, Alan 1993  
*Enchanted Fields: American Missionary Churches in Hawaii*. Department of Land and Natural Resources, State Historic Preservation Division, Honolulu.

RECEIVED AS FOLLOWS

RECEIVED AS FOLLOWS

- Gosser, D., S. Clark, and B. Dixon  
1993  
*No Lani'a O'ia'io Kona O Ka Moku: Excavations at the Southern Acreage and Lot 15, Wailea, Maui, Anthropology Department, Bishop Museum, Honolulu.*
- Lee-Grigg, Tanya  
May 2003  
*Archaeological Inventory Survey of the Chang Family Property, Keolu and Ka'ali Ahupua'a, Honua'ula, Maui, prepared for Mr. and Mrs. Joseph Noland, by Island Archaeology, Kahului, HI.*
- McCarthy, L., M. Dege, and R. Spear  
2000  
*An Archaeological Inventory Survey of C. 26,000 Square Feet, Located within the Ahupua'a of Keolu, Honua'ula, Molokai District, Maui Island (TMK: 2-1-07: 102 and portions of 8), prepared for Pacific Rim Land, by Schmittle Consultant Services, Inc., Honolulu.*
- Hoady, E.S., Craighill, E. Hoady and M.K. Pukui  
1972  
*Nāhāne Pūhāne In Oia'i Hawai'i: Their Life, Loss, and Enticement: Bishop Museum Publication 233, Bishop Museum Press, Honolulu.*
- Huau, Alan E.  
1987  
*Archaeological Field Inspection of the Embassy Suites Hotel Site, Wailea Resort, Land of Palaua, Molokai District, Island of Maui (TMK: 2-1-08: 87). PHRI Letter Report 336-072987. Prepared for Group 70.*
- Hony, Jack D., Alan T. Walker, and Paul H. Rosenzahn  
1992  
*Additional Archaeological Inventory Survey Testing for Additional Burial, Palaua Development Parcel, Land of Palaua, Molokai District, Island of Maui (TMK: 2-1-11: 3). Prepared for Eugene C. Hu, Project Manager, Projects International, Honolulu, by PHRI, Hilo (Report 1131-09191).*
- Jensen, P.M. and A.E. Haun  
1988  
*Archaeological Data Recovery Plan, Embassy Suites Hotel Site, Wailea Beach Resort, Land of Palaua, Molokai District, Island of Maui (TMK: 2-1-23: 3). PHRI Report 517-033189. Prepared for Landmark Suites of America, Inc. Waialua.*
- Juric, Sonia P., and James O. Juric, Editors  
1998  
*Atlas of Hawaii, 3rd Edition. Department of Geography, University of Hawaii-Hilo, University of Hawaii Press, Honolulu.*
- Kelly, M.  
1987  
*Background History of Alana'i 'Aupuni, Honua'ula, Maui, prepared for the 'Ohana o Makana.*
- Kamakau, Samuel M.  
1992  
*Riding Chiefs of Hawaii (Revised Edition), Kanehahameha Schools Press, Honolulu.*
- Kirch, P.V.  
1969  
*An Archaeological Survey of the Alexander and Baldwin Property Surrounding Wailea, Kihui, Maui. Ms. Dept. Anthropology, B.P. Bishop Museum.*
- 1970  
*Archaeological Excavations at Palaua, Southeast Maui. Ms. Dept. Anthropology, B.P. Bishop Museum.*
- Shapiro, W.A. and A.E. Haun
- 1989  
*Archaeological Reconnaissance Survey and Limited Surface Reconnaissance, Palaua Lands, Project Area, Land of Palaua, Molokai District, Island of Maui. PHRI Report 408-021788. Prepared for VMS Realty Partners, Waialua.*
- Sterling, Elsiebeth P.  
1998  
*Sites of Maui, Bishop Museum Press, Honolulu, Hawaii.*
- Toonjes, J., R. Nees, P. Cleghorn and L. Anderson  
1992  
*Archaeological Inventory Survey of Portions of Palaua Ahupua'a, Molokai District, Maui Hawaiian Islands, prepared for Palaua Partners, by Paul Cleghorn Consulting, Kailua, HI. [DRAFT]*
- Walker, Winlow  
1991  
*Archaeology of Maui, Manuscript at Maui Historical Society, Waialua, Maui, Hawaii.*
- Watson, Beth  
1972  
*Archaeological Survey, Palaua and Keolu Section Pilihi Highway, Island of Maui. Waikoi Enterprises Historic Preservation Report 72-1. Prepared for the Dept. of Transportation, Division of Highways, Honolulu.*
- Yoklavich, Ann  
1990  
*Preliminary Historical Documentary Research, Merroy Pacific Property, Palaua Ahupua'a, Molokai District, Island of Maui, in Shapiro and Haun, 1989*

RECEIVED AS FOLLOWS

**BETA** **BETA ANALYTIC INC.**  
 DR. MAL TAMERS RES. DR. DOG. HOOD  
 UNIVERSITY BRANCH  
 MAINE LABORATORY  
 PH: 334.737.7477 FAX: 334.737.7474  
 E-MAIL: beta@radiocarbon.com

**REPORT OF RADIOCARBON DATING ANALYSES**

Dr. Walter Fontana  
 Senanack Research  
 Report ID: H112781  
 Material Received: H112781

Sample Name	Measured Radiocarbon Age	1σ / 2σ Error	Conventional Radiocarbon Age (yr)
H112781-1 SAMPLE: P0001010101 ANALYSIS: Radiocarbon (Standardized) ANALYSIS PREPARATION: Standardized radiocarbon PREPARATION: 1 of 10 (100% of 100%)	21,000 ± 100 BP	± 100	18,000 ± 100 BP
H112781-2 SAMPLE: P0001010102 ANALYSIS: Radiocarbon (Standardized) ANALYSIS PREPARATION: Standardized radiocarbon PREPARATION: 1 of 10 (100% of 100%)	20,000 ± 100 BP	± 100	17,000 ± 100 BP
H112781-3 SAMPLE: P0001010103 ANALYSIS: Radiocarbon (Standardized) ANALYSIS PREPARATION: Standardized radiocarbon PREPARATION: 1 of 10 (100% of 100%)	19,000 ± 100 BP	± 100	16,000 ± 100 BP
H112781-4 SAMPLE: P0001010104 ANALYSIS: Radiocarbon (Standardized) ANALYSIS PREPARATION: Standardized radiocarbon PREPARATION: 1 of 10 (100% of 100%)	18,000 ± 100 BP	± 100	15,000 ± 100 BP
H112781-5 SAMPLE: P0001010105 ANALYSIS: Radiocarbon (Standardized) ANALYSIS PREPARATION: Standardized radiocarbon PREPARATION: 1 of 10 (100% of 100%)	17,000 ± 100 BP	± 100	14,000 ± 100 BP
H112781-6 SAMPLE: P0001010106 ANALYSIS: Radiocarbon (Standardized) ANALYSIS PREPARATION: Standardized radiocarbon PREPARATION: 1 of 10 (100% of 100%)	16,000 ± 100 BP	± 100	13,000 ± 100 BP
H112781-7 SAMPLE: P0001010107 ANALYSIS: Radiocarbon (Standardized) ANALYSIS PREPARATION: Standardized radiocarbon PREPARATION: 1 of 10 (100% of 100%)	15,000 ± 100 BP	± 100	12,000 ± 100 BP
H112781-8 SAMPLE: P0001010108 ANALYSIS: Radiocarbon (Standardized) ANALYSIS PREPARATION: Standardized radiocarbon PREPARATION: 1 of 10 (100% of 100%)	14,000 ± 100 BP	± 100	11,000 ± 100 BP
H112781-9 SAMPLE: P0001010109 ANALYSIS: Radiocarbon (Standardized) ANALYSIS PREPARATION: Standardized radiocarbon PREPARATION: 1 of 10 (100% of 100%)	13,000 ± 100 BP	± 100	10,000 ± 100 BP
H112781-10 SAMPLE: P0001010110 ANALYSIS: Radiocarbon (Standardized) ANALYSIS PREPARATION: Standardized radiocarbon PREPARATION: 1 of 10 (100% of 100%)	12,000 ± 100 BP	± 100	9,000 ± 100 BP

Once we received the sample (including any relevant information), we immediately began the analysis. The sample was analyzed using the standard procedure for radiocarbon dating. The results are reported in the table above. The error is 1σ (68% confidence) unless otherwise noted. The conventional radiocarbon age is calculated using the Libby half-life of 5568 years. The sample was analyzed using the standard procedure for radiocarbon dating. The results are reported in the table above. The error is 1σ (68% confidence) unless otherwise noted. The conventional radiocarbon age is calculated using the Libby half-life of 5568 years.

Appendix A

Beta Analytic, Inc.  
 Radiometric Analysis

RECEIVED AS FOLLOWS

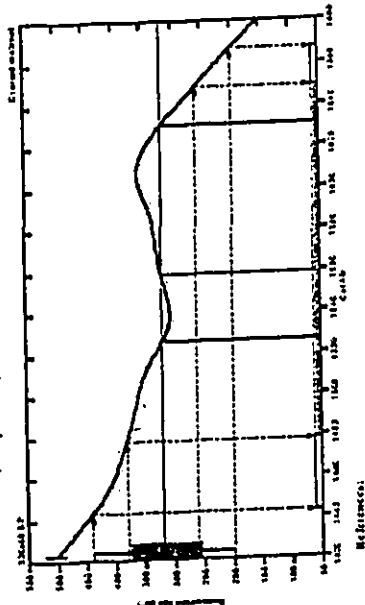
**CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS**

(Worksheet: C13C13-216, tab. tab. 1)

Laboratory number: Beta-184282  
Conventional radiocarbon age: 2160 ± 80 BP  
2 Sigma calibrated result: Cal AD 1410 to 1570 (Cal BP 510 to 350)  
(95% probability)

Intercept file

Intercept of radiocarbon age with calibration curve:  
Cal AD 1320 (Cal BP 620) and  
Cal AD 1540 (Cal BP 160) and  
Cal AD 1630 (Cal BP 370)  
1 Sigma calibrated result: Cal AD 1410 to 1570 (Cal BP 510 to 350)  
(95% probability)



References:

Calibration curves:  
Stuiver, M., & Reimer, P. M. (1993). Radiocarbon calibration curve for the last 8000 years. *Radiocarbon*, 35(3), 217-226.  
Stuiver, M., & Reimer, P. M. (1995). Radiocarbon calibration curve for the last 10,000 years. *Radiocarbon*, 37(3), 229-238.  
Stuiver, M., & Reimer, P. M. (1998). Radiocarbon calibration curve for the last 12,000 years. *Radiocarbon*, 40(3), 229-238.  
Stuiver, M., & Reimer, P. M. (2003). Radiocarbon calibration curve for the last 14,000 years. *Radiocarbon*, 45(3), 229-238.  
Stuiver, M., & Reimer, P. M. (2005). Radiocarbon calibration curve for the last 16,000 years. *Radiocarbon*, 47(3), 229-238.  
Stuiver, M., & Reimer, P. M. (2007). Radiocarbon calibration curve for the last 18,000 years. *Radiocarbon*, 49(3), 229-238.  
Stuiver, M., & Reimer, P. M. (2009). Radiocarbon calibration curve for the last 20,000 years. *Radiocarbon*, 51(3), 229-238.  
Stuiver, M., & Reimer, P. M. (2011). Radiocarbon calibration curve for the last 22,000 years. *Radiocarbon*, 53(3), 229-238.  
Stuiver, M., & Reimer, P. M. (2013). Radiocarbon calibration curve for the last 24,000 years. *Radiocarbon*, 55(3), 229-238.  
Stuiver, M., & Reimer, P. M. (2015). Radiocarbon calibration curve for the last 26,000 years. *Radiocarbon*, 57(3), 229-238.  
Stuiver, M., & Reimer, P. M. (2017). Radiocarbon calibration curve for the last 28,000 years. *Radiocarbon*, 59(3), 229-238.  
Stuiver, M., & Reimer, P. M. (2019). Radiocarbon calibration curve for the last 30,000 years. *Radiocarbon*, 61(3), 229-238.  
Stuiver, M., & Reimer, P. M. (2021). Radiocarbon calibration curve for the last 32,000 years. *Radiocarbon*, 63(3), 229-238.  
Stuiver, M., & Reimer, P. M. (2023). Radiocarbon calibration curve for the last 34,000 years. *Radiocarbon*, 65(3), 229-238.

Beta Analytic Inc.

10000 10000 Blvd, Suite 1000, Houston, TX 77036, USA  
Phone: 281-485-1100  
Fax: 281-485-1101  
Email: info@betaanalytic.com  
Website: www.betaanalytic.com

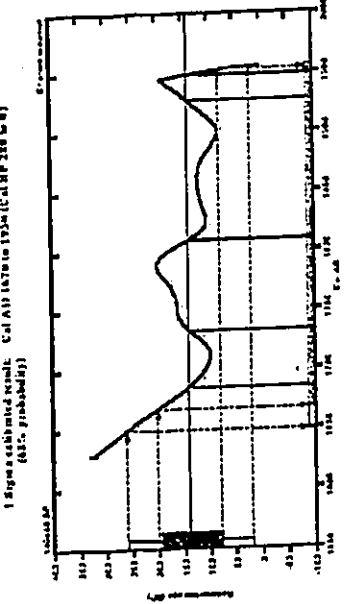
**CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS**

(Worksheet: C13C13-184282, tab. 1)

Laboratory number: Beta-184282  
Conventional radiocarbon age: 1840 ± 80 BP  
2 Sigma calibrated result: Cal AD 1630 to 1930 (Cal BP 260 to 0)  
(95% probability)

Intercept file

Intercept of radiocarbon age with calibration curve:  
Cal AD 1630 (Cal BP 260) and  
Cal AD 1930 (Cal BP 0) and  
Cal AD 1930 (Cal BP 0) and  
Cal AD 1930 (Cal BP 0)  
1 Sigma calibrated result: Cal AD 1630 to 1930 (Cal BP 260 to 0)  
(95% probability)



References:

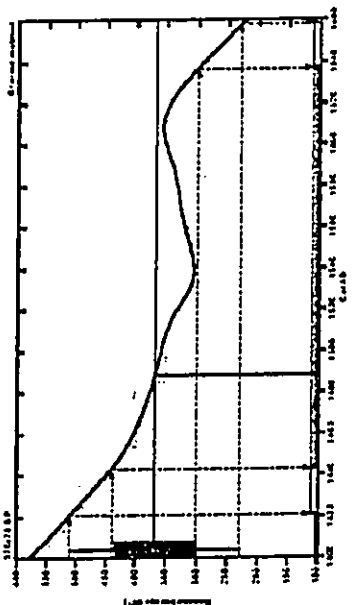
Calibration curves:  
Stuiver, M., & Reimer, P. M. (1993). Radiocarbon calibration curve for the last 8000 years. *Radiocarbon*, 35(3), 217-226.  
Stuiver, M., & Reimer, P. M. (1995). Radiocarbon calibration curve for the last 10,000 years. *Radiocarbon*, 37(3), 229-238.  
Stuiver, M., & Reimer, P. M. (1998). Radiocarbon calibration curve for the last 12,000 years. *Radiocarbon*, 40(3), 229-238.  
Stuiver, M., & Reimer, P. M. (2003). Radiocarbon calibration curve for the last 14,000 years. *Radiocarbon*, 45(3), 229-238.  
Stuiver, M., & Reimer, P. M. (2005). Radiocarbon calibration curve for the last 16,000 years. *Radiocarbon*, 47(3), 229-238.  
Stuiver, M., & Reimer, P. M. (2007). Radiocarbon calibration curve for the last 18,000 years. *Radiocarbon*, 49(3), 229-238.  
Stuiver, M., & Reimer, P. M. (2009). Radiocarbon calibration curve for the last 20,000 years. *Radiocarbon*, 51(3), 229-238.  
Stuiver, M., & Reimer, P. M. (2011). Radiocarbon calibration curve for the last 22,000 years. *Radiocarbon*, 53(3), 229-238.  
Stuiver, M., & Reimer, P. M. (2013). Radiocarbon calibration curve for the last 24,000 years. *Radiocarbon*, 55(3), 229-238.  
Stuiver, M., & Reimer, P. M. (2015). Radiocarbon calibration curve for the last 26,000 years. *Radiocarbon*, 57(3), 229-238.  
Stuiver, M., & Reimer, P. M. (2017). Radiocarbon calibration curve for the last 28,000 years. *Radiocarbon*, 59(3), 229-238.  
Stuiver, M., & Reimer, P. M. (2019). Radiocarbon calibration curve for the last 30,000 years. *Radiocarbon*, 61(3), 229-238.  
Stuiver, M., & Reimer, P. M. (2021). Radiocarbon calibration curve for the last 32,000 years. *Radiocarbon*, 63(3), 229-238.  
Stuiver, M., & Reimer, P. M. (2023). Radiocarbon calibration curve for the last 34,000 years. *Radiocarbon*, 65(3), 229-238.

Beta Analytic Inc.

10000 10000 Blvd, Suite 1000, Houston, TX 77036, USA  
Phone: 281-485-1100  
Fax: 281-485-1101  
Email: info@betaanalytic.com  
Website: www.betaanalytic.com

**CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS**

(Variable C12/C13 - 13.2 pp. perm. †)  
 Laboratory number: B10-180285  
 Conventional radiocarbon age: 2762 ± 28 BP  
 2 sigma calibrated results: Cal AD 1426 to 1459 (Cal BP 239 to 219)  
 (95% probability)  
 Laboratory Data  
 Laboratory of Radiocarbon Age  
 with calibration center: Cal AD 1496 (Cal BP 106)  
 1 sigma calibrated results: Cal AD 1436 to 1446 (Cal BP 210 to 210)  
 (95% probability)

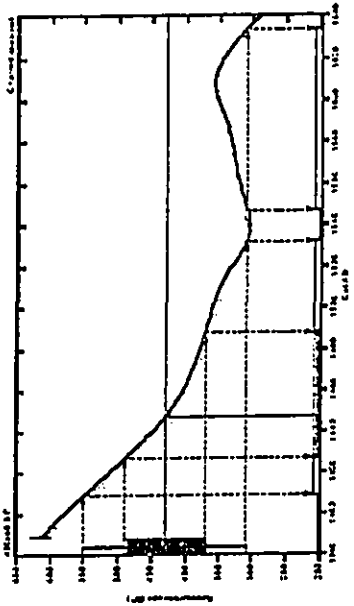


**References:**  
 Stuiver, M., & Reimer, P. M. (1986). Radiocarbon Age Calibration (AD 1950-1400). *Radiocarbon*, 28(2), 103-128.  
 Stuiver, M., & Reimer, P. M. (1993). Radiocarbon Age Calibration (AD 1950-2600). *Radiocarbon*, 35(2), 175-186.  
 Stuiver, M., & Reimer, P. M. (2005). Radiocarbon Age Calibration (AD 1950-11.0 ka). *Radiocarbon*, 47(3), 361-376.  
 Stuiver, M., & Reimer, P. M. (2006). Radiocarbon Age Calibration (AD 1950-14.0 ka). *Radiocarbon*, 48(3), 309-317.  
 Stuiver, M., & Reimer, P. M. (2009). Radiocarbon Age Calibration (AD 1950-24.0 ka). *Radiocarbon*, 51(3), 336-350.  
 Stuiver, M., & Reimer, P. M. (2013). Radiocarbon Age Calibration (AD 1950-50.0 ka). *Radiocarbon*, 55(4), 769-783.

**Beta Analytic Inc.**  
 4840 NE 17th Street, Suite 100, Miami, FL 33179  
 Phone: 305-675-3333  
 Fax: 305-675-3334  
 Email: beta@betaanalytic.com  
 Website: www.betaanalytic.com

**CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS**

(Variable C12/C13 - 13.1 pp. perm. †)  
 Laboratory number: B10-180289  
 Conventional radiocarbon age: 4262 ± 30 BP  
 3 sigma calibrated results: Cal AD 1419 to 1436 (Cal BP 548 to 431) and  
 (95% probability) Cal AD 1558 to 1638 (Cal BP 306 to 226)  
 Laboratory Data  
 Laboratory of Radiocarbon Age  
 with calibration center: Cal AD 1436 (Cal BP 306)  
 1 sigma calibrated results: Cal AD 1426 to 1436 (Cal BP 239 to 210)  
 (95% probability)



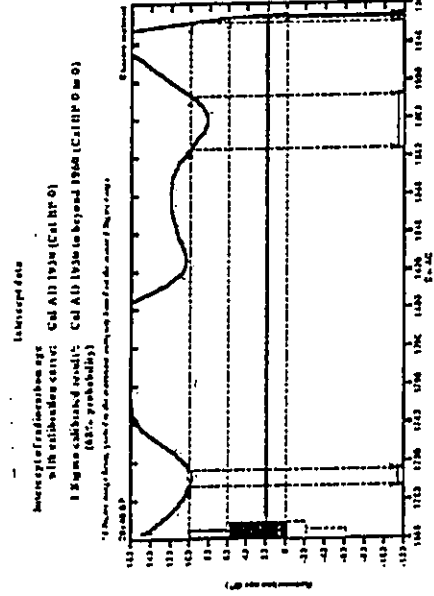
**References:**  
 Stuiver, M., & Reimer, P. M. (1986). Radiocarbon Age Calibration (AD 1950-1400). *Radiocarbon*, 28(2), 103-128.  
 Stuiver, M., & Reimer, P. M. (1993). Radiocarbon Age Calibration (AD 1950-2600). *Radiocarbon*, 35(2), 175-186.  
 Stuiver, M., & Reimer, P. M. (2005). Radiocarbon Age Calibration (AD 1950-11.0 ka). *Radiocarbon*, 47(3), 361-376.  
 Stuiver, M., & Reimer, P. M. (2006). Radiocarbon Age Calibration (AD 1950-14.0 ka). *Radiocarbon*, 48(3), 309-317.  
 Stuiver, M., & Reimer, P. M. (2009). Radiocarbon Age Calibration (AD 1950-24.0 ka). *Radiocarbon*, 51(3), 336-350.  
 Stuiver, M., & Reimer, P. M. (2013). Radiocarbon Age Calibration (AD 1950-50.0 ka). *Radiocarbon*, 55(4), 769-783.

**Beta Analytic Inc.**  
 4840 NE 17th Street, Suite 100, Miami, FL 33179  
 Phone: 305-675-3333  
 Fax: 305-675-3334  
 Email: beta@betaanalytic.com  
 Website: www.betaanalytic.com



**CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS**

(Variable: C13/C12--12.2, lab. each 1)  
 Laboratory number: Beta-18239  
 Conventional radiocarbon age: 2840 BP  
 2 Sigma calibrated results: Cal AD 1718 to 1728 (Cal BP 340 to 230) and  
 95% probability) Cal AD 1888 to 1918 (Cal BP 20 to 10) and  
 95% probability) Cal AD 1938 to beyond 1968 (Cal BP 0 to 0)



Intercept date  
 Intercept of radiocarbon age  
 with calibrated curve: Cal AD 1938 (Cal BP 0)  
 1 Sigma calibrated result: Cal AD 1938 to beyond 1968 (Cal BP 0 to 0)  
 95% probability)  
 2 Sigma calibrated results: Cal AD 1718 to 1728 (Cal BP 340 to 230) and  
 95% probability) Cal AD 1888 to 1918 (Cal BP 20 to 10) and  
 95% probability) Cal AD 1938 to beyond 1968 (Cal BP 0 to 0)

Beta Analytic Inc.  
 7410 W. Sunset Blvd. Suite 2004 Los Angeles, CA 90045  
 (310) 441-2041  
 www.betaanalytic.com

RECEIVED AS FOLLOWS

Appendix B


Library	Geological Engineering	LAWSON SITES FOR RURAL FRIER OPTIC LINES - PHASE II STATE OF HAWAII (8 BUNDLES)	Logid Boring M-3	Approximate Ground Surface Elevation:		Description
				(ft)	(m)	
UC-100 1/10 1/10				30.5	9.3	Black and Brown MALLATIVE GRAVEL with sand (local origin)
			20	6.1	Light brown and grey MALLATIVE GRAVEL, heavily fractured, moderately well-sorted, hard (dense) (local origin)	
			13	3.9	Black and brown MALLATIVE GRAVEL with sand (local origin)	
			33	10.1	Light brown and grey MALLATIVE GRAVEL, heavily fractured, moderately well-sorted, hard (dense) (local origin)	
			33	10.1	Black and brown MALLATIVE GRAVEL with sand (local origin)	


  

Date Started: January 15, 2003	Water Level: 2	Not Encountered
Date Completed: January 15, 2003	Drill Pipe: MOBILE 843	
Logged By: F. Meyer	Drilling Purpose: 4" Auger & HQ Coring	
Total Depth: 30 feet	Drilling Energy: 140 B. W. 30 ft. drop	
Work Order: 4174-0010		

DRAFT

RECEIVED AS FOLLOWS

 <b>GEOLABS, INC.</b> Geotechnical Engineering		<b>LANDING SITES FOR RURAL FIBER OPTIC LINES - PHASE B</b> STATE OF HAWAII (8 ISLANDS)			Log of Boring <b>M-4</b>	
Lab	Field	Depth (ft)	Soil Description	Approximate Ground Surface Elevation	Soil Classification	Notes
UC-0000	3	3	Very brown fine SAND, medium dense, dry			
	3	11	Black soil with brown fine SAND ALSO BARRELING GRAVEL, medium dense, moist			
	6	13	Gray and brown SILTY, moderately fissured, slightly weathered, hard (best formation)			
	12	16	1010			
	17	17	Reddish brown SANDY GRAVEL, with some SL, very loose, wet (dense)			
UC-4200	40	17	Gray medium SAND, moderately to heavily fissured, moderately to slightly weathered, hard (best formation)			
	43	0	Gray SILTY, strongly fissured, moderately weathered, hard to very hard (best formation)			
	47	06	Gray SILTY, slightly fissured with vertical cracks, slightly weathered, hard (best formation)			
UC-4800	100	62	Gray SILTY, massive to slightly fissured with vertical cracks, slightly weathered, hard (best formation)			
UC-4900	100	100	Gray slightly weathered SAND, massive, slightly weathered, hard to very hard (best formation)			
UC-5000						
UC-5100						
UC-5200						
UC-5300						
UC-5400						
UC-5500						
UC-5600						
UC-5700						
UC-5800						
UC-5900						
UC-6000						
Date Borehole: January 16, 2003 Date Completed: January 16, 2003 Logged By: F. Meyer Total Depth: 41.8 feet Work Order: 4773-000(B)			Water Level: 3 Not Encountered Drill Rig: MOBILE B-3 Driving Method: C Auger, C Cutting, S HG Coring Driving Energy: 140 ft. wt., 20 ft. drop			

 <b>GEOLABS, INC.</b> Geotechnical Engineering		<b>LANDING SITES FOR RURAL FIBER OPTIC LINES - PHASE B</b> STATE OF HAWAII (8 ISLANDS)			Log of Boring <b>M-4</b>	
Lab	Field	Depth (ft)	Soil Description	Approximate Ground Surface Elevation	Soil Classification	Notes
UC-0000	3	3	Very brown fine SAND, medium dense, dry			
	3	11	Black soil with brown fine SAND ALSO BARRELING GRAVEL, medium dense, moist			
	6	13	Gray and brown SILTY, moderately fissured, slightly weathered, hard (best formation)			
	12	16	1010			
	17	17	Reddish brown SANDY GRAVEL, with some SL, very loose, wet (dense)			
UC-4200	40	17	Gray medium SAND, moderately to heavily fissured, moderately to slightly weathered, hard (best formation)			
	43	0	Gray SILTY, strongly fissured, moderately weathered, hard to very hard (best formation)			
	47	06	Gray SILTY, slightly fissured with vertical cracks, slightly weathered, hard (best formation)			
UC-4800	100	62	Gray SILTY, massive to slightly fissured with vertical cracks, slightly weathered, hard (best formation)			
UC-4900	100	100	Gray slightly weathered SAND, massive, slightly weathered, hard to very hard (best formation)			
UC-5000						
UC-5100						
UC-5200						
UC-5300						
UC-5400						
UC-5500						
UC-5600						
UC-5700						
UC-5800						
UC-5900						
UC-6000						
Date Borehole: January 16, 2003 Date Completed: January 16, 2003 Logged By: F. Meyer Total Depth: 41.8 feet Work Order: 4773-000(B)			Water Level: 3 Not Encountered Drill Rig: MOBILE B-3 Driving Method: C Auger, C Cutting, S HG Coring Driving Energy: 140 ft. wt., 20 ft. drop			

RECEIVED AS FOLLOWS

Appendix C  
Photographs

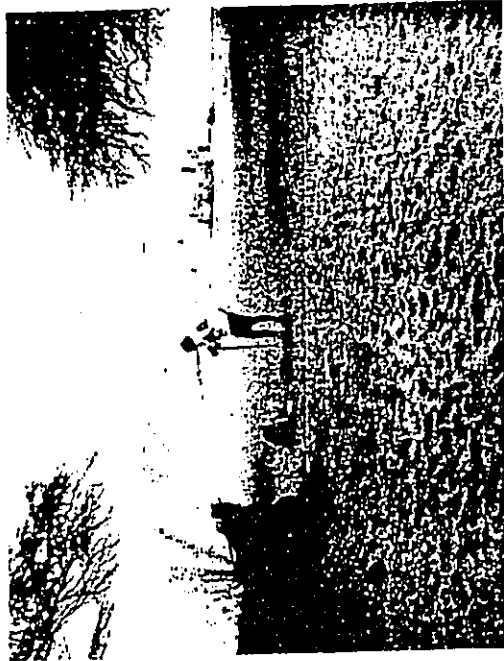


Photo 1 - Auger testing in backhoe trench corridor. View to the southwest.

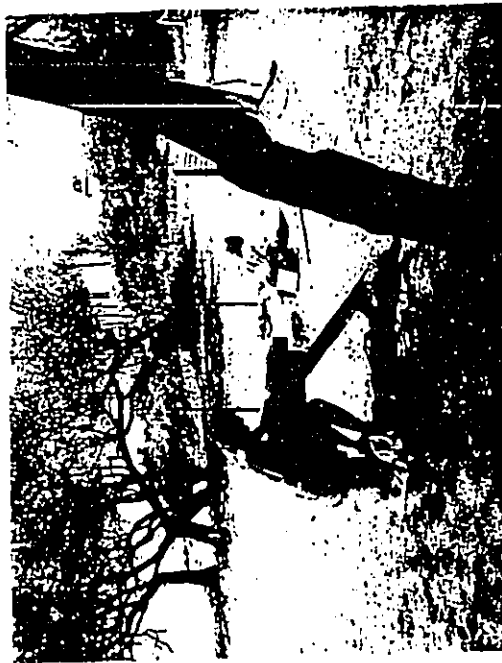


Photo 2 - TU1 excavation in process prior to expansion. View to the northwest.



Photo 3 - General view of project area looking southwest. TU1 in process.

RECEIVED AS FOLLOWS



Photo 6 - TU 1 excavation complete—view of southwest face. (Trowel point indicates north).



Photo 4 - TU 1 excavation—view of southeast wall.



Photo 5 - View of southeast corner showing portion of F 1.8 pavement.

RECEIVED AS FOLLOWS

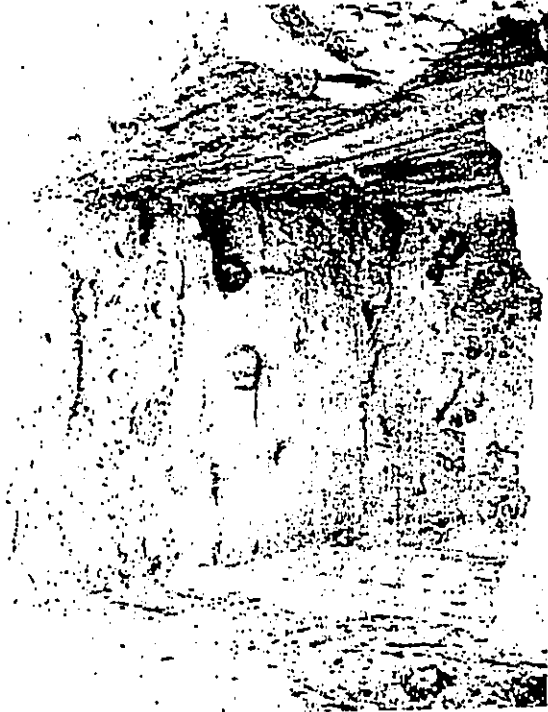


Photo 8 - Test Unit 2—view of north wall profile.

Appendix C 6

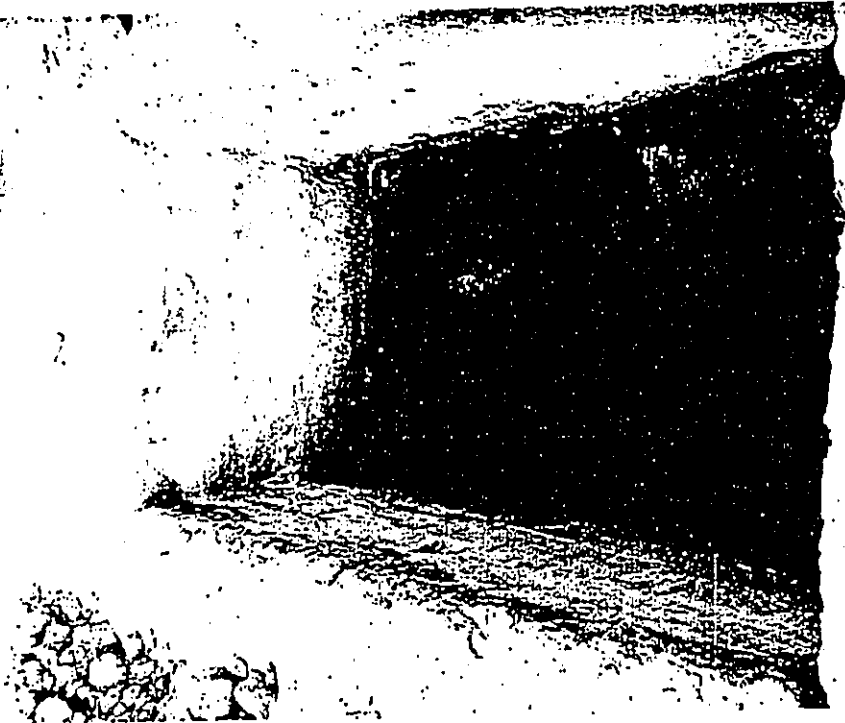


Photo 7 - Completed TU 1 excavation—looking to the northeast.

Appendix C 5

RECEIVED AS FOLLOWS

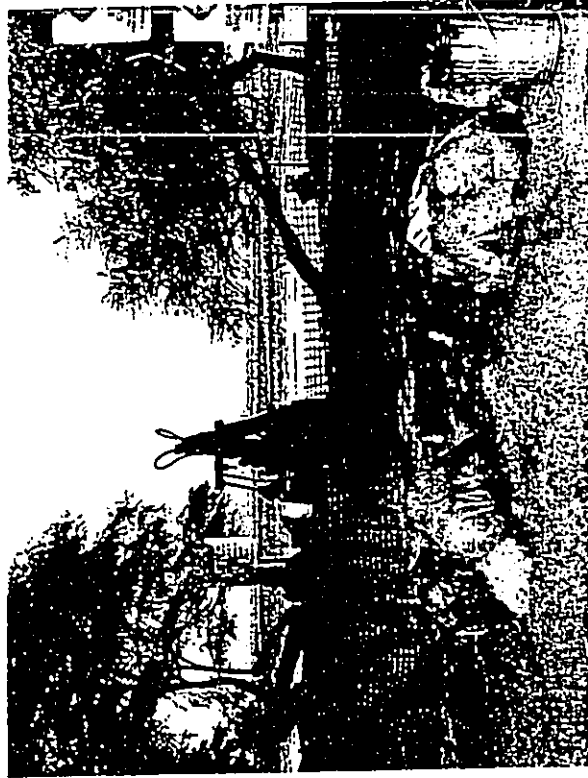


Photo 10 - General view of project area looking to the southwest. Backhoe trench excavation beginning. Photo taken from the parking lot. M4 on boulders indicates the earlier soil bore testing location.

Appendix C

8

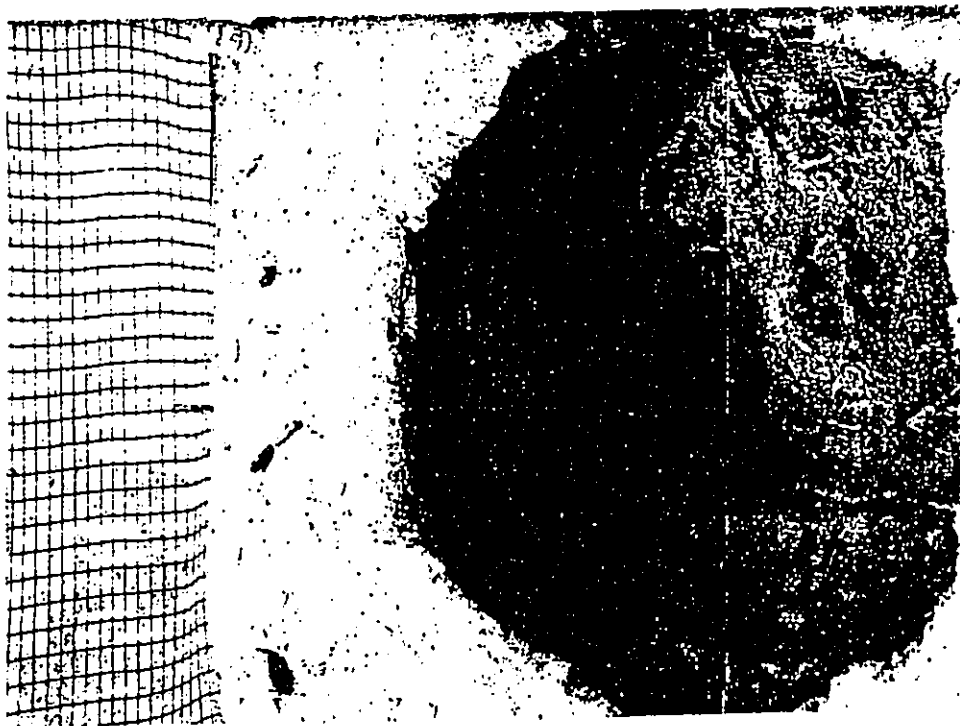


Photo 9 - Test Unit 3 excavation in process. Note collapse both north and south faces.

Appendix C

7

RECEIVED AS FOLLOWS



Photo 11 - Backhoe trench excavation in process—looking to the southwest.

Appendix C

9



Photo 12 - View of southeast face of backhoe trench showing Feature 1 dog burial in center—taken just before wall collapsed.

Appendix C

10

RECEIVED AS FOLLOWS



Photo 15 - Trench excavation nearly complete. Note large tree stump in center of trench. View to the southwest.



Photo 13 - Portion of Section 3 prior to collapse.

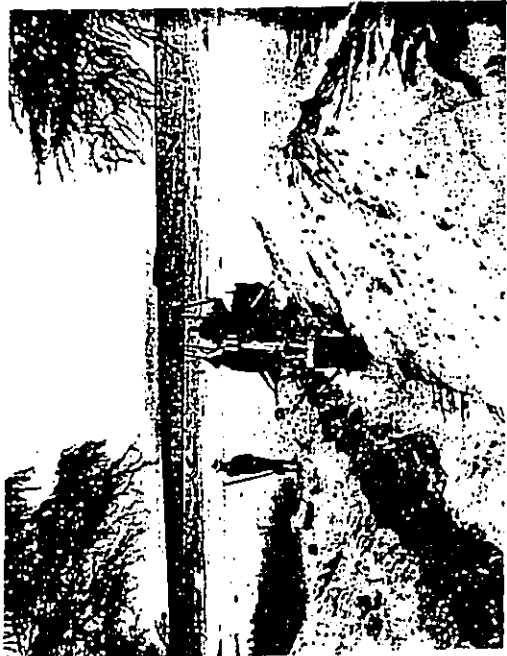


Photo 14 - Excavation of Section 7—showing general unstable condition of sand.



RECEIVED AS FOLLOWS

Cultural Impact Study (CIS) & Assessment  
SIC Submarine Fiber Optic Cable Project  
Kawaihae I Ahupua'a  
District of South Kohala, Hawaii I  
[TMK: 6-1-04: por 20]



Cover Page: View of Kawaihae Harbor from project site.  
All photos unless otherwise cited are by the author.

Prepared for  
Haun & Associates  
Parsons Brinckerhoff  
Sandwich Isles Communications, Inc. (SIC)

By Maria E. Ka'imipano Orr  
June 16, 2003  
Revised August 20, 2003

RECEIVED AS FOLLOWS

#### EXECUTIVE SUMMARY

At the request of Haun & Associates a Cultural Impact Assessment/Study (CIS) for Sandwich Isle Communications, Inc. Submarine Fiber Optic Cable Project, (TMK: 6-1-04; por 20) drill site 2 location in the *ahupua'a* of Kawaihae I, South Kohala, Hawaii Island, was conducted between April to June 2003. This study was part of larger studies prepared by Haun & Associates [Archaeological Inventory Study] and Parsons Brinckerhoff [Environmental Assessment].

This study is in compliance with Act 50 S.L.H. 2000 (HB 2895 H.D.1) as it amends the State of Hawaii Office of Environmental Quality Control (OEQC) Guidelines for Environmental Impact Statement law [Chapter 343, HRS]. To this end, the targeted "audience" of this report are the people who will be reviewing it. Therefore, it was written with this in mind and includes an overview of the history of Kawaihae within the broader context of the greater Hawai'i Island and Hawai'i in general. The literature review included *mo'olelo* or Hawaiian stories and legends of the vicinity, ethno-historic works from the 19<sup>th</sup> and early 20<sup>th</sup> centuries, other pertinent archival material, and an Internet search.

This study included one extensive interview, two mini interviews (their request) and five impromptu interviews. A preliminary assessment concluded that these lands have been heavily impacted and modified by light house construction in 1869 and 1915; ranching activity in the 1930-50s; World War II activity in the 1940s; the construction activity of nearby Kawaihae Harbor complex in the 1950s and 1960s; and DIIIL subdivision construction in the 1960s. However the area (Kawaihae *Ahupua'a*) was once part of a thriving Hawaiian community from pre-contact through modern historic times, and still has a number of significant cultural remains in the *makaai* (mountain direction) lands and neighboring *ahupua'a* (traditional land division).

#### ACKNOWLEDGEMENTS

This project could not have been completed without the assistance, support and *mana'o* of my ethnographic consultants: William Ahiyou Akau "Papa Akau," Mrs. Mabel Tolentino "Kupuna Mabel," and Mr. Donald Tolentino "Kupuna Donald" for taking the time to be interviewed.

Mahalo also to the following people who answered impromptu questions regarding Kawaihae, the canoe club and fishing: Coach Manny Veincent, Assistant Coach Ron Auwae, Mr. Kenneth Demaya, Mr. Alfred Berdon, Sr., and two fishermen who wish to remain anonymous.

Special mahalo to Kupuna Mail and Ikaika Napolcon for their hospitality; to Ms. Mary Villaire for her hospitality; NPS Staff Supervisor Daniel Kaiaica, Jr. for his kotus; to Uncle Mel Kalahiki for trying; and to Jessica Orr for technical support.

Additional mahalo also goes out to SHPD archaeologists Dr. Pat McCoy; Dr. Sara Collins and Muffet Jourdane for their continuing help; and to the staff of Bishop Museum Archives, especially DeSoto and Ron.

And last but certainly not least, a big MAHALO to Dr. Alan Haun of Haun & Associates for allowing me to do the CIS.

MAHALO!

RECEIVED AS FOLLOWS

TABLE OF CONTENTS

INTRODUCTION	1	D. Historic References	44
SCOPE OF WORK	1	D-1. History of Land Divisions	44
PART I: PROJECT AREA	3	D-2. Land Commission Awards (LCA)	45
Project Location	3	D-3. Kawahae	45
Geology	7	D-3-a. Kawahae Canoe Club	46
Flora	7	D-3-b. Kawahae Surf	48
Fauna	9	D-3-c. Kawahae Landing	48
PART II: METHODS	10	D-3-d. Kawahae Bay & Harbor	49
Personnel	10	D-3-e. Kawahae Fishing Practices and Concerns	51
Level of Effort	10	D-3-f. Kawahae Salt Pans	51
Theoretical approach	10	D-3-g. Kawahae Ujehouse	53
Archival Research	10	D-3-h. TMK: 6-1-04; por 20 (former parcel 2)	55
Consultant Selection	11	D-4. Pu'u Kohala	57
Interview Process	11	D-5. Mailekini and Hale-o-Kapuni Heiau	59
Ethnographic Interview Procedures	11	D-6. Palikane	60
Transcribing Process	11		
Analysis Process	11		
Research Problems	11		
PART III: CULTURAL & HISTORICAL BACKGROUND REVIEW	12	E. Previous Archaeology and Other Studies	61
A. Models of Hawaiian Chronology	12	Sokes (1906/1907 - pub 1991)	61
B. An Overview of Human Impact, Settlement and Socio-economic Development in North Kohala in the context of Greater Hawaii	13	United States, Army, Corps of Engineers (1949).	61
B-1. Colonization Period (AD 300-600)	13	Rath (1957)	61
B-2. Developmental Period (AD 600-1100)	13	Territorial Highway Dept., Hawaii (1938)	61
B-3. Expansion Period (AD 100-1650)	14	Hiland Bartholomew & Associates (1959).	61
B-4. Proto-Historic Period (1659-1795)	14	Tedor Engineering Company (1961).	61
B-5. Early Historic Period (AD 1795-1900)	15	Tedor Engineering Company (1962)	62
B-6. Territorial History (AD 1900-1949)	21	Waimea-Kawahae Community Association, Economic Development Committee (1963).	62
B-7. Modern History (AD 1950-)	29	Soehren (1964a)	62
C. Traditional Literature	32	Soehren (1964b)	62
C-1. Genealogies	32	Brafeld and Chubbam (1967)	62
C-1-a. Kumuhoua	33	Ukooowa (1967).	62
C-1-b. Kumulipo	33	Rock (1968)	62
C-1-c. <i>Ihauilan</i> Genealogies	35	Chung and Rosendahl (1968).	63
C-2. Mo'olelo	36	Adams (1969)	63
C-2-a. History of Mo'olelo Collecting	37	Ching, Cluff and Eiley (1969).	63
C-2-b. <i>Mo'olelo</i> Review Sources	38	Cluff, Kikuchi and Apple (1969).	63
C-3. Māle and 'Ōi	40	Apple (1969)	63
C-4. 'Ōiolo No'ea	40	Fotbes, Goodell and Larsen (1969).	63
C-4. Place Names	42	Severance (1970).	63
		Chung (1971).	63
		Sullivan, Gerritsen and James (1972).	63
		Barrera (1973).	63
		Kelly and Kelly (1974).	63
		Kirch (1974).	64
		Luccomb (1974).	64
		Neighbor Island Consultants (1974).	64
		R.M. Towill Corporation (1976).	64
		Malinowski (1977).	65
		Apple (1978)	65
		Ocean Research Consulting & Analysis, Ltd. (1978)	65
		McElowney (1979).	65
		Cruz-Fix Hawaii Corp. (1981)	65
		Pyle (1982).	65
		Soehren, et al. (1980).	65
		Clark and Welch (1981).	65
		Clark (1981)	65
		Kirch, Clause and Atkins [Ed] (1981)	65

RECEIVED AS FOLLOWS

Rosenzahn (1981).	65	B-2.b. Stuffed Foods	80
Clark (1983a).	65	B-3. Project Leads.	80
Clark (1983b).	65	B-4. Puulo Neighborhood	80
Allen (1985a)	66	B-5. Fauna	81
Allen (1985b)	66		
Woodley, Miyabara & Associates (1985)	66		
Allen (1986).	66	C. Water Resources & Uses	81
Clark (1986).	66	C-1. Water System	81
Halbig (1986).	66	C-2. Stream Water	81
Ladd (1986).	66	C-3. Stream Names	81
Allen (1987).	66		
n.a. (1987).	67	D. Marine Resources & Uses	81
Rosenzahn and Carter (1988).	67	D-1. Fishponds	81
Carter (1989).	67	D-2. Fishing & Gathering	83
Hawaii Harbors Division (1989)	67	D-3. Limu Gathering	84
Hammati and Shiedler (1990).	67	D-4. Crabbing	84
U.S. Dept of Commerce (1990)	68	D-5. Fishing Styles and Types of Fish	85
Hammati (1991).	68	D-6. Kawahae Harbor	85
Hammati, Shiedler, Borthwick, Stride, McDermott and Nakamura (1991a).	68	D-7. Currents of Kawahae Bay & Vicinity	86
Hammati and Shiedler (1991a).	68	E. Project Concerns	86
Hammati, Shiedler, Borthwick, Stride, McDermott, Nakamura (1991b)	68	E-1. Makana Ka'Alina and Ocean	87
Schuster (1992).	69	E-2. High Surf	87
R.M. Towill Corporation (1992).	70	E-3. Project	87
Groze (1993).	70		
U.S. Fish and Wildlife Service (1993).	70	F. Traditions or Cultural Practices	88
Langlas (1994).	71	F-1. Naming Tradition	88
Halbig (1994).	71	F-2. Cultural Sites and Resources	88
Llops and Sharp ( 1994).	71		
Walker and Rosenzahn (1994).	71	G. Anecdotal Stories.	88
Walker & Rosenzahn, (1995).	72	G-1. The Whistling Story	89
Maly (1999).	72	G-2. Drifting at Sea Story	89
Bothwick, Chingioji and Hammati (2000)	73	G-3. Fishing Story	89
Haua, Henry and Orr (2003)	73	G-4. Akama'i Kipuna	90
	73	G-5. Queen's Connection Story	90
	73	G-6. Hupu'a Ala Hike Battle	91
	74		
	74	PART V. SUMMARIES & CULTURAL IMPACT ASSESSMENT	92
	74	Summary of Significant People and Events	92
	74	Mythical Entities	92
	75	Alii Fani	92
	76	Historic People	92
	77	Significant Events	93
	77	Summary of Resources and Use	93
	77	Ancient Land Use	93
	77	Historic Land & Marine Resources and Use	93
	77	Water Resources and Use	94
	78	Cultural Impact Study (CIS) Assessment/Recommendations	94
	78		
	79	REFERENCES CITED/REVIEWED	95
	79		
	79		
	79		
	79		
	79		
	79		
	79		
	80		
	80		
	80		

RECEIVED AS FOLLOWS

LIST OF APPENDICES

A.	Act 50 SLHF 2000 (HB 2893 H.D.1)	111
B.	Scope Of Work (SOW)	112
C.	OEQC Guidelines for Assessing Cultural Impacts (1997)	113
D.	Informed Consent/ Agreement To Participate Form	116
E.	Ethnographic Research Instrument	119
F.	LCA List (Hauu et al., 2003)	121
G.	Tax Map History	122
H.	Signed Consent Forms	123
I.	Signed Release Forms	124

LIST OF FIGURES

1.	TMK: 6-1-04: por 20, in former parcel 2 [arrow] (adapted from Hauu 2003)	3
2.	Abupua'a of Kawaihae 1 in South Kohala (adapted from Lauglas 1994:14)	4
3.	Kawaihae DHHL Site 2 (provided by Parsons Brinckerhoff 2003).	5
4.	Project site in relation to various sites and places in Kawaihae Village [adapted from Hamman 1991:V-13].	6
5.	1819 map of Kawaihae coastline by Louis DuFerry (Cahill 1999:103).	24
6.	Hawaiian Home Lands - Hawaii Island (DHHL 2003).	30
7.	Map indicating sites on project lands (adapted from Hamman et al., 1991a/c).	54
8.	Map of Kohala District Heiau Sites (Stokes 1991).	61
9.	1883 Map showing sand beach (Jackson in Kelly 1974).	82

RECEIVED AS FOLLOWS

LIST OF TABLES

1. Hawaii Line extracted from McKenzie (1983, 1986) and Kamakau (1992).
2. Annotated place names of Kawaihae lands and vicinity.
3. Consultant Demographics in relation to Kawaihae
4. Marine Resources of Kawaihae (according to Papa William Akau)
5. Cultural Impact Assessment of Kawaihae Cultural Properties/Practices

LIST OF PHOTOGRAPHS

	Cover
1. View of Kawaihae Harbor from project site	2
2. Fishermen parked on road bisecting project area.	7
3. Project area with rocky coastline	7
4. Remnants of historic structure.	7
5. Remnants of historic pier.	7
6. Kiawe and grass dominate project area (Haus 2003)	9
7. Kawaihae Canoe Club at north end of the harbor	47
8. Canoe paddlers not made by Coach Veincent anymore	47
9. Club canoes made by Coach Veincent	47
10. Coach & club president Veincent next to canoe he is finishing	47
11. Kawaihae Harbor [S] from just below Pe'u Kohola showing breakwater	50
12. Canoe Club in view of harbor	52
13. View of Lighthouse and project site (Veillet 2001)	53
14. Kawaihae Lighthouse adjacent to project parcel	53
15. Bishop Museum Photo (cropped photocopy) ca. 1960s clearly shows the pier	55
16. Sign in kiawe/grass grove	55
17. Various types of trash in project area	55
18. Fishermen camping at project site historic ruins	56
19. Fishermen jet around the cinder berm	56
20. Remnants of the old pier	56
21. Historic remnants of old pier	56
22. Wall of unknown age	56
23. Pe'etohola Heiau mauna of Mailekini Heiau and Hale-o-Kapuni (Shark) Heiau	57
24. Grass-thatched house; Emma's birthplace (Bishop Museum photo from Kelly 1974)	60
25. Kula lands of Kawaihae looking north	73
26. William Ahyou Akau "Papa Akau"	75

INTRODUCTION

At the request of Haun & Associates a Cultural Impact Study & Assessment (CIS) for Sandwich Isle Communications, Inc. Submarine Fiber Optic Cable Project, (TMK: 6-1-04; por 20, which includes former parcel 2) drill site 2 location in the *ahupua'a* of Kawaihae I, South Kohala, Hawaii Island, was conducted between April to June 2003. A follow-up to this study was conducted in August 2003. The CIS is part of larger studies prepared by Haun & Associates (Archaeological Inventory Study) and Parsons Brinckerhoff (Environmental Assessment). For the sake of continuity, the project will be referred to as 'Fiber Optics CIS' and the project site as 'Kawaihae Drill Site 2' or 'project site/area.' According to Haun & Associates, this cultural impact study is a *low level of effort* [1-3 oral histories and limited background research], due primarily to the already heavily impacted and modified site location.

The purpose of this CIS was to gather information about traditional cultural practices, ethnic cultural practices and pre-historic and historic cultural remains that may be affected by the implementation of the development project. This study is in compliance with Act 50 S.L.H. 2000 (HB 2895 H.D.1) [Appendix A] as it amends the State of Hawaii Environmental Impact Statement law [Chapter 343, HRS] to include:

*effects on the cultural practices of the community and State. Also amends the definition of "significant effect" to include adverse effects on cultural practices.*

This report is organized into five parts. Part I describes the project area in terms of location, in the context of *ahupua'a*, district and island, as well as a generalized description of the natural environment (geology, flora and fauna). Part II explains the methods and constraints of this study. Part III summarizes the review of the traditional and historical literature in the context of the general history of Hawaii, the island of Hawaii, the district of South Kohala, and the local history of Kawaihae as it pertains to cultural resources, land, water and marine resources and use in the project area. Part IV presents the analysis of the ethnographic survey based on the supporting data (oral history transcripts). Part V summarizes the findings of this cultural impact assessment/study.

SCOPE OF WORK

The scope-of-work (SOW) [Appendix B] was based on the OEQC Guidelines for Assessing Cultural Impacts (1997) [Appendix C] and focuses on three cultural resource areas (traditional, historical and archaeological), conducted on two levels: archival research (literature review) and ethnographic survey (oral histories). Since independent contractors have already conducted the archaeological inventory survey of Kawaihae, this study will only include brief summaries of previous archaeological studies of the project area and vicinity, focusing on information regarding cultural/historical significance. [*level of effort is clarified in these Guidelines.*]

Scope of Work: Cultural Impact Study & Assessment [in accordance with OEQC Guidelines]

1. identify and consult with individuals with expertise concerning the types of cultural resources, practices and beliefs found within the broad geographical area, e.g., district or *ahupua'a*; or with knowledge of the area potentially affected by the proposed action;
2. receive information from or conduct ethnographic interviews and oral histories with person(s) having knowledge of the potentially affected area;
3. conduct ethnographic, historical, anthropological, and other culturally related documentary research;
4. identify and describe the cultural resources, practices and beliefs located within the potentially affected area; and
5. assess the impact of the proposed action on the cultural resources, practices and beliefs identified.

27. Former site of the Alau homestead	75
28. Tomb of George Huon Davis	76
29. Ohai'ole or Spencer Beach	85
30. Two archaeologists at Mauna Kea Hoel/Hapuna Beach	86
31. Nearby Hapuna Beach with tidal pools.	90
32. Hapuna Beach at Sunset	91
33. Hapuna Beach at Sunset	91

Research on traditional resources entailed a review of the literature of Hawaiian *mo'olelo* (stories, legends or oral histories) of late nineteenth and early twentieth century ethnographic works, and interviews with knowledgeable consultants who met one of the following consultant criteria:

- ◆ Referred By Office of Hawaiian Affairs (OHA) Staff
- ◆ Halohas Ties to Project Locations
- ◆ Known Hawaiian Cultural Resource Person
- ◆ Known Hawaiian Traditional Practitioner
- ◆ Referred By Other Cultural Resource People
- ◆ Referred By Staff of Pe'a u Kohala National Park

Historic research focused on the ranching influence. Literature from the following institutions were reviewed: State Historic Preservation Division Library; University of Hawai'i-Maui Hamilton Library; Hawaiian Collections; Bishop Museum Archives and Library; Waikona 'Aina Corp; information from State Bureau of Conveyances; personal library; and Internet searches.

Archaeological research entailed a limited review of the literature located in the DLNR State Historic Preservation Division library; reports from Jaum & Associates; and site visits.



Photo 2. Fishermen parked on road bisecting project area.

## PART I: PROJECT AREA

### Project Location

The project site is located in TMK: 6-1-04; par 20 (in the former parcel 2) in the *ahupua'a* of Kawaihewa I, *mo'okai* or district of South Kohala, Island of Hawai'i (Figure 1 and 2). The Fiber Optic project site (Figures 3 and 4) is on the coast (5 - 40 ft elevation) adjacent to (north) the Coast Guard Reservation (lighthouse), on the southern end of Department of Hawaiian Home Lands (DHHL); and north of the Kawaihewa Harbor complex, which was constructed from around 1955 (Allen 1987:12).

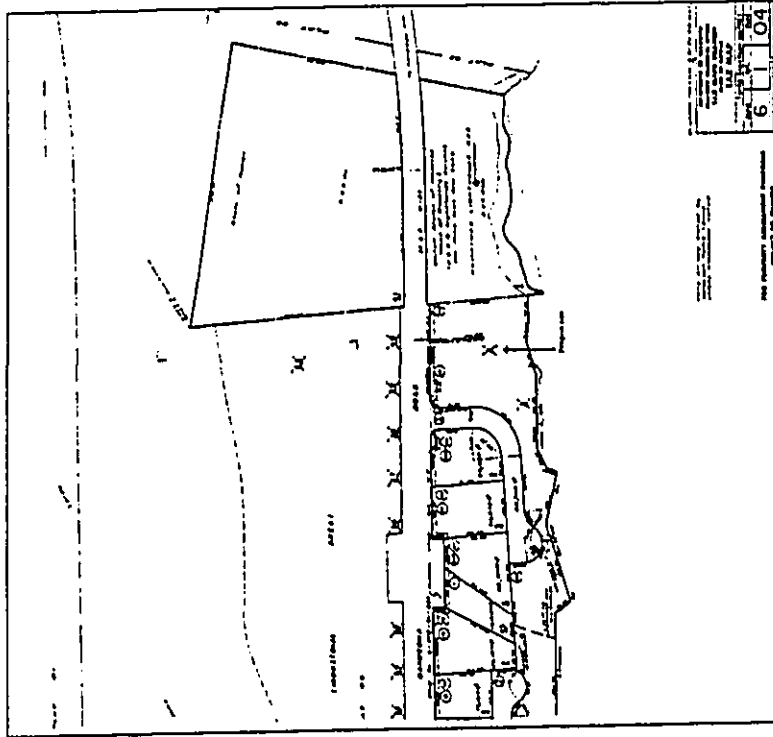


Figure 1. TMK: 6-1-04; par 20, in former parcel 2 [arrow] (adapted from Jaum 2003).

RECEIVED AS FOLLOWS



RECEIVED AS FOLLOWS

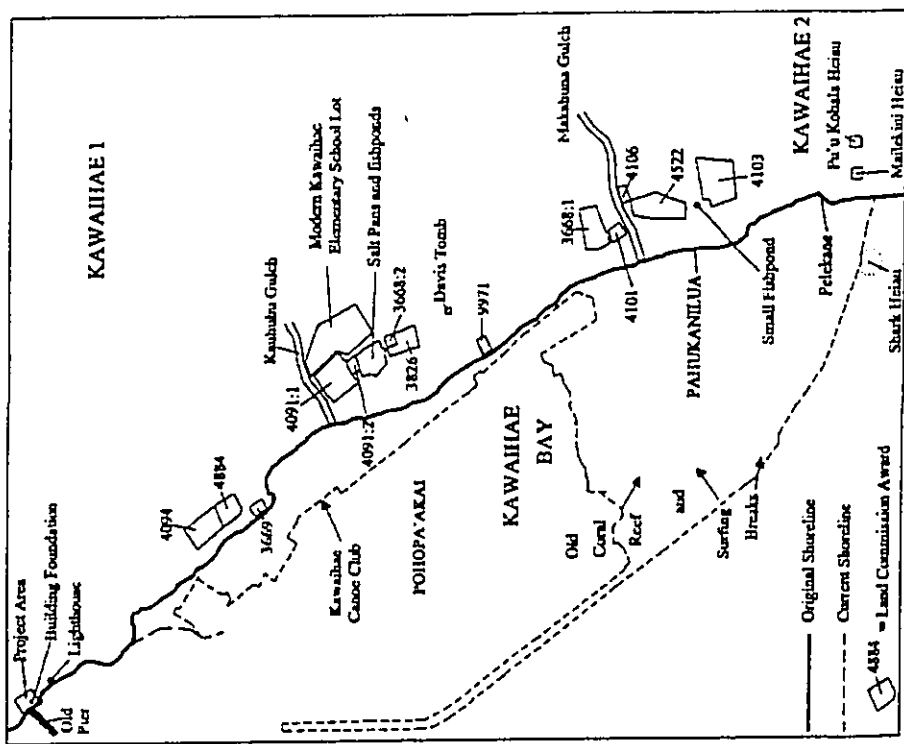


Figure 4 Project site in relation to various sites and places in Kawailae Village [adapted from Hamnett (1991: V-1) by Haun 2003]



Figure 3. Kawailae D1111L Site 2 (provided by Parsons Brinckerhoff 2003)

**Geology & Environment**

The project site is on the hot and dry western slopes of the Koolala Mountain range, which dominates the district of North Kohala and part of South Kohala (which also includes Mauna Kea). Koolala Mountain is the oldest extinct volcano (formed 430,000 years ago) of the five volcanoes (Kohala, Mauna Kea, Hualalai, Mauna Loa and Kilauea) that make up Hawai'i Island, the largest Hawaiian island. Kohala last erupted 60,000 years ago. The thick ash that covers Kohala is both local and from Mauna Kea eruptions. Mauna Kea is a dominant volcano which last erupted about 4,500 years ago. Some of the flows of Mauna Kea funneled down streambeds to the coast. The oldest exposed flows are 250,000 years old. Widespread ash deposits were produced by explosive eruptions, which "may have been triggered by the interaction of lava with glacial water during periods of glaciation at the summit (Juvik and Juvik 1998:17, 45, 73).

The project site is a relatively empty lot situated between the Hawaiian Hunes subdivision and the Lighthouse (Coast Guard Reservation) close to the rocky coastline that is typical of that area. There are remnants of a historic pier, said by Papa William Akau (pers com 2030) to have been built in the 1930s for shipping cattle, which were hoisted by chutes onto a boat, then shipped to O'ahu. However, the 1946 Tūhāi Wave damaged the pier as did other heavy storms known by the locals to hit the coast on a regular basis. When the harbor was constructed in the 1950s, the unused and damaged pier just fell apart; as did other structures on the site - a shed for the cowboys to sleep in, and a comfort station for men and women, mostly used by the cowboys.



Photo 3. Project area with rocky coastline.



Photo 4. Remnants of historic structure.

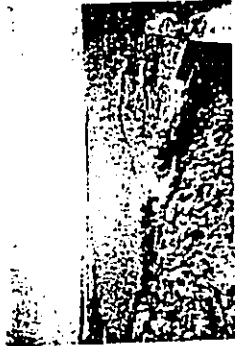


Photo 5. Remnants of historic pier.

**Flora**

The project lands have most likely gone through several modifications over time. In *Hawaii's Natural History*, Carlquist divides each island into six regions: Coast, Dry Forest, Wet Forest, Epiphytic Vegetation, Big and Alpine. The coastal vegetation are plants that grow near the shore. Most of the native coastal plants consisted of shrubs and herbaceous vegetation such as *naupaka kūi* (*Scaevola taccada*), *ʻitiāna* (*Sida fallax*) and *Ipomoea* sp. (Carlquist 1980:269, 300). Within the 0-500' elevation the only native tree is the *hala* (*Pandanus odoratissimus*). Humans have introduced other coastal trees in this zone (Carlquist 1980:267).

The Dry Forest Region (lower and upper) has suffered the most impact by man. This is the area the early Polynesians modified extensively in slash and burn cultivation to expand their subsistence level, intensifying food production with complex irrigated agricultural systems of various crops (Kauk 1985:217). Some of the Dry Forest vegetation that may have been affected by early Hawaiian cultivation practices are the *nāio* (*Mypororum sandwicense*), *wiluwili* (*Frylinaria sandwicensis*), *ʻohi* (*Renouillia sandwicensis*), *ʻiʻiaki* (*Santalum* sp.), *ʻohi* (*Metrosideros* sp.), *koa* (*Acacia koa*), as well as several species of *Azadirachta* (i.e., *Sida cordifolia*), *ʻālei* (*Dacrydium anthyridifolium*), vines and ground cover (Carlquist 1980: 275-300). These "typical" dry-land forest species however, can be found higher up-slope on leeward-coasts (Carlquist 1980:285).

The distinction of a Hawaiian Wet Forest is that it gets more than 70 inches of rain per year, and its most predominant native plant is the multi-range *ʻōhi* (*A. sandwicensis*). Other native species of this region are the *loaia* palm (*Pritchardia maculata*), *ʻulalo* (*Dicranopteris*), *hapa* (*Cibotium*), *maile* (*Alpinia uliviformis*) and an abundant variety of fern, mosses, liverworts, fungi and lichens. The significance of the *ʻōhi* on wet forest is that it is the most bio-diverse region of the Islands. It is here that the greatest evolution and diversification of plants and animals take place, and it was a region relatively unoccupied at first by early Hawaiians (on the Islands (Carlquist 1980:301, 306).

Epiphytes of the Hawaiian wet forests are limited to the many species of mosses, liverworts, lichens, ferns, about 50 species of Peperomia, and *ʻieʻie* (*Freyinetia arborea*), a plant of early Hawaiian ethnobotanical significance that displays qualities of an epiphyte and a climber (Carlquist 1980: 333-5).

Bogs are usually found at higher elevations where rainfall exceeds the porosity level of the soil, and on old volcanic domes with steep slopes and natural damming. They usually consist of mud, very small pockets of standing water and tussocks of sedge (*Drosera* sp.) or grass (*Panicum* sp.). Plants that grow in the bog are usually dwarfed (Carlquist 1980: 351-355).

Prait and Cron (In Juvik and Juvik 1998: 121-129) define five ecological zones in the Hawaiian terrestrial ecosystems, based on elevation, moisture (Dry, Moist, Wet), dominant life forms and vegetation structures (Forest and woodlands, Shrublands, Dwarf shrublands, Grasslands, Herblands and deserts): Alpine (>9,000 feet); Subalpine (6,000 - 9,000 feet); Montane (3,000 - 6,000 feet); Lowland (0 - 3,000 feet); and Coastal (0-100 feet).

The project lands are considered *Lowland Dry Shrubland and Grassland*, as well as *Coastal* according to their classification. The climate is very hot and dry with annual rainfall less than 20 inches. The terrain is made up of dry, rocky soils. The natural vegetation was once *ʻāhihi* grasslands and *ʻāhihi* shrublands, dry cliff vegetation, small patches of Hawaiian coast *ʻāhihi*, *Gossypium tomentosum*, and dwarf shrublands of *ʻāhihi* (*Chamaesyce* species) still exist. Parts of these lands may have once been covered with open, dry woodlands of native trees, now alien grasses and *ʻāhihi* (*Prosopis pallida*) are the dominant vegetation. Other vegetation in the coastal area would have been *naupaka-kūkū* (*Scaevola sericea*), *ʻitiāna* (*Sida fallax*), *nāio* (*Mypororum sandwicense*), *ʻāhihihi* (*Scaevola portulacastrum*), *ʻāhihi* grass (*Sporobolus virginicus*) or sedge (*Fimbristylis cynosu*). Much of coastal areas were densely populated in

RECEIVED AS FOLLOWS

ancient Hawaiian times and coastal vegetation was "important in traditional Hawaiian culture, providing medicines, lei materials, and other resources." The dry environment of the *Lowland Dry Scrubland and Grassland* was "ideal for burial and storage caves" (Pratt and Cow In Juvik and Juvik 1998:128-129).

The *muku* lands were once predominantly open *pili* grassland. Boundary Commission testimonies for Kohala made a distinction between lowland *pili* and upland cultivated areas (McElkowney 1983:414-415 In Allen 1987:13). A hearth site in Kawaihāe dated AD 1400-1515 (Klein et al. In Clark 1983c:319) produced charcoal wood samples that were identified as *airea* (*Nathoestrang*), *adiale* & (*Cambium odoratum*), *Lunilar* (*Cultraria oppositifolia Brongt.*) and *lima* (*Diospyros* sp.) (MuraKami 1983 In Allen 1987:13). "According to Handy (1940:163), in coastal South Kohala sweet potatoes were planted in sandy strips along the sea" (Allen 1987:13). Kawaihāe coastal inhabitants may have also directly or indirectly utilized the *muku* Kohala Field System that began from the 1,000-ft. elevation, extending inland (Allen 1987:14).

The terrain immediately around it [Kawaihāe] is dry and barren but (usually) much dry taro was grown beyond in the lower forest zone, which formerly extended from the Kohala Mountains much farther to seaward over what is now open pasture land. Wet taro was grown also in small pockets of land wherever streams, even intermittent ones, flowed down from the mountains in the wet season (Handy and Handy 1972:531 In Allen 1987:13).

A recent (Borthwick et al. 2000:1) archaeological assessment of Kawaihāe (Hawaiian Home Lands *muku* of the Akoni Pule Highway) reported that "vegetation is of limited diversity, largely limited to buffel grass (*Cenchrus ciliaris*) and *kiawe* (*Prosopis pallida*) trees, with scattered *koa huale* (*Leucaena glauca*), *ilima* (*Sida fallax*) and *uhulou* (*Polthelia* sp.)."



Photo 6. Kiawe and grass dominate project area (11 Aug 2003).

**Fauna.** In almost all of the elevation zones, alien animals such as feral pigs, goats, sheep, cattle and horses damaged native vegetation. Terrestrial fauna in pre-colonized Hawaii consisted of only one endemic mammal, the hoary bat (*Lasiurus cinereus*), thousands of endemic insects (i.e., damselflies (*Ischnura ramburii*) and *Ichneura posita*) found around reservoirs and streams), and about 100 species of endemic birds such as the Hawaiian honeycreeper (*Drepanididae* spp.) (Boyer, 1972:7, Kirch, 1985:28). Early Polynesian introduced animals included the Southeast Asian pig (*Sus scrofa*), jungle fowl (*Gallus gallus*), dog (*Canidae*), and the Polynesian rat (*Rattus exulans*). Mammals in historic Kawaihāe included various breeds of horses, cattle, and sheep, as well as pigs, dogs and cats.

Threatened or endangered fauna of the Coastal lands includes the green sea turtle (*Chelonia mydas*), water and sea birds. A once thriving marine resource area is threatened by the intense modification of the Kawaihāe coast. "[The principal prehistoric resource...[was] deep-sea fishing, coral reef resources, brackish water ponds for fish cultivation, and sea salt.

PART II: METHODS

The Cultural Impact Assessment/Study for Kawaihāe I was conducted between the months of April through June 2003. The study consisted of three phases: (1) cultural and historical archival research (literature review); (2) ethnographic survey (oral history interviews), transcribing interviews, analysis of ethnographic data, and (3) report writing.

Personnel. The personnel consisted of the researcher who has a masters degree in Anthropology, with a graduate curriculum background in the archaeology track as well as anthropology theory, cultural resource management, ethnographic research methods, and public archaeology; an undergraduate curriculum background that included Hawaiian history, Hawaiian Language, Hawaiian Archaeology, Pacific Islands Religion, Pacific Islands Archaeology, Cultural Anthropology, as well as a core archaeology track, Geology, and Tropical Plant Botany; and ethnographic field experience that includes over 140 interviews to date.

Level of Effort. This study included one extensive interview, two mini interviews [their request] and five impromptu interviews. A preliminary assessment concluded that these lands have been heavily impacted and modified by light house construction in 1869 and 1915; ranching activity in the 1930-50s; World War II activity in the 1940s; the construction activity of nearby Kawaihāe Harbor complex in the 1950s and 1960s; and DHRH subdivision construction in the 1960s. However the area [Kawaihāe Ahupua'a] was once part of a thriving Hawaiian community from pre-contact through modern historic times, and still has a number of significant cultural remains in the *makai* (mountain direction) lands and neighboring *ohupua'a* (traditional land division).

Theoretical approach. This study is loosely based on *Grounded Theory*, a qualitative research approach in which "raw data" (transcripts and literature) are analyzed for concepts, categories and propositions. Conceptual labels or codes are generated by topic indicators [i.e., fishing, agriculture, flora, ranching]. Categories are generated in a similar manner by forming groupings such as "Land Resource & Use," "Water Resource & Use," or "Marine Resources & Use." Since this was a semi-focused study, categories were pre-selected as part of the overall research design. However, it is not always the case that these research categories are supported in the data. In the *Grounded Theory* approach, theories about the social process are developed from the data analysis and interpretation process (Haug 1995; Paoliti 1996). This step was not part of this cultural impact assessment as the research sample was too small.

Archival Research. Archival research included a limited background literature review. Compiling data took several weeks of intermittent archival research. The majority of the archival research [primary and secondary sources] took place in the State Historic Preservation Division library, State Bureau of Conveyance, the Hawaiian Collections of the University of Hawaii Hamilton Library (Manoa Campus), Bishop Museum Archives and Library, Waikōa "Aina Corp.; the researcher's private library and Internet searches. Primary source material included land records, maps, genealogies, oral histories and other studies. Secondary source material included translations of 19<sup>th</sup> century ethnographic works, historical texts, indexes, archaeological reports, and Hawaiian language resources (i.e., proverbs, place names and dictionary).

Consultant Selection. The selection of the consultants was ultimately based on the following criteria:

- ◆ Referred By Hawaiian Cultural Practitioner
- ◆ Had/has Ties to Project Location(s)
- ◆ Referred By Staff of Pu'u Kohola National Park

Interview Process. The formal interview process included a brief verbal overview of the study. Then the consultant was provided with an informed consent or agreement to participate form to review, which was drafted for the education and protection of each consultant (Appendix D). An ethnographic research instrument (Appendix E) was designed to facilitate the interview; a semi-structured and open-ended method of questioning based on the person's answers to questions ('talk-story' style). Each interview was conducted at the convenience (date, place and time) of each consultant. A *makana* or gift was given to each consultant in keeping with traditional reciprocal protocol. The impromptu interviews were entirely spontaneous or serendipity. A second site visit was more productive as people were available to answer questions about fishing and canoe club activities involving the project site area.

Ethnographic Interview Procedures. One primary interview was conducted at the Pu'u Kohola National Park Service staff office at his request. Two mini interviews were also conducted there; these consultants were invited by the park staff person. Notes were also taken, but more attention was given to listening intently to each consultant. At a later date, five impromptu interviews were conducted in Kawaihāe and Waimea.

Transcribing Process. The taped interviews were transcribed verbatim by the principal investigator using a Sony Dictator/Transcriber (BM-87DST). Each consultant was given a hard copy of the interview transcripts along with a *makalo* letter that explained the transcript review process, and a self-addressed, stamped envelope for return of the edited transcripts. This allowed for corrections (i.e., spelling of names, places), as well as a chance to delete any part of the information if so desired. Copies of information from the hand-written notes were sent to each of the mini-interviewees. No follow-up procedure was done for the five impromptu interviews. However, each person was informed as to what the project was and why information was being sought.

Analysis Process. The analysis process followed a more traditional method, as a qualitative analysis software program was not necessary. Each interview was manually coded for research thematic indicators or categories (i.e., biographical information; land and water resources and uses; site information-traditional and/or historical; and anecdotal stories). For the purpose of this study, it was also not necessary to go beyond the first level of content and thematic analysis, as this was a more focused study. However, sub-themes or sub-categories were developed from the content or threads of each interview (i.e., irrigation system, ranching, and agriculture).

Research Problems. A typical constraint for most studies is not enough time for archival research as there is a lot of material to review. However, several unforeseen circumstances prevented some interviews from taking place.

- ◆ Interviews were scheduled/rescheduled four times.
- ◆ One consultant had to re-schedule four times due to health problems and prior commitments.
- ◆ After flying to Maui at their request to meet with four potential consultants, two potential consultants decided to re-schedule because the other two could not make it.
- ◆ After attending an event on O'ahu to do a group interview, it was rescheduled again because one member could not attend.
- ◆ After flying to Hawaii island two potential consultants decided not to be interviewed because they felt they could not contribute any more than the senior-ranked member of their society did during his interview; and one consultant did not show up and had to be re-scheduled twice. That interview was never conducted.

**An Overview of Human Impact, Settlement and Socio-economic Development in South Kohala in the context of Greater Hawaii**

**B-1. Colonization Period.** First voyager dating is scanty at best, however, based on early site dates from Bellows, Oahu and South Point, Hawaii, Kirch (1985) estimated that the Colonization Period of the Hawaiian Islands was somewhere between AD 300-600. These first Polynesian voyagers to Hawaii "followed the tracks of migratory birds. Mainly they traveled by the stars... On a voyage of migration, from fifty to a hundred persons could exist for weeks on a large canoe, which might be a hundred feet in length" (Day 1992:3). This feat was remarkable in that it was done in canoes carved with tools of stone, bone, and coral; lashed with handmade fiber; and navigated without instruments" (Ternia 1995:vi). Based on Mo'okini genealogy charts, the earliest dates for the vicinity of South Kohala are AD 480 for the *heiau* (James 1993:143). However, according to ethno-historian Kamakau, the *heiau* was constructed during the early part of Kirch's Expansion (AD 1100-1650) Period (Kamakau 1976:125), during the time of Pa'ao.

Initial settlement on the island of Hawaii probably occurred in its windward valleys by A.D. 300 to 500, with the population slowly moving to suitable, less-crowded sites on the leeward coast over the next few hundred years. (South Point [Ka Lae], however, has one of the earliest Carbon 14 dates in the islands.) Ancient land districts on the island of Hawaii consisted of Puua, Hilo, Hamakua, Kohala, Kona, and Ka'u, which were traditionally autonomous chiefdoms (Greene 1993: Chapter VI).

Reconstructing the cultural sequence for the Kohala district and other places in Hawaii during the colonization period would involve the "founder effect" and time necessary to adjust and adapt to a new environment. The colonizers were not able to bring all of the gene pool or culigens from their homeland, so their new culture consisted of what survived the journey, what was remembered and what could be applied to the new environment (Kirch, 1985:285-8). Although early Hawaiians were farmers and fishers, spiritually tied to the *aloha* (land) in many ways (Waters, n.d.), when they first arrived they had to modify both their subsistence practices and the land. Faunal remains analyses indicate that early Hawaiian subsistence depended on fishing, gathering, bird hunting (extinct fossil remains, see Olson and James, 1987), as it took time to clear the dryland forests, plant their crop culigens, breed their animals, and construct suitable living quarters. Creation chants such as the *Kumulipo* depict a very deep philosophical bond with the land and nature and "the respectable person was bound affectionately to the land by which he was sustained" (Charlot 1983: 45,55). Ancient sites of various *ko'a* (fishing and bird shrines) also imply a spiritual respect for their sustenance.

As the founding groups grew, they fused into subgroups anthropologists refer to as *runagers*, with the senior male of the original *runage* as chief of the conical clan, although hierarchical ranking was not just relegated through the patrilineal line of descent (Kirch 1985:31). Bellwood refers to these groups as tribal and related by blood (Bellwood 1978:31). In *Ko Pu'e Kohalo* Kamakau refers to Hawaiian ranking in the following passage:

For 28 generations from Hulihooua to Wakea, no man was made chief over another, and during the 25 generations from Wakea to Kapawa, various noted deeds are mentioned... Kapawa was the first chief to be set up as a ruling chief... from then on the group of Hawaiian islands became established as chief-ruled kingdoms - Maui from the time of Halepapa, son of Kapawa... this was the time that records (oral) began to be kept of the chiefs (Kamakau 1964:3)

**B-2. Developmental Period.** According to Fomander (1969) certain practices were universal Polynesian customs which the Hawaiians brought from their homeland; such as the major gods *Kane, Ku* and *Lono*; the *kupa* system of law and order; *pu'uhonua* (place of refuge); *aumakua* (ancestral guardian) concept; and the concept of *mana* (supernatural or divine power) (Fomander 1969:61, 113, 118, 127-8). However,

**PART III: CULTURAL & HISTORICAL BACKGROUND REVIEW**

The Cultural and Historical Background Review entailed a search of primary and secondary source literature. The majority of this research took place in the Hawaiian Collections of the University of Hawaii Hamilton Library (Manoa Campus), State Historic Preservation Division library, State Bureau of Conveyance, Kohala Bookstore, and the researcher's private library. Primary source material included Land Court records, maps, visitor journals, genealogies, oral histories and other studies. Secondary source material included translations of 19<sup>th</sup> century ethnographic works, historical texts, indexes, archaeological reports, and Hawaiian language resources (i.e., proverbs, place names and Hawaiian language dictionary). A review of the archival material is presented in this section, along with an overview of the chronology of the *mo'au* (district) of South Kohala, within the context of the broader history of the *mo'au 'aiha* (island) of Hawaii and Greater Hawaii, along with specific review of traditional and historic literature as they pertain to Kawahae I Ahupua'a.

**A. Models of Hawaiian Chronology.**

Models of Hawaiian Chronology such as Corby (1974/1996), Hommon (1976/1986) or Kirch (1985) provide a temporal view of settlement patterns as well as cultural changes through time, from initial settlement through first contact with the western world. Corby's (1974) first model of a cultural development sequence looked at Initial Settlement Period, New Adaptation Period and a Complex Chiefdom Period. He has since modified this model (1996). Hommon's (1976) model of sociopolitical development sequence included four phases: Phase I AD 500-1400; Phase II AD 1400-1550; Phase III AD 1550-1650; and Phase IV AD 1650-1778. This model was later modified (1986) to three phases: Phase I AD 400-1400 Exploration and Settlement; Phase II AD 1400-1600 Expansion; and Phase III AD 1600-1778 Consolidation. Kirch (1985) believed that initial settlement occurred much earlier than AD 600. His culture-historical sequence has four phases: Phase I Colonization Period (AD 350-650), Phase II Developmental Period (AD 600-1100); Phase III Expansion Period (AD 1100-1650); and Phase IV Proto-Historic Period (AD 1650-1793) (Kirch, 1985:296-308; Kolb, 1991:205).

It should be noted that a study (Tuggle & Spriggs 2001) refutes the 'early colonization' dates supposition. For decades, the consensus among Hawaiian archaeologists was that evidence from Bellows and Ka'u supported early Polynesian colonization dates of AD 300 to AD 600 (Tuggle 1997; Kirch 1985). However, Tuggle and Spriggs (2001) have since studied new data and re-evaluated past dates and dating methods and have concluded that acceptable early dates fall within AD 700-1100. These dates appear to coincide with data that eastern Polynesia was settled much later than previously thought (Robert 1989).

While Kirch's chronology model may need to be revised, his basic period system is still a valid model. Therefore for this cultural impact assessment, Kirch's (1985) model will be used with the following modifications and additions: the dates for the Colonization and Developmental periods will not be used; Early Historic Period (AD 1795-1899), Territorial History (AD 1900-1949), and Modern Historic Period (post AD 1950) will be added. The reasoning behind using Kirch's model is the belief of many native Hawaiian people that based on oral histories or legends, the migrations of their Polynesian ancestors to Hawaii took place prior to AD 700. According to Fomander (1917:IV, II: 406), there are seventy-five generations from Wakea to Kamehameha I who was born around AD 1753-1758. If just eighteen years were allotted to each generation (typically a generation is twenty years) that would make the time of Hawaiian progenitors Wakea and Papa Haumea (who settled in Nu'uauu, Oahu) approximately AD 403. [McKenzie (1983:112) gives thirty years per generation.]

The following overview encapsulates cultural changes over time and highlights significant events and people. More corroborating details follow this overview section with traditional *mo'olelo* and *mele*, historic works and various studies.

Ahupua'a were ruled by *ali'i* or lesser chiefs, who for the most part, had complete autonomy over this generally economically self-supporting piece of land, which was managed by a *konohiki*. Ahupua'a were usually wedge or pie-shaped, incorporating all of the eco-zones from mountain to the sea and for several hundred yards beyond the shore, assuring a diverse subsistence resource base (Hommon 1976:15,16).

The *ali'i* and the *maka'ainana* (commoners) were not confined to the boundaries of the ahupua'a. Not only did the *maka'ainana* (ocean) and *maka'ala* (mountain) people share seafood and produce by lighting a fire when there was a need, they also shared with their neighbor ahupua'a's *ohana* (Hono-kohou 1974:14,15). The ahupua'a was further divided into smaller sections such as the *'ili*, *mo'o'aina*, *pauku'aina*, *kihapai*, *Loe'e*, *hokuwe* and *Luakua* (Hommon 1976:15; Fogue 1978:10). The chiefs of these land units gave their allegiance to a territorial chief or *mo'i* (king). *Heiau* building flourished during this period as religion became more complex and embedded in a socio-political climate of territorial competition. Monumental architecture such as *heiau*, "played a key role as visual markers of chiefly dominance" (Kirch 1990:266).

*Mo'ohala* about events that took place in the early to mid 1600s were revealing in that they illustrate that many of the battles of this period were relatively quickly contained by the opposing *ali'i* (see *History of Kuali'i* (Kuali'i ca. 1630-1660) in Fornander 1917:IV: II: 364-434). These stories also illustrate the ongoing inter-relationships between the people of the various islands. In the *History of Kuali'i*, the exploits of Kuali'i (great-great grandson of Kahuhewa, *ali'i* of Oahu) take him to every island and he eventually unites all the islands "from Hawaii to Ni'ihau" (Fornander 1917:IV: II: 406).

B-4. Proto-Historic Period. The Proto-Historic Period, A. D. 1650-1795, appears to be marked with both intensification and stress. Many wars took place during this time between intra-island chiefs and inter-island kingdoms. During the early part of this period Maui *ali'i* Maui Kama-laha-wala ignored the advice of his council and sent his half-brother Ka-ahi-o-ka-lani (both sons of Kiha-a-Pi'lanii) to spy on Hawaii's island, to see how large the population was. They landed in Kawilihaha.

Ka-ahi-o-ka-lani ran about that same evening and returned before the canoe was dismantled and placed in the house. The keepers of the gods at Maiekinii were servants of Kama, and so they concealed the canoe of the spies. When Ka-ahi-o-ka-lani returned his fellow spies and hosts asked, where did you go? "I went visiting from here to the lava bed and Kihoko, the pond. Then did you turn back?" "No, I went on to the long stretch of sand, to the small bay with a point on that side and one on this side. There are large inland ponds." "The sandy stretch is 'Ohiki, and this walked its ponds are Kihoko and Hono-kohou. Then you came back? No, I went on..." (Kamakau 1992:56).

The next morning the spies began a circuit of Hawaii, then they returned to Maui and reported to Kama-laha-wala the following:

"We went all around Hawaii. There were many houses, but few men. We went to Kohala and found the men only on the shores.... The spies had seen the land of Kohala but had failed to see the people for on all of the fields where sports were held from inner Kohala to outer Kohala, from Kohala to the coastal cliffs to Kohala of the island, a crowd of people gathered every day from morning to night to play. Kohala was known as a thickly populated land. The spies thought that if Kohala was conquered, Kona, Ka'u and Puna would be easily taken, and they felt that Hilo and Hamakua would lend no assistance. This was true, for the chiefs of these districts were cousins of the chiefs of Maui (Kamakau 1992:56-57).

While most of the prophets and seers supported Kama-laha-wala's war on his cousins of Hawaii island, children of his father's sister Pi'ikea and 'Umi-a-Liloa. Some warned that if he did go, he would die and not return to Maui alive. They landed at Kohala and began the destruction of the people of Kohala. Kama-laha-wala, son of Keawe-nui-a-Umi was captured and treated cruelly. "His whole skin was tattooed, his eyelids turned inside out and tattooed." He was renamed Ka-maka-hiwa.

during the Developmental Period, changes occurred bringing about a uniquely Hawaiian culture, documented by the material culture found in archaeological sites. The adze (*lo'i*) evolved from the typical Polynesian variations of plano-convex, trapezoidal and reverse-trapezoidal cross section to a very standard Hawaiian quadrangular-tanged adze. A few areas in Hawaii produced quality basalt for adze production. Mauna Kea on the island of Hawaii was a well-known adze quarry. The two-piece fish hook and the octopus lure breadloaf sinker are Hawaiian inventions of this period, as are the *'ulu* *malika* stones and the *lei niho palooka*. The later was a status item worn by those of high rank, indicating a trend toward greater stratification (Kirch 1983:184,204,306). The evidence also indicates that the "ancestral pattern of corporate descent groups" were still in place (Kirch 1985:302-3). The early culture evolved as the population grew, and many of the changes were related to significant socio-economic changes.

B-3. Expansion Period. The Expansion Period, AD1100-1650, is significant in that most of the "ecologically favorable zones," the windward and coastal areas of all major islands, were now settled, and the more marginal leeward areas were being developed. This was also the period of high population growth, the development of large irrigation field system projects, and dryland farming (Bellwood 1978:98; Kirch 1985:298,303-4). Earlier dates (AD 520-1170, AD 610-1210) from leeward Kapa'uni were reported by Dunn and Rosendahl (1989) according to Wulzen and Goodfellow (1995), however these sites are believed to be temporary camp sites (Wulzen and Goodfellow 1995:11).

It was during the early part of this period that a second major migration settled in Hawaii, this time from Tahiti in the Society Islands (some say Samoa). It was also during this leeward expansion movement that Mo'i'ikeha (Oahu), La'maikihiki (Kauai), Pi'ikea'ia or Pili (Hawaii) and Kaha Pa'ao settled in the islands during the 13th century (Kamakau 1976:125). Pa'ao was the keeper of the god Ku ka'ulimoku who had fought bitterly with his older brother, the high priest Loopele. After much tragedy on both sides, Pa'ao escaped Loopele's wrath by fleeing in a canoe. Kamakau (1991) told the following story in 1866:

Puna on Hawaii's island was the first land reached by Pa'ao, and here in Puna he built his first *heiau* for his god Aha'ula and named it Aha'ula (Wahat'ula). It was a *luakini*. From Puna, Pa'ao went on to land in Kohala, at Pa'uepa. He built a *heiau* there called Mo'ohiki, a *luakini*. It is thought that Pa'ao came to Hawaii in the time of the *ali'i* La'au because Pili ruled as *mo'i* after La'au. You will see Pili there in the line of succession, the *mo'i* *ka'uhou*, of Hanalei, and it was said that Hawaii island was without a chief, and so a chief was brought from Kahiki; this is according to chiefly genealogies. Hawaii's island had been without a chief for a long time, and the chiefs of Hawaii were *ali'i* *maka'ainana* or just commoners (Kamakau 1991:100). There were seven generations during which Hawaii's island was without chiefs—some eight hundred years (Kamakau 1991:101, 102).

There are several versions of this story which are discussed by Beckwith (1976), including the version where Mo'ohiki and Kahuwiliama, two of Mo'i'ikeha's men decide to stay on at Kohala (Beckwith 1976:352, 353, 370-373). Pa'ao brought with him the Ku practice of human sacrifice, used in monumental *luakini heiau* or war temples. Pili started a line of *ali'i* that would continue to the Kanehahua "dynasty." The evolution of the *luakini heiau* is difficult to place archaeologically, and although the arrival of Pa'ao may have been a real event, the uniqueness and complexity of *heiau* were most likely a local (Hawaiian) development (Kolb 1989:3). The bones of the *kahuna* Pa'ao is said to be deposited in a burial cave in Kohala in Pu'uwepe [possibly Pu'upepe] (Kamakau 1987:41).

The uniquely Hawaiian invention, the *loko* or fishpond aquaculture, was developed in the fifteenth century or the later half of this period (Kirch 1985:303). There are several *mo'olelo* or stories about significant personalities from this expansion time period; from Pa'ao to Liloa and Umi. During the last 200 years of the Expansion Period, the concept of *ahupua'a* was established, as well as class stratification, territorial groupings, powerful chiefs and "mo'i" or king (Kirch 1985:303-6). This land unit became the equivalent of a local community, with its own social, economic and political significance.

From Kohala, Kama-lala-walu set forth for Kawaihae, and found no one there. The people had gone up to Waimea, for all observed the services at the heiau of Mailekini. Only those of lower rank remained. The battlefield was at Waimea. Kama-lala-walu's counselor said, "Waimea is not a battle site for strangers because the plain is boggy, and there is no water.... It is better to go to Kona..." (Kamakau 1992:59).

Kama-lala-walu did not take heed and listened instead to two old men of Kawaihae who gave him false information and suggested that he cut up his canoes before heading up to Waimea so that Maui warriors would not be tempted to retreat to Maui. Then they headed for the plains of Waimea. When they got there they looked back towards the sea and saw the men of Kona advancing toward them.

The lava bed of Kaniku and all the land up to Hic'chi'e was covered with men from Kona. Those of Ka'u and Puna were coming down from Mauna Kea, and those of Waimea and Kohala were on the level plain of Waimea. The men covered the whole of the grassy plain of Waimea like locusts (Kamakau 1992:58).

The battle of Pu'u'o'o'aka commenced just outside these plains. The light-weighted lava rocks here contributed to the defeat of the Maui warriors who were used to heavier water-worn rocks. The Maui warriors retreated; some to Kawaihae, others to Kohala. And because of the lack of canoes, very few escaped alive. Ka-ahi-a-Kama, son of Kama-lala-walu who was killed on the plain of Puako, escaped to Kekaha, found a canoe and fled to Maui. He was saved by Hinaiu, the foster son of Loro-i-ka-makahiki. Many of the chiefs of Kona were relatives of Ka-ahi-a-Kama through his mother Kapu-kini-akua (Kamakau 1992:59-60).

After the death of Hawaii'i Island *alii'inau* Looe-i-ka-makahiki, his children did not succeed him. Instead Hawaii'i Island was divided into smaller divisions. The descendants of Kanaloa-kua'ana [Keawe, Ke'caumoku, Kalani'opu'u and Kona] later ruled Kohala, Kona and Ka'u. The descendants of Keawe, nui-a-Umi ruled Hilo and Hamakua. This was not a peaceful period. The chiefs of Kona and Hilo fought each other for the various resources each area had [Hilo's bird feathers, war canoes, fine taro; Kona's food, drinking water and fish]. These wars lasted for several decades with the Hilo chiefs usually defeating the Kona-Kohala chiefs, especially during the reigns of Kua'ana, Kua'oua, Kua'oua, Kua'oua, Kua'oua and Moku. Ke-aka-mahana (w) was the ruler of Kona during the wars with Hilo. "The rulers of Kekaha-*alii'io-ka-moku*." "Kekaha-lani was the ruler of Kona and her son, Keawe [Ke-awe-i-lei-lei, that is they were in charge]." "But the chiefs of Hilo were always victorious over those of Kona...after they won the battle of Hu'chi'u'e the secret places and burial caves in Kona were broken open..." In the battle of Mahiki, Ka-lani-ku-kau-ia-ala and Moku were the chief war leaders of Hilo. After Moku the Hilo chiefs ceased to reign (Kamakau 1992:61-63).

It was during the later part of the Proto-Historic period that the *Royal Koolowala Statute* or *Kualii's Law* was enforced. Kualii Kuniakua Kuithehikauoikama'i lived for an extremely long time, was said to sometimes have supernatural powers, and was the first to "unite" all the islands. This *alii'inau* of Oahu died at Kailua in Ko'olauloa in AD 1730, supposedly at the age of one hundred and seventy five.

It (Kualii's Law) was strict, unvarying and always just. It was for the care and preservation of life; it was for the aged men and women to lie down in the road with safety; it was to help the husbandmen and the fishermen; to entertain (morally) strangers, and feed the hungry with food. If a man says, "I am hungry for food," feed (him) with food, lest he hunger and claim his right by swearing the *ko'lowala* law by his mouth, whereby that food becomes free, so that the owner thereof cannot withhold it; it is forfeited by law. It is better to compensate.... A transgressor, or one who is about to die, is, under the application of this law exonerated.... A transgressor, or penalty.... (Fornander 1917:IV: 432).

However, this law did not prevent the continuing battles between families, factions and district chiefs.

Kohala *alii'inau* Keawe's half sister Ka-lani-ku-kau-telo-ia-iwi was the mother of Alapa'i-nui-a-Ka-uaua, who went to live on Maui with his half sister, Ke-ku-i-ipo-iwa-nui (wife of Ke-kau-like, Maui *alii'inau*) after his father's (Ka-uaua-nui-a-Mahi) death at the hands of the Hilo chiefs in the battle of Mahiki. When Alapa'i heard of Keawe's death and the unrest between the district chiefs, he went back to Hawaii'i Island with plans to make war on all the chiefs. He captured the chiefs of Kohala and Kona, and became ruler of those districts. However, when his brother-in-law Ke-kau-like heard about Alapa'i's victory, Ke-kau-like made war on Alapa'i in order to return Kohala and Kona to their chiefs. He wasn't successful, but Ke-kau-like's warrior prevented Alapa'i from conquering the Hilo and Ka'u chiefs (Kamakau 1992:64-65). However, during these battles a lot of damage was done on the landscape.

The fighting began with Alapa'i at Kona. Both sides threw all their forces into the fight. Ke-kau-like cut down the trees throughout the land of Kona. Obligated to flee by canoe before Alapa'i, he abused the country people of Kohala. At Kawaihae he cut down all the coconut trees. He slaughtered the country people of Kohala, seized their possessions and returned to Maui (Kamakau 1992:66).

In retribution, Alapa'i decided to carry the battle to Maui. While Alapa'i and his warriors were encamped in Kohala, Kamehameha was born to Ke-ku-i-ipo-iwa (II) in Kapakapa (Yi, John Papa 1983:3), in the *ahupua'a* of Kokoiki, in the *moku* of South Kohala (Kamakau 1992:67) says it was AD 1736; however others say it was between AD 1753 and 1758 with more leaning towards AD 1753 (Cahill 1999:56-57) near the Mo'okini heiau. He was quickly taken by Kohala chief Nae-ole and hidden in Halawa (Kamakau 1992:67-69), his ancestral homeland (Williams 1919:121). Ke-ku-i-ipo-iwa (II) was the daughter of Kekela and Ii'ae. Kamehameha's father was Keoua, younger brother of Ke-lani-'opu'u. Because of her weakened condition, Ke-ku-i-ipo-iwa did not accompany the Alapa'i expedition to Maui. The infant Kamehameha was placed in the charge of Nae-ole and his younger sister Ke-ku-nui-a-lei-moku until he was five. He was then returned to Alapa'i who placed the child in the care of his wife, Ke-aka (Kamakau 1992:68-69).

However, before Alapa'i reached Maui, a dying Ke-kau-like (Ka-lani-ku-i-hono-i-ka-moku) made his son Kamehameha-nui his successor. Ke-kau-like died enroute to Kula (Kamakau 1992:69). When Alapa'i heard of his death, he decided not to make war on his sister's son. While visiting them on Maui Alapa'i heard that the O'ahu chiefs attacked his relatives on Molokai, so he went there to help (Kamakau 1992:70).

Alapa'i was said to have been a good ruler and loved by the common people, but his rule had come about by slaying *alii'inau* Ka-lani-nui-i-a-mamao (father of Kalani'opu'u and Keoua) and his brother Ka-lani-ke-ou-moku, rightful *alii'inau* of Hawaii island, and taking control. This would be the cause of several battles between Alapa'i and his nephew, Kalani'opu'u (Kamakau 1992:75-78).

In 1754 Alapa'i became ill and moved to Kikiako'i in Kawaihae. As his illness progressed "at Kikiako'i (Kamakau 1992:77). However, he appointed his son Keawe-'opala to be ruler over the island" (Kamakau 1992:77). However, this was short-lived due in part to shifting allegiances of Keawe-'opala's chiefs (i.e., his relative Ke'caumoku) and *kahuna*, to go with Kalani'opu'u. "A canoe arrived from Kekaha and brought word to Ke'caumoku that Ka-lani-'opu'u was at Kapalua (in south Kona) and was coming to make war against Keawe-'opala. Ke'caumoku therefore made up his mind to join forces with Ka-lani-'opu'u" (Kamakau 1992:78). It was that same year that Kalani'opu'u, a lover of war, became *alii'inau* of Hawaii island (Kamakau 1992: 78-79). Kalani'opu'u was the son of Ka-lani-nui-i-a-mamao (ruling chief of Ka'u whom the *Kumulipo* was composed for) however, his biological father was said to be Pele-to-halani, *alii'inau* of Oahu (Kamakau 1992:110; see also 'I'i 1983). About 1759 Kalani'opu'u conquered East Maui from his wife's brother the Maui king Kamehameha-nui (son of Kekaulike) by using Hana's prominent Pu'u Kau'iki as his fortress. He appointed one of his own Hawaii chiefs, Puna, as governor of Hana and Kipahulu. "Many chiefs, from Hawaii at this time settled on Maui, some of them grandchildren of Keawe" (Kamakau 1992:79-80).

Kohala. While in Kohala, Kamehameha farmed the land growing taro and sweet potatoes (Handy and Handy 1978:53). After Kalani'opu'u died civil war broke out and the wars between Maui and Hawaii also continued (Kuykendall and Day 1976:23, 24; Handy and Handy 1978:528; King 1990).

In 1781 after Kahakili heard about the death of Kalani'opu'u, Kahakili, split his forces and sent them through Maui's south-eastern Kaupo Gap and the north-eastern Ko'olau Gap into Hana. After dunnung and diverting the supply of spring water to Pu'u Kau'iki, the Hawaii chiefs were finally defeated, and the Maui *ali'i nui* regained control of Hana in 1782 (Kamakau, 1992:84-86; 115-116; Fomander 1900: Vol II 146-7, 150, 216). Following his Hana victory, Kahakili went on to gain control of all the islands except Hawaii, by treckery and warfare (Kamakau 1992:116, 128-141).

Kiwa'o (Ke'opohani's father) was killed in 1782 (Cahill 1999:62), but the waring between the forces of Hawaii's island districts continued. Demographic trends during the Proto-Historic Period indicate a population reduction in some areas, yet show increases in others, with relatively little change in material culture. There was a continuum of craft and status material, intensification of agriculture, *ali'i* (Chief) controlled aquaculture, upland residential sites, and oral records which were rich in information. The Ku cult, along with its *luakini he'iau*, and the *lopu* (restriction or regulation) system were at their peak, although western influence was already altering the cultural fabric of the islands (Kirch 1983:308, Kent 1983:13).

In 1790 when Captain George Vancouver made his first stop in the Hawaiian islands he was told that Kalani'opu'u was dead; Hawaii was ruled by Kroua Kuahi'ula (half-brother of Kiwa'o), his uncle Keawe-mau-hili, and Kroua's cousin, Kamehameha (Day 1984:77). Vancouver went on to trade with Kalaupapa in Waikiki. He then found that the ruling chief of Kauai, Ka-umu-ali'i, was a mere child; his father Ka'eo was on Maui with Kahakili. Vancouver also noted a decrease in the population and the number of chiefs since the arrival of Cook (Kamakau 1992: 162-163).

In early 1790 the *Eleonora* lay off the village of Ka'opulehu. Before heading to Kealahou Bay there was an altercation between Captain Metcalf and high chief Kame'eiamoku. For revenge the next ship, the *Fair American*, was attacked and all on board were killed except for crewmember, Isaac Davis. As the attack was going on, *Eleonora's* boatswain John Young was on shore trading for supplies. Fearing retaliation by the crew of the *Eleonora*, Kamehameha detained Young and allowed his ship to sail without him. Kamehameha took both Davis and Young under his care (Kuykendall 1957:24-26 In Rosenblat & Carter 1988:20). Both men were to serve pivotal roles in Kamehameha's war campaign.

Kame'eiamoku, one of the North Kona chiefs on Hawaii, however, had previously been insulted by Metcalf and vowed revenge on the next ship that passed his way. By coincidence, it happened to be the *Fair American*, seeking land near Kawaihe Bay. The opportunity to avenge his insult by force, the defenseless state of the vessel due to its small crew and inexperienced commander, and the value of the muskets and other iron implements on board sealed the vessel's doom. Metcalf and his crew were either killed or drowned. The only survivor was Isaac Davis, who, although wounded, jumped overboard and managed to reach a native canoe, whose occupant clubbed him into submission but for some reason spared his life. The *Fair American* was hauled ashore and Kamehameha later appropriated it, its guns, ammunition, and other articles of trade, as well as Davis himself (Ribbles 1991: Chapter III).

By 1790 Kamehameha I had gained enough control of the island of Hawaii, that he could leave to join the war parties on Maui. Kamehameha also had at his disposal, western weapons, and an armed schooner (n.a. 1967:5). Kamehameha brought a cannon from the *Eleonora* along with the expertise of Isaac Davis and John Young, who were now advisors and *ai'ane punahale* (favorites) of Kamehameha I (Kamakau 1992:147-148).

Conflict between Hawaii's chiefs continued. Ke'eaumoku, son of Keawe-poo-pee rebelled against Kalani'opu'u and set up a fort at Pohoia and Honoakane. He was attacked by Kalani'opu'u so he moved to Maui. In 1766 Maui *ali'i nui* Kamehameha-nui became ill in Hana and ceded his lands to his younger brother Ka-behiki-nui. 'Abu-mau (Kahakili), a fierce warrior and "manipulator." Following the death of Kamehameha-nui, Ke'eaumoku "married" his widow Namahana, a cousin of Ku-ka'i-iakea Kamehameha (Kamehameha I). Their daughter Ka'ahumoa, would later become a favorite wife of Kamehameha I (Kamakau 1992:79-84, 309).

Between 1775 and 1779 fighting continued between Kalani'opu'u and Kahakili. In 1775 Kalani'opu'u and his Hana forces raided and severely destroyed the neighboring Kaupo district, before continuing several more raids on Molekai, Lanai, Kaho'olawe and parts of West Maui. It was at the battle of Kalaheka'ilo that Kamehameha, nephew and favorite warrior of Kalani'opu'u, was first recognized as a great warrior and given the name of Pa'i'ea (hard-shelled crab) by the Maui chiefs and warriors (Kamakau 1992:84). Kalani'opu'u returned again to Maui in 1776, but was severely defeated by Kahakili's warriors.

In January 1778 Cook landed in Waimea, Kauai and the culture of old Hawaii began its spiraling change (see Day 1992). Cook left Hawaii for several months, but returned later in the year. Kalani'opu'u was fighting Kahakili's forces in Waialua, Maui on November 19, 1778 when Cook's ship was sighted on his return trip to the islands. Kalani'opu'u visited Cook on the *Resolution*, while Kahakili visited Clerke on the *Discovery* (Kuykendall and Day 1976:16).

When Cook sailed into Kealahou Bay on January 17, 1779, Kalani'opu'u was still fighting Kahakili on Maui. Captain Cook left an English saw and bear on Ni'ihau and observed chickens on Kauai (Takaguchi et al. 1999:1). At this time Kahakili's brother Ka'eo-kuhani was ruling chief of Kauai; Ka-hahaia was ruling chief of Oahu and Moliokai; Kahakili'ahumanu of western Maui, Lanai and Kaho'olawe; and Kalani'opu'u was ruling chief of Hawaii and Hana (Kamakau, 1992:84-86, 92, 97-98). On January 25<sup>th</sup> Kalani'opu'u visited Cook again at Kealahou Bay, presenting him with several feather cloaks. By February Cook's scheme to kidnap Kalani'opu'u as a hostage went thwarted and Cook was killed following a skirmish over a stolen cutter (Kuykendall and Day 1976:18).

Lieutenant King made the following observation when they entered Kawaihe Bay February 6, 1779:

Although the northwestern part of the bay which...is call'd Tee-yah-ya looks green and pleasant, yet as it is neither wooded or hardly any signs of culture, and a few houses. It has certainly some defect, and does not answer the purposes of what the natives cultivate (Beaglehole 1967:525 In Allen 1987:14).

However a month later King made the following observations:

Along the NE side of the bay close to which we Saikd [sic], it is very little cultivated, & we saw but few houses; the Peoples appearance shew'd that they were the lowest Class that inhabited them (Beaglehole 1967:608 In Rosenblat & Carter 1988:19).

The off and on warring between the Hawaii and Maui forces continued, but Kalani'opu'u was aging. Kalani'opu'u schemed for peace by having his son Kiwala'o by Kalola, sister of Kahakili, and their twin half-brothers, go to Kahakili, who had the battles cease (Kamakau 1992:88-89; Detha 2000:49-50). Kalani'opu'u declared his young son Ka-iani-kau'i-ke-a-ou'i Kiwala'o to be his heir; to his nephew Kamehameha he gave the war god, Ku-ka'ili-moku (Kamakau 1992:107). But even before the death of Kalani'opu'u in 1772, chiefs and *kahuna* were already taking sides between Kiwala'o and Kamehameha.

Kamehameha and a few other chiefs were concerned about their land claims which Kiwala'o did not seem to honor, so after usurping Kiwala'o with a sacrificial ritual, Kamehameha retreated to his district of



Finding their lives secure, and being watched closely and unable to escape, Young and Davis became reconciled to their lot. Their fortunes became quickly and closely linked to those of the king. They would play a significant role in Kamehameha's rise to dominance, and Young, especially, who quickly gained the king's trust and became his principal advisor, would be visited, consulted, or at least mentioned by every visitor to the islands for the next forty years (Rhodes 1993:Chapter III).

In spite of the on-going battles, the foreign explorers and merchants were not deterred; foreign vessels continued to come to the islands.

By 1790 several other foreign ships also visited the islands, helping to establish them as a "familiar resort for the fur traders" and as a "port of call and wintering place... for those engaged in the more general trade which grew up between Asia and the west coast of North and South America." [21] These voyagers included English Captains Powell, Dixon, and Meares (seeking commercial development), and French naval vessels under the command of La Perouse.... Because of their excellent harbors and strategic location nearby equidistant from the coasts of the Orient and North America, the Hawaiian islands quickly became a primary stop on the Pacific trade routes. These islands contained more cultivated land than most of the other Pacific islands, forming "an oasis in the ocean desert" (Greene 1993:Chap II).

"At Kawaihāe and Kealahou, Young and Davis built up an army and navy for Kamehameha along European lines, introduced firearms to Hawaiian warfare, and directed their use in Kamehameha's conquest of Maui, Lanai and Molokai" (n.a. 1967:5). His canoe fleet "beached at Hanalei and extended from Hanalei to Kawaihāe" to battle Kalanikūpule, son of Kāhikūi (who now ruled Oahu). After several battles along the East Maui coast, Kamehameha's forces reached Wailuku where the "great battle" took place. This would be the beginning of the end of independent ruling chiefs because of the inequity of battle strategy and weaponry! (Kamakau 1992:147-148).

Back on Hawaii island in 1790, Keoua Kuahu'ula (twin brother of Keoua Pe'e'ale, son of Kalanikūpū'u and Kane-kapo-kei (Kamakau 1992:120)) ravaged Kamehameha's birthlands of Kohala. At the advice of Ka-pou-kahi, a *kohuna* from Kaula (Kelly 1974:6), Kamehameha personally helped to construct the heiau Pū'u Kohala in the summer of 1791, to assure his victory over his cousin, Keoua Kuahu'ula, who was sacrificed at the heiau (Day 1984:77; Kamakau 1992:154-157).

After the death of his older brother (Kiwaia-ō) Keoua lived in Ka'u, successfully fighting off Kamehameha's generals. Following the new strategy, Kamehameha sent Keoua's uncle, Keawahewa and Kamaewa, to convince Keoua that Kamehameha was offering him a truly respectful peace. Apparently untrusting at first, Keoua consented to go with them, but at some point on the trip to Kawaihāe he evidently suspected he was being led into a trap. His canoe landed briefly at the sacred place of Luahinewai near Kiholo. There, in the beautiful fresh-water pool, he bathed.... After bathing he cut off the end of his... *omū'u*, an act which believers in sorcery call 'the death of Uli' and which was a certain sign that he knew he was about to die.... The death of Uli' refers to death caused by the vengeance of the sorcerer, since Uli is the goddess worshipped by sorcerers. The part cut off is used for the purposes of sorcery so that those who do a man to death may themselves be discovered and punished.... Just as Keoua was stepping from the canoe onto the beach at Kawaihāe, Ke'eaumoku and the other chiefs of Kamehameha's forces attacked him and the occupants of his canoe (Kamakau 1961:156-157).

John Young reportedly noted that "Kamehameha offered 11 human sacrifices at the dedication of the heiau. The principal offering was the body of Keoua Ku-ahu'ula" (Llopiet & Sharp 1994:1). [More elsewhere in this report].

"At the time of the dedication of Pū'ūkohala heiau in 1791, the coastal region from Kawaihāe to Pū'ūkohala supported a sizable Hawaiian population" (n.a. 1967:8). [Note: During Foran's time, someone who carried the stones was still alive and talked to him about it (Kelly 1974:6).]

After the death of his older brother (Kiwaia-ō) Keoua lived in Ka'u, successfully fighting off Kamehameha's generals. Following the new strategy, Kamehameha sent Keoua's uncle, Keawahewa and Kamaewa, to convince Keoua that Kamehameha was offering him a truly respectful peace. Apparently untrusting at first, Keoua consented to go with them, but at some point on the trip to Kawaihāe he evidently suspected he was being led into a trap. His canoe landed briefly at the sacred place of Luahinewai near Kiholo. There, in the beautiful fresh-water pool, he bathed.... After bathing he cut off the end of his... *omū'u*, an act which believers in sorcery call 'the death of Uli' and which was a certain sign that he knew he was about to die.... The death of Uli' refers to death caused by the vengeance of the sorcerer, since Uli is the goddess worshipped by sorcerers. The part cut off is used for the purpose of sorcery so that those who do a man to death may themselves be discovered and punished.... Just as Keoua was stepping from the canoe onto the beach at Kawaihāe, Ke'eaumoku and the other chiefs of Kamehameha's forces attacked him and the occupants of his canoe (Kamakau 1961:156-157 in Kelly 1974:7).

[Note: At Kawaihāe today a different version is told. Keoua is said to have been shot and killed by John Young and Isaac Davis who stood a short distance back from the water's edge below Mailekini Heiau. This area now is known as Pelekani [Pelekae], meaning Britain or British, because of Young and Davis' action taken there (Kelly 1974:7).]

On his second voyage to Hawaii in 1793, Vancouver counseled the chiefs to stop making war on each other. He gave Kamehameha some cows and sheep (at Vancouver's advice Kamehameha put a ten-year *kape* on them). Vancouver went on to visit Kāhikūi in Lahaina and made the same request; then on to Waikiki to Kalanikūpule.

Young and Davis became an integral part of this early period of modern Hawaiian civilization, and for their efforts Kamehameha rewarded them by making them high chiefs and allowing them with large tracts of land on which they settled and raised families. This property was given particularly for their services in helping conquer the islands of Hawaii, Maui, Molokai and Oahu. The land given to Young included Mailekini and Pū'ūkohala heiau. Near their homes in Kawaihāe, Young and Davis raised fruits and vegetables new to Hawaii from seeds procured from foreign ships. Their residence in this area made it a required port of call for sea captains who had to obtain Young's blessing before conducting business with the Hawaiian government. In 1793 Vancouver landed the first cattle in Hawaii at this spot (Rhodes 1993:Chapter III).

When Vancouver returned in January 1794 on his third and last visit, he gave Kamehameha three bulls and more cows and sheep (horses came later in 1803 from Captain Richard J. Cleveland). Kāhikūi had recently died (late 1793) in Waikiki at the age of eighty-seven and his brother Ka'eo was now ruling Maui (Kamakau 1992:162-166; Brennan 1995:15-23, 31-34).

By 1794 at least eleven foreigners were living on the island of Hawaii; these included American, English, Irish, Portuguese, Genoese, and Chinese (Day 1992:23-25). In November and December 1794 a great battle was fought in 'Aiea, Oahu between Ka'eo and his nephew Kalanikūpule. Ka'eo was killed and his young son Ka-unui-ali'i became ruling chief of Kaula (Kamakau 1992:168-169).

B-5. Early Historic Period. The Early Historic Period (AD 1795-1900) is marked by very significant events. In spite of invasion plans perhaps because of them, local trade and produce came to Kawaihāe from as far away as Waipio. Menzies, a naturalist with Capt. Vancouver noted the following on a walk from Kawaihāe.

Occupants of the Waipio Valley lived by taro cultivation, the surplus of which was taken to Kawaihāe. According to Menzies, during a walk from Kawaihāe to Waimea he met several people carrying surplus produce from upland plantations down to the coast to market "for the consumption was not great, not only by the ship, but by the concourse of people which curiosity brought into the vicinity of the bay [Kawaihāe]." (Greene 1993:Chapter VI:11b).

In February 1795 Kamehameha's war fleet landed in Lahaina and covered the coast from Lanai to Māhala. All the food patches and cane fields were overrun by Hawaiian warriors; and on Mōloka'i the coast from Kawai to Kalama'ula was also covered by warrior-laden canoes (Kamakau 1992:171). Kamehameha also invaded O'ahu in 1795, covering the beaches from Wa'ialeale to Waikiki. Several foreigners were living with Kalanikōpule at that time (Kamakau 1992:172, 174). Kamehameha brought the daughter of Kaloua, Ke-ku'i-ape-iwa Liliha and her daughter, Kalanika'ulani alanoa to O'ahu to witness the Battle of Nu'uanoa Pali and the defeat of Oahu. It was during this trip that the name Ke'ōpūloani was given to Kalanika'ulani alanoa (Klieger 1998:21). Kamehameha's forces defeated Kalanikōpule's forces. After several months of hiding, Kalanikōpule was found and sacrificed to Kamehameha's war god (Kamakau 1992:174). While on Oahu with Kamehameha, John Young married a young woman of O'ahu named Namokuaia [they had two sons, Robert and James Kinohao, before she died in 1804] (Cahill 1999:104).

When Kamehameha I conquered Oahu, Maui, Mōloka'i and Lanai (with the help of western advice and technology), subsequently unifying the Island Kingdom (Kent 1983:16), it marked the end of the Pre-historic Period. Hawaii's culture and economy continued to change radically as capitalism and industry established a firm foothold. By 1796 Kamehameha had conquered all the island kingdoms except Kauai, and it wasn't until 1810 when Kaunūāli'i ceded his kingdom of Kauai, Ni'ihau, Lanai and Kā'uai. Kaunūāli'i gave his allegiance to Kamehameha and the Hawaiian Islands were unified under one rule (Kuykendall and Day 1976:26-29, 32). Isaac Davis died this year and it was left to Young to carry on; Young acquired the nickname "Olohana" which was a Hawaiian equivalent to sailor's cry "All hands!" He also adopted Davis' six children, raised them as his own, and held Davis' estate in Trust for them (n.a. 1967:9, 11; Whittington 1953:77; Cahill 1999:133).

Davis served as governor of Oahu during the early years of the nineteenth century. In 1810 he negotiated terms of peace for Kamehameha with Kaunūāli'i, the king of Kauai, bringing that island under Kamehameha's dominion. When Kaunūāli'i journeyed to Honolulu on board a foreign vessel to see Kamehameha, some lower chiefs conspired to kill him and proposed to Kamehameha that a sorcerer perform this deed. The king refused and even had the sorcerer slain. The chiefs then hatched a plot to kill Kaunūāli'i secretly as he journeyed into the interior. Learning of these plans, Davis warned Kaunūāli'i to return on board ship. Shortly thereafter, Davis died by poisoning, possibly in retaliation for this act of loyalty to Kaunūāli'i. Davis' grave is located at Kawaihāe (Rhodes 1993:Chapter III).

After the conquest of Oahu, Young was designated governor of Hawaii's island, an office that primarily involved superintending tax gathering for the king. He governed Hawaii from his home at Kawaihāe from 1802 to 1812 while Kamehameha attended to royal business on other islands; Young later became the resident chief of Kohala, with frequent assignments to Honolulu and elsewhere (Rhodes 1993: Chapter III). [1806] Young married a niece of Kamehameha, Koaanaha, who [later] gives birth to Fanny (Paine) Kakalokalani [mother of Emma Rooke (Queen)]. Grace Kama'ehu'i [Rooke], Keoni Ana (John Jr.), and Jane (Olmi or Kini) Labiliani [Widd]. Koaanaha dies in 1830 (Cahill 1999:13).

At this time the sandalwood (*Santalum sp.*) trade in Hawaii was flourishing; the Fijian and Marquesan supply of sandalwood was exhausted, so Hawaii became known as the "sandalwood mountains" to entrepreneurs of Southern China. Sandalwood came under the personal control of Kamehameha I, who had become "a fervent consumer of high-priced western goods" (Kent 1983:17-20). The sandalwood industry, discovered by Euro-Americans in 1790, and turned it into commerce by 1805 (Oliver 1961:261), was flourishing in Hawaii by 1810 to the point where the subsistence level fell apart, as farmers and fishermen were ordered to spend most of their time logging, causing famine to set in, and a population decline. However, Kamehameha did manage to keep some control on the trade (Kuykendall and Day 1976:43; Kent 1983: 23, 29; Bushnell 1993:212).

Coastal Kawaihāe was developing into an important provisioning and trading "port-of-call" by the early 1800s; sweet potatoes, yams and a variety of other crops, were cultivated in the vicinity and sometimes traded for arms and ammunition.

Kawaihāe's principal articles of trade in the period were salt and sweet potatoes, timber for ship repairs, high quality tapa, hogs, iron, sugar cane, breadfruit, melons, coconuts and bananas. Vessels replenished their water stores from either stream or springs. Among his private enterprises, Olohana conducted a thriving canoe-making venture and supervised the land he had received as a gift from Kamehameha which included the two *ohupua'a* of Oahu and Kawaihāe 2<sup>nd</sup>. Young modified Māliekini *hale* to serve as a protective fort for Kawaihāe. Eyewitness accounts describe the fort as being mounted with twenty-two guns and had the appearance of the broadside of a European warship (n.a. 1967:12).

As business agent for Kamehameha, as well as chief of the area, Young supervised the trade with ships at this port, where local salt and sweet potatoes, timber for ship repairs, hogs, iron, sugar cane, breadfruit, muttonchick, coconut, and bananas were traded for nails, iron, and finally, at Young's suggestion, for more sophisticated types of goods. A lucrative sandalwood trade also originated here; with Young supervising from his home the measuring and loading of trees. Young was involved in, or witness to, most of the significant events in the early years of the Hawaiian kingdom (Rhodes 1993: Chapter III).

In 1812, despite the fact that his battles were over and done with, Kamehameha established a considerable arsenal at Kawaihāe in the remains of the old and abandoned Māliekini *hale*. The man Kamehameha entrusted that arsenal to was his competent lieutenant, John Young. Behind its walls were cannons, muskets, swords, and ammunition that had been traded for provisions with numerous visiting ships. Perhaps the only ship captain to refuse to trade arms and ammunition was Vancouver (Cahill 1999:104).

In 1813, Don Francisco de Paula y Marin, Spanish advisor to King Kamehameha I introduced coffee and pineapple to Hawaii, but it wasn't until a little later that John Wilkinson brought 30 coffee plants from Brazil, the type that would become known as "Hawaiian coffee" (Takeguchi et al., 1999).

By the mid-1800s cattle became a flourishing economic factor in the Kohala and North Kona areas with cattle being shipped out of Kawaihāe (Rosendahl 1995:11). In 1815 John Palmer Parker, an ex-seaman, made his home at Kawaihāe where he began hunting cattle that roamed the slopes of Mauna Kea. By this time the Vancouver's cattle of 1793 had increased to destructive numbers and Parker was hired to thin the wild herds. Since people had not yet developed a taste for beef, Parker salted the meat with Kawaihāe salt and lugged the hides to trade with ships that stopped at Kawaihāe. He later built pens to confine the cattle and horses (n.a. 1967:14-15).

In 1818 Von Kotzebue arrived in Hawaii to discover that fellow Russians had been purposefully or unwittingly been part of an effort to overthrow Kamehameha under the design of Georg Anton Scheffer, a German doctor who was sent by the administrator of a Russian colony in Alaska [Sitka] to negotiate for salvage rights/compensation when a Russian trading ship was sunk off Kauai. Under this plan two Russian forts were built on Kauai. When Kamehameha learned of this subversive action, he ordered Kaunūāli'i to expel the Russians.

An 1819 map by Louis DuRoi during the Freycinet expedition, indicates 75 to 80 structures along Kawaihāe Bay, stretching from Mākeahua Gulch in the south to the present Kawaihāe lighthouse in the north and showing houses laid out in three rows running parallel to the coast and extending inland to roughly 40 to 50 feet in elevation. The map indicated the location of John Young's house, as well as that of L.Boilho and Ke'eaunoku (Rosendahl and Carter 1988:23). "Four years later Reverend William Ellis (1963:399) estimated the number of houses at Kawaihāe Village to be around 100" (Allen 1987:14).

After Kamehameha's death, a degree of unrest existed among some of the principal chiefs regarding several economic matters, including the king's monopoly of the sandalwood trade. This tension in the political situation disturbed the elderly Young, who endeavored to stress to the Hawaiians that peace and unity were essential for the future of the country and could only be attained by continuing loyalty to the Kamehameha dynasty. De Freycinet's draftsman, Jacques Arago, noted that this request of Mr. Young's could only have been dictated by generosity of sentiment; personal interest had no share in it; the poor old man has but a few days to live; extended on a bed of sickness, he perceives the rapid approach of death, and, little regarding his own sufferings, his last prayers are offered up for a country, which the beneficence of Tamaramah makes him grieve to leave a prey to the factions which are about to divide it (Rhodes 1993: Chapter III).

Six months after Kamehameha's death, his son and successor Liholiho, met with kuhina nui Ka'ahumanu, and a council of chiefs and chieftains at Kawaihāe. His advisors, which included his father's *kahuna* Hewahewa, convinced the new king Kamehameha II to abolish the *kapu* system. He signified his agreement by sitting down and eating with his mother Keopūolani, breaking the 'ai *kapu*. (Oliver 1961:260; Kuykendall and Day 1976:41; Kamakau 1992:222-228).

Liholiho's cousin Kekūāiōkai, caretaker of the war god Ku-Ka'ilimoku, disagreed with the new edict and revolted. By December of 1819 the revolution was quelled. Kamehameha II sent edicts throughout the kingdom renouncing the ancient state religion, ordering the destruction of the *heiau* images and the *heiau* structures to be destroyed or abandoned and left to deteriorate, allowing the personal family religion, the *aumakua* worship, to continue (Oliver 1961:260; King 1990; Kamakau 1992:222-228).

Regarding this subject Formander wrote the following:

When the tabus were abrogated, when the Heians were doomed, when Christian zealots proved the genuineness of their new faith by burning the objects of faith of their fathers, and when the ancient gods were stripped of their laps and feathers and their altars overturned, then many a devotee, a *kaha* or servant of special Heians or individual gods, hid the object of his adoration in caves, in streams, in mountain recesses, in the mud of swamps or other unfrequented places, in hopes of better days which never came. Thus many a *Kahu* died and made no sign, and the idol he cherished has only been discovered by accident (Formander: 1879:80,37-38 v II)

Ironically, in October of 1819, seventeen Protestant missionaries had set sail from Boston to Hawaii. They arrived in Kailua-Kona on March 30, 1820 to a markedly changed culture; one with a "religious" void, and a growing appetite for western products Cahill (1999:123, 127) says the *Thaddeus* "made its first landfall at Kawaihāe" on April 1, 1820 and "departed Kawaihāe for Kailua-Kona where it arrived on April 4). Many of the ali'i who were already exposed to western material culture welcomed the opportunity to become educated in a western style and adopt their dress and religion. Soon they were rewarding their teachers with land and positions in the Hawaiian government (King 1990). During this period, the sandalwood trade was wreaking havoc on the commoners who were weakening with the heavy production, exposure, and famine just to fill the coffers of the ali'i who were no longer under any control constraints (Oliver 1961:261; Kuykendall and Day 1976:42; Bushnell 1993:212). On a stopover in the Kohala district in the early 1800s Ellis wrote the following:

About eleven at night we reached Towahāe [Kawaihāe], where we were kindly received by Mr. Young...Before daylight on the 21st, we were roused by vast multitudes of people passing through the district from Waimea with sandal-wood, which had been cut in the adjacent mountains for Karamoku, by the people of Waimea, and which the people of Kohala, as far as the north point, had been ordered to bring down to his storehouse on the beach, for the purpose of its being shipped to Oahu. There were between two and three thousand men, carrying each from one to six pieces of sandalwood, according to their size and weight. It was generally tied on their backs by bands of li leaves, passed over the shoulders and under the arms, and fastened across their breasts... (Kuykendall and Day 1976:42, 43; Ellis 1984:397)

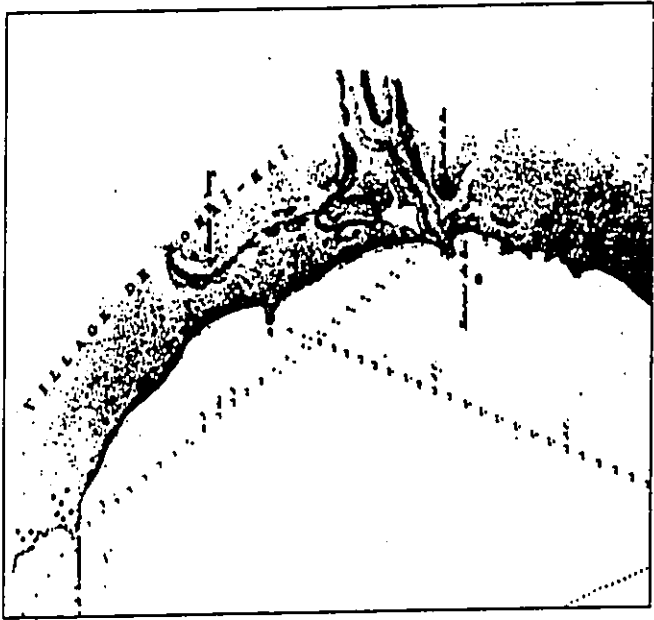


Figure 5. 1819 map of Kawaihāe coastline by Louis DuPerry (Cahill 1999:103).

Kamehameha I died on May 8, 1819 in Kailua-Kona and once again the culture of Hawaii was to change radically.

On the morning after his father's death, Liholiho left Kailua, which had been defiled by death, for Kawaihāe in Kohala, as was the custom. During his absence, as was also the custom, the population committed all kinds of excesses, breaking the *kapu* with impunity. Although the usual mourning ceremonies on the death of a king took place, no sacrifices occurred to provide the old king with companions in the next world. During this mourning period, the dead chief's bones were secreted in a cave, the traditional action that ritually disassociated the mandate to rule from the dead king so that his heir could re-establish it on his return to the area. After the requisite ten days of seclusion had passed, Liholiho returned to assume power, at which time he was also supposed to re-establish the *kapu* system, something he did not do. Instead he left again for Kawaihāe in the Kohala district, where he took up residence until October, probably hoping to avoid having to make some important decisions concerning land redistribution, requests by the ali'i to share in the sandalwood trade, and whether or not to break the *kapu*, an action he knew Ka'ahumanu and others favored (Greene 1993: Chapter V).

(*Saccharum officinarum* L.) was Polynesian introduced and served a variety of uses. The *ko kua* or white cane was the most common, usually planted near Hawaiian homes for medicinal purposes, and to counteract bad taste (Handy and Handy 1978:183). Sugar cane was a snack, a condiment, a famine food, fed to nursing babies, and helped to strengthen children's teeth by chewing on it (Handy and Handy 1978:187). It was used to thatch houses when *pili* grass (*Heteropogon contortus*) or *lau hala* (*Pandanus edotrisinus*) were not abundant (Malo 1987:121, 124). Sugar cane was also used in relation to taro and sweet potato. Handy and Handy (1978) explain:

In wet-taro farming, cane was planted along the embankments separating the flooded terraces and flats. In dry-taro and sweet potato fields on the sloping *loio* or in the lower forest zone, cane was planted as hedges along the lines of stone and rubbish thrown up between the fields. Thus it helped the planter to utilize to the maximum his soil and water, and acted as a windbreak against the gusty breezes which blow in most valley bottoms, along the coasts, and on the uplands where taro is grown (Handy and Handy 1978:186).

Sugar cane was grown on all islands and when Cook arrived, he wrote of seeing sugar cane plantations. The Chinese on Lanai are credited with first producing sugar as early as 1802. However, it was not until 1835 that sugar became established commercially, primarily to replace a waning sandalwood industry (Oliver 1961:263; Kuykendall and Day 1976:92). 1835 was also the year that John Olohana Young died at the age of 93 in Honolulu where he is buried at the Royal Mausoleum (n.a. 1967:19).

Many of the Hawaiian chiefs became involved in the early days of the sugar industry. Hawaii's Governor (John Adams) Kuakini, son of Ke'eaumoku and Nāmāhāna (Kamakau 1992:149), grew sugar cane and had a mill in Kohala; he also had a sugar plantation in Kohala in the 1830s-1840s (Dorrance 2000:17). Between 1863 and 1897 there were 14 sugar plantations in North Kohala (Dorrance 2000:82). Kohala was a land in transition and eventually a major force in the sugar industry beginning with the arrival of American missionary Elias Bood (KTF 1975:68; Stephenson 1977:7).

In the 1840s a political act of the Hawaiian Kingdom government would change forever, the land tenure system in Hawaii and have far-reaching effects. The historic land transformation process was an evolution of concepts brought about by fear, growing concerns of takeovers, and western influence regarding land possession. King Kamehameha III, in his mid-thirties, was persuaded by his *kuhina nui* and other advisors to take a course that would assure personal rights to land. One-third of all lands in the kingdom would be retained by the king; another one-third would go to *ali'i* as designated by the king; and the last one-third would be set aside for the *maka'ainana* or the people who looked after the land. In 1846 he appointed a Board of Commissioners, commonly known as the Land Commissioners, to "confirm or reject all claims to land arising previously to the 10<sup>th</sup> day of December, AD 1845." Notices were frequently posted in *The Polynesian* (Moffat and Kirkpatrick, 1995). However, the legislature did not acknowledge this act until June 7, 1848 (China 1938:16; Moffat and Kirkpatrick 1995:48-49), known today as *The Great Mahele*. In 1850, the Kingdom government passed laws allowing foreigners to purchase fee simple lands (Speakman 2001:91).

The 1840s also heralded other changes as well. The Hawaiian government, with the aid of the missionaries, encouraged the sugar industry as well as other enterprises such as coffee, cotton, rice, potatoes, and silk worms (Speakman 2001: 93). Subsistence crops were ruined by displaced dirt and dust, natives were being asked to grow sugar cane on their lands in exchange for money, only to find themselves indebted, and forced to surrender homelands; land-use disputes between natives and other cultures ensued; and restrictions on government lands prevented subsistence hunting and gathering. Subsistence-based culture was eventually lost with the escalating dependence on purchased goods and the growing development related to sugar production (Tomouari-Tuggle 1988:50, 51).

Disease also had a devastating effect on the population and the landscape, killing *ali'i* and *maka'ainana* alike; measles epidemics in 1848 and 1849, was followed by the horrendous smallpox epidemic in 1853. Ten thousand people are said to have died of this disease in Hawaii (Kamakau, 1992:411, 418). John

The lack of control of the sandalwood trade was to soon create the first Hawaiian national debt as promissory notes and levies were initiated by American traders and enforced by American warships (Oliver 1961:261, 262). "In the 1820s, the sandalwood trade was at its peak and every tree found was cut for its value. The forests of Kohala, which reached almost to the Kawaihae shore as late as 1815, contained an abundance of the coveted wood, presumably the dry-land species. From his home, Olohana [John Young] supervised its measuring and loading" (n.a. 1967:16).

In 1825, Kūhina-nui Ka'ahumanui [King Kamehameha III was just a child] placed a *kapu* on cutting sandalwood trees. She saw what it was doing to the people; neglecting their crops and fishing and getting into debt (Brennan 1995:48). This was too late for Kawaihae. In 1820 the missionaries on the *Thaddeus* noted the "green slopes of Kohala" on arriving at Kawaihae; by 1832 missionary Lorenzo Lyons remarked that Kawaihae was "about as desolate a place as I have ever seen, nothing but bareness, with here and there a native hut, " and "scorched, withered and desolate Kawaihae" (n.a. 1967:18). Between the denuded forest, and the wild cattle ravaging the say re-growth, "they even ate the grass-latched roofs of native houses" (Handy and Handy 1972:18), a growing community in Waimea diverted the streams, forever changing the Kohala leeward landscape and climate (n.a. 1967:18).

During the 1820s the Hawaiian Kingdom government was maintaining relationships with several other world governments on a nation-to-nation basis, yet always under a certain amount of threat.

The Hawaiian government made a number of treaties and agreements with foreign nations during the years 1826 to 1839. In most of them, the Hawaiian government had little room for negotiation because demands "made by the military representatives of powerful nations" were usually backed "with threats of violence and the presence of warships." (133) The French, British, and American all sent warships several times to protect their commercial interests, acquire special rights for their citizens in Hawaii, collect sandalwood debts, and protest Hawaiian land tenure policy. In addition, each foreign nation tried to prevent the other from annexing Hawaii (Greene 1993:Chapter V-k).

Beef became a barter item (Brennan 1995:48); and in 1832, Kamehameha III sent a high chief to California to bring some *vaqueros* back to Hawaii to help with the training of horse and cattle handling. Although the cattle were being slaughtered by the thousands for their hides and tallow, their numbers were increasing beyond belief. Over 100,000 wild cattle were roaming the mountains of Waimea alone. Many crops were ruined by the herds of cattle (Brennan 1995:51-54). The solution was for the *vaqueros* or *paniolo* as Hawaiians called them, to first train Hawaiian and *haoles* men to be good horsemen or wrangler or cowboy (*paniolo*). This was the beginning of Hawaii's cattle kingdom (Brennan 1995:70). Paniolo Jack Purdy and John Parker, Kamehameha III's chief cattle killer, partnered to furnish the king with badly needed beef for bartering with foreign ships (Brennan 1995:74).

In the mid-1800s Kawaihae was a popular anchorage for foreign vessels. Hawaiian chiefs were actively involved in foreign trade, and food, sandalwood, firewood, *puke*, and fresh water were exchanged for imported goods (Kelly 1974:36-77). These items were generally brought from areas outside Kawaihae, but salt was one important trade good produced locally. A well-developed salt manufacturing system was maintained near the beach and each salt pan was said to be owned (Kelly 1974:33-34). Apparently salt was an important traditional exchange item for Kawaihae residents as well, being traded to Kona and other parts of Kohala for food and *topa* (Barrett 1983:30 in Allen 1987:15).

The Hawaiian culture was well on its way towards Western assimilation as industry in Hawaii went from the sandalwood trade, to a short-lived whaling industry, to cattle ranching, and the more lucrative, but insidious sugar industry.

"For the first time Hawaiian masses were drawn to a cash economy as workers and producers." In 1836 the first sugar plantation was established on Kauai (Kent 1983:22, 23, 29). However, sugar cane

Papa 'I'i in *Fragments of Hawaiian History* (1984) talks about the impact of this disease and as *kahu* or guardian of several young *ali'i*; he had to take several of them off of Oahu island. They just kept sailing from island to island and usually were not allowed to land as Oahu was thought to be the source of the smallpox. (TI 1984:171). The people of Kawaihāe were not spared during this period.

The people (of coastal Kawaihāe) have nothing to eat half the time... sometimes they get one meal a day and sometimes they are entirely destitute (Missioha Station Report 1841).... I could not refrain from weeping when I entered there (coastal Kawaihāe)... it was a sad and desolate scene. In April one hundred communicants were present, many of them in the bloom of life - now there were but twenty-four, and not a youth among them (Mission Station Report 1835) (Hamann & Sheilder 1991a:7).

While other places were getting established with growing sugar cane in the 1850s, Kawaihāe was still involved in the whaling industry the fledgling cattle ranching industry via Waimea; cattle were driven from Waimea to Kawaihāe where they were shipped to Honolulu. Cattle pens were located across from the small boat harbor, but massive rock walls near the present Canoe Club are said by local consultants, to be remnants of older cattle pens (Allen 1987:15).

The extensive commerce of Kawaihāe is indicated in an account in the *Pacific Commercial Advertiser* for January 29, 1857 (in Broudy 1971:22) which reports that 40-50 whaling ships had stopped at this port during the year and that exports included 1,500 barrels of salt beef, 5,000 barrels of sweet potatoes, fresh beef, pork, fowl, and beans, 1,200 bullock hides, 5,000 goat skins, 35,000 lbs of tallow, and 22,000 lbs of wool. Weekly service was provided by the inter-island *Boat*.  
ton *Mary* by this time (Hamann and Sheilder 1991a:8).

In 1854 Kamehameha III dies. "Under his liberal guidance, Hawai'i had established constitutional government, a workable legislature, and executive and judicial branches, and had redefined personal and property rights" (Greene 1993:Chapter V-k). In 1856 Emma Nā'ea Rooke, granddaughter of Jobo Oloheana Young married Alexander Liholiho-Kamehameha IV, grandson of Kamehameha I; her estate included Kawaihāe 2" where the heiau of Pu'ukohala and Mailekini are located. Together they founded the Queen's Hospital in 1859 to help with the health care of Hawaiians (n.a. 1967:19; Cahill 1999:157).

By 1858 at least 2,119 foreigners lived in Hawaii. Many were merchants who traded and provided provisions, ranchers and missionaries who lived in various locations throughout the islands. "Foreigners engaged in agricultural pursuits with the idea of reaping a profit from the land, in contrast with the Hawaiians, who carried on...subsistence agriculture" (Coulter 1971:11). In the 1860s the U. S. Civil War brought about a boost for the sugar industry in Hawai'i as sugar plantations in the South were boycotted or destroyed. And while Rev. Lorenzo Lyman was busy building churches (14); *Imitola* in Waimea (1953), *Hoku Loa* at Puukō and one at Kawaihāe in 1859 (n.a. 1967:18-19). Rev. Bood was getting involved in the sugar business. In 1860 Rev. Bood engaged his "long-time acquaintance" (Stephenson 1977:7), Samuel N. Castle in founding the Kohala Sugar Company on lands owned by Bood and his neighbor Dr. James Wright. When George W. Wilfong was hired as the company manager he was surprised to see an abundance of wild sugar cane growing for several miles around. He asked a Hawaiian who gave him the following answer:

After the Kamehameha was (after 1790 on Hawai'i) the *konohiki* (head of land divisions) were ordered to plant cane about the land; so when their chiefs came that way with their many followers, which was the custom of that day, they would have cane to eat (Dorrance 2000:3).

The first crop of the Kohala Sugar Company was harvested in January 1865 (KTF 1975:69). Kohala's transition was a reflection of what was happening elsewhere in Hawaii, as the sugar industry grew. The industry brought in tens of thousands of laborers from Asia, Europe, the Americas, Oceania, and Africa to work on the many plantations and mills that were being established on all major islands, which had a profound effect on life in Hawaii (Oliver 1961:123). This influx not only radically changed the culture,

but also drastically altered ethno-botanical agricultural lands, destroying traditional architectural features in the process.

In Kohala sugar cane was transported by ox-cart to various landings. However, by 1879 Kohala had seven mills and five landings and due to demands, a 20-mile railroad was built between 1881 to 1883, from windward Niuli'i to leeward Mahukoua Landing. "By 1882, most of the original Hawaiian missionaries had died, and those who came later had left. The only remaining missionary stations were at Kohala, Waimea, and Hilo; the churches had been turned over to native Hawaiian pastors" (Greene 1993:Chapter V-k). The monarchy that started in Kawaihāe in 1791 and prevailed during the time of the missionaries were having more downs than ups.

Following the death of Kamehameha V, the popular pro-American Lunalilo reigned for only a year before the kingdom was taken over by King Kalakaua, who ruled from 1874 to 1891. He helped bring about the reciprocity treaty with the United States in 1875. As extended in 1887, this treaty gave the United States the exclusive right to Pearl Harbor and allowed tariff-free exchange of certain items, especially Hawaiian sugar and molasses, for several American products. King Kalakaua also made a world tour — the first by a Hawaiian monarch — thereby catching the attention of world leaders. However, he increasingly leaned toward a return to many of the aspects of the old Hawaiian system, including the idea of divine right. A new constitution was promulgated in 1887, guaranteeing more responsible ministerial government (Greene 1993:Chapter V-k).

Kalakaau's sister Lili'uokalani assumed office in 1891, but was deposed in 1893. Her opponents, mostly American residents in the islands, objected to her attempts to provide a more authoritarian government and reduce American influence. These Americans also sought annexation of the islands by the United States in order to end the prohibitive McKinley tariff of 1890, which had precipitated a severe depression. [186] There were other underlying reasons behind the move for annexation. Honolulu's protected Pearl Harbor was needed as an American fueling station during the Spanish-American War. In addition, some Americans viewed the Hawaiian Islands as a logical steppingstone for United States manifest destiny in the Pacific (Greene 1993:Chapter V-k).

Over the years, large landholders had acquired Hawaiian lands at the expense of the small native farmers. By 1867, seventy-two large private landholders and the government owned approximately 95.36 percent of the land in Hawaii. Americans continued to heavily influence the course of Hawaiian industry. For example, American investors furnished approximately three quarters of the funds invested in the sugar industry and also managed the plantations. Hawaiian government funds continued to be sold until the Revolt of 1893 placed the remainder of the Crown Lands in the public domain (Greene 1993:Chapter V-k).

B-6. Territorial History (AD 1900-1949). Several events, which took place in the early 1900's eventually, created a downward spiral effect on the sugar industry. Mainland labor union leaders went into the fields organizing membership drives, the military began a major drive to install airfields and encampments, and the Federal government imposed quota restrictions on sugar exports (Oliver 1961:147, 148). In 1900 the Waimea Post Office was "officially" changed to "Kamuela" in honor of Samuel Parker, grandson of John Palmer Parker who was then the current owner of Parker Ranch (n.a. 1967:19), and the largest land owner and employer in Waimea.

In 1904 a monumental task and major engineering feat was initiated. The Kohala Ditch was completed in 1906, and provided a minimum of 20 million gallons of water per day to irrigate sugar cane fields in the northern locales of the district (Tomomani-Tuggle 1988:1-42). However, it was not without adverse consequences.

Construction of the Kohala Ditch and the railroad greatly impacted subsistence activities, not in an actual loss of land but in the ability to effectively utilize it. The Ditch tapped the headwaters of the Kohala valleys and gulches and essentially cut the water supply to makai areas, thus ending

irrigated kula cultivation on a wide scale...construction of the Ditch coincided with the abandonment of Hooakane Nui Valley (Tomouani-Tugale 1988:149, 50).

While coastal and kula Kohala were affected by the sugar industry because lands were modified with extensive fields of sugar cane, the higher uplands were modified even more when surviving forests were cut down to provide fuel for the sugar mill.

Also in 1906 William Wagner and David Forbes found a huge cache of artifacts in association with burial caves in Hooakane Gulch, now referred to as "Forbes Cave." The items included four wooden kii or images, a wood bowl inlaid with human teeth, fiber foundations for a feather cloak, a wooden kōnane board with carved images for legs, a fiber helmet with human hair, carrying poles, ornaments, ūpa, and hala mats (Allen 1987:17). The items were later taken to Bishop Museum.

This period saw Native Hawaiians running for Congress (Daws 1974 297); and much of the lands being sold in fee simple. In 1920 Hawaii delegate to Congress, Prince Jonah Kūhiō Kalanianaʻōle authorized the Hawaiian Homes Act. Lands were set aside on all islands for homesteading by Hawaiians with 50% or more native blood (Takeguchi et. al., 1999). Kawaihae I became Hawaiian Home Lands (Figure 6).

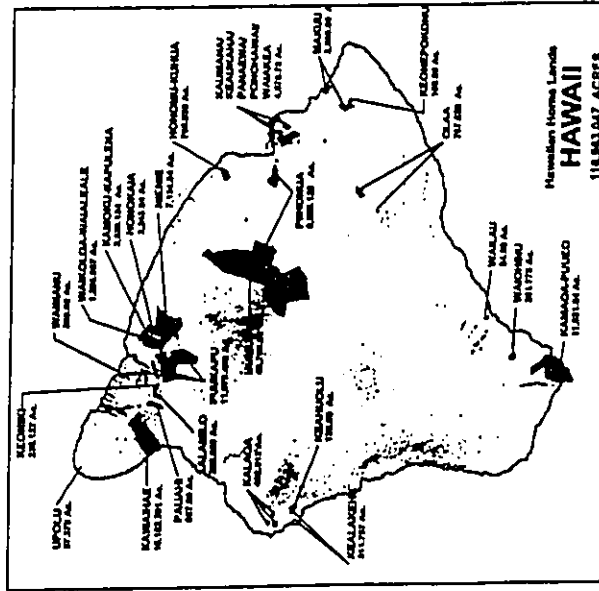


Figure 6. Hawaiian Home Lands - Hawaii Island (DIIIIL 2003).

Prince Jonah Kūhiō Kalanianaʻōle, Hawaii's delegate to Congress, saw the urgent need to revitalize his people. He convinced "āie, ho'opūpūa as a way to help his once proud, self-sufficient people by returning them to their beloved land. His efforts resulted in the enactment of the Hawaiian Homes Commission Act of 1920, as amended (HIIIIL 2003).

Prince Kūhiō was born in Kohala, Kauai, in 1871. He was the youngest of three sons of Kawai High Chief David Kahaiepoai Pitikoi and Princess Kīkaeiki Kēkaiuli. He served as the Territory of Hawaii's delegate to the U.S. Congress from 1903 to 1921. With John Wise, John Laue and Noah Aulū, they formed the first Hawaiian civic club in 1917 (HIIIIL 2003).

In the 1930s Kawaihae appeared to be a gathering place, a place to hohoholo (go for pleasure) or to go sell dried 'opelu and buy supplies for the people of the Kēkaha as well as the cowboys from Parker Ranch.

When 'opelu meke'o (dry) put all in the bag, sew 'um up, pak, put 'um on top the mule, go Kawaihae.... Kawaihae so more that gas tank, mōmōa (before). Only down by the shipping pen where you folks hōlo (go).... One store, Kimo the name of that store. And the old post office was over there...and the shipping pen was right over there. Parker Ranch cowboys come over there... We take ('opelu) over here on the mule. Take to Kimo...he buy. We sell our 'opelu, then we buy rice, flour, salt, coffee.... Three guys go. We go, they wild.... Us we go Kawaihae hohoholo...we eat ice cream.... We go Kawaihae, we eat and smoke, he suck 'um up eh. Pau, we come home. We leave Kawaihae, I think about 2 o'clock, come home. We reach home here about 6:30pm [Tutu Robert L. Kēkaiulani, Sr. In May 1999:A4-5].

In 1935 several more burials were discovered in Hooakane Gulch by Everett Brumaghian and later referred to as "Mummy Cave" because of a mummified tattooed human arm that was found in there. Unfortunately, both this cave and the "Forbes Cave" were subsequently vandalized as reported by Earle in 1980 (Allen 1987:18). (These caves have been the subject of very intense controversy the last few years, especially after the human remains and cultural items were "loaned out" by staff from Bishop Museum only to have them items "stored" a couple of years in someone's home. They have supposedly been recently returned. However, there are those who say the items were not part of the original burial, but where kahuna items hōkōka there after the overthrow of the kōwa system or the traditional Hawaiian religion, therefore are insisting that the items be returned for safe-keeping at Bishop Museum.)

A Japanese puniolo working for Parker Ranch from the 1940s (for 50 years) talked about driving the fattened cattle from Matakāhā to Pu'ūiki by the Lāllimilo House Lot down to Kawaihae, swimming them out to the ships (Hawaii' or Hōmō' side; each boat would hold about 120 head of cattle (Hiro Yamaguchi In May 1999:A61, 86). "In January 1942 a Japanese submarine sank the Hilo-bound U.S. Army transport General Royal T. Frank, and, as a precaution, many harbors and landings were closed" (Dorrance 2000:164).

In the late 1950s Kawaihae became involved in the sugar industry as a shipping port. During World War II the Mahukona port was closed and never reopened. It was costly for Castle & Cooke, owners of Kohala Sugar Company to truck to Hilo. What happened next is explained by Francis Swamy Morgan, Morgan (descendant of Dr. Gerrit Todd) who's family owned Kūiaoa Ranch on O'ahu since 1850, was hired by Theo H. Davies & Co., Ltd. in 1946 and later became owner of Hamakua Sugar Company. He explained that C. Brewer had a monopoly on shipping from Hilo and after negotiations failed he decided to look elsewhere (Dorrance 2000:viii, 79, 86, 95).

Castle & Cooke (owners of Kohala Sugar Company) had considered developing the port at Kawaihae to handle bulk shipments. They proposed a joint venture to Theo H. Davis. Together, we developed the port, shared the costs of the sugar warehouse and loading machinery, and from 1949 on, our product was trucked to Kawaihae with a large savings (Morgan in Dorrance 2000:79). From 1949 until the plantation (Kohala Sugar Company) closed in 1975, sugar was shipped from Kawaihae (Dorrance 2000:86, 94).

B-7. Modern History (AD 1950-). Post World War II brought about an influx of people and industries to Hawaii, allowing the tourism industry and offshoot enterprises. 1950 also marked the introduction of radiocarbon analysis which shifted the focus of study in archaeology from relative dating excavated material cultural remains to carbon dating; this was followed by a research focus on settlement and subsistence patterns, and land and marine resources and use.

In 1955 construction began of the Kawaihāe Harbor. This radically changed the appearance of coastal Kawaihāe, the flow of the ocean, the feeding habitat of several species of marine life, and the lifestyle of the people of Kawaihāe Village and others who frequented the shores of the Kawaihāe black sand beach.

Along with the rise of the tourism industry, and competing sugar markets abroad, the sugar companies saw a sharpening decline in business (the Sugar Acts of 1934 and 1937, and ILWU Strike of 1946 didn't help). The 1950s and 1960s were the bleakest years for the sugar industry and it was becoming apparent that the sugar industry was beyond salvage (Kent 1983:107-108). More changes were soon to take place on the landscapes of Hawaii. The lack of jobs in Kohala caused an exodus to O'ahu during the construction boom of the sixties. As an economic remedy, Kohala Sugar Company offered its employees an option to purchase lots in newly created subdivisions. On the heels of this offer, new jobs were being created in the tourist industry as Mauna Kea Hotel, followed a few years later by other hotels in nearby Waikōloa, were built and occupied in the late 1960's and early 1970's (Tomonani-Tuggle 1988:159-62).

In the 1960s, various federal and state environmental and historic preservation laws and regulations were passed, mandating surveys and impact studies of the landscape, prior to development. Technology and mechanization initiated in the 1950s to 1970s helped to bring about the decline of plantation camps and lifestyles, yet in 1959 "one out of twelve people employed in Hawaii was in the sugar industry" (Vorfeld 2002:1). However, technology could not save the sugar industry, which could not compete with unfavorable sugar markets and higher costs.

On March 1, 1971, Castle and Cooke, Inc. announced that they would be closing Kohala Sugar Company on December 31, 1973. This news hit the community very hard. A legislative-appointed task force was created to search for alternative measures. Through the efforts of the Kohala Task Force (KTF), the Legislature, and Castle and Cooke, termination was postponed for two years (KTF 1972:1-25).

By the 1990s most of the sugar plantations in the State reluctantly closed down operations. The vacant lands soon gave way to various development projects and the need for more Environmental Impact Studies (EIS). However, the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) and its implementing regulations (43 CFR Part 10) shifted the focus of studies to include a greater interaction with indigenous peoples, and a lesser focus on invasive methods of study.

In 2000 Hawaii's Legislature passed an EIS amendment resolution which the governor signed as Act 50. This legislation has broadened the scope of environmental impact studies to include cultural impact studies in order to assure that traditional Hawaiian and other ethnic cultural practices are not adversely impacted by proposed projects, as vacant sugar fields give way to the ever-growing population, expanding tourist and real-estate industries, and other development projects. [For more on Kawaihāe, see "Historic References" section of this report.]

### C. Traditional Literature

The ethnographic works of the late 19<sup>th</sup> and early 20<sup>th</sup> century contribute a wealth of information that comprise the traditional literature—the *mo'olelo*, *oli*, and *mele*—as well as glimpses into snippets of time, and a part of the Hawaiian culture relatively forgotten. The genealogies handed down by oral tradition and later recorded for posterity, not only give a glimpse into the depth of the Hawaiian culture of old, they provide a permanent record of the links of notable Hawaiian family lines. The *mo'olelo* or legends allow *ka po'e kahiko*, the people of old, the *kupuna* or ancestor, to come alive, as their personalities, loves, and

struggles are revealed. The *oli* (chants) and the *mele* (songs) not only give clues about the past, special people and *waahi pouna* or legendary places, they substantiate the magnitude of the language skills of *na kupuna kahiko* (the people of old).

C-1. Genealogies. *Po'e ku'aukua* or genealogy *kahuna* (masters) were very important people in the days of old. They not only kept the genealogical histories of chiefs "but of *kahuna*, seers, land experts, diviners, and the ancestry of commoners and slaves.... An expert genealogist was a favorite with a chief." During the time of 'Umi-a-Liloa, genealogies became *kapa* (restricted) to commoners, which is why there "were few who understood the art; but some genealogists survived to the time of Kamehameha and even down to the arrival of the missionaries" (Kamakau 1992:242).

Surviving genealogies illustrate that the ruling families of each island were interrelated quite extensively. The chiefs of O'ahu, Kauai, Hawaii, Maui and Molokai had one common ancestry. Families branched out, but conjoined several times in succeeding generations (Kamakau in McKenzie, 1983:xv). Not only were the chiefs or *alii* related to each other, they were also related to the commoners. In *Ruling Chiefs*, Kamakau states that "there is no country person who did not have a chiefly ancestor" Kamakau (1992:4). "It is said that the chiefs of Hawaii's island were from Maui and from O'ahu and Molokai between the times of 'Aikama and Hamaia 'uni'" (Kamakau, 1991:101).

Malo (1987) also wrote about the connection between the *maka'ainana* and the chiefs. "Commoners and *alii* were all descended from the same ancestor, Waia and Papa" (Malo, 1987:52). This is evident in the genealogies. Genealogies were very important to the chiefs, because ranking was very important. The genealogies not only indicated rank; they ascertained a link to the gods.

The following excerpt explains the idea and importance of rank and the role of genealogies:

Position in old Hawaii, both social and political, depended in the first instance upon rank, and rank upon blood descent—hence the importance of genealogy as proof of high ancestry. Grades of rank were distinguished and divine honors paid to those chiefs whose who could show such an accumulation of inherited sacredness as to claim with the gods among men... a child inherited from both parents.... The stories of usurping chiefs show how a successful inferior might seek intermarriage with a chief's rank in order that his heir might be in a better position to succeed his parent as ruling chief.... a virgin wife must be taken in order to be sure of child's paternity—hence the careful guarding of a highborn girl's virginity (Blockwith: 1990:11).

One could defend and/or prove their rank by knowing or having one's genealogist recite one's genealogy. "To the Hawaiians, genealogies were the indispensable proof of personal status. Chiefs traced their genealogies through the main lines of 'Ulu, Nana'ulu, and Pili, which all converged at Waia and Papa (Barrett, 1969:24). Two well-known genealogy chants are the *Kumuhonua* and the *Kumulipo*."

C-1-a. *Kumuhonua*. The *Kumuhonua*, first published by Fornander in 1878, in *The Polynesian Race* Vol. 1, was based on information from Kamakau and Kepelino. *Kumuhonua*, the man, was of the Nanaulu line, and the older brother of Olopana and Moikeha (McKenzie 1986:14-15). However, the birth chant *Kumuhonua* has been a subject of controversy as noted in following *Preface* by Kenneth P. Emory:

We have become painfully aware that the *Kumuhonua* 'legends' are not ancient Hawaiian legends, nor is the genealogy which accompanies them a totally authentic genealogy...in his second volume (1880) when he relates events from the period of the arrival in Hawaii of migrant chiefs from Tahiti to the time of Kamehameha, in these writings he is dealing with relatively unaltered, authentic Hawaiian traditions and genealogies....we must ever be on guard against the effects of this impact in what was recorded subsequently about the pre-contact period....The world of the Polynesian began to be transformed overnight by Western influence." (In Barrett, 1969:1)

The following list (Table 1) of *alii* are in a loose chronological order; not all unions are represented:





response to a call to preserve the Hawaiian heritage. Some of the information came from Malo's (1838) Hawaiian History, and in Fornander's (1880), The Polynesian Race (Book I) (McKenzie, 1983:1).

The ruling chiefs of the various islands came from combinations of genealogies or branches. The list of Hawaii's Island Chiefs provided in Table I has most of the people in a loose chronological order, however, the multiple unions of a particular person is not necessarily in a chronological order, as much of that information was not provided in most cases. This list is not by any means inclusive as many lesser unions (mates and offspring) were not listed or recorded in official genealogies.

Youngblood (1992) found that he could draw on both Fornander and Beckwith's translations of *The Kumulipo* to sketch a socio-political history of Hawaii (Youngblood, 1992:34). In his re-creation he found that stemming from Waikea and Papa are two major Hawaiian genealogies: the *Maui ulu* and the *Ulu*. The *Maui ulu* was the wellspring for the *ali'i* of O'ahu and Kauai, while the *Ulu* line supplied the chiefs of Maui and the Big Island.

Using thirty years to account for one generation, McKenzie determined that Waikea was born in AD 190; Umi-a-Liela in 1490; Keawe'ehala'iohookoku in 1650; Kalaunuihiku'upaiukanihi Keoua in 1710; and Kamehameha I in 1740 (McKenzie, 1983:12). Volume Two of *Hawaiian Genealogies* was published in 1988 to 1990. It complements genealogies found in other works, such as Fornander's (1880) *An Account of the Polynesian Race...*, and David Malo's *Hawaiian Antiquities* (McKenzie, 1986:v).

The following excerpt is from Kamakau's article in *Ka Nupepa Kuaokoa* October 7, 1865, and was translated by McKenzie (1986). It illustrates some of the mid-19<sup>th</sup> century sentiment regarding genealogies:

*I na makainana, he mea waiwai ole, no ka mea no papa ka labou mau makua o hookahikalie, a hookahana kiki o ke kooione a pii'ou i na i'i. No laila ia no ole ia ai na kiki a na makainana, ma kahi makuaane o hookahikalie, a kupauna aia no.... Ia kailou i ka poe o keia wa, aole waiwai o keia mea he moooli ole o labou mau kuleana mai iloko. Aia, ma ka kalou waiwai o keia mea, aole waiwai o keia mea, ma ka kalou waiwai o keia mea, aole waiwai o keia mea, aole waiwai o keia mea. Aia, ma ka kalou waiwai o keia mea, aole waiwai o keia mea, aole waiwai o keia mea. Aia, ma ka kalou waiwai o keia mea, aole waiwai o keia mea, aole waiwai o keia mea. Aia, ma ka kalou waiwai o keia mea, aole waiwai o keia mea, aole waiwai o keia mea.*

To the commoners, a genealogy was of no value because their parents forbade (hik) it lest comparisons should occur and country children be born and rise up as chiefs. Therefore, the children of the commoners were not taught beyond father, mother, and perhaps grandparents.... To us, the people of this time, there is no value of this thing of a chiefly lineage; we have no great interest in it. But in our thoughts it is of great value. We have entered into discussion of it; the chiefs valued the chiefs and ancestors; and we also value our knowledge of it. Because it was forbidden to the commoners, they were not to know this. However, due to the rise of wisdom and skill of the children of the commoners, they were not to know this. Because of the wisdom and skill of the children of the commoners, therefore, all of the ranking privileges were no longer restricted; it was only lifted. What remains of the ancestors is something of value (McKenzie 1986:18-19).

C-2. Mo'olelo. Legends, stories or mo'olelo are a great cultural resource as well as entertaining. Leib and Day (1979) state in their annotated bibliography of Hawaiian legends, that legends "are a kind of rough history." They noted Luomala's idea of the value of legend and myth in the serious study of a culture and her following quote. "To a specialist in mythology, a myth incident or episode is as objective a unit as an axe, and the differences and similarities of these units can be observed equally clearly and scientifically." Leib and Day also expressed concern about authenticity, and sometimes found it difficult to determine if a legend was a primary or secondary source. The following definitions of terminology including the Hawaiian classification of prose tales--mo'olelo or ka'ao, come from their work (Leib and Day 1979:xi, 1).

**Tradition**  
used to refer to that which is handed down orally in the way of folklore

**Folklore**  
a rather inclusive term, covering the beliefs, proverbs, customs, and literature (both prose and poetry) of a people

**Myth**  
a story of the doings of godlike beings

**Legend**  
deals with human beings and used interchangeably with 'myth'... because the collectors and translators of the tales often failed to make the strict distinction

**Ka'ao**  
'pure fiction'

**Mo'olelo**  
deals with historical matters and somewhat didactic in purpose... included tales of the gods, as well as tales of historical personages... many have recurring patterns, plots, and types of characters

C-2-a. History of Mo'olelo Collecting. According to Leib and Day (1979) a substantial number of legends were collected and written in Hawaiian, during the century following Cook's arrival in Hawaii. A few accounts of the mythology were printed in the journals of missionaries and travelers, and a few of the Hawaiian lore were printed in languages other than English. The following synopsis are excerpts from the works of Leib and Day's (1979), and gives an overview of the first collectors and compilers of Hawaiian myths and legends.

The first printed narrative legend of any importance is the epic "Song of Lono" in Byron's *Voyage of H.M.S. Blonde to the Sandwich Islands* (1826), credited by Byron to the American missionaries. Byron had hoped that the missionaries "will obtain a correct knowledge of the creed and traditions of the islanders." Unfortunately, the missionaries were at first more anxious to supplant the native beliefs with new ones than to perpetuate the old ones, with the result that a good many of the legends became altered or were lost. However, the missionaries did a more thorough job of writing down the legends than did the explorers and voyagers (Leib and Day 1979:5). William Ellis, who sojourned Hawaii in 1823, is credited as "chronologically the first important source of Hawaiian mythology. Although (Ellis) deplored the content of the legends, they showed that the Hawaiian had mental powers which might later be employed on subjects more consistent with truth" (Leib and Day 1979:6).

About 1836 a movement was started under the influence of Reverend Sheldon Dibble, to write down in Hawaiian some of the material dealing with the native legendary history, customs, and other lore. Results of the research were published at the Lahainaluna press in 1838. A partial translation made by Rev. Reuben Tinker was issued serially in 1839 and 1840--the first four installments appearing in *The Hawaiian Spectator* and the last four in *The Polynesian*. In 1841 the Royal Hawaiian Historical Society was formed at Lahainaluna. Some of their research and earlier *Ka Ikaokoa Hawaii* were incorporated into Dibble's *History of the Sandwich Islands* (1843). After his death in 1843 his work was carried on principally by two of his outstanding native pupils, David Malo and Samuel M. Kamakau. Malo wrote his own *Mo'olelo Hawaii* about 1840 at the request of Rev. Lorin Andrews, which was later translated by Emerson as *Hawaiian Antiquities*. In 1858 the Rev. John F. Pogue of Lahainaluna printed a third *Mo'olelo Hawaii*, based on the 1838 history, but included additional material. Kamakau did not print any of his material for thirty years (Leib and Day 1979:7, 8, 9).

The increase in the amount of Hawaiian lore appearing in the native press in the 1860's and thereafter was at least in part the result of an organized effort to collect and preserve such material. At Kamakau's instigation a Hawaiian society was formed in 1863 to collect material for publication in the native press at the time, and also to aid Fornander's research. Fornander was the greatest collector of Hawaiian lore. He credits as sources, several natives whom he sent on tours of the Hawaiian Islands to collect all available Hawaiian lore, as well as Kailaha, Lorin Andrews, Malo, Dibble, Dr. John Rae, Kamakau, Nabbe, S.N. Hakole, Kepelema, and Renny. The culmination of this effort was Fornander's (1880) *An Account of the Polynesian Race: Its Origin and Migrations and the Ancient History of the Hawaiian People to the Times of Kamehameha I*.

RECEIVED AS FOLLOWS

successor Hakau, half brother of 'Umi, sends messengers to the district chiefs of Kohala, Kona, and Hamakua ordering them "to report without delay at Waipio with two thousand warriors each" (Kaikaua 1990:298). Some of the sources reviewed are listed here:

Barrow, Terence (1985) *More Incredible Hawaii.*  
 Day, A. Grove (1992) *Hawaii and Polau Souk: Two Island Tales*  
 Ellis, William (1984) *Polyesian Researches: Hawaii*  
 Foranader, Abraham (1996) *Ancient History of the Hawaiian People*  
 Kaikaua (1990) *The Legends and Myths of Hawaii*  
 Knudsen, Eric (1946) *Teller of Hawaiian Tales*  
 Miyamoto, Kazuo (1991) *Hawaii, End of the Rainbow*  
 Pratt, Helen Gay (1998) *The Hawaiians, an Island People*  
 Thum, Thom. G. (1998) *Hawaiian Folk Tales*  
 Westervelt, William D. (1963) *Hawaiian Legends of Volcanoes*  
 Westervelt, W. D. (1987) *Myths and Legends of Hawaii*  
 Westervelt, William D. (1995) *Hawaiian Legends of Ghosts and Ghost-Gods*  
 Westervelt, William D. (1996) *Hawaiian Historical Legends*

The following *mo'olelo* mention Kawaihae as noted in the *Hawaiian Legends Index* (1989) v II.

Beckwith, Martha Warren (1919) *Lale (La wa), In The Hawaiian Romance of Laleikawai*  
 Beckwith, Martha Warren (1919) *Honouliuli In The Hawaiian Romance of Laleikawai*  
 Beckwith, Martha Warren (1919) *Poaka and Kupaokai In The Hawaiian Romance of Laleikawai*  
 Beckwith, Martha Warren (1919) *Kuanawa In The Hawaiian Romance of Laleikawai*  
 de Vis-Noronha, Lionel W. (1819) *The Story of the Noble Stone.*  
 Emerson, Nathaniel Bright (1993) *The History of Moikaha In Expanded Collection of Hawaiian Antiquities and Folklore v II*  
 Foranader, Abraham (1984) *The Story of Umi*  
 Foranader, Abraham (1984) *Legend of Honouliuli*  
 Foranader, Abraham (1984) *Legend of Pupaikaha*  
 Foranader, Abraham (1984) *Legend of Kupaokai*  
 Foranader, Abraham (1984) *Legend of Poika*  
 Foranader, Abraham (1984) *Legend of Kupaokai*  
 Foranader, Abraham (1984) *Legend of Nani*  
 Foranader, Abraham (1984) *Legend of Iwa*  
 Foranader, Abraham (1984) *Chief Stories of Ghosts and Cursing*  
 Foranader, Abraham (1984) *Legend of Pupaikaha*  
 Foranader, Abraham (1984) *Chief Sketch of Kamehameha I*  
 Foranader, Abraham (1984) *Famous Men of Early Days*  
 Foranader, Abraham (1984) *A Story of Kamehameha*  
 Govea, Herbert Rev (1998) *Lono's Last Martyr, Hawaiian Myths of Love and Death*  
 Kaikaua, David (1990) *Umi, The Peasant Prince of Hawaii, in Legends and Myths of Hawaii*  
 Kaikaua, David (1990) *The Prophecies of Kamehameha*  
 Kaikaua, David (1990) *Kaiana, The Last of the Hawaiian Knights*  
 Kaikaua, David (1990) *The Destruction of the Temples*  
 Kaikaua, David (1990) *The Story of Laleikawai*  
 Kaikaua, David (1990) *Kamehameha's Last Heir in Hawaii, in People, their Legends*  
 Thum, Thom G. (1993) *Kai a Kahinai In More Hawaiian Folk Tales*  
 Westervelt, W. D. (1996) *Captain Cook In Hawaiian Historical Legends*  
 Westervelt, W. D. (1996) *The Annihilation of Kona's Army In Hawaiian Historical Legends*  
 Westervelt, W. D. (1996) *Kaniwa In Hawaiian Historical Legends*  
 Westervelt, W. D. (1996) *The Wonderful Story In Legends of Old Hawaii*

Foranader's collection remains the most important single source of Hawaiian legends (Leib and Day 1979:9, 12, 13).

In June 1865 Kaikaua began publishing in *Ke Nuipepe Kaula*, articles on traditions and legends. His series of articles dealing with Hawaiian history, particularly from the late eighteenth century on, and especially of Kamehameha, appeared weekly in the same publication in October 1866. When the newspaper ceased in 1869, this series continued in *Ke Au Oloa* for nine months. Kaikaua then wrote a series on ancient Hawaiian religion, customs, and legendary history in *Ke Au Oloa* until February 1871. All of his writings were in Hawaiian (Leib and Day 1979:9, 9).

Very little work was done in translating Hawaiian mythology into English until late in the nineteenth century. It wasn't until 1888, over a hundred years after the discovery of the Hawaiian Islands, that the first book in English dealing exclusively with Hawaiian mythology was printed. *The Legends and Myths of Hawaii* by King Kaikaua. However, it was more likely authored by former United States Minister to the Hawaiian Islands, R.M. Duggett (Leib and Day 1979:5, 7).

Thrum is one of the most frequently cited authorities on Hawaiian lore. He was born in Australia in 1842 and arrived in Honolulu in 1853. In 1875 he began publication of the *Hawaiian Almanac and Annual*, later known as *The Hawaiian Annual* or *Thrum's Annual*, which appeared yearly under his editorship until his death in 1932. Thrum's contribution is as editor, compiler, and publisher of translations, not translator. By providing in his *Annual* a place for the publication of such material, and perhaps by persuading authors to provide him with translations, he was instrumental in much legendary matter appearing in printed form. Thrum wrote or rewrote a large portion of his own material (Leib and Day 1979: 17).

Thrum's first book *Hawaiian Folk Tales* was published in 1907 and consisted largely of tales that had previously been published in *Thrum's Annual*. Only 35 of the 260 pages were translated by Thrum, the rest were credited to Rev. A.O. Forbes, Rev. C.M. Hyde, William Ellis, J.S. Emerson, Mrs. E.N. Haley, N.B. Emerson, Mrs. E.M. Nakawa, Walter M. Gibson, Joseph M. Poepe, and M.K. Nakua. His second book *More Hawaiian Folk Tales*, published in 1913 was similar. A number were translations from Hawaiian language newspapers of half a century earlier, often with no translator cited. Translators credited were A. F. Knudsen, Henry M. Lyman, W. D. Westervelt, J. H. Boyd, and Lahlalai Webb. Some of the chapters were reprinted or abridged from the Bishop Museum translations of the *Foranader Collection*, of which Thrum was editor. His greatest work, *Foranader's Collection of Hawaiian Antiquities and Folklore*, was published by Bishop Museum in 1916 and 1920 in three volumes. The original editor was W. D. Alexander and most of the work completed under his supervision. However, he died in 1913 and Thrum was appointed to complete the production. Beckwith credits John Wise with the original translation of that work. In 1920 or 1921 Thrum completed another work "Ancient Hawaiian Mythology" which was never published (Leib and Day 1979: 18-19).

A great resurgence of interest in Hawaiian folklore began in the early twentieth century, in part caused by the annexation to the United States. People on the mainland wanted to know more about "their new island possessions." The funds of the Bureau of American Ethnology were made available for Hawaiian studies i.e., Emerson's *Unwritten Literature* and Beckwith's *Laleikawai*. The most important twentieth-century translation of Hawaiian legends have been N. B. Emerson, Thomas G. Thrum, William D. Westervelt, William Hyde Rice, Laura C. S. Green, Martha Warren Beckwith, and Mary Wiggins Kawena Paki. Emerson's extensive notes were a major contribution to Hawaiian scholarship. Most of them explain the meanings of Hawaiian words. In many, Emerson alludes to legends, giving a number of them briefly and relating a few in some detail. Some of these probably do not exist anywhere else in print (Leib and Day 1979:14).

C-2-b. Mo'olelo Review Sources. Due to the limited research time of this project, only a cursory review of mo'olelo sources was done. A few stories in the Kaikaua (1990) collection of legends mentioned Kohala, though not specific enough and will not be recounted here i.e., "The Triple Marriages of La'amaihihi" (Kaikaua 1990:120); "Lono and Kaikaha" (Kaikaua 1990:321); "The Adventures of Iwiwikauna" (Kaikaua 1990:338) and Kaiana, the last of the Hawaiian Knights (Kaikaua 1990:384-385, 393, 398). In Kaikaua's (1990) *mo'olelo* of "Umi, The Peasant Prince of Hawaii," Liloa's

C-3. *Mele and 'Oli*. Aside from the *mo'olelo*, legends or stories of these famous and infamous *ali'i*, the chants and songs also give glimpses into the lives of the ancient ones. This research has revealed that there are literally thousands of *mele* and *oli* that have been recorded and/or written over the last 170 years. There are several indexes of songs and chants in the Hawaiian Collections at the University of Hawaii Hamilton Library (i.e., Horie 1990; Silliman 1988; 1990; 1993; 1996). Unfortunately, they just give the first line as titles, and it would probably take several months to go through each *mele* and *oli*. Pukui explained that it was common, for chants not to have a title, as it was the composer's role to create the *mele*, which was then given away. When formal titles were not specified, the first line of verse served as the title (Pukui, 1995: xvii). Some of the "titles" had reference to Kama, Iliana or Maui and should be followed up. These are listed in [Appendices D & E] along with their reference source. However, there are texts of songs and chants compiled and translated by Roberts (1967), Pukui (1995), and Emerson (1997), as well as chants in legends compiled by Foranauer (1969). Roberts' *Ancient Hawaiian Music* only covers *mele* from the islands of Kauai, Oahu and Hawaii (Roberts 1926/1967: 11).

The Hawaiian word *mele* included all forms of poetical composition and sometimes overlap *oli* or chant, the lyric utterance (Emerson, 1997: 254). In regards to Hawaiian poetry or *mele*, "they had no exact word for so abstract a term as our poetry." The English equivalent to the Hawaiian *mele* means a song. All *mele* were "sung, or rather chanted, or cantillated. This is equally true of all early poetry of whatever race.... The *mele* is interwoven in Hawaiian culture with the *hula* and the *kaao*—that is, poetry is interwoven with the dance and with mythology.... *Haku mele*, is one who arranges words into song (Plews, 1981: 176).

The following is a *mele* or song about Kawaihae found during an InterNet search about Kawaihae:

*Kaulana Kawaihae*  
by Keihibae Alama Nahi

Kaulana o Kawaihae I ke kai hāwawana	Resful Kawaihae In the whispering sea
Hui:	Chorus:
E'ōlelo mai kahiko mai O Puaka'ilima E kihoi iā Mauua Kea Kua'ihwi kō kihakila	Telling from olden times of Puaka'ilima Gaze at Mauua Kea Mountain standing majestic
E'ōlelo mai kahiko mai O Puaka'ilima	Telling from olden times of Puaka'ilima
Ha'ina mai ka puana Kua'ihwi kō kihakila	Tell the refrain Mountain standing majestic
E'ōlelo mai kahiko mai O Puaka'ilima	Telling from olden times of Puaka'ilima

Puaka'ilima (the ilima blossom) was a low istet off the shore of Kawaihae (water of wrath) in the south Kona district of Hawaii. It was one of old, maintained a garden of ilima, specifically, to make leis for the chiefs. The tsunami of 1946 took back the island, when it subsided into the reef. The surf that broke on this reef was also called Puakalima, for it resembled ilima leis. This reef was dredged out for the construction of Kawaihae Harbor and is now only a memory. The composer was born in Waipio Valley and moved to Kawaihae when she married a Waimea man.

C-4. *'Olelo No'eau*. *'Olelo no'eau* or proverbial/traditional sayings usually had several layers of meanings. They reflected the wisdom, observations, poetry and humor of old Hawai'i. Some of them referenced people, events or places. The following *'Olelo no'eau* were compiled by Pukui between 1910 and 1960 with both translations and an explanation of their meaning (Williamson, et al. in Pukui, 1983: vii), which are often more *kaona* (hidden or double meaning) than obvious.

*'Olelo no'eau:*  
Translation:  
Meaning:

*'A'ole w'i hele wile o Kohala*  
No youth of Kohala goes empty-handed.  
Said in praise of people who do not go anywhere without a gift or a helping hand.... Another version is that no Kohala person goes unprepared for any emergency (1911, p.25).

*'Olelo no'eau:*  
Translation:  
Meaning:

*He pōhi kō lea no Kohala, e kōle ai ka waha 'ai*  
A restful white sugar cane of Kohala that injures the mouth when eaten.  
A person that one does not tamper with. This was the resort of Pupuika, a Hawai'i chief, when the Maui chief Hahakuihānaunani made fun of his small stature. Later used in praise of the warriors of Kohala, who were known for valor (1875, p.95).

*'Olelo no'eau:*  
Translation:  
Meaning:

*I'ike 'ia no o Kohala i ka pōhi kōle ai ka waha*  
One can recognize Kohala by her rows of sugar cane which can make the mouth raw when chewed.  
When one wanted to fight a Kohala warrior, he would have to be a very good warrior to succeed. Kohala men were vigorous, brave, and strong (1917, p.127).

*'Olelo no'eau:*  
Translation:  
Meaning:

*Ipa lei Kohala no ka Moa'e'āhi*  
Kohala is like a wreath container for the Moa'e breeze.  
Kohala is a windy place (1236, p.136).

*'Olelo no'eau:*  
Translation:  
Meaning:

*Kohilipua Kohala no ka moana*  
Kohala is swept, munched and all, by the wind.  
Kohala is a windy place (1313, p.143).

*'Olelo no'eau:*  
Translation:  
Meaning:

*Ka moana 'Ape'ape'a o Kohala*  
The 'Ape'ape'a wind of Kohala.  
Kohala was famed in song and story for the 'Ape'ape'a wind of that district (1455, p.157).

*'Olelo no'eau:*  
Translation:  
Meaning:

*Kohala 'āina ho'āhau*  
Kohala, land of the proud.  
The youth, let-be-dethed, were proud of their handsome appearance and of their home district (1813, p.196).

*'Olelo no'eau:*  
Translation:  
Meaning:

*Kohala i ka unuqo'a*  
Kohala of the solid stone.  
The people of Kohala were known for their firm attitudes (1815, p.196).

*'Olelo no'eau:*  
Translation:  
Meaning:

*Kohala, mai Hono'ō'ō a Kauhāloano*  
Kohala, from Hono'ō'ō to Kauhāloano.  
The extent of Kohala (1816, p.196).

*'Olelo no'eau:*  
Translation:  
Meaning:

*Ku pō'ia e ka 'Ape'ape'a*  
Founded first by the 'Ape'ape'a wind.  
Said of sudden terrible disaster, or one who has taken a beating. The 'Ape'ape'a is a wind of Kohala (1884, p.203).

*'Olelo no'eau:*  
Translation:  
Meaning:

*Le'i o Kohala i ka maku no mānala*  
Covered is Kohala with men to the very point of land.  
A great population has Kohala, Kauhāloano once traveled to Kohala to spy for his father, the ruling chief of Maui. While there, he did not see many people for they were all tending their farms in the upland. He returned home to report that there were hardly any men in Kohala. But

The following place names of Kawaihāe were found on maps. Some of the place names have managed to survive the changes over time.

Table 2. Annotated place names of Kawaihāe lands and vicinity.

Alawai	Bathing pool in Kawaihāe (T1 1959:59 in Kelly 1974:28).
Hale-o-Kapuni	Hāina site near Kawaihāe, Hawai'i to be restored. Kamohameha I is said to have used this <i>hale</i> , and abuts were fed there. Rocks from here may have been used to build Pu'u-kohala <i>ke'iaua</i> . <i>Lit.</i> , house of Kapuni (a high priest of the chief Keawe) (Pukui et al., 1976:38).
Hooakoa	Gulch, Kohala <i>qd.</i> <i>Lit.</i> , brave boy (Pukui et al., 1976:49).
Kapeu'ilima	Reef at Kawaihāe, and surfing spot.
Kawaihāe	Kawaihāe 1 & 2; <i>obscure</i> 's. South Kohala. Kawaihāe is an ancient surfing area. The meaning of the name is: "Water-of-wrath" which, it was said, derived from the fact that people fought for water from a pool in this arid area [Elbert, Ms.]. According to present [1974] residents at Kawaihāe, this pool has been destroyed by recent harbor developments (Kelly 1974:5).
Kohala	District (famous for the "Apu'apu" a wind), <i>qd.</i> , extinct volcano, land location, forest reserve, ditch, mountains, village, etc., northwest Hawai'i (Pukui et al., 1976:114).
Mai'ikini	Ancient <i>ke'iaua</i> near Kawaihāe, Hawai'i, near Pu'u Kohala, soon to be restored. (ii 17) <i>Lit.</i> , many male vines (Pukui et al., 1976:139).
Makahuna	Gulch, Kohala <i>qd.</i> <i>Lit.</i> , hidden-point or hidden-eyes (Pukui et al., 1976:140).
Mumuhu	Strong winds of Kawaihāe. (Kelly 1974:37).
Pelekae	"British" - site of where Kroua was killed supposedly by former Brits John Young and Isaac Davis - west of Pu'u Kohala <i>ke'iaua</i> .
Pu'u Kama'i'i	Peak marks of project
Pu'u Kohala	Hill and <i>ke'iaua</i> near Kawaihāe, Kohala, Hawai'i, constructed by Kamohameha I for his war god, Kū-ka'i-uli-moku. In 1966 it was declared a registered national historic landmark and in 1972, a congressionally authorized national historic site; it is to be restored by the National Park Service. (ii 17; Kuykendall 1:37; RC 145, 154). <i>Lit.</i> , white hill (Pukui et al., 1976:199-200).
Waialepa's	Place adjacent to Pelekae, 20 ft from shore where water wells up from under the surface. Said to have been warm and have healing qualities. Place where people bathed in spite of proximity to Hale-o-Kapuni <i>ke'iaua</i> and the sharks (From Eddie Laau to Kelly 1974:28). Ellis (1823/1963:287) described the warm springs - "a short distance to the southward of the large <i>ke'iaua</i> ...most refreshing baths. The springs were a little below high-water mark and had stones piled around them to enclose the water that bubbled up through the sand (Kelly 1974:33).
Waimea	The literal meaning of the word is "reddish water," as though it had been lined as it drained through the <i>hope</i> (tree fern) forest or thought the red soil (Elbert, Ms) (Kelly 1974:5).

when the invaders from Maui came they found a great number of men, all ready to defend their homeland (1973, p 213).

*Lele au la, kohakoha wale iho.*  
I fly away, leaving disappointment behind.  
Said of one who is disillusioned after giving many gifts. Waka'ia was a ghost of North Kohala who deceived people. He often flew to where people gathered and chanted. When he had their attention he would say, "I could chant better if I had a tapa cloth" (1975, p 213).

*Lele o Kohala me he lupe la.*  
Kohala soars as a kite.  
An expression of admiration for Kohala, a district that has often been a leader in doing good works (1938, p 214).

*No 'ilina wai' ole o Kohala.*  
The waterless plains of Kohala, where water will not remain long.  
After a downpour, the people look even in the hollows of rocks for the precious water (19220, p 243).

*Nani ka waiho o Kohala i ka la'i.*  
Beautiful lies Kohala in the calm.  
An expression of admiration for Kohala, Hawai'i, or for a person with poise and charm—especially a native of that district (19276, p 248).

*No pu'u hae'iaua, o Pili me Kauhikihaha.*  
The hills that go together--Pili and Kauhikihaha.  
These two hills that stand together are often mentioned in chants and legends of Kohala (19292, p 250).

*'Ope'ope Kohala i ka meka'i.*  
Kohala is buffeted by the wind.  
[No meaning given] (19233, p 277).

*'Ulu me'eme'e o Kohala.*  
A person who hangs around constantly. Ne'eme'e, a variety of sweet potato, also means "to move up closer" (19211, p 309).

*'Ope'ope Kohala i ka meka'i.*  
Kohala is buffeted by the wind.  
[No meaning given] (19233, p 277).

C-4. Place Names. Hawaiians of old generally named everything: from winds and mountains, to rocks, springs, canoes, taro patches, fishing stations, and "the finest spots where miraculous or interesting events are believed to have taken place" (Elbert in Pukui et al., 1974:1). They all represented a story, some known only locally, while others became legendary.

Place names are an expression by the ancient Hawaiians of their attachment to the land, sea, and skyline (animals, mountains, sea and not seen). Hawaiian place names are the benchmarks of Hawaiian history, values, and experience on the land and sea which nurtured and sustained them and in the sky which oriented them. The ready omission - in some cases purposeful, of place names, for the sake of "convenience" - has facilitated the erosion of what might be called a "sense of place." Perhaps, it takes merely a generation or two after the removal of a place name for yet another aspect of the cultural attachment of the *ka'oiwa* to their islands to disappear. As is often demonstrated in the cultural historical resources review process, one aspect in the Hawaiian cultural environmental sustains and supports many others, and the erosion of the subtleties of historical consciousness to land, sea and sky threatens more than just the signpost on the street-corner (Creed and Maly 2002:1).

D. Historic References.

By and large "Historic References" pertain to notable historic events, overviews of important place names and land tenure within the project area and districts. One of the most significant practices in the history of the Hawaiian people was their concept of the stewardship of the land. However, over time, these practices were replaced by more western methods of land use, as the lands of South Kohala went from the domain of the *ali'i nui* to the monarchy; to various individuals and corporate entities.

D-1. History of Land Divisions. It was during the time of Kamehameha I that the division of lands is said to have taken place under a *kahuna* named Kalahaohi'i. He partitioned out the island into districts, sub-districts, and smaller divisions, each ruled over by an agent appointed by the landlord of the next larger division, and the whole under control of the ruling chief over the whole island or whatever part of it was his to govern (Beckwith 1970:383). Each island was divided into *moku* or districts that were controlled by an *ali'i 'ai moku*. Within each of the *moku* on each island, the land was further divided into *ahupua'a* and controlled by land managers or *konohiki*. The boundaries of the *ahupua'a* were delineated by natural features such as shoreline, ridges, streams and peaks, usually from the mountain to the sea, and ranged in size from less than ten acres to 180,000 acres (Moffat and Kirkpatrick 1995:24-29; see also Chinen 1958:3).

Each *ahupua'a* was often divided and sub-divided several times over (i.e., *ili*, *luakana*, *mo'o*, *pouka*, *ko'e*, *kila* *pa'i*), answerable to *ali'i* where the lesser division was located. However the *ili* *luakana* or the *ili* *ku* was "completely independent of the *ahupua'a* in which it was situated...Inherits were paid directly to the king himself" (Chinen 1958:4). Rights to lands were mutable or revocable; a ruling chief or any "distributor" of lands could change these rights if displeased, or as (avors--usually after a victorious battle, and after the death of the *ali'i nui*) (Chinen 1958:5).

During the period between 1839 to 1855, several legislative acts transformed the centuries-old Hawaiian traditions of *ali'i nui* land stewardship to the western practice of private land ownership. In the first stage, King Kamehameha III (Kauikoaouli) divided up his lands among the highest ranking *ali'i* (chiefs), *konohiki* (land managers), and favored *haole* (foreigners) (Chinen 1958:7-14; Moffat and Fitzpatrick, 1995:11, 17). This historic land transformation process was an evolution of concepts brought about by fear, growing concerns of takovers, and western influence regarding land possession. Kamehameha III, in his mid-thirties, was persuaded by his *kuhina nui* and other advisors to take a course that would assure individual personal rights to land.

One-third of all lands in the kingdom would be retained by the king; another one-third would go to *ali'i* or chiefs as designated by the king. In 1846 he appointed a Board of Commissioners, commonly known as the Land Commissioners, to "confirm or reject all claims to land arising previously to the 10<sup>th</sup> day of December, AD 1845." Notices were frequently posted in *The Polynesian* (Moffat and Kirkpatrick, 1995). However, the legislature did not acknowledge this act until June 7, 1848 (Chinen 1958:16; Moffat and Kirkpatrick, 1995:48-49), known today as *The Great Mahele*. "The *mahele* did not actually convey title to the various *ali'i* and *konohiki*; it essentially gave them the right to claim the lands assigned to them--these lands became known as the *konohiki* lands. The *konohiki* chiefs were required to present formal claims to the Land Commission and pay a commutation fee, which could be accomplished by surrendering a portion of their land to the government." The government could later sell these lands to the public. Upon payment of the commutation fee, the Minister of Interior issued a Royal Patent to the chief or *konohiki*. The last one-third was originally designated to the *maka'ainana*, but not acted on--just as it was set aside to the government, "subject always to the rights of the tenants" (Moffat and Kirkpatrick, 1995:41-43; see also Chinen 1958:15-21).

*Ili luakana* were the only *ili* (part) recognized in this process, all the *ili* and lesser divisions were absorbed into the *ahupua'a* claim (Chinen 1958:20). In 1892 the legislature authorized the Minister of

Interior to issue Royal Patents to all *konohiki* or to their heirs or assignees where the *konohiki* had failed to receive awards for their lands from the Land Commission. The Act further stipulated "that these Royal Patents were to be issued on surveys approved by the Surveyor General of the Kingdom" (Chinen 1958:24; Moffat and Fitzpatrick 1995:41-43). Kamehameha III formalized the division of lands among himself (one-third) and 245 of the highest-ranking *ali'i* and *konohiki* (one-third) between January 27 to March 7, 1948. He acknowledged the rights of these individuals to various land divisions in what came to be known as the *Buke Mahele* or 'sharing book'.

D-2. Land Commission Awards (LCA). An internet search of the Waipona Mahele Database www.waipona.com (Waipona 'Mina, Inc.) produced four Land Commission Awards (LCA) claims in the *ahupua'a* of Kawaihae, but only claim (MA#8513) was awarded, that of Lincoln B. Lorenzo for Kawaihae uka. However, according to Hammit & Sheldor (1991 a: 7) "eleven LCAs were awarded to Native Hawaiians at Kawaihae but these awards were all coastal Kawaihae Town....Kawaihae was retained by King Kamehameha III as Crown Lands." (See Haun 2003 Appendix F.)

D-3. Kawaihae. Kawaihae was once a significant village and port of call in the Proto-historic and Early Historic Periods. It was the site of pivotal events, such as the building and dedication of Pu'u Kohala Heiau and the sacrifice of Keoua-Kuhua-ula, an act that Kawaihae Ka-pou-kahi told Kamehameha would assure his ascendancy to power, thus radically changing the history of Hawaii from individual island polity rule to a one-rule monarchy (Kamakau 1992:154). However, to some of the early visitors to Kawaihae, they had a very different perception. On one of his many trips to Hawaii, Captain Vancouver describes Kawaihae.

Tooiha [Kawaihae] is situated in a grove of cocoa nut trees, just behind a sandy beach. A reef of coral rocks, extending thence about three quarters of a mile into the sea, rendered it inaccessible to our boats in a direct line, but we landed very commodiously in a narrow channel, between the reef and the shore, near the mouth [Pu'u Kohala], to the S.E. of the beach, from whence we had about two miles to walk. . . . 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 trading, building, and repairing their canoes, were excellent in their kind (Greene 1993: Chapter VI:11-A).

In the 1800s another visitor, Isaac Ilesin on the *Maryland*, visited Kawaihae and described what he observed.

This Bay of Tooiha [Kawaihae] is very open; an extensive reef runs near it nearly level with the water, and altogether it is no inviting place to anchor at. The country around it looks like a hilly barren desert; nothing grows within ten miles of it, except a few coconut trees, of which a fine grove stands near the beach. The inhabitants and huts are thinly scattered along the shore, far less numerous than about Kairakooah, and seem more indigent, indeed, having to go so far for their subsistence, they are not seldom in want of the supports of life (Greene 1993: Chapter VI:11-A).

Kawaihae had one of the early Mission Stations as noted by Greene (1993) and the missionaries also described the area.

Kawaihae was the site of one of the first mission stations in the Hawaiian Islands, although it was only briefly looked after by Elisha Loomis beginning in 1821. Kawaihae and Puako were ultimately included in the area served by missionaries Dwight Baldwin from 1832 to 1835 and Lorenzo Lyons from 1837 to 1876. Lyons landed at Kawaihae in 1832 before proceeding to Waimea to establish a station. He noted that Kawaihae was "about as desolate a place as I have ever seen, nothing but barracks, with here and there a native hut." His Waimea parish eventually included the districts of Kohala and Hamakua, making it the largest mission station in Hawaii. During his tenure, Lyons was responsible for the erection of fourteen churches, including one at Kawaihae (Greene 1993: Chapter VI:11-A-4).

Although most descriptions about Kawaihae were diurnal, one visitor, Isabella Bird Bishop, managed to put a positive twist on her description of Kawaihae in the 1870s.

A foreign store, a number of native houses, a great heiau, or heathen temple on a height, a fringe of cocoa-nut palms, and a background of blazing hills, flaring with varieties of red, hardly touched down by any attempt at vegetation, a crystalline atmosphere palpating with heat, deep, rippleness, clear water, with coral groves below, and a view of the three great Hawaiian mountains, are the salient features of this outlet of Hawaiian commerce (Greene 1993: Chapter VI:11-A-4)

Lands throughout the island chain were re-distributed to the loyal supporters of Kamehameha. Kawaihae was one of those lands that were divided (Kawaihae 1 and 2) and redistributed with one explanation (1800s) below from the "Kawaihae 20, District of South Kohala, Island of Hawaii, Boundary Commission, Hawaii, Volume B, pgs 391" by Creed and Maly (2002).

Kamehameha, kane was born at Kawaihae aka, he says, "I saw the Pukou and was old enough to cook food at that time. I live on Kawaihae 1<sup>st</sup>, Kohala, Hawaii, and have always lived there. I am a kananiwa of these lands, and know the boundaries between them, from the shore to maoula end. My parents told me the boundaries. Kanaawa, my father, and Nakoana, my mother, were kamauna here. They told me the boundaries because of the killing of Oloheana's man by Kawaihaepopo's son. They wanted to kill the man, but Kalaimaku (Kalaimoku, father of Leleiohoku) said no, give the land to pay for it, and so the land from Iohakouka to Waiulala (Waiulala is boundary between Kawaihae 20 and Ooli) was given to Oloheana (John Young), and this place where we now are was left for Kawaihae 1<sup>st</sup>" (Creed and Maly 2002:7).

[Kawaihae]...the meaning of the name is "Water-of-war" which, it was said, derived from the fact that people fought for water from a pool in this area (Eibert, Ma). According to present residents at Kawaihae, this pool has been destroyed by recent harbor developments (personal conversation, E. Laau and W. Akau) (Kelly 1974:3).

Population. Ellis recorded 100 houses in Kawaihae village in 1824 (Ellis 1963:288). Averaging five persons to a house, the population was about 500. In 1835, a missionary census reported the population of Kawaihae to be 437, including 150 male adults, 178 female adults and 109 children (Schmitt 1973:27). In the summer of 1853, the smallpox epidemic struck Kawaihae. A report on June 27, tallied 17 cases and 4 deaths, with 3 currently ill and 12 recovered (Greer 1966:101).... The church at Kawaihae had about a hundred communicants; after the epidemic there were only 24, and not a youth among them. The others were dead, sick, convalescent, or gone (Greer 1966:101) (Kelly 1974:55).

One visitor, Caspar Whitney commented in 1899, on the decline of Kawaihae.

Once, many years ago, Kawaihae was a thriving port, where the whalers came for the potatoes raised on the hills directly back of the settlement, and people lived here and prospered. Now the settlement owes its life to the weekly arrival of the steamer from Honolulu. Small wonder its handful of residents shake off sleep to view this periodical deliverance from utter stagnation! (Greene 1993: Chapter VI:11-A-4).

D-3-a. Kawaihae Canoe Club. The Kawaihae Canoe Club is located south of the Kawaihae Lighthouse at the northern end of the Kawaihae Harbor and is an active club. According to Coach, Manny Veincent, there are 250 members who practice in and outside of the Kawaihae harbor.

The Kawaihae Canoe Club, a "Terrestrial Big Island paddling powerhouse," was formed in 1972 by a group of athletic and civic-minded individuals from Waimea. Athletic activities were sorely needed at the time. The ancient Hawaiian sport of outrigger canoe racing was being revived on other parts of the Islands. According to old-timers, the sport was active in Kawaihae many years before. It seemed fitting to continue the tradition...two hundred individuals make up the Kawaihae Canoe Club. Participants live in the South Kohala, South Kohala, Hamakua and Hilo districts (KCC 2003).



Photo 7. Kawaihae Canoe Club at north end of the harbor.

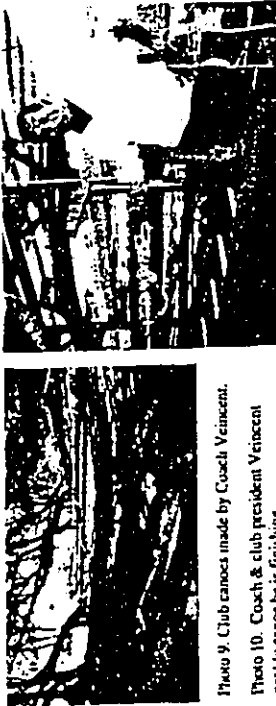


Photo 9. Club canoes made by Coach Veincent.

Photo 10. Coach & club president Veincent next to canoe he is finishing.

Photo 8. Canoe paddles now made by Coach Veincent anywhere.

Coach Manny Veincent is founder, president, equipment manager, canoe builder and janitor he says, of the Kawaihae Canoe Club whose members range from 9 year's old to 79 year's old. Club members can be found practicing almost everyday from Kawaihae Harbor to Mahukoua, normally about six miles north of the harbor. During mauka winds the paddlers stay about 10 feet from the shoreline, but during regular winds they can paddle up to about 200 feet off shore (Veincent 2003).

According to Coach Veincent he makes all the club's canoes, a skill he learned from two kupauna, one from Hilo and one from the West-side of the island. His pure Hawaiian mother is from the Kahaehaeha opana. Also Hawaiian is Assistant Coach Rui Auwae, the eldest grandson of the late Kahuia La au Lapa'u Papa Henry Auwae. Coach Auwae has been paddling for over 30 years and has been a Kawaihae longshoreman for 25 years. He says that any project has impacts; there's concessions that have to be made if for good. Coach Veincent feels that the fiber optic cable land drilling is no problem, but ocean dredging will be with work-basis in the canoe paddling area (Veincent 2003; Auwae 2003).

The next long-distance (8 miles) race will take place the first part of May 2004; and the Annual Regatta is scheduled for Memorial Day weekend from the harbor to the first buoy (Veincent 2003).

Today (mid-1970s) Kawaihae Bay and coastline are so changed that they are hardly recognizable as the same place. Rev. Tyerman (1822 described - drawing by Montgomery 1831). Or even Wilson (1920) sketched. [Kelly's] 'before' and 'after' aerial photographs taken in 1950 and 1971 indicate how much of the change has been made (Kelly 1974:41).

D-3-d. Kawaihae Bay & Harbor. One of the reasons for Kawaihae's popularity with the outside world was Kawaihae Bay. Over the course of time the bay and her famous anchorage was modified to suits the needs of progress. Some of that history of change is describe by Greene (1993) and other's below.

Despite the non-descript nature of the early village of Kawaihae, as recorded in the journals of early Euro-American voyagers to the islands, it has played a conspicuous role in Hawaiian history. In both prehistoric and historic times, its spacious natural harbor has distinguished it from the other coastal settlements of leeward Kohala, making it not only the safest mooring spot in that district, but also one of the best anchorage on the island of Hawaii..... According to under William French, who owned a store in Kawaihae, the settlement was extremely active during the time of Kamehameha's reign. Its harbor and its proximity to the fertile uplands of Waimea ensured its status as an important stopover for many early European voyagers and merchants needing to make repairs and re-supply their ships (Greene 1993:Chapter VI:11-4-A-1).

Because King Kamehameha firmly controlled all trade and other intercourse with Euro-American ships, all sea captains arriving in the Hawaiian Islands had to obtain his permission before initiating any activities with his subjects. Therefore ships were constantly stopping at Kawaihae to pay their respects and gain his blessing when he was in residence. If he was not there, visitors contacted John Young, Kamehameha's business manager and governor of the island from 1802 to 1812, an important foreign political figure who, while he lived at Kawaihae, exerted a strong influence on its social, political, and economic life (Greene 1993:Chapter VI:11-4-A-1).

In 1949 construction of a deep-draft harbor was recommended for the bay, which by that time was a small port shipping sugar, steers, pigs, and sheep to markets on interisland vessels. In 1957 a contract was let to build causeways, a dike, and a revetment; the new deep-water port of Kawaihae Harbor was finally completed in 1959. Three years later the Corps of Engineers decided to widen the harbor's entrance channel and its basin, extend the existing breakwater, and constructing a small boat harbor (Greene 1993:Chapter VI:11-4-A-8).

The following excerpts from *GlobalSecurity.org* website also present a history of the Kawaihae Harbor and the relationship between the harbor and the military.

Kawaihae, 35 miles north of Kailua - Kona, has been used since 1937 [for] various shipping purposes, first as a berthing for interisland steamers, and then by ships after 1959 when it was developed into a deep draft harbor.... Kawaihae Harbor... was a small port of historical significance until 1957 when the Corps began construction of a deep-draft harbor. The initial project concluded with completion of the main breakwater in 1959. The Pohakuloa Training Area (PTA) is about midway between Hilo, on the east coast and the Army landing site at Kawaihae Harbor. In preparation for large-scale training exercises at PTA, the ground forces are flown to Hilo and transported over Saddle Road. Supporting equipment and vehicles are transported from Oahu by ship or barge to Kawaihae and driven to the site....

While the military cargo ramp at Kawaihae Harbor... underwent repairs in early 2001, the Logistics Support Vessels assigned to the 45th Corps Support Group (Forward) had to find an alternate off load site. The only viable option turned out to be the state pier, which are located across from the military ramp within Kawaihae Harbor. Shaping that decision was the fact that the LSV can lay ber ramp on the pier to discharge cargo, and consequently take up less pier space....

Water pollution is a continuing problem in the vicinity of the harbors. It is anticipated that the use of both deep [water] draft harbors will expand substantially. As population grows, resort areas develop in West Hawaii and cargo is re-routed from Hilo, Kawaihae Harbor is especially expected

D-3-b. Kawaihae Surf. Kawaihae was also an ancient surfing area (Kelly 1974:5). Kelly (1974) gives some surfing quotations by 'Ti. "The surf at Kapuailima is in Kawaihae" (Ti 1959:135). "Liholiho and Giteon Lanui, 'were often seen together gliding on the surf outside of Halekumihiole at Kawaihae and at Kapuni, outside of Kiihikoi'" (Ti 1959:28) (in Kelly 1974:28).

The following is from a surfing website *EMSquared* informing on the three main surf breaks in Kawaihae. This was not only a favorite surfing place for ancient Hawaiians of the area, it continues to be enjoyed by today's surfers as well.

This may be the most inconsistent surf break in the world. Still, the nature of this spot causes it to have a long list of devotees. At smaller sizes it is impossible to ignore a comparison with Waikiki. The waves form long rolling breakers that are perfect for longboards. At this size the break lacks the punch for smallboards. Beginners have a good time, as the reef is deep and the waves die out before running up on any rocks.

Somewhere around 5 feet Kawaihae begins to reap with a little power. At 8 feet it is not unusual for boards to break and for some of the surfers to be pounded on the reef. With size, the waves really power-up, and shortboards may be used at intermediate sizes. However, the long, walling nature of the wave is such that board length is an advantage, when covering all that ground.

There are three main breaks. The main reef, called in ancient times *Kapua-Ilina*; the break by the small boat harbor; [and] the break in front of the shark basin.

This break was named after the *Ilina* flower, a hibiscus, which grew in profusion upon a small inlet, which lay just inside of the surfbreak. Apparently quality flowers were available consistently enough to be considered remarkable, and so the name.... The inlet was consumed by the construction of the breakwater for the commercial Harbor at Kawaihae, during which the reef was blown-up by "neck stone blasts." The reef is an extensive one, with multiple breaks, both right and left. As size increases, the dominance of the right become more apparent. The spot takes a direct West, and possibly W/NW swell to break. Many times there is substantial surf South of here, while Kawaihae sits in the "shadow" of the island of Maui.

This spot is the site of the annual *Pua* - Kailima Longboard Surfing Classic. It's also now the first cultural surf park in the country. A Board of Directors governs the event and oversees maintenance of the park (EMSE 2003).

D-3-c. Kawaihae Landing. Photographs from the mid-1800s reveal a number of land structures near Kawaihae Landing. Most prominent was William French's warehouse where he stored sandalwood, wool, barrels of staked beef, and hides waiting for shipment to Honolulu or California. French received his land from Governor Kuakini in 1838 to store cargo near the landing. There was also a wool shed, native store, boathouse, and jail in 1838; and a store, hotel and jail in 1903, with the old soapworks and salt pans not far away (Kelly 1974:35).

As ranching at Waimea expanded, and large ships were brought into interisland service, Kawaihae became one of West Hawaii's largest ports of call. From it and other similar ports cattle were shipped alive in Honolulu's slaughterhouses. They were driven into the water, floated to the waiting ship tied by their horns to a small boat and lifted in a belly sling on to the deck of the ship. A roadway, that runs just back of Dol's store and leads to the cattle pens, was described by Eddie Lasu as the cattle road which was used in the days when the cattle were river from Waimea and held in the corral near the old wharf until ship day (Kelly 1974:37).

In January 1872 Lyons recorded a great storm: "All wharves swept away at Kawaihae.... Apparently the wharf was either repaired or a new one was built because in April of the following year, Kawaihae received a visit from King David Kalakaua and Queen Kapiolani at which time "All Waimea went of Kawaihae" (Doyle 1953:205, 298. in Kelly 1974:40).

11-3-e. **Kawaihale Fishing Practices and Concerns.** Kawaihale was once an ancient fishing village where various species were in abundance. The people there fished for produce from people in the uplands. Recent studies indicate that there still are a number of species, but not in abundance.

**Kawaihale, Hawaii Fish Data (3 and 10 meters). Findings:** Among 60 reefs, Kawaihale 3m ranked 25 in species richness, 5 in density, 2 in biomass, and 35 in diversity. Kawaihale 10m ranked 38 in species richness, 13 in density, 13 in biomass, and 23 in diversity. The most abundant species were the Brown surgeonfish (*Acanthurus nigrofasciatus*) and the Golden surgeonfish (*Ctenochaetus striatus*) at the 3m and 10m reefs, respectively. The species with the highest biomass were the Convict tang (*Acanthurus lineatus*) and the Orangeband surgeonfish (*Acanthurus fasciatus*) at the 3m and 10m reefs, respectively. This area was dominated by herbivores. *Acanthurus nigrofasciatus* and *Mugiluretus aeneus* presence presence notable (not common to sites surveyed) (Camp 2003).

A Big Island company's plans to raise and sell up to 4.4 million pounds of ahi in underwater pens off of Kawaihale have been delayed to address environmental concerns raised by two community groups. Ahi Nui Tuna Farming LLC will conduct a full environmental impact statement on the project -- a process that will postpone the proposed start-up of the operation by nine months to a year, said Clayton Iremion, Ahi Nui's fish-farming expert. "We're all trying to make this work for the community," he said. "The logical thing is to try to resolve the concerns." The company is proposing to catch juvenile big-eye and yellowfin tuna and raise them until they are ready for market in underwater cages over 216 acres of ocean about four miles north of Kawaihale. Ahi Nui will raise the fish in six cages 165 feet across and 60 feet deep, anchored in about 170 feet of water 1,100 to 1,800 feet from shore. If the venture is successful, the company may expand to up to 18 cages. The operation could bring in up to \$10 million a year and create 50 to 100 jobs, Iremion said. But local fishermen and others in the area are concerned about how the project will affect the environment and their access to the ocean. "We have a stake in the area. We live there and we fish there. What if it gets polluted? We can't just pull up our stakes and fish somewhere else," said Andy Ito, a member of the Kawaihale Fishing Association, a group of fishermen, including native Hawaiians, formed because of their concerns about the project. "We'd like to see the Kawaihale area have something for our children and our children's children," he said. His group and another organization called Ka Māhāli'i O Kūhala Ohana, composed of fishermen, divers, surfers and paddlers, have asked for a contested-case hearing over state permits needed for the project to begin operations (Gina 2003).

Paniolo Yamaguchi of Parker Ranch also talked about "squirbling" in Kawaihale.

Our days plenty Ah'e, even Kawaihale...before they made that wharf there, plenty. [Wharf construction] they took away most of the corals eh. Because before you could go on the coast, you can walk on the coast...all gone (Yamaguchi in May 1999, A75-76).

Two brothers (same mother, different fathers) Alfred Berdon, Sr. and Kenneth Demaya mentioned the Berdon sampan fleet (18). They were commercial fishermen in Kawaihale in the 1950's and lived between what is now the canoe club and the former Dot Store. Kawaihale was once a sandy beach from the canoe club to Spencer Beach according to Kenneth who misses that life style and now lives in Wainima (Berdon & Demaya 2003).

11-3-f. **Kawaihale Salt Pans.** Located on the beach at Kawaihale were a number of salt pans where ancient and historic Hawaiians of that area processed salt for various uses and for trade. Vancouver described the salt pans on one of his early trips in the late 1700s.

In about the middle of the village [Kawaihale] is a reservoir of salt water, nearly in the center of a large enclosure, made by walls of mud and stones. Between these walls and the reservoir the whole space is occupied by shallow earthen pans, of an regular size or shape, not placed in any order or degree of elevation. The reservoir . . . constantly affords a sufficient quantity of excessively salt water, for supplying the numerous pans (Kieune 1993; Chapter VI:FA)

to experience a dramatic increase in its use. Cargo volume at Kawaihale Harbor has increased significantly as the population and development in West Hawaii continues to grow. The Hawaii Commercial Harbors 2020 Master Plan was developed by the State in 1998 to guide the development, maintenance and enhancement of the island's harbor systems to ensure its efficient, safe, accessible and economical operations.

There is a deep water draft port and small boat harbor at Kawaihale, both of which are being further developed. Kawaihale Harbor has two commercial piers with approximately 14 acres of cargo landing and storage areas, with room for expansion as needed. Although a new piermaster breakwater was constructed at the southern end of the harbor by the Army Corps of Engineers, there [There] is insufficient parallel docking space at the present facility. The State Department of Transportation has plans to increase small boat capacity when funding can be appropriated (by developing a small boat harbor outside the coral stockpile area where a portion of a breakwater has been constructed). The Hawaii Commercial Harbors 2020 Master Plan identifies the need for additional cargo yard space to accommodate intermodal and overseas cargo as well as the construction of a passenger terminal at Pier 4.



Photo 11. Kawaihale Harbor (S) from just below Pu'u Kohala showing breakwater

In the late 1990s the U.S. Army Engineer District, Honolulu, completed construction of a harbor for light-duty vessels at Kawaihale, in the South Kohala District of the island of Hawaii. The entrance channel and turning basin were dredged in 1969 and 1970 during Operation Tugboat. Completing the harbor required extension of the existing breakwater and construction of a new mole and breakwater. No additional dredging was required. However, the construction covered about 1.8 hectares (4.5 acres) of natural habitat, some of which is occupied by corals and associated organisms. The Army Corps of Engineers recommended that a coral transplantation and monitoring plan be developed as one of the measures designed to mitigate adverse impacts of harbor construction.

The existing small boat anchorage is bounded by revegetated landfill to the north, the existing breakwater to the west, a relatively healthy coral reef to the south, and a relatively eroded reef platform to the east. The turning basin apparently functions as a sediment sink, and is characterized by low-relief sand flat, low wave energy, and sparse coral coverage dominated by delicate corals (*Pocillopora damicornis* and finely branching *Montipora verticosa*). The U.S. Fish and Wildlife Service reports that reef fish diversity in the basin is high (64 species) but abundance is low (GSO 2002).



In the 1860s Isaac Iselein of the *Maryland* commented that "several salt ponds or pans, the arrangement of which displays much industry and ingenuity" (Greene 1993: Chapter VI-11-A). Ellis also described the salt production of Kawaihae ca. 1823 and noted the liberal use of salt in their meals and in preserving the fish (Greene 1993: Chapter VI).

The natives of this district manufacture large quantities of salt, by evaporating the seawater. We saw a number of their pans, in the disposition of which they display great ingenuity. They have generally one large pond near the sea, into which the water flows by a channel cut through the rocks, or is carried thither by the natives in large calabashes. After remaining there some time, it is conducted into a number of smaller pans about six or eight inches in depth, which are made with great care, and frequently lined with large evergreen leaves, in order to prevent absorption. Along the narrow banks or partitions between the different pans, we saw a number of large evergreen leaves placed. They were tied up at each end, so as to resemble a shallow dish, and filled with seawater, in which the crystals of salt were abundant (Greene 1993: Chapter VI-11-A.3b).

According to LCA native Register (LCA 10, 903 Puna; 10,904 Manua) the salt pans of Kawaihae had individual names: Pohaikula, Pipipi, Nuape, Makela, Puopua, Iweraka, Kaniku, Kapohukapu, Wiliwili, Kukui, Kaulamio (2) and Maluhuehue (2). "The foregoing names are our areas of land. These names have been given to the salt depressions. These areas were taken and conveyed to the *aliʻi* (Kawaihae) in the middle of the reign of Kamehameha I. There are a total of 14 of them" (Kelly 1974:34). In Greene's (1993) history of the area for the Pu'u Kohala National Historical Park, she summarizes the importance of the salt pans to Kawaihae.

The salt pans constructed for the extraction of salt from seawater were an extremely important aspect of Kawaihae's subsistence — perhaps its major industry for many years. Because of its shoreline's lack of fertility, Kawaihae was always foremost a fishing village; in the mid-1800s, it was reportedly the best place to buy fish on the entire island. This distinction resulted not only from its abundant marine resources but also from its status as an important trading center in which people from other communities along the Kohala coast brought their catches. The ready availability of salt there allowed the immediate preservation of excess fish for use as trade items or for future local need. The locals traded this salt to Kona as well as other sections of Kohala for the necessities they lacked — such as cultivated food and kapa.

Hawaiian salt, used to season and preserve fish and meat, was one of the first items of exchange between the natives and foreign fur traders in the early nineteenth century. Extensive areas in certain parts of the islands were reserved for the production of this commodity. On Hawaii Island, Kawaihae boasted the largest salt pans. Hawaii exported salt from around 1840 to 1881, reaching a peak production about 1870. Hawaiian salt was later used in curing hides in addition to salting meat, requiring construction of larger pans as the Waimea cattle industry expanded; these were destroyed by a tidal wave in 1946 (Greene 1993: Chapter VI-11-A.3b).

According to some former Kawaihae residents and current harbor area users, the salt pans were located in the vicinity of the current Kawaihae Canoe Club, but they are not sure exactly where as the area was completely modified with the dredging and construction of the harbor (Demaya, 2003; Veinsent 2003; Auwae 2003).

Photo 12. Canoe Club in view of harbor.



Photo 13. View of Lighthouse and project site (Veillet 2001).



Photo 14. Kawaihae Lighthouse adjacent to project.

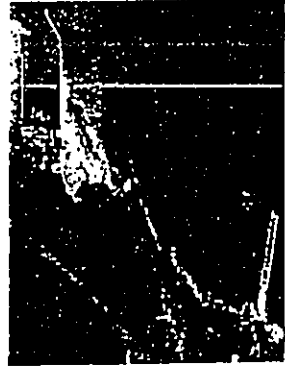
D-3-g. Kawaihae Lighthouse. The Kawaihae Light is managed by the U. S. Coast Guard. It's located in the adjoining property, south of the project site. It's a "square pyramidal reinforced concrete tower" with an operational light. The first lighthouse was built in 1869; the present-day tower was built in 1915 (LHD 2003). Kawaihae Lighthouse is above the Kawaihae Harbor, on the North West coast of the Island of Hawaii (Big Island). It's a 36-foot high white pyramidal concrete tower with the light 59ft above sea level (ca 9M) (ZL 2003).

D-3-h. TMK: 6-1-04-0020 (includes former parcel 2). Parcel 20 is a long parcel that follows the coastline. In the 1950s and 1960s other parcels were incorporated into it (Appendix G). Hamann et al., (1991 a & c) identified four pre-contact sites and one historical site within TMK: 6-1-04; par 20, and described in 1991b. The pre-contact sites include Site #811 Habitation Enclosure; Site #700 Burial Mounds; Site #812 Shelter/Habitation Complex; Site #813 Habitation Platform. The only historic site to be given a site number to date was Site #814 a World War II Observation Post (Figure 7).

RECEIVED AS FOLLOWS

However none of these sites are within the former parcel 2 (south end of par. 20), the location of the fiber optic drill site. No description of this particular parcel was found in the Hamann et al. studies. Friday there are several remnants that exist within the former parcels 2 and 3, which will be described in more detail in the study currently being conducted by Ham & Associates. In a telephone conversation (May 21, 2003) with lifetime Kawaihale resident and former Kawaihale Harbor Master William Ah You Akau, he explained the remnants there.

In the 1930s there was a pier there where the Parker Ranch cowboys would drive the cattle to and hoist them onto boats for shipping to O'ahu. There was what he called a shed which was the sleeping quarters for the cowboys, and a canteen station set up for both men and women. The pier suffered its first major damage in the 1946 tidal wave that slammed into the coastline. Additional heavy storms and high seas further deteriorated the pier making it unsafe to use. It was abandoned for better facilities at the Kawaihale Harbor (Akau 2003).



An aerial photo of the harbor circa 1960 from Bishop Museum shows the pier in the lower left-hand corner of the photo. However, a website photograph of the Kawaihale Lighthouse and coastline by Mauna Kea astronomer Christian Veillet shows no sign of the pier; the other remnants are also not visible from the sea (See photo above).

Photo 15. Bishop Museum Photo (cropped photocopy) ca. 1960s, clearly shows the pier (lower left corner).

D-34. TMK: 6-1-04:par 20 (former parcel 2). The project drill site is located on the former parcel 2 now incorporated into portion 20. It is primarily kiawe trees and grasses, often strewn with various rubbish.

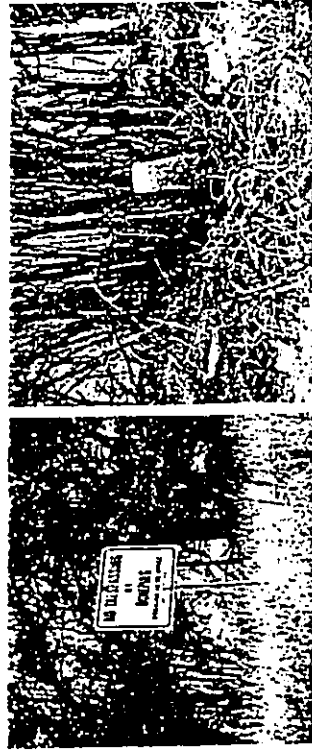
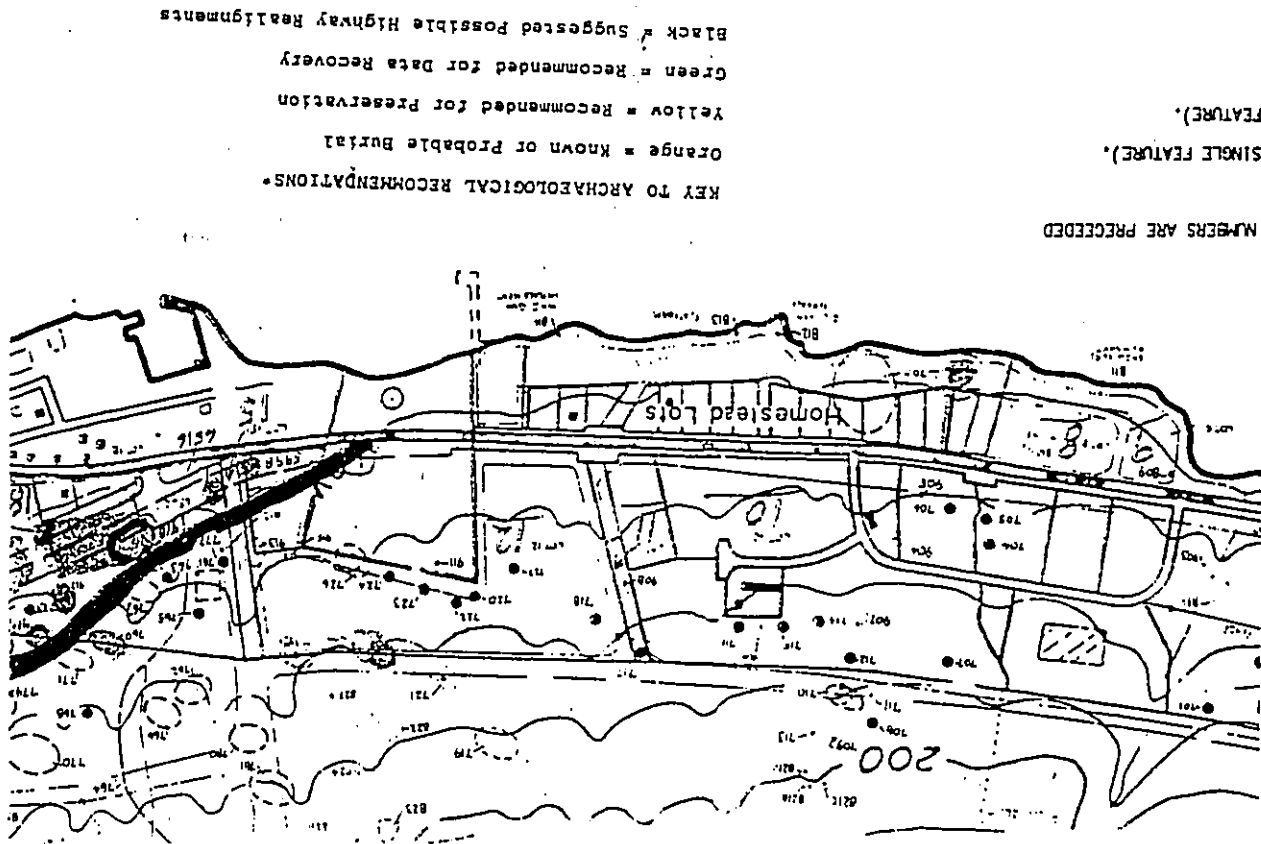


Photo 16. Sign in kiawe/grass grove.

Photo 17. Various types of trash in project area.



KEY TO ARCHAEOLOGICAL RECOMMENDATIONS.

Orange = Known or Probable Burial

Yellow = Recommended for Preservation

Green = Recommended for Data Recovery

Black = Suggested Possible Highway Realignment

NUMBERS ARE PRECEDED

SINGLE FEATURE).

FEATURE).

Figure 7. Map indicating sites on project leads (adapted from Hamann et al., 1991a/c).



Photo 18. Fishermen camping at project site historic ruins.

The project site is bisected by a road that is cordoned off with cinder and rock berm. Several historic remnants (ruins/piers) can be seen in the project area such as a concrete wall, pier and piling remnants, and basalt/mwā facility remnants. Fishermen camping at project site said they were fishing for *menjarhi* from the coastline and gathering *opiti* (Fishermen 2003).



Photo 19. Fishermen get around the cinder berm.



Photo 20. Remnants of the old pier.



Photo 21. Historic remnants of old pier.



Photo 22. Wall of unknown age.



Photo 23. Pu'uhohola Heiau maieikimi of Maieikimi Heiau and Hale-o-Kapuni (Shook) Heiau

D-4, Pu'u Kohola, Pu'u Kohola Heiau, located at the south east of the harbor is said to have been a reconstructed older Lono heiau from the time of Lonoikamakahiki (1580) and Kama and "consecrated by Lono" (Kelly 1974:6).

It is said that Lonoikamakahiki built (1580) a temple on the border between South Kohala and North Kohala to memorialize a covenant between himself and his friend, Kapihahāhā (Purmanoh 1974:7, 300-302). The temple was named *Kapihahāhā* (another emphasis) and this has been the name of that place ever since (Kelly 1974:5).

Tradition holds that the present heiau on the "hill of the whale" overlooking Kawaihāe Bay is located on the site of an earlier temple structure. Further centering around one of King Lonoikamakahiki's heiaus with his enemies on Hawaii, at Kawaihāe, as recounted by Furness, mentions Maieikimi and Halekapuni and alludes to Pu'uhohola as a strategic point that the rebels hoped to occupy. There is a brief mention of a temple at Pu'uhohola, but no physical description. [233] Purmanoh makes two references to human sacrifices on the hill. First, he states that the rebel forces encamped at Halekapuni, who planned to occupy Pu'uhohola and shower rocks down on the forces of Lono, "would not ascend Pu'uhohola unless a man on the side of Lonoikamakahiki should be slain; then only would Pu'uhohola be sealed for human sacrifices." [234] He also relates that "This heiau of Lonoikamakahiki at Pu'uhohola was named the Kawaihāe, because of the night strategy successfully executed by him on that occasion. Kapihahāhā, having been made prisoner, was killed and laid upon the altar (hele)." [235] We can only surmise that this means the altar of a temple on top of the hill. After winning his battles, Lono conducted religious services at certain temples in rituals and celebration; one of these observances was held at Pu'uhohola (Greene 1993: Chapter VII).

Kamehameha thought first of re-constructing Maieikimi Heiau, which was on the slope of a hill named Pu'u Kohola, but his chief *kahu* advised him to build a new one at the top of the hill instead. "Kamehameha may have rebuilt an abandoned heiau there or constructed a new one, but the heiau platform he built in 1791 still dominates...Kawaihāe" (n.a. 1967:6). According to Kamakau (1992) a heiau of this magnitude would have been built following rigid specifications.

Kamehameha abandoned war and adopted the advice of *Kaui* *Kuhuna* Ka-pou-kali and his son *Ha'ab'u*, to build a house for the god [Kūka'ilimoku].... The building of the heiau of Pu'u Kohola was, as in ancient times, directed by an expert - not in warfare, politics, genealogy, or the prophetic art, but by a member of the [Kuhuna] class called *hulihua* who knew the configuration of the earth (called *hulihua*, *pu'u* name). Their knowledge was like that of the navigator who knows the latitude and longitude of each land, where the rocks are, the deep places and the shallow.... Such knowledge taught on Kauai, one could apply anywhere in the world; so Ka-pou-kali had instructed *Ha'ab'u* to the kiter (Kamakau 1992:154).

D-S. Maliekini and Hale-o-Kapuni Heiau. Two other significant heiaus near Pu'u Kohola are Maliekini Heiau located west and down slope from Pu'u Kohola; and Heiau O Kapuni, dedicated to shark *aumakua*, located west and off shore from the two land heiaus.

Maliekini Heiau is said to relate to 'imua-chieftain and inter-island warfare of the period before 1780 when it served as the principal temple of the ruling chief of Kohala' (Apple 1969:23). Maliekini continued to be important into the historic period, being restored by Kamehameha I contemporaneously with construction of Pu'u Kohola Heiau (Soehren 1964:11). Offshore from Maliekini is the location of a third heiau known as Hale O Kapuni. Reportedly Hale O Kapuni was associated with sharks, and remains of human sacrifices from Maliekini were placed here to feed them (Davies in Soehren 1964:12; Apple 1969:17-19). Soehren reports the structural position of the heiau has been largely obliterated by tidal waves and siltation connected with construction of the harbor, but local residents continue to sight sharks in the general area. Of...note is the former residence of Kamehameha II, which was located near the beach, just below Pu'utobohi Heiau (Allen 1987:16).

Hale O Kapuni is mentioned in the *Story of Lonoikamakahiki* as the place where all the chiefs encamped; it was located immediately below the temples of Pu'utobohi and Maliekini at Kawaihāe (Fornander 1917(4): 324 in Kelly 1974:27). [Note: Kelly (1974) mentions that in a visit to Kawaihāe, resident Eddie Lau St. pointed out where the heiau, which is no longer visible, was located. It is now covered with silt that washes down from the coral fill. At least three white-tipped sharks circled in the vicinity that afternoon. Lau also stated that the "chair" of Kamehameha was not a chair, but a place Kamehameha used to "rest his arm on while standing on land, watching the sharks circle in the vicinity of Hale-o-Kapuni below" (Kelly 1974:27)]. Papa Akau talked about this heiau, about when his father was alive (Maly 1999).

Hale-o-Kapuni, that's a heiau. In the ocean, it's covered up, we cannot find it.... You cannot see anything now because it's really too much of the silt. [When I was young] well it wasn't covered as bad as it is today, because when you have the runoff from the mountains, but yet you have the movement of the ocean the wave, so it's not that bad. But when you go over there now because you have that sand backfill, the water doesn't circulate.... When my papa was alive, he told the park service guys that if they would go to the approximate area of Hale-o-Kapuni, an push a stick into the silt, they could tell when they were at the heiau. Where the rocks were built up, they couldn't push down, where no more rocks, they could push the stick. I told the same thing to them recently, and the park service archaeologists found the locations. They even have an old film from before the harbor was put in, and you can see the heiau (William Ah You Akau in Maly 1999:122).

Papa Akau had more to say about the heiaus and other things in that vicinity.

That's the shark heiau [just below Pelekane]. That one was way before Alapa'i, I think because the heiau, Maliekini, was during the time of Liloa. Liloa used to come here. Alapa'i and I used to go play with the sharks there. You could watch from Pu'u Kohola, Pelekane side.... Puhakole is the name of that *loahawai* coming down....

Paniolo Yamaguchi talked about seeing sharks near the heiaus in Kawaihāe.

Only shark I see is that by the heiau, Kawaihāe...Pelekane, "ae. They get cave. They *muemue* (sleep) inside there. [After harbor built?] Still yet, there. [Cave] still yet, about 'ohā, 'ono meo (four, six sharks) over there. Kumukui. I see, we used (book) at that.... That's his home over here [Hale-o-Kapuni] (Yamaguchi in Maly 1999:A94-95).

Demays (2003) said that when he was living in Kawaihāe in the 1950s the shark heiau was said to be located offshore from Eddie-Joe's house (in Pelekane). He said that sharks used to come right off shore.... "Big one's."

No one, not even a uba chief, was excused from the work of carrying stone. Kamehameha himself labored with the rest. The only exception was the high uba chief Ke-ali'i-maka'i (Kamehameha's younger brother).... Thus Kamehameha and the chiefs labored until the heiau was completed; with his fence of images (*poehumu*) and oracle tower (*ouu'ouu'ou*), with all its walls outside and the bole for the bones of sacrifice. He brought down the *ohi'o* tree (*ohi'oko*) for the *haka'ok'o* and erected the shelter house (*hale'oulu*) of *ohi'o* wood for *Kauka'ili-moku* according to that rule laid down for the kahuna class of Pa'ao (Kamakau 1992:154-155).

The common people came in relays from all parts of Kamehameha's dominions to carry stone for the walls and plaitforms of the heiau. The workers are said to have camped by thousands on the neighboring hillsides" (n.a. 1967:7; Kelly 1974:6; see also Fornander 1969:328 (2)). When it was completed an invitation from Kamehameha was sent to his cousin Keoua Kuahu'ula who was residing in Ka'u, to attend the dedication. Keoua accepted, and even though along the way he knew he would be killed, he continued. When Keoua arrived in Kawaihāe, he addressed Kamehameha who told him to come forward.

Keoua rose again, intending to spring forward, when Ke'oua-moku (father of Ke'ouamano) thrust a spear at him which Keoua dodged, snatched, and thrust back at Ke'oua-moku, who snatched it away. Kua-haha, who was an eyewitness, says that if there had been weapons about Keoua's caecus some (of Kamehameha's warriors) would have been killed. Muskets were then fired from the shore, and a great commotion took place among the people, during which Kua-haha, Keoua's kahuna, jumped overboard and, disappearing under the eyes of thousands, hid in the tuba house of Ke-ku'i-ipo-iwa [half-sister of Alapa'i-nui-a-Ka-uaui and wife of Maui chief Ke-kau-ika] where he lay concealed in a roll of matu.... this man and one other were the only ones saved of those who came in the canoe with Keoua. Le'auui jumped overboard secretly while off Puakā.... Had the two chiefs greeted each other (face-to-face), Kamehameha might not have killed him, for he loved Keoua (*Ma Nuiyepa Ku'oko'o*, May 4, 1867 in Kamakau 1992:157).

During Kelly's (1974) ethnographic survey, two consultants shared a slightly different version, the Kawaihāe version of what happened to Keoua.

At Kawaihāe today a different version is told. Keoua is said to have been shot and killed by John Young and Isaac Davis who stood a short distance back from the water's edge below Maliekini Heiau.... This area is now known as Pelekane (Pelekane), meaning British or British, because of Young and Davis' action taken there (personal conversation, E. Lau and W. Akau in Kelly 1974:7).

"John Young later told Waimea's missionary Lorenzo Lyons that he had seen thirteen humans sacrificed on the altars of Pu'utobohi during the ceremonies" (n.a. 1967:7). "When Ke-ihē-ki'oi saw the chief Keoua being born on men's shoulders to Pu'utobohi he chanted these words of affectionate lament."

Ke'e haka / ka wa hā'ao e, Ke'ele a'e la ka wa, Ma'ua o'Ah'ouli'i, Lele ka wa, lele pa no me ka ma'uaui, E lele po'o ana ka wai o ka hā, Ke'e haka mai ka wai Hā'ale po'o e.	My herd of the rain of his'ao (Ke'u rain) The rain flies fast, Flies over the upland of 'Ah'ouli'i, The rain flies driven by the wind, The rain drives down from the cliffs above, The tears for my chief Drop down on the heads of the people.
--	---

"By the death of Keoua Kuahu'ula and his placing in the heiau of Pu'utobohi the whole of Hawaii became Kamehameha's." [emphasis included] (*Ma Nuiyepa Ku'oko'o*, May 11, 1867 Kamakau 1992:158).

RECEIVED AS FOLLOWS

E. Previous Archaeology and Other Studies. The following studies in Kawaihae and vicinity add to the overall view of cultural and historical activity in Kawaihae and South Kohala.

Stokes (1906-1907/1991). *Heiau of the Island of Hawaii: A Historic Survey of Native Hawaiian Temple Sites* (Figure 8).

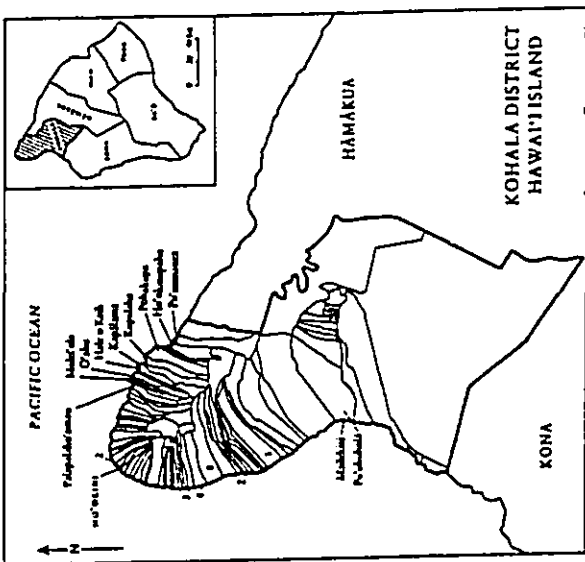


Figure 8. Map of Kohala District Heiau Sites (Stokes 1991).

Harloe (1949). "Survey Report for Navigation, Kawaihae Harbor Island of Hawaii, T.H."

[US-ACE] United States Army, Corps of Engineers (1949). "Kawaihae Harbor, T.H. Letter from the Secretary of the Army transmitting a letter from the Chief of Engineers, United States Army, dated July 6, 1949, submitting a report...on a preliminary examination and survey of Kawaihae Harbor, Hawaii, authorized by the River and Harbor Act approved on July 24, 1946."

Rush (1957). "History of Construction and Development of Honolulu Harbor, Hilo Harbor, Kawaihae Harbor, Kahului Harbor, Kaunakakai Harbor, Nawiliwili Harbor, Port Allen Harbor."

Territorial Highway Dept. Hawaii (1958). "A Preliminary Report on the Proposed Kawaihae-Mahukona Road, Federal Aid Secondary Route 270, Districts of South & North Kohala, Island of Hawaii."

Harland Bartholomew & Associates (1959). "Location Studies for Proposed Power Plant, Kawaihae, Hawaii."

D-6. Pelekane. The historic name Pelekane or Pelekani was named after the Kona incident where Young and Davis, former British subjects, and advisors to Kamehameha, shot and killed Keoua, cousin of Kamehameha and King of Hawaii Island. It was a special hamlet where the ali'i lived, where Kamehameha once resided and where Kamehameha II spent some time.

Kamakau mentioned that Kamehameha I from time to time retired to the tube district of Mailekini below Pu'uhou (Kamakau 1961:330). It was most probably at the "King's Residence" where Kamamalu, daughter of Kamehameha I and Kaheleimale, was born, about 1802. She was Liboilho's half sister and lived in his household as his betrothed when they were children. She became his favorite wife and died, as he did, in England in 1824 (Kelly 1974:26).

Kawaihae [Pelekane] was not only the place where Kamehameha I became the ali'i of Hawaii Island, but also the place where Kamehameha II returned after the death of his father to seek consolidation of his forces and consecration of his leadership role. It was there Freycinet found Liboilho in 1829, shortly after Kamehameha I's death... it was there that Freycinet was entertained by Liboilho, and where he visited with the Queens who were sitting in the shade of a landi attached to a grass house (Kelly 1974:18).

Pelekane is where Fanny Kakaekalani Young, wife of George Niles of Lahaina supposedly gave birth to Emma Kalanikoumakanano in 1836 [in Bishop Museum photo and caption] in a grass shack house. Young Emma would be given in adoption to her aunt Grace Kama'iku'i Young and her husband Dr. Thomas C. B. Rooker. Fanny and Grace were the daughters of John Young and Kaoua, daughter of Kei'imaikali, kapa brother of Kamehameha I. Young Emma went to the Chief's Children's School where she met Alexander Liboilho, son of Kinanu-daughter of Kamehameha, and adopted son of his uncle Kamehameha III. Emma later married [1856] Alexander when he was King Kamehameha IV. They were to have one son, Prince Albert. The couple founded the Queen's Hospital among other deeds. Tragedy when young Albert died at four years. The king died fifteen months later. After their deaths the took the name Kaleleolani. A still young Emma dedicated herself to her charities and writing to Queen Victoria of England. She died in 1885 at the age of forty-nine. Queen Emma inherited several lands from her real and adopted mothers, and from her uncle, in her will she was very generous. One of the main beneficiaries was the Queen's Hospital which was given the ahupua'a of Kawaihae 2, land given to her grandfather John Young by Kamehameha I (Cahill 1999:149-157).

\* Alau said his great-grandmother (Kamakamehale'i) in 1840 told him that another building located near the road, was "like o le ali'i waihi" (house of the Queen, meaning Queen Emma.) This building was, Alau said, on the present site of Yamada's coral crushing business, its foundation having been built there about 1857, when the reef was dredged and the coral was stockpiled on the site. Today the foundation is under about 8 ft of coral (Kelly 1974:16).

\* A grass-datched house photographed at Kawaihae about 1889 has been identified as the house in which Queen Emma was born (Fisher 1968:266). Not everyone agrees today that Emma was born at Kawaihae, but if her mother lived there, as Loebenstein indicated, it is possible that Emma was born there. This could have been the house John and Kaoua first lived in before John built his famous stone and mortar house, and it was probably the grass house Kaoua preferred to live in (Kelly 1974:16).



Photo 24. Grass-datched house; Emma's birthplace (Bishop Museum photo from Kelly 1974)

RECEIVED AS FOLLOWS

Ching and Rosendahl (1968). "Archaeological Surface Survey of the Kailua-Kawaihae Road (Section II: Hoookohau to Keahole Point) and the Keahole Point Airport: Archaeology of North Kona." State Parks. State Archaeological Journal, 68-1. Prepared by Division of State Parks for the Airports and Highways Divisions

Adams (1969). "Hydrogeophysical Survey from Kawaihae to Kailua-Kona, Hawaii. Water Resources Research Center-University of Hawaii, Honolulu. Technical report no.32, HIG series, HIG-WRRRC - 4. Final report for Geophysical exploration for Hawaiian ground water - phase III; OWRR Project no. B-011-III.

Ching, Cluff and Riley (1969). "Preliminary Report of Archaeological Surface Survey and Salvage Operations at Keahole, North Kona, Hawaii Island: Section II Keahole Point Airport, Kailua-Kawaihae Road." Appendixes: Trails / by Jennie Peterson -- Preliminary excavation of feature T-120 (cave shelter), a summarization / by Roy Nihimura -- A formal classification of Hawaiian archaeological features / by Robert J. Hornum -- Notes on a formal classification of archaeological features / by Robert J. Hornum -- Artifact numbering system.

Cluff, Kikuchi and Apple (1969). "The Archaeological Surface Survey of Puu Kohola Heiau and Mailekini Heiau, South Kohala, Kawaihae, Hawaii Island: (including the inspection of a dismantled section of a stone wall near the Project Control Center in Association with Project Tugboat at Kawaihae, Hawaii Island) [The archaeology of South Kohala, the Ahupua'a of Kawaihae." 69-3 December 1969.

Apple (1969). "A History of Historic Structures Kawaihae, South Kohala, Hawaii Island."

Forbes, Goodell and Larsen (1969). "A History of the Koola Hou Church, Kawaihae, Hawaii."

Charles Yoon & Associates, Inc.(1970). Hapuna Beach State Park, South Kohala, Hawaii.

Severance (1970). "John Young Homestead (upper portion), Kawaihae, Kohala, Hawaii Island: Archaeological Studies: Analysis of Fish Remains Excavated from Western-style Structure 2: preliminary report 79(1)." March 29, 1979.

Ching (1971). "The Archaeology of South Kohala and North Kona from the Ahupua'a of Lahamilo to the Ahupua'a of Hamamauna: Surface Survey Kailua-Kawaihae Road Corridor (Section III), by Francis K.W. Ching. Appendixes by Ginny Austin (and) Joseph E. Kennedy. Hawaii State Archaeological Journal; 71-1

Sullivan, Gerritsen and James (1972). "Dredging Operation Monitoring and Environmental Study, Kawaihae Harbor, Hawaii."

Barrers (1973). "Preliminary Field Report on an Archaeological Survey of the Waimea-Kawaihae Highway corridor, South Kohala, Island of Hawaii. Dept. of Anthropology, B.P. Bishop Museum, Honolulu.

Barrers and Kelly (1974). "Archaeological and Historical Surveys of the Waimea to Kawaihae Road Corridor Island of Hawaii." A reconnaissance survey of the Mudlane-Waimea-Kawaihae Road realignment project--an approximately 2000-ft-wide highway corridor. Ninety-eight sites composed of over 531 features were described although "nearly 5000" were located. They were predominantly enclosures for shelters, canoe shed, or house sites, walls, platforms, agricultural features, a salt pan, midden scatters, hearths, C-shapes, shelter caves, a cemetery and numerous artifacts including abraders, adze frags, volcanic glass, grindstones, hammer stones, sinkers, and basalt pounders. Historic artifacts such as buttons, bottle and ceramic frags were also located and described.

63

[TEC] Tudor Engineering Company (1961). "Master plans for ports of Hilo & Kawaihae. Prepared for Department of Transportation, State of Hawaii."

[TEC] Tudor Engineering Company (1962). "Master plans for ports of Kahului, Maui, Hilo and Kawaihae, Hawaii (and) Nawiliwili and Port Allen, Kauai."

[W-KCA] Waimea-Kawaihae Community Association. Economic Development Committee (1963). "Summary of Area Facilities and Economic Factors."

Soehren (1964a). "An Archaeological Reconnaissance of the Mahukona-Kawaihae Highway, Kohala." June 1964. [According to Hammatt et al., (1991:VII-2) by the time Soehren's team got on-site "approximately two miles of centerline had been rough graded. Nearly the whole centerline had been previously cleared by a bulldozer (Soehren 1964:3)].

Soehren (1964b). "An Archaeological Survey of the Shores of Oahu and Kawaihae, South Kohala, Hawaii." July 1964.

Braxfield and Chatham (1967). "Expansion and Revision of Kawaihae Harbor, Hawaii; Hydraulic Model Investigation. Technical report no. 2-806." Sponsored by U.S. Army Engineer District, Honolulu. Conducted by U.S. Army Engineer Waterways Experiment Station, Corps of Engineers, Vicksburg.

Unknown (1967). "Historical Notes: Waimea-Kawaihae, South Kohala, Hawaii."

Hawaiian place names often defy interpretation. Today's literal translations can lead to error since most original meanings lie buried with the ancient chiefs whose prerogative it was to give names to sites and regions. At times, names were changed to commemorate significant events. It is traditional among Hawaiians that, where ever the true meaning of a name is unknown, one may adopt an interpretation which fits his impressions of the locale which bears the name in question.

Kohala	a place of destiny
Waimea	reddish water typical of the area
Kawaihae	may refer to the gentle surf, which ripples ashore and reminded Hawaiians of a waving flag
Kapaulana	The surf, when used for surf boarding

The village of Kawaihae was desolate and remote and nearly forgotten when construction of the deep-water port began and Mauna Kea Beach Hotel opened. But it was not always so. Migrants from greater Polynesia once brought people to this area, such as from Marquesas in AD 900 and Tahiti in AD 1250. With this migration came Pa'ao who constructed two heiau--one in Puna and one at Upolu Point, North Kohala. Pa'ao brought with him a ruling chief named Pili whose descendant was Kamehameha I. Between the time of Pili and Kamehameha there were many battles fought between chiefly relatives. In Waimea where the *mumukū*, fierce seven-foot warriors who were loyal to the reigning Kohala high chiefs, and fought like the strong winds of that names that swept across the Waimea plain. Unfortunately, Waimea and Kawaihae were favorite battle grounds for warring chiefs of the six districts. Invading fleets from Maui also came across from Kawaihae, just came for provisions.

Boak (1968).

62

RECEIVED AS FOLLOWS

- Volcanic glass dating (Hydration-rind age estimates) produced a range from AD1698±39 to AD1788±27 for Kawaihae 1 compared to Walkoloa, which ranged from AD1643±27 to AD 1867±22
- A petroglyph was located in the Kawaihae area [Site # 50-10-05-6530] on a vertical boulder face near the edge of a dry gully. It measures 15 by 15 cm and is lightly pecked into the rock.
- Kelly (1974). "Historical Survey of the Waimea to Kawaihae Road Corridor, Island of Hawaii." [NOTE: Marion Kelly is the sister of Mr. Laau who owns the Laau Fish Market in Kawaihae.] Aside from a comprehensive cultural history of Kawaihae, this study tries to identify where various significant structures, such as Young's houses, Rev Lyon's Kawaihae home, and the Kawaihae church on Makahuna ridge were located.
- It is said that Keliimaitiki, Kamehameha's younger brother, dedicated the bathing pool in the upland of Kawaihae called Keliimaitikihooahawai (the chief who roused to dedicate the water). Also in Kawaihae was a large bathing pool called *Alowai* (Ti 1959:59) Perhaps this is the pool described by Ellis..... The surf at Kapeoia is in Kawaihae. Lihohio and Odeon Laana'i were often seen together gliding on the surf outside of Hialekumihiole at Kawaihae and at Kanui, outside of Kiikikoi' (Ti 1959: 135, 59 in Kelly 1974:28).
- Eddie Laau pointed out a place called Waikape's, adjacent to Pelekae and about 20 ft from the shore, where the water wells up from under the surface. It is said to have once been warm and to have had some healing qualities that attracted many people to bathe there, in spite of its proximity to hale-o-Kanui and its associates (Kelly 1974:28).
- The first resident missionary at Kawaihae was Elisha Loomis, a 21-year old printer, who was supported by Kalaninokou. In the summer of 1820, Loomis was given two buildings (a schoolhouse and a dwelling place) and 10 youths to educate (Mission Station Report 1832). [Note: Kelly notes that Kalaninokou lived at Kawaihae as the reigning chief of the area at this time. The site of his house was recorded by DuPerry. He was Kamehameha's treasurer, overseer for dividing up the lands, and war leader (Kamakau 1961:277 in Kelly 1974:29).]
- The salt pans at Kawaihae had individual names. There were one of each with the following names: Pohakulou, Pipipi, Nuape, Makiia, Puoopa, Poemaka, Kanika, Kapuhakapu, Wiliwili, Kukui; and two of each named Kanuhio and Maluhuehue. The generic name was *poko pa'akai* (depressions where salt is gathered.) The statement continued, "The foregoing names are our areas of land. These names have been given to the salt depressions. These areas were taken and conveyed to the *ahupua'a* (Kawaihae) in the middle of the reign of Kamehameha I. There are a total of 14 of them." Signed, Puna & Manuia (LCA 10, 903 Puna; 10, 904 Manuia, native Register) (Kelly 1974:34).
- In January 1872, Lyons recorded a great storm: "All wharves swept away at Kawaihae. Such a sea not known by oldest inhabitants." Apparently the wharf was either repaired or a new one was built because in April of the following year, Kawaihae received a visit from King David Kalakaua and Queen Kapiolani at which times "all Waimea went to Kawaihae." (Doyle 1953:205, 208 in Kelly 1974:40).
- Kirch (1974). "Aerial Archaeological Reconnaissance Survey of Queen Kaahumanu Highway Power-Line Alignment, Hawaii Island: Kawaihae-to-Anaehoomalu Segment, December 1974.
- Luscomb (1974). "Archaeological Walk-through Survey of Proposed Kawaihae and Kukuipahu Power Plant Areas, Island of Hawaii." March 1974. Three of Barrera's sites were located.
- Neighbor Island Consultants (1974). "Summary Report for Kawaihae Water Quality and Current Studies, June 9, 1973 to June 10, 1974."
- [Towill] R.M. Towill Corporation (1976). "Final alignment report for Waimea-Kawaihae Road, South Kohala, Island of Hawaii: project nos. F-019-1(6) & S-0270(4)."
- Malinowski (1977). "Geology of the Kawaihae Quadrangle, Kohala Mountain, Island of Hawaii." Master Thesis.
- Apple (1978). "Pahukaniua: Homestead of John Young, Kawaihae, (South) Kohala, Island of Hawaii. [Young, John, 1759-1834].
- [ORCA] Ocean Research Consulting & Analysis, Ltd. (1978). "Reconnaissance Surveys of the Marine Environment, Kawaihae Small Boat Harbor project site, Island of Hawaii, Hawaii." 1 June 1978.
- McEldowney (1979). "Archaeological inspection of right-of-way for Kawaihae-Boise 69-KV line, Island of Hawaii."
- Cine-Pic Hawaii Corp. (1983) "Puukohala Heiau National Historic Site" [VIDEOTAPE 2504VHIS]
- Pyle (19827). "The Kolea Stone."
- Soehren, et al. (1980). "Archaeological Reconnaissance Survey Along the Shore Between the Mauna Kea Beach Hotel and Samuel M. Spencer Park: A Portion of Tax Map Key G-2-02:6, in the land of Kawaihae 2, South Kohala. Letter report to Mr. William Mielcke [of] Mauna Kea Land Corp., dated 2 July 1980.
- Clark and Welch (1981). "Preliminary report on phase III archaeological excavations and salvage, Mudlane-Waimea-Kawaihae Road Corridor." October 1981.
- Clark (1981). "Preliminary Report on Human Burial Remains Located in Section 1, Mudlane-Waimea-Kawaihae Road Corridor." February 1981.
- Kirch, Clause and Athens [Ed] (1981). "The Mudlane-Waimea-Kawaihae Archaeological Project: Interim Report 1, Results of Archaeological and Historical Survey of Road Corridor, Sections 2 and 4." March 1981.
3. Archaeological survey of section 2, Mudlane-Waimea-Kawaihae Road corridor / by J. Stephen Athens
4. Archaeological survey of section 4, Mudlane-Waimea-Kawaihae Road corridor / by Jeffrey Clark
5. Vegetation survey Mudlane-Waimea-Kawaihae Road corridor, sections 2 and 4 / by Holly McEldowney
6. Preliminary analysis of subfossil nonmarine mollusks, section 4, Mudlane-Waimea-Kawaihae Road corridor / by Carl C. Christensen
7. Summary and general recommendations / by Patrick V. Kirch.
- Rosenbahl (1981). "Archaeological Reconnaissance, Kawaihae, South Kohala, Hawaii: Villas EIS Project, TMK 6-2-02:4."
- Clark (1983a). "Archaeological Investigations in Section 1." A detailed study of 51 sites that included 231 features; twelve were new sites.
- Clark (1983b). "The Waimea-Kawaihae Region: Historical Background."

Before the Kawaihae Harbor construction began in 1955, there was a long sand beach extending roughly from Pihoua Point (near the present small boat harbor) to Mailekini Heiau and a well-developed reef extended out from the shore approximately one-half mile. There were two brackish-water ponds behind the beach, in the early 1800s; one was at the mouth of Makahaui Gulch (up until 1848) and the other near the old salt pans to the north. According to former harbor Master William Akau, his family used a pond and three holding areas, though not necessarily those mentioned, to raise milkfish. A 1957 aerial photo shows the Akau pond located across from the present Kawaihae Fire Station.

Most of the project area appears to be burned in the recent past as evidenced by charred tree trunks... The 1974 Hawaii Register of Historic Places Historic Sites Information and Review Form for Site 10-05-2298 (George Heiau Davis' Tomb) mentions a large fire "recently" in the hills back of Kawaihae Village. Most directly, fires impact sites through the construction of firebreaks with bulldozers. Potentially these fires might also affect the dating quality of volcanic glass artifacts that frequently occur in local surface assemblages (Allen 1987:17).

Allen (1987) suggests that future studies include the history of the military in the area.

Rosenzahn and Carter (1988). "Excavations at John Young's Homestead, Kawaihae, Hawaii: Archeology at Pu'ukohala Heiau National Historic Site." This site located between Makahaui Gulch on the north, and old quarry on the east, Makahaui Gulch on the south and Akoni Pule Highway (Highway 27) on the west and includes eight major structural features on a low ridge between the two gulches. Between AD 1738 and 1835 the site was the permanent residence of John Young, an English sailor who became a friend and advisor of Kamehameha I, making this site historically significant. It also bridges the late proto-historic and historic periods.

The presence of numerous archaeological sites and features in this arid coastal region around Kawaihae Bay and to the north and south of Kawaihae indicates that aboriginal Hawaiians successfully inhabited and exploited much of this barren area during the late prehistoric and proto-historic periods. After the construction of Pu'ukohala in 1790 and the establishment of John Young's homestead in 1798, the Kawaihae area increased in popularity with both Hawaiian people and later foreign visitors (Rosenzahn and Carter 1988:19).

Young was given several tracts of land on several islands including the *ahupua'a* of Kawaihae Hikiina (Kawaihae 2). He moved to the lower section of Kawaihae 2 in 1793 and started building his Western-style house on the upper section in 1798. His house was constructed of basalt and "coral blocks brought by canoe from the reef at Puako," a plaster was made by mixing sand, burnt coral, poi and hair (Apple 1978:47). In Rosenzahn and Carter 1988:211. According to his log books, construction was still going on in 1817. Young was later made governor of Hawaii's island between 1802 and 1812 by Kamehameha. He and his wife had six children. His second wife Ka'ana'ana was a niece of Kamehameha I; she died in Honolulu in 1850. Young died in 1835.

Carter (1989). "Archaeological Excavations of Six Features Within the Right-of-way for the Proposed Spencer Beach Park Entrance road: Pu'ukohala Heiau National Historic Site, Island of Hawaii." Hawaii Harbors Division (1989). "2010 Master Plan for Kawaihae Harbor, Hawaii. July 1989. Hamann and Sheddler (1990). "Forbes' and Mummy Caves Sites 50-10-5-13926 & 13927.

Allen (1985). "Limited Archaeological Reconnaissance Survey, Kahua Shores Coastal Parcel, Kahua 1, North Kohala, Island of Hawaii. PHRI Report 74-031883." [On the coast, too far from project site.]

Allen (1985b). "Limited Archaeological Reconnaissance Survey, Kahua Shores Coastal Parcel, Kahua 1-2 and Waika, North Kohala, Island of Hawaii. PHRI Report 76-031883." [On the coast, too far from project site.]

Woodley, Miyabara & Associates (1985). "Final Environmental Impact Statement for Development of Kawaihae Boat Harbor, Kawaihae, Hawaii."

Allen (1986). "Preliminary Results of Archaeological Work Undertaken Between September 3 and 17, 1986 on Department of Hawaiian Home Lands Parcels Within the Ahupua'a of Kawaihae 1, South Kohala District, Hawaii Island." Bishop Museum, Honolulu. Letter report to Mr. Dennis Ling, Property Development Branch, Department of Hawaiian Home Lands, dated October 16, 1986.

Clark (1986). "Waimea-Kawaihae, A Leeward Hawaii Settlement System." Thesis (Ph. D.). Findings include dating on volcanic glass and charcoal. Sites 18826-AD 1000-1600 (volcanic glass); Site #2722 -AD 1000-1350 (volcanic glass); AD1400-1515 (charcoal-radiocarbon date) and AD 1495-1670 (charcoal-radiocarbon date). "The dates provide no evidence of an early coastal occupation prior to the settlement of the uplands. In fact, the inland sites are slightly earlier than the dates for the coast, although the difference is probably not significant" (Clark 1986:177).

Halbig (1986). "A baseline Study of Ground Water Geochemistry in the Kawaihae and Hilo areas on the Island of Hawaii."

Ladd (1986). "Ruins Stabilization and Restoration Record : Pu'ukohala Heiau National Historic Site, Kawaihae, Hawaii, Pu'ukohala Heiau." April 1986.

Allen (1987). "Archaeological Inventory Survey of Department of Hawaiian Home Lands, Kawaihae 1, South Kohala, Hawaii, December 1986." This survey of Kawaihae Ahupua'a was originally supposed to go to the 1,000-ft. elevation, but was modified to only extend up to the 600-ft elevation (Allen 1987: 2-3). The survey included the Fiber Optic CMS project site.

Archaeological investigations were conducted on 23 Department of Hawaiian Home Lands lots at Kawaihae 1, South Kohala, island of Hawaii. A reconnaissance survey was completed for 12 lots, totaling approximately 213 acres and 108 sites, composed of over 345 features, were identified, located, and recorded. For another parcel of 203 acres, a sample of approximately 35% (72 acres) was surveyed at the reconnaissance level and three sites consisting of four features were identified. Seven other lots were investigated by non-systematic walk-through assessments, and a total of 32 features were identified. In total, 111 sites comprised of 381 features were identified during the present study. The study indicates that in the project area, archaeological sites are most concentrated along the coast, decreasing in number with distance inland. In the north to south direction, site density is greatest adjacent to and up slope from Kawaihae Bay and decreases northward towards the North/South Kohala District boundary (Allen 1987:iv).

Traditional sources... speak of occasional high velocity winds from the northeast known as *manuaka*. Fortunately these hurricanes are now not nearly so violent or frequent as they used to be some twenty-five or thirty years ago. The old residents all affirm that, and they state that formerly the *Muumunus* were so common and violent, that the natives made a regular practice of lashing their canoes which were hauled upon the shore to a rock, stick or tree, to prevent them from being blown off the land into the sea (Anon. 1836--Allen 1987:12).



[US-DOC] U.S. Dept of Commerce (1990). "Kawaihae Bay, Island of Hawaii [Map]." Hawaii.

Hammatt (1991). "Archaeological Survey and Testing, Kawaihae I (Komoana), South Kohala, Hawaii."

Hammatt, Sheddler, Borthwick, Stride, McDermott and Nakamura (1991). "Archaeological Survey and Testing Kawaihae I (Komoana), South Kohala, Hawaii."

Hammatt and Sheddler (1991a). "A Reconnaissance and Archaeological Assessment for the Kawaihae Master Plan" (Draft). A large number of archaeological sites including heiau, permanent prehistoric habitations, historic habitations, burial site, to'a, trail, cave sites and agricultural complexes were identified in this archaeological assessment. Very extensive sites were found in two areas of the Hawaiian Home Lands at Kawaihae: (1) seaward sites 300 feet elevation south of Honokaa Gulch and seaward of Akoni Pule Highway north of the gulch have been surveyed and (2) a large number of burials in the proposed new industrial area. Extensive sites were identified *maui* of Kohala Mountain Road down to an elevation of 2,000 feet north of Keawewai Stream and in most of the area south of the stream to an elevation of 1,200 feet. A detailed inventory survey was recommended, as some sites will undoubtedly "merit preservation". Lands above Kohala Mountain Road "are relatively lacking" in archaeological sites. Inventory surveys have not been conducted above the 1,000 feet elevation. An air [helicopter] reconnaissance revealed an impressive number, size, and variety of major archaeological complexes "which are unusual in their integrity and degree of preservation. Three separate heiau and several extensive irrigated agricultural systems" were identified. Some of the irrigated complexes could easily be restored for taro production.

Hammatt & Sheddler (1991a:5) reported that while several detailed historical and ethnographic studies have been done on the Kawaihae area, most have focused on Pu'u Kohala, John Young's residence, Puako and Waimea. And while the "studies in these areas touch on important aspects of Kawaihae's history, much of this research has little direct relevance to the archaeology of the present study area" [Hawaiian Home Lands]. "Chronometric determinations on volcanic glass and charcoal suggest that there was very little occupation at Kawaihae before the 15<sup>th</sup> century. However, there is some evidence to suggest that inland sites are slightly earlier than coastal sites."

The earliest detailed map of Kawaihae is one by Loebenstein (1903a) of Kawaihae 2<sup>nd</sup> and documents two heiau sites: Kane Kea Heiau and another one near Pu'u Kanae. Several other maps (Loebenstein 1903b; Wall 1909; TH 1913; Wright 1917; King 1931; Aiken 1931; USGS 1951; and TMK maps help by depicting sites [trails, boundary markers, place names, churches, enclosures, and other structures] or their absence. Most of these are concentrated on Kawaihae uka

"The density of settlement is suggested by the identification of three heiau sites (#904, #905, #924) within the project area. Many of the prehistoric sites appear to have been utilized in the 19<sup>th</sup> and 20<sup>th</sup> century by homestead and ranch related activity." Some of the historic structures (corrals, walls) appear to abut prehistoric sites. Some typically prehistoric artifacts were observed on the surface with a surprising absence of historic artifacts. "Not only is there a wealth of sites but there are particularly well preserved." The areas above 3,400 ft and/or the Kohala Mountain Road have relatively few archaeological sites, usually cairns or temporary shelters.

Hammatt and Sheddler (1991b) "Documents Relating to the Cultural Surveys Hawaii's Inventory of Hawaiian Home Lands at Kawaihae Excluded from the Main Body of the Report." This dense report is an explanation of criteria for site significance for the 147 new sites identified by Cultural Surveys in the Hawaiian Home Lands.

Hammatt, Sheddler, Borthwick, Stride, McDermott, Nakamura (1991c). "Archaeological Survey and Testing, Kawaihae I (Komoana), South Kohala, Hawaii." Hammatt et al., did a comprehensive study of Kawaihae I (traditionally called Kawaihae Komoana (Kawaihae 2 was called Kawaihae Iikina). The distinction is that *komo* refers to the sun entering the sea (west) and *hikina* refers to ascendancy (east).

Their "culture history" focused on settlement patterns based on 19<sup>th</sup> century ethno-historical accounts, primarily Kamakau's *Ruling Chiefs of Hawaii* (1961/1992). Fomander (1919) and observations from late 18<sup>th</sup> century voyages, and compared them with archaeological sites identified during their surveys of the area, *maui* to *maui*. DuFerry's map was discussed: the house site of "Krainoku" was determined to be that of Kabeihi Ke'eaumoku a.k.a. Ke'eaumoku 'Opio a.k.a. George Cox, Governor of Maui at the time (son of chief Ke'eaumoku) and not that of Krainoku a.k.a. He'e'u Kalaninuioku a.k.a. William Pitt, Chief Treasurer and Prime Minister of the Kingdom who lived near or at the royal houses below Pu'ukohala/Mailekini. The "west" was associated with death, the setting of the sun and *maui*, which relates to a *heiau* Kaubuhue, located [unknown] in Kawaihae I which had been "dedicated to the vanquishing of Keoua-Kuahu'u" (Hammatt et al., 1991:V-5-6). Ke'eaumoku was responsible for killing Loah Kiuwala'o and Keoua. "Boundary Commission testimony of Kooanaihu in 1876 (Vol 8, p 390): 'An old *heiau* called Kaubuhue is the boundary at the shore between the two Kawaihae'" (Hammatt et al., 1991:V-9).

Naturalist Archibald Menzies linked possibly in the vicinity of Kaubuhue Gulch and reported the following in 1792-94:

I traveled a few miles back from Kawaihae...through the most barren scorching country I have ever...walked over.... The herbs and grasses which the soil produced in the rainy seasons were now mostly in a shrivelled state, thinly scattered and by no means sufficient to cover the surface from the sun's powerful heat.... [On his return he wanted to] view the inside of it [heiau], but my guides told me it was so strictly tabooed that they durst not indulge my curiosity without risking their own lives. They told me it was built about two years before in commemoration of a famous victory gained over Keoua (Menzies 1970:56, 156 in Hammatt et al., 1991:V-8-9).

It is intriguing to consider that the images and other artifacts recovered from Forbes' cave may have come from this *heiau*. The Kaubuhue Heiau is late, one of the last built, small, and associated with the death of Keoua-Kuahu'u which involves themes of kinship and sorcery. The artifacts in Forbes' Cave Chamber C, include female sorcery images and small images (probably of Kukailimoku or Kuuikiaka) which suggest themes of land conquering and kingship. The scale of these images would have been appropriate for small *heiau* like that reported by Menzies. Associated artifacts from Forbes Cave fit the relatively brief time period that the Kaubuhue Heiau would have been operational (Hammatt et al., 1991:V-9-10).

The plethora of sites identified in Kawaihae I (above the highway) was hypothesized to be related to the Fomander (1969, (2):328) reference of the "thousands of people encamped on the neighboring hillsides" during the construction of Pu'ukohala [in 1790-91]; and the lack of domestic midden associated with these sites could have been because they were fed elsewhere, such as fresh produce from Waimea. Hogs used for trading could account for the "pens" located in the upland elevations. The historic burials located in Kawaihae I may likely have been associated with the small pox epidemic in 1853.

"Before the Kawaihae Road was made possible for carts, the natives were ordered by the chiefs to carry the [cow] hides to the seashore in the same way that they had to carry logs of sandalwood. On the return trip to Waimea they were compelled to take bags of salt...." Circa 1830, Governor Kuakini had a wagon road built from Kawaihae to Waimea by sentencing to this labor forty an guilty of violating the seventh commandment (Judd 1931:19 in Hammatt et al., 1991:V-12).

The effect of WWII on Kawaihae was twofold; a greater increase in the export of live cattle to Honolulu to feed the exploding population there and the embarking of one or more divisions of marines who were based up in Waimea. A letter from Alfred Carter dated December 11, 1941 reported an ability to ship 1,900,000 pounds of beef as soon as transportation could occur for

some months following the bombing of O'ahu. Mr. Carter urged the shipment of cattle be formed at Kawaihae because it was the closest port, where most of the cattle were, and where the best cattle were (Brudage 1971:103). In another letter from August of 1945, Alfred Carter reports the presence of a division of over 20,000 U.S. marines at Waimea and refers the "testing lot" as many as 30,000 men practically at the village of Waimea" (Brudage 1971:109). Sixteen military sites were identified during archaeological investigations in Section 2 of the Waimea-Kawaihae Road Corridor Survey (Clark and Kirch 1983:140). Several sites within the present project area (Kawaihae I) were previously identified as military features (Clark and Kirch 1983:87). While many of these WWII military sites may have been constructed in the course of training exercise, most of them are situated for defense of roadways. The absence of trash at these sites suggests single-use, short-term occupation...oral history research was helpful in reconstructing the impact of WWII on life at Kawaihae (Hamman et al., 1991:V-20).

The biggest impact on Kawaihae in historic times was the construction of a new Federal deep-draft harbor. The harbor's construction was hailed as an economic shot in the arm, for the sugar planters in the Kohala region of the island would no longer have to ship their crops overland to Hilo or to Kailua-Kona. The harbor would serve military needs as well. The Army was about to acquire a 100,000-acre training site nearby and could unload supplies at Kawaihae Harbor (Van Hoften 1970:78). The project was completed jointly by the Territorial Government and U.S. Army Engineers. Authorized in 1950, the Kawaihae Harbor Project was officially dedicated on October 15, 1959. While the harbor basin was excavated out of what had been shallow reef, the filled area for terminal facilities obliterated the vast majority of what had been the Kawaihae settlement. Today, Kawaihae Bay and coastline are so changed that they are hardly recognizable (Kelly 1974:41). The star point, the Kaulihue Heiau site, the vast majority of the village mapped by DePerry in 1819, and the majority of the Land Commission Awards are now obliterated by graded and compacted dredged material up to 13' thick. The 1969 and 1970 work on a small boat harbor at Kawaihae, largely funded by the U.S. Army Engineer Nuclear Clearing Group, finished the transformation of Kawaihae from a Hawaiian village to Kawaihae as an industrial park (Hamman et al., 1991:V-20, V-21).

Schuster (1992). "Bulldozers and Archeology at John Young's Homestead: Archeology at Pu'ukohola Heiau National Historic Site." A brush fire in July 1991 burned hundreds of acres of land in the Kawaihae area and the John Young Homestead (State Site # 50-10-05-2296) was between the fire and the highway. In an effort to control the fire, Hawaii County firefighters created a bulldozer firebreak and inevitably went through the Young Homestead, damaging some of the walls. The John Young Homestead (1798-1835) is part of the Pu'ukohola Heiau National Historic Site complex and "is one of the best examples of an early Western residential complex in Hawaii" (Schuster 1992:7), which is located south of Makahuna Gulch and north of Pu'ukohola Heiau. Young served as an advisor to Kamehameha I between 1793 and 1819. Subsurface damage included crushed rock and fractured volcanic glass artifacts. Structural damage included permanent scars on building stones and stone wall facings; some of the stones from the wall were crushed and/or buried from the weight of the bulldozer. An interesting observation during this study was the 'i'i'i'i paving around all of the features (Hawaiian and Western); and a discovery that postholes and a hard packed earthen floor predated the 'i'i'i'i paving (Schuster 1992:29).

[Towill] R.M. Towill Corporation (1992). "Final Environmental Impact Statement for Kawaihae Ten-Year Master Plan, Kawaihae, South Kohala, Hawaii." December 1992.

Greene (1993). "A Cultural History of Three Traditional Hawaiian Sites on the West Coast of Hawaii: Pu'ukohola Heiau, National Historic Site, Kawaihae, Hawaii; Kaloko-Honokohau, National Historical Park, Kaloko-Honokohau, Hawaii; Pu'uhonua o H'oumau, National Historical Park, H'oumau, Hawaii."

[US-F&W] U.S. Fish and Wildlife Service (1993). "Final Fish and Wildlife Coordination Act report: Kawaihae Harbor for Light-Draft Vessels, Kawaihae, Hawaii." October 1993.

Langlas (1994) "Pu'u of Mauna Kawaihae and Kalihū Ahupua'a, District of Kohala, Hawaii Island: Report of an Investigation of the Hawaiian Cultural Significance of Candidate Sites for the NEXRAD Installation: Ethnographic Background and Site Assessment."

- Central Kohala Mauna: from Kawaihae Uka (above Kamuela town) to Kahaena
- 20<sup>th</sup> century: 3 Hawaiian settlements in the area; Hawaiian communities at Kawaihae Uka and Kahaena; midway between them is Kahaia Ranch which employed them and maintained employee housing for some of them
- in 1800s Kawaihae Bay was important shipping point for sandalwood from Waimea; later for sweet potatoes and Irish potatoes from Kawaihae Uka and Waimea for provisions for whaling ships (AD 1840-1860); also for Kohala cattle industry-wild and domestic-(up to 20th century)
- in 1800s Kawaihae Bay had Hawaiian settlement- salt production and fishing; white merchant; Congregational church
- at Kawaihae Uka (1 and 2) had substantial population of Hawaiians (makai of Kohala Mountain Road) growing sweet potatoes up to 1920s; irrigation by ditches (Langlas 1994:24-26)
- church called Mauna Horeb (Mauna Horepa) built by North Kawaihae Uka community of Kaalaia; Kawaihae Uka proper community of Māhela also built a church called Sinai near Pu'u Māhela
- epidemics of 1848 (measles, whooping cough) and 1853 (smallpox) killed many Hawaiians in the Waimea/Kawaihae area
- in early 20<sup>th</sup> century a forest of *naio*, *koa'i* and *ohi'a* still existed at Kawaihae Uka even though cattle were grazing there
- Cultural changes included Hawaiians who can not speak Hawaiian or remember the traditional stories connected with the place-names;

Haltig (1994). "A Baseline Study of Weather, Climate and Atmospheric Geochemistry in the Kawaihae and Hilo Areas on the Island of Hawaii." No. 116.

Llops and Sharp (1994). "Geophysical Investigation for the Location of a Historic Heiau, Kawaihae, Hawaii." The purpose of this geophysical investigation was to locate a buried "shart" heiau using non-intrusive geophysical methods (magnetic, electromagnetic and ground penetrating radar). The survey turned up seven anomalous land sites and five anomalous offshore sites. There are two intact heiau at Pu'ukohola Heiau National Historic Site; residents report that there is a third heiau (about 10' by 10') in the bay several yards offshore, or somewhere offshore near the shoreline.

Two maps found in the NPS archives showed the heiau at two different locations; the 1800s map indicated it to be on what is now land, whereas the Corp of Engineers map indicated it was in the bay. The results of these surveys were inconclusive. However, the results could be used to target specific areas for more intense investigations (excavation and/or boring).

Walker and Rosendahl (1994). "Archaeological Inventory Survey Proposed NEXRAD and ATCBI Sites and Related Access Road Corridor: Land of Kawaihae I", South Kohala District, Island of Hawaii." A 100% coverage pedestrian survey with limited subsurface testing was conducted March 14-20, 1994. Three sites were identified; these are believed to be from the early historic-era ranching operations. There were two ditches and one complex of enclosure and wall. All three were in or associated with Kilohana Gulch; 3,500 to 4,700 feet above sea level. No cultural material remains were recovered and there was no evidence of prehistoric or early historic agriculture.

Maly (1999). "Nā Ala Hele Ma Kai O Kohala Hele (The coastal trails of South Kohala): Archival-historical Documentary Research, Oral History-Consultation Study, and Limited Site Preservation Plan Kawaihāe-Anueho'ema'u trail section: Lands of Kawaihāe 2nd, 'Ouli, Lālanilo, Waikōloa, Puukō, Wainā, Kalāhāpua'a and Anueho'ema'u district of Kohala, Island of Hawai'i (TMK:6-2, 6-8 & 6-9)."

Borthwick, Chilogloji and Hammat (2000) "Archaeological Assessment of Proposed Water Line Corridors and a Reservoir Site in Kawaihāe I Ahupua'a, South Kohala District, on the island of Hawai'i (TMK: 6-1-06; par. 2, 3, 7; 6-1-01; par. 3). An archaeological assessment (a 150 feet wide or 75 feet on either side of the proposed centerline of the access road) was conducted on DIII. Hawaiian Home Lands in Kawaihāe I Ahupua'a, between Makahua and Honokaa (Julies). Several studies within the Hawaiian Home Lands Fiber Optic project area and vicinity were cited in this report: Barrera and Kelly 1974; Lancaster 1974; Clark and Kirch 1983; Allen 1987; and Hammat et al., 1991. A number of sites (generally below 200 ft. elevation) were addressed in these studies:

- #50-10-05-5978 enclosures with associated burials
- #50-10-05-13725 temporary habitation complex
- #50-10-05-13726 temporary habitation complex
- #50-10-05-13913 possible burial site

Borthwick et al. Also report that the area closest to the Akoni Pale Highway has "fairly extensive midden and artifacts surface scatter, related to previous habitation use." Bulldozing during fire-fighting activity "damaged sites and dispersed associated cultural deposits" (Borthwick et al., 2000:5). The proposed access road (3,200 ft. long by 12 ft. wide) "will adversely affect some of the observed sites." However, no sites were observed in the 200 feet anal. tank locale (6" water line, ring water tank locale) and (2,500 ft long by 12 ft. wide 12" waterline corridor). While burials could be avoided, all archaeological could not be avoided.

Haun, Henry and Orr (2003). Current.



Photo 25. Kōla lands of Kawaihāe looking north.

Walker & Rosendahl, (1995). "Archaeological Inventory Survey Proposed Substation Site and Utility Corridor for NEXRAD: Land of Kawaihāe I", South Kohala District, Island of Hawai'i." This inventory survey was conducted December 15 and 22, 1994 and included a 100% coverage pedestrian survey and one excavation pit. Four sites were identified and assessed for Criteria D; data was sufficiently collected and the findings were: no adverse effect. "Portions of the four sites that are located outside of the project zone are believed to still contain additional information (p. ii).

The project was located at the extreme mauka of Kawaihāe I Ahupua'a, west of the Kohala Mountain Road, at the elevation of about 3,500 feet above sea level, north of Kilohana Gulch. One site #19799, appeared to be the remains of a traditional terrace alignment, "possible associated with agriculture or habitation and may represent a component of an upland agricultural field system, as prehistoric and early historic agriculture has been documented at that elevation (Rosendahl, 1995:6).

A Hawaiian newspaper article in *Ka Hōkū o Hawai'i* (December 2, 1920), translated for this study supports this notion. Members of the Hawaiian community questioned the value of the lands of Kawaihāe and their being included among lands to be turned over to the newly formed Hawaiian Home Lands Trust (Hawaiian Homes Commission Act of 1920)" (Rosendahl, 1995:6). "*He Momi 'Aina Waiwai Mai o Huihui 'i'ia Ima Kanihāe-Uka no mā Hawai'i?*" or "I huihui 'i'ia mā Hawai'i-ūka are extremely valuable lands for the Hawaiians" (Rosendahl, 1995:6). Kama'āina William Lindsey was interviewed:

Mr. Lindsey responded that these are good lands. It is there that Parker Ranch raises its cattle. There is water there and an abundance of grass. The person who receives these lands can farm, care for cattle, and be very well off. If unfenced cattle, unfenced houses, or unfenced mules are released there in Kawaihāe-ūka for a few months, when you see them again, they will become wild with backs resembling the runners of rocking chairs. The person that says these are bad (useless) lands, does not know what he is talking about. I am one of the people who raises cattle near this land of Kawaihāe-ūka. On this land was also grown the sweet potatoes that were planted by the old people. If you are there, you will see the large sweet potatoes, the white sweet potato of olden times, and it is the same for the cabbage greens grown before (translated by Kapa Maly) (Rosendahl, 1995:7).

Another site #19479, may have been historic period irrigation channel for agriculture or cattle; however there was no alive who could say for certain. Although consultants who use to live in the nearby community of Ilo'ilo (until the 1950s) recalled that there were ditches that brought water from the uplands to their village. This area (sometimes referred to as the *kūlo-ūka* lands) was impacted in the early historic sandalwood era. As the forests were cleared, cattle were introduced (by Vancouver in 1793), greatly limiting the regeneration of the forests, which were much lower than they are today. The proliferation of free-ranging cattle forced the abandonment of *hōmekeads* and *agricultural fields* by the 1830's. By the 1880's organized ranching was well under way in this area (Rosendahl, 1995:7-8).

The typical upland zones were occasionally visited by traditional specialists who gathered medicinal plants, timber wood, and bird feathers. Based on other studies as well as findings in this study (McElbowney 1983), "it is likely that significant traditional habitation or traditional agriculture occurred within the immediate vicinity" of the NEXRAD project area (Rosendahl, 1995:8-9). McElbowney (1983) cites LCA testimony from of lands awarded to Lincoln #8513 "that records the presence of an 'auwai at the 4,000 ft elevation on the boundary between the lands of Kawaihāe I" and 2", south of the project area. Aside from LCA #8513, no other LCAs were awarded above the 1,000 ft elevation in Kawaihāe I". Studies of North and South Kohala, however, studies within North and South Kohala don't support a settlement date earlier than AD 1280. And there "is little doubt that many of the sites and features which Hammat (1991) has identified below Highway 250 along Keawewai Stream and Honokaa Gulch, were occupied by individuals who periodically accessed the... [mauka] area for a variety of special purposes" (Rosendahl 1995:9-11).

PART IV: ETHNOGRAPHIC SURVEY

The Ethnographic Survey (oral history interviews) is an essential part of the Cultural Impact Study (CIS) and Assessment because they help in the process of determining if an undertaking or development project will have an adverse impact on cultural practices or access to cultural practices. The following are initial consultant selection criteria:

- ◆ Hadhus Ties to Project Locations
- ◆ Referred By Office of Hawaiian Affairs (OHA)
- ◆ Known Hawaiian Cultural Resource Person
- ◆ Known Hawaiian Traditional Practitioner
- ◆ Referred By Other Cultural Resource People
- ◆ Referred By Staff of Pu'u Kōhola National Historic Park

The consultants for this CIS were selected because they met the following criteria: (1) consultant grew up, lives or lived in Kawaihāe; (2) consultant is familiar with the history and *mo'olelo* of Kawaihāe; (3) consultant referred by Hawaiian Cultural Practitioner(s); and/or (4) consultant referred by Staff of Pu'u Kōhola National Historical Park. Copies of signed "Consent" and "Release" forms are provided in Appendixes (Appendix H and Appendix I).

Research Themes or Categories

In order to comply with the scope of work for this cultural impact study (CIS), the ethnographic survey was designed so that information from consultants interviewed would facilitate in determining if any cultural sites or practices would be impacted by the undertaking of the Sandwich Isles Communication (SIC), Inc. Submarine Fiber Optics Cable Project. To this end the following basic research categories or themes were incorporated into the ethnographic instrument: Consultant Background, Land Resources & Use, Water Resources & Use, Marine Resources and Anecdotal Stories. Except for the "Consultant Background" category, all the other research categories have sub-categories or sub-themes that were developed based on the ethnographic data or responses of the consultants. These responses or clusters of information then become supporting evidence for any determinations made regarding cultural impacts.

A. Consultant Background and Demographics

Each consultant was asked to talk about their background, where they were born and raised, where they went to school and worked, and a little about their parents and grandparents. This category helps to establish the consultant's connection to the project area, their area and extent of expertise, and how they acquired their proficiency. In other words, how the consultant met the research consultant criteria. Four individuals were identified as potential consultants. However, due to scheduling circumstances only one of the original potential consultants was interviewed. Two consultants were recommended by Staff of Pu'u Kōhola National Historical Park. One consultant was born in Kawaihāe; two were born elsewhere, but came to Kawaihāe-Wāineka area as young adults. Table 3. provides the demographics of the consultants.

Table 3. Consultant Demographics in relation to Kawaihāe.

Consultant	Hawaiian	Raised	Work	Live	Kawaihāe Ties	Wāineka Ties
William Akau	X					X
Ma'ehi Taketino	X	X	X	X	X	X
Dawald Tokimasi					X	X

There is always a danger of not allowing the consultant's "voice" to be heard; of making interpretations that are not theirs; and of asking leading questions. To remedy this, the "talk story" method is used and allows for a dialogue to take place, thereby allowing the consultant to talk about a general topic in their own specific way with their own specific words. All of the excerpts used are in the exact words of each consultant or paraphrased to insert words that are "understood" or to link sentences that were brought up as connected afterthoughts or additions spoken elsewhere in the interview. The following excerpts in "Consultant Background" provide a summary of each consultant, as well as information about their parents and grandparents. First names are used to identify quotes for two consultants who have the same last name.

A-1. "Papa" William Ahiyuu Akau. Papa Akau was born and raised in Kawaihāe and one of several generations from Kawaihāe. He was the second generation to serve as Kawaihāe Harbor Master.



[My name is] William Ahiyuu Akau. I was born January 13, 1927 in Wāineka that's in Wāineka. My dad used to be caretaker for the Theopoughlighted Inves of Parker Ranch. I was born in that area. My dad is from Kawaihāe--Akau family--most of them were born and raised here in Kawaihāe. My mom is from Kūloa; she is Heleu Waiahūi Kā'ōhi. And her name was Harriet Kā'ōhi Husey. So that takes care of the Kūloa family. Mom is from Kūloa; dad is from Kawaihāe. So as I said I was born in Wāineka in 1927. In 1928 dad was sent back here to Kawaihāe by Parker Ranch. And so we moved back here and we lived here ever since. And there is eleven of us in the family. We live just where the Kawaihāe Harbor is located today, that's where we used to live. Right close to the Standard Oil tank.

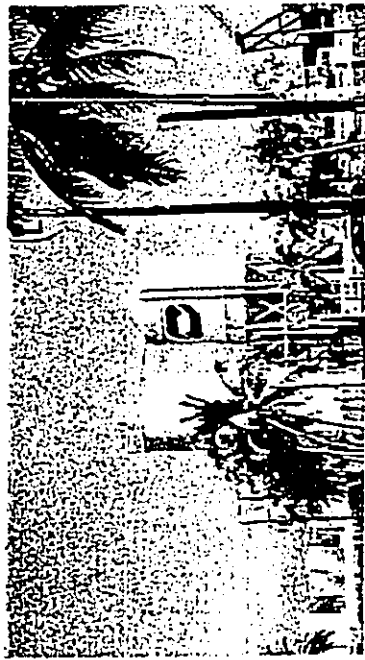


Photo 27. Former site of the Akau homestead.

In fact my grandmother's [Hussey] side; they called Kealoha Pauoi; Kahlua comes from Kaupo, she comes from there; she's buried here across the street. There's a lot of family [there]. My grandmother on my dad's side; my grandfather's mother. The same way that you call Mel and sister. So that's the first marriage of my grandfather. William Paul Mahina'uli, Alau, my great-grandfather and Mel's grandfather. They used to live in Kahala... that's where the moon live so he used to go down there all the time. Used to watch the *Hono'ua* from here and go down... [My grandfather was] Abraham Akau, but he got a Chinese name Ah Chung Ko, but that's what they call him - "cousin" or something like that (Papa Akau).

I grew up [there] till the age of 22, then I was called away; the church called me to fulfill a mission in Japan. So 1949 I was sent to Japan and stayed there three years as a missionary. Then I returned home. Then I stayed in Puunahia Hospital for twenty months to remove fluid from my lungs until it dried up. Then I went to technical school--trade school in Hilo. When I got out there I get a call from Honolulu to construct the Church College of Hawaii. So I stayed there for three years. When I finished that mission then I came home, I stayed for three or four months then I applied for a job with the State. They hired me so I worked with the State for ten years as a maintenance and motor boat operator. After that I applied for the job that my dad had as Harbormaster. I applied and got the job and stayed with the State for twenty-eight years then I retired. So when I retired I didn't go back fishing. I stayed home and took care of my mom; my mom was still living, my dad passed on. So I took care of mom until she passed on, my sister Caroline, my sister Harriet... so I was more or less the one responsible for my family when my dad passed on. So they all gone today so we are home; my two sisters, we all retired from the State government (Papa Akau).

**A-2. Mabel Tufenino, Kupuna Mabel is the President of the Waimea Hawaiian Civic Club, on the Advisory Board for the Pu'u Kohala National Historical Park and President of Hawaii Island Hawaiian Civic Club Council.**

I am Mabel Tufenino from the Waimea Hawaiian Civic Club, I'm historian for the Pu'u Kohala [NPS] and the development of this area.... I went to Sacred Hearts Academy in Honolulu; born in 1939 in the Territory and learned all of my culture and stuff ever since 1952 when I came here and learned all about the environmental impact on our Hawaiian lands, restoring the National Park here at Pu'u Kohala; cleaning, removing all of the junk that people have left and are still doing today. But I reside in Waimea [Hawaiian Home Lands] at this time for fifty-nine years. We have a ranch and a house lot. A 205 acres Ranch and one-acre house lot in the Village. We were very fortunate at that time. My Mom registered for Hawaiian Home Lands. We were in Honolulu at that time. And we had to sell all of our possessions without knowing if you got picked. In 1951 they picked our name; by '52 we were here. We first lived up at the old barracks of the Hawaiian Home Land, which is now a big Club, the CC Camp because of the forest fire. And we had an old *hono* built houses; we ate like in a commune. And we slept in a log building like another commune. And the fog would come down and drying clothes was problem. We came down and drove to a halfway point on Kawaihau Road. My mom was Mamie Keawemaulili - that's from Hilo. But she was born in Waimea. She belonged to the Thomas Christborough and Lindsey family. Her sister was Fanny Letaloha Christborough Lindsey. That was the second Lindsey. Lindsey's came [when the first brother died, Mary married the second brother]. My father was from Italy, I'm Italian-Hawaiian. He was actually Graciano like the fighter. But when they came and lived in Pittsburgh, PA as coal-miner workers, their parents died when the oldest was nine years old; he was five at that time and they were adopted through the orphanage there. And he became "Anderson" a Swede name. A Swede family adopted him; they were very good friends with his parents. After he became a policeman; growing up he didn't want to work in the coal mines. He turned to the police department; then joined the Corp of Engineers eleven years after (7) his age, then came to Oahu. My mother was already married and had seven children. But her husband passed away in a big fire at Kaka'aku waterfront back in the early '20s. After four years then she married my Dad and there's six of us giving us 13 in the family; nine of us are still alive today. I met my husband in Waimea and we've been married 48 years, last week. Four children; 3 girls, 1 son. We have seven grand-children; 5 boys and two girls. And we have 4 great-

grandchildren at this time; expecting two more before the year is over. A pair of twins. They're 3 months old already. And we've all resided in my mother's house for the last 26 years. I belonged to [WHCC] for 32 years. Six of that 32 years that been my presidency. And now for the next two [years], president of Hawaii Council of Civic Clubs; I have nine clubs under my jurisdiction (Kupuna Mabel).

**A-3. Donald Tufenino, Kupuna Donald is a Waimea paniolo. He is also a re-knowned lei maker, although arthritis in his hands have taken its toll and he no longer makes *ākūlūlū* leis.**

I am Donald Tufenino, Sr. and I was born and raised at Waimea, 1932. And all my life I lived at Waimea and learned my culture from my parents at Apakaukau. And I taught my wife certain things that I knew all about. My mom was born and raised in Waimea. Originally, from my great grandmother then was from Ka'upulehu. My mother was Miriam Fern and my grandmother was Elizabeth Ku'ukua'a Fern. My mother grew up in Waimea. She met my father there.... My father was left on the beach when he was a young boy and a Hawaiian family found him and raised him. At Kawaihau Harbor where the Cause Club is, by the Kawoe family. My father was brought by his aunt from the Philippines, but things didn't work out so she left him on the beach and just went. My father's brother came to look for him, but he landed in Hana. And he started his family in Hana. And for some reason things happened and we got together and made a reunion and found out that we're related. My uncle when I saw his picture, he was a small man. My father was a big man. My father was fair, and he had colored eyes. But my uncle he looked like a real Filipino. But his offspring in Hana look exactly like us. But only he was small and my father was big. My father ended up speaking fluent Hawaiian. And he worked for Parker Ranch all his life (Kupuna Donald).

You live with Mabel's house, in there for him to offer me as best witness, but we put a book what we can back up with books, we put up *ākūlūlū* leis. (Papa William, Akau, Mar 3001)

**B. Land Resources & Uses.**

Land resources and use changes over time. Evidence of these changes are often documented in archival records. Cultural remains are also often evident on the landscape and/or beneath the surface and provide information regarding land resources and use. However, oral histories can give personal glimpses of how the land was utilized over time and where the resources are or may have been. Oral histories can also provide confirmation of cultural practices.

**B-1. Kawaihau.** For at least one hundred years, the most dominant use of the land in the project area has been ranching with cattle grazing in the uplands. However, the consultants remember agricultural practices in nearby *āhupua'a* as various cultural features of Kail bring back memories

**B-1-a. Kawaihau Lifestyle.** The lands of Kawaihau have a varied history from pre-contact to historic as evidence of ancient sites and local lore will attest. The consultants shared their experiences and *mana'o* about Kawaihau.

Well my vision growing up - Kawaihau was a beautiful community you know. Very simple lifestyle, nice weather, ocean is beautiful you know. The weather was more on the cool side. You look at mountainside, Kihala Mountain it was nice; our horses like you see today with nothing on it. Before was nice and green and lot of trees. Lot of what you call... well *paunani* [pear cactus] was brought in and there was lots of that growing about. And lot of wild animals, wild pigs and goats and even wild donkeys and stuff like that. So because the land was alive you might say that, things were growing beautiful and the wild animals do survive and survive because the land takes care of themselves. So looking at the past and looking today are two different things totally. Just like nobody lives on the land. But in the past it was beautiful (Papa Akau).

**B-1-e. Kamehameha's Kawaihae Residence.**

[Kamehameha lived] down here by where they call Kihikū'e, just below the other *feinu* over here. That's the name of the place, right by Mālikiini Heiau.

**B-1-f. Pelekane**

[Late Kapuni [Hicau]...right in the front of Pelekane...in about 25-30 feet offshore. It's all covered up. You know you cannot move the material, so it just pile up.

**B-1-g. Waimea Ohana.**

It's [ohana] gotten smaller because of intermarriage, but at one time between the Linsleys, the Purlys and the Bells, they owned all of Waimea. Then the Kimua's came in working for Parker Ranch and they married a Linsley, a Bell or a Purly. And then the families now divide--four Hawaiian or *Kapu Kaula*--they were English, the Linsleys. And so today you have everybody's uncle or aunty up there. And the family they are small and the tax goes so high they cannot afford to hold on to their properties...today's generation. There were no more than twenty cars; ten even 100 people--72 people counting the children when we arrived here [1952]; Waimea's school's population at that time was 56 children...with Ernest Makao. The first school was with them at the old Iweia Episcopal Church. And the houses where all owned outright by the Linsley's, the Purly's, the Bells. And Parker Ranch bought into this where the park is today. The population has grown over 300,000 within our area now with people from outside. And the transformation of the land has changed dramatically. We now have two large shopping centers; 15 outlets all around that little town; we have seven different denominations of churches and the oldest one is Iiwiola (Kupuna Mabel).

**B-1-h. Waimea-Kawaihae Connection.**

[The Waimea-Kawaihae connection was] Shipping cattle. I used to work Parker Ranch as a horseback and rough rider. I did almost everything, groundwork, fence work, work with the carpenter. Whenever we can't work the Ranch send us to this place to help. Went up Hanaleiua steering, dipping and all like that. I don't know if anybody know what is dipping--it's where you sleep the sheep and then you dip. And you go out there and sleep at night at outside station and drive cattle from one station to the next station. That was long hard work, but it was enough to raise my family (Kupuna Donald).

I can't remember when the last cattle drive, but we used to leave at 2:00 o'clock in the morning and reach Kawaihae about 4:30, 5:00. We used to come down on the highway. That time didn't have so much cars. Sometime you only meet one car, sometime no car. Had holding pen. The harbor that you're talking about, the pier collapsed (Kupuna Donald).

At my time we used to drive them on the pier and right to the boat. They had the chute to drop to the pier. And before that they used to take it from the Canoe Club, tied it to the boat and take it out and then lift it up and put it on the pier. Until they built that pier out there and then the cattle was walked on the pier to the ship. The ship name was *Huana'ua*...the other one was *Hanawii* right (Kupuna Donald).

*Muaun Loa and Kimua Kra [ka] (Papa Akau).*

**B-2. Fura. Kawaihae looks like a desert with *kiawe* trees and a few coconut trees and crown flowers shrubs. However, according to our consultant it wasn't always like that.**

Going *ma'ani* along the [coast]...see it was all black sand beach going out to the Canoe Club. We used to always go down to the beach and get the regular sand crabs, *ulu'ulu*, fish...they were plentiful--you take what you need that's all. And it's always there. Big schools of *ka'ala*, *aka'ala*, *o'pe'ia*, go out into fishing, lots of *aka*, *aka'aka*. The water from above always running, always used to have water in the stream. So there was a lot of wild guava always growing, plentiful. But today look at the land it's like nobody lives here; it's like nobody cares for the land. It's a sad thing. I seen the past; I seen in-between and I see now. If the future will change, well more power to the future. But everything was really meant for people because it was there. But you take care; you responsibility is watch over things (Papa Akau).

**B-1-b. Kawaihae Schools and Churches.**

Kawaihae had a school. Had a school long time, but it closed because not enough students. So it closed for several years. Then when the community was growing and a lot of children coming in so they opened up. When I went to school I was kind of old already. So when the war break out we went to Waimea because here went up to the sixth or seventh grade, I forgot. So at Waimea when the war break out I never went back to school. Kawaihae School. Has two schools. The tidal wave came in and destroyed the old one, so they built a new one across the road. The last teacher was Hattie Saffrey. The Saffrey family is from Maui I think. So she was the last teacher (Papa Akau).

Had the Protestant churches right across the street going down. It's gone. Was in good shape but they wanted to build another one so they just tear it down (Papa Akau).

**B-1-c. Davis Ohana & Stories.**

So just below there is the burial of [George] Huen Davis. His dad used to be the advisor to Kamehameha. His name was Isaac Davis...this is the son. He's buried down there. [See Figure 4] See had three. Isaac Davis had three children: one boy and three girls I think. It's a big concrete tomb. He moved Kawaihae he married my grandma's cousin and had one son. That's why you see all the Huen Davis... Huen married Hu'ehu'e. And Alice Fredland...she used to sing at the Hialekiani with Dela Cruz. They used to sing at Hialekiani. Hialekiani Girls. That's Huen Davis second marriage and children. So that's where we come in...that Davis, my grandmother's side....



Photo 28. Tomb of George Huen Davis.

You remember when the king from Kauai [Kamualili], when they wanted to kill him they had to give the poison and I think Davis took the poison and he died. This [the tomb] is his son. Because he [Isaac] wanted to protect him [Kamualili]. Some of the chiefs [poisoned him], that group... This was in Honolulu I think this happened.... They wanted to wipe out the ali'i line I guess (Papa Akau).

**B-1-d. Kawaihae Village or Town.**

Kawaihae had a jailhouse. Had some big building, but when I was growing up was in ruins. And they had some sandalwood trading so they had a place there (Papa Akau).

**B-5. Fauna.** Aside from destroying the sandalwood forests, feral animals did their share of damage to the landscape and forest, which radically changed the weather patterns.

The thing that really kind of did the most harm was bringing animals like cows, horses, mules, goats, pigs. They got into the mountains and they rook up things and gradually you know they dry things up. And then the clouds come and they don't hang over...they just move on. That's why it's very important to always protect your forest. But who cares...they think the money is more important. And who suffers? Everybody suffers (Papa Akau).

**C. Water Resources & Uses**

The Hawaiian word for fresh water is wai; the Hawaiian word for wealth is wai wai. This is because of the value the ancient Hawaiians placed on fresh water, which was crucial for growing taro, the staple of the Hawaiian people. Water was also critical for the people of Kawaihāe.

**C-1. Water System.** The water system for the potato farming was similar to the taro watering system. Water later came by way of pipelines and catchment.

Because you depend on the ocean, you depend on what you raise, so you have running water. So the system that they use is just like the taro system...it's a flood system; you flood one patch and move on to the next. It's the same system that Hawaiians had even down here in the dry sunny area. You had the water that comes from the stream and they do that. It's all gone now (Papa Akau).

In 1990 they brought water lines from Waimea/Kawaihāe, but before that they get catchment tanks. And they dig wells too. Each family had their own well.... Beachside water. We used to that so no pitikō ch you know what I mean...you make adjustment. So had that (Papa Akau).

**C-2. Stream Water.** At one time the streams flowed down to Kawaihāe, but sandalwood industry, ranching and sugar plantation all contributed to changing the stream waters.

They didn't disturb the flow of the water. The mountain always raining you see? So the stream always running. But when the plantations came into play, then they start taking ch. Not only Hawaii, all the islands they did that. First thing you know, why the taro farmers give up? Because they don't have the water, and the taro all spoil. Same thing like in Kohala on my mom's land, we still have the land, we still raising taro. [Niahi!] And what happened? They start taking the water. Especially in the summer months when get more warm. You need more water to cool off the lo'i ch. But if you don't have enough water it gets warm and all the taro spoil so have to give up (Papa Akau).

**C-3. Stream names.** In keeping with naming everything, the streams of Kawaihāe had names too. Papa remembered a few.

Waikōi, Wai'ū'ū, Makahoa, Hoookoa, Kai'opae, there's more but I don't remember (Papa Akau).

**D. Marine Resources & Use.**

The sea can be a great resource to people with access to its bounty. The consultants benefited from the resources of the coastal environs of Kawaihāe; went fishing there or had family members who went fishing or gathering. It is also a place of recreation.

**D-1. Fishponds.** Before the harbor was constructed. There was a long beach that followed the coastline. Behind that beach there were once fishponds.

**B-2-a. Native Flora and Farmlands.**

A lot of 'ohai trees...and willi willi. But now going further back they say this whole maunā oea used to be lots of sandalwood, lot of 'ohai. In fact the forest was way below the main highway. When they started cutting down all the trees for sandalwood to be sent overseas, that's why you don't see hardly anything growing now. They say even the 'ohai used to be loaded maunā. And lot of old...not only sandalwood some other old Hawaiian woods like the puu - what was that now? Because they not around it hard to remember their names. All what had before...because it's not around we don't remember-it's gone. And that farm even when you coming through here [Pu'u Kohala], this was all potato farm. We used to harvest. Up there, what do you call above here where the housing area is, used to be all farmlands (Akau).

**B-2-b. Staples Foods.** The residents of Kawaihāe depended on fishing for their lively hood, which they supplemented with potato farming. But their poi and beef came from Waimea.

Up at Parker Ranch, poi and beef come from the ranch. [Fish weal] mostly family. Give. Exchange kind. We not in the business of money. Everybody poor...they don't have money. We go Kohala and we get 'ohai, and banana and taro and different kind of cabbage. [We went by] Car. The horse days was in the past already (Papa Akau).

**B-3. Project Lands.**

That area was open area. People didn't live down there until the pier went in. There still nobody live that area...mostly fishermen fish in that area. Come down, they get little shacks and stuff like that, but that's "come and go" kind. But I don't know...what you call, 75 years before that. I just know a lot of people was born and raised along the shoreline you see, because all the streams coming from maunā to maunā used to always run that's why people live along the shoreline going to Kohala yesh. Just like here going maunā, same thing people used to stay. They used to travel on foot or by canoe (Papa Akau).

Well it's more poi area too. Not high pali, but people usually throw net and you cannot throw net when it high, you gotta be low.... Oh they usually be use, they set the net they get maunā, maunā and stuff like that. Because they feed ch. They come from outside, follow the shoreline come up yesh (Papa Akau).

And right in front there is where the Humu'ū used to throw anchor and that's where they used to ho'oe the pōi in the water. Drive them and they tie them alongside the life-boat...each side you get four on each side. And the lifeboat we tow out to the ship and as you get alongside the ship then they sling the...they put the sling around the belly, the oya and they hoist it with the wōoch and they put them in its stall on the ship (Papa Akau).

**B-4. Puako Neighbors.**

Only a handful [unrevel by canoe], people who live down Puako like that go down. They said I remember that people used to come in, in like the afternoos from the maunā direction. So they set in and they put the canoe on the shoreline. And then they go to the store...had two stores in Kawaihāe. They bring up fish, dried fish, oya's and stuff like that. And so they trade and so they buy what they need. And early in the morning before sunrise they start putting up their sail and start going in that direction. And each one they blow their conch shell and then everybody say oh certain, certain...person they know ch by the sound. It's an everyday thing how people move.... Both times. You know just letting you know "I'm coming" or "I'm going." But you don't hear that now days (Papa Akau).

Puako used to be the Hōnd Ranch ch, used to be a sugar mill down there. That's why Puako means cane flower...that's why Puako get that name (Papa Akau).

D-2. Fishing & Gathering. The consultants noted the various fish or other marine species found in the waters of Kawaihāe, and shared fishing adventures and what they caught, and gathered and how they caught their fish.

But as I grew up in Kawaihāe our family did a lot of fishing. That's the whole lifestyle of the whole community; everybody is a fisherman. So I learned a lot of the life of a fisherman (Papa Akau).

We go fishing after that at Oka'i'ula. And the road now that they have in existence they didn't have really a road. When the water rose, you couldn't cross. You go on the other side and you couldn't unless you had a small boat to come in.... Well in season you have ahii, you go for that; they drop lines, feed the opelu, 'hole. But now they got cigeritis so they can't catch those fish they gets really go somewhere else. They got ooo, mupacki if somebody orders (Kupoua Mabel).

Well fishing was a whole part of our life. We had boats; we had nets and all that. And my dad built boats and stuff and I used to help him out. And I used to build myself after that. But those things all pass by today and you don't do those things anymore. So we build the old way because of the tools that we had, but then we bought regular machinery. That was real fast. But then that period past already and you get an interest so you just put it aside. And we used to do a lot of *Aulani*. [Where?] All on the shoreline. A little fishing, we had big net. Open fishing, hand line. I done mostly everything that came up in me life; I learn, I try. What the story says.... Jack of all trade, Master of none—that was me. But I learned. To survive this world you have to learn something (Papa Akau).

Like right below here, Pelekahe, used to get.... now what you have in there is *talapia* and stuff like that because it's too shallow on the outside.... I don't know [where the *talapia* came from]. Not too long ago I'm sure.... 25-28 years.... University of Hawaii experiment. Not only *talapia* a lot of others they brought in too. That's why you go hand line now and you see all kinds of fishes. You don't want to eat it because when they disturb the harbor they kind of disturb the grounds. What that *cigeritis*? That things came about year. So we used to go fish every Saturday, we used to hand line right above here, above the reef. Get lot of *ju'*'s no, that's a fish we love to eat. Well it looks like *hinafira*, but I cannot compare say other. You go about line you get enough—maybe about two dozen. And you know they good size [10-12"]. If they too big, well the small size the one (Papa Akau).

Manini oh. My grandfather used to go throw net. He used to make the *inu* ch.... you know when the tide come up the *manini* start feeding ch and so you watch and when they all in that area you throw the net, they all run in the *inu*. So with net over you shake the *inu*, the manini all in the net ch. You take dozen, two dozen, that's plenty enough.... good size you know (Papa Akau).

[For the *inu*] you just get big all the flat kind.... you steady like the rock ch. You get maybe three like that and you take one flat one on just like one shed and then the *manini* go underneath. That's an *inu*. For protection yeah, that's why they run into the *inu*... because they feeding on the *pepo*, the flat area. They come up on the feeding area, so you shed you *inu* there, you throw your net and they run in the *inu* like that. Most of them if you don't have one *inu* they run down you see. But for protection they see that quick they go. But nobody use that now days. It's gone (Papa Akau).

[Fishhouse] That's what it is.... *inu*. Then another one is the *ku'inu*. *Ku'inu* means the roadway. When the tide is rising they come into that roadway and they feed on that feeding area. You know they feeding here so you swim out and you cross the net across that road you might say. So soon as you cross the net you have someone jump up here and they all run down into your net. And then you take the fish out. [It's] the original bottom. That's why the Hawaiians were really smart. They study the whole area and they know where the fish start feeding, where they feed, why they feed in certain areas and where they run back. You see.... they know. That's why they had those kind *ku'inu* around the shoreline. And you wonder why they don't go to certain areas, because the

There was a big fishpond right alongside of our home. My grandfather used to be the caretaker. Every season he used to go to the beach and take in the small baby owa and small *pea*. And he used to always put it in the pond. There was 3 small ponds and the big pond. In the small pond he used to put the seaweed in and raise it in the small pond. And when they hit certain size he would move them out to the big pond. And Parker Raach owns *Anaecho'omaha* and *Anaecho'omaha* has a fishpond there. So every year Parker Raach has a *lu'au*, usually they go down and they bring in all the *awa* from that pond and they use it for the *lu'au*. And so the fish in Kawaihāe would replace those in *Anaecho'omaha*. So that's the rotation that goes on year after year—they do the same thing. And my grandfather was in charge of all that (Papa Akau).

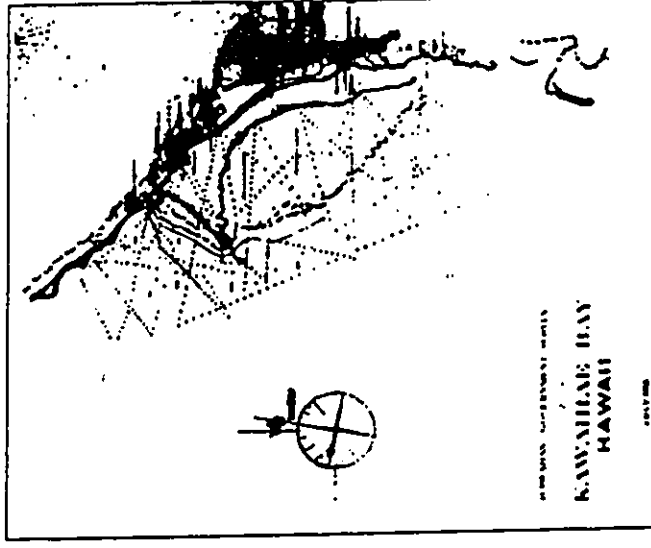


Figure 9. 1883 Map showing sand beach and reef (Jackson in Kelly 1974).



D-6. Kawaihiae Harbor.

So my dad's job here in Kawaihiae--well you might say today, man in his profession would be called a Harbormaster you might say. So that was his job was to oversee the movement of ships that comes in; the movement of cargo; the movement of cattle, sheep, wood--all of these things. So my dad used to be in charge; he used to make reports and all things that goes with his job (Papa Akau).

D-7. Currents of Kawaihiae Bay & Vicinity. Kawaihiae was known for its big storms and rough seas. During those times the residents found alternative ways of getting to shore, by following the currents, which all had names too.

You cannot come through there because it's so heavy. They usually come below here at Spencer Beach, come in through there because over there the wave that comes there is Ka'ewa. So Ka'ewa gets so heavy that nothing can come through. That's why the pier used to get built up every year on the Eia pier--but 'em up. Even the cat-walk the waves just move...cover the pier and move from shoreline you see. That's Ka'ewa. Then you come on this side, that's Pu Ka'ilima (coral reef). Then you reach from here, coming down here, that's Kukui (Spencer to Wai'ohu'ala). So you have the three areas; one is heavy, one is gentle, one is very gentle (Papa Akau).

Okay from here going in here (Kawaihiae Pier) Kawaihiae is Ka'ewa; from here, come up here (Coral Reef) is Pu Ka'ilima; and from over here across here (Spencer Beach -> Wai'ohu'ala Point) is Kukui. See this is the Kahawai come down Wai'ohu'ala. So Kukui run across like that. So over here supposed to get a channel going in over here. That's why is over here is bad you come through here (Spencer Beach).... That's why Kauhau'au used to surf at night in this area (Wai'ohu'ala) (Papa Akau).



Photo 29. Ohai'ala or Spencer Beach.

fish don't feed in that kind of area. So you know no sense you brother over there. So you look for where is their road back out. When you find that you just put your net right across there then they hit the net. Very smart the Hawaiians (Papa Akau).

Get that and the season. You go from about March. The first thing that come in is the *nehu*. When you see the *nehu* coming in you know the *nehu* is out. So when the *nehu* is out there you take the *nehu* and you put it in a alive box and then you go out there and you cast the silver *nehu* out into the school of *aka* and they go after and they start feeding. So then you drop it right in the back of the stern of the boat and then they start coming up right in the back. Then you put your *nehu* down with your pole, then you start hooking up. That's why I get a big scar across from an *aka* book eh. So that time, March, April, May, June, July, August.... all those months for that kind fish. Because seasonal thing they come then they go...the *nehu* and *nehu* and *nehu*. They all feed at that certain time. And the *nehu*, different kind, the *nehu*, *nehu* they come in too because that's their feed, what they're after. So when they hit certain time they move out, they go away (Papa Akau).

D-3. Limb Gathering.

Oh yeah...limu 'e'ele plenty down here. And the other kind, *leuce* like. Because of the fresh water. When you take away the fresh water they don't grow. No it was really beautiful, but you can't stop progress (Papa Akau).

D-4. Crabbing.

[We get] regular Kona crab and along the shoreline had *ka'aka*, *aka'aka* and stuff like that... It's a long one as big as your arm with the pincer in front like that. The other day I seen one book and they had a picture of *aka'aka*. I think *Molokai* has that. You see all this black sand... they dig a hole in the sand and they live in the sand.... Before plenty get, but I don't know about now. The other one *aka'aka*... *aka'aka* is gone. There's *ka'aka* is another type crab, and *aka'aka*... oh there's lots. When you don't see it any more we kind of forget. Before it's around us... just take what you want. Even the small kind shell like that, you hear the crackle sound yeah, when the tide going back you can hear it (Papa Akau).

D-5. Fishing Styles & Types of Fish.

The different kind [fish]. But the big *aka* no. I used to dive a lot and see huge ones in the cave and stuff like that. But why hassle with the big ones eh. I used to go hand line for like *aka'aka* you know the *aka* with the yellow dot on the side.... Get different types. *aka'aka* is the smaller one yeah. Get so many, cannot remember all the names. But that one [fish] I used to go hand line up here going north, there's a nice *aka* over there. There's a lot of *aka'aka*, when the current pulling right and you following the ground they start coming in just like the *aka'aka*. And then the sharks come in. So you have to give and take when you fishing when the sharks are around... they take what they want and you take what you take. So all those kind of *aka'aka*, *aka'aka*, you get *aka'aka*, *aka'aka*, *aka'aka*, *aka'aka*, *aka'aka*, *aka'aka* all those deeper water fishes we do that. *aka'aka*, *aka'aka*, *aka'aka*, *aka'aka* in more 35-40 fathoms deep. We used to see big schools of them but I don't see them anymore. [fish] They around but you don't see the big schools that moving [like the black school in the water] yeah... like the *aka* you don't see that anymore. Used to see pile after pile after pile. I guess when once you disturbed the shoreline you kind of change things.... [And] we used sew them all up - throw net, *aka'aka*, all that. Not like today where you can buy it the stuff. But before you had to make it. Even the *aka'aka* net had so small eye (papa Akau).

(May now as you get down to what I going to tell you... natural flow when comes from the south, flows around here, comes in and through Kawahae like this, and moves out like that you see. So you always have what you call fresh and clean water that moves--the current that moves in this direction. But when they want build this [breakwater], they want cut off. So you don't have anything to clean out in here. Because when you block it off its like putting a big fence right across. So that's what my concern is. If they open up in here even a little then you have the movement. But it's not happening (Papa Akau).

E-2. High Surf. The high surf caused by seasonal passing storms is a natural phenomenon that the old-time residents of Kawaihae have lived with all their lives. It has done much damage over the years to man-made structures along the coastline. Therefore one of the concerns is for the cables that SIC will be using.

Heavy [surf] over there. You never seen what I seen. So you know they cannot control the large. Break loose and first thing you know went on the ground. That's why when rough season the ahims say you. But if you going put something permanent over there and you get heavy sea and heavy current there's no way that you can move the thing. You see you're crossing the pattern of the force. The other way if you by em [feet], come right into the harbor itself you kind of going with it because the current go in that direction. Well they should study about that. You get some idea of what I'm trying to say.... (Oh) in the channel into the harbor. But I don't know if they can do it. But you know it's just an idea. They don't have to dig and go down and still get out in the ocean you going to cross the same thing you see. You going break some channel from the shoreline go out to the cable and sink the cable in the trench and cover it up it's different story, but they not going do that. Only on shore they talking about. So what's that going do? Nothing, if the outside is not safe. So either way.... Because the thing [winter surf] is HEAVY when it comes in. And then you might have problem with run off of the sand. Because when rough weather the sand pile up in the small boat harbor. [The season is] from about December, January, February... (April) should cool off [rain down] already. We used to see that every year when you know, you see the shoreline it just pounding. When you see the weather change you see more come from the south, you see more rain on this side (Papa Akau).

E-3. Project. In general, the consultants had no problem with the project itself, although a couple of consultants qualified their "testimony" regarding the Fiber Optic Cable project.

Well, this one I have no what you call against this because if the Federal government went give the money to build it why should we stop it because it's going to benefit. That's why it's going to be Hawaiian Homes. But maybe in the future it might open to others.... Well it's working in Oahu.... On this island I have a feeling they going right around the island because you get Hawaiian Homes Land at South Point, you have in Keekaha.... Well you know in the long run everybody going benefit not only the Hawaiian people.... Because the key thing was because we come under the Federal pact.... then you can get Federal monies under Hawaiian Homes. So this is Federal money, because they owe the Hawaiian people. So it probable not going benefit every Hawaiian, but who ever qualify themselves. Like as we old, retired already well we can enjoy that. But some they struggling, that's kind of hard (Papa Akau).

And also I would like to comment on your proposal of this study of the underground Fiber Optic cable project at this time at Kawaihae, situated at Hawaiian Homes Land. I oppose to many of the things, but the procedure if it's done without a risk and safe reasonable purposes for the development of the future of the telephone or anything concerning the Hawaiian people and the grant that will be received will be taken place with the carefulness and the understanding of the 'auna that they are using for their purpose. Hopefully it will benefit all Hawaiians in this area as well as any place where it is put. Mine's is an agreement to this and I stand on the procedure and the risk. An explanation was above very well by Maria to let us know. And we would like to say thank you to her (Kupuna Mabel).

E. Project Concerns. The consultants all expressed concerns regarding the project; some in a more general way, and one, very specifically, though not directly, involving the project lands.

E-1. Malama Ka 'Aina and Ocean. One consultant was particularly concerned about the ocean flow, or lack of it, within the Harbor proper. He gave reasons for this concern and suggestions as to how to remedy it. He also provided analogies regarding why it is important to care for both the land and the ocean. He also was concerned about beach-going practices that were polluting nearby beaches.

Kawahae for fishing, it's a special place. Used to see schools of *opelu*, *ahi*, but when they put in the harbor it's all gone. Wiped out the whole place. But they can, what you call, preserve it if they fit the inner part because the fish always come back but there's no place for them to hang around. They have to have a place where the big fish can't get after them. When you lose that you lose everything. That's why you look.... just like I no can hold air it's like nobody live here. The ocean is the same thing, but before everything is season, you know what's coming in. It comes in and it goes out, just like in a circle yeah. That's why the Hawaiian they see that and they live by that. That's why they had certain rules yeah they put in. To protect themselves. But that's why you had lot of meetings....they said oh we gotta protect the ocean. But it's kind of too late yeah. The Hawaiians knew that and they done it, but generations follow after that didn't follow though. Everybody said oh lets do research you know. The Hawaiians done that already but we didn't keep up you see. So who's fault is it? For money. But Hawaiians that's their lifestyle, that's why they got to live with Mother Nature. Because that's, why things are in place...that's for you. But you...like the Hawaiians say...*malama ka 'aina*. You take care! You take care of the land; you take care of the ocean. Today everybody get that smart ahem way....they know it all. Well I've seen all of these things. You feel kind of sad within yourself, but what can you do? You can only go to meetings and express yourself how you feel.... Well with things going on today you have to train your children and put them on the right track. Respect. Because if you have no respect oh, you mean nothing. But if you respect its going take care you. Because respect is all about we have to take care; not to disturb things. To help things better yourself each day (Papa Akau).

[Mauna Kea Beach Hotel - Hapuna Beach] use to get plenty *moai*, *waka*, *papa* off that beach, and the Kona crab. So when you live natural, makes you a natural person too, you fit in. But when you do business you bring people in they come with all their ideas, with all different things. They come, put *umua* *loko*, get in the water, they pollute the ocean. They no think that! That's why you don't see the live fishes around, you don't see the crab and stuff like that. Why....because this is what happens (Papa Akau).



Photo 30. Two archaeologists at Mauna Kea Hotel/Hapuna Beach.

G-1. "The Whaling Story." I remember Tuis Kūhū... when he went back around and said "Oh... a *pepo* means? he tell you. And you look at okay? *ʻŌle o ma ka lae lae ma nawai* a line and your paddle, everything. So first thing he tell you, you come early in the morning, you see. So early in the morning... because I live the other end and be live on the other end. So early in the morning still dark I walk, but I whistle. He comes out of the house, he looks up at the mountains, he looks at the ocean and he said like this "Maikai" wa pe." It's a beautiful day! He goes wind blows, wind or rain.... So it goes like this you know. So one day I ask "ʻE Tuis Kūhū how come everytime we going out, I come early in the morning and you say "Eh it's going wind, rain. How come you say that? Then he tells me like this, "Well Hawaiians don't like you to whistle." I said "then why don't you tell me so I learn?" So after I don't whistle no more. So you know you gotta catch on to so many things. They give you a round-about story, but if direct then you learn something. But them they go like that. That's why they say "You look with your eyes... nose to make." "ʻŌle la pepeina." "ʻŌle la hana." Meaning you watch with your eye, you listen with your ear, but you don't say anything. That's the Hawaiian way. But sometime you gotta ask question eh. But they don't want to tell you; you gotta ask someone else. So that's how with me.

G-2. "Drifting at Sea Story." Like one time we went fishing at Hulo Point and it was really good. Big swell come up at the end of your nose, the sting no can loose, start dragging. Oh go start the engine. The engine no work... dead! Oh what we going do, the wind blowing and the high surf. So some want to put the sail up. I say put the sail and we go the direction of the wind, we go back this way. Eh the boat is still like that, no move north, no move south. What that, going down like that. Going down till the end of Kaho'olawe. Kaho'olawe right there, you know. But before that my other two partners said "Let's do this." I said no, no, no. I said ah, just wait. So I go in front the bow I want go rest. While I was sleeping I can see you know... like a vision in my eye. I can see my Mom... Okay when I got up and I look at the engine, at the flywheel and I see the flywheel get all small like bottle yeast. Right there something just hit my mind. Oh bring me straight gaff, hook gaff. It come, I stick that one in the flywheel, I left em up and the engine start. So as start we turn around, we head for Maui, we head for Kihui. Went Kihui... we walk across the street had one house... that time didn't have too much house in Kihui... way this side was [Aoki?] family. I didn't know. So we went inside, we tell him our problem. Oh come, come, come. So then I call home and I talk to my dad. So okay, I said this is what happened. So okay. Then I tell him, you know we here with this family, I said you your good friend who was in the military, stationed over here. But when I mentioned it to the mother, Oh that is how he mentioned he met. So they fed us and the next morning my dad came over and we took the boat over to Ma'alea. We anchored the boat there then we went home. By and by when the time, I came back and I took the boat from there and I went to Ma'alea. And then we waited there and then Ilumu'ula came in from Hoolulu, pick us up and we went back to Kawaihe. So that's one experience. I'll never forget. So you have to remember the Man upstairs because him first in everybody's life.... I always was like that. So you know I wasn't afraid of anything like that. You just have to do something and I did that and already you can see what you have to do. So that's fishing life... (Papa Akau).

G-3. "Fishing Story." We learn a lot going with our Tuis those days. You know two men on a small canoe, we paddle, makes his hand like this that means you go in that direction; when he puts his hand up like this means you hold back. And then first thing he drop his anchor, I mean he drop his fish line in the water and first thing he's fishing and you not catching. He's getting a lick and he's jumping up, so I watch him and I look down on the bottom and you say how come? He's on the reef and you on the sand bottom. How can you catch fish? So you catch *opele* and you move ahead. So when he catch his fish he say "ʻŌle kawa, go." So all like that, but I learned a lot. And the wind it's blowing so hard I tell him "ʻŌle kawa, go." So all like that, but I learned a lot. And so he looking at the white cap blowing. You still going ahead. So when you reach up to the line he said "ʻA love, love." Okay, you put everything away in the canoe and you back up. And where you do that, first thing you know the wind changed. The wind is coming in the back of you... going to push you to that direction. So smart I tell you (Papa Akau).

But I'm against things like this you know, pertaining to the land, desecration of the land and stuff like that. But I will participate, depends on how they do it. But if anything out of the way, then I'm against it. That's all (Kupuna Donoh).

F. Traditions or Cultural Practices. Many ancient Hawaiian traditions and practices went by the wayside with the breaking of the *kapu* in 1819 after the death of Kamehameha I, but many are still being handed down generation after generation. Naming was and is very important to families as they pass on family history and family traditions. Sometimes the naming comes with expectations that conflict with today's world. This is explained by one of the consultants.

F-1. Naming Tradition.

I had a Hawaiian given name, a high *ali'i* name, but you know I cannot handle it. Things are changing and we're not living in the past, so that wouldn't work. So they feel it's not right, so it was removed and that's why "Allyou" came into play. That's why Robert Kaka'alani and us we family. So one day we went to Puhakuloa to do a blessing on the training area, he was asked by Teresia to come up so we flew out at that area and he did the blessing. And while we were going home we were talking about our names. I told him I don't have a Hawaiian name it was old, taken away because cannot handle it, yeah—you can see yeah. So then he came up well the same thing with him. He had a name like that and he can't handle it too. So that was removed. You see you looking at the past when you know people go under the *ali'i* of the *ohupua'a* what he said eh, so each has a certain responsibility. That's why you given that, but you can't handle it so no sense holding on to that position. So that's the reason why we asked to cut it off. So who knows. They tell you that it's important, but the whole thing is changing. We start from Hawaiian and we go to the white man's way of living. We don't speak Hawaiian in the home or in schools see. That was *kapu* as far as the *hale* is concerned. That's the reason why Hawaiian people had hard time in life. Because if you follow the old system you have more respect, but we don't that today. Everything is too *hukaka* you might say that today. So that's the reason. Because of removing one name you have to replace that. So I'm the only one in our family that has Chinese name, the rest is all Hawaiian name. That's the reason they did that I guess because it's something you cannot reveal eh—because you know things change eh—in the past you know you have certain responsibility that you have to care for. If you are *kahuna*, you *kahuna*, if you *kahuna* *hoku* that's your job; *kahuna* *lawai'a*, *kahuna* the farmer. All that kind of things, that's the responsibility given to you. But then when all things change you not in charge any more, so no make sense yeah. But it's okay (Papa Akau).

F-2. Cultural Sites and Resources.

That's what they say. You know old days our parents, grandparents they don't talk about these things... they're sacred sites... so *no wala*, as they tell you "ʻA ole wala" *na*. They already passed so they should rest in peace. I don't go look for that kind of things, I see a lot, but I don't touch (Papa Akau).

Sometimes it pay back, you touch you know, they hit. Yeah, you gotta watch - especially Hawaiians. That's why they don't want to say anything, to protect things yeah. 'ʻA ole wala' *na* a *le maika'i* if you know, things like that.... Me, I used to hear - some people can see. But sometimes it's the feeling you get inside you - things happen, you can feel it (Papa Akau).

G. Anecdotal Stories. Often while "talking story" many little stories are shared. Often they are not site-specific or have anything to do with the project lands, but they are never-the-less very interesting and give a glimpse into a window of time that has passed - usually about the area in the vicinity of the project location. Therefore they are treasures that cannot be passed up and must be shared in this report as well.

RECEIVED AS FOLLOWS

G-4. "Hapuna Ala Hele Battle." But not now [no trails]. You get roads all over. That's why when outsiders come to "Oh beautiful!" Buy the land, build a house; first thing you push out the Hawaiian...they the boss. That's why when we fight, we lose. Just like Mauna Kea Beach Hotel when they build the hotel. Seven years we fight the case - we won the case... from the shoreline. They tell you cannot, private property, they said security after you. Never hunt the directly, but a lot of friends, a lot of family. When they tell the story you get hurt inside. That's why we go after them. He was at Ben Gato, he was with Legal Aid. But I cannot be with Legal Aid, but he wanted me in the worst way. But I have to get an attorney to support me so I got Andy Levitt... You see with my attorney then I can work with the Legal Aid. And we won the case. You know we went to the meeting with all the high class kind attorneys... they ask me like this "What right I have? Me I say burn up "What right?" I didn't say anything right off, if I do then... By and by I tell them like this "My Hawaiian rights..." What right they tell me. I'm a Hawaiian! And I know because Ala Hele is there. I know why the people go down to the beach it is to fish. They don't go for any other thing. They go to go to Hapuna. When that thing happen we went after the County, the State. Mrs. Ruth... five people from Kawaihae said they own the land. You see those days they never care. Once they buy the land everybody is shut out. But we will have our rights. That's why the law 1840 I think... what was that law... so that's the one we went fight on... that law, because all the *hele*, *ala hele* was held in trust by the government.... (Papa Akau).

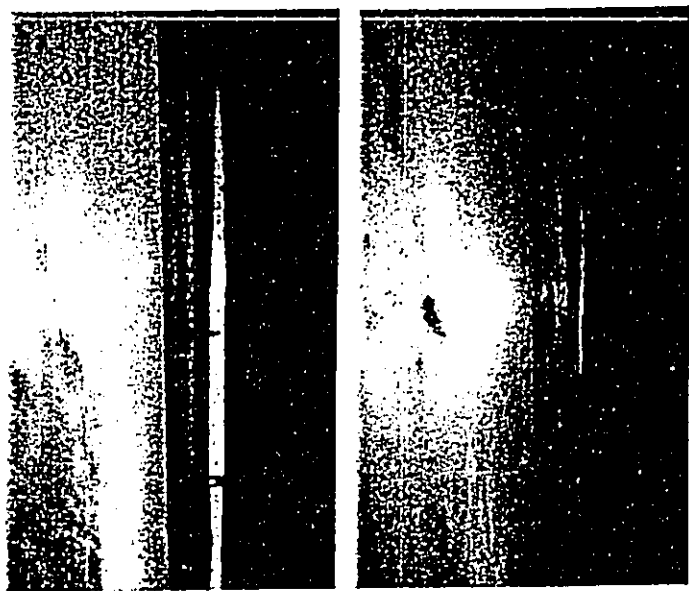


Photo 32 & 33 Hapuna Beach at Sunset.

G-4. "Akamaul Kupuna." I learned all these kind of things. I look at that I think today really the old timers, the Hawaiians were really intelligent people. You know to survive on the island here and by living, by understanding the ocean and the land. You gotta do things in order for you to survive. So they gone through things all their life so they said you gotta watch what I do. Don't ask questions. So you learn when you do that. But like today's time they ask you many questions yeah. And its kind of hard when you ask question and you yourself don't know. So that's why the Hawaiians that's all they know is what they do you see, because it's passed down yeah. When you farm, when to plant...that's why the calendar is really something yeah. They tell you "it's in *maui* *le e* *le e* *le e* because it's *maui*... *le e* because no matter what you plant or what you go get, you not going get nothing. So that's what it means. That first moon, *hilo*, is good to fish. All down the line. They knew the law of the land; they knew the winds, they knew the setting of the sun. They were really something. And you know I grew up with that because I see that. But today, it's gone. You try to face the world the *hau* way and it you don't do it you not going get ahead. Wasn't easy.... (Papa Akau).

G-5. "Queen Connection Story." Like Lili'uokalani she married Ikaika, was her husband. So my great grandmother from Kohala, that's the one that adopted my grandmother. Kawaihae's and what was her name, anyway go down to Washington Place and stay with the Queen. So my mom was a young girl and go down there. But my mom used to tell us she go down, but we cannot see so we don't question. So one time when we had Aloha Week and everything was *new* we meet in Honolulu. Big celebration. So went to tour the Washington Place and when we went to tour and then the guide showed us each thing in the Palace. And when we went into the main, her room and I looked at the wall, the bed facing the wall and I look I said oh we have the same picture at home. So I think gee boy this is Moke'e and Kawaihae's, that's husband and wife. So when I came home I said I seen Moke'e and Kawaihae's. So mama was right. Mama said she used to go down with Moke'e and Kawaihae's and used to stay with the Queen in the Palace. And you know we thought only story, but when I went go, I seen for myself there is a connection that family. [Moke'e and Kawaihae's were] husband and wife. My grandmother was *hau* by Moke'e and Kawaihae's because Moke'e's father was the high *alii* and he had *hau* rights in Kohala, he had government land....



Photo 31. Nearby Hapuna Beach with tidal pool.

PART V: SUMMARIES & CULTURAL IMPACT ASSESSMENT

The following summaries are based on the information presented in the previous sections: the traditional and historical literature review and the ethnographic data and analyses. The summaries focus on significant individuals and events in South Kohala's history in relation to Kawaihae, and provide an overview of land, water and marine resources and uses in the general area, as they reflect cultural practices.

Summary of Significant People and Events

According to traditional and historical material, the South Kohala District, specifically the lands of Kawaihae 1 and 2 have gone through a number of significant changes, and witnessed the comings and goings of many significant people. Some of these people contributed substantially not only to the history of South Kohala, but also that of Hawaii's Island and the rest of the Hawaiian Islands. These significant people lived in Kohala and vicinity, and were responsible for land modifications, shifts in polity and commerce, and the gene pool of Hawaii's *alii* and monarchs.

Mythical Entities.

The most significant mythical entity to impact Hawaii's Island was the volcano or fire goddess Pele, who left evidence of her visits in the form of *pu'u* that dot the landscape, ash that fertilizes the land, and especially monumental lava flows that erased entire settlements, forever changing these lives affected by the destruction. Often, though time has passed, archaeologists with the help of oral histories are able to reconstruct the life of the ancient ones through the clues left behind, but this cannot be done in the places visited by Pele; the few stories left have to suffice.

*Ai'i* nui.

One of the first legendary *alii* nui was the priest Pa'ao who is said to have arrived on Hawaii's Island between AD 1100-1200 and constructed Waha'ula in Puna and Mo'okini Heiau in North Kohala. Pa'ao is credited with constructing *heiau*, specifically *luakini* or temples of human sacrifice, and radically changing the religious system and political structure of the people of Hawaii's Island. Pa'ao brought about a significant change in religious practices by introducing the human sacrifice (*Ku* Cult), and he brought high chief Pili to rule in place of chief's he believed had lost their *mana* or power due to too many intermarriages with commoners and/or ineffective rule. His new system introduced the concept of hierarchical or *alii* rule to the islands and a new order of *kahuna* or priests.

Many battles took place across Hawaii's Island as rivals fought for control of the various districts. Kamehameha I successfully conquered the local island polities and went on to conquer the rest of the main Hawaiian Islands, consolidating his archipelago-wide realm, a feat that only Kualii was said to have done in the past. Kamehameha's conquest was aided by foreign weapons and advisors and by powerful *kahuna* or priests. Two influential *kahuna* were Pu'ou and his son Hewahewa, descendants of Pa'ao. Pu'ou and Hewahewa were masters of many arts, and were considered *kahuna nui*, the highest rank of a *kahuna*.

Kamehameha, at the advice of *kahuna* constructed the monumental Pu'u Kohola Heiau on a prominent hilltop overlooking Kawaihae Bay. This heiau was constructed above the ancient Mailekini Heiau and perhaps on an older heiau, said to have been consecrated by Lonoikamakahiki. Kamehameha conducted the sacrificial ritual, offering his cousin Keoua to his war god, Ku-ta-ii-moku, to assure his victory over the polities of Hawaii's Island and the other islands.

During his conquests, Kamehameha lived periodically in Kawaihae. When he was elsewhere, his *hoole* advisors Isaac Davis and especially John Young took care of business negotiations and transactions. Both men received large tracts of land in Kawaihae and elsewhere for their faithfulness. Although Davis died relatively young, Young lived to 93 years of age, most of it on his lands in Kawaihae 2 that were eventually inherited by his granddaughter Queen Emma.

Kamehameha chose to live in Kailua-Kona during the final years of his life. After he died in 1819, his son who also lived nearby, chose to capitulate to his mother, Queen Ke'opuolani and his *Kuhina Nui* (co-ruler in this case) Queen Ka'ahumanu, and break the *'oi kapu*. This act was done at Kawaihae and signaled the end of the religion of Pa'ao. Hewahewa, who had been given the role of guardian and priest for Liholiho, resigned his position and helped the missionaries. He eventually left Hawaii's Island and moved to Waimea, Oahu.

Historic People.

Most of the significant historic people connected to Kawaihae are mentioned above because they were also the *alii* nui of the area. John Young was bestowed the title of chief and awarded lands by Kamehameha I. His granddaughter Queen Emma, together with her husband Kamehameha IV, grandson of Kamehameha I, founded the Queen's Hospital on O'ahu. It is administered by the Queen Emma Trust Foundation that also administers her lands including the Kawaihae lands where Pu'u Kohola and Mailekini Heiau are situated.

Significant Events.

Two of the most significant events in Kawaihae include the construction of Pu'u Kohola Heiau and the overthrow of the traditional religion. Other significant events and developments include visits by whaling ships, the sandalwood trade, the first Mission Station and Protestant Church, shipping Waimea cattle, the discovery of Forbes and Mummy Caves, the construction of World War II gun, the construction of the deep-draft and small boat harbors, and the construction of Hawaiian Home Lands residential subdivisions.

Summary of Resources and Use

Various land use patterns are physically evident as well as recounted in the literature. The physical evidence is in the form of stone ruins including *heiau*, platforms, mounds, walls, enclosures, and burials. Clues regarding function and use of the ruins come from stories, songs, chants and ethno-historical observations, and from the surviving cultural remains (artifacts, midden, charcoal for dating).

Ancient Land Use.

The traditional literature and archaeological evidence document a prosperous settlement at the coast in Kawaihae. Permanent and temporary shelters, habitation and agricultural complexes, artifacts and midden, and especially burials and *heiau* tell a story of ancient use of the lands. People lived and died here. People worked and worshipped here. People cultivated the diverse natural resources (endemic/indigenous plants; bountiful marine resources and aquaculture), and cultivated Polynesian-introduced cultigens including their staples, medicine, and ritual plants.

Land Resources and Use.

The only evidence of the once thriving sweet potato and yam farms are found in the stone ruins and the stories of a few old timers who still recall that time. Although the cattle drives from Waimea and the shipping of cattle ended in the 1940s, several of the old time *paniolo* still recall those days. Ohana

(family) trading of ocean resources for produce persists, but not on the large scale of years gone by, because modern stores now sufficiently provide a family's needs.

Marine Resources and Use.

Although the fishponds and sail pans are gone, the marine resources have survived (Table 4) and families of Kawaihae still take advantage of the entire coastline and favorite neighboring spots at Spencer Beach, Hapuna Beach and Puako.

Water Resources and Use.

Although there are no streams, springs, or wells in Kawaihae today, there are people still alive who were witness to these resources. They still know the names and locations of the streams and springs, although those are fading in memory.

Table 4. Marine Resources of Kawaihae (according to Papa William Akau).

Fish	Other name	Method/fishing	Place	Time Period
Ahi	<i>Thunnus spp.</i>	canoe boat	deep water	ancient-modern
Alu	<i>Lutjanus fulviflamma</i>	canoe/boat/diving bell	deep water	ancient-modern
Alu	<i>Trachurus sp.</i>	fishline net	35-40 fathoms	ancient-modern
Alo alo Crab		black sand net	35-40 fathoms	ancient-modern
Awa	<i>Chenopodion</i>	net		ancient-modern
Himala	<i>Coris spp.</i>			ancient-modern
Iao	<i>Francis (various)</i>			ancient-modern
Ili'oli uba	<i>Syngnathus</i>	hand line/ho'a	North Kawaihae	ancient-modern
Kabala	<i>Syngnathus</i>		deep water	ancient-modern
Kakala	<i>Eucinetus brachycephalus</i>			ancient-modern
Ko'ko'e			deep water	ancient-modern
Kona Crab	<i>Ranina serrata</i>	gaber	shoeline	ancient-modern
Kunaha Crab		gaber	shore	ancient-modern
Lima	Varley	gaber	Old coral reef	ancient-modern
Mahimahi	<i>Coryphaena hippurus</i>			ancient-modern
Mania	<i>Acanthurus spp.</i>	limb/throw net	reef	ancient-modern
Mopochi/ U'a	<i>Myripristis spp.</i>			ancient-modern
Muke'e		ku'ua/net	ball fish	ancient-modern
Naha	<i>Stolephorus pariparus</i>	shore		ancient-modern
Olowaha Crab	<i>Coenobita melanocarpa</i>			ancient-modern
Oni'hi uba	<i>Acanthurus spp.</i>			ancient-modern
Opa'opa	<i>P. microstictus</i>	hand line/ho'a		ancient-modern
Opeka	<i>Pteroporus spp.</i>	hand line/net	Kawaihae; Pelekane	ancient-modern
'Opunui			deep water	ancient-modern
Pa'ua'o		hand line	Old coral reef	ancient-modern
Pelekane Crab	<i>Spartilodactylus spp.</i>	gaber	shore	ancient-modern
Talapa		hand line	harbor	ancient-modern
Ulu	<i>Aplousia viridissima</i>			ancient-modern
Ulu	<i>Corax spp.</i>			ancient-modern
Upepa'a Crab		gaber	shore	ancient-modern

Cultural Impact Study (CIS) Assessment

According to the OEQC Guidelines, the types of cultural practices and beliefs subject to assessment may include subsistence, commercial, residential, agricultural, access-related, recreational, religious and spiritual customs. Table 5 summarizes cultural resources and practices for coastal Kawaihae. Nearly all of these are, or were formerly, situated south of the project area in Kawaihae 2 (see Figure 4) and these

will not be impacted by the fiber optic cable project. Several, including the surfing sites, fishponds, squidding, and sail pans, were destroyed by modern harbor improvements.

Access to the ocean for fishing and gathering, and for canoe paddling are the only surviving cultural practices potentially affected by the fiber optic cable project. Fishermen park on the access road and camp out on the historic pier-related ruins in the project area, and gather *opihi* and fish along the rocky coast from the project site. According to the Kawaihae Canoe Club coach and assistant coach, the practice path of the paddlers takes them right past the project site at about 10 feet off shore during *mauka* winds.

The canoe club coach felt that the land drilling would not interfere with practice, but any offshore work might. Fishing and gathering of marine resources in the project area potentially will be disrupted by the project. Any potential impacts to canoe paddling or fishing/gathering would be temporary, limited to the period of drilling and cable installation. None of the practices would be impacted by subsequent operation of the facility, with the possible exception of major maintenance or repair/replacement of the facility. Any temporary impacts should be mitigated through consultation with the canoe club and any individuals who fish or gather marine resources in the project area.

While the consultants interviewed for the project generally approve of it because it will benefit the residents of the Hawaiian Home Lands, they still have some reservations and concerns including:

1. That the project will be done safely and without risk to the Hawaiian people and with care for the land;
2. That the project will not desecrate the land;
3. That the ocean as well as the land will not be further destroyed;
4. That SIC would be mindful of the high surf-related problems;
5. That something be done about the lack of octopus flow within the harbor proper; and
6. That SIC respect the land and the ocean.

Table 5. Cultural Impact Assessment of Kawaihae Cultural Properties/Practices

Name	Location	Use	Practices	Project Impact	Mitigation
Alawai	Kawaihae 2	bathing pool	ancient	none	none
Hale O' Kypuoi	Kawaihae 2	shank heiau	ancient	none	none
Honokaa Church	Kawaihae 1	burial caves	ancient	none	none
Kapua'ilima	Kawaihae 1 & 2	coral reef/gaber	ancient/historic	none/destroyed	none
K Canoe Club	Kawaihae 2	surfing spots	ancient/modern	none	none
K Canoe Club	Kawaihae 1	canoeing	ancient/modern	possible	meet with Club
Fuliponoi	Kawaihae 1 & 2	aquaculture	ancient/historic	none/destroyed	none
Makelini Heiau	Kawaihae 2	ritual	ancient/historic	none	none
Makahaia	Kawaihae 2	habitation	ancient/historic	none	none
Pelekane	Kawaihae 2	all'i haunalei	ancient/historic	none	none
Pu'u Kama'i'i	Kawaihae 1	wahi puna	ancient	none	none
Pu'u Kaho'i'i	Kawaihae 2	ritual/heiau	ancient/historic	none	none
Ruins	Kawaihae 1	peki/fiber	ancient/historic	none	none
Sail Pans	Kawaihae 1 & 2	domestic	ancient/modern	none/destroyed	none
Shore Fishing	Kawaihae 1 & 2	domestic	ancient/modern	yes-access	meet/organize
Shore gathering	Kawaihae 1 & 2	opihi	ancient/modern	yes-access	meet/organize
Squidding	Kawaihae 1 & 2	domestic	ancient/historic	none/destroyed	none
Waikane'a	Kawaihae 2	healing	ancient/historic	none	none

Barthe, Dorothy B.  
1969 *The Kumuhama Legends: A Study of Late 19th Century Hawaiian Stories of Creation and Origins*. Pacific Anthropological Records No. 3. Bishop Museum. (First published in 1878 by Abraham Fornander in *The Polynesian Race*) [Barthe also 1971]

1983 *Notes on the Lands of Waimea and Kawaihewa*. Hawaii Historic Preservation Report 83-1. Bernice P. Bishop Museum, Honolulu.

Barrow, Terence  
1983 *More Incredible Hawaii*. Charles E. Tuttle Company, Inc. Vermont.

Beaglehole, J. C. (editor)  
1967 *The Journals of Captain James Cook on His Voyages of Discovery*. Vol. III. The University Press, Cambridge.

Beckwith, Martha W.  
1919 *The Hawaiian Romance of Lailikawai*. Government Printing Office, Washington.

1940 *Hawaiian Mythology*. Yale University Press, New Haven. [1970]

1951 *The Kumuipo: A Hawaiian Creation Chant*. University of Hawaii Press, Honolulu. [1990]

Bellwood, Peter  
1978 *The Polynesians: Prehistory of an Island People*. Thames and Hudson Ltd., London.

Benbow, Alfred, Sr.  
2003 Personal Communication in Waimea. August 9, 2003

Berger, Andrew J.  
1972 *Hawaiian Birdlife*. The University Press of Hawaii, Honolulu.

Book, W. J.  
1968 "An Archaeological Survey of a Coastal Tract in North and South Kohala, Hawaii." Prepared for the Department of Land and Natural Resources, Division of State Parks, State of Hawaii.

Borthwick, Douglas, Chiojaji, Rodney, and Hamama, Haku II  
2000 "Archaeological Assessment of Proposed Water Line Corridors and a Reservoir Site in Kawaihewa I Ahupua'a, South Kohala District, on the Island of Hawaii" (TMK: 6-1-06; par. 2, 3, 7; 6-1-01; par. 3). Cultural Surveys Hawaii. Prepared for R. M. Towill Corp. [On file at SHPD Library #H-1742].

Brasfield, Charles W. and Chalham, C. E. (Claude E.)  
1967 "Expansion and Revision of Kawaihewa Harbor, Hawaii; Hydraulic Model Investigation. Technical report no. 2-866." Sponsored by U.S. Army Engineer District, Honolulu. Conducted by U.S. Army Engineer Waterways Experiment Station, Corps of Engineers, Vicksburg. [On file at UHIM-Hamilton Library]

Brennan, Joseph  
1995 *Poniolo*. Ku Pua Publishing Inc., Honolulu. [Original 1978]

Brundage, Lucille  
1971 *Alfred W. Carter Hawaii's Dean of Gentlemen and Notes on Hawaiian Life*. Privately printed, Kamuela

Burchard, Joan  
2002 *Little Britain: Letters from the Hawaiian Kingdom*. C. J. Burchard, Sherborne.

n.a. 1967 "Historical Notes: Waimea-Kawaihewa, South Kohala, Hawaii." [On file at SHPD Library #H-463]

n.a. 1967 Kohala Coast Resort, Kawaihewa, Hawaii, U.S.A.: a recreation community concept of Dilrock Company, Honolulu, Hawaii. Dilrock Company, Honolulu. [On file at UHIM-Hamilton Library]

Adams, J., and J. S. Ahrens  
1994 "Archaeological Inventory Survey, Upland Portions of Kukupahu and Awala, North Kohala, Island of Hawaii." *International Archaeological Research Institute, Inc.* Prepared for Chelon International of Hawaii, Inc.

Akai, William Ah You  
2003 Telephone Conversation. May 31\*

Allen, Melinda S.  
1985a "Limited Archaeological Reconnaissance Survey, Kahua Short Coastal Parcel, Kahua 1, North Kohala, Island of Hawaii. PHRI Report 74-031863." [On file at UHIM-Hamilton Library]

1985b "Limited Archaeological Reconnaissance Survey, Kahua Short Coastal Parcel, Kahua 1-2 and Waika, North Kohala, Island of Hawaii. PHRI Report 76-03183." [On file at UHIM-Hamilton]

1986 Preliminary results of archaeological work undertaken between September 3 and 17, 1986 on Department of Hawaiian Home Lands parcels within the ahupua'a of Kawaihewa 1, South Kohala District, Hawaii Island. Bishop Museum, Honolulu. Letter report to Mr. Dennis Ling, Property Development Branch, Department of Hawaiian Home Lands, dated October 16, 1986.

1987 "Archaeological Inventory Survey of Hawaiian Home Lands, Kawaihewa 1, South Kohala, Hawaii. Applied Research Group, Bishop Museum, Honolulu. Prepared for Department of Hawaiian Home Lands. [On file at SHPD Library #H-389]

Apple, Russell  
1969 "A History of Historic Structures Kawaihewa, South Kohala, Hawaii Island." In *The Archaeological Surface Survey of Pua Kohala Heiau and Maliekini Heiau, South Kohala, Kawaihewa, Hawaii Island* pp. 10-34. *Hawaii State Archaeological Journal* 6:3.

1978 *Pohukanihau: Homestead of John Young Kawaihewa, Kohala, Island of Hawaii*. National Park Service, Honolulu.

Auwae, Ron  
2003 Personal Communication Kawaihewa Canoe Club, Kawaihewa. August 8, 2003

Barrera, William M.  
1973 Preliminary field report on an archaeological survey of the Waimea-Kawaihewa Highway corridor, South Kohala, Island of Hawaii. Dept. of Anthropology, B.P. Bishop Museum, Honolulu. Prepared for State of Hawaii, Dept. of Transportation. August. [On file at UHIM-Hamilton Library]

Barrera, William, Jr. and Kelly, Marion  
1971 *Archaeological and Historical Surveys of the Waimea to Kawaihewa Road Corridor, Island of Hawaii*. Departmental Report Series 74(1). Bernice P. Bishop Museum, Honolulu. DOT-Hawaii. [On file at SHPD Library #H-19]

RECEIVED AS FOLLOWS

- Bureau of Conveyance  
1870-1884 *Grantor Index* [A-J; K; L-Z]  
1885-1894 *Grantor Index* [A-J; K; L-Z]  
1895-1899 *Grantor Index* [A-J; K; L-Z]
- Burgett, B. D., and P. H. Rosenbluh  
1990 "Archaeological Inventory Survey, Mahukona Property Lands of Koa, Kamao, Mahukona 1st and 2nd, Hihia, and Kaona, North Kohala District, Island of Hawaii (TMK:3-5-7-03:10-14, 16-18)." *PHRI* Report 672-031290. Prepared for Chalco International of Hawaii, Inc.
- 1993 "Summary of Archaeological Inventory Surveys, Kahaouli Agricultural Subdivision and Mahukona Property: Lands of Kepanui, Koa, Kamao, Mahukona 1st and 2nd, Hihia, and Kaona, North Kohala District, Island of Hawaii (TMK:3-5-7-02:11 and TMK:3-5-7-03:13, 10-14, 16-18)." *PHRI* Report 743-020993. Prepared for Chalco International of Hawaii, Inc.
- Bushnell, O. A.  
1993 *The Gifts of Civilization: Grows and Genocide in Hawaii*. University of Hawaii Press, Honolulu
- Cahill, Emmett  
1999 *The Life and Times of John Young: Confidant and Advisor to Kamehameha the Great*. Island Heritage Publishing, Aiea.
- Cantelmo, S.  
1980 *Hawaii and Natural History*. S.B. Pionier, Inc., Honolulu.
- Carter, Laura A.  
1989 "Archaeological Excavations of Six Features Within the Right-of-way for the Proposed Spenser Beach Park Entrance road: Pu'ukohala Heiau National Historic Site, Island of Hawaii."
- Chick Pic Hawaii Corp.  
1981 Pu'ukohala Heiau National Historic Site (video recording) [UIIM]
- Charles Yoo & Associates, Inc.  
1970 Hapena Beach State Park, South Kohala, Hawaii. Prepared for Dept. of Land and Natural Resources, State of Hawaii
- Charles, Jon  
1983 *Changing the Universe: Hawaiian Religious Culture*. Emphasis International, Honolulu.
- Chooen, Jon J.  
1958 *The Great Moku: Hawaii's Land Division of 1868*. University of Hawaii Press, Honolulu.
- Ching, Francis  
1971 *The Archaeology of South Kohala and North Kona: Surface Survey, Kailua-Kawaihae Road Corridor*. Hawaii State Archaeological Journal 71(1). Department of Land and Natural Resources, Honolulu.
- Ching, Francis K. W.; Cluff, Deborah F.; Riley, Thomas J.  
1969 Preliminary report of archaeological surface survey and salvage operations at Keahole, North Kona, Hawaii Island: section II, Keahole Point Airport, Kailua-Kawaihae Road. Dept. of Land and Natural Resources, Division of State Parks, Honolulu. Prepared by the Dept. of Land & Natural Resources, Division of State Parks, State of Hawaii for the Dept. of Transportation, Airports Division [and] Highways Division, State of Hawaii. UH Manoa copy: missing leaves 38-89.
- Clark, Jeffrey  
1981 Preliminary report on human burial remains located in section 1, Maduze-Waimea-Kawaihae Road corridor. Dept. of Anthropology, B. P. Bishop Museum, Honolulu. Mt. Report [UIIM]
- 1983a "Archaeological Investigations in Section 1."
- 1983b "The Waimea-Kawaihae Region: Historical Background." In *Archaeological Investigations of the Maduze-Waimea-Kawaihae Road Corridor, Island of Hawaii: An Interdisciplinary Study of an Environmental Transect*, edited by Jeffrey T. Clark and Patrick V. Kirch, pp. 39-57. Hawaii Historic Preservation Report 83(1).
- 1986 Waimea-Kawaihae, a leeward Hawaii settlement system. Thesis (Ph. D.). University of Illinois at Urbana-Champaign. [On file at UIIM-Hamilton Library]
- Clark, Jeffrey and Kirch, Patrick V. (editors)  
1983 *Archaeological Investigations of the Maduze-Waimea-Kawaihae Road Corridor, Island of Hawaii: An Interdisciplinary Study of an Environmental Transect, Hawaii* Historic Preservation Report 83(1).
- Clark, Jeffrey T. Welch, David J., 1946-Hawaii. Dept. of Transportation.  
1981 Preliminary report on phase III archaeological excavations and salvage. Maduze-Waimea-Kawaihae Road corridor. Dept. of Anthropology, Bernice P. Bishop Museum, Honolulu. Mt. 107081. Prepared for Dept. of Transportation, State of Hawaii. Contract No. 11408, Project No. 19DE-01-79, October 1981. [On file at UIIM-Hamilton Library]
- Cluff, D. F., Kikuchi, W. K., Apple, R. A. and Siroca, Y.-H.  
1969 "The Archaeological Surface Survey of Puu Kohala Heiau and Mahealani Heiau, South Kohala, Kawaihae, Hawaii Island; Hawaii State Archaeological Journal 69(3). Department of Land and Natural Resources, Honolulu.
- Cordy, Ross  
1974a "Cultural Adaptation and Evolution in Hawaii: A Suggested New Sequence." *Journal of the Polynesian Society* 83(2): 180-191.
- 1974b "Traditional History of O'ahu Political Units: Its Use for Explaining the Origin of Complex Rank Cultural Systems in the Hawaiian Islands." Ms. January.
- 1996 "The Rise and Fall of the O'ahu Kingdom: A Brief Overview of O'ahu's History." In *Oceanic Culture History: Essays in Honor of Roger Green*, pp.591-613. New Zealand Journal of Archaeology Special Publication.
- Coulter, Jon Wesley  
1971 *Population and Utilization of Land and Sea in Hawaii, 1835*. Bernice P. Bishop Museum Bulletin 88, Kraus Reprint Co., New York [Originally published by BPBM 1931].
- Cramp, WCC  
2003 "Kawaihae, Hawaii Fish Data (3 and 10 meters)." [http://cramp.wcc.hawaii.edu/Study\\_Sites/Hawaii/KawaihaeFish\\_Data.asp](http://cramp.wcc.hawaii.edu/Study_Sites/Hawaii/KawaihaeFish_Data.asp)
- Creed, Victoria and Ma'iy, Ke'pa  
2002 "Cultural Landscapes and Legal Issues in the Boundary Commission Records." Paper presented at the Society for Hawaiian Archaeology Conference, Publ. October.
- Day, A. Grove  
1984 *History Matters of Hawaii*. Mutual Publishing, Honolulu. [In Dorrance 2000:139]
- 1992 *Hawaii and Points South: True Island Tales*. Mutual Publishing, Honolulu.
- Daws, Gavva  
1974 *Shoat of Time: History of the Hawaiian Islands*. University of Hawaii Press, Honolulu.



RECEIVED AS FOLLOWS

- Demery, Kenneth  
2003 Personal Communication in Waimea. August 9, 2003
- de Vis-Norton, Lionel W.  
1819 *The Story of the Naha Stone. The Board of Trade of Hilo, Hilo.*  
1820
- DIHIL - Department of Hawaiian Home Lands  
2002 Map of Hawai'i Island Hawaiian Home Lands. Pop-up on website: <http://www.hawaii.gov/dihil/>
- DLNR - Department of Land and Natural Resources  
1972 "North Kohala Preservation Master Plan for Historical Resources." DLNR, Division of State Parks, Outdoor Recreation and Historic Sites.
- Dorrance, William H. and Morgan, Francis S.  
2000 *Sugar Island: The 165-Year Story of Sugar in Hawai'i*. Mutual Publishing, Hooiloala.
- Doyle, Emma Lynn  
1953 *Makua Lalana, the story of Lorenzo Lyons*. Adventist Publishing Co., Hooiloala.
- Dunn, A. and Rozendahl, Paul H.  
1989 "Archaeological Inventory Survey, Kapanaui Agricultural Subdivision, Lands of Kapanaui and Kou, North Kohala District, Island of Hawai'i. PIIRI Report 568-100289. Prepared for Aluaboa Development, Inc.
- Earle, John  
1980 "Mummy Cave." (E6-8) Description. Ms. On file Department of Anthropology, B. P. Bishop Museum, Hooiloala.
- Elbert, Samuel E.  
1974 *Place Names of Hawaii*. In Pukui et al., University of Hawai'i Press, Hooiloala.
- Ellis, William  
1984 *Polynesian Researches Hawaii: Journal of William Ellis*. Charles E. Tuttle Company, Inc., Japan. (Fifth Edition)
- Ellis, William Rev.  
1823/1979 *Journal of William Ellis: narrative of a tour of Hawaii, or Owhyhee*. Tuttle, Rutland
- Emerson, Nathaniel B.  
1915 *Pele and Hii'aka, a myth of Hawaii*. Hooiloala Star Bulletin, Hooiloala. In Pukui et al. 1974:60.
- 1997 *Pele and Hii'aka: A Myth from Hawaii*. 'Ai Puhaka Press, Hooiloala. [Original 1915 Hooiloala Star Bulletin Limited]
- EMSEB - EMSQUARED Enterprises  
2003 "Back to the Surf - Kawahae." <http://www.kohala.net/kohala/guide/JanJan/kawahae.htm>
- Faber, Joseph [Compiled by Edward Jostling (Part I) and O.A. Bushnell (Part II) (Text By)]  
1969 *Hawaii: A Pictorial History*. Bishop Museum Special Publication No. 38. Bishop Museum Press, Hooiloala.
- Ferguson, M. D.  
1982 *A Dynamic Model for Temporal Variation in Maesa Type and Eruption Interval at Kohala Volcano, Hawaii*. Princeton University, Princeton.
- Forbes, David; Goodell, Lela and Larsen, Elizabeth  
1969 *A history of the Keola Hou Church, Kawahae, Hawaii*. [On file at UIHM Library]
- Fornander, Abraham  
1880 *An Account of the Polynesian Race: Its Origins and Migrations and the Ancient History Of the Hawaiian People to the Times of Kamehameha I*. Trubner and Company, Ludgate Hill. (1969)
- 1917 *Fornander Collection of Hawaiian Antiquities and Folk-Lore: Memoirs of the Bernice Pauahi Bishop Museum of Polynesian Ethnology and Natural History Vol IV, Part II*. Bishop Museum Press, Hooiloala.
- 1916-1920 "Collection of Hawaiian Antiquities and Folk-lore." Ser 1-3. *Memoirs Bernice Pauahi Bishop Museum* Vols 4-6, Hooiloala
- 1996 *Ancient History of the Hawaiian People to the Times of Kamehameha I*. Mutual Publishing, Hooiloala. [Originally published as Volume II of *An Account of the Polynesian Race, its Origin and Migrations in the 1870s.*]
- Freyfessel, Louis  
1978 *Claude de Saules de Hawai'i in 1819: A Narrative Account By Louis Claude de Saules de Freyfellet*. Notes and Comments by Marion Kelly. Translated by Ella Wiswell. Pacific Anthropological Records 26. Bernice P. Bishop Museum, Hooiloala.
- Gima, Craig  
2002 "Proposed fish farm off Kawahae delayed; Community concerns prompt Ahi Nui Tuna to prepare an EIS." In *Star-Bulletin*. <http://starbulletin.com/2002/12/02/news45a022.html>
- GSO - GlobalSecurity.org  
2002 <http://www.globalsecurity.org/military/facility/kawahae.htm> Maintained by John Pike.
- Gowen, Herbert Rev  
1908 "Lono's Last Martyr." *Hawaiian Idylls of Love and Death*. Cochrane Publishing Co., New York.
- Graves, Donna K. and Franklin, Leta J.  
1998 "Archaeological Inventory Survey Kahua Maku/Kahua Shores Coastal Parcels: Lands of Kahua 1 and 2 and Waika, North Kohala District, Island of Hawai'i (TMK: 3-5-9-01: 7.8). PIIRI Report 1024-033198. [On file at SIIPD Library #11-1315]
- Groene, Linda Wedel  
1993 "A Cultural History of Three Traditional Hawaiian Sites on the West Coast of Hawai'i Island." United States Department of the Interior National Park Service Denver Service Center, Denver. <http://www.nps.gov/palms/>
- Hag, Brian D.  
1993 "Grounded Theory as Scientific Method." In *Philosophy of Education Society* [1996-2001]. University of Cambridge. [http://www.ed.usc.edu/ESP/ESPES-Yearbook93\\_djess@haig.liml](http://www.ed.usc.edu/ESP/ESPES-Yearbook93_djess@haig.liml)
- Habig, J. B.  
1986 A baseline study of ground water geochemistry in the Kawahae and Hilo areas on the island of Hawaii. Prepared for Dept. of Planning and Economic Development, State of Hawaii.
- Hammatt, Hallett H  
1991 Archaeological survey and testing, Kawahae I (Kamohau), South Kohala, Hawai'i. Cultural Surveys Hawaii, Kailua. Prepared for Dept. of Hawaiian Home Lands. "Revised July 1991. [On file at UIHM: Hamilton Library]
- Hammatt, Hallett H. and Shideler, David W.  
1980 "Fortes' and Munmy Caves Sites 50-10-5-13926 & 13927." *Cultural Surveys Hawaii*. Prepared for Department of Hawaiian Home Lands. [On file at SIIPD Library #11538]

RECEIVED AS FOLLOWS

- 1991a "A Reconnaissance and Archaeological Assessment for the Kawaihae Master Plan. Cultural Surveys Hawaii. Prepared for R. M. Towill Corp. [On file at SHPD Library #H-1263]
- 1991b "Documents Relating to the Cultural Surveys Hawaii's Inventory of Hawaiian Home Lands at Kawaihae Excluded from the Main Body of the Report." Cultural Surveys Hawaii. Prepared for Department of Hawaiian Home Lands State of Hawaii I. [On file at SHPD Library #H-1190]
- Hammant, Hallett H., Shideler, David W., Borhwick, Douglas K., Stride, Mark, McDermott, Man, and Nakamura, Kiritie.  
1991 "Archaeological Survey and Testing, Kawaihae I (Kooheana), South Kohala, Hawaii." Cultural Surveys Hawaii. Prepared for Department of Hawaiian Home Lands. [On file at SHPD Library #H-832]
- Handy, E. S. C., and E. G. Heady  
1978 *Native Hunters in Old Hawaii: Their Life, Lore, and Environment*. Bernice P. Bishop Museum Bulletin 233, Bishop Museum Press, Honolulu.
- Harford Bartholomew & Associates  
1939 Location studies for proposed power plant, Kawaihae, Hawaii. Prepared for Hilo Electric Company. [On file at UHM-Hamilton Library]
- Harboe, B. M. Coloeel  
1949 Survey Report for Navigation, Kawaihae Harbor Island of Hawaii, T.H. United States Army. Corps of Engineers [On file at UHM-Hamilton Library]
- Hau, Henry, and Orr  
2003 Archaeological Inventory Survey, TMK: 6-1-04; Por. 20, Land of Kawaihae I, South Kohala District, Island of Hawaii.
- HIID - Hawaii Harbors Division  
1989 2010 Master Plan for Kawaihae Harbor, Hawaii. Harbors Division, Department of Transportation, State of Hawaii. July 1989 [On file at UHM-Hamilton Library]
- HILL - Hawaiian Home Lands, Department [see D1111]  
2003 <http://www.hawaii.gov/dhhl/>
- Homonon, Robert J.  
1976 "The Formation of Primitive States in Pre-Contact Hawaii." Ph.D. Dissertation, University of Arizona, Tucson.
- 1986 "Social Evolution in Ancient Hawaii." In *Island Societies* (ed) Patrick Vinton Kirch. Cambridge University Press, New York.
- Horie, Ruth (Compiled By)  
1990 *Mtze Index* [From Sources in Bishop Museum Library]
- Hosaka, Edward Y.  
1973 *Shore Fishing in Hawaii*. Petroglyph Press LTD., Hilo.
- HooSpods  
2003 "Today, March 26th is Kaho Day in Hawaii!" <http://www.besthosts.hawaii.com/pages/kyho.html>
- 'I'i, John Papa [Translated by Mary Kawena Pukui; Edited by Dorothy B. Barrère]  
1983 *Fragments of Hawaiian History*. Bishop Museum Press, Honolulu. [Original 1939. Translations of newspaper articles (Kaokoia) written in 1866-1870].
- Juvik, Socia P. and Juvik, James O.  
1998 *Atlas of Hawaii* (Third Edition). University of Hawaii Press, Honolulu.
- Kakaha, D.  
1990 *The Legends and Myths of Hawaii: The Fables and Folk Lore of a Strange People*. Mutual Publishing, Honolulu. [Originally published in 1888 by Charles Webster and Co., New York.]
- Kamakau, Samuel Māhinaalani  
1976 *The Works of the People of Old: Na Hana a Ka Po'e Kahiko*. Bernice P. Bishop Museum Special Publication 61. Bishop Museum Press, Honolulu.
- 1987 *Ka Po'e Kohika: The People of Old*. Bishop Museum Special Publication 51. Bishop Museum Press. [From articles in *Ka'alo'a* and *Ka'ao'ao* from 1866 to 1871. Translated in 1931-34 by Mary Kawena Pukui. Arranged and edited by Dorothy B. Barrère in 1964.]
- 1991 *Tales and Traditions of the People of Old: Na Mo'olelo a Ka Po'e Kohika*. Bishop Museum Press, Honolulu. [From newspaper articles of 1868 and 1870, translated from newspapers *Ka Niipepa Kaokoia* and *Ka Ao Oka'a* by Mary Kawena Pukui; Edited by Dorothy B. Barrère]
- 1992 *Ruling Chiefs of Hawaii*. [Revised] Kamehameha Schools Press, Honolulu. [1842 and 1870.]
- KCC - Kawaihae Canoe Club  
2003 <http://www.kamuela.com/ccc/about.htm>
- Kekelaui, Robert Sr.  
1999 [Interview transcripts in July 1999] "Ni Ala Hale Ma Kai O Kohala Ilima (The Coastal Trails of South Kohala): Archival/Historical Documentary Research, Oral History-Consultation Study, and Limited Site Preservation Plan, Kawaihae: Anaehe'omahu Trail Section: Lands of Kawaihae 2". 'Ouli, Lilihiko, Waikoloa, Puakō, Waialea, Kāhānui-pua'a and 'Anaehe'omahu District of Kohala, Island of Hawaii." *Kuana Pono Associates, Hilo*. [On file at SHPD Library #H-1597]
- Kelly, Marion  
1974 "Historical Survey of the Waimea to Kawaihae Road Corridor Island of Hawaii." In *Archaeological and Historical Surveys of the Waimea to Kawaihae Road Corridor, Island of Hawaii*. By William Barzra, Jr. and Marion Kelly. Departmental Report Series 74(1). Bernice P. Bishop Museum, Honolulu.
- Keat, Noel J.  
1983 *Hawaii: Islands Under the Influence*. Monthly Review Press, New York.
- King, P.  
1990 Hawaiian History 284 Class Lectures. University of Hawaii, Honolulu.
- Kirch, Patrick V.  
1974 "Aerial Archaeological Reconnaissance Survey of Queen Kaahumanu Highway Power-line Alignment, Hawaii Island: Kawaihae-to-Anaeheomahu Segment." Bernice P. Bishop Museum, Honolulu. Ms. Report 120474. 4 December. Prepared for Hilo Electric Light Company, Ltd.
- 1983 "Indigenous Artifacts." In *Archaeological Investigations of the Middleme-Waimea: Kawaihae Road Corridor, Island of Hawaii: An Interdisciplinary Study of an Environmental Transition*. Edited by Jeffrey T. Clark and Patrick V. Kirch, pp 341-347. Hawaii Historic Preservation Report 83(1).
- 1985 *Feathered Gods and Fishhooks: An Introduction to Hawaiian Archaeology and Prehistory*. University of Hawaii Press, Honolulu.
- Kirch, Patrick Vinton; Chase, Bonnie T. and Athens, John Stephen et al.

RECEIVED AS FOLLOWS

- 1981 The Muliwai-Waimea-Kawihae Archeological Project: Interim Report 1, Results of Archeological and Historical Survey of Road Corridor, Sections 2 and 4 (Contract parts 1A and 1B). Edited by Patrick V. Kirch and Bonnie T. Clouse; with contributions by Stephen Ahena [et. al] Dept. of Anthropology, Bernice P. Bishop Museum, Honolulu. Ms. 032781. Prepared for Dept. of Transportation, State of Hawaii. Contract No. 11408, Project No. 19DE-01-79. March
- Krieger, P. Christian  
1998 *Maka'ala: Maui's Sacred Island*. Bishop Museum Press, Honolulu.
- Koudsen, Eric  
1946 *Teller of Hawaiian Tales*. Mutual Publishing, Honolulu.
- KTF - Kohala Task Force  
1975 Annual Report.
- Koib, Michael  
1991 *Social Power, Chiefly Authority, and Ceremonial Architecture in an Island Polity, Maui, Hawaii*. Ph.D. Dissertation, University of California, Los Angeles.
- Kuykendall, Ralph S.  
1957 *The Hawaiian Kingdom*. University of Hawaii Press, Honolulu.
- Kuykendall, Ralph S. and Day, A. Grove  
1976 *Hawaii: A History from Polynesian Kingdom to American State*. Prentice-Hall, Englewood.
- Ladd, Edmund  
1986 *Ruin Stabilization and Restoration Record Pu'uhohola Heiau National Historic Site, Kawahae, Hawaii, Pu'uhohola Heiau National Park Service, Honolulu.*
- Langley, Charles M.  
1994 "Pu'u o Maunā Kawahae and Kalaia Ahupua'a, District of Kohala, Hawaii I Island: Report of an Investigation of the Hawaiian Cultural Significance of Candidate Sites for the Kamuela Area (Hawaii I) NEXRAD Installation. Part I: Candidate Sites for the NEXRAD Installation: Ethnographic Background and Site Assessment." Prepared for SRI International. [On File at SHIPD Library #11-1317.]
- LHD - Lighthouse Digest  
2003 <http://www.lighthousedigest.com/databases/unimagelighthouse.cfm?xhtml>
- Leib, Amos P. and Day, A. Grove  
1979 *Hawaii Legends in English: An Annotated Bibliography*. Second Edition. The University Press of Hawaii, Honolulu.
- Lopit, José and Sharp, Michael K.  
1994 "Geophysical Investigations for the Location of a Historic Heiau, Kawihae, Hawaii." Geotechnical Laboratory. Prepared for U.S. Army Engineer, Honolulu. [On file at SHIPD Library #11-1375]
- Loo, Virginia and Book, William J.  
1970 "A Historical Site Study and Evaluation of North Hawaii."
- Luomala, Katherine  
1986 *Voices on the Wind: Polynesian Myths and Chants*. (Revised Edition) Bishop Museum Special Publication 75. Bishop Museum, Honolulu.
- Luomb, Margaret L. K.  
1974 "Archaeological Walk-Through Survey of Proposed Kawihae and Kukuipahu Power Plant Areas, Island of Hawaii I." Department of Anthropology, B. P. Bishop Museum, Honolulu.
- Malinowski, Marion Joan.  
1977 *Geology of the Kawihae Quadrangle, Kohala Mountain, Island of Hawaii*. University of Hawaii at Manoa, Theses/Minister of Sciences; Jan. 1975; Geology and Geophysics (UHM-Hamilton)
- Malo, David  
1987 *Hawaiian Antiquities*. Bishop Museum Press, Honolulu. [Original 1903-- translated by N.B. Emerson from Malo's works of early 1800s.]
- Maly, Kepā  
1999 "Na Ala Hele Ma Kai O Kohala Heia (The Coastal Trails of South Kohala): Archival-Historical Documentary Research, Oral History-Consultation Study, and Limited Site Preservation Plan, Kawihae." Anaehe'omaha Trail Section: Lands of Kawihae 2", Ohi, Liliuokalani, Waikoloa, Puako, Waimea, Kalahelepu'a and 'Anaehe'omaha; District of Kohala, Island of Hawaii I. *Kaena Pono Associates, Iiilo*. [On file at SHIPD Library #11-1597]
- McDonald, Marie and McPeck, Flo  
1977 "Places Names." In *Kohala Kria*. Stephenson, Larry K. Kohala Library Fund, Kohala. Pp 80-87.
- McElowney, Holly  
1979 Archaeological inspection of right-of-way for Kawihae-Boice 69-KV line, Island of Hawaii I. Dept. of Anthropology, Bernice P. Bishop Museum, Honolulu. Prepared for Hawaii Electric Light Company, Inc. October 1979. [On file at UHM-Hamilton Library]
- 1983 "A Description of Major Vegetation Patterns in the Waimea-Kawihae Region During the Early Historic Period."
- McKenzie, Edith Kawalohea [Edited by Isabel W. Suggs, II]  
1983 *Hawaiian Genealogies: Volume II*. University of Hawaii Press, Honolulu.
- 1986 *Hawaiian Genealogies: Volume II*. University of Hawaii Press, Honolulu.
- Menzies, Archibald  
1970 *Hawaii Nei 128 Years Ago*. W. P. Wilson, Honolulu.
- Mission Station Reports  
1832-70 Mission Station Reports: Waimea, Hawaii. Hawaii Mission Children's Society Library.
- Moffat, Riley M. and Fitzpatrick, Gary L.  
1995 *Surveying the Mobile: Mapping the Hawaiian Land Revolution*. Palopala'ama. Editions Limited, Honolulu.
- Nazi, Kaihauae Alana  
n.d. [http://www.hawaii.gov/kaulana\\_kawihae.html](http://www.hawaii.gov/kaulana_kawihae.html)
- Nakuina, Emma Metcalf  
1904 *Hawaii, its People, their Legends* [by] Emma Metcalf. TH
- Neighbor Island Consultants.  
1974 Summary report for Kawihae water quality and current studies, June 9, 1973 to June 10, 1974. U.S. Army Corps Engineer Division-Pacific, Honolulu. [On file at UHM-Hamilton Library]
- O'ahu Centennial's Association (OCA)  
2000 *Paristio Hall of Fame Oral History Interviews*. O'ahu Centennial's Association, Ewa Beach.

RECEIVED AS FOLLOWS

- ORCA - Ocean Research Consulting & Analysis, Ltd.  
1978 Reconnaissance surveys of the marine environment, Kawaihae Small Boat Harbor project site, Island of Hawaii, Hawaii. Funded by the Department of the Army, Pacific Ocean Division, Hawaii Corps of Engineers, Fort Shafter, Hawaii. 1 June 1978. Authorized under: Contract No. DACW84-78-C-0009 [On file at UHIM-Hamilton Library]
- Oliver, Douglas  
1961 *Pacific Islands* [Rev Ed] Harvard University Press.
- Olson, Scott L., and James Hiken F.  
1982 "Fossil Birds from the Hawaiian Islands: Evidence for Wholesale Extinction by Man before Western Contact." *Science* Vol. 217.
- Orr, Maria E. Ka'imipoo  
2003 "Cultural Impact Assessment, Kahua Ranch DAGS Rainbow Tower & Facilities, Pu'a Waikanoa, Kahua Ranch, Ahupua'a of Kaha'ulu, District of Kohala, Hawaii Island, Hawaii." Prepared for Haun & Associates, Wilcox Okamoto & Associates and DAGS, State of Hawaii. February 25.
- Pandit, Nareth R.  
1996 "The Creation of Theory: A Recent Application of the Grounded Theory Method." *The Qualitative Report*, Volume 2, Number 4, December.  
<http://www.nwra.edu/~334/COTOR2-4/pandit.htm>
- Parler Ranch  
2003 Website: [www.parlerranch.com](http://www.parlerranch.com)
- Pew, Edith Rice  
1981
- Pope, John F. (Rev.)  
1978 *Mo'olelo of Ancient Hawaii*. [trans by Charles Keam]. Toppalant Publishing Co., Honolulu.
- Pratt, Helen Guy  
1996 *The Hawaiians, An Island People*. Charles E. Tuttle Company, Inc., Japan.
- Pratt, Linda and Ooa, Sam III  
1998 "Terrestrial Ecosystems." In Juvik and Juvik (pp 121-129).
- Pukui, Mary Kawena  
1983 *Ōlelo Nō'eau: Hawaiian Proverbs and Poetical Sayings*. Bernice P. Bishop Museum Special Publication No. 71. Bishop Museum Press, Honolulu.
- 1995 *No Mele Wālo: Songs of Our Heritage*. [Selections from The Roberts Mele Collection] Bishop Museum Special Publication 88. Bishop Museum, Honolulu.
- Pukui, Mary Kawena, Elbert Samuel E. and Mookini, Esther T.  
1974/76 *Place Names of Hawaii*. University of Hawaii Press, Honolulu.
- Pukui, Mary Kawena, Elbert Samuel E.  
1986 *Hawaiian Dictionary*. University of Hawaii Press, Honolulu.
- Pyle, Leilani  
n.d. "The Kolea Stone." Ms. Auth 460B-UHIM. [On file at SHPD Library #H-1528]
- R.M. Towill Corporation.  
1976 Final alignment report for Waihoa-Kawaihae Road, South Kohala, Island of Hawaii: project nos. F-019-1(6) & S-0770(4). R.M. Towill Corporation-The Corp., Honolulu. UHIM-Hamilton Library
- 1992 Final environmental impact statement for Kawaihae ten-year master plan, Kawaihae, South Kohala, Hawaii. Prepared for Dept. of Hawaiian Home Lands, State of Hawaii. December 1992
- Randall, John E.  
1998 *Shore Fishes of Hawaii*. University of Hawaii Press, Honolulu. [original 1996]
- Rhodes, Diane Lee  
1993 "Overview of Hawaiian History" (Chapter II & III) in Greene (1993) NPS  
<http://www.nps.gov/poulo/>
- Richard, W. Rev.  
1904 *Memoir of Keopokani, Late Queen of the Sandwich Islands*. Reprinted by W.D. Alexander. Original 1825 Crocker & Brewster, Boston. [On file at UHIM Hamilton Library-Hawaiian Collections]
- Roberts, Helen H.  
1967 *Ancient Hawaiian Music*. Dover Publications, Inc., New York. [Original 1926]
- Rohlf, Barry V.  
1989 *University of Hawaii Archaeological Research on Bellows Air Force Station: Report of the 1989 Field School and a Proposal for Further Research in 1990*. Dept. of Anthropology, University of Hawaii, Honolulu.
- Rosenbahl, Paul H. (Paul Harmer)  
1981 Archaeological Reconnaissance, Kawaihae, South Kohala, Hawaii: Villus EIS project, TRK 62-024. Prepared for Belt, Collins & Associates [On file at UHIM-Hamilton Library]
- Rosenbahl, Paul H. and Carter, Laura A.  
1988 "Excavations at John Young's Homestead, Kawaihae, Hawaii: Archeology at Pu'uhohola Heiau National Historic Site." National Park Service, Western Archaeological and Conservation Center, Publications in Anthropology No. 7. [On file at SHPD Library #H-688]
- Rush, Benjamin Franklin  
1957 History of construction and development of Hoopulu harbor, Hilo harbor, Kawaihae harbor, Kahala harbor, Kaunakakai harbor, Nawiliwili harbor, Port Allen harbor. Prepared for Board of Harbor Commissioners, Honolulu. [On file at SHPD Library #H-688]
- Schuster, Laura Carter  
1992 "Bulkheads and Archeology at John Young's Homestead: Archeology at Pu'uhohola Heiau National Historic Site." National Park Service, Honolulu. [On file at SHPD Library #H-1117]
- Severnace, Craig  
1970 John Young Homestead (upper portion), Kawaihae, Kohala, Hawaii Island: archaeological studies: analysis of fish remains excavated from Western-style structure 2: preliminary report 79(1). Submitted to Superintendent, Pu'uhohola Heiau National Historic Site. March 29, 1979 [On file at UHIM-Hamilton Library]
- Smith, Jared O.  
1942 *The Big 5: A Brief History of Hawaii's Largest Firms*. The Advertiser Publishing Co. Ltd., Honolulu
- Soehren, Lloyd J.  
1964a "An Archaeological Reconnaissance of the Mahukona-Kawaihae Highway, Kohala, Hawaii." Dept. of Anthropology, B.P. Bishop Museum, Honolulu.
- 1964b An archaeological survey of the shores of Oahu and Kawaihae, South Kohala, Hawaii Dept. of Anthropology, Bernice P. Bishop Museum, Honolulu. July 1964. [map incomplete]

- 1980 "An Archaeological Reconnaissance Survey of a Portion of Kawahae 2, South Kohala, Hawaii." For Mauna Kea Land Corp., Honolulu.
- Speakman, Cummins E.  
2001 *Mowee: a history of Maui the magic life*. Mutual Publishing, Honolulu.
- Stephenson, Larry K.  
1977 *Kohala Keia*. Kohala Library Fund, Kohala.
- Stillman, Amy (Compiled By)  
1990 *Hawaiian Chants: An Index of Published Sources and Audio Recordings*. Reference, on file at Hawaiian Collections, Hamilton Library, University of Hawaii, Honolulu.
- 1995 *Hawaiian Chants: An Index of Published Sources and Audio Recordings (Supplement)*. Reference on file at Hawaiian Collections, Hamilton Library, University of Hawaii, Honolulu.
- Stokes, John F. G.  
1991 *Hales of the Island of Hawaii: A Historic Survey of native Hawaiian Temple Sites*. Bishop Museum Press, Honolulu
- (SIHPD) State Historic Preservation Division  
1993 "Officer Tolentino Inadvertent Burial Discovery report." At: The Meadows, Kohala Ranch. By: Palicor Construction Company. (Case No. 638)
- Sullivan, Scott P.; Gerritsen, Frans, and James K. K. Look Laboratory of Oceanographic Engineering, Dredging operation monitoring and environmental study, Kawahae Harbor, Hawaii  
1972 U Hawaii Look Lab-72-23 [On file at UHIM-Mason]
- Takaguchi, Aoi; Jim Hollyer, Wendell Koga, Miles Hakoda, Ken Rohrbauch, HC Stip Bimambender, Brent Buckley, J.B. Friday, Richard, Bowen, Richard Manshardt, James Leary, Glenn Teves, Eileen Herring, Halina Zaleski, Ken Leohardt, Bill Eger.  
1999 "Some History of Hawaii Agriculture." [Chronology] <http://www.hawaii.org/SHISTORY.htm>
- Taylor, Frank J.  
1976 *From Land and Sea*. Chronicle Books, San Francisco
- Territorial Highway Dept. Hawaii  
1938 A preliminary report on the proposed Kawahae-Mahukona Road, Federal aid secondary route 270, districts of South & North Kohala, island of Hawaii; as requested by HCR 51, 29th Legislature. Honolulu. [On file at SIHPD Library #11-688]
- Teuira, Henry  
1995 *Voyaging Chiefs of Hawaii*. Kalamuku Press, Honolulu.
- Tinker, Spencer Wilkie  
1982 *Fishes of Hawaii: A Handbook of the Marine Fishes of Hawaii and the Central Pacific Ocean*. Hawaiian Service, Inc., Honolulu. [original 1978]
- Tomoeiri-Toggie, Myra  
1988 "North Kohala: Perception of a Changing Community. A Cultural Resource Management Study." For DLNR Division of State Parks, Honolulu.
- Tudor Engineering Company  
1961 Master plans for ports of Hilo & Kawahae. Prepared for Department of Transportation, State of Hawaii. Tudor Engineering Company, San Francisco. [On file at UHIM-Hamilton Library]
- 1982 Master plans for ports of Kahului, Maui, Hilo and Kawahae, Hawaii [and] Nawiliwili and Port Allen, Kauai. Prepared for Dept. of Transportation, State of Hawaii. Companion report to The Honolulu waterfront, by Harland Bartholomew & Associates and Tudor Engineering Co. Originally issued in 3 pts., each with its own t.p. and table of contents. [On file at UHIM-Hamilton Library]
- Tuggle, H. David  
1977 "Archaeological Research of Areas Proposed for Development of Military Family Housing and Expansion of Military Training at Bellows Air Force Station, Oahu: Task 1: Literature Review of the Cultural Resources of the Bellows Area." *International Archaeological Research Institute, Inc.* Honolulu.
- Tuggle, H. David and Spriggs, Maubew  
2001 "The Age of the Bellows Dune Site 018, O'ahu, Hawaii", and the Antiquity of Hawaiian Colonization." In *Astion Perspectives*, Vol 39, No. 11-2, pp. 165-188. University of Hawaii Press, Honolulu.
- United States Army, Corps of Engineers.  
1949 Kawahae Harbor, T.H. Letter from the Secretary of the Army transmitting a letter from the Chief of Engineers, United States Army, dated July 6, 1949, submitting a report...on a preliminary examination and survey of Kawahae Harbor, Hawaii, authorized by the River and Harbor Act approved on July 24, 1946. U.S. Govt. Print. Off., Washington. map. Series: [U.S.] 81st Cong., 1st sess., House. Document no.31. [On file at UHIM-Hamilton Library]
- U.S. Dept of Commerce  
1989 Kawahae Bay, Island of Hawaii [Map]. Dept. of Commerce, Washington D.C.
- [US-F&W] U.S. Fish and Wildlife Service  
1993 "Final Fish and Wildlife Coordination Act report: Kawahae Harbor for Light-Draft Vessels, Kawahae, Hawaii." October 1993.
- Vancouver, George  
1801 *A Voyage of Discovery to the North Pacific Ocean and Round the World*. John Stockdale, London.
- Veillet, Christian  
2000 Photograph of Kawahae Lighthouse from Website/Home Page: <http://www.cflh.hawaii.edu/~veillet/hlhawaii.html>  
<http://www.cflh.hawaii.edu/~veillet/index.html>
- Vinecent, Maany  
2003 Personal Communication the Kawahae Canoe Club, Kawahae. August 8, 2003
- Verfield, Judy  
2001 "Hawaii's Sugar Industry" <http://judyverfield.com/sugarsindustry.htm>  
[Information from *The Hawaii Book* (1961) by J. G. Ferguson Publishing Company, Chicago, and *Cane Sugar and Hawaii* (1962) by C&H Sugar Refining Corp., Ltd., San Francisco]
- Waikona'Ana Corporation (WAC)  
2003 Mabel Database, Honolulu. [www.waikona.com](http://www.waikona.com)
- W-KCA - Waimea-Kawahae Community Association. Economic Development Committee.  
1963 Summary of area facilities and economic factors. Cooperative Extension Service, College of Tropical Agriculture, University of Hawaii, U.S. Dept. of Agriculture cooperating. [On file at UHIM-Hamilton Library]

RECEIVED AS FOLLOWS

APPENDIX A  
A BILL FOR AN ACT RELATING TO  
ENVIRONMENTAL IMPACT STATEMENTS  
(UNOFFICIAL VERSION)  
HOUSE OF REPRESENTATIVES H.B. NO. 2895 H.D.1  
TWENTIETH LEGISLATURE, 2000  
STATE OF HAWAII

A BILL FOR AN ACT  
RELATING TO ENVIRONMENTAL IMPACT STATEMENTS.  
BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF HAWAII:

SECTION 1. The legislature finds that there is a need to clarify that the preparation of environmental assessments or environmental impact statements should identify and address effects on Hawaii's culture, and traditional and customary rights.

The legislature also finds that native Hawaiian culture plays a vital role in preserving and advancing the unique quality of life and the "aloha spirit" in Hawaii. Articles IX and XII of the state constitution, other state laws, and the courts of the State impose on government agencies a duty to promote and protect cultural beliefs, practices, and resources of native Hawaiians as well as other ethnic groups.

Moreover, the past failure to require native Hawaiian cultural impact assessments has resulted in the loss and destruction of many important cultural resources and has interfered with the exercise of native Hawaiian culture. The legislature further finds that due consideration of the effects of human activities on native Hawaiian culture and the exercise thereof is necessary to ensure the continued existence, development, and exercise of native Hawaiian culture.

The purpose of this Act is to: (1) Require that environmental impact statements include the disclosure of the effects of a proposed action on the cultural practices of the community and State; and (2) Amend the definition of "significant effect" to include adverse effects on cultural practices.

SECTION 2. Section 343-2, Hawaii Revised Statutes, is amended by amending the definitions of "environmental impact statement" or "statement" and "significant effect", to read as follows:

"Environmental impact statement" or "statement" means an informational document prepared in compliance with the rules adopted under section 343-6 and which discloses the environmental effects of a proposed action, effects of a proposed action on the economic [and] welfare, social welfare, and cultural practices of the community and State, effects of the economic activities arising out of the proposed action, measures proposed to minimize adverse effects, and alternatives to the action and their environmental effects.

The initial statement filed for public review shall be referred to as the draft statement and shall be distinguished from the final statement which is the document that has incorporated the public's comments and the responses to those comments. The final statement is the document that shall be evaluated for acceptability by the respective accepting authority.

"Significant effect" means the sum of effects on the quality of the environment, including actions that irreversibly commit a natural resource, curtail the range of beneficial uses of the environment, are contrary to the State's environmental policies or long-term environmental goals as established by law, or adversely affect the economic [or] welfare, social welfare[,], or cultural practices of the community and State."

SECTION 3. Statutory material to be repealed is bracketed. New statutory material is underscored.

SECTION 4. This Act shall take effect upon its approval.

Approved by the Governor as Act 50 on April 26, 2000

Walker, J. and Rosendahl, Paul  
1994 "Archaeological Inventory Survey: Proposed NEXRAD and ATCBI Sites and Related Access Road Corridor." PHRI No. 1492-062294. Prepared for SRI International. [On file at SHPD Library #H-1189]

1995 "Archaeological Inventory Survey Proposed Substation Site and Utility Corridor for NEXRAD: Land of Kawaihae I", South Kohala District, Island of Hawaii." PHRI #1492-121694. Ilio. Prepared for SRI International. [On file at SHPD Library #H-1470]

Water, Lynae (Produced by)  
n.d. "The Hawaiians Part I" (video).

Westervelt, William D.  
1987 *Myths and Legends of Hawaii*. (Selected and Edited by A. Grove Day) Mutual Publishing Company, Honolulu. [Originally published in the early 1900s.]

1991 *Hawaii Legends of Volcanoes*. Charles E. Tuttle Company, Japan. [Originally published in 1916.]

1994 *Hawaiian Legends of Ghosts and Ghost-Gods*. Charles E. Tuttle Company, Japan. [Originally published in 1916.]

1995 *Hawaiian Historical Legends*. Charles E. Tuttle Company, Japan

Whitington, Anatoette  
1933 *The Golden Cloak*. Hawaiians Press, Honolulu.

Wilcox, Carol  
1996 *Sugar Water: Hawaii's Plantation Ditches*. University of Hawaii Press, Honolulu.

Willoug, George W.  
1882 "Sugar Plantations in the Early Days in the Hawaiian Islands." *The Planter's Monthly*, Honolulu. December [in Dorrance 2000:3]

Williams, J.N.S.  
1919 "A Little Known Engineering Work." In *Hawaiian Almanac and Annual*. Theo. G. Thrum, Honolulu.

Williamson, Eleanor et al.  
1983 "Preface" In *Ololo Mo'ana*. Pukui. Bishop Museum Publication No. 71. Bishop Museum Press, Honolulu.

Woolsey, Miyabara & Associates.  
1984 Final environmental impact statement for development of Kawaihae boat harbor. Kawaihae, Hawaii. Prepared for Hawaii Harbor Division.

Walton, and Goodfellow,  
1995

Young, John  
n.d. Log Book, 1809-1817. Ms. On file, State of Hawaii, Department of Archives, Honolulu.

Youngblood, Ron  
1983/1992 *On the Hans Coast*. Emphasis International, Inc. and Carl Lindquist, Hoog Kooq.

ZL - Zoinaady  
2003 <http://www.zoinaady.com/kawaihae/kawaihae.html>

**APPENDIX C**  
**Guidelines for Assessing Cultural Impacts**  
 Adopted by the Environmental Council, State of Hawaii  
 November 19, 1997

**I. INTRODUCTION**

It is the policy of the State of Hawaii under Chapter 343, HRS, to alert decision makers, through the environmental assessment process, about significant environmental effects which may result from the implementation of certain actions. An environmental assessment of cultural impacts gathers information about cultural practices and cultural features that may be affected by actions subject to Chapter 343, and promotes responsible decision making.

Articles IX and XII of the State Constitution, other state laws, and the courts of the state require government agencies to promote and preserve cultural beliefs, practices, and resources of native Hawaiians and other ethnic groups. Chapter 343 also requires environmental assessment of cultural resources, in determining the significance of a proposed project.

The Environmental Council encourages preparers of environmental assessments and environmental impact statements to analyze the impact of a proposed action on cultural practices and features associated with the project area. The Council provides the following methodology and content protocol as guidance for any assessment of a project that may significantly affect cultural resources.

**II. CULTURAL IMPACT ASSESSMENT METHODOLOGY**

Cultural impacts differ from other types of impacts assessed in environmental assessments or environmental impact statements. A cultural impact assessment includes information relating to the practices and beliefs of a particular cultural or ethnic group or groups.

Such information may be obtained through scoping, community meetings, ethnographic interviews and oral histories. Information provided by knowledgeable informants, including traditional cultural practitioners, can be applied to the analysis of cultural impacts in conjunction with information concerning cultural practices and features obtained through consultation and from documentary research.

In scoping the cultural portion of an environmental assessment, the geographical extent of the inquiry should, in most instances, be greater than the area over which the proposed action will take place. This is to ensure that cultural practices which may not occur within the boundaries of the project area, but which may nonetheless be affected, are included in the assessment. Thus, for example, a proposed action that may not physically alter gathering practices, but may affect access to gathering areas would be included in the assessment. An ahupua'a is usually the appropriate geographical unit to begin an assessment of cultural impacts of a proposed action, particularly if it includes all of the types of cultural practices associated with the project area. In some cases, cultural practices are likely to extend beyond the ahupua'a and the geographical extent of the study area should take into account those cultural practices.

The types of cultural resources The historical period studied in a cultural impact assessment should commence with the initial presence in the area of the particular group whose cultural practices and features are being assessed. The types of cultural practices and beliefs subject to assessment may include subsistence, commercial, residential, agricultural, access-related, recreational, and religious and spiritual customs.

The types of cultural resources subject to assessment may include traditional cultural properties or other types of historic sites, both man made and natural, including submerged cultural resources, which support such cultural practices and beliefs.

The Environmental Council recommends that preparers of assessments analyzing cultural impacts adopt the following protocol:

**APPENDIX B**  
**Scope of Work (SOW)**

**Cultural Impact Assessment [in accordance with OEQC Guidelines]**

1. identify and consult with individuals and organizations with expertise concerning the types of cultural resources, practices and beliefs found within the broad geographical area, e.g., district or ahupua'a;
2. identify and consult with individuals and organizations with knowledge of the area potentially affected by the proposed action;
3. receive information from or conduct ethnographic interviews and oral histories with persons having knowledge of the potentially affected area;
4. conduct ethnographic, historical, and other culturally related documentary research;
5. identify and describe the cultural resources, practices and beliefs located within the potentially affected area; and
6. assess the impact of the proposed action, alternatives to the proposed action, and mitigation measures, on the cultural resources, practices and beliefs identified.

**Methods**

The specific tasks listed below expand on the above scope of work:

- Conduct historical and cultural background research (i.e., business records, land records; archival documents, literature, reports, letters, photographs, journals, or newspaper files) to locate material that will provide broad patterns of the history of the project area such as subsistence, religious, recreational, and commercial uses of the land; as well as settlement and residential patterns of the area and region; major family groups that inhabited, used or controlled lands within the project area and region; documented legends, myths, or traditional histories associated with the area; and descriptions of traditional practices, customs and beliefs associated with identified traditional cultural practices;
- Prepare a semi-structured ethnographic research instrument that will include questions that will generate general biographical information, association with and knowledge of the project area, its history and use
- Prepare a consent form to be used as written agreement with any individual interviewed concerning the review of content and use of information recorded during the interview
- Identify individuals knowledgeable with the project area e.g., Puukohli Village, Pioneer Mill;
- Conduct and record ethnographic interviews with knowledgeable individuals. If feasible individuals shall participate in field inspections (Makana to be given)
- Transcribe recorded interviews (Approximate time, 3-4 hrs/per hr of recording)
- Prepare a report that will include an overview of the archival material, and an analysis of the ethnographic data;

RECEIVED AS FOLLOWS

4. Biographical information concerning the individuals and organizations consulted, their particular expertise, and their historical and genealogical relationship to the project area, as well as information concerning the persons submitting information or interviewed, their particular knowledge and cultural expertise, if any, and their historical and genealogical relationship to the project area.

5. A discussion concerning historical and cultural source materials consulted, the institutions and repositories searched, and the location within the broad geographical area in which the proposed action is located, as well as their direct or indirect significance or connection to the project site. This discussion should include, if appropriate, the particular perspective of the authors, any opposing views, and any other relevant constraints, limitations or biases.

6. A discussion concerning the cultural resources, practices and beliefs identified, and, for resources and practices, their location within the broad geographical area in which the proposed action is located, as well as their direct or indirect significance or connection to the project site.

7. A discussion concerning the nature of the cultural practices and beliefs, and the significance of the cultural resources within the project area, affected directly or indirectly by the proposed project.

8. An explanation of confidential information that has been withheld from public disclosure in the assessment.

9. A discussion concerning any conflicting information in regard to identified cultural resources, practices and beliefs.

10. A analysis of the potential effect of any proposed physical alterations on cultural resources, practices or beliefs; the potential of the proposed action to isolate cultural resources, practices or beliefs from their setting and the potential of the proposed action to introduce elements which may alter the setting in which cultural practices take place.

11. A bibliography of references, and attached records of interviews which were allowed to be disclosed.

The inclusion of this information will help make environmental assessments and environmental impact statements complete and meet the requirements of Chapter 343, HRS. If you have any questions, please call 586-4183.

113

1. Identify and consult with individuals and organizations with expertise concerning the types of cultural resources, practices and beliefs found within the broad geographical area, e.g., district or ahupua'a;

2. Identify and consult with individuals and organizations with knowledge of the area potentially affected by the proposed action;

3. Receive information from or conduct ethnographic interviews and oral histories with persons having knowledge of the potentially affected area;

4. Conduct ethnographic, historical, anthropological, sociological, and other culturally related documentary research;

5. Identify and describe the cultural resources, practices and beliefs located within the potentially affected area; and

6. Assess the impact of the proposed action, alternatives to the proposed action, and mitigation measures, on the cultural resources, practices and beliefs identified.

Interviews and oral histories with knowledgeable individuals may be recorded, if consent is given, and field visits by preparers accompanied by informants are encouraged. Persons interviewed should be afforded an opportunity to review the record of the interview, and consent to publish the record should be obtained whenever possible. For example, the precise location of human burials are likely to be withheld from a cultural impact assessment, but it is important that the document identify the impact a project would have on the burial. At times an informant may provide information only on the condition that it remain in confidence. The wishes of the informant should be respected.

Primary source materials reviewed and analyzed may include, as appropriate: Maps, land court, census and tax records, including testimonial; vital statistics records; family histories and genealogies; previously published or recorded ethnographic interviews and oral histories; community studies, old maps and photographs; and other archival documents, including correspondence, newspaper or almanac articles, and visitor journals. Secondary source materials such as historical, sociological, and anthropological texts, manuscripts, and similar materials, published and unpublished, should also be consulted. Other materials which should be examined include prior land use proposals, decisions, and rulings which pertain to the study area.

### III. CULTURAL IMPACT ASSESSMENT CONTENTS

In addition to the content requirements for environmental assessments and environmental impact statements, which are set out in HAR §§ 11-200-10 and 16 through 18, the portion of the assessment concerning cultural impacts should address, but not necessarily be limited to, the following matters:

1. A discussion of the methods applied and results of consultation with individuals and organizations identified by the preparer as being familiar with cultural practices and features associated with the project area, including any constraints or limitations which might have affected the quality of the information obtained.

2. A description of methods adopted by the preparer to identify, locate, and select the persons interviewed, including a discussion of the level of effort undertaken.

3. Ethnographic and oral history interview procedures, including the circumstances under which the interviews were conducted, and any constraints or limitations which might have affected the quality of the information obtained.

114



RECEIVED AS FOLLOWS

APPENDIX D

Agreement to Participate in this Cultural Impact Assessment

Project Title: SIC, Inc. Submarine Fiber Optic Cable Project  
Kawaihae, South Kohala, Hawaii  
(TMK: 6-1-04: (part) 20)

Investigator: Maria E. Ka'imipono Orr

You are being asked to participate in a cultural impact assessment [study] conducted by an independent investigator contracted by Haun & Associates as part of an archaeological inventory study to be included in a larger Environmental Impact Study by Parsons Brinckerhoff Quade & Douglas, Inc. of the proposed Sandwich Isles Communications, Inc. [SIC] Underground Fiber Optic Cable Project to be located on TMK 6-1-04: (part) 20 in the ahupua'a of Kawaihae, South Kohala, Hawaii. The investigator will explain the purpose of the study, the procedures to be used, the potential benefits and possible risks of participating. You may ask the investigator any question(s) in order to help you to understand the study, procedures or undertaking. A basic explanation of the study is written below. If you then decide to participate in the study, please sign on the second page of this form. You will be given a copy of this form to keep.

I. Nature and Purpose of the Study

The purpose of this cultural impact assessment is to gather information about the proposed site for the drilling for the SIC underground fiber optic cable, through interviews with individuals who are knowledgeable about this area; including traditional and historic information such as legends, songs, chants or other information. The objective of this study is to facilitate in the identification and location of any possible pre-historic and/or historic cultural resources, or traditional cultural practices in the area mentioned above, in accordance with applicable historic preservation laws, regulations, and guidelines, including:

- Office of Environmental Quality Control [OEQC] Guidelines
- Act 50 HB2895 (A.D. 2000), HRS Chapter 343
- National Environmental Protection Act (NEPA)
- National Historic Preservation Act; Sec 106

II. Explanation of Procedures

After you have voluntarily agreed to participate and have signed the consent page, the investigator will tape record your interview and transcribe it later. Data from the interview (ethnographic research) will be used as part of the background history summary for this project. The investigator may also need to take notes and/or ask you to spell or clarify terms or names that are unclear.

III. Discomforts and Risks

Foreseeable discomforts and/or risks may include, but are not limited to the following: having to talk loudly for the recorder; being recorded and/or interviewed; providing information that may be used in reports which may be used in the future as a public reference; knowing that the information you give may conflict with information from others; your uncompensated dedication of time; possible miscommunication or misunderstanding in the transcribing of information; loss of privacy; and worry that your comment(s) may not be understood in the same way you understood them. It is not possible to identify all potential risks, however reasonable safeguards have been taken to minimize risks.

IV. Benefits

This study will give you the opportunity to express your thoughts (wānā'o), and your opinions will be listened to and shared; your knowledge may be instrumental in the preservation of significant resources and information.

V. Confidentiality

Your rights of privacy, confidentiality and/or anonymity will be protected if you so desire. You may request, for example, that your name and/or sex not be mentioned in write-ups, such as field notes, on tape, on files (disk or folders), drafts, reports, and future works; or you may request that some of the information you provide remain "off-the-record" and not be recorded in any way. In order to ensure protection of your privacy, confidentiality and/or anonymity, you should immediately advise the investigator of your desires. The investigator will ask you to specify the method of protection, and note it on this form below.

VI. Refusal/Withdrawal

You may, at any time during the interview process, choose to not participate any further and ask the investigator for the tape and/or notes. Please note that you will be given an opportunity to review your transcript, and to revise and/or delete any part of the interview.

VII. Waiver

Part I: Agreement to Participate

I, \_\_\_\_\_, understand that Maria E. Ka'imipono Orr, an independent investigator contracted by Haun & Associates, will be conducting oral history interviews with individuals knowledgeable about the lands of TMK 6-1-04: (part) 20, Hawaiian Home Lands, Kawaihae, South Kohala, Hawaii I. The oral history interviews are being conducted in order to collect information on possible pre-historic and/or historical cultural resources associated with these lands, as well as traditional cultural practices.

I understand I will be provided the opportunity to review my interview to ensure that it accurately depicts what I meant to say about any of these lands.

\_\_\_\_\_ I am willing to participate.  
\_\_\_\_\_ I am willing to participate, under the following conditions:

Interviewer \_\_\_\_\_ Date \_\_\_\_\_

Investigator \_\_\_\_\_ Date \_\_\_\_\_

MAHALO NUI LOA

RECEIVED AS FOLLOWS

Part II: Personal Release of Interview Records

I, \_\_\_\_\_ have been interviewed by Maria E. Ka'imipono Orr, an independent investigator contracted by Haun & Associates. I have reviewed the written transcripts of tape recordings of the interview, and agree that said documentation is complete and accurate except for those matters specifically set forth below the heading "CLARIFICATION OR CORRECTIONS."

I further agree that Haun & Associates may use and release my identity and other interview information, both oral and written, for the purpose of using such information in a report to be made public, subject to my specific objections, to release as set forth below under the heading "SPECIFIC OBJECTIONS TO RELEASE OF INTERVIEW MATERIALS."

CLARIFICATION OR CORRECTIONS:

SPECIFIC OBJECTIONS TO RELEASE OF INTERVIEW MATERIALS:

Interviewer \_\_\_\_\_ Date \_\_\_\_\_

Investigator \_\_\_\_\_ Date \_\_\_\_\_

MAHALO NUI LOA

APPENDIX E

Ethnographic Survey  
Basic Research Instrument for Oral History Interviews  
SIC, Inc. Submarine Fiber Optic Cable Project  
Kawalihae, South Kohala, Hawaii

This research instrument includes basic information as well as research categories which will be asked in the form of open primary questions which allow the individual interviewed (Consultant) to answer in the manner he/she is most comfortable. Secondary or follow-up questions are asked based on what the Consultant has said and/or to clarify what was said. The idea is to have an interview based on a "talk-story" form of sharing information. Questions will NOT be asked in an interrogation style/method, NOR will they necessarily be asked in the order presented below. This research instrument is merely a guide for the investigator and simply reflects general categories of information sought in a semi-structured format. Questions will be asked more directly when necessary.

The Consultants were selected because they met one or more of the following criteria:

- ◆ Had/has Ties to Project Location(s)
- ◆ Referred By Office of Hawaiian Affairs (OHA) Staff
- ◆ Known Hawaiian Cultural Resource Person
- ◆ Known Hawaiian Traditional Practitioner
- ◆ Referred By Other Cultural Resource People

(NOTE: This part of the Interview, #1-4 is mutual sharing and rapport building. Most of the information for research categories "Consultant Background" and "Consultant Demographics" come from this section, but not exclusively.)

1. Name? Address? Birth Year? Phone #? Email address?

(This information can be addressed in a couple of ways. After the investigator first turns on the tape recorder, the following information will be recorded: Day/Date/Time/Place of Interview/Name of Consultant (if authorized by Consultant)/Name of Investigator/Question: Have you read the Agreement To Participate? Do you have any questions before we begin? Will you please sign the Consent page. The investigator will explain again the purpose of the interview.

The investigator will then ask the Consultant to "Please tell me about yourself--when/where were you born? where did you grow up? where did you go to school?" This general compound question allows the Consultant to share as much or as little as he/she wants without any pressure. Most of the information for #1 may already be known to the investigator.)

2. Family Background: History? Hawaiian connection (if any)?

[Much of the information for questions #2, 3, and 4 usually comes from the "monologue" answer to Question #1. If it does not, then these questions will be asked. The answer in this section usually establishes how the Consultant meets the criteria; how the Consultant developed his/her information base, etc.]

3. Youth? Where lived?

4. Schooling?

RECEIVED AS FOLLOWS

(NOTE: This part of the interview, PS-7 reflects information sought for the following research categories: "Significant Properties," "Significant People," "Significant Events," "Traditional Cultural Practices," "Traditional Arts/Crafts," and Oral History/Oral Tradition/Place Names." The questions are open-ended so as NOT to "put words in the mouths" of the Consultants.)

5. Can you tell me what you know about the Kawaihāe Hawaiian Home Lands? Specifically the area along the coast (see map)?

(NOTE: Generally when people share information about a specific topic/place, they usually state where their information came from. If it isn't volunteered, it is asked as a follow-up question(s). A map of the project area should be available to confirm that investigator and consultant are talking about the same place. Photos would also help if a field trip is not possible. The best scenario would be to be "on-site" at some part of the interview...although this is not always practical.)

6. What are your recollections and/or personal experiences of this area?

(NOTE: If Consultant is related to any Land Commission Awardee [LCA] or subsequent land-owner in the project zone, or Hawaiian Homes resident or employee of Harbor, NPS, the follow-up question(s) is asked.)

7. How are you related to the Awardee? How long have you/did you live there? Work there?

8. Do you know any stories/legends/songs/chants associated with these areas?

(NOTE: Possible follow-up questions for Kawaihāe HUL/ta general:

- How are you or your family connected to the lands of Kawaihāe/HUL?
- What year(s) were you and/or your family associated with these lands?
- What was this place/area called when you were growing up?
- Can you describe what the area looked like--what kinds of natural and/or man made things?
- To your knowledge what kind of activities took place in this location?
- Do you know of any traditional gathering of plants, etc in the area?
- To your knowledge please describe any gathering practices nearby?
- Any other land/water use?
- What was the historic land use? Sugar Cane? Agriculture? Habitation? Dwellings? Cattle?
- Where were these "features" located? (Have map ready for marking.)
- Can you describe any stream/fresh water use?
- Do you know about any burials in the project area?

9. Is there anyone you know who can also tell me about the project area?

(NOTE: Usually in the course of the interview, Consultants suggest other people to interview.)

10. As soon as I have transcribed this interview I will send you two copies. Please review the transcript, make any corrections and/or additions. If you're satisfied, please sign the attached third page of the Consent Form thereby releasing the information. Then mail one set back to me in the enclosed stamped addressed envelope.

MAHALO NUI LOA

RECEIVED AS FOLLOWS

Land Commission Award Claims in Kawaihae

LCA	Class	Area (acres)	Area (sq ft)	Other (sq ft)	Section 5	II	Section No.	Land Use	Boundary Status	Boundary Name	Boundary Status	Boundary Name	Date Rec'd	Over	Acres	Revol	Source	Comment
1038	Kawahi	8	8	8	Kawaihae (1/2 Sec 5, 1/2 Sec 6)	1	1	NO	NO	NO	NO	NO	NO	NO	6.08	None	NT 1444	
3400	Wai Kapaolu	8	1	8	Kawaihae (1/2 Sec 5, 1/2 Sec 6)	1	1	NO	NO	NO	NO	NO	NO	NO	8.11	7332	NT 1434	
3401	Kawahi	8	3	8	Kawaihae (1/2 Sec 5, 1/2 Sec 6)	1	1	NO	NO	NO	NO	NO	1033	NO	34.88	7388	NT 1444	Kawaihae 1/2 Sec 5, 1/2 Sec 6
3402	Kawahi	1	1	1	Kawaihae (1/2 Sec 5, 1/2 Sec 6)	1	1	NO	NO	NO	NO	NO	NO	NO	8.88	None	NT 144, NT 145, NT 146	
3403	Kawahi	1	1	1	Kawaihae (1/2 Sec 5, 1/2 Sec 6)	1	1	NO	NO	NO	NO	NO	NO	NO	8.88	8348	NT 144, NT 145	
3404	Kawahi	1	1	1	Kawaihae (1/2 Sec 5, 1/2 Sec 6)	1	1	NO	NO	NO	NO	NO	NO	NO	8.88	8348	NT 144, NT 145	
3405	Kawahi	2	2	2	Kawaihae (1/2 Sec 5, 1/2 Sec 6)	1	1	NO	NO	NO	NO	NO	NO	NO	1.54	8317	NT 144, NT 145	
3406	Kawahi	2	1	2	Kawaihae (1/2 Sec 5, 1/2 Sec 6)	1	1	NO	NO	NO	NO	NO	NO	NO	1.18	8330	NT 144, NT 145	
4101	Kawahi	1	1	1	Kawaihae (1/2 Sec 5, 1/2 Sec 6)	1	1	NO	NO	NO	NO	NO	NO	NO	8.10	8388	NT 144, NT 145	
4102	J.P. Kapaemahu	1	1	1	Kawaihae (1/2 Sec 5, 1/2 Sec 6)	1	1	NO	NO	NO	NO	NO	NO	NO	1.34	8679	NT 144, NT 145	
4103	Kawahi	1	1	1	Kawaihae (1/2 Sec 5, 1/2 Sec 6)	1	1	NO	NO	NO	NO	NO	NO	NO	8.88	8388	NT 144, NT 145	

RECEIVED AS FOLLOWS

APPENDIX C  
Tax Map History  
Territory and State of Hawaii

Land Commission Award Claims in Kawaihāe (cont.)

LCA	Claimant	Acres claimed	Acres awarded	Other status	Adverse's	Q	Section No.	Land Use	Boundary Status	Boundary Name	Boundary Mark	Boundary Markers	Date Rec'd	Order	Acreage	Acres Paid	Source	Comments
1823	Pure	1	1	0	Kawaihāe	Public/State		Forest, 2, 3 Kawaihāe, 2000	part pasture	Monahua Stream	see	Postholes	NO	Order of Young	1.05	none	NR 646, HT 646	
1824	Wm. French	1	0	0	Kawaihāe	NO		part unimproved & Kawaihāe, 2000	NO	NO	NO	NO	Y	Y	0.00	none	PT 167, 173d, 256, 230d	see LCA 6864
1824	Wm. French	1	1	0	Kawaihāe	NO		part unimproved & Kawaihāe, 2000	NO	NO	NO	NO	NO	None	1.34	00	PR 643, PT 167d, HT 686d	
1873	G. Kane	1	0	0	Kawaihāe	Land		NO	NO	NO	NO	NO	NO	NO	0.00	none	NR 671d	
1873	L.S. Linn	1	1	0	Kawaihāe	Land		part unimproved, 2 part Kawaihāe, 2000, & 2000, 2000	pasture	Kawaihāe	part L.S.	Lelelele	1920	Ord. Adams	1.35	3000	NR 284d, PT 255, 299d, 246d, HT 346d	order from
1874	Jam. Young	1	1	0	Kawaihāe	Land		NO	NO	NO	NO	NO	NO	None	1.05	1682	PR 643, HT 167d, PT 230d, HT 230d 41 433- 120d	awarded Kawaihāe 2
1874	Wm. Linn	1	1	0	Kawaihāe	Land		part unimproved, 2 part Kawaihāe, 2000, & 2000, 2000	vacant land	vacant land	beam	vacant land	1844	Kawaihāe	0.00	6882	NR 16d, HT 167d, PT 230d	
1874	G. Kane	1	0	0	Kawaihāe	Land		NO	NO	NO	NO	NO	NO	None	0.00	none	NR 16d, HT 167d, PT 230d	
1874	Pure	1	0	0	Kawaihāe	NO		NO	NO	NO	NO	NO	NO	None	0.00	none	NR 634d, HT 634d	
1874	Jam. Young	1	0	0	Kawaihāe	NO		NO	NO	NO	NO	NO	NO	None	0.00	none	NR 634d, HT 634d	

RECEIVED AS FOLLOWS

Dept. of Finance - K/P Tax Map  
 TMK: 5-6-01 RD THRU 6-4-10-S  
 HISTORY SHEET BOOK 1959-1987

TAX MAPS BRANCH HISTORY SHEET			DIV.	
DATE:	LOCATION:	TITLE:	6	1 04 20
4/26/67	Kawaihae			
NO.	GRANTOR, ETC.	AREA OF PARCEL	GRANTEE, ETC.	
1.	As shown on Tax Maps	238.026 $\Phi$	Hawaiian Home Lands	
2.	TMK 1147'67(2111-4 etc)RYT/sy 4/26/67	233.614 $\Phi$	do	
	EXCH/D: 200 $\Phi$ -Rd Par 3.			
	3811 $\Phi$ -Rd Par 10. &			
	401 $\Phi$ -Rd Par 22 dropped into Road			
	Dept of Havn Home Lands To: State of Haw			
	Bk 5619 p 62 Cons-exchange 1/18/67			
	3/31/67			
	F/D: 6104-20: Area & bdry			
NOTE: INFORMATION ON THIS SHEET IS SUBJECT TO CHANGE				

Dept of Fin. K/P Tax Map  
 TMK: 5-6-01 RD THRU 6-4-10  
 History Sheet Book 1959-1987

SOURCE:			1957		DIV.	
BY:	DATE:	TITLE:	6	1 04 3		
P. Lake	5/21/57	FOR GOVT land at Kawaihae, S. Kona				
NO.	GRANTOR ETC.	AREA OF PARCEL	GRANTEE ETC.			
1.	As shown on Tax Maps	2,019 ac	Territory of Hawaii (Board of Harbor Commission) Per. Exec. Order 737 CATTLE PEN SITE			
2.	TMK M-34157 1/2 DL 5/21/57	2,019 ac	To: Territory of Hawaii			
	R/S: By Exec. Order 1776, Exec. Order 737 is hereby cancelled and no longer in effect.					
	F/D: 6-1-04-3, Ownership					
3.	TMK 1147'67(2111-4 etc)RYT/sy 4/26/67	85.138 $\Phi$	Hawaiian Home Lands			
	EXCH/D: 2,809 $\Phi$ -Rd Par 2 dropped into Rd					
	Dept of Havn Home Lands To: State of Haw					
	Bk 5619 p 62 Cons-exchange 1/18/67					
	3/31/67					
	F/D: 6104-3: Area, bdry & Ownership					
4.	TMK 4730'69 AS/sy 6/19/69	85.138 $\Phi$	do			
	Rev Permit No. S-4302: State of Hawaii					
	Date of Commencement: 1/1/69 Mo.					
	Rental: \$55 Purpose: Sand stockpiling					
	Improvement: None. Info per L/O 5/21/69					
	F/D: 6104-3; Rev Prmt S-4302 issued					
5.	TMK 12312'71-72 RYT/en 5/10/72	do	Hawaiian Home Lands			
	R/S: Cancel Rev Prmt No. S-4302:					
	Ocean Mining & Development of Hawaii Inc					
	Effective Date: 11/30/70					
	Info rec'd fr L/O 4/26/72					
NOTE: LAST AREA & GRANTEE FINAL DATA AS SHOWN ON TAX MAP						

RECEIVED AS FOLLOWS

APPENDIX II  
SIGNED CONSENT FORMS

IV. Benefits

This study will give you the opportunity to express your thoughts (*mana'o*), and your opinions will be listened to and shared; your knowledge may be instrumental in the preservation of significant resources and information.

V. Confidentiality

Your rights of privacy, confidentiality and/or anonymity will be protected if you so desire. You may request, for example, that your name and/or sex not be mentioned in write-ups, such as field notes, on tape, on files (disk or folders), drafts, reports, and future works or you may request that some of the information you provide remain "off-the-record" and not be recorded in any way. In order to ensure protection of your privacy, confidentiality and/or anonymity, you should immediately advise the investigator of your desires. The investigator will ask you to specify the method of protection, and note it on this form below.

VI. Refusal/Withdrawal

You may, at any time during the interview process, choose to not participate any further and ask the investigator for the tape and/or notes. Please note that you will be given an opportunity to review your transcript, and to revise and/or delete any part of the interview.

VII. Waiver

Part I: Agreement to Participate

I, Wahiana Ahyon Akan, understand that Maria E. Ka'imipono Orr, an independent investigator contracted by Haun & Associates, will be conducting oral history interviews with individuals knowledgeable about the lands of TMK 6-1-04: (part) 20, Hawaiian Home Lands, Kawaihau, South Kohala, Hawaii. The oral history interviews are being conducted in order to collect information on possible pre-historic and/or historical cultural resources associated with these lands, as well as traditional cultural practices.

I understand I will be provided the opportunity to review my interview to ensure that it accurately depicts what I mean to say about any of these lands.

I am willing to participate.  
 I am willing to participate, under the following conditions:

Wahiana Ahyon Akan Interviewer Date 29 April 2003  
Maria E. Orr Investigator Date 4/29/03

MAHALO NUI LOA

RECEIVED AS FOLLOWS

IV. Benefits

This study will give you the opportunity to express your thoughts (mao'a) and your opinions will be listened to and shared; your knowledge may be instrumental in the preservation of significant resources and information.

V. Confidentiality

Your rights of privacy, confidentiality and/or anonymity will be protected if you so desire. You may request, for example, that your name and/or sex not be mentioned in write-ups, such as field notes, on tape, on files (disk or folders), drafts, reports, and future works; or you may request that some of the information you provide remain "off-the-record" and not be recorded in any way. In order to ensure protection of your privacy, confidentiality and/or anonymity, you should immediately advise the investigator of your desires. The investigator will ask you to specify the method of protection, and note it on this form below.

VI. Refusal/Withdrawal

You may, at any time during the interview process, choose to not participate any further and ask the investigator for the tape and/or notes. Please note that you will be given an opportunity to review your transcript, and to revise and/or delete any part of the interview.

VII. Waiver

Part I: Agreement to Participate

I, Maria E. Ka'imipono Orr, understand that Maria E. Ka'imipono Orr, an independent investigator contracted by Haun & Associates, will be conducting oral history interviews with individuals knowledgeable about the lands of TMK 6-1-04; (part) 20, Hawaiian Home Lands, Kawaihae, South Kohala, Hawaii. The oral history interviews are being conducted in order to collect information on possible pre-historic and/or historical cultural resources associated with these lands, as well as traditional cultural practices.

I understand I will be provided the opportunity to review my interview to ensure that it accurately depicts what I meant to say about any of these lands.

I am willing to participate.  
 I am willing to participate, under the following conditions:

Interviewer: Maria E. Ka'imipono Orr Date: 4/29/03  
Investigator: Maria E. Ka'imipono Orr Date: \_\_\_\_\_

MAHALO NUI LOA

IV. Benefits

This study will give you the opportunity to express your thoughts (mao'a) and your opinions will be listened to and shared; your knowledge may be instrumental in the preservation of significant resources and information.

V. Confidentiality

Your rights of privacy, confidentiality and/or anonymity will be protected if you so desire. You may request, for example, that your name and/or sex not be mentioned in write-ups, such as field notes, on tape, on files (disk or folders), drafts, reports, and future works; or you may request that some of the information you provide remain "off-the-record" and not be recorded in any way. In order to ensure protection of your privacy, confidentiality and/or anonymity, you should immediately advise the investigator of your desires. The investigator will ask you to specify the method of protection, and note it on this form below.

VI. Refusal/Withdrawal

You may, at any time during the interview process, choose to not participate any further and ask the investigator for the tape and/or notes. Please note that you will be given an opportunity to review your transcript, and to revise and/or delete any part of the interview.

VII. Waiver

Part I: Agreement to Participate

I, Maria E. Ka'imipono Orr, understand that Maria E. Ka'imipono Orr, an independent investigator contracted by Haun & Associates, will be conducting oral history interviews with individuals knowledgeable about the lands of TMK 6-1-04; (part) 20, Hawaiian Home Lands, Kawaihae, South Kohala, Hawaii. The oral history interviews are being conducted in order to collect information on possible pre-historic and/or historical cultural resources associated with these lands, as well as traditional cultural practices.

I understand I will be provided the opportunity to review my interview to ensure that it accurately depicts what I meant to say about any of these lands.

I am willing to participate.  
 I am willing to participate, under the following conditions:

Interviewer: Maria E. Ka'imipono Orr Date: 4/29/03  
Investigator: Maria E. Ka'imipono Orr Date: 4/29/03

MAHALO NUI LOA



APPENDIX I  
SIGNED RELEASE FORMS

Part II: Personal Release of Interview Records

I, William Ahijon Ahe, have been interviewed by Maria E. Ka'imipono Orr, an Independent Investigator contracted by Haun & Associates. I have reviewed the written transcripts of tape recordings of the interview, and agree that said documentation is complete and accurate except for those matters specifically set forth below the heading "CLARIFICATION OR CORRECTIONS."

I further agree that Haun & Associate may use and release my identity and other interview information, both oral and written, for the purpose of using such information in a report to be made public, subject to my specific objections, to release as set forth below under the heading "SPECIFIC OBJECTIONS TO RELEASE OF INTERVIEW MATERIALS."

CLARIFICATION OR CORRECTIONS:

Ahijon  
Waitema  
Rumaike Hospital  
Church College of Hawaii

SPECIFIC OBJECTIONS TO RELEASE OF INTERVIEW MATERIALS:

William Ahijon Ahe 28 May 2003  
Interviewer Date  
Mani On 5/22/03  
Investigator Date

MAHALO NUI LOA

RECEIVED AS FOLLOWS

RECEIVED AS FOLLOWS

Part II: Personal Release of Interview Records  
I, Robert D. Lentino Sr., have been interviewed by Maria E. Ka'imipono Orr, an independent investigator contracted by Haun & Associates. I have reviewed the written transcripts of tape recordings of the interview, and agree that said documentation is complete and accurate except for those matters specifically set forth below the heading "CLARIFICATION OR CORRECTIONS."

I further agree that Haun & Associates may use and release my identity and other interview information, both oral and written, for the purpose of using such information in a report to be made public, subject to my specific objections, to release as set forth below under the heading "SPECIFIC OBJECTIONS TO RELEASE OF INTERVIEW MATERIALS."

CLARIFICATION OR CORRECTIONS:

To Lentino I.L.  
Kauwe  
Kauwe pulchur

SPECIFIC OBJECTIONS TO RELEASE OF INTERVIEW MATERIALS:

Robert D. Lentino Sr. Interviewer 5/25/03 Date  
Maria Orr Investigator 5/22/03 Date

MAHALO NUI LOA

Part II: Personal Release of Interview Records  
I, Mahalo K. Johnis, have been interviewed by Maria E. Ka'imipono Orr, an independent investigator contracted by Haun & Associates. I have reviewed the written transcripts of tape recordings of the interview, and agree that said documentation is complete and accurate except for those matters specifically set forth below the heading "CLARIFICATION OR CORRECTIONS."

I further agree that Haun & Associates may use and release my identity and other interview information, both oral and written, for the purpose of using such information in a report to be made public, subject to my specific objections, to release as set forth below under the heading "SPECIFIC OBJECTIONS TO RELEASE OF INTERVIEW MATERIALS."

CLARIFICATION OR CORRECTIONS:

1) 1st To Lentino missing @ L  
2) "line on bidini Hawaii Home 53 yr. not 84.  
and also 305 am  
3) more pure than  
4) My father's name was Lamp'ieil'ieil'ieil'ieil'

SPECIFIC OBJECTIONS TO RELEASE OF INTERVIEW MATERIALS:

Mahalo K. Johnis Interviewer 5-26-03 Date  
Maria Orr Investigator 5/3/03 Date

MAHALO NUI LOA

RECEIVED AS FOLLOWS

ARCHAEOLOGICAL INVENTORY SURVEY

TMK: 6-1-04: Por. 20

LAND OF KAWAIHAE 1, SOUTH KOHALA DISTRICT

ISLAND OF HAWAII

By:

Alan E. Haun, Ph.D.

Dave Henry, B.S. and

Maria E. Ka'imipono Orr, M.A.

Prepared for:

Sandwich Isles Communications, Inc.  
c/o Parsons Brinkerhoff Quade & Douglas, Inc.  
1001 Bishop Street, Suite 3000  
Honolulu, HI 96813

June 2003

**Haun & Associates**

Archaeological, Cultural, and Historical Resource Management Services  
HCR 1 Box 4730, Keaua, Hawaii 96749 Phone: 982-7755 Fax: 982-6343

Report 145-060203

ARCHAEOLOGICAL INVENTORY SURVEY

TMK: 6-1-04: Por. 20

LAND OF KAWAIHAE 1

SOUTH KOHALA DISTRICT

ISLAND OF HAWAII

**Haun & Associates**

Archaeological, Cultural, and Historical Resource Management Services  
HCR 1 Box 4730, Keaua, Hawaii 96749 Phone: 982-7755 Fax: 982-6343

## SUMMARY

At the request of Parsons, Brinckerhoff, Quade & Douglas, Inc. on behalf of Sandwich Isles Communications, Inc., Haun & Associates conducted an archaeological inventory survey of TMK: 6-1-04: Por. 20, a c. 0.2-acre parcel located in the Land of Kawaihae 1, South Kohala, Island of Hawaii. The objective of the survey was to satisfy historic preservation regulatory review requirements of the Department of Land and Natural Resources-Historic Preservation Division (DLNR-HPD), as contained within Hawaii Administrative Rules, Title 13, DLNR, Subtitle 13, State Historic Preservation Rules, and Section 106, 36 CFR Part 800 of the National Historic Preservation Act of 1966 (as amended).

The survey identified four historic sites consisting of two concrete walls, a concrete building foundation, and the remains of a concrete and mortared stone pier. The identified sites are limited to historic structural remains that primarily date to the late 1910s. A pier and associated restroom facility were constructed in 1937. The pier was used until it was destroyed in 1946 by a tidal wave. An associated concrete wall is probably contemporaneous with the pier and comfort station. The other wall, a possible bridge abutment, probably predates the other sites because the condition of the concrete is more deteriorated than it is in the other structures.

Sites identified during the survey are assessed for significance based on the criteria outlined in the Rules Governing Procedures for Historic Preservation Review (DLNR 2007: Chap 275), and Section 106, 36 CFR Part 800 of the National Historic Preservation Act of 1966 (as amended). All four sites are assessed as significant for their information content. The sites have yielded information important for understanding historic land use in project area. The mapping, written descriptions, and photography at the four sites adequately documents them and no further work or preservation is recommended.

## CONTENTS

Introduction	1
Scope of Work	1
Project Area Description	1
Field Methods	4
Archaeological and Historical Background	4
Historical Documentary Research	4
Previous Archaeological Work	21
Project Expectations	24
Findings	25
Conclusion	35
Discussion	35
Significance Assessments	35
Recommended Treatments	35
References	36
ILLUSTRATIONS	
Figure 1. Project Location Area	2
Figure 2. Paved Road bisecting Project Area	3
Figure 3. Project Area Vegetation	3
Figure 4. Ahupua'a Boundaries and Land Commission Awards	5
Figure 5. Portion of Duperrey's 1819 Map of Kawaihae	13
Figure 6. Portion of Loebenstein's 1903 Map of Kawaihae Bay	20
Figure 7. Previous Archaeological Work	23
Figure 8. Site Location Map	26
Figure 9. Site 23857 Concrete Wall	27
Figure 10. Site 23858 Concrete Wall	27
Figure 11. Site 23859 Plan Map	28
Figure 12. Site 23859 Concrete Foundation	3
Figure 13. Site 23859 Mortared Stone Wall and Stairs	30
Figure 14. Site 23860 Plan Map	31
Figure 15. Site 23860. Bataat Boulders and Displaced Concrete	32

ILLUSTRATIONS (cont.)

Figure 16. Site 23860, Main Wall and Lower Shelf . 32

Figure 17. Site 23860, Raised Wall . 34

Figure 18. Site 23860, Pilings and Piers . 34

TABLES

Table 1. Land Commission Award Claims Kawaihae . 16

Table 2. Summary of Previous Archaeological Work . 22

INTRODUCTION

At the request of Parsons, Brinkerhoff, Quade & Douglas, Inc. on behalf of Sandwhich Isles Communications, Inc., Haun & Associates conducted an archaeological inventory survey of TMK: 6-1-04: Por. 20 located in the Land of Kawaihae 1, South Kohala District, Island of Hawaii (Figure 1). The objective of the survey was to satisfy current historic preservation regulatory review requirements of the Department of Land and Natural Resources-State Historic Preservation Division (DLNR-SHPD), as contained within Hawaii Administrative Rules, Title 13, DLNR, Subtitle 13, State Historic Preservation Rules (DLNR 2002). The project area encompassed the Area of Potential Effect (APE) as determined in consultation with DLNR-SHPD.

The survey fieldwork was conducted on May 15, 2003 by Dr. Alan Haun and Project Supervisor Dave Henry, B.S. Approximately 2 labor days were required to complete the field work portion of the project. Described in this final report are the project scope of work, field methods, background information, survey findings, and significance assessments of the sites with recommended treatments.

Scope of Work

Based on DLNR-SHPD rules for inventory surveys, the following specific tasks were determined to constitute an appropriate scope of work for the project:

1. Conduct background review and research of existing archaeological and historical documentary literature relating to the project area and its immediate vicinity—including examination of Land Commission Awards, oblique records, historic maps, archival materials, archaeological reports, and other historical sources;
2. Conduct a high intensity, 100% pedestrian survey coverage of the project area;
3. Conduct detailed recording of all potentially significant sites including scale plan drawings, written descriptions, and photographs, as appropriate;
4. Conduct limited subsurface testing (manual excavation) at selected sites (e) to determine the presence or absence of potentially significant buried cultural deposits or features, and (f) to obtain suitable samples for radiocarbon age determination analysis;
5. Analyze background research and field data; and
6. Prepare and submit Final Report.

Project Area Description

The project area consists of a c. 0.8-acre parcel bounded on the northeast by Highway 270 (Aloha Puli Highway), on the southwest by the ocean, on the northwest by Kawaia Place and undeveloped land and on the southeast by undeveloped Coast Guard Reservation property. It lies in elevation from sea level to c. 10 ft. The project area is bisected by a paved asphalt road that originates along the seaward side of Highway 270 and extends 73.0 m to the southwest (Figure 2). The seaward end of the road terminates in an area of jumbled water-worn basalt boulders, inland from the remains of an historic pier (Site 23860). A soil berm extends across the inland end of the road, likely constructed to limit vehicular access to the parcel.

The site area in which the study parcel is situated receives from 10-20" of annual rainfall (Javik and Javik 1998) and averages daytime temperatures of 80 degrees (Ammerson 1983). The parcel is relatively level, sloping slightly towards the ocean. Soils within the project area consist of Kawaihae very rocky very fine sandy loam (6-12% slopes). This soil series is characterized by a thin surface layer of reddish brown extremely stony sandy loam, over a dark reddish brown to dusky red stony silt loam (Sato et al.

RECEIVED AS FOLLOWS

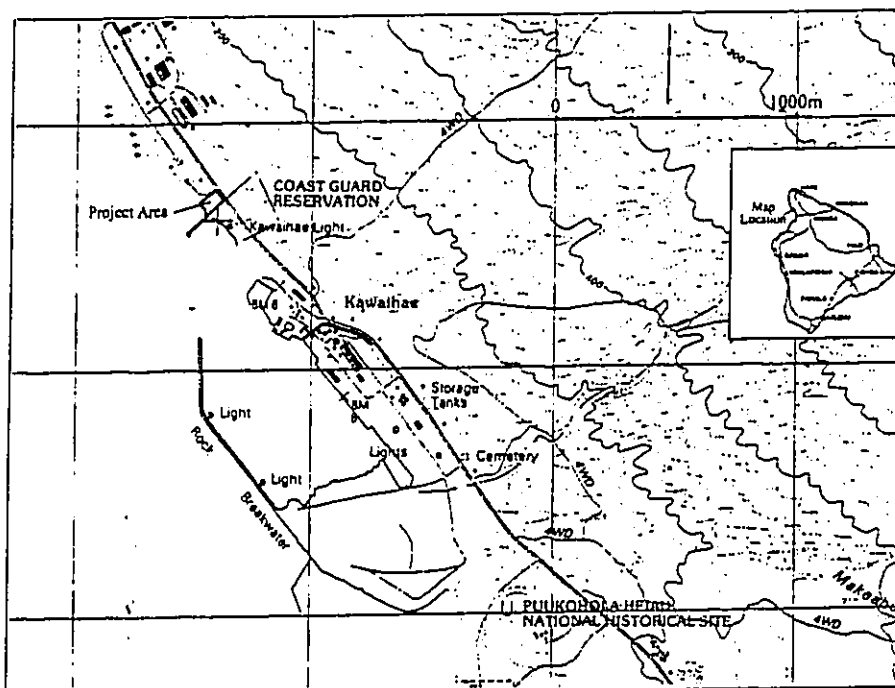


Figure 1. Portion of USGS Kaiwaha Quadrangle showing Project Area

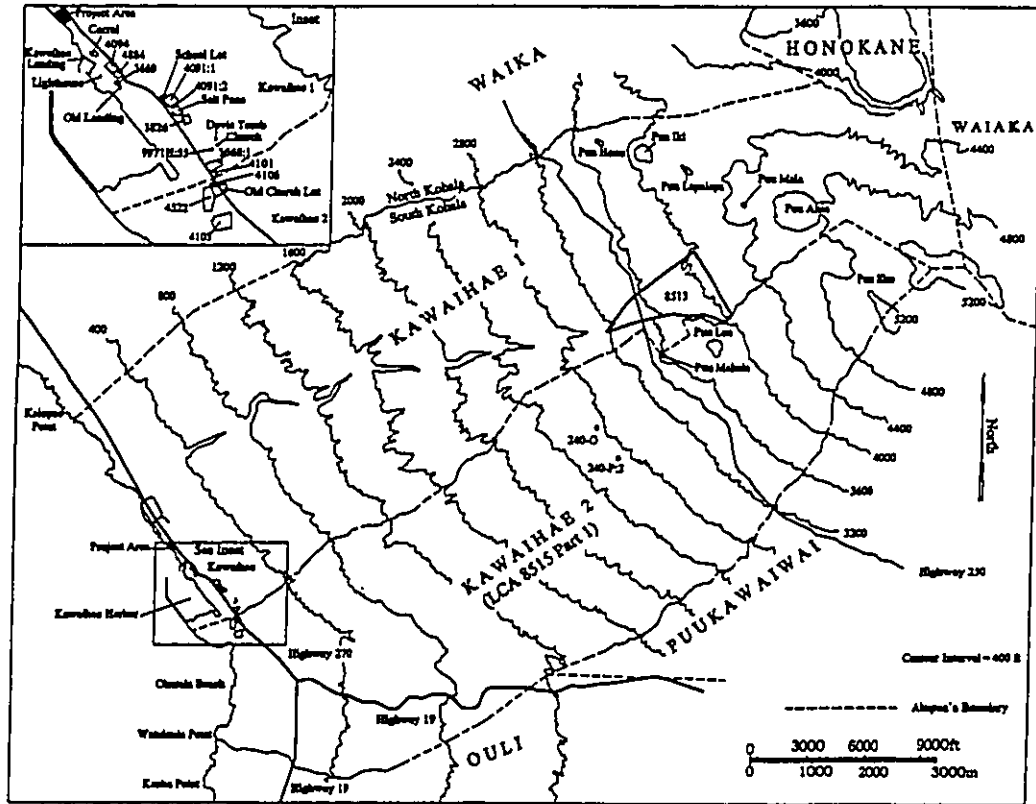


Figure 4. Ahupua'a Boundaries and Land Commission Awards

1973:26). The soil in this area is underlain by Pleistocene Era pahoehoe bedrock associated with Pōhōhō volcanics (Wolfe and Morris 2001). The vegetation within the parcel consists of *Miconia* (*Praxipolis pedunculata* [Humb. & Boeml. Ex Willd.] HBK.) and low grasses (Figure 5). Modern debris is scattered throughout the project area.

### Field Methods

The project area was subjected to a 100% surface examination with surveyors spaced at 10 m intervals. Transects were oriented in a north-south direction, parallel to Highway 270. Ground surface visibility was excellent throughout the parcel. The sites were flagged with pink and blue flagging tape and their locations plotted on a scaled project area map with the aid of Garmin Global Positioning System (GPS) III+. The accuracy of the GPS device for a single point is +/- 15 m. This accuracy is increased to less than c. 3-5 meters by taking multiple points including property corners and overlying the plotted points on a scaled map using AutoCAD software. The sites were subjected to detailed recording consisting of the preparation of scaled plan maps, the completion of standardized site/feature forms, and photographic documentation. No subsurface testing was undertaken.

## ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

### Historical Documentary Research

The project area is situated in Kawāihāb 1 (Figure 4). Kawāihāb is literally translated as "the water [of] wrath (people are said to have fought for water from a pool in this arid area)" (Pukui et al. 1974:97). Traditional and legendary accounts contain many references to Kawāihāb (Kamakau 1997). Maui *o'ia'i* Kama-ihā-wāhi ignored the advice of his counsel and sent his half-brother Ka-uhū-o-ka-lani (both sons of Kūka-ā-Pū-llani) to spy on Hawai'i Island, to see how large the population was. They landed in Kawāihāb.

Ka-uhū-o-ka-lani ran about that same evening and returned before the canoes were dismantled and placed in the house. The keepers of the gods at Māhikihi were servants of Kama, and so they concealed the canoes of the spies. When Ka-uhū-o-ka-lani returned his fellow spies and boats asked, "where did you go?" "I went visiting from here to the lava bed and Kiholo, the pool. Then did you turn back?" "No, I went on to the long stretch of sand, to the small bay with a point on that side and one on this side. There are large inland ponds." "The sandy stretch is 'Ohiki, and this walk-in ponds are Kāhōko and Hō-nokohau. Then you came back?" "No, I went on..." (Kamakau 1992:56).

The next morning the spies began a circuit of Hawaii. After they returned to Maui, they reported to Kama-ihā-wāhi the following:

"We went all around Hawaii. There were many houses, but few men. We went to Kohala and found the men only on the shores..." The spies had seen the land of Kohala but had failed to see the people for on all of the fields where sports were held from inner Kohala to outer Kohala, from Kohala of the coastal cliffs to Kohala of the inland, a crowd of people gathered every day from morning to night to play. Kohala was known as a thickly populated land. The spies thought that if Kohala was conquered, Kona, Ka'u and Puna would be easily taken, and they felt that Hilo and Hamakua would lead no assistance. This was true, for the chiefs of these districts were cousins of the chiefs of Maui (Kamakau 1992:56-57).

While most of the prophets and seers supported Kama-ihā-wāhi's war on his cousin of Hawaii Island, children of his father's sister Pū-llā did not. Some warned that if he did go, he would die and not return to Maui alive. They landed at Kohala and began the destruction of the people of Kohala. Kama-ihā-wāhi, son of Keawe-nui-ā-Umi was captured and treated cruelly. "His whole skin was tanned, his eyelids turned inside out and tattooed." He was renamed Ka-maka-hiwa.

In retribution, Alapa'i decided to carry the battle to Maui. While Alapa'i and his warriors were encamped in Kohala, Kamehameha was born to Ke-ku-i-ipo-iwa (II) in Kepohai (U.I. John Papa 1983:3), in the *okupa'o* of Kokoiki, in the *moai* of North Kohala near the Mt Oliahi *heiau*. Kamakau (1992:67) says it was AD 1756; however, others say it was between 1753 and 1758 with more leaning toward 1753 (Chaff 1999:56-57). He was quickly taken by Kohala chief *Nae'ole* and hidden in Halawa (Kamakau 1992:67-69), his ancestral homeland (William 1919:121). Ke-ku-i-ipo-iwa (II) was the daughter of *Kehela* and *Hi'a'e*. Kamehameha's father was *Koua*, younger brother of *Ke-lani-'opu'u*. Because of her weakened condition, Ke-ku-i-ipo-iwa did not accompany the Alapa'i expedition to Maui. The infant Kamehameha was placed in the charge of *Nae'ole* and his younger sister *Ke-lu-nui's* *leimoku* until he was five. He was then returned to Alapa'i who placed the child in the care of his wife, *Ke-aka* (Kamakau 1992:68-69).

Before Alapa'i reached Maui, a dying *Ke-kau-like* [Ke-lani-ku'i-*boon-i-ka-moku*] made his son Kamehameha his successor. *Ke-kau-like* died enroute to *Kala* (Kamakau 1992:69). When Alapa'i heard of his death, he decided not to make war on his sister's son. While visiting them on Maui Alapa'i heard that the O'ahu chiefs attacked his relatives on Molokai, so he went there to help (Kamakau 1992:70).

Alapa'i was said to have been a good ruler and loved by the common people, but his rule had come about by slaying *alii'iwa* *Ke-lani-nui-i-a-mamao* (father of *Kalan'i-'opu'u* and *Koua*) and his brother *Ke-lani-ti'e-a-moku*, *riipoini alii'iwa* of Hawaii island, and taking control. This would be the cause of several battles between Alapa'i and his nephew, *Kalan'i-'opu'u* (Kamakau 1992:75-78).

In 1754 Alapa'i became ill and moved to *Kihiko'i* in *Kawaihae*. As his illness progressed "a *Kihiko'i* in the *Moai* of *Makikiini*, *Kawaihae*, he appointed his son *Keawe-opala* to be ruler over the island" (Kamakau 1992:77). However, this was short-lived due in part to shifting allegiances of *Keawe-opala's* chiefs (i.e. his relative *Ke-taumoku*) and *Keawe-opala* to go with *Kalan'i-'opu'u*. "A canoe arrived from *Kahala* and brought word to *Ke-taumoku* that *Ke-lani-'opu'u* was at *Kapiliua* (in south Kona) and was coming to make war against *Keawe-opala*. *Ke-taumoku* therefore made up his mind to join forces with *Ke-lani-'opu'u*" (Kamakau 1992:78). It was that same year that *Kalan'i-'opu'u*, a lover of war, became *alii'iwa* of Hawaii island (Kamakau 1992:78-79). *Kalan'i-'opu'u* was the son of *Ke-lani-nui-i-a-mamao* (*nui-iwa* chief of *Ke'u* whose *Kuwai'i'oo* was composed for) however, his biological father was said to be *Pele-i-badani alii'iwa* of *Ohua* (Kamakau 1992:110; see also 'I'i 1983). About 1759 *Kalan'i-'opu'u* conquered East Maui from his wife's brother the Maui king *Kamehamehanui* (son of *Kakauike*) by using *Hua's* prominent *Pu'o* *Ke'u'ihi* as his fortress. He appointed one of his own Hawaii chiefs, *Puna*, as governor of *Hua* and *Kipohulu*. "Many chiefs from Hawaii at this time settled on Maui, some of them grand-children of *Keawe*" (Kamakau 1992:79-80).

Conflict between Hawaii's chiefs continued. *Ke-taumoku*, son of *Keawe-poo-poo* rebelled against *Kalan'i-'opu'u* and set up a fort at *Poloa* and *Hooakao*. He was attacked by *Kalan'i-'opu'u* so he moved to Maui. In 1766 Maui *alii'iwa* *Kamehamehanui* became ill in *Hua* and ceded his lands to his younger brother *Ke-hekili-nui-Ahi-mama* (*Kahikili*), a fierce warrior and "manipulator." Following the death of *Kamehamehanui*, *Ke-taumoku* "married" his widow *Nimabana*, a cousin of *Ke-nui-aka*, *Kamehameha* (Kamehameha I). Their daughter *Ke'uhumana*, would later become a favorite wife of *Kamehameha I* (Kamakau 1992:79-84, 309).

Between 1773 and 1779 fighting continued between *Kalan'i-'opu'u* and *Kahikili*. In 1775 *Kalan'i-'opu'u* and his *Hua* forces raided and severely destroyed the neighboring *Kaupo* district, before continuing several more raids on *Molokai*, *Lana'i*, *Kaho'olawe* and parts of *West Maui*. It was at the battle of *Kaleoaka* (the *Kamehameha*, nephew and favorite warrior of *Kalan'i-'opu'u*, was first recognized as a great warrior and given the name of *Pai'ea* (hard-shelled crab) by the Maui chiefs and warriors (Kamakau 1992:84). *Kalan'i-'opu'u* returned again to Maui in 1776, but was severely defeated by *Kahikili's* warriors.

In January 1778 Cook landed in *Waimea*, *Kauai* and the culture of old Hawaii began its spiraling change (see Day 1992). Cook left Hawaii for several months, but returned later in the year. *Kalan'i-'opu'u* was fighting *Kahikili's* forces in *Waialua*, Maui on November 19, 1778 when Cook's ship was sighted on his return trip to the islands. *Kalan'i-'opu'u* visited Cook on the *Resolution*, while *Kahikili* visited *Clare* on the *Discovery* (Kuykendall and Day 1976:16).

From *Kohala*, *Kama-lala-wala* set forth for *Kawaihae*, and found no one there. The people had gone up to *Waimea*, for all observed the services at the *heiau* of *Makikiini*. Only those of *Lower Kawaihae* and *Puako* remained. The battlefields was at *Waimea*. *Kama-lala-wala's* counsellors said, "Waimea is not a battle site for strangers because the plain is long, and there is no water.... It is better to go to *Koua*..." (Kamakau 1992:58).

*Kama-lala-wala* did not take heed and littered instead to two old men of *Kawaihae* who gave him false information and suggested that he cut up his canoes before heading up to *Waimea* so that Maui warriors would not be tempted to retreat to Maui. Then they headed for the plains of *Waimea*. When they got there they looked back to watch the sea and saw the men of *Koua* advancing toward them.

The lava bed of *Kauiki* and all the land up to *Hi'ehi'e* was covered with men from *Koua*. Those of *Ka'u* and *Puna* were coming down from *Muana Kea*, and those of *Waimea* and *Kohala* were on the level plain of *Waimea*. The men covered the whole of the grassy plain of *Waimea* like locusts (Kamakau 1992:58).

The battle of *Pu'o* *o'ohu* commenced just outside these plains. The light-weighted lava rocks here contributed to the defeat of the Maui warriors who were used to heavier water-worn rocks. The Maui warriors retreated; some to *Kawaihae*, others to *Kohala*. And because of the lack of canoe, very few escaped alive. *Ke-ahi-a-Kama*, son of *Kama-lala-wala* who was killed on the plain of *Puako*, escaped to *Kahala*, found a canoe and fled to Maui. He was saved by *Hua*, the foster son of *Loon-i-ka-makihiki*. Many of the chiefs of *Koua* were relatives of *Ke-ahi-a-Kama* through his mother *Ke-ahi-kini-aka* (Kamakau 1992:59-60).

After the death of Hawaii Island *alii'iwa* *Loon-i-ka-makihiki*, his children did not succeed him and Hawaii Island was divided into smaller divisions (Kamakau 1992:61-63). The descendants of *Kaunaloa-tua'ana* (*Keawe*, *Ke-taumoku*, *Kalan'i-'opu'u* and *Koua*) later ruled *Kohala*, *Koua* and *Ka'u*. The descendants of *Keawe-nui-a-Umi* ruled *Hilo* and *Hanalei*. This was not a peaceful period. The chiefs of *Koua* and *Hilo* fought each other for the various resources each area had. These wars lasted for several decades with the *Hilo* chiefs usually defeating the *Koua-Kohala* chiefs, especially during the reigns of *Kur'ana*, *Kahur'ia*, *Ke-lani-ku-kau-i-ai'a* and *Moku*. *Ke-aka-mahana* (w) was the ruler of *Koua* during the wars with *Hilo*.

The rulers of *Koua* who succeeded *Ke-aka-mahana* were her daughter *Ke-ahi-lani* and her son, *Keawe* (*Ke-awe-i-kekahi-alii-o-ka-moku*)...*Ke-ahi-lani* was the ruler of *Koua* and *Kohala*. The *Mahi* clan were the war leaders, that is they were in charge...But the chiefs of *Hilo* were always victorious over those of *Koua*...after they won the bank of *Hi'ehi'e* the secret places and burial caves in *Koua* were broken open... In the bank of *Mahiki*, *Ke-lani-ku-kau-i-ai'a* and *Moku* were the chief war leaders of *Hilo* (Kamakau 1992:61-63).

After *Moku* the *Hilo* chiefs ceased to reign. *Kohala alii'iwa* *Keawe's* half sister *Ke-lani-kau-ke-ke-lani* was the mother of *Alapa'i-nui-a-Ke-aka*, who went to live on Maui with his half sister, *Ke-kai-i-ipo-iwa-nui* (wife of *Ke-kau-like*, Maui *alii'iwa*) after his father's (*Ke-aka-nui-a-Mahi*) death at the hands of the *Hilo* chiefs in the battle of *Mahiki*. When *Alapa'i* heard of *Keawe's* death and the unrest between the district chiefs, he went back to Hawaii Island with plans to make war on all the chiefs. He captured the chiefs of *Kohala* and *Koua*, and became ruler of those districts. However, when his brother-in-law *Ke-kau-like* heard about *Alapa'i's* victory, *Ke-kau-like* made war on *Alapa'i* in order to return *Kohala* and *Koua* to their chiefs. He wasn't successful, but *Ke-kau-like's* warriors prevented *Alapa'i* from conquering the *Hilo* and *Ka'u* chiefs (Kamakau 1992:64-65). During these battles a lot of damage was done on the landscape.

The fighting began with *Alapa'i* at *Koua*. Both sides threw all their forces into the fight. *Ke-kau-like* cut down the trees throughout the land of *Koua*. Obligated to flee by canoe before *Alapa'i* he abused the country people of *Kahala*. At *Kawaihae* he cut down all the coconut trees. He slaughtered the country people of *Kohala*, seized their possessions and returned to Maui (Kamakau 1992:66).



During this same year the *Elizaveta*, a fur-trading vessel arrived at Kealahou Bay, as did the *Fair American*, which accompanied the *Elizaveta*. Everyone on board the *Fair American* was killed except for crewmember, Isaac Davis. As the attack was going on, Elizaveta's boatwain John Young was on shore trading for supplies. Fearing retaliation by the crew of the *Elizaveta*, Kamehameha detained Young and allowed his ship to sail without him. Kamehameha took both Davis and Young under his care (Kuykendall 1993:24-26 in Rosenzweig & Carter 1988:20).

Young later served as Governor of Hawaii Island (1802-1812) and maintained a residence at Kawaihau, located between Makaha and Makahaia gulches (Allen 1987:15).

Kamehameha, one of the North Kona chiefs on Hawaii, however, had previously been insulted by Metcalf and vowed revenge on the next ship that passed his way. By coincidence, it happened to be the *Fair American*, seeking land near Kawaihau Bay. The opportunity to avenge his insult by fortifying the defenseless state of the vessel due to its small crew and inexperienced commander, and the value of the muskets and other iron implements on board sealed the vessel's doom. Metcalf and his crew were either killed or drowned. The only survivor was Isaac Davis, who, although wounded, jumped overboard and managed to reach a native canoe, whose occupant clubbed him into submission but for some reason spared his life. The *Fair American* was hauled ashore and Kamehameha later appropriated it, its guns, ammunition, and other articles of trade, as well as Davis himself (Rhodes 1993: Chapter III).

By 1790 Kamehameha I had gained enough control of the island of Hawaii that he could leave to join the war party on Maui. Kamehameha also had at his disposal western weapons, and an armed schooner (n.a. 1967:5). Kamehameha brought a canoe from the *Elizaveta* along with the expertise of Isaac Davis and John Young, who were now advisors and *eilane panakale* (favorites) of Kamehameha I (Kamakau 1992:147-148).

Finding their lives secure, and being watched closely and unable to escape, Young and Davis became reconciled to their lot. Their fortunes became quickly and closely linked to those of the king. They would play a significant role in Kamehameha's rise to dominance, and Young, especially, who quickly gained the king's trust and became his principal advisor, would be visited, consulted, or at least mentioned by every visitor to the islands for the next forty years (Rhodes 1993: Chapter III).

"At Kawaihau and Kealahou, Young and Davis built up an army and navy for Kamehameha along European lines, introduced firearms to Hawaiian warfare, and directed their use in Kamehameha's conquest of Maui, Lanai and Moolokai" (n.a. 1967:5). His canoe fleet "beached at Hana and extended from Hana to Kawapapa" to battle Kalanikoupele, son of Kamehameha (who now ruled Oahu). After several battles along the East Maui coast, Kamehameha's forces reached Wailuku where the "great battle" took place. This would be the beginning of the end of independent ruling chiefs because of the inequity of battle strategy and weaponry (Kamakau 1992:147-148).

Back on Hawaii Island in 1790, Keoua Kuahu'u (twin brother of Keoua Pe'e'a, sons of Kalanikoupele and Kamehameha) navigated Kamehameha's birthlands of Kohala. At the advice of Keoua-tahi, a *kahuna* from Kauai (Kelly 1974:6), Kamehameha personally helped to construct the heiau Pu'u Kohala in the summer of 1791, to ensure his victory over his cousin, Keoua Kuahu'u, who was sacrificed at the heiau (Day 1984:77; Kamakau 1992:194-197). John Young reportedly noted that "Kamehameha offered 11 human sacrifices at the dedication of the heiau. The principal offering was the body of Keoua Kuahu'u" (Lopie & Sharp 1994:1). Pu'u Kohala Heiau is said to have been a reconstructed older heiau from the time of Lonoikamakahiki (c. 1580) and Kama and "consecrated by Lono" (Kelly 1974:6). Kamehameha thought first of re-constructing Mailekini Heiau, which was on the slope of a hill named Pu'u Kohala, but his chief *kahuna* advised him to build a new one at the top of the hill instead.

"Kamehameha may have rebuilt an abandoned heiau there or constructed a new one, but the heiau platform he built in 1791 still dominates...Kawaihau" (n.a. 1967:6). "...the common people came in relays from all parts of Kamehameha's dominions to carry stones for the walls and platforms of the heiau. The

When Cook sailed into Kealahou Bay on January 17, 1779, Kalani'opu'u was still fighting Kamehameha. At this time Kamehameha's brother, Keoua-tahi was ruling chief of Kauai; Keoua-tahi was ruling chief of Oahu and Moolokai; Kamehameha was ruling chief of western Maui, Lanai and Kahoolawe; and Kalani'opu'u was ruling chief of Hawaii and Hana (Kamakau, 1992:84-86, 92, 97-99). On January 25, Kalani'opu'u visited Cook again at Kealahou Bay, presenting him with several feather cloaks. In February Cook's plan to kidnap Kalani'opu'u as a hostage was thwarted and Cook was killed following a skirmish over a stolen canoe (Kuykendall and Day 1976:18).

Lieutenant King made the following observation when they entered Kawaihau Bay February 6, 1779:

Although the northwestern part of the bay which...is call'd Toe-yah-yah looks green and pleasant, yet as it is neither wooded or hardly any signs of culture, and a few houses. It has certainly some defect, and does not answer the purposes of what the natives cultivate (Beaglehole 1967:525 in Allen 1987:14).

A month later King made the following observations:

Along the NE side of the bay close to which we sailed [sic], it is very little cultivated, & we saw but few houses; the Peoples appearance shew'd that they were the lowest Class that inhabited them (Beaglehole 1967:608 in Rosenzweig & Carter 1988:19).

The off and on warring between the Hawaii and Maui forces continued, but Kalani'opu'u was signing Kalani'opu'u's schemed for peace by having his son Kiwala'o by Kalola, sister of Kamehameha, and their twin half-brothers, go to Kamehameha, who had the battles cease (Kamakau 1992:88-89; Debra 2000:49-50). Kalani'opu'u declared his young son Kalani'uni-ke-a-ouli Kiwala'o to be his heir; to his nephew Kamehameha he gave the war god, *Kauka'ili-moku* (Kamakau 1992:107). But even before the death of Kalani'opu'u in 1772, chiefs and *kahuna* were already taking sides between Kiwala'o and Kamehameha.

Kamehameha and a few other chiefs were concerned about their land claims which Kiwala'o did not seem to honor, so after usurping Kiwala'o with a sacrificial ritual, Kamehameha retreated to his district of Kohala. While in Kohala, Kamehameha farmed the land growing taro and sweet potatoes (Handy and Handy 1978:331). After Kalani'opu'u's death civil war broke out and the war between Maui and Hawaii also continued (Kuykendall and Day 1976:23, 24; Handy and Handy 1978:328; King 1990).

In 1781, after Kamehameha heard about the death of Kalani'opu'u, Kamehameha split his forces and sent them through Maui's south-eastern Kawapo Gap and the north-eastern Ko'olau Gap into Hana. After demonstrating and diverting the supply of spring water to Pu'u Kaw'iki, the Hawaii chiefs were finally defeated, and the Maui *alii'uni* regained control of Hana in 1782 (Kamakau, 1992:84-86; 115-116; Fornander 1900:Vol II 146-7, 150, 216). Following his Hana victory, Kamehameha went on to gain control of all the islands except Hawaii, by trickery and warfare (Kamakau 1992:116, 128-141).

Kiwala'o (Keopohohani's father) was killed in 1782 (Cahill 1999:62), but the warring between the forces of Hawaii Island districts continued. Demographic trends during the early historic period indicate a population reduction in some areas, yet show increases in others, with relatively little change in material culture (Kirch 1985:308; Kent 1983:13). There was a continuum of craft and status material, intensification of agriculture, *alii* (chief) controlled aquaculture, upland residential sites, and oral records which were rich in information. The Ko'ouli, along with its *huahine heiau*, and the *kapu* (restriction or regulation) system were at their peak, although western influence was already altering the cultural fabric of the islands.

In 1790, when Captain George Vancouver made his first stop in the Hawaiian Islands he was told that Kalani'opu'u was dead; Hawaii was ruled by Keoua Kuahu'u (half-brother of Kiwala'o), his uncle Keawe-nau-ili, and Keoua's cousin, Kamehameha (Day 1984:77). Vancouver went on to trade with Kamehameha in Waikiki. He then found that the ruling chief of Kauai, Ka-uni-uli'i, was a mere child; his father Ke'eo was on Maui with Kamehameha. Vancouver also noted a decrease in the population and the number of chiefs since the arrival of Cook (Kamakau 1992: 162-163).

workers are said to have camped by thousands on the neighboring hillsides" (n.s. 1967:7; see also Formander 1996:328 [2]). "John Young later told Waimea's missionary Lorenzo Lyons that he had seen thirteen humans sacrificed on the altar of Pu'uhoholi during the ceremonies" (n.s. 1967:7).

Tradition holds that the present heiau on the "hill of the whale" overlooking Kawaihe Bay is located on the site of an earlier temple structure. Folklore centering around one of King Loonohamakahiki's battles with his enemies on Hawaii, at Kawaihe, as recounted by Formander, mentions Mailekini and Hahakapuani and alludes to Pu'uhoholi as a strategic point that the rebels hoped to occupy. There is a brief mention of a temple at Pu'uhoholi, but no physical description [233]. Formander makes two references to human sacrifices on the hill. First, he states that the rebel forces encamped at Hahakapuani, who planned to occupy Pu'uhoholi and throw rocks down on the forces of Lono, "would not second Pu'uhoholi unless a man on the side of Loonohamakahiki should be slain; then only would Pu'uhoholi be scaled for human sacrifices" [234]. He also relates that "This battle of Loonohamakahiki at Pu'uhoholi was named the Kawaihe, because of the night strategy successfully executed by him on that occasion. Kanaloapulehu, having been made prisoner, was killed and laid upon the altar (heiau) [235]. We can only surmise that this means the altar of a temple on top of the hill. After winning his battles, Lono conducted religious services at certain temples in thanks and celebration; one of these observances was held at Pu'uhoholi (Greene 1993: Chapter VII).

"At the time of the dedication of Pu'uhoholi heiau in 1791, the coastal region from Kawaihe to Pu'uhoholi supported a sizable Hawaiian population" (n.s. 1967:8). [Note: During Formander's time, someone who carried the stones was still alive and talked to him about it (Kelly 1974:6)].

After the death of his older brother (Kiwaia-6) Keoua lived in Ka'u, successfully fighting off Kamehameha's general. Following the new strategy, Kamehameha sent Keoua's wife, Keawehehu and Kamaeawa, to convince Keoua that Kamehameha was offering him a truly respectful peace. Apparently unimpressed at first, Keoua consented to go with them, but at some point on the trip to Kawaihe he evidently suspected he was being led into a trap. His canoe landed briefly at the sacred place of Luahihewa near Kiholo. There, in the beautiful fresh-water pool, he bathed.... After bathing he cut off the end of his... *owei o*, an act which believers in sorcery call "the death of Ulu" and which was a certain sign that he knew he was about to die.... "The death of Ulu" refers to death caused by the vengeance of the sorcerer, since Ulu is the goddess worshipped by sorcerers. The part cut off is used for the purpose of sorcery so that those who do a man to death may themselves be discovered and punished.... Just as Keoua was stepping from the canoe onto the beach at Kawaihe, Keawehehu and the other chiefs of Kamehameha's forces attacked him and the occupants of his canoe (Kamakau 1961:156-157 in Kelly 1974:7).

[Note: At Kawaihe today a different version is told. Keoua is said to have been shot and killed by John Young and Isaac Davis who stood a short distance back from the water's edge below Mailekini Heiau. This area now is known as Pelekani, meaning Britain or British, because of Young and Davis' action taken there (Kelly 1974:7)].

Two other significant heiaus near Pu'uhoholi are Mailekini Heiau located west and downlope from Pu'uhoholi; and Hale O Kapuni, dedicated to the shark *aumakua*, which is located west and off shore from the two land heiaus.

Mailekini Heiau is said to relate to "inter-chieftain and inter-island warfare of the period before 1760 when it served as the principal temple of the ruling chief of Kohala" (Apple 1969:23). Mailekini continued to be important into the historic period, being restored by Kamehameha I contemporaneously with construction of Pu'uhoholi Heiau (Soehren 1964:11). Offshore from Mailekini is the location of a third heiau known as Hale O Kapuni. Reportedly Hale O Kapuni was associated with sharks, and remains of human sacrifices from Mailekini were placed here to feed them (Davies in Soehren 1964:12; Apple 1969:17-19). Soehren reports the structural portion of the heiau has been largely obliterated by tidal waves and siltation connected with construction of the harbor, but local resi-

denis continue to sight sharks in the general area. Of... note is the former residence of Kamehameha II, which was located near the beach, just below Pu'uhoholi Heiau (Allen 1987:16).

Hale O Kapuni is mentioned in the *Story of Loonohamakahiki* as the place where all the chiefs camped; it was located immediately below the temples of Pu'uhoholi and Mailekini at Kawaihe (Formander 1971(4):324 in Kelly 1974:27). [Note: Kelly (1974) mentions that in a visit to Kawaihe, resident Eddie Lass Sr. pointed out where the heiau, which is no longer visible, was located. It is now covered with silt that washes down from the coral fill. At least three white-tipped sharks circled in the vicinity that afternoon. Lass also stated that the "chair" of Kamehameha was not a chair, but a place Kamehameha used to "rest his arm on while standing on land, watching the sharks circle in the vicinity of Hale-o-Kapuni below" (Kelly 1974:27)].

On his second voyage to Hawaii in 1793, Vancouver counseled the chiefs to stop making war on each other. He gave Kamehameha some cows and sheep (at Vancouver's advice Kamehameha put a ten-year *kapu* on them). Vancouver went on to visit Kakekili in Lahaina and made the same request; then on to Waikiki to Kalaupapa.

Young and Davis became an integral part of this early period of modern Hawaiian civilization, and for their efforts Kamehameha rewarded them by making them high chiefs and endowing them with large tracts of land on which they settled and raised families. This property was given particularly for their services in helping conquer the islands of Hawaii, Maui, Molokai, and Oahu. [23] The land given to Young included Mailekini and Pu'uhoholi heiaus. Near their homes in Kawaihe, Young and Davis raised fruits and vegetables new to Hawaii from seeds procured from foreign ships. Their residence in this area made it a required port of call for sea captains who had to obtain Young's blessing before conducting business with the Hawaiian government. In 1793 Vancouver landed the first cattle in Hawaii at this spot (Rhodes 1993: Chapter III).

In 1810, Isaac Davis died and it was left to Young to carry on; he acquired the nickname "Obobaha" which was a Hawaiian equivalent to sailor's cry "All hands!" He also adopted Davis' six children, raised them as his own, and held Davis' estate in trust for them (n.s. 1967: 9, 11).

Davis served as governor of Oahu during the early years of the nineteenth century. In 1810 he negotiated terms of peace for Kamehameha with Kaumualii, the king of Kauai, bringing that island under Kamehameha's dominion. When Kaumualii journeyed to Honolulu on board a foreign vessel to see Kamehameha, some lower chiefs conspired to kill him and proposed to Kamehameha that a sorcerer perform this deed. The king refused and even had the sorcerer slain. The chiefs then hatched a plot to kill Kaumualii secretly as he journeyed into the interior. Learning of these plans, Davis warned Kaumualii to return on board ship. Shortly thereafter, Davis died by poisoning, possibly in retaliation for this act of loyalty to Kaumualii [30]. Davis's grave is located at Kawaihe (Rhodes 1993: Chapter III).

After the conquest of Oahu, Young was designated governor of Hawaii Island, an office that primarily involved superintending tax gathering for the king. He governed Hawaii from his home at Kawaihe from 1802 to 1812 while Kamehameha attended to royal business on other islands; Young later became the resident chief of Kohala, with frequent assignments to Honolulu and elsewhere (Rhodes 1993: Chapter III).

Coastal Kawaihe was developing into an important provisioning "port-of-call" by the early 1800s with sweet potatoes, yams and a variety of other crops, which were cultivated in the vicinity, particularly the uplands. By the mid-1800s ranching became a flourishing economic factor in the Kohala and North Kona areas with cattle being shipped out of Kawaihe (Rosenzweig 1993:11).

Kawaihe's principal articles of trade in the period were salt and sweet potatoes, timber for ship repair, high quality tapa...boys, fowl, lard, sugar cane, breadfruit, melons, co-

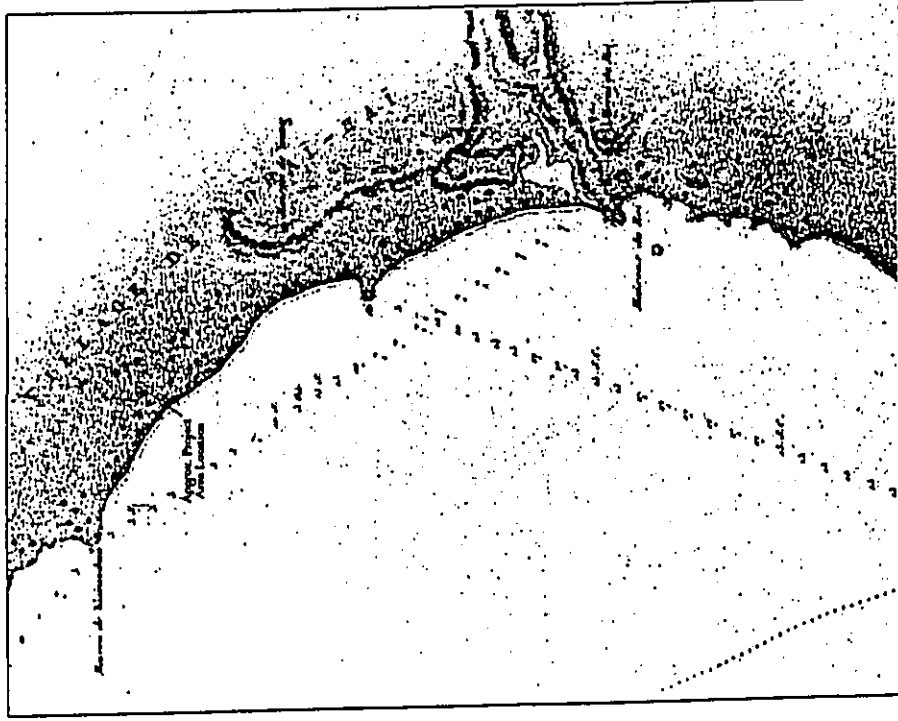


Figure 5. Portion of Duperrey's 1819 Map of Kawaihine

coconuts and bananas. Vessels replenished their water stores from either stream or springs. Among his private enterprise, Olohana conducted a thriving canoe-making venture and supervised the land he had received as a gift from Kamehameha which included the two *chupana's* of Ouli and Kawaihine 2<sup>nd</sup>. Young modified Malitini *kelehu* to serve as a protective fort for Kawaihine. Eyewitness accounts describe the fort as being mounted with twenty-two guns and had the appearance of the broadside of a European warship (L.A. 1967:12).

As business agent for Kamehameha, as well as chief of the area, Young supervised the trade with ships at this port, where local salt and sweet potatoes, lumber for ship repairs, hogs, fowl, taro, sugar cane, breadfruit, muskmelons, coconuts, and bananas were traded for nails, iron, and finally, at Young's suggestion, for more sophisticated types of goods. A lucrative sandalwood trade also originated here; with Young supervising from his home the measuring and loading of trees. Young was involved in, or witness to, most of the significant events in the early years of the Hawaiian kingdom (Roberts 1993: Chapter III).

In 1815 John Palmer Parker, an ex-seaman, made his home at Kawaihine where he began hunting cattle that roamed the slopes of Mauna Kea. By this time the Vancouver's cattle of 1793 had increased to destructive numbers and Parker was hired to thin the wild herds. Since people had not yet developed a taste for beef, Parker salted the meat with Kawaihine salt and tanned the hides to trade with ships that stopped at Kawaihine. He later built pens to confine the cattle and horses (L.A. 1967:14-15).

An 1819 map by Louis Duperrey during the Freycinet expedition (Figure 5), indicates 75 to 80 huts along Kawaihine Bay, stretching from Makahina Gulch in the south to the present Kawaihine lighthouse in the north and showing houses laid out in three rows running parallel to the coast and extending inland to roughly 40 to 50 feet in elevation. The map indicated the location of John Young's house, as well as that of Liholiho and Ke'eumoku (Kooemahu) and Carter (1982:23). Four years later Reverend William Ellis (1963:399) estimated the number of houses at Kawaihine Village to be around 100<sup>+</sup> (Allen 1987:14).

Kamehameha I died on May 8, 1819 in Kailua-Kona and once again the culture of Hawaii was to change radically.

On the morning after his father's death, Liholiho left Kailua, which had been defiled by death, for Kawaihine in Kohala, as was the custom. During his absence, as was also the custom, the population committed all kinds of excesses, breaking the *kapu* with impunity. Although the usual mourning ceremonies on the death of a king took place, no sacrifices occurred to provide the old king with companions in the next world. During this mourning period, the dead chief's bones were secreted in a cave, the traditional action that finally disassociated the mandate to rule from the dead king so that his heir could re-establish it on his return to the area. After the requisite ten days of seclusion had passed, Liholiho returned to assume power, at which time he was also supposed to re-establish the *kapu* system, something he did not do. Instead he left again for Kawaihine in the Kohala district, where he took up residence until October, probably hoping to avoid having to make some important decisions concerning land redistribution, requests by the *alii* to share in the sandalwood trade, and whether or not to break the *kapu*, an action he knew Ka'ahumanu and others favored (Grease 1993: Chapter V).

After Kamehameha's death, a degree of unrest existed among some of the principal chiefs regarding several economic matters, including the king's monopoly of the sandalwood trade. This tension in the political situation disturbed the elderly Young, who retreated to Freycinet to stress to the Hawaiians that peace and unity were essential for the future of the country and could only be attained by continuing loyalty to the Kamehameha dynasty. De Freycinet's draftsman, Jacques Arago, noted that this request of Mr. Young's could only have been dictated by generosity of sentiment; personal interest had no share in it; the poor old man has but a few days to live; extended on a bed of sickness, he perceives

the rapid approach of death, and, little regarding his own suffering, his last prayers are offered up for a country, which the beneficence of Tumecameah makes him grieve to leave a prey to the factions which are about to divide it (Roberts 1993: Chapter III).

Six months after his death, his son and successor Liholiho, met with Kūhūnua and Kūmānuu, and a council of chiefs and chieftesses at Kawaihewa. His advisors, which included his father's *kohuna* (heavens), convinced the new king Kamehameha II to abolish the *kapu* system. He signified his agreement by sitting down and eating with his mother Keōpūolani, breaking the *ʻāi kapu* (Oliver 1961:260; Kuykendall and Day 1976:41; Kamakau:1992:222-223).

Liholiho's cousin Kamehameha, caretaker of the war god Ku-Kailiimoku, disagreed with the new edict and revolted. By December of 1819 the revolution was quelled. Kamehameha II sent edicts throughout the kingdom renouncing the ancient state religion, ordering the destruction of the *Ahioa* images and the *Ahioa* structures to be destroyed or abandoned and left to deteriorate, allowing the personal family religion, the *ʻaumakua* worship, to continue (Oliver 1961:260; King 1990; Kamakau 1992:222-223).

During this period, the sandalwood trade was wreaking havoc on the commoners who were weak-coming with the heavy production, expense, and famine just to fill the coffers of the *aliʻi* who were no longer under any control constraints (Oliver 1961:261; Kuykendall and Day 1976:42; Bushnell 1993:212). On a stopover in the Kohala district in the early 1800s Ellis wrote the following:

About eleven at night we reached Towaihāe (Kawaihewa), where we were kindly received by Mr. Young. Before daylight on the 22nd, we were roused by vast multitudes of people passing through the district from Waimea with sandal-wood, which had been cut in the adjacent mountains for Kailiimoku, by the people of Waimea, and which the people of Kohala, as far as the north point, had been ordered to bring down to his storehouse on the beach, for the purpose of its being shipped to Oahu. There were between two and three thousand men, carrying each from one to six pieces of sandalwood, according to their size and weight. It was generally tied on their backs by bands of li leaves, passed over the shoulders and under the arms, and fastened across their breasts... (Kuykendall and Day 1976:42, 43, Ellis 1984:397)

The lack of control of the sandalwood trade was to soon create the first Hawaiian national debt as promissory notes and levies were initiated by American traders and enforced by American warships (Oliver 1961:261, 262). "In the 1820s, the sandalwood trade was at its peak and every tree found was cut for its value. The forests of Kohala, which reached almost to the Kawaihewa shore as late as 1815, contained an abundance of the coveted wood, presumably the *dry land species*" (n.a. 1967:16).

In 1825, Kūhūnua-nui Kūmānuu (King Kamehameha III was just a child) placed a *kapu* on cutting sandalwood trees. She saw what it was doing to the people; neglecting their crops and fishing and getting into debt (Brennan 1995:48). This was too late for Kawaihewa. In 1820 the missionaries on the *Thaddeus* noted the "green slopes of Kohala" on arriving at Kawaihewa; by 1832 missionary Lorenzo Lyons remarked that Kawaihewa was "about as desolate a place as I have ever seen, nothing but barrenness, with here and there a native hut," and "scarched, withered and desolate Kawaihewa...Between the denuded forest, and the wild cattle ravaging any re-growth, a growing community in Waimea diverted the streams, forever changing the Kohala forward landscape and climate" (n.a. 1967:18).

Beef became a barter item (Brennan 1995:48), and in 1832, Kamehameha III sent a high chief to California to bring some *vaqueros* back to Hawaii to help with the training of horse and cattle handling. Although the cattle were being slaughtered by the thousands for their hides and tallow, their numbers were increasing beyond belief. Over 100,000 wild cattle were roaming the mountains of Waimea alone. Many crops were ruined by the herds of cattle (Brennan 1995:51-54). The solution was for the *vaqueros* or *poniolo* as Hawaiians called them, to first train Hawaiian and *kaōke* men to be good herders or wrangler or cowboy (*poniolo*). This was the beginning of Hawaii's cattle kingdom (Brennan 1995:70). Paniolo Jack Puddy and John Putter, Kamehameha III's chief cattle killer, partnered to furnish the king with badly needed beef for bartering with foreign ships (Brennan 1995:74).

In the mid-1800s Kawaihewa was a popular anchorage for foreign vessels. Hawaiian chiefs

were actively involved in foreign trade, and food, sandalwood, firewood, *palms*, and fresh water were exchanged for imported goods (Kelly 1974:36-77). These items were generally brought from areas outside Kawaihewa, but salt was one important trade good produced locally. A well-developed salt manufacturing system was maintained near the beach and each salt pan was said to be named (Kelly 1974:33-34). Apparently salt was an important traditional exchange item for Kawaihewa residents as well, being traded to Kona and other parts of Kohala for food and *lupa* (Barritt 1983:30 In Allen 1987:15).

The Hawaiian culture was well on its way towards Western assimilation as industry in Hawaii went from the sandalwood trade to a short-lived whaling industry, to cattle ranching, and the more lucrative, but incursions sugar industry. Sugar cane was grown on all islands and when Cook arrived, he wrote of seeing sugar cane plantations. The Chinese on Lanai are credited with first producing sugar as early as 1807. However, it was not until 1835 that sugar became established commercially, primarily to replace a waning sandalwood industry (Oliver 1961:263; Kuykendall and Day 1976:92). 1835 was also the year that John Olohana Young died at the age of 93 in Honolulu where he is buried at the Royal Mausoleum (n.a. 1967:19).

In the 1840s a political act of the Hawaiian Kingdom government would change forever, the land tenure system in Hawaii and have far-reaching effects. The historic land transformation process was an evolution of concepts brought about by fear, growing concerns of takeovers, and western influence regarding land possession. King Kamehameha III, in his mid-thirties, was persuaded by his *kūhūnua* and other advisors to take a course that would assume personal rights to land. One-third of all lands in the kingdom would be retained by the king; another one-third would go to *aliʻi* as designated by the king; and the last one-third would be set aside for the *maoʻiʻanoa* or the people who looked after the land. In 1846 he appointed a Board of Commissioners, commonly known as the Land Commissioners, to "confirm or reject all claims to land arising previously to the 10<sup>th</sup> day of December, AD 1845." Notices were frequently posted in *The Polynesian* (Moffat and Kirkpatrick, 1993). However, the legislature did not acknowledge this act until June 7, 1848 (Chinen 1938:16; Moffat and Kirkpatrick 1993:48-49), known today as *The Great Mahele*. In 1850, the Kingdom government passed laws allowing foreigners to purchase fee simple lands (Speakman 2001:91).

The 1840s also heralded other changes as well. The Hawaiian government, with the aid of the missionaries, encouraged the sugar industry as well as other enterprises such as coffee, cotton, rice, potatoes, and silk worms (Speakman 2001: 93). Substitution crops were ruined by displaced dirt and dust, natives were being asked to grow sugar cane on their lands in exchange for money, only to find themselves indebted, and forced to surrender homelands; land-use disputes between natives and other cultures ensued; and restrictions on government lands prevented subsistence hunting and gathering. Subsistence-based culture was eventually lost with the escalating dependence on purchased goods and the growing dependence related to sugar production (Tunouari-Fuggle 1988:50, 51).

During the Great Mahele, Kawaihewa 2 was given to John Young (LCA 851511). Kawaihewa 1 was retained as government land. This Land Commission Award (LCA) and subsequent *kūhūnua* claims in Kawaihewa 1 and 2 are listed in Table 1. The locations of all awarded parcels are shown in Figure 4.

The Waipona 'Aina (2000) Mahele Database, which is a compilation of data from the Indices of Awards (Indices 1979), Native Register (NR n.d.), Native Testimony (NT n.d.), Foreign Register (FR n.d.) and Foreign Testimony (FT n.d.); lists twenty-two claims for 56 parcels within Kawaihewa 1 and 2. Seventeen parcels were awarded to 15 claimants. There are no LCAs within the project area. The awarded *kūhūnua* parcels, except for the unusually large award to Kauhāhi (LCA 2409, 34.58 ac), range from 0.06 to 5.2 acres in area with an average of 1.33 acres. These awards consisted of two parcels and the rest consist of a single parcel.

The testimonies refer to fourteen *ʻāi* land divisions. Only one, Makaha, is mentioned twice. Most of the awarded parcels are concentrated in at the coast. Three inland parcels are situated between 2,700 ft and 4,000 ft elevation. LCA testimony mentions fourteen lots with at least 31 houses. Seven houses lost were enclosed. Nine parcels are described as cultivated; however, no specific crops are named. The testimony describes a pier and warehouse (LCA 4884) owned by William French, 20 salt pans or beds, a chapel, and two animal pens for horses, goats, and cattle owned by L.B. Lincoln, a leather tanner.

RECEIVED AS FOLLOWS

Table 1. Land Commission Award Claims In Kawaihae (cont.)

LCA	Claimant	Address (Mileage)	Address (Acres)	Other (Acres)	Archieve #	#	Section No.	Land Use	Boundary Status	Boundary Name	Boundary Detail	Boundary Name	Boundary Detail	Class (Acres)	Other	Adverse	Revol (Acres)	Source	Comment
4823	Puna	1	1	0	Kawaihae	Pohorua		House lot, 2 houses, 1000 sq ft	partly wooded	Makuaue Street	W	Pohorua	NO	Chengs (John Young)	1.08	none	NR 646, NT 2nd		
4824	Wm. Prough	1	0	4	Kawaihae	NO		partly wooded & forest, 2000 sq ft	NO	NO	NO	NO	1	1	0.20	none	FR 407, 1774, 206, 230-5	see LCA 4884	
4884	Wm. Prough	1	1	0	Kawaihae	NO		partly wooded & forest, 2000 sq ft	NO	NO	NO	NO	128	Kuasi	1.34	08	FR 407, 1774, 206, 230-5		
5279	B. Kani	1	0	0	Kawaihae (aka)	Kawaihae		NO	NO	NO	NO	NO	NO	NO	0.00	none	NR 671-6		
8813	L.R. Linton	1	1	0	Kawaihae (aka)	Kawaihae		House lot, 3 houses, 2 part for house, 600 sq ft, 2000 sq ft	partly wooded	Kawaihae	partly lot	Lanikaua	1028	Gen. Adams	0.30	2008	NR 226-1, 226-2, 226-3, 226-4, 226-5, NT 140-1	higher tier	
8818	John Young	1	1	several	Kawaihae (aka)	NO		NO	NO	NO	NO	NO	NO	NO	0.00	1988, 8402	FR 407, 1774, 206, 230-5, NT 140-1	several Kawaihae 2	
8874	Wm. Linton	1	1	many	Kawaihae	Kawaihae		House lot, 3 houses	wooded land	wooded land	beach	wooded land	1944	Kuasi	0.20	2002	NT 433-1, 433-2		
10221	G. Mule	1	0	0	Kawaihae	Kawaihae		NO	NO	NO	NO	NO	1948	Maua	0.20	none	NR 174, NT 1st, 2nd, 3rd		
10263	Puna	14	0	0	Kawaihae	NO		14 lot	NO	NO	NO	NO	Kam, 1	NO	0.00	none	NR 624, NT 1st		
1084	Maua	1	0	0	Kawaihae	NO		NO	NO	NO	NO	NO	NO	NO	0.00	none	NR 624, NT 1st		

Table 1. Land Commission Award Claims in Kawaihae

LCA	Claimant	Address (Mileage)	Address (Acres)	Other (Acres)	Archieve #	#	Section No.	Land Use	Boundary Status	Boundary Name	Boundary Detail	Boundary Name	Boundary Detail	Class (Acres)	Other	Adverse	Revol (Acres)	Source	Comment	
1028	Kawaihae	0	0	0	Kawaihae (aka)	Maui		House lot	NO	NO	NO	NO	NO	NO	NO	0.00	none	NT 140-1		
2492	Wm. Kawaihae	0	1	0	Kawaihae (aka)	Kawaihae								Kam, 1	Partly					
								1 Half subdivided	partly wooded	partly wooded	partly wooded	partly wooded								
								2 Half subdivided	partly wooded	partly wooded	partly wooded	partly wooded								
								3 Half subdivided	partly wooded	partly wooded	partly wooded	partly wooded								
								4 Subdivided	partly wooded	partly wooded	partly wooded	partly wooded								
								5 Subdivided	Kawaihae	Kawaihae	Kawaihae	Kawaihae								
								6 House lot, 1000 sq ft	partly wooded	Kawaihae	Kawaihae	Kawaihae			0.41	2022	NT 140-1			
								7 NO	Kawaihae	Kawaihae	Kawaihae	Kawaihae								
								8 NO	Kawaihae	Kawaihae	Kawaihae	Kawaihae								
2493	Kawaihae	2	2	0	Kawaihae (aka)	Maui								1220	NO	34.88	7200	NT 140-1	Kawaihae 2 (aka) Kawaihae 2 (aka) Kawaihae 2 (aka)	
								1 Subdivided	partly wooded	partly wooded	partly wooded	partly wooded								
								2 NO	NO	NO	NO	NO								
								3 Subdivided	Kawaihae	Kawaihae	Kawaihae	Kawaihae								
								4 House lot one acre	Kawaihae	Kawaihae	Kawaihae	Kawaihae								
								5 NO	NO	NO	NO	NO								
2681	T.L.A. Name for A.C. (1905-1906)	1	0	20	Kawaihae			NO	NO	NO	NO	NO	NO	NO	NO	0.00	none	FR 704, 1774, 206, 230-5	several Kawaihae 2	
2880	G. Mole	1	1	0	Kawaihae	Kawaihae		House lot, 2000 sq ft	partly wooded	Partua Street	Kawaihae	Kawaihae	1949	Kawaihae	0.28	3614	NR 174, NT 1st			
2888	Maha	1	1	0	Kawaihae	Pohorua		House lot, 2000 sq ft	partly wooded	partly wooded	partly wooded	partly wooded	1941	NO	0.38	2348	1st			
3828	Puhorua	1	1	0	Kawaihae	Kawaihae		House lot, 2000 sq ft	partly wooded	partly wooded	partly wooded	partly wooded	Kam, 1	partly wooded	0.36	2348	NR 646, NT 1st			
4091	Kani	2	2	0	Kawaihae	Kawaihae		House lot, 2000 sq ft	partly wooded	Kawaihae	partly wooded	partly wooded	1948	Kam, 1	1.54	2217	NR 646, NT 1st			
4284	Kawaihae	2	1	0	Kawaihae	Kawaihae														
								1	partly wooded	partly wooded	partly wooded	partly wooded								
								2	House	wooded land	Partua	Partua			NO	1.18	2232	NR 646, NT 1st		
4191	Kawaihae	1	1	0	Kawaihae	Kawaihae		House lot, 2000 sq ft	partly wooded	Partua	Partua	partly wooded	1948	Chengs (John Young)	0.19	2388	NR 646, NT 1st			
4198	J.P. Kawaihae	1	1	0	Kawaihae	Kawaihae		House lot, 2000 sq ft	partly wooded	Kam & Puhorua Street	partly wooded	partly wooded	1928	NO	1.34	4828	NR 646, NT 1st			
4198	Kani	1	1	0	Kawaihae	NO		House lot, 2000 sq ft	partly wooded	off's lot	off's lot	partly wooded	1943	Kawaihae & Chengs (John Young)	0.91	2088	NR 646, NT 1st			

Figure 6 is a portion of Lechenstein's 1903 map of Kawaihāe Bay. The map shows the *Keia* on Pu'u Kohala. To the north of Pu'u Kohala, Fanny Young's house, Parker's house, church, and Davis' grave are shown. Further north the old soap works, salt pans, a jail, a hotel, and another store are depicted near the wharf. Beyond the wharf to north, a shipping canal and the locations of the "old" and "new" lighthouses are shown.

Early 1900s land use in Kawaihāe is described in oral historical interviews conducted by Hammatt et al. (1991), Carlson and Rosenzweig (1990), Maly (1999), and Orr (2003). William Akau moved to Kawaihāe as a child in 1928. Water was obtained from a well near the Dot Chevron Station. Water was also obtained from the gulch near Pu'u Kohala when it was still a perennial stream. In about 1931, a water line from Waimea was built and the well was no longer used. Mr. Akau's grandfather used to raise fish for Parker Ranch in a pond where the old salt works were located. Mr. Akau and Mr. Eddie La'au, Jr. remember that people living along the coast south of Kawaihāe used to come to Kawaihāe by canoe to trade dried fish for dry goods and produce.

In the 1930s, Kawaihāe was a bustling place with twice weekly steamship arrivals. Cast iron street lamps illuminated the village streets at night. The ships anchored offshore and transferred goods using life-boats until the concrete territorial pier (Site 23860) was constructed in 1937. Cattle were the principal export. The cows were driven down from Waimea early in the morning and kept in large corrals near the pier. There was a building with restrooms (Site 23859) at the pier and a building where the cowboys would spend the night before returning to Waimea. There were two dry docks in town that served the fishing fleet based at Kawaihāe. Kawaihāe families were fish retailers and wholesalers selling fish throughout the island and shipping fish to Honolulu. The hills behind the coastal village were planted with limes, mangoes, tomatoes, melons, and other produce.

Mr. Masaru Doi and Mr. Akau recounted events at Kawaihāe during World War II. Barbed wire was stretched along the entire shoreline where a series of gun emplacements were established. A huge tent camp was built and the area was used for troop training. The soldiers mined the territorial pier with explosive. Fishing was greatly reduced and forbidden to people of Japanese descent. The Doi family began large-scale raising of pigs fed with the food waste from the military camp. Following the war Kawaihāe town suffered from unemployment and was seriously damaged by a tidal wave in 1946. The wave destroyed the pier and it was never repaired; however, it continues to be depicted on the 1993 USGS Kawaihāe Quadrangle map (see Figure 1), adjacent to the project area.

In 1955, construction of the Kawaihāe Harbor began and it was completed in 1959 (Hammatt et al. 1991). This radically changed the appearance of coastal Kawaihāe, the flow of the ocean, the feeding habits of several species of marine life, and the lifestyle of the people of Kawaihāe Village and others who frequented the shores of the Kawaihāe black sand beach.

Along with the rise of the tourism industry, and competing sugar markets abroad, the sugar companies saw a burgeoning decline in business. The 1950s and 1960s were the bleakest years for the sugar industry and it was becoming apparent that the sugar industry was beyond salvage (Kent 1983:107-108). More changes were soon to take place on the landscapes of Hawaii. The lack of jobs in Kohala caused an exodus to O'ahu during the construction boom of the 1960s. As an economic remedy, Kohala Sugar Company offered its employees an option to purchase lots in newly created subdivisions. On the heels of this offer, new jobs were being created in the tourist industry at Mauna Kea Hotel, followed a few years later by other hotels in Waikoloa, were built and occupied in the late 1960's and early 1970's (Tunoiwai-Tuggle 1988:59-62).

Records at the Bureau of Conveyances indicate that the project area was Territory of Hawaii property controlled by the Board of Harbor Commission under Executive Order 737. The order was cancelled in 1957 and the land was transferred to the Department of Hawaiian Home Lands in 1967. The property records identify the area as the "Cattle Pen Site" probably due to its use for shipping cattle in the 1930s.

Disease also had a devastating affect on the population and the landscape, killing ali'i and making *ohono* alike; measles epidemics in 1848 and 1849, was followed by the horrendous smallpox epidemic in 1853. Ten thousand people are said to have died of this disease in Hawaii (Kamakau, 1997:411, 418). John Papa I'i in *Fragments of Hawaiian History* (1984) talks about the impact of this disease and as *lohi* or guardian of several young ali'i, he had to take several of them off of Oahu island. They just kept sailing from island to island and usually were not allowed to land as Oahu was thought to be the source of the smallpox (I'i 1984:171). The people of Kawaihāe were not spared during this period.

The people (of coastal Kawaihāe) have nothing to eat half the time...sometimes they get one meal a day and sometimes they are entirely destitute (Mission Station Report 1841)...I could not refrain from weeping when I entered there (coastal Kawaihāe)...it was a sad and desolate scene. In April one hundred communicants were present, many of them in the bloom of life - now there were but twenty-four, and not a youth among them (Mission Station Report 1835, cited in Hammatt & Shickler 1991a: 7).

While other places were getting established with growing sugar cane in the 1850s, Kawaihāe was still involved in the whaling industry and the fledgling cattle ranching industry via Waimea, cattle were driven from Waimea to Kawaihāe where they were shipped to Honolulu. Cattle pens were located across from the small boat harbor, but massive rock walls near the present Canee Club are said by local coastalians to be remnants of older cattle pens (Allen 1987:15).

The extensive commerce of Kawaihāe is indicated in an account in the *Pacific Commercial Advertiser* for January 29, 1857 (in Binnsage 1971:23) which reports that 40-50 whaling ships had stopped at this port during the year and that exports included 1,500 barrels of salt beef, 5,000 barrels of sweet potatoes, fresh beef, pork, fowl, and beans, 1,200 bullock hides, 5,000 goat skins, 35,000 lbs of tallow, and 22,000 lbs of wool. Weekly service was provided by the inner-island 87-ton *Mary* by this time (Hammatt and Shickler 1991a: 8).

By 1858 at least 2,119 foreigners lived in Hawaii. Many were merchants who traded and provided provisions, ranchers and missionaries who lived in various locations throughout the islands. "Foreigners engaged in agricultural pursuits with the idea of reaping a profit from the land, in contrast with the Hawaiians, who carried on...subsistence agriculture" (Collier 1971:11). In the 1860s, the U. S. Civil War brought about a boost for the sugar industry in Hawaii as sugar plantations in the South were boycotted or destroyed. And while Rev. Lorenzo Lyons was busy building churches; *Heiōia* in Waimea, *Hōia* Loo at Puukō and one at Kawaihāe (a.n. 1967:18-19), Rev. Bond was getting involved in the sugar business.

In 1860, Rev. Bond engaged his "long-time acquaintance" (Stephenson 1977:7), Samuel N. Cass, to founding the Kohala Sugar Company on lands owned by Bond and his neighbor Dr. James Wight. The first crop of the Kohala Sugar Company was harvested in January 1863 (KTF 1975:69). Kohala's tradition was a reflection of what was happening elsewhere in Hawaii, as the sugar industry grew. The industry brought in tens of thousands of laborers from Asia, Europe, the Americas, Oceania, and Africa to work on the many plantations and mills that were being established on all major islands, which had a profound effect on life in Hawaii (Oliver 1961:123).

Maly (1999) presents excerpts from a variety of historic documents spanning the mid- to late 1800s. The documents describe road building efforts from Kawaihāe to Kiholo and Waimea, and schools including one at Kawaihāe Kai that was used until it was destroyed in 1940 by a tidal wave. Boundary Commission testimony cited by Maly, mentions Kawaihāe residents who were bird catchers. Kawaihāe had ancient fishing rights that extended out to sea.

During the late 1800s, and continuing into the 1900s there were many leases, subleases, and other land transactions, most involved Kohala and Parker Ranches (Carlson and Rosenzweig 1990). A storm in 1872 destroyed all the wharves in Kawaihāe (Hammatt et al. 1991). Jackson's 1883 map shows a number of houses, a jail, a lighthouse, a woodshed, a store, a church, a boathouse, and the graves of Davis and George Macy (Hammatt et al. 1991).

Previous Archaeological Research

A search of DLNR-SHPD archaeological report database and other sources identified 26 reports covering portions of Kawaihae and adjacent areas. Table 2 summarizes the studies and Figure 7 shows the project locations. At least seven previous studies included the project area (see Figure 7); however, none of them reported the historic features there, probably because they appear quite recent. Not included in the table or figure are the early surveys by Thurun (1908), Stokes (Stokes and Dye 1991), and Reinecke (1930). Thurun (1908:42) reported the former presence of a *heiau* at Uli in Waiimea.

In 1906, John Stokes, then Curator of Polynesian Ethnology at Bishop Museum, did fieldwork on the island of Hawaii, documenting *heiau* and drawing plans of the better-preserved ones. Using Thurun's list as a guide, Stokes began his fieldwork in Kailua-Kona. "Once in the field, however, Stokes discovered that local Hawaiians could identify many more *heiau* than appeared on Thurun's list" (Stokes & Dye 1991:10). In the South Kohala District, Stokes recorded only two *heiau*, Maikiki and Pu'okobohi, at Kawaihae. In addition, Stokes heard about four other *heiau* at Puako, near the coast, but he was unable to gather any information about these sites from local informants (Stokes & Dye 1991).

During his 1930 survey conducted for the Bishop Museum, Reinecke examined the western coast of the island and, "walked along the coast from Kalihupua'a [near Puako] to Kawaihae, but considered it not worth while to attempt a survey of this algaroba-covered [lower] coast unless... [he]... had a base there" (Reinecke 1930).

The surveys in Table 2 cover nearly 17,000 acres identifying 506 sites with 879 features. To aid in reconstructing settlement patterns, features were quantified by probable age and function, and the studies are ordered by elevation. Traditional Hawaiian features were categorized as habitation, agricultural, burial (including possible burials), ritual, trail, *ahu*, and wall. Features not assignable to these categories were categorized as miscellaneous/indeterminate. Traditional sites in this category include *salipua*, *paopoua*, fishponds, and *paohoe* elevations.

Density per acre values are given for sites, features, and habitation and agricultural features. Overall, the studies have identified 723 habitation features, 241 agricultural features, 83 burials, 23 ritual features, 13 trail segments, and 67 *ahu*, and 2,007 petroglyphs. Historic features, except walls, were not segmented by function. The majority of the walls are ranch-related.

Density values for surveys of at least 50 acres indicate the highest densities of habitation features between sea level and 200 ft elevation (0.36 features per acre). Agricultural feature density is also high near the coast. Overall feature density ranges from 0.01 to 1.28 features per acre. Habitation feature density ranges from 0 to 0.36 features per acre with an average of 0.09. Agricultural feature density ranges from 0 to 0.35 features per acre with an average of 0.09. Burial and ritual sites are concentrated near the coast.

Only five radiocarbon dates are reported in the studies by Hammett et al. (1991) and Walker and Rosenzweig (1995). The four Hammett et al. (1991) dates from habitation sites include a modern result, and three age ranges of A.D. 1670-1935, 1510-1950, and 1330-1430. Walker and Rosenzweig report a age determination on charcoal from an inland temporary habitation site that produced two potential age ranges of 1689-1734 and 1811-1925.

Clark (1987) proposed a settlement pattern model for the Kawaihae-Waiimea region that consists of four zones as follows:

- Coastal Zone Extends from the coast to between 200 m and 400 m inland with most sites below 30-45 m (98-148 ft) elevation. The Coastal Zone is subdivided into shoreline and inland sub-zones. Subsistence activity had a marine exploitation emphasis including fishing, collecting, and salt making. Agricultural crops included coconut, sweet potato, gourd, and other medicinal, utilitarian, and food plants. Archaeological features in-

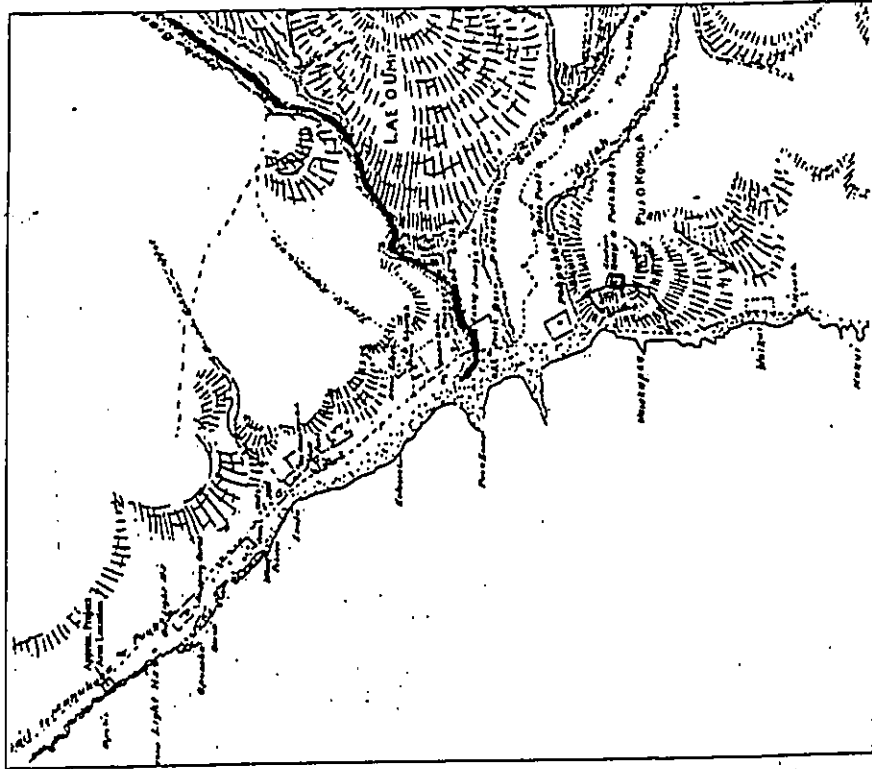


Figure 6. Portion of Loebenstein's 1903 Map of Kawaihae Bay (from Barrera and Kelly 1974)

RECEIVED AS FOLLOWS

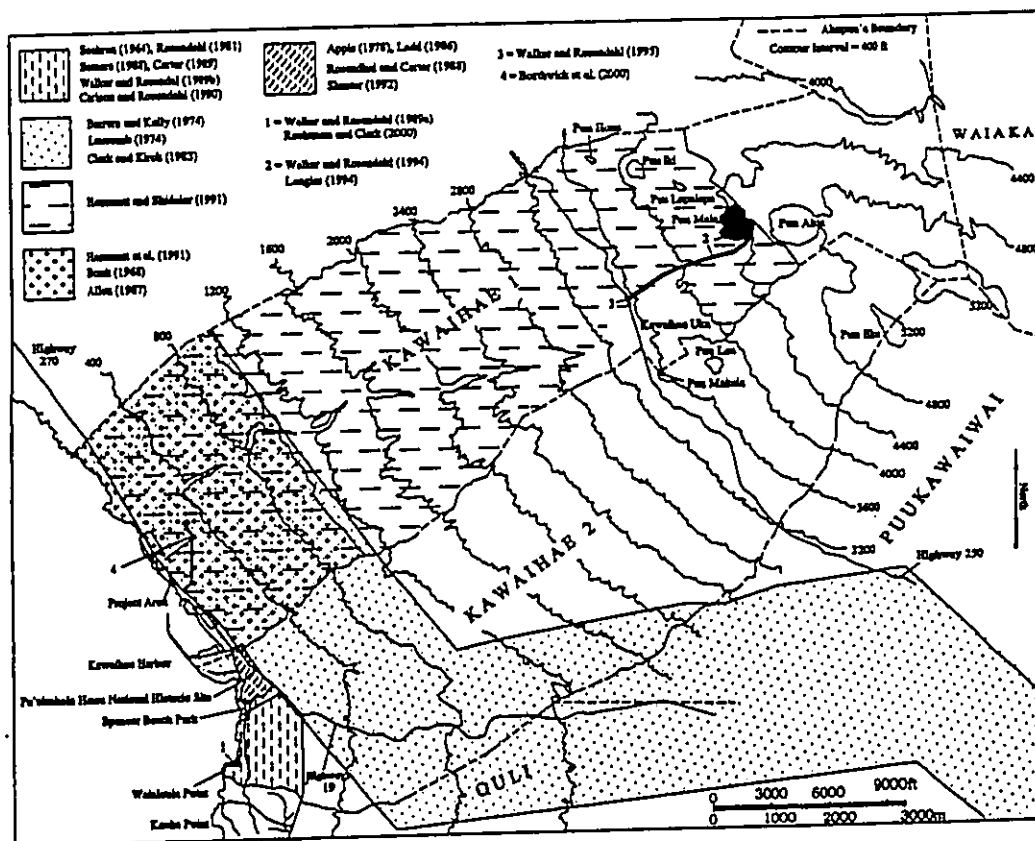


Figure 7. Previous Archaeological Work

Table 2. Summary of Previous Archaeological Work

Author	Land	Study Type	Elevation (feet)	Area (ac)	No. of Sites	Sites/more	No. of Pans	Pans/acre	Heb Pans	Heb Pans/acre	Ag Pans	Ag Pans/acre	Burial Pans	Ritual Pans	Trail	Ahu	Wall	Historic Pans	Mound/Inhab. Pans	
Apple (1978), Ladd (1986), Rosenzweig and Carter (1984), Schwab (1982)	Kawaihau 2	IN	0-20	78.8	3	0.04	11	0.14					2					9		
Walker and Rosenzweig (1994), Rasmussen and Clark (2000)	Kawaihau 2	IN	0-75	8.7	8	0.00	20	2.30	12	1.36	8	0.90						2		
Sorenson (1964), Rosenzweig (1981), Somers (1984), Carter (1984), Walker and Rosenzweig (1994), Carter and Rosenzweig (1990)	Kawaihau 2	FVN	8-280	371	148	0.40	478	1.28	134	0.36	128	0.34	43	4	9	35	18	80	38	
Borthwick, Chiogri, and Hammett (2002)	Kawaihau 1	AS	35-300	18.98	0															
Bork (1985), Allen (1987), Hammett et al. (1981)	Kawaihau 1	IN	0-1000	2800	147	0.08	491	0.18	384	0.18	25	0.01	31	2	7	12		24	6	
Barnes and Kelly (1874), Lascombe (1874), Clark and Kirk (1982)	Kawaihau 1-2	RM	10-2800	3178	178	0.08	308	0.10	190	0.06	78	0.024	8	2				80	3	
Hammett and Shickler (1981)	Kawaihau 1	RWAS	20-4800	10188	21	0.002	72	0.01	32	0.00	7	0.001	1	13	1			18		
Walker and Rosenzweig (1994)	Kawaihau 1	IN	3550-3680	3.44	3	0.87	4	1.18	1	0.28								3		
Walker and Rosenzweig (1994), Langille (1994)	Kawaihau 1	IN	3800-4700	823	3	0.01	4	0.01										4		
Total/Average					18838	806	0.03	879	0.88	723	0.37	341	0.21	83	23	13	67	18	178	48

\* Inventory Survey, FV=Field Inspection, AS=Assessment, RM=Reconnaissance Survey



**FINDINGS**

The survey identified four historic sites consisting of two concrete walls (Sites 23857 and 23858), a concrete building foundation (Site 23859), and the remains of a concrete and mortared stone pier (Site 23860). The distribution of the sites is presented in *Figure 8*. The sites are described below.

**Site 23857**

Site 23857 is a formed concrete wall located in the inland portion of the project area, 18.0 m southwest of the seaward edge of Highway 270 and 1.0 m northwest of the northern edge of the paved road that extends through the parcel. The wall is 3.05 m long (northeast by southwest), 0.56 m wide and 0.8 m in height (*Figure 9*). It is built into the northern side of a cut bank in which the paved road is located. The top of the wall is level with the surrounding ground surface above the cut bank. No cultural remains were found in association with the wall.

The size and shape of the wall suggests that it may have functioned as a low bridge abutment for a road; however, no evidence of a road was noted above the cut bank to the north of the wall, and no matching wall was present to the south of the paved road. Site 23857 is unaltered and in fair to good condition.

**Site 23858**

Site 23858 is a formed concrete wall situated in the approximate center of the project area, 30.5 m southwest of Site 23857. The wall is 14.0 m long (northwest by southeast) and originates 1.0 m northwest of the paved road. The concrete wall is 0.46 m wide and ranges in height from 1.05 m at its southeastern end, to 0.12 m at its northwestern end (*Figure 10*). The surface of the wall is level, with the base of the wall following the remains of an asphalt road, oriented perpendicular to the main paved road situated to the southwest. This road remnant slopes up to the northwest from the edge of the paved road. The southeastern 1.0 m of the wall is freestanding, with the remaining portion built against the southwestern side of a cut bank that parallels the road remnant. The area to the northeast of the wall and cut bank consists of a level soil deposit.

There are a series of six vertical grooves located along the southwestern face of the wall, spaced at 1.97 m wide intervals. These grooves are 0.165 m wide and 0.235 m deep and extend from the top of the wall to 0.6 m below the top. Metal sleeves have been fitted into the back of these grooves. No cultural remains were present at the site.

Site 23858 is interpreted as a concrete retaining wall which potentially functioned as a portion of a foundation for a wooden structure that is no longer present. Oral interviews conducted by Mr. Maria Orr (Or 2003b) indicate that additional structures associated with a restroom (Site 23859 discussed below) once existed on the parcel. The grooves in the wall likely supported vertical timbers. It is possible that the remaining portions of the foundation once consisted of post and piers located in the level soil area to the northeast of the wall. The road remnant located to the southwest of the wall may have served as a means of the wooden structure. The concrete wall is unaltered and in fair to good condition.

**Site 23859**

Site 23859 is a concrete foundation located on the southeastern side of the paved road, 16.0 m south of Site 23858. The main, raised portion of the foundation is 5.2 m square, ranging in height from 0.35 to 0.45 m above the surrounding ground surface (*Figure 11*). There are two adjoining concrete slabs that abut the main foundation; one to the northeast and one to the southwest.

The northeastern slab is 5.2 m long (northwest by southeast) and 2.9 m wide. A step leads down from the main foundation to the surface of this slab at its northwestern end. A raised concrete stem wall occupies the southeastern two-thirds of this slab, forming two rooms. This stem wall range in width from 0.1 to 0.16 m and is 0.35 m in height above the surface of the slab and 0.13 m in height above the surface of the main foundation. Entrances into both rooms are located along the northeastern side. The floor of the

clude "residential structures, community-oriented structures, burial mounds, agricultural features, military features (recent), and mixed-use" (1987:247). Habitation sites include single use sites, extended and recurrent occupations, and permanently occupied sites. Habitation features include small walled shelters, caves, overhangs, terraces, platforms, and enclosures. The more intensively occupied habitation sites are clustered in neighborhoods sometimes larger wards.

**Intermediate Zone**

Extends from the Coastal Zone to between 7.3 and 9.7 km inland at approximately 385 m (1,919 ft) elevation. Subsistence activity limited to small scale seasonal cultivation of alluvial fluvial near drainages and bird catching. Archaeological features include short-term occupation sites including midden scatters, fireplaces, small walled shelters, caves, and overhangs, which are typically situated near drainages.

**Kula Zone**

Extends from the Intermediate Zone to between 7.3 and 9.7 km inland. It ranges in elevation from 385 m to 830 m (1,919-2,722 ft) in elevation, with small sections extending to as much as 975 m (3,198 ft) elevation. Subsistence activity is dominated by agriculture. The zone is divided into two primary sub-zones based on the nature of cultivation. Sub-zone 1 is defined by the presence of formal fields mound complexes, small terraces, modified outcrops, and animal and garden enclosures. Sub-zone 2 is characterized by the absence of formal fields and limited to planting waxes, clusters of mounds, and modified outcrops. Irrigation ditches occur in both sub-zones. Crops included sweet potatoes, dry-lad taro, gourds, and waxes. Habitation sites include single use sites, extended and recurrent occupations, and permanently occupied sites. Habitation features include small walled shelters, caves, overhangs, terraces, platforms, and enclosures. The more intensively occupied habitation sites are clustered in neighborhoods sometimes larger wards. Burial features are also present.

**Wilderness Zone**

Zone extends inland from the Kula Zone to the mountain tops. The zone is divided into two sub-zones. Sub-zone 1 consists of areas that were exploited for a variety of resources including, wood, bark, birds, wild plants foods, fine-grained basalt for tool manufacture. Sub-zone 2 consists of the highest elevation areas that were not economically exploited and largely untouched except for some religious activity.

**PROJECT EXPECTATIONS**

Based on historical documentary evidence and previous archaeological work, prehistoric sites in the project area could include habitation sites, burials, salt pans, and ritual features. Habitation sites should consist of temporary and permanent habitations (walled shelters, platforms, terraces and enclosures). Prehistoric sites would be expected to date no earlier than the 1300s with most post-dating the 1600-1800s. Historic sites, except WWII military training features, primarily could include habitation sites, graves, post-related infrastructure, and ranching and farming features. Ranch-related features should be represented by roads and cattle walls and pens. The military training features should be represented by small coastal fortifications.

RECEIVED AS FOLLOWS



Figure 9. Site 23857 Concrete Wall, view to northwest



Figure 10. Site 23858 Concrete Wall, view to north

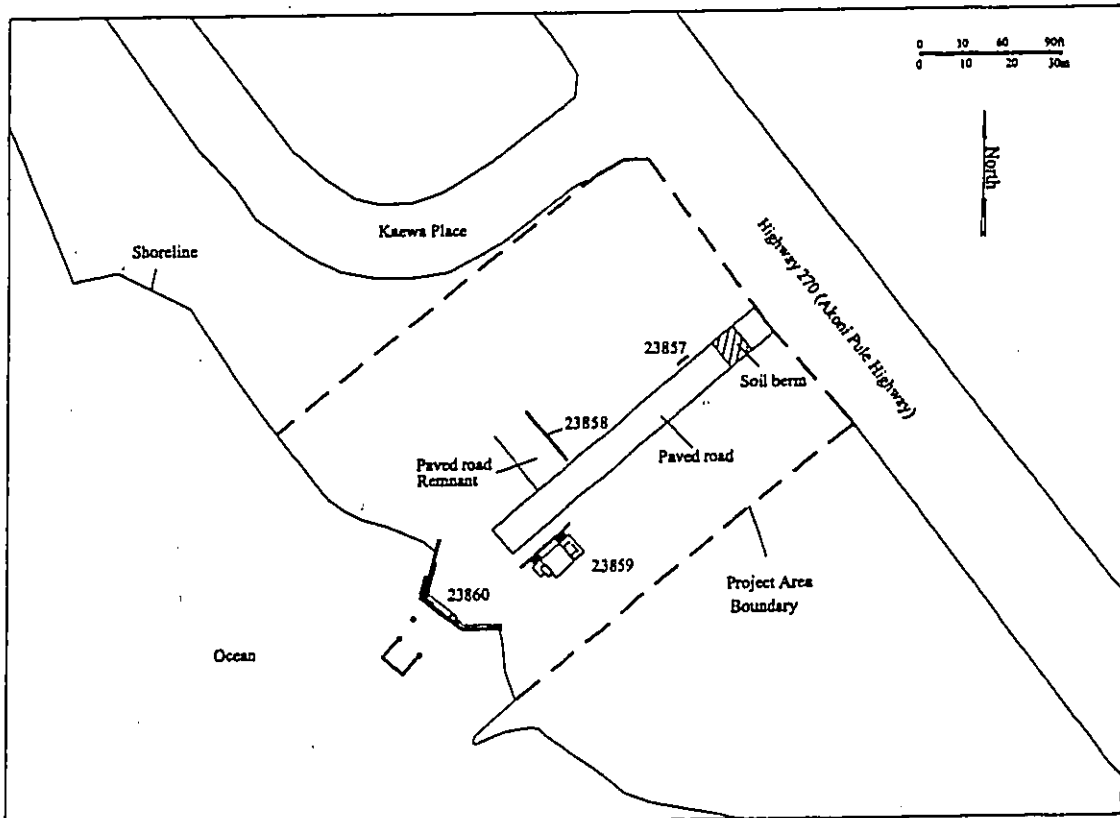


Figure 8. Site Location Map

Two rooms are raised 0.15 m above the surface of the slab. The northwestern room is 2.7 m long (northwest by southeast) and 2.1 m wide. The southeastern room is 1.4 m long (northwest by southeast) and 2.1 m wide. There are 4" toilet flanges imbedded into the floor of both rooms, with 1/2" galvanized metal pipes extending vertically from the floor, behind the flanges. There are two flanges in the southeastern room and one in the northwestern room.

The slab to the southwest of the main foundation is 2.7 m long (northwest by southeast) and 2.3 m wide and is 0.2 m in height above the surrounding ground surface (Figure 12). There is a concrete step leading from this slab up to the main foundation in the northeastern corner. A concrete stem wall enclosing a room is situated in the southeastern portion of this slab. This room also extends beyond the slab to the southeast and is 2.35 m long (northwest by southeast) and 1.4 m wide. The floor of this room is also 0.15 m in height above the slab surface. There is an entrance into the room in its south western side. The stem wall enclosing the room is 0.1 to 0.15 m wide. It is 0.15 m in height above the main foundation, 0.3 m in height above the surface of the slab and 0.65 m in height above the surrounding ground surface at its southern end. Two sets of 4" toilet flanges and 1/2" galvanized pipes are situated within this room at its southern end.

The Site 23859 foundation is situated on an artificially leveled area to the southwest of the paved road. A mortared stone retaining wall parallels the foundation, 1.8 m to the northwest. This wall is 14.2 m long (northwest by southeast) and retains areas of level soil between it and the foundation. The wall is 0.45 to 0.5 m wide and 1.0 to 1.4 m in height (Figure 13). There are two sets of concrete stairs that lead up from the ground surface to the northeast and southwestern slabs. The stairs at the northeastern end are 1.5 m wide and contain six treads. The stairs at the southwestern end are 1.3 m wide with eight treads.

Large quantities of modern trash are scattered on and adjacent to the foundation, likely deposited by recent visitors to the area. An interview with Mr. William Akau conducted by Ms. Maria Orr (2009) indicates that the site represents the foundation for a restroom station that was constructed in the 1930s in conjunction with the Site 23860 pier. Site 23859 is unaltered and is in fair to good condition.

**Site 23860**

Site 23860 consists of the remains of a concrete and mortared stone pier that once extended in the ocean at the southwestern end of the project area (Figure 14). The portion of the pier located on land is constructed on and between bare pahoehoe outcrops. This portion consists of a main wall, upper and lower shelves and a raised wall, built of mortared basalt stones with a concrete veneer. The area on the inland side of the structure consists of scattered waterworn basalt boulders and displaced fragments of concrete (Figure 15). This area slopes down to the south-southwest from the end of the paved road to the structure.

The main wall is situated along the southern side of the structure. It is 18.0 m long and from 0.6 to 1.4 m wide. It is 0.7 to 1.1 m in height above the boulders on the island and was 1.75 to 2.5 m in height above the ocean surface at the time of the survey (Figure 16). There are the remains of six metal bolts on top of the main wall in the western portion.

There are two upper shelves associated with the main wall; one at the western end and one in center of the main wall. The western shelf originates along the seaward side of the main wall. This portion is 2.3 m long (northwest by southeast), 0.35 m wide and 0.5 m in height above the main wall. There are three vertical grooves for wooden beams along the seaward side of this shelf, measuring 0.15 m wide, 0.19 m deep and 0.46 m in height. The shelf angles to the north-northeast at the western end of the main wall and extends 8.0 m in this direction. This portion is 0.35 to 0.45 m and 0.4 to 2.1 m in height above the boulder rubble. This section of raised shelf abuts the eastern side of the raised wall portion of the structure (discussed below).

A second upper shelf is located in the center of the main wall. It is 2.25 m long (west-northwest by east-southeast) and 1.2 m wide. The northeastern corner of this shelf has been destroyed. Large displaced blocks of concrete are located adjacent to this shelf to the north and east. This shelf varies in height above the main wall from 0.52 to 0.6 m. There are vertical grooves along the seaward side of the shelf, identical to those noted on the western shelf.

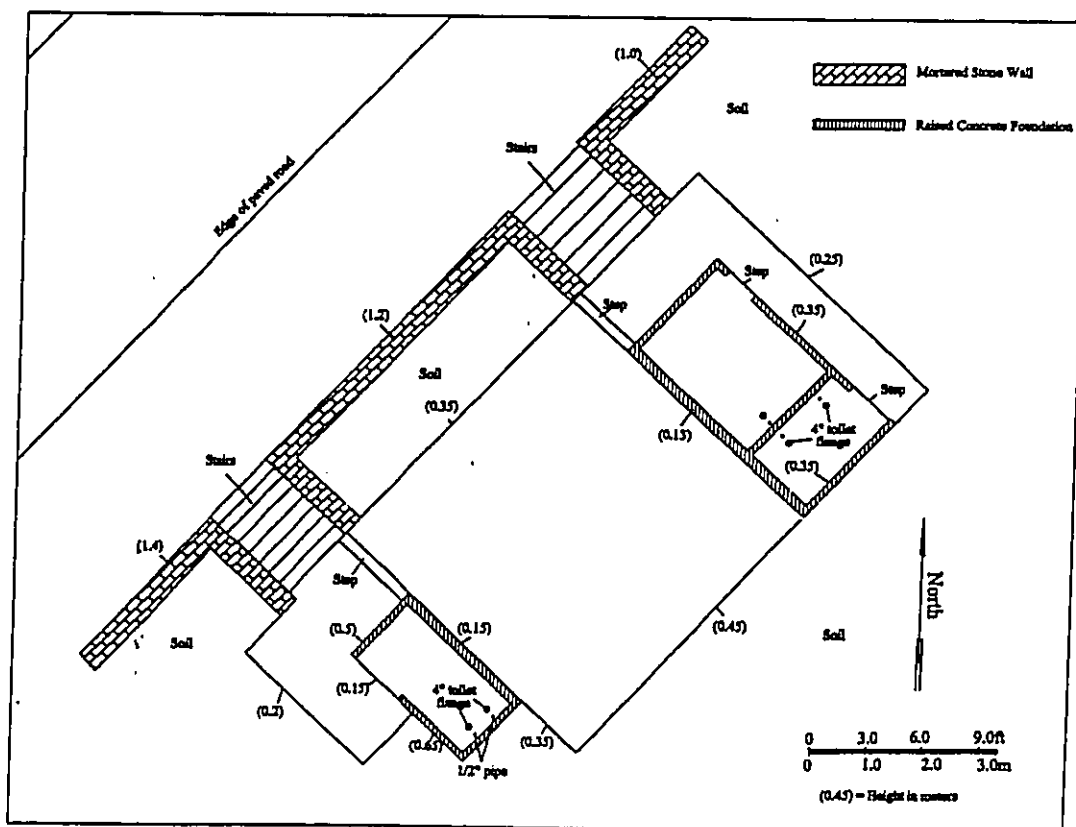


Figure 11. Site 23859 Plan Map

RECEIVED AS FOLLOWS

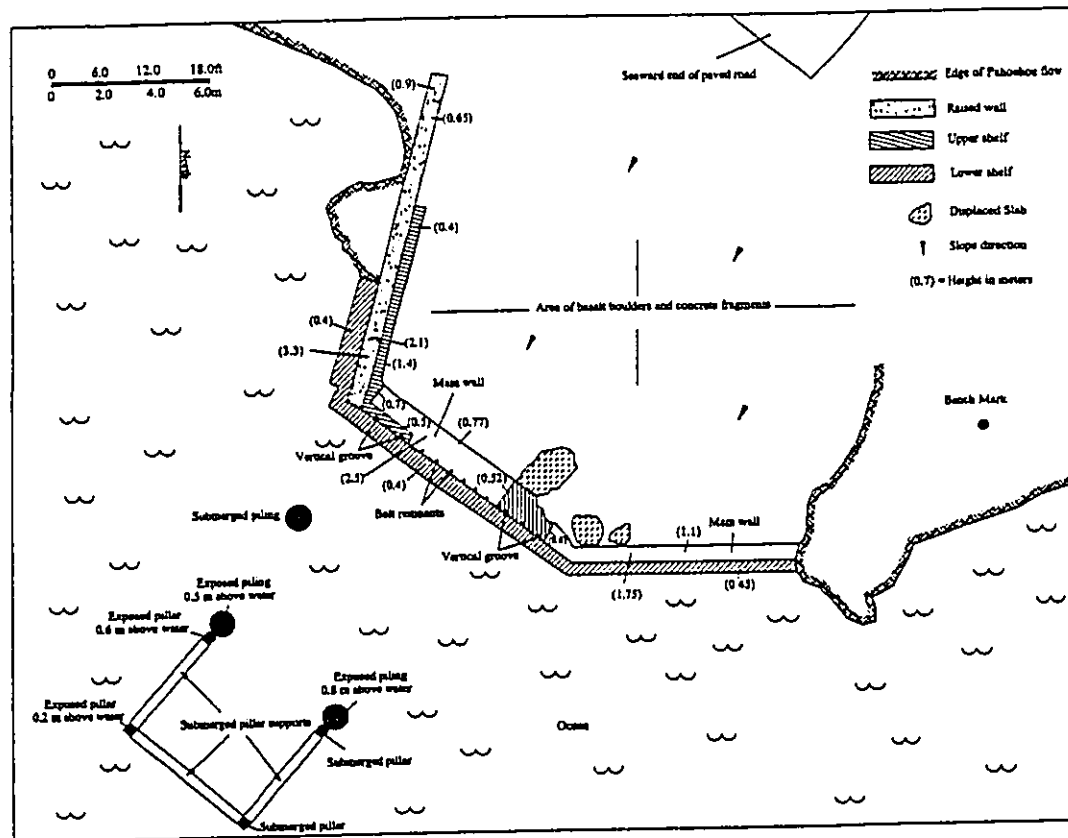


Figure 14. Site 23860 Plan Map



Figure 12. Site 23859 Concrete Foundation, view to east

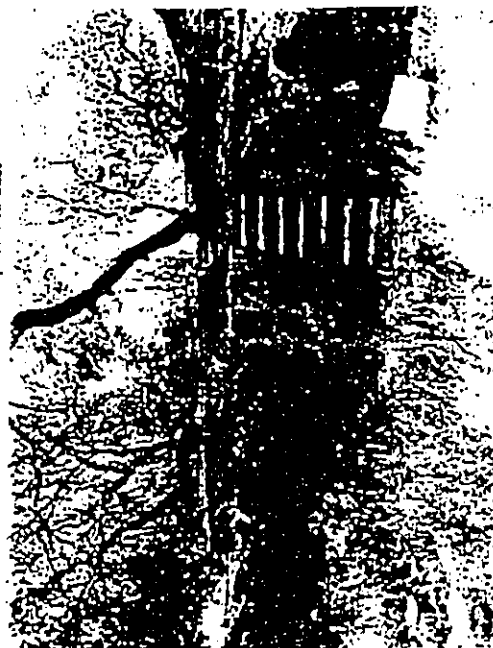


Figure 13. Site 23859 Mortared Stone Wall and Stairs, view to southeast

The lower shelf extends along the base of the main wall on the seaward side, ranging in height above the ocean surface from 0.4 to 0.45 m (see *Figure 16*). This shelf is 0.45 to 0.78 m wide and 1.3 to 2.1 m below the top of the main wall.

The raised wall is located along the eastern side of the structure. It originates at the western end of the western shelf and extends 13.0 m to the north-northeast. This wall is 0.6 m wide with a curving facet along the western side at the top. The top of the wall is 2.1 m in height above the boulder rubble at the southern end, and 0.65 to 0.9 m in height at its northern end. The top of the wall is 3 m in height above the surface of the ocean (*Figure 17*).

The portion of the pier situated within the water is comprised of three concrete pilings, four concrete pillars and three sections of rectangular pillar supports that connect the pillars. The recording of this section of the site consisted of estimations made from land, as it is situated in c. 10 feet of water. The first piling is 4.0 m southwest of the structure on land. The second is 4.8 m to the southwest of the first, and the third is 5.6 m southeast of the second. The fourth piling, which would have completed this rectangular configuration, is not present. The pilings are circular in shape, measuring c. 1.0 m in diameter. Only two of the three pilings were above the water surface during the time of the survey, extending from c. 0.5 to 0.8 m in height (*Figure 18*).

The four pillars are c. 0.4 m square and are connected by three submerged horizontal concrete supports, forming a rectangular configuration that is 6.2 m long (northwest by southeast) and 4.93 m wide. The two pillars on the northwest side of the configuration ranged in height from 0.2 to 0.6 m above the water surface. The two remaining pillars were submerged. The horizontal supports appeared to be approximately the same width as the pillars.

An oral interview conducted by Ms. Orr (2003) indicates that the structure represents the remains of an historic pier built in 1937. The pier was used to load cattle onto ships after they had been transported from the Waimānua area. The pier was destroyed by a 1946 tidal wave and was never rebuilt. While the foundation of the pier was built of concrete and mortared stone, the surface of the pier was probably built of wood. The site is altered and in poor to fair condition.



Figure 15. Site 23860, Basalt Boulders and Displaced Concrete, view to southeast



Figure 16. Site 23860, Main Wall showing Lower Shelf, view to northwest

## CONCLUSION

### Discussion

The identified sites are limited to historic structural remains that primarily date to the late 1930s. According to Kawilua resident Mr. William Alwa, the pier (Site 23860) and associated concrete station (Site 23859) were constructed in 1937. The pier was used until it was destroyed in 1946 by a tidal wave. The Site 23858 wall is probably contemporaneous with the pier and restroom because it is built along a road that is connected to the road that leads to the pier. The Site 23857 possible bridge abutment probably predates the other sites because the condition of the concrete is more deteriorated than it is in the other structures.

Records at the Bureau of Conveyances indicate that the project area was Territory of Hawaii property controlled by the Board of Harbor Commission under Executive Order 737. The order was cancelled in 1957 and the land was transferred to the Department of Hawaiian Homelands in 1967. The property arounds identify the area as the "Cattle Pen Site" probably due to its use for shipping cattle in the 1930s.

### Significance Assessments

Pursuant to DILNR (2002) Chapter 215-6 (4), the initial significance assessments provided herein are not final until concurrence from the DILNR has been obtained. Sites identified and relocated during the survey are assessed for significance based on the criteria outlined in the Rules Governing Procedures for Historic Preservation Review (DILNR 2002: Chap 215), and Section 106, 36 CFR Part 800 of the National Historic Preservation Act of 1966 (as amended). According to these rules and regulations, a site must possess integrity of location, design, setting, materials, workmanship, feeling, and association and still meet one or more of the following criteria:

1. Criterion "a". Be associated with events that have made an important contribution to the broad patterns of our history;
2. Criterion "b". Be associated with the lives of persons important in our past;
3. Criterion "c". Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; or possess high artistic value;
4. Criterion "d". Have yielded, or it likely to yield, information important for research on prehistory or history; and
5. Criterion "e" (State Rules only). Have an important traditional cultural value to the native Hawaiian people or to another ethnic group of the state due to associations with traditional cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts—these associations being important to the group's history and cultural identity.

Based on the above criteria, all four sites are assessed as significant under Criterion "d". The sites have yielded information important for understanding historic land use in the project area.

### Recommended Treatments

The mapping, written descriptions and photography provided in this inventory survey adequately document the four sites identified in the APE. As a result, the sites are not recommended for preservation or further archaeological work. Therefore, development of the project area will not have an adverse effect on historic properties.



Figure 17. Site 23860, Raised Wall, view to southeast

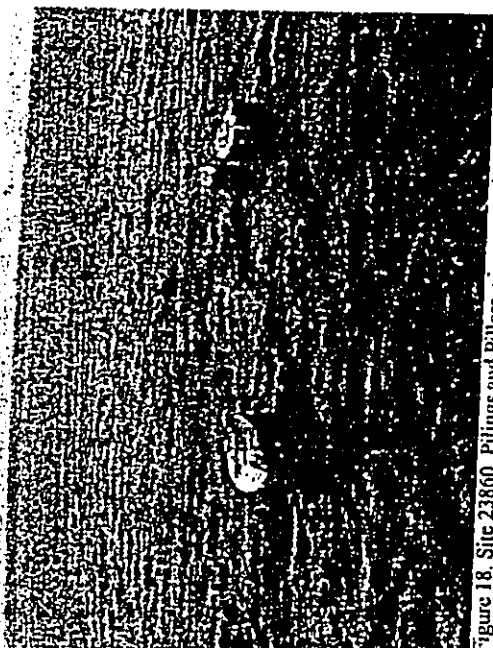


Figure 18. Site 23860, Pilings and Pillars, view to southwest

- REFERENCES**
- Allen, M.  
1977 Archaeological Inventory Survey of Hawaiian Homelands, Kawaihāe I, South Kohala, Hawaii. Applied Research Group, B.P. Bishop Museum Report MS. 072187 report prepared for Department of Hawaiian Home Lands, State of Hawaii.
- Apple, R.  
1969 "A History of Historic Structures Kawaihāe, South Kohala, Hawaii Island." In *The Archaeological Surface Survey of Puu Kohala Heiau and Mālikihi Heiau, South Kohala, Kawaihāe, Hawaii Island* pp. 10-34. *Hawaii State Archaeological Journal* 69:3.
- 1978 Pāhālanilua: Homestead of John Young, Kawaihāe, Kohala, Island of Hawaii. National Park Service, Honolulu.
- Armstrong, R. (editor)  
1953 *Atlas of Hawaii*. Honolulu: University of Hawaii Press (2nd Edition).
- Barrera, W., and M. Kelly  
1974 Archaeological and Historical Surveys of the Waimea-Kawaihāe Road Corridor, Hawaii Island. Department of Anthropology, B.P. Bishop Museum, Honolulu.
- Burns, Dorothy B.  
1983 *Notes on the Lands of Waimea and Kawaihāe*. Hawaii Historic Preservation Report 83-1. Bernice P. Bishop Museum, Honolulu.
- Bergsbock, J. C. (editor)  
1967 *The Journals of Captain James Cook on His Voyages of Discovery, Vol. III*. The University Press, Cambridge.
- Brennan, J.  
1995 *Paniloa*. Ku Pa's Publishing Inc., Honolulu. (Original 1978).
- Brundage, L.  
1971 *Alfred W. Carter Hawaii's Dean of Cattlemen and Notes on Hawaiian Livestock*. Privately printed, Kamuela, Hawaii.
- Book, W.  
1968 "The Archaeology of North and South Kohala, from the Ahupua'a of Kawaihāe to the Ahupua'a of Upolo". *Hawaii State Archaeological Journal* 68-3. Hawaii State Parks, Department of Land and Natural Resources, Division of State Parks.
- Bothwick, D., R. Chiofoli and H. Hammat  
2000 Archaeological Assessment of Proposed Water Line Corridors and A Reservoir Site in Kawaihāe I Ahupua'a, South Kohala District, on the Island of Hawaii (TMK: 6-1-06; par 2, 3, 7; 6-1-01; par 3). Cultural Surveys Hawaii Report prepared for R.M. Towill Corp.
- Bushnell, O. A.  
1993 *The Gifts of Civilization: Gems and Genocide in Hawaii*. University of Hawaii Press, Honolulu.
- Cabill, Emmet  
1999 *The Life and Times of John Young: Confidant and Advisor to Kamehameha the Great*. Island Heritage Publishing, Ala.
- Carlson, A., and P. Rosendahl  
1990 Archaeological Inventory Survey, Queen's Lands at Mauna Kea, Land of Kawaihāe 2, South Kohala District, Island of Hawaii (TMK: 3-6-2-0256). PIIRI Report 591-057090 prepared for Mauna Kea Properties.
- Carter, L.  
1989 Archaeological Excavations of Six Features within the Right-Of-Way for the Proposed Spencer Beach Park Entrance Road, Pu'u Kohala Heiau National Historic Site, Island of Hawaii. National Park Service, Honolulu.
- Chinen, J.  
1958 *The Great Mahele: Hawaii's Land Division of 1818*. University of Hawaii Press, Honolulu.
- Clark, J.  
1983 "The Waimea-Kawaihāe Region: Historical Background." In *Archaeological Investigations of the Waimea-Kawaihāe Road Corridor, Island of Hawaii I: An Interdisciplinary Study of an Environmental Transect*, edited by Jeffrey T. Clark and Patrick V. Kirch, pp. 39-57. Hawaii Historic Preservation Report 83(1).
- Clark, J., and P. Kirch  
1983 Archaeological Investigations of the Mudlone-Waimea-Kawaihāe Road Corridor, Island of Hawaii: An Interdisciplinary Study of an Environmental Transect. Department of Anthropology, B.P. Bishop Museum prepared for Department of Transportation, State of Hawaii.
- Coolter, Jon Wesley  
1971 *Population and Utilization of Land and Sea in Hawaii, 1835*. Bernice P. Bishop Museum Bulletin 88, Krauss Reprint Co., New York [Originally published by BPBM 1931].
- Day, A. G.  
1984 *History Makers of Hawaii*. Mutual Publishing, Honolulu. [In Donnan 2000:139]
- 1992 *Hawaii and Polaris South: True Island Tales*. Mutual Publishing, Honolulu.
- Deha, Reverend Stephen L.  
2000 *Kamehameha and His Warrior Kūlāhau*. (Originally published in *Ko Holo o Hawaii* 1.) Translated by Frances N. Frazier. Kanehameha Schools Press, Honolulu.
- DLNR (Department of Land and Natural Resources)  
2002 Hawaii's Administrative Rules, Title 13, Dept. of Land and Natural Resources, Subtitle 13, State Historic Preservation Division Rules.
- Elli, W.  
1963 *A Narrative of a Tour through Hawaii ...* Originally published in 1917. Honolulu Advertiser Publishing Co., Honolulu.
- Fornander, A.  
1900-1915 "Collection of Hawaiian Antiquities and Folk-lore." Ser 1-3. *Memoirs Bernice Pauahi Bishop Museum* Vols 1-3, Honolulu.
- 1917 *Fornander Collection of Hawaiian Antiquities and Folk-Lore: Memoirs of the Bernice Pauahi Bishop Museum of Polynesian Ethnology and Natural History* Vol IV, Part II. Bishop Museum Press, Honolulu.
- 1996 *Ancient History of the Hawaiian People to the Times of Kamehameha I*. Mutual Publishing, Honolulu. [Originally published as Volume II of *An Account of the Polynesian Race, Its Origin and Migrations in the 1870s*.]

FR n.d. Foreign Register of Kuleana Claims Recorded by the Board of Commissioners to Quiet Land Titles in the Hawaiian Islands. Manuscript. Hawaii State Archives.

FT n.d. Foreign Testimony Recorded by the Board of Commissioners to Quiet Land Titles in the Hawaiian Islands. Manuscript. Hawaii State Archives.

Greene, L. W. 1993 "A Cultural History of Three Traditional Hawaiian Sites on the West Coast of Hawaii Island." United States Department of the Interior National Park Service Denver Service.

Hammatt, H., and D. Shideler 1991 A Reconnaissance and Archaeological Assessment for the Kawaihee Master Plan. Cultural Surveys Hawaii report prepared for R.M. Towill.

Hammatt, H., D. Shideler, D. Berthwick, M. Strick, M. McDermott and K. Nakamura 1991 Archaeological Survey and Testing, Kawaihee 1 (Kooobana), South Kohala, Hawaii. Cultural Surveys Hawaii Report prepared for Department of Hawaiian Home Lands, State of Hawaii.

Handy, E. S. C., and E. O. Handy 1978 *Native Planters in Old Hawaii: Their Life, Love, and Environment*. Bernice P. Bishop Museum Bulletin 231, Bishop Museum Press, Honolulu.

'I'i, J.P. (Translated by Mary Kawena Pukui; Edited by Dorothy B. Barrett) 1983 *Fragments of Hawaiian History*. Bishop Museum Press, Honolulu. (Original 1959. Translations of newspaper articles (Kaoi) written in 1866-1870).

Indices 1929 *Indices of Awards Made by the Board of Land Commissioners to Quiet Land Titles in the Hawaiian Islands*. Territory of Hawaii, Honolulu.

Juvik, S.P. and J.O. Juvik (editors) 1998 *Atlas of Hawaii*. Third Edition. University of Hawaii Press, Honolulu.

Kamakau, S. 1992 *Ruling Chiefs of Hawaii*. [Revised] Kamehameha Schools Press, Honolulu. [1842 and 1870.]

Kelly, Marion 1974 "Historical Survey of the Waimea to Kawaihee Road Corridor Island of Hawaii." In *Archaeological and Historical Surveys of the Waimea to Kawaihee Road Corridor, Island of Hawaii*. By William Barrera, Jr. and Marion Kelly. Departmental Report Series 74(1). Bernice P. Bishop Museum, Honolulu.

Kent, N. J. 1983 *Hawaii: Islands Under the Influence*. Monthly Review Press, New York.

King, P. 1990 *Hawaiian History 284 Class Lectures*. University of Hawaii, Honolulu.

Kirch, P. 1983 *Feathered Gods and Fishhooks: An Introduction to Hawaiian Archaeology and Prehistory*. University of Hawaii Press, Honolulu.

KTF - Kohala Task Force 1975 Annual Report.

Koykendall, R. 1937 *The Hawaiian Kingdom 1854-1874*. Honolulu: University Press of Hawaii.

Kuykendall, R. and Day, A. G. 1976 *Hawaii: A History from Polynesian Kingdom to American State*. Prentice-Hall, Englewood.

Ladd, E. 1986 Ruins Stabilization and Restoration Record. Pu'uhohola Heiau National Historic Site, Kawaihee, Hawaii. National Park Service ms. On file, State Historic Preservation Division, Kapolei.

Langley, C. 1994 Pu'u of Mauika Kawaihee and Kalala Ahupua'a, District of Kohala, Hawaii Island. Report of an investigation of the Hawaiian Cultural Significance of Candidate Sites for the Kamehameha Area (Hawaii) NEXRAD Installation. Prepared for SRI International, Menlo Park, California.

Laypis, J. and Sharp, M. 1994 "Geophysical Investigation for the Location of a Historic Heiau, Kawaihee, Hawaii." Geotechnical Laboratory. Prepared for U.S. Army Engineer, Honolulu. (On file at SHPD Library #11-1375)

Maly, Kapa 1999 "Ni Ala Hike Ma Kai O Kohala Heima (The Coastal Trails of South Kohala): Archival-Historical Documentary Research, Oral History-Consultation Study, and Limited Site Preservation Plan, Kawaihee-Anaeho'omaha Trail Section: Lands of Kawaihee 2'. Ouli, Liliuokalani, Waikoloa, Pukoh, Waimea, Kauhupua'a and 'Anaeho'omaha; District of Kohala, Island of Hawaii." *Kamehameha Associates, Hilo*. (On file at SHPD Library #11-1597)

Mission Station Reports 1832-70 Mission Station Reports. Waimea, Hawaii. Hawaii Mission Children's Society Library.

Madrau, Riley M. and Fitzpatrick, Gary L. 1995 *Surveying the Mahalo: Mapping the Hawaiian Land Revolution*. Palapala 'aina. Editions Limited, Honolulu.

n.a. (No Author) 1967 "Historical Notes: Waimea-Kawaihee, South Kohala, Hawaii." (On file at SHPD Library #11-463)

NR n.d. Native Register of Kuleana Claims Recorded by the Board of Commissioners to Quiet Land Titles in the Hawaiian Islands. Manuscript. Hawaii State Archives.

NT n.d. Native Testimony Recorded by the Board of Commissioners to Quiet Land Titles in the Hawaiian Islands. Manuscript. Hawaii State Archives.

Orr, M. 2003 Cultural Impact Study & Assessment of Fiber Poie Project, Kawaihee 1, South Kohala, Hawaii (TMK: 6-1-04; Pw. 20).

Pukui, M., Elbert, S. and Mookini, E. 1974 *Place Names of Hawaii*. University of Hawaii Press, Honolulu.



RECEIVED AS FOLLOWS

- Reichman, B., and M. Clark  
2000 An Archaeological Inventory Survey of an 8.7-acre Parcel at Ma'u'uame Beach (TMK: 3-6-2-027), Kawahae 2<sup>nd</sup>, South Kohala District, Island of Hawaii. Reichman Consulting Report RC-009 prepared for C & H Properties, Kamuela Hawaii.
- Rinecke, J.E.  
1930 Survey of Sites on West Hawai'i. Ms. in Bishop Museum.
- Rhodes, D.  
1993 "Overview of Hawaiian History" (Chapter II & III) in Greene (1993) NPS
- Rosendahl, P.  
1981 Archaeological reconnaissance, Kawahae, South Kohala, Hawaii: Villa's EIS project, TMK 6-2-024. Prepared for Belt, Collins & Associates (On file at UHM-Hamilton Library)
- Rosendahl, P., and L. Carter  
1988 Excavations at John Young's Homestead, Kawahae, Hawaii. Archaeology at Pu'ukohala Heiau National Historic Site. Edited by Gary F. Somers. *Western Archaeological and Conservation Center Publications in Anthropology No. 47*.
- Sato, H., W. Ikeda, R. Paeth, R. Smythe, and M. Takehiro  
1973 Soil Survey of the Island of Hawaii, United States Department of Agriculture, Soil Conservation Service, in Cooperation with the University of Hawaii Agricultural Experiment Station.
- Schuster, L.  
1992 Bulldozers and Archaeology at John Young's Homestead, Archaeology at Pu'ukohala Heiau National Historic Site. National Park Service, Honolulu.
- Soehren, L.  
1964 An Archaeological Survey of the Shores of Oahu and Kawaihewa, South Kohala, Hawaii. Department of Anthropology, D.P. Bishop Museum, Honolulu.
- Somers, G.  
1988 Archaeological Survey of the Proposed Spencer Beach Park Entrance Road, Pu'ukohala Heiau National Historic Site, Island of Hawaii. Ms. On file, Pacific Area Office, National Park Service, Honolulu.
- Speakman, Cummins E.  
2001 *Mowee: a History of Maui the magic Isle*. Mutual Publishing, Honolulu.
- Stephenson, I.K.  
1977 Kohala Keia (This is Kohala) Collected Expressions of a Community, A Product of Kohala People. Privately published.
- Stokes, J., and T. Dye  
1991 Heiau of the Island of Hawai'i. *Bishop Museum Bulletin in Anthropology* 2. Bishop Museum Press, Honolulu.
- Thrum, T.  
1908 *Heiaus and Heiau Sites Throughout the Hawaiian Islands*. IN Hawaiian Annual for 1908, pp. 38-47.
- Tonnoori-Tuggle, Myra  
1987 North Kohala: Perception of a Changing Community. A Cultural Resource Management Study. For DLNR Division of State Parks, Honolulu.
- Wilhoos' Aina Corporation  
2000 The Mahalo Database, Wilhoos.com
- Walker, A., and P. Rosendahl  
1989a Interim Report: Summary of Findings and General Significance Assessments and Recommended General Treatments, Archaeological Inventory Survey, Maunae Beach Parcel. PIHR Report 702-102689 prepared for Sidney Fuke & Associates, Hilo.
- 1989b Preliminary Report: Summary of Findings and General Significance Assessments and Recommended General Treatments, Phase 1 - Site Identification, Archaeological Inventory Survey, Queen's Lands at Mauna Kea, Land of Kawahae 2, South Kohala District, Island of Hawaii. PIHR Report 591-0907891 prepared for Mauna Kea Properties.
- 1994 Archaeological Inventory Survey, Proposed NEXRAD and ATCBI Sites and Related Access Road Corridor, Land of Kawahae 1<sup>st</sup>, South Kohala District, Island of Hawaii. PIHR Report 1497-023194 prepared for SRI International, Menlo Park, California.
- 1995 Archaeological Inventory Survey, Proposed Substation Site and Utility Corridor for NEXRAD, Land of Kawahae 1<sup>st</sup>, South Kohala District, Island of Hawaii. PIHR Report 1497-121694 prepared for SRI International, Menlo Park, California.
- Williams, J.N.S.  
1919 "A Little Known Engineering Work." In *Hawaiian Almanac and Annual*, Thos. G. Thrum, Honolulu.
- Wolfe, E., and J. Morris  
2001 Geological Map of the Island of Hawaii. U.S. Department of the Interior, U.S. Geological Survey

RECEIVED AS FOLLOWS

Appendix 4  
**Terrestrial Flora Studies**



**Final Environmental Assessment/  
Finding of No Significant Impact**  
Submarine Fiber-Optic Cable Project

## CHAR & ASSOCIATES

Botanical/Environmental Consultants

4471 Puu Panini Ave.  
Honolulu, Hawaii 96816  
(808) 734-7828

October 2002

### BOTANICAL RESOURCES ASSESSMENT KEKAHA CABLE LANDING SITE KEKAHA, MAIHEA DISTRICT, KAUAI

#### INTRODUCTION

The proposed cable landing site in Kekaha Town is located on the corner of Kaunali'i Highway and Aki'aloa Road at about 10 ft. above mean sea level. The parcel is fenced and is currently used for grazing horses. The land owner is the State Department of Hawaiian Home Lands.

Field studies to assess the botanical resources on the proposed cable landing site were made on 18 September 2002. A survey was also made along the land route from the landing site, up Aki'aloa Road, and terminating at the switch building; and from the cable landing site to the land route identified by SSPM. The primary objectives of the field studies were to prepare a general description of the vegetation on the cable landing or HDD site and along the connecting routes, and to search for threatened and endangered species as well as species of concern.

Prior to the field studies, topographic maps and recent colored aerial photographs were examined to determine vegetation cover patterns, terrain characteristics, access, boundaries, and reference points. In the field, a walk-through survey method was used. Notes were made on plant associations

and distribution, disturbances, substrate types, topography, exposure, etc. The project planners and engineers accompanied us on the field studies.

#### RESULTS

The plant names used in this report follow Wagner *et al.* (1990) and Wagner and Herbst (1999). The few recent name changes are those reported in the *Hawaii Biological Survey series* (Evenhuis and Eldredge, eds., 1999-2002).

Cable Landing Site: Topography on this parcel is level with a slight slope along the mauka boundary; the parcel has been bulldozed in the past. The substrate is sandy loam.

The vegetation composition is very simple because the site is used as a corral for horses and is heavily disturbed. It consists of scattered patches of Bermuda or manile grass (*Cynodon dactylon*) and numerous plants of golden crown-beard (*Verbesina encelioides*), an annual weedy herb, 1 to 2 ft. tall, with clusters of yellow, daisy-like flowers. A few plants of spiny amaranth or pakai kuku (*Amaranthus spinosus*) and fuzzy rattletop or kukaenoki (*Crotalaria incana*) are occasionally encountered. Along the mauka boundary is a stand of kiawe trees (*Prosopis pallida*).

Connecting Route: The connecting routes are located within the right-of-way along the roads and highway. The right-of-way is periodically maintained (mowed or weed-whacked).

The ruderal or roadside vegetation consists primarily of low mats of Bermuda grass. Weedy plants form scattered low patches here and there. Some of the more commonly observed plants include swollen fingergrass (*Chloris barbata*), goose grass (*Eleusine indica*), golden crown-beard, hairy spurge (*Chamaesyce hirta*), lovegrass (*Eragrostis amabilis*), pitted beardgrass (*Bothriochloa pertusa*), and buffelgrass (*Cenchrus ciliaris*).

RECEIVED AS FOLLOWS

#### DISCUSSION

The vegetation on the cable landing site and the connecting land routes is dominated by introduced or alien species, most of which are considered weedy. This is not surprising as the parcel proposed for the landing site is used intensively as a corral, and the connecting routes occur along the right-of-way which is periodically maintained. None of the plants found on the areas to be affected by the project is a threatened and endangered species or a species of concern (U.S. Fish and Wildlife Service 1999a, 1999b; Wagner *et al.* 1999).

Given these findings, the proposed project is not expected to have a significant negative impact on the botanical resources.

#### REFERENCES

- Evenhuis, H.L. and L.G. Eldredge, editors. 1999-2002. Records of the Hawaii Biological Survey. Bishop Museum Occasional Papers Nos. 58-70.
- U.S. Fish and Wildlife Service. 1999a. U.S. Fish and Wildlife Service Species List, plants. March 23, 1999. Pacific Islands Office, Honolulu, HI.
- U.S. Fish and Wildlife Service. 1999b. Endangered and threatened wildlife and plants. 50 CFR 17.11 and 17.12. December 31, 1999.
- Wagner, W.L., M.M. Brueggmann, D.R. Herbst, and J. Q.C. Lau. 1999. Hawaiian vascular plants at risk: 1999. Bishop Museum Occasional Papers No. 60.
- Wagner, W.L., D.R. Herbst, and S.H. Sohmer. 1990. Manual of the flowering plants of Hawai'i. 2 vols. University of Hawai'i Press and Bishop Museum Press, Honolulu. Bishop Museum Special Publication 83.
- Wagner, W.L. and D.R. Herbst. 1999. Supplement to the Manual of the flowering plants of Hawai'i, pp. 1855-1918. In: Wagner, W.L., D.R. Herbst, and S.H. Sohmer, Manual of the flowering plants of Hawai'i. Revised edition. 2 vols. University of Hawai'i Press and Bishop Museum Press, Honolulu.

RECEIVED AS FOLLOWS

## CHAR & ASSOCIATES

Botanical/Environmental Consultants  
4471 Puu Pahi Ave.  
Honolulu, Hawaii 96816  
(808) 734-7828

November 2002

### BOTANICAL RESOURCES ASSESSMENT KILI DRIVE CABLE LANDING SITE MAKAHA, MAI'ANAE DISTRICT, O'AHU

#### INTRODUCTION

The cable landing site parcel is located along Kili Drive where it intersects Farrington Highway across from Makaha Beach Park. The land is owned by the City and County of Honolulu.

An assessment of the botanical resources on the Kili Drive parcel and along the connecting route or "gap" from the Kili Drive site to the SSFM land route at Mai'anae Valley Road was conducted on 21 November 2002. The primary objectives of the survey were to prepare a general description of the vegetation on the Kili Drive site and connecting route, and to search for threatened and endangered species as well as species of concern.

Topographic maps and a recent colored aerial photograph were examined prior to the field studies to familiarize the principal investigator with the project's location and vegetation cover patterns. In the field, notes were made on plant associations and distribution, substrate types, drainage, disturbances, topography, etc.

#### RESULTS

The plant names used in this report follow Wagner et al. (1990) and Wagner and Herbst (1999). The few recent name changes are those recorded in the Hawaii Biological Survey series (Evenhuis and Eldredge, eds., 1999-2002).

**Cable Landing Site:** Soils on the area mauka of Farrington Highway are mapped as "HeA", Hale'iwa silty clay, 0 to 2 percent slopes on the soil maps (Foote et al. 1972). On the low lying area on the northwest portion of the parcel, the soils are poorly drained. A small wetland dominated by pickleweed (Batis maritima) is found here. Pickleweed is an obligate wetland indicator species (Reed 1997); obligate species occur almost always (estimated probability greater than 99%) under natural conditions in wetlands.

The rest of the parcel mauka of the highway (slightly more than three-quarters of the site) is well-drained, dark brown silty clay fastland (non-wetland). The vegetation is open to closed kiawe (Prosopis pallida) forest, 20 to 25 ft. tall, with scattered koa haole (Leucaena leucocephala) thickets, 3 to 7 ft. tall. Guinea grass (Panicum maximum) and buffelgrass (Cenchrus ciliaris) form a very dense cover between the woody components. A few plants of lantana (Lantana camara), virgate mimosa (Desmanthus pennabucanus), and wild basil (Ocimum basilicum) are found where the grass cover is patchy.

A few bougainvillea shrubs (Bougainvillea glabra hybrid) have been planted along the Kili Drive side of the parcel. Along the highway right-of-way, the vegetation consists primarily of low mats of Bermuda grass (Cynodon dactylon) and Sida ciliaris.

Maka of the highway is a narrow band of kiawe trees with Guinea grass and buffelgrass. A broad, sandy beach is found seaward of the kiawe trees.

RECEIVED AS FOLLOWS

Connecting Route: The connecting land route between the Kili Drive cable landing site and the SSFH identified land route at Wai'anae Valley Road is approximately 3.3 miles long and follows along the Farrington Highway right-of-way.

The route passes through developed, urban lands and the right-of-way is regularly mowed. Bermuda grass and *Sida ciliaris* are the most abundant plants along the right-of-way. Large sections of the right-of-way are covered with a crushed coral/sand mixture or coarse blue-rock gravel.

#### DISCUSSION

The vegetation on the Kili Drive cable landing site and connecting route is dominated by introduced species such as kiawe, koa haole, Guinea grass, buffelgrass, *Sida ciliaris*, etc. Introduced or alien species are all those plants brought to Hawai'i by humans, intentionally or accidentally, after Western contact, that is Cook's arrival in Hawai'i in 1778. The only native plants observed on the project site were the 'uhaloa (*Waltheria indica*) and 'ilima (*Sida fallax*); both of these species are indigenous, that is, they are native to Hawai'i and elsewhere.

None of the plants found during the field studies is a threatened and endangered species or a species of concern (U.S. Fish and Wildlife Service 1999a, 1999b; Wagner *et al.* 1999). All of the plants can be found in similar lowland, disturbed habitats throughout Hawai'i.

The small wetland on the northwest portion of the cable landing site parcel is of concern and should be avoided. Wetlands are of particular interest to Federal and State regulatory agencies. Any activities within wetlands would be subject to permitting and review. The cable landing site can be located within the much larger non-wetland area occupied by kiawe trees and koa haole shrubs.

RECEIVED AS FOLLOWS

#### REFERENCES

- Evenhuis, M.L. and L.G. Eldredge, editors. 1999-2002. Records of the Hawaii Botological Survey. Bishop Museum Occasional Papers Nos. 58-70.
- Foote, D.E., E.L. Hill, S. Nakamura, and F. Stephens. 1972. Soil survey of the islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii. Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C.
- Reed, P.B., Jr. 1997. Revision of the national list of plants that occur in wetlands. Department of the Interior, U.S. Fish and Wildlife Service. Washington, D.C.
- U.S. Fish and Wildlife Service. 1999a. U.S. Fish and Wildlife Service species list, plants. March 23, 1999. Pacific Islands Office, Honolulu, HI.
- U.S. Fish and Wildlife Service. 1999b. Endangered and threatened wildlife and plants. 50 CFR 17.11 and 17.12. December 31, 1999.
- Wagner, M.L., M.M. Brueggemann, D.R. Herbst, and J. Q.C. Lau. 1999. Hawaiian vascular plants at risk: 1999. Bishop Museum Occasional Papers No. 60.
- Wagner, M.L., D.R. Herbst, and S.H. Sohmer. 1990. Manual of the flowering plants of Hawai'i. 2 vols. University of Hawai'i Press and Bishop Museum Press, Honolulu. Bishop Museum Special Publication 83.
- Wagner, M.L. and D.R. Herbst. 1999. Supplement to the Manual of the flowering plants of Hawai'i, pp. 1855-1918. In: Wagner, M.L., D.R. Herbst, and S.H. Sohmer, Manual of the flowering plants of Hawai'i. Revised edition. 2 vols. University of Hawai'i Press and Bishop Museum Press, Honolulu.

## CHAR & ASSOCIATES

Botanical/Environmental Consultants  
4471 Pali Pali Ave.  
Honolulu, Hawaii 96816  
(808) 734-7828

November 2002

### BOTANICAL RESOURCES ASSESSMENT SANDY BEACH CABLE LANDING SITE HONOLULU DISTRICT, O'AHU

#### INTRODUCTION

The proposed cable landing site will be situated within the Sandy Beach County Park located along Kalaniana'ole Highway on the southeastern coast of O'ahu. Field studies were made on 17 November 2002 to assess the botanical resources on the cable landing site and the connecting route ("gap") between the landing site and the land route identified by SSFH. The primary objectives of the field survey were to provide a general description of the vegetation and to search for threatened and endangered species as well as species of concern.

A recent colored aerial photograph and topographic map were examined prior to the field studies to familiarize the principal investigator with the location of the study site. In the field, notes were made on substrate types, disturbances, plant associations and distribution, topography, exposure, etc.

#### RESULTS

The plant names used in this report follow Wagner *et al.* (1990) and Wagner and Herbst (1999). The few recent name changes are those reported in the Hawaii Botanical Survey series (Evenhuis and Eldredge, eds., 1999-2002).

RECEIVED AS FOLLOWS

**Cable Landing Site:** The landing site is located between Kalaniana'ole Highway and the paved beach park access road. The vegetation in this area is open grassy lawn, recently mowed. It is a mixture of pitted beardgrass (*Bothriochloa pertusa*) and Bermuda grass (*Cynodon dactylon*) with various herbaceous species which include false mallow (*Malvastrum coromandelianum*), khaki weed (*Alternanthera pungens*), nutgrass (*Cyperus rotundus*), goose grass (*Eleusine indica*), pigweed (*Portulaca oleracea*), creeping indigo (*Indigofera hendecaphylla*), and *Calypocarpus vialis*; the last two species can become locally abundant and form fairly large-sized mats. A large planting of *Clerodendron inermis* shrubs and milo trees (*Thespesia populnea*) is found within the lawn area.

Along the highway is a narrow band of low, windswept koa haole (*Leucaena leucocephala*) scrub vegetation, 5 to 6 ft. tall. Lumpy mats of Chinese violet (*Asystasia gangetica*) and clumps of Guinea grass (*Panicum maximum*) fill in the matrix between the shrubs. Other weedy species found here include buffelgrass (*Cenchrus ciliaris*), Boerhavia coccinea, golden crown-beard (*Verbesina encelioides*), crabgrass (*Digitaria* sp.), and running pop (*Passiflora foetida*).

Makat of the beach access road, shrubs of naupaka kahakai or beach naupaka (*Scaevola sericea*) form scattered patches, 3 to 5 ft. high on sandy substrate. In between the naupaka patches are open areas with 'aki'aki or seashore rushgrass (*Sporobolus virginicus*) and low mats of 'ilima papa (*Sida fallax*), kipukai (*Heliotropium curassavicum*), Australian saltbush (*Atriplex semibaccata*), and pa'uohi'ika (*Jacquemontia ovalifolia* ssp. *sandwicensis*). On the rocky, basaltic coastline, a few small shrubs of 'ohelo kai (*Lycium sandwicense*) and beach naupaka, and low mats of 'akulikuli (*Sesuvium portulacastrum*) are found.

**Connecting Route:** The connecting route or "gap" segment crosses the mowed lawn and the band of koa haole scrub bordering the beach park along Kalaniana'ole Highway. It follows along Kalaniana'ole Highway for about

RECEIVED AS FOLLOWS

on the immediately surrounding area is a threatened and endangered species or a species of concern (U.S. Fish and Wildlife Service 1999a, 1999b; Wagner et al. 1999). All of the plants can be found in similar lowland, coastal environments throughout the Hawaiian Islands.

Given these findings, the proposed project is not expected to have a significant negative impact on the botanical resources. It is recommended that the disturbed areas within the beach park be grassed over as soon as possible to prevent generation of dust.

0.3 mile and connects with the land route at the intersection with Kealahou Street.

The shoulders along the highway right-of-way are lined with coarse blue-rock gravel in some places; a wide, gravel-lined area is found by the intersection and stoplight. In other places, there are low mats of Bermuda grass and buffelgrass with scattered patches of weedy heliotrope (*Heliotropium procumbens* var. *depressum*), khaki weed, goose grass, and beach wiregrass (*Dactyloctenium aegyptium*). *Sida ciliaris* forms fairly large, creeping mats in some places; this introduced relative of the 'Ilima has spread rapidly on O'ahu in dry, lowland areas since it was first observed in 1987 (Wagner and Herbst 1999).

#### DISCUSSION

The Sandy Beach cable landing site will be sited on grassy mowed lawn, while the connecting route will run along the Kalaniana'ole Highway right-of-way which is either gravel-lined or supports weedy patches of vegetation.

Eleven native species were found during the field studies; most of which were observed within the coastal strand vegetation on sandy or rocky substrate. The coastal strand vegetation will not be disturbed by the proposed project. Nine of the native species are indigenous, that is, they are native to Hawai'i and elsewhere. These are: 'Ilima (*Sida fallax*), 'uhaloa (*Malthesia indica*), 'akulikuli (*Sesuvium portulacastrum*), nohu (*Tribulus cistoides*), 'ohelo kai (*Lycium sandwicense*), beach naupaka (*Scaevola sericea*), 'aki'aki (*Sporobolus virginicus*), alena (*Boerhavia repens*), and kipukai (*Heliotropium curassavicum*). Two species are endemic, that is, they are native only to Hawai'i. These are: hihahina (*Heliotropium anomalum* var. *argenteum*) and pa'uohi'iaka (*Jacquemontia ovalifolia* ssp. *sandwicensis*).

None of the plants found on the cable landing site and the connecting route, or



RECEIVED AS FOLLOWS

REFERENCES

- Evenhuis, M.L. and L.G. Eldredge, editors. 1999-2002. Records of the Hawaii Biological Survey. Bishop Museum Occasional Papers Nos. 58-70.
- U.S. Fish and Wildlife Service. 1999a. U.S. Fish and Wildlife Service species list, plants. March 23, 1999. Pacific Islands Office, Honolulu, HI.
- U.S. Fish and Wildlife Service. 1999b. Endangered and threatened wildlife and plants. 50 CFR 17.11 and 17.12. December 31, 1999.
- Wagner, M.L., M.H. Brueggemann, D.R. Herbst, and J. Q.C. Lau. 1999. Hawaiian vascular plants at risk: 1999. Bishop Museum Occasional Papers No. 60.
- Wagner, M.L., D.R. Herbst, and S.H. Sohmer. 1990. Manual of the flowering plants of Hawai'i. 2 vols. University of Hawai'i Press and Bishop Museum Press, Honolulu. Bishop Museum Special Publication 83.
- Wagner, M.L. and D.R. Herbst. 1999. Supplement to the Manual of the flowering plants of Hawai'i, pp. 1855-1918. In: Wagner, M.L., D.R. Herbst, and S.H. Sohmer, Manual of the flowering plants of Hawai'i. Revised edition. 2 vols. University of Hawai'i Press and Bishop Museum Press, Honolulu.

## CHAR & ASSOCIATES

Botanical/Environmental Consultants

4471 Puu Paia Ave.  
Honolulu, Hawaii 96816  
(808) 734-7828

April 2003

### BOTANICAL RESOURCES ASSESSMENT KALAMA'ULA CABLE LANDING SITE MOLOKA'I DISTRICT, MOLOKA'I

#### INTRODUCTION

The Kalama'ula cable landing/drill site is located makai of Kamehameha Highway (Route 450) and west of the nearby Aii'i Fishpond. A number of homes line the coastline along this portion of leeward Moloa'i. The proposed Kalama'ula cable landing site parcel is located on State-owned lands, i.e., Department of Hawaiian Home Lands. It is a somewhat overgrown parcel; an old house site is found on the property.

Field studies to assess the botanical resources on the property were conducted on 11 December 2002. The primary objectives of the field survey were to (1) prepare a general description of the vegetation on the parcel, and (2) search for threatened and endangered species as well as species of concern.

Aerial photographs and topographic maps of the project site were examined prior to the field studies to determine vegetation cover patterns, terrain characteristics, access, boundaries, and reference points. In the field, a walk-through survey method was used. Notes were made on plant associations and distribution, substrate types, disturbances, topography, exposure, etc. The project planners and engineers accompanied the survey team in the field.

#### RESULTS

The plant names used in the following discussion follow Wagner et al. (1990) and Wagner and Herbst (1999). The few recent name changes are in accordance with those reported in the Hawaii Biological Survey series (Evenhuls and Eldredge, eds., 1999-2002).

The proposed cable landing/drill site is an old house lot. The vegetation on the cable landing site is dominated by buffelgrass (Cenchrus ciliaris), 1 to 2 ft. tall; this grass species is common in dry areas and sandy soils in a wide variety of disturbed habitats throughout the Hawaiian Islands. Shrubs of Indian pluchea (Pluchea indica), sourbush (Pluchea carolinensis), koa hале (Leucaena leucocephala), and klu (Acacia farnesiana), 2 to 4 ft. tall, occur as scattered patches among the clumps of buffelgrass. These woody species cover approximately 5% of the cable landing/drill site. Two common native species, the 'uhaloa (Waltheria indica) and 'ilima (Sida fallax), were observed interspersed with the other species. The substrate is sandy and some areas contain gravel.

The east side of the parcel, near the landing/drill site, is framed by a row of young coconut palms (Cocos nucifera), 25 to 35 ft. tall, and a large false kamani or tropical almond tree (Terminalia catappa). The makai portion of this area may be intermittently wet with the tide as a few small mangrove trees (Rhizophora mangle) were observed 15 to 20 ft. inland.

To the west of the cable landing/drill site is a former house site with an overgrown gravel driveway. This portion of the property is also dominated by buffelgrass. Other weedy species observed on this area occur sporadically and include spiny amaranth (Amaranthus spinosus), Guinea grass (Panicum maximum), garden spurge (Chamaesyce hirta), hairy horseweed (Gonypa bonariensis), little ironweed (Cyanthillium cinereum), and pitted beardgrass (Bothriochloa pertusa).

RECEIVED AS FOLLOWS

Makai of the cable landing/drill site is a small grove of coconut palms, 50 to 60 ft. tall. Areas with bare sandy soil are abundant here. Ground cover is patchy and consists of a few native coastal species: 'akulikuli (*Sesuvium portulacastrum*) and kipukai (*Heliotropium curassavicum*). The dominant vegetation near the shoreline is pickleweed (*Batis maritima*) and mangrove. This vegetation type continues onto the rock wall that encloses the fishpond adjacent to the property.

#### DISCUSSION

The proposed Kalama'ula cable landing/drill site is located on an old house lot. The level lot located along the coastline supports low grassy mats and patches of sandy soil. Groves of coconut and low shrubs frame the west and south sides of the parcel.

Only four native species were observed on the parcel. 'Uhaloa and 'Iliia are small shrubs which commonly occur in dry, lowland habitats. Kipukai and 'akulikuli are coastal species with succulent leaves. All these plants are indigenous, that is, they are native to the Hawaiian Islands and elsewhere. None of the plants found on the Kalama'ula parcel is a threatened and endangered species or a species of concern (U.S. Fish and Wildlife Service 1999a, 1999b; Wagner et al. 1999).

Because the Kalama'ula parcel has been greatly disturbed in the past and is dominated primarily by introduced species, there is very little of botanical interest or concern. The proposed use of the parcel for a cable landing/drill site is not expected to have a significant negative impact on the botanical resources.

#### References

- Evenhuis, M.L. and L.G. Eldredge, editors. 1999-2002. Records of the Hawaii Biological Survey. Bishop Museum Occasional Papers Nos. 58-70.
- U.S. Fish and Wildlife Service. 1999a. U.S. Fish and Wildlife Service species list, plants. March 23, 1999. Pacific Islands Office, Honolulu, HI.
- U.S. Fish and Wildlife Service. 1999b. Endangered and threatened wildlife and plants. 50 CFR 17.11 and 17.12. December 31, 1999.
- Wagner, M.L., M.M. Brueggemann, D.R. Herbst, and J. Q.C. Lau. 1999. Hawaiian vascular plants at risk: 1999. Bishop Museum Occasional Papers 60.
- Wagner, M.L., D.R. Herbst, and S.H. Sohmer. 1990. Manual of the flowering plants of Hawai'i. 2 vols. University of Hawai'i Press and Bishop Museum Press, Honolulu. Bishop Museum Special Publication 83.
- Wagner, M.L. and D.R. Herbst. 1999. Supplement to the Manual of the flowering plants of Hawai'i, pp. 1855-1918. In: Wagner, M.L., D.R. Herbst, and S.H. Sohmer, Manual of the flowering plants of Hawai'i. Revised edition. 2 vols. University Press of Hawai'i and Bishop Museum Press, Honolulu.

RECEIVED AS FOLLOWS

RECEIVED AS FOLLOWS

**CHAR & ASSOCIATES**  
Botanical/Environmental Consultants

4471 Puu Pauni Ave.  
Honolulu, Hawaii 96816  
(808) 734-7828

**TRANSMITTAL**

TO Jason Yazawa  
Parsons Brinckerhoff

FROM Minona Char

RE Mahikuli, Lahaina, Maui

May 2003

BOTANICAL RESOURCES ASSESSMENT  
MAHIKULI CABLE LANDING SITE  
MAHIKULI, LAHAINA, MAUI

Original plus 2 copies  
e-mailed to folio

were examined to determine vegetation cover patterns, terrain characteristics, access, boundaries, and reference points. In the field, notes were made on plant associations and distribution, substrate types, disturbances, topography, exposure, drainage, etc.

**RESULTS**

The plants names used in this report follow Wagner et al. (1990) and Wagner and Herbst (1999). The few recent name changes are those reported in the Hawaii Biological Survey series (Evenhuis and Eldredge, editors, 1999-2002).

Soils on the study parcel and the surrounding lands belong to the Mahikuli series (Foote et al. 1972). These are well-drained, dark reddish-brown silty clay soils ranging from sea level to 600 ft. elevation. Annual rainfall amounts to 12 to 20 inches; most of it occurring during the wetter, winter months. Permeability is moderate, runoff is slow, and the erosion hazard is slight. The soil type maps, which are overlaid on a photobase from 1965, show that the study site was under sugar cane cultivation at that time.

Vegetation on the cable landing/drill site and the rest of the weedy section is largely buffelgrass (*Cenchrus ciliaris*), 6 inches to a foot tall. Locally common and forming fairly large sized patches are swollen fingergrass (*Chloris barbata*) and wild bushbean (*Macroptilium latyroides*), about one foot tall. Scattered here and there are koa haole shrubs (*Leucaena leucocephala*) which have been cut back; these are 6 inches to a foot tall. Lovegrass (*Eragrostis amabilis*) is abundant during the wetter months. Other species occurring here in smaller numbers include Florida beggarweed (*Desmodium tortuosum*), false mallow (*Malvastrum coromandelianum*), Boerhavia coccinea, saltbush (*Atriplex suberecta*), hairy merremia (*Merremia aegyptia*), creeping indigo (*Indigofera hendecaphylla*), coatbuttons (*Tridax procumbens*), garden spurge (*Chamaesyce hirta*), and 'uhaloa (*Malthesia indica*). Mats of *Sida*

**INTRODUCTION**

The Mahikuli cable landing/drill site is located on a triangular-shaped parcel bounded by Hono a Pi'ilani Highway (Route 30) along its makai (west) boundary and the Lahaina, Ka'anapali and Pacific Railroad tracks along its mauka (east) boundary. The access road to the Lahaina Post Office and Lahaina Civic center abuts the north side of the parcel. The northern half of the parcel is open, well-maintained, green, grassy lawn area, while the southern half of the parcel, where the landing/drill site is located, is weedy and somewhat infrequently mowed. An overgrown concrete and rock-lined drainage ditch separates the well-maintained lawn area from the weedy, overgrown section.

Field studies to assess the botanical resources on the cable landing/drill site as well as the overgrown portion of the parcel were conducted on 30 April 2003. The primary objectives of the field studies were to (1) prepare a general description of the vegetation on the project site, and (2) search for threatened and endangered species as well as species of concern.

Prior to the field studies, a colored aerial photograph and topographic maps

cliffside form a patchy band along the highway. The first collections of this species recorded from Maui were made in about the same area (Oppenheimer and Bartlett 2000).

The drainage ditch supports tall clumps of Guinea grass (*Panicum maximum*) and koa haole shrubs, 8 to 12 ft. tall. Buffelgrass is very dense along the banks of the drainage. Other plants found in this area include little bell (*Ipomoea triloba*), castor bean (*Ricinus communis*), lion's-ear (*Leonotis nepetifolia*), klu (*Acacia farnesiana*), and 'uhaloa.

#### DISCUSSION

The cable landing/drill site is located on a level, weedy, triangular-shaped parcel which is infrequently maintained. The vegetation consists primarily of buffelgrass and a number of weedy species which are commonly associated with ruderal or wayside areas. 'Uhaloa was the only native species found during the field survey. It is an indigenous species, that is, it is native to the Hawaiian Islands and elsewhere. All the other plants are introduced or alien; these are plants which were brought to the islands by humans, intentionally or accidentally, after Western contact, that is, Cook's arrival in the islands in 1778.

None of the plants found during the field studies is a threatened and endangered species or a species of concern (U.S. Fish and Wildlife Service 1999a, 1999b; Wagner et al. 1999). All of the plants can be found in similar dry, lowland, disturbed habitats throughout the main Hawaiian Islands.

All of the parcel and the adjacent lands mauka of the highway were under sugar cane cultivation at one time. As a result, there is very little of botanical interest remaining on the project site. The proposed limited use of the site is not expected to have any significant negative impact on the botanical resources.

RECEIVED AS FOLLOWS

#### References

- Evenhuis, M.L. and L.G. Eldredge, editors. 1999-2002. Records of the Hawaii Biological Survey. Bishop Museum Occasional Papers Nos. 58-70.
- Foote, D.E., E.L. Hill, S. Makamura, and F. Stephens. 1972. Soil survey of the islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii. Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C.
- Oppenheimer, H.L. and R.T. Bartlett. 2000. New plant records from Maui, O'ahu, and Hawai'i Islands, pp. 1-9. In: Evenhuis, M.L. and L.G. Eldredge, editors, Records of the Hawaii Biological Survey for 1999. Part 2: Notes. Bishop Museum Occasional Papers No. 64.
- U.S. Fish and Wildlife Service. 1999a. U.S. Fish and Wildlife Service species list, plants. March 23, 1999. Pacific Islands Office, Honolulu, HI.
- U.S. Fish and Wildlife Service. 1999b. Endangered and threatened wildlife and plants. 50 CFR 17.11 and 17.12. December 31, 1999.
- Wagner, M.L., M.M. Brueggmann, D.R. Herbst, and J. Q.C. Lau. 1999. Hawaiian vascular plants at risk: 1999. Bishop Museum Occasional Papers No. 60.
- Wagner, M.L., D.R. Herbst, and S.H. Sohmer. 1990. Manual of the flowering plants of Hawai'i. 2 vols. University of Hawai'i Press and Bishop Museum Press, Honolulu. Bishop Museum Special Publication 83.
- Wagner, M.L. and D.R. Herbst. 1999. Supplement to the Manual of the flowering plants of Hawai'i, pp. 1855-1918. In: Wagner, M.L., D.R. Herbst, and S.H. Sohmer, Manual of the flowering plants of Hawai'i. Revised edition. 2 vols. University of Hawai'i Press and Bishop Museum Press, Honolulu.

## CHAR & ASSOCIATES

Botanical/Environmental Consultants  
4471 Puu Paipai Ave.  
Honolulu, Hawaii 96816  
(808) 734-7828

April 2003

### BOTANICAL RESOURCES ASSESSMENT PO'OLENALENA CABLE LANDING SITE MAKENA, MAKAHAO DISTRICT, MAUI

#### INTRODUCTION

The cable landing site for the Makena area is located at Po'olenalena State Park. The State-owned parcel consists of approximately 2 acres located along Makena Road. The park is bounded by privately owned lands to the north, Makena Road to the east, State of Hawaii-owned lands and private lands to the south, and the ocean to the west. Most of the site is level and open with a large unpaved parking area located in the center of the property. The vegetation consists of a weedy assemblage of plants, 1 to 2 ft. tall, and scattered stands of kiawe trees (*Prosopis pallida*) and shrubs of sourbush (*Pluchea carolinensis*). Makai of the parking area and small band of kiawe trees is a white sandy beach.

Field studies to assess the botanical resources on the proposed cable landing/drill site and the park were conducted on 16 December 2002 by a team of two botanists. The primary objectives of the field studies were to (1) provide a general description of the vegetation on the park site, and (2) search for threatened and endangered species as well as species of concern.

Prior to the field studies, topographic maps and recent colored aerial

photographs were examined to determine vegetation cover patterns, terrain characteristics, access, boundaries, and reference points. In the field, notes were made on plant associations and distribution, substrate types, disturbances, topography, exposure, etc.

#### RESULTS

The plant names used in this report follow Wagner *et al.* (1990) and Wagner and Herbst (1999). The few recent name changes are those reported in the Hawaii Biological Survey series (Evenhuis and Eldredge, eds., 1999-2002).

The proposed cable landing at Po'olenalena is located within a State park. The drill site will be placed on or near to a dirt and gravel-covered parking area. A stand of large kiawe trees, 25 to 30 ft. tall, borders the seaward side of the parking area. Ground cover consists of low clumps of Guinea grass (*Panicum maximum*) and buffelgrass (*Cenchrus ciliaris*). The trees thin out closer to the sandy beach and ground cover consists of scattered, small patches of golden crown-beard (*Verbesina encelloides*) and Australian saltbush (*Atriplex semibaccata*).

A few small trees of milo (*Thespesia populnea*) have been planted along the north side of the parking area, but most of the vegetation around the parking area consists of weedy species, 1 to 2 ft. tall. Swollen fingergrass (*Chloris barbata*), spiny amaranth (*Amaranthus spinosus*), and *Boerhavia coccinea* are abundant to common. Other species which occur here in somewhat smaller numbers include golden crown-beard, false mallow (*Malvastrum coromandelianum*), garden spurge (*Chamaesyce hirta*), cheese weed (*Malva parviflora*), coatbuttons (*Tridax procumbens*), and *Heliotropium curassavicum* var. *depressum*. A few shrubs of sourbush and Indian pluchea (*Pluchea indica*) are scattered here and there.

From the cable landing site, the cable will follow under or next to the asphalt-covered driveway which accesses the parking area. It will connect

RECEIVED AS FOLLOWS

to the land route identified by SSFM along Makena Road. Again, weedy patches line the driveway.

A small 'a'a lava outcrop is found on the northeast corner of the park bordering Makena Road. This lava outcrop supports seven williwil trees (*Erythrina sandwicensis*), 15 to 18 ft. tall; a few small shrubs of 'i'ie'e (*Plumbago zeylanica*); and koali 'awa (*Ipomoea indica*), a native morning glory. The proposed cable project does not affect this outcrop with native plants.

#### DISCUSSION

The Po'olenalena site is dominated primarily by introduced plants such as kiawe, buffelgrass, swollen fingergrass, pluchea shrubs, and a number of weedy, annual species. The drill/landing site will be located on an existing dirt and gravel-covered parking lot within a public park.

Native plants observed within the park are the beach morning glory (*Ipomoea pes-caprae*) and naupaka shrubs (*Scaevola sericea*) found on the sandy beach; small shrubs of 'i'lima (*Sida fallax*) and 'uhaloa (*Malthesia indica*) which occur along the paved driveway; and williwil, 'i'ie'e, and koali 'awa on the small 'a'a outcrop. Of these native species, only the williwil is endemic, that is, it is native only to the Hawaiian Islands. The others are all indigenous, that is, they are native to the Hawaiian Islands and elsewhere.

None of the plants found on the proposed cable landing/drill site and within the State park is a threatened and endangered species or a species of concern (U.S. Fish and Wildlife Service 1999a, 1999b; Wagner et al. (1999)). The 'a'a outcrop found on the northeast corner of the park with the small stand of williwil trees will not be affected by the proposed project.

Given these findings, the proposed project at the Po'olenalena site is not expected to have a significant negative impact on the botanical resources of the site or the surrounding area.

#### References

- Evenhuis, M.L. and L.G. Eldredge, editors. 1999-2002. Records of the Hawaii Biological Survey. Bishop Museum Occasional Papers Nos. 58-70.
- U.S. Fish and Wildlife Service. 1999a. U.S. Fish and Wildlife Service species list, plants. March 23, 1999. Pacific Islands Office, Honolulu, HI.
- U.S. Fish and Wildlife Service. 1999b. Endangered and threatened wildlife and plants. 50 CFR 17.11 and 17.12. December 31, 1999.
- Wagner, M.L., M.H. Brueggemann, D.R. Herbst, and J. Q.C. Lau. 1999. Hawaiian vascular plants at risk: 1999. Bishop Museum Occasional Papers 60.
- Wagner, M.L., D.R. Herbst, and S.H. Sohmer. 1990. Manual of the flowering plants of Hawai'i. 2 vols. University of Hawai'i Press and Bishop Museum Press, Honolulu. Bishop Museum Special Publication 83.
- Wagner, M.L. and D.R. Herbst. 1999. Supplement to the Manual of the flowering plants of Hawai'i, pp. 1855-1918. In: Wagner, M.L., D.R. Herbst, and S.H. Sohmer, Manual of the flowering plants of Hawai'i. Revised edition. 2 vols. University of Hawai'i Press and Bishop Museum Press, Honolulu.

RECEIVED AS FOLLOWS

## CHAR & ASSOCIATES

Botanical/Environmental Consultants

4471 Puu Paiahi Ave.  
Honolulu, Hawaii 96816  
(808) 734-7828

April 2003

### BOTANICAL RESOURCES ASSESSMENT KAWAIIHAE CABLE LANDING SITE SOUTH KOHA DISTRICT, HAWAII

#### INTRODUCTION

The Kawaihae cable landing/drill site is located west of Kawaihae Harbor. The cable landing site parcel adjoins the Coast Guard Reservation property which contains the Kawaihae Light. An old concrete pier, identified as "Ruins" on the USGS map, is found makai (seaward) of the cable landing site. Vegetation on the cable landing site parcel consists primarily of kiawe forest.

Field studies to assess the botanical resources on the cable landing site as well as the entire parcel were conducted on 18 December 2002. The primary objectives of the field survey were to (1) prepare a general description of the vegetation on the project site, and (2) search for threatened and endangered species as well as species of concern.

Recent colored aerial photographs and topographic maps of the project site were examined to determine vegetation cover patterns, terrain characteristics, access, boundaries, and reference points. A walk-through survey method was used. Notes were made on plant associations and distribution, substrate types, disturbances, topography, exposure, etc. The project planners and engineers accompanied the survey team in the field.

#### RESULTS

The plant names used in the following discussion are in accordance with Wagner *et al.* (1990) and Wagner and Herbst (1999). The few recent name changes are those reported in the Hawaii Biological Survey series (Evenhuis and Elredge, editors, 1999-2002).

Soils on the study parcel are mapped as Kawaihae very rocky very fine sandy loam, 6 to 12 percent slopes; "KOC" on the soil maps (Sato *et al.*, 1973). This dark reddish-brown, extremely stony soil type is somewhat excessively drained and is found on coastal plains to about 1,500 ft. elevation. Rock outcrops occupy 10 to 20 percent of the surface. Annual rainfall is 5 to 20 inches, most of it falling during the winter months. Typical vegetation on this soil type consists of kiawe trees (*Prosopis pallida*), a number of grasses including pill grass (*Heteropogon contortus*), and small shrubs such as 'i'iima (*Sida fallax*).

The cable landing/drill site will be located on an old asphalt-covered road which leads down from Akoni Pule Highway (Route 270) to a former pier. Clumps of buffelgrass (*Cenchrus ciliaris*), 1 to 2 ft. tall, line the old roadway. From the cable landing site, the cable will follow under or next to the old road and connect to the land route identified by SSFM along the highway. A nearby, open area with scattered patches of buffelgrass and barren patches of soil and rubble may be used for storing equipment. This bull-dozed area has a pile of boulders and broken concrete slabs along its makai edge. Besides buffelgrass, other plants observed here in smaller numbers include 'aheaha (*Chenopodium murale*), 'uhaloa (*Waltheria indica*), and sixweeks threawn grass (*Aristida adscensionis*).

The old pier site is located along a boulder-covered shoreline. Immediately mauka (inland) of the old pier is an open area with bare soil and rocks and a few patches of buffelgrass, 'aheaha, swollen fingergrass (*Chloris*

RECEIVED AS FOLLOWS



barbata), 'uhaloa, and Australian saltbush (Atriplex semibaccata).

Kiawe forest borders these open areas and covers the rest of the parcel. The kiawe trees form a closed-canopy forest, 20 to 30 ft. tall. Many of the larger trees exhibit coppicing (branches originating from the stump remaining after the main trunk has been cut), and were probably cut for kiawe firewood in the past. Ground cover consists of scattered patches of buffelgrass, but areas with bare soil and leaf litter are prominent. Small shrubs or subshrubs of 'ilima and 'uhaloa are occasionally observed. Most of these plants occur along the margins of the forest where there is more light available.

#### DISCUSSION

The vegetation on the proposed cable landing/drill site as well as the rest of the parcel is dominated by two introduced species: kiawe and buffelgrass. Introduced species are all those plants which were brought to the Hawaiian Islands by humans, intentionally or accidentally, after Western contact, that is, Cook's arrival in the islands in 1778. Only two native species were observed on the project site. 'Ilima and 'uhaloa are small shrubs which are found in dry, often disturbed sites throughout the islands. Both are indigenous, that is, they are native to the Hawaiian Islands and elsewhere. A few plants of pa'uohi'iaka (Jacquemontia ovalifolia subspecies sandwicensis), a member of the morning glory family with pale blue flowers, were found on the neighboring Coast Guard property. The pa'uohi'iaka is endemic, that is, it is native only to the Hawaiian Islands; it is found in coastal environments, usually on the leeward sides of the islands.

None of the plants found during the field studies is a threatened and endangered species or a species of concern (U.S. Fish and Wildlife Service 1999a, 1999b; Wagner et al. 1999). All of the native plants can be found in similar dry, lowland habitats throughout the islands.

Given these findings, the proposed project is not expected to have a significant negative impact on the botanical resources. There is very little of botanical interest or concern on the cable landing/drill site or on the entire parcel.

RECEIVED AS FOLLOWS

RECEIVED AS FOLLOWS

References

- Evenhuis, M.L. and L.G. Eldredge, editors. 1999-2002. Records of the Hawaii Biological Survey. Bishop Museum Occasional Papers Nos. 58-70.
- Sato, H.H., W. Ikeda, R. Paeth, R. Seythe, and M. Takehiro, Jr. 1973. Soil survey of the Island of Hawaii, State of Hawaii. Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C.
- U.S. Fish and Wildlife Service. 1999a. U.S. Fish and Wildlife Service species list, plants. March 23, 1999. Pacific Islands Office, Honolulu, HI.
- U.S. Fish and Wildlife Service. 1999b. Endangered and threatened wildlife and plants. 50 CFR 17.11 and 17.12. December 31, 1999.
- Wagner, M.L., M.M. Brueggmann, D.R. Herbst, and J. Q.C. Lau. 1999. Hawaiian vascular plants at risk: 1999. Bishop Museum Occasional Papers No. 60.
- Wagner, M.L., D.R. Herbst, and S.H. Sohmer. 1990. Manual of the flowering plants of Hawai'i. 2 vols. University of Hawai'i Press and Bishop Museum Press, Honolulu. Bishop Museum Special Publication 83.
- Wagner, M.L. and D.R. Herbst. 1999. Supplement to the Manual of the flowering plants of Hawai'i, pp. 1855-1918. In: Wagner, M.L., D.R. Herbst, and S.H. Sohmer, Manual of the flowering plants of Hawai'i. Revised edition. 2 vols. University of Hawai'i Press and Bishop Museum Press, Honolulu.

RECEIVED AS FOLLOWS

Appendix 5  
**Marine Biological Study**



**Final Environmental Assessment/  
Finding of No Significant Impact**  
Submarine Fiber-Optic Cable Project

RECEIVED AS FOLLOWS

### EXECUTIVE SUMMARY

Sandwich Isles Communications, Inc. is proposing to develop a state-of-the-art fiber optic communication system linking Hawaiian Home Land areas on Kauai, Oahu, Molokai, Maui and Hawaii. This system will require the deployment of cables between the islands and will utilize directional drilling at the landing sites. Directional drilling bores a small diameter tunnel through which the cable passes from the shoreline to a point about a kilometer offshore at depths from 20 to 30 m at where the cable "daylights". From that point seaward, the cable is deployed directly on the substratum. Use of this technology avoids many of the sensitive coral reef areas that are usually more common inshore of these offshore breakout points. The proposed routes include the deployment and landing of cables at Kekaha, Kauai; Makaha and Hawaii Kai on Oahu; Kilauea'ia, Molokai, Honokowai and Makana, Maui and at Kawahae, Hawaii. This document addresses the environmental concerns raised with the deployment and operation of this system as they relate to the near shore coral reef habitats through which the cable system will pass.

Quantitative studies of the marine communities at and in the vicinity of the proposed breakout points as well as along the tentative alignments were studied at each proposed landing site. The most common substratum type at the selected offshore breakout points is a mix of sand and coralline rubble. Marine species found in or on sand habitats have evolved to live in this continually moving substratum thus placing a cable on this substratum which usually sinks into and becomes buried will not materially hinder these species. These sand/rubble conditions are present at all breakout points and seaward of them except at Sandy Beach, Oahu and the Pualealana, Maui sites where a small amount of coral is present on limestone surrounding the breakout point.

Deployment of fiber optic cables across hard substratum could have an impact on species that are covered by the overlying cable. However, fiber optic cables have relatively small diameters (less than one inch) thus cover very little substratum and if they are stable on that bottom (i.e., do not move), will often be covered by bottom dwelling species. The old trans-Pacific communications cables deployed through Hanalei Bay, Oahu crossed areas of hard substratum. Corals that would be susceptible to coverage by these relatively large diameter cables (~2-inch diameter), simply have overgrown the cables such that today old cables run through the middle of coral colonies thus the presence of these surface deployed cables show no evidence of negative impact.

The federally protected green sea turtle was seen in the vicinity of the proposed Makaha, Oahu, the Kaunapali Airstrip, and the Waikiki, Maui alignments. The area offshore of Waikiki where four turtles were encountered was considered to be a form of undergrowth, ledges and relatively large coral colonies which probably serve as a diurnal resting site for these turtles. The turtles seen at the other sites appeared to be just passing through the area of the alignment. In no cases were turtles observed in resting habitat within 100m of proposed breakout points and alignments seaward of those breakout points. At these distances, impact from the deployment of fiber optic cables at these locations should have no impact on the activities of any resident green turtles at these sites.

Both porpoises and whales must be considered when deploying fiber optic cables in island waters. In the case of humpback whales, if deployment were to occur during that part of the year when whales are absent from island waters (May through November) there is no possibility of impact due to deployment. If present, spinner porpoises are obvious because of their behavior on the sea surface. Their presence in the deployment area should be a signal to halt deployment activities until they have left the area. Insofar as impact to these marine mammal species due to fiber optic cable operation, there is no evidence to support the contention that impact does occur with cable operation. Indeed, the available information suggests that no impact occurs because there are a number of previously surface deployed operational fiber optic cables along the leeward coast of Oahu and both whales and porpoises continue to be present in these waters.

### MARINE BIOLOGICAL ASSESSMENT OF FIBER OPTIC CABLE DEPLOYMENT AT SEVEN SITES IN THE HAWAIIAN ISLANDS IN SUPPORT OF THE SANDWICH ISLES COMMUNICATIONS, INC.

#### NETWORK

#### Prepared For:

Parsons Brinckerhoff Quade & Douglas, Inc.  
Pacific Tower, Suite 3000  
1001 Bishop Street  
Honolulu, Hawaii 96813

#### Prepared By:

Richard Brock, Ph.D.  
Environmental Assessment Co.  
1820 Kihl Street  
Honolulu, Hawaii 96821

EAC Rept No. 2003-13  
July 2003

present in each proposed alignment. Many benthic (i.e., bottom dwelling) coral reef species require the presence of hard substratum and many motile species utilize the shelter created by the presence of hard bottom and associated sessile species living on it. Thus the presence of hard substratum signals the possibility of greater impact to coral reef species with cable deployment activities because of the greater diversity of species present than would occur on sand bottom (low diversity) areas.

The selection of a preferred alignment within a given site was made in the field following a preliminary examination of the possible breakout points for that site and was based on the degree of development in coral reef communities, substratum type at breakout and seaward of it as well as depth. Preferred criteria include little coral reef community development (as usually seen in sandy areas), the presence of sand substratum both around the preferred breakout point and seaward of it and having the breakout point within safe diving depths (~20 m).

Organisms found on sand substratum have evolved to survive in an ever-shifting bottom. The deployment of a fiber optic cable through a sandy bottom usually has little or no resulting impact to the communities resident to the area; these species are all, to a degree, motile and are able to avoid any impact by simply temporarily moving a few meters away.

Thus the strategy in selecting a breakout point for the fiber optic cable emerging from the directional drill bore, was to look for an area of sand preferably with sand continuing from this point into deeper water. Such a situation would pose minimal impact to most coral reef species and in addition, the cable would probably sink into and be covered by the shifting substratum. Where a sand bottom occurred, a biologist would inspect the sand substratum and quantitatively note any benthic or fish species encountered in the vicinity of the breakout point and along the seaward alignment within reasonable diving depths. Diver safety dictated below depths of about 30 m no attempt was made to quantitatively describe the marine communities due to limitations with bottom time. Thus qualitative studies were carried out inshore of this depth and seaward of this, only qualitative observations were made.

Where the proposed cable alignments and/or breakout points crossed or approached hard substratum or coralline rubble, biological studies were carried out. The locations of these sampling stations were subjectively chosen as being representative of the major biological zones or biotopes through which the proposed alignments passed. Each of these locations was marked using a hand held global positioning system (GPS). Immediately following site selection, a visual census of fishes was undertaken to estimate their abundance. These censuses were conducted over a 4 x 25 m corridor and all fishes within this area to the water's surface were counted. Data collected included the number of individuals of each species as well as an estimate of individual lengths of all fishes seen; the length data were later utilized in estimating the standing crop of fishes present at each station using linear regression techniques (Ricker 1975, Brock and Norris 1989). A single diver equipped with SCUBA, transect line, slate and pencil would enter the water, count and note all fishes in the prescribed area (method modified from Brock 1954). The 25 m transect line was paid out as the census progressed, thereby avoiding any previous underwater activity in the area which could frighten wary fishes.

## INTRODUCTION

Sandwich Isles Communications, Inc. is proposing to develop a fiber optic communication system linking Hawaiian Home Land areas on Kauai, Oahu, Molokai, Maui and Hawaii. This system would utilize up-to-date fiber optic technology, thus providing users with modern communications. This system will require the deployment of cables between the islands. The proposed routes between the islands are shown in Figure 1 and include landing/exiting sites at Kekaha, Kauai, Makaha and Hawaii Kai on Oahu, Kalama'ula, Molokai, Honokowai and Makaha, Maui and at Kawaihae, Hawaii. Because these cables must enter and exit the ocean, environmental concerns regarding the impact that the deployment and subsequent operation of this system must be addressed. This document was prepared to address environmental concerns regarding the impact that this fiber optic cable system may have on nearshore marine resources in the vicinity of the seven proposed landing/exiting sites.

It is proposed that directional drilling be used in the deployment of the fiber optic cable at the landing sites. In lay terms, this technology simply bores a small diameter tunnel from the shoreline, boring in a seaward direction and "daylighting" or breaking out from the substratum at depths from 15 to 30 m up to about a kilometer from shore. The fiber optic cable is run through this tunnel and at the point of breakout, is deployed or laid directly on the substratum from that point seaward. Use of this technology avoids many of the sensitive coral reef areas that are usually more common inshore of these offshore breakout points. The older cable deployment technology used one of three methods on the approach to shore: (1) simply deploying the cable across the substratum which was usually done in areas of sand and the cable would eventually work into the sand and be covered, (2) trenching the substratum and placing the cable in the trench and often protecting it with tremie concrete or (3) placing the cable in a steel pipe which was bolted to the substratum. The last two techniques were used where there was a need to protect the cable from the elements which is usually the case close to shore where storm surf could cause breaks to occur.

## MATERIALS AND METHODS

The general area for each fiber optic cable directional drilling alignment and possible breakout point were provided to the biological field crew (Figure 1). All alignments were verified in the field using a global positioning system (GPS) and the preselected breakout points were marked in the field with bouya. To obtain an overall perspective of each alignment, divers were towed behind a vessel from the proposed breakout point towards the shoreline usually to a depth of about 5 m or to within 50 m of the shoreline in most cases. The same strategy was used in towing a diver seaward of the proposed breakout point usually to a point where the surface towed diver could no longer see the bottom (usually to a depth of about 30+ m). This exercise allowed the delineation of different substratum types, topographic variation and biological zones

Fish abundance and diversity is often related to small-scale topographical relief over short linear distances. A long transect may bisect a number of topographical features (e.g., cross coral mounds, sand flats and algal beds), thus sampling more than one community and obscuring the distinctive features of individual communities. To alleviate this problem, a short transect (25 m in length) has proven adequate in sampling many Hawaiian benthic communities (Brock and Norris 1989).

Besides frightening wary fishes, other problems with the visual census technique include the underestimation of cryptic species such as moray eels or puhi (family Muraenidae) and nocturnal species, e.g., squirrelfishes or ala'ihi (family Holocentridae), awaoweo or bigeyes (family Priacanthidae), etc. This problem is compounded in areas of high relief and coral coverage affording numerous shelter sites. Species lists and abundance estimates are more accurate for areas of low relief, although some fishes with cryptic habits or protective coloration (e.g., the nobu or rockfishes, family Scorpaenidae; the flatfishes or paki'i, family Bothidae) might still be missed. Obviously, the effectiveness of the visual census technique is reduced in turbid water and species of fishes which move quickly and/or are very numerous may be difficult to count and to estimate sizes. Additionally, bias related to the experience of the diver conducting the counts should be considered in making any comparisons between surveys. In the present study, one individual (Brock) carried out all of the visual censuses. In spite of these drawbacks, the visual census technique probably provides the most accurate nondestructive method available for the assessment of diurnally active fishes (Brock 1982).

After the assessment of fishes, an enumeration of epibenthic invertebrates (excluding corals and other colonial forms) was undertaken using the same transect line as established for fishes. Exposed invertebrates usually greater than 2 cm in some dimension (without disturbing the substratum) were censused in the 4 x 25 m area. As with the fish census technique, this sampling methodology is quantitative for only a few invertebrate groups, e.g., some of the echinoderms (some sea urchins and sea cucumbers), arthropods, molluscs and polychaetes. Most coral reef invertebrates (other than corals) are cryptic or nocturnal in their habits making accurate assessment of them in areas of topographical complexity very difficult. This, coupled with the fact that the majority of these cryptic invertebrates are small, necessitates the use of methodologies that are beyond the scope of this survey (see Brock and Brock 1977). Recognizing constraints on time and the scope of this survey, the invertebrate censusing technique used here attempted only to assess those few macroinvertebrate species that are diurnally exposed.

Exposed sessile benthic forms such as coral and macrobenthic algae were quantitatively surveyed by use of quadrats and the point-intersect method. The point-intersect technique only notes the species of organism or substratum type directly under a point. Along the previously set fish transect line, 50 such points were assessed (once every 50 cm). These data have been converted to percentages. Quadrat sampling consisted of recording benthic organisms, algae and substratum type as a percent cover in six one-meter frames placed at five-meter intervals along the transect line established for fish censusing (at 0, 5, 10, 15, 20 and 25 m).

If macrobenthic algae were encountered in the 1 x 1 m quadrats or under one of the 50 points, they were quantitatively recorded as percent cover. Emphasis was placed on those species that are visually dominant and no attempt was made to quantitatively assess the multitude of microalgal species that constitute the "algal turf" so characteristic of many coral reef habitats.

During the course of the fieldwork notes were taken on the number size and location of any green sea turtles and other threatened or endangered species seen within or near to the study areas. With green turtles, efforts were made to record the size (straight line carapace length) of the individuals seen as well as the presence of tags, tumors or any deformities.

## RESULTS

There are seven proposed landing sites for fiber optic cables running between the main Hawaiian Islands. At some of these areas more than one site was examined and reported on herein. There is one site on Kauai at Kekaha, two on Oahu (on the leeward coast at Yokohama Bay or at Makaha, and offshore of Sandy Beach at Hawaii Kai), Kalama'ula on Molokai, in West Maui (at the old Kaanapali Airstrip or at Waikeolu near Lahaina) and Makana on Maui and a landing site at Kawaihae on Hawaii Island. The physical and biological characteristics of each are discussed below.

### 1. Kekaha, Kauai

The proposed landing alignment for Kekaha, Kauai is shown in Figure 2. The overall breakout area was defined by four points delineating a rectangle in which the exact breakout point was to be determined in the field. Following field observations, the best breakout point is located at (N21°57.660', W159°43.590'). An examination of the proposed breakout point is located in an area of sand and rubble having a depth of 20.7 m (68 feet). Since sand dominates the substratum, benthic community development is low. Species seen in the vicinity of the breakout include a juvenile white or "haole" crab (*Portunus sanguinolentus*), two juvenile sand wrasses or nabeta (*Xyrichtys pavo*) and a small auger shell (*Terebra inconstans*). Within 40 m inshore of the breakout point is an area of emerging limestone substratum (depth 13.4 m, 44 feet; N21°57.804', W159°43.596'). This limestone occurs as a narrow 2 to 4 m wide band running approximately parallel to shore and having a length of about 50 m. This limestone band is the first of several until an area of solid limestone is encountered about 30 m inshore of the first limestone band. Since some corals were present on the most seaward parts of the limestone, a transect was established to quantify the marine community present. This transect had an orientation parallel to shore and carried out the first limestone inshore of the proposed breakout point.

Appendix 2 presents a summary of the results of the survey carried out on the limestone located approximately 40 m inshore of the proposed breakout offshore of Kekaha at a depth 13.4 m on 25 September 2002. Seven algal species (*Amansia glomerata*, *Doryella hawaiiensis*,

RECEIVED AS FOLLOWS

*Halimeda opuntia*, *Sphaelaria furcigera*, *Spyridia flamentosa*, *Corallina* sp. and *Gracilaria* sp.) had a mean coverage of 2.8% and five coral species (*Porites lobata*, *Pocillopora meandrina*, *Pocillopora eydouxi*, *Pavona varians* and *Montipora patula*) had a mean coverage of 3.4% at this station. Also present in the quadrat survey was the delicate branching bryozoan (*Bugula neritina*). Diurnally exposed macroinvertebrates seen in the 4 x 25 m census area included the leopard cone shell (*Conus leopardus*), the 7-11 crab (*Carpilius maculatus*) and the black short-spined sea urchin (*Tripanistes gratilla*). The results of the fish census carried out at this station are presented in Appendix 1; in total, 11 species and 53 individual fishes were censused in the 4 x 25 m area. The most common species included the elegant wrasse (*Coris venusta*), the arc-eye hawkfish or piliko'a (*Paracirrhites arcatus*) and the sidespot goatfish or malu (*Parupeneus bifasciatus*). The biomass of fish was estimated to be 24 g/m<sup>2</sup> and the species contributing most heavily to this biomass included elegant wrasse (*Coris venusta* - 27% of the total) and the barred filefish or 'o'ili (*Cantherhines dumerilii*) comprising 34% of the total estimated standing crop at this station.

A diver was towed seaward from the proposed Kekaha breakout point along the approximate alignment to determine the substratum type and marine community development. The bottom appeared to be primarily sand and rubble with little hard substratum present out to the depth limit of visibility (at about 33 m). In a shoreward direction, limestone becomes more dominant but coral communities are not well-developed probably due to the low topographical relief of the limestone and near-constant movement of sand with passing waves. During periods of high surf, this sand probably abrades the substratum which would retard the development of corals.

Recreational activities were recorded during our field operations in the Kekaha area. Two fishing vessels were observed passing well seaward of the proposed breakout point and three groups of shoreline fishermen were seen as well as several swimmers (spear fishermen?) in the waters well inshore of the breakout point.

## 2. Leeward Coast of Oahu

The proposed undersea SIC fiber optic cable connects Kaula to Oahu via Kekaha, Kaula to the Makaha area on the leeward coast of Oahu. Two sites were examined in the Makaha area of Oahu as potential landing sites: these were at Yokohama Bay and just offshore of Makaha Beach (the Kiji Street alignment). The marine communities in the vicinity of each area are described below.

### A. Yokohama Bay, Oahu

Yokohama Bay is fronted by a large sand beach and there are considerable sand deposits offshore. The proposed general breakout point offshore in Yokohama Bay is shown in Figure 3; this site was moved slightly to put the breakout point in an area of sand. This proposed breakout point is approximately 800 m from shore at a depth of 21.6 m (71 feet) and is located at N21°32.468', W158°14.678'. Inspection of the sand area surrounding the breakout point noted a

single small sand wrasse or nebeia (*Xyrichtys pavo*) and a flea cone (*Conus pulicarius*). However, approximately 20 m inshore of the proposed breakout point is an area of relatively smooth limestone rising above the sand and having some coral present. A quantitative station was established about 4 m up on the limestone and having an orientation parallel to shore. The results of the survey are summarized in Appendix 3. Four algal species were encountered in the quadrat survey (*Amanita glomerata*, *Porolithon onkodes*, *Halimeda opuntia* and *Padina japonicum*) having a mean coverage of 1.1%. One sponge species was seen (*Mycale* sp.) and four coral species (*Porites lobata*, *Pocillopora meandrina*, *Montipora verrucosa* and *Lepastrea purpurea*) having a mean coverage of 4.1%. The most important coral species is the lobate coral, *Porites lobata*. The macroinvertebrate census noted the imperial cone shell (*Conus imperialis*), boring bivalve (*Arca venricosa*), black-lipped pearl oyster or pa (*Pinctada margaritifera*), small hermit crab (*Calcinus lateris*) and cushion starfish (*Culcita novaezelandica*) in the census area and the fish census (Appendix 1) found 184 individuals among 16 species. The most common fish species included the manybar goatfish or moano (*Parupeneus multifasciatus*), the bicolor anthias (*Pseudanthias bicolor*) and the whitespot damselfish or 'alo'ilo' (*Dasyatis albigella*). The standing crop of fish was estimated to be 44 g/m<sup>2</sup>. Species of fishes contributing heavily to this estimated biomass included the moano (*Parupeneus multifasciatus* - 17% of the total), the orangebar surgeonfish or na'ena'e (*Acanthurus olivaceus* - 18% of the total), the pinktail durgon or humuhumu hi'ukole (*Melichthys vidua* - 14%) and the lei triggerfish or humuhumu lei (*Sufflamen bursa*) making up 13% of the total weight at this station.

Towing a diver along the approximate cable alignment in a seaward direction from the proposed cable breakout point noted that sand dominates the substratum out to the point where visibility of the bottom at about 30 m. Towing inshore from the breakout point along the alignment noted areas of limestone and some coral present along with sand filled depressions.

Yokohama Bay is used for recreation and has been a favorite place for shorecasting. Snorkelers, swimmers and spear fishermen use the inshore waters of Yokohama Bay. During our fieldwork, several fishing boats passed by seaward of our activities, apparently trolling on their way towards Kaena Point. In general, individuals that are carrying out shore-based activities do not use the more offshore sandy regions as where the proposed SIC cable breakout is located because of the lack of resources to be targeted as well as due to the distance offshore. The lack of resources is generally related to the lack of shelter appropriate for targeted species. Individuals with fishing boats will usually focus their efforts further offshore where drop-offs occur and provide better shelter for most fish species. Thus the cable breakout point is not located in an area that receives much use.

### B. Kili Drive, Makaha Site:

Makaha Beach Park is a well-known surfing beach and has been the site of many cable landings over the years. The near shore bathymetry is well-known and the broad sandy beach is connected to an offshore sand cell via the Makaha channel. Cables have been landed through

this sand floor channel and on to the beach. Generally, these cables are buried in the sand but the seasonal movement of sand covers and uncovers portions of these cables. The proposed SIC cable would be connected to the shoreline via a directionally drilled tunnel which would daylight at approximately the point marked "exit" in Figure 4. This proposed alignment avoids the numerous surface-deployed cables that pass through the Makaha Channel and the exit point is located east of most extant cables. Also the directional drilling will avoid the problem of exposure of the SIC cable with the seasonal movement of sand in the shallow portions of the Makaha Channel. An examination of the proposed SIC cable alignment seaward of the breakout noted a continuous sand substratum to the outer limits of diver visibility from the surface which is about 35 m.

Makaha is a popular recreational beach and world famous surfing site with surfing contests being held there yearly which attract many thousands of visitors. The main surf break is on the north side of the channel and on the south side is another area where surf breaks. Makaha Beach is exposed to southern swell and to North Pacific swell emanating from the west and northwest. Swells from a more northerly direction can refract and diffract around Kaena Point and result in significant surf at Makaha. Other recreational activities that occur at Makaha include swimming, spear fishing, snorkeling and canoe paddling. Use of directional drilling at Makaha would avoid interaction and possible problems with other users whose activities occur primarily inshore of the proposed breakout point.

Coral communities are well-developed along the sides and adjacent hard substratum on either side of the Makaha Channel. The proposed exit point for the SIC cable is located in an area of sand more than 80 m seaward of these coral communities. The selected breakout point is N21°28'29.3", W158°13'68.0" and the depth is 21.3 m. An examination of the sand plain for marine species around the proposed breakout noted one small sand wrasse or nabeta (*Xyrichtys pavo*) and a juvenile kona crab (*Ranina ranina*). This relatively depauperate community is not unusual for Hawaiian sand communities at this depth. Inshore of this along the sides of the Makaha sand Channel on hard substratum the coral communities are well developed. A quantitative station was established on the hard substratum along the north edge of the Makaha channel to provide some contrast in marine community development on these different substrates. The results of the quantitative survey are given in Appendix 4. The quadrat survey noted five algal species (*Amanoa glomerata*, *Porolithon onkodes*, *Halimeda opuntia*, *Asparagopsis taxiformis* and *Galaxaura farigata*) having a mean coverage of 6.5%, one soft coral (*Anithella edmondsoni*) with a mean coverage of 0.1% and five coral species (*Porites lobata*, *Porites compressa*, *Pocillopora meandrina*, *Montipora verrucosa* and *Montipora patula*) having a mean coverage of 5.9%. The census of macroinvertebrates noted seven species (the cone shell - *Conus lividus*, rock oyster - *Spondylus fenebronus*, black-lipped pearl oyster (*Pinctada margaritifera*, shrimp - *Saron marmoratus*, short-spined black urchin - *Tripneustes gratilla*, green urchin - *Echinomeira mathaei* and the black urchin or wana - *Echinolixis diadema*). The results of the fish censuses are presented in Appendix 1. Twenty species and 109 individual fishes were censused in the transect area. The most common species were the brown surgeonfish or ma'i'i (*Acanthurus nigrofasciatus*) and the saddleback wrasse or hinalea lauwilli (*Thalassoma duperrey*). The standing crop of fishes at this station was estimated to be 33 g/m<sup>2</sup> and the species

making the greatest contribution to this standing crop included the hinalea lauwilli (*Thalassoma duperrey*) and the ma'i'i (*Acanthurus nigrofasciatus*).

Approximately 150 m inshore and west of the proposed breakout point, a single green turtle was seen (straight-line carapace length estimated at 60 cm). This turtle was seen on the surface and was some distance from the vessel, thus the presence of lags or tumors could not be ascertained.

### 3. Sandy Beach, Hawaii Kai, Oahu

It is proposed that the SIC cable on Oahu be linked to Molokai via a directional drilling site at Sandy Beach, Oahu. The general location of the Sandy Beach exit site is given in Figure 5 (at west exit site 2). The substratum at the exit site is a mix of sand and small areas of emergent limestone. These hard bottom areas range in size from about 0.3 x 0.3 m up to 2 x 8 m in size and benthic communities on this hard bottom are not well developed probably due to the scouring action of sand any time there is much wave activity. These hard bottom areas are spaced from 2 to 35 m apart. Inshore of the proposed breakout point limestone substratum becomes more prominent and about 200 m seaward (N21°16'90.5", W157°39'87.3") at a depth of 23 m smooth limestone again becomes more evident, but again coral development is very low (less than 1% coverage) probably due to the scouring of the substratum that must occur with occasional storm surf.

A station was established to quantify the benthic community present in the area of the proposed breakout. The results of the survey at this station are given in Appendix 5. The quadrat study noted two algal species (*Halimeda opuntia* and *Lynghya majuscula*) having a mean coverage of 0.7% and two coral species (*Porites lobata* and *Pocillopora meandrina*) with a mean coverage of 1.6%. The macroinvertebrate census noted one species, the christmas tree worm (*Spirobranchius giganteus*). There were four species of fishes (9 individuals) seen in the fish census (Appendix 1); the most common fish species was the lined wrasse or malamalama (*Coris ballieu*) and the standing crop was estimated at 15 g/m<sup>2</sup>. The malamalama (*Coris ballieu*) comprised 93% of the biomass at this station.

Sandy Beach is a popular recreational area with many people using the shorebreak for surfing. Other recreational activities carried out at Sandy Beach include swimming, snorkeling and fishing. These activities occur well inshore of the proposed SIC cable exit.

### 4. Kalamau'ula, Molokai

There is one proposed point for the landing of the SIC fiber optic cable on Molokai at Kalamau'ula near Kaunakakai. The location of the proposed exit site is shown in Figure 6. The original proposed exit (as given in Figure 6) was situated along the edge of a sandy depression which is roughly circular and about 65 m in diameter. We repositioned the proposed exit about



10 m seaward to be close to the middle of this sand area at N21°03.8180', W156°37.00'. The bottom at this site is sand with a well-developed *Halimeda incrassata* community present. This calcifying green algal species is characteristically found on West Maui and the south Molokai site is the first record this author has of this species beyond Maui in more than 40 years of diving in Hawaii. Water depth at the breakout point is between 24.4 to 25.0 m. A station was established at the breakout point to quantify the marine communities present in the area. The results of the survey of this station are given in Appendix 6 where the quadrat survey noted the calcifying green *Halimeda incrassata* having a mean coverage of 25.7% and no corals were present on the sand. The macroinvertebrate census noted a flea cone shell (*Conus pulicaris*) and a black sea cucumber (*Holothuria atra*). Three species of fishes (6 individuals) were encountered in the transect area (Appendix 1) and the estimated standing crop of fish was 0.6 g/m<sup>2</sup>.

Surrounding this sand patch is a near-continuous ridge of live coral which has 10 m wide break (across the bottom of the channel) in a seaward direction that comprises a sand floor channel which has an onshore-offshore orientation. This channel was explored in a seaward direction until it apparently merges with a larger, deeper sand flat at N21°03.748', W156°59.381' (depth ~32 m). Since there is a well-developed coral community nearly surrounding the proposed breakout, a station was established about 30 m seaward of the breakout on the ridge of coral. The results of this survey are given in Appendix 7 where the quadrat survey noted five coral species having a mean coverage of 81.8% with *Porites compressa* and *Montipora verrucosa* being the dominant species. The macroinvertebrate census noted four species including the christmas tree worm (*Spirobranchus giganteus*), green sea urchin (*Echinometra mathaei*), black short-spined urchin (*Tripneustes gratilla*) and the wana (*Echinothrix diadema*). Eighteen species of fishes (183 individuals) were censused in the transect area. The most abundant species were the black surgeonfish (*Acanthurus thompsoni*), the goldring surgeonfish or kole (*Ctenochaetus strigosus*) and the yellow tang or lau'ipala (*Zebrazoma flavescens*). The standing crop of fishes at this station was estimated to be 61 g/m<sup>2</sup> and the species contributing most heavily include a single blue spotted grouper or roi (*Cephalopholis argus*) comprising 18% of the total, the kole (*Ctenochaetus strigosus*) making up 23% and the lau'ipala (*Zebrazoma flavescens*) adding 13% to the standing crop at this station.

It is recommended that seaward of the proposed breakout point, the fiber optic cable be deployed through the sand floor channel thereby avoiding the surrounding coral communities. This strategy would avoid an impact to the surrounding well-developed coral communities.

Inshore of the proposed breakout at Kalama'ula is a reef crest and reef flat area. During our fieldwork we did not see anyone using the area inshore of the breakout, but several small fishing vessels passed seaward of the breakout point, apparently trolling. However, on other occasions working along the south shore of Molokai, residents spend time looking for octopus and fishing on the reef flat and seaward of it. Thus the area inshore of the proposed SIC breakout point is used for recreational activities as well as finding food for the family.

## 5. West Maui

Two possible landing sites were examined in the West Maui area. The first of these is located offshore of the old Kaanapali Airstrip most of which is now fallow land that formerly was in sugar. It is expected that this area will be developed in the future. The second site examined in this study for the West Maui area was offshore of Wahikuli about 2.5 km south of the Kaanapali site and close to Lahaina.

### A. Kaanapali Airstrip Site:

In general, the old Kaanapali Airstrip is fronted by a sandy beach. Just offshore of the beach a near-continuous limestone platform is encountered that, in general, extends from 75 to over 200 m offshore. This platform dips in a seaward direction and on the outer half has a well-developed coral community present. In some areas, the coral continues further seaward. The near shore waters at Kaanapali are heavily used by visitors and residents alike. Many visitors swim and snorkel to view the fish and coral reef in the area. Shore-based SCUBA dive tours operate out of Kahakili Park located at the south end of the Kaanapali Airstrip site and shore fishermen as well as spear fishermen use the entire coastline fronting the old airstrip.

The general location of the proposed breakout point for the SIC cable offshore of the old Kaanapali Airstrip is given in Figure 7. In the field, the initial breakout point was found to be at the shoreward end of a sand plain and very close to an area of limestone and corals. We moved the preliminary breakout point approximately 15 m seaward out and on to the sand/*Halimeda* plain (to N20°56.6540', W156°41.7638', depth 19.5 m). Marine communities around the proposed breakout are dominated by *Halimeda incrassata* which has a mean coverage of 17.6%; macroinvertebrates seen around the breakout include a single auger shell (*Zerebra inconspicua*) and two small fishes, a sharpback puffer (*Canthigaster fasciata*) and the twospot wrasse (*Cheilinus bimaculatus*).

A second transect was established on the limestone approximately 15 m shoreward of the proposed breakout point. The results of this survey are given in Appendix 8. The quadrat survey noted the calcifying green alga, *Halimeda incrassata* with a mean coverage of 2.0%, the sponge (*Mycale cecilia* - mean coverage = 0.03%) and five coral species (*Porites lobata*, *Pocillopora meandrina*, *Montipora verrucosa*, *Montipora patula* and *Lepidastrea purpurea*) that had a mean coverage of 2.5%. The macroinvertebrate census noted six species including the boring bivalve (*Arca venircosa*), rock oyster (*Spondylus tenebrosus*), christmas tree worm (*Spirobranchus giganteus*), serrate urchin (*Chondrocidaris giganteus*), banded urchin (*Echinothrix calamaris*) and the wana (*Echinothrix diadema*). The fish census (Appendix 1) noted 10 species and 39 individuals present in the transect area. The most abundant fishes were the twospot wrasse (*Cheilinus bimaculatus*) and the smalltail wrasse (*Pseudofistuloides ceratinus*). The standing crop of fish was estimated to be 39 g/m<sup>2</sup> and the species contributing greatest to this were two tablebosses or 'awa (*Bodianus bilineatus*) which made up 80% of the biomass at this station. Two green turtles were seen inshore of this station each having an estimated

straight-line carapace length of 60 cm. These turtles were seen on the surface about 100 m inshore of the proposed breakout point and appeared to be swimming north parallel to the coast, probably to the well-known offshore turtle resting area at Honokowai just north of the Kaanapali Airstrip site.

Towing a diver seaward of the proposed breakout point offshore of the old Kaanapali Airstrip, we noted that the sand and *Halimeda* community dominates the substratum out to the limits of visibility from the surface (about 27 m). As noted above inshore of the proposed breakout along the alignment, limestone is the dominant bottom type and coral communities are well-developed on the deeper parts of this platform.

#### B. Wahikuli Site:

A second location was examined as a possible landing site in West Maui at Wahikuli. The shoreline along the Wahikuli area is comprised primarily of basalt rock with a steep angle of repose and Honopitani Highway is situated in close proximity to the shoreline. As with the old Kaanapali Airstrip site, there is a limestone platform that commences at the shoreline and extends offshore for 40 to about 80 m before the deeper zone of sand and *Halimeda* beds is encountered. Figure 8 depicts the proposed Wahikuli alignment and offshore breakout point. The proposed Wahikuli breakout point is situated in the zone of sand and *Halimeda* beds at a depth of 17.1 m (N20°54.002', W156°41.568'). A reconnaissance of the area seaward of the proposed breakout point and roughly along the proposed alignment found that this zone (sand and *Halimeda* beds) continues uninterrupted to depths of at least 35 m where the surface divers could no longer see the bottom.

The results of the quantitative survey of the marine communities in the vicinity of the proposed Wahikuli breakout point are given in Appendix 9. The quadrat survey noted two algal species (*Halimeda incrassata* and *Grateloupia filicina*) with a mean coverage of 37% and the blue sponge (*Halichondria coerulea*) having a mean coverage of 0.02%. The dominant algal species is *Halimeda incrassata* which comprised a mean coverage of 32%. *Grateloupia filicina* is locally consumed and has a common name of huluhuluwacna. Huluhuluwacna was growing as an epiphyte on the *Halimeda*. The *Halimeda* in this area formed meadows on scales from 3 to 60 m<sup>2</sup> with intervening open sand areas. These meadows are spaced from 2 to 25 m apart. The macroinvertebrate census noted two species: the flea cone shell (*Conus pulicaris*) and a juvenile auger shell (*Terebra* sp.). The fish census found three individuals among three species having a mean standing crop of 1 g/m<sup>2</sup>.

About 100 m offshore of the shoreline and slight south of the proposed Wahikuli alignment, four green turtles were seen on the surface in a single small area. Usually turtles appearing on the surface for air in approximately the same location over time indicate that a turtle resting site is present. The resting area was not examined by diving but the estimated straight-line carapace lengths of the four turtles seen there were two at 75 cm and two at about 50 cm. This turtle resting area is several hundred meters inshore and east of the proposed Wahikuli breakout point

and the deployment of the cable should have no impact on this protected species.

The near shore waters of Wahikuli are used by paddlers, swimmers, snorkelers, spear fishermen and shorecasters. Most of these activities occur inshore of the proposed breakout. At the time of our fieldwork only two shorecasters were seen in the vicinity of the proposed alignment.

#### 6. Pualanalea (Makana), Maui

The proposed SIC cable network would connect Maui and Hawaii Islands between Pualanalea, Maui to Kawaihae, Hawaii. A sand beach fronts the Pualanalea site. Just northwest of the proposed alignment is a subtidal rocky area with considerable coral cover present. This feature extends only about 150 m seaward and is evident in Figure 9. The proposed exit point is well-removed from this feature, being several hundred meters seaward. As with the other Maui sites, the proposed cable breakout point is situated in the zone of sand and *Halimeda* beds at a depth of 16.3 m. Examination of the area around the proposed breakout point revealed that the bottom is a mix of flat and relatively featureless limestone with sand and *Halimeda* beds between these areas. The scale of the limestone features is from 4 to 25 m<sup>2</sup> in area and these are spaced from 8 to 25 m apart. Between these limestone areas is found sand and some *Halimeda*. An examination from the surface by a diver towed behind the vessel in a seaward direction noted that these bottom features continue uninterrupted to depths in excess of 30 m. There are some small corals present on the limestone but local coverage does not exceed 1% and in general, is much less than this.

The results of the quantitative station carried out adjacent to the proposed Pualanalea breakout point are given in Appendix 10. The quadrat survey noted three algal species (*Halimeda incrassata*, *Laurencia nidifica* and *Sphacelaria furcigera*) having a mean coverage of 8.9% and *Halimeda incrassata* comprises 96% of this coverage. Two coral species were encountered on the adjacent limestone in the quadrat survey; these were *Porites lobata* and *Montipora verrucosa* having a mean coverage of 0.7%. The macroinvertebrate census noted six species including the leopard cone shell (*Conus leopardus*), the boring bivalve (*Arca ventricosa*), Christmas tree worm (*Spirobranchus gigantea*), wana (*Echinothrix diadema*), urchin (*Eucidaris metularia*) and the short-spined urchin (*Tripanistes graillia*). Eleven species of fish (16 individuals) were encountered in the census area (Appendix 1); the most common were the 'alo'lo'i (*Dascyllus albirella*) and the smalltail wrasse (*Pseudogobius cerasinus*). The standing crop of fishes at this station was estimated to be 7 g/m<sup>2</sup> and species contributing heavily to this biomass included a single cometsfish (*Fistularia commersoni*) making up 47% of the total and a single 'o'iii (*Cantherhines dumerilii*) adding 46% to the estimated biomass at this station.

As with most other sites, swimmers, snorkelers and fishermen use Pualanalea Beach. During our fieldwork, we saw several individuals strolling on the beach but no one in the water near the proposed alignment. Seaward of the alignment we did note several trolling vessels

RECEIVED AS FOLLOWS

passing in a southerly direction.

#### 7. Kawaihae, Hawaii

It is proposed that the SIC fiber optic cable be linked from Pualamalena, Maui to Hawaii island via the Kawaihae area on the West Hawaii coast. Kawaihae is the commercial port for West Hawaii and inshore of the proposed SIC cable breakout point is the harbor. The proposed directionally drilled alignment passes beneath the entrance channel for this harbor (see exit 1, Figure 10). The preliminary proposed breakout offshore of Kawaihae was situated on the landward edge of dredge tailings about 2 m south of a very large and diverse area of live coral. Consequently, the breakout was moved about 7 m south out on to the area of dredge materials to a location at N20°02.148', W155°50.314'. The dredge materials are a mix of sand and coralline rubble in sizes up to about 20 cm x 20 cm. Most of the surface material appears to be a fine coral sand. A station to qualitatively examine the marine community on the dredge material was established and the results of this survey are given in Appendix 11. The transect commenced next to the proposed breakout point (depth = 19.0 m) and terminated at a depth of 29.6 m due to the slope of the dredged materials. The quadrat survey noted three coral species (*Porites compressa*, *Montipora verrucosa* and *Montipora patula*) having a mean coverage of 0.4%; all of these corals were quite small having settled on some of the larger pieces of rubble. The sizes (diameters) of these corals suggests that none were more than a few years of age. Six macroinvertebrate species were encountered in the transect area including a pair of octopus or he'e (*Octopus cyanea*), the boring bivalve (*Arca ventricosa*), two sea urchin species (*Triplonustes gratilla* and *Echinostrix diadema*) and two sea cucumber species (*Holothuria atra* and *Bodadachia villosa*). The census of fishes at this station are presented in Appendix 1. Five species (23 individuals) were counted in the census area; the most common was the sleek unicornfish or kala holo (*Naso hexacanthus*). The standing crop of fishes was estimated to be 8 g/m<sup>2</sup> and the species contributing the most were the kala holo (*Naso hexacanthus* - 58% of the total) and the orangebar surgeonfish or na'ema'e (*Acanthurus olivaceus*) making up 24% of the biomass at this station.

As noted above, there is a relatively large ridge of coral with an orientation perpendicular to the shoreline and adjacent to the SIC breakout point. This coral ridge is about 50 m in width and about 200 m in length. It commences in about 10 m of water and extends seaward into depths below 55 m. Because of its proximity, a second quantitative station was established in the middle of this ridge spanning depths from 13.7 to 15.8 m. The dominant coral on this ridge is the finger coral (*Porites compressa*) which usually is found in relatively wave-protected areas. Appendix 12 presents the results of the survey carried out in this coral-rich habitat. The quadrat survey noted three algal species (*Mitradicyon japonicum*, *Peyssonella rubra* and *Porolithon onkodes*) having a mean coverage of 6.5% and five coral species (*Porites lobata*, *Porites compressa*, *Pocillopora meandrina*, *Montipora verrucosa* and *Montipora patula*) having a mean coverage of 75.3%. Eighty-two percent of this coral coverage is from *Porites compressa*. The macroinvertebrate census noted four species including the christmas tree worm (*Spirobranchus gigantea*) and three sea urchin species (*Triplonustes gratilla*, *Echinometra mathaei* and

*Heterocentrotus mammillatus*). The fish census noted 21 species and 333 individuals. The most common species were the yellowfin goatfish or weke'ula (*Mulloides vanicolensis*), yellowstripe goatfish or weke (*Mulloides flavolineatus*), 'alo'alo'i (*Dascyllus albigella*), damselfish (*Chromis agilis*), black surgeonfish (*Acanthurus thompsoni*), kole (*Ctenochaetus strigosus*) and the lau'ipala (*Zebrafurca flavescens*). The standing crop of fish was estimated to be 266 g/m<sup>2</sup> and the species contributing most heavily include weke'ula (*Mulloides vanicolensis* - 38% of the total) and the weke (*Mulloides flavolineatus*) which made up 44% of the biomass present.

Along the south side of the large coral ridge is the area where dredge tailing were placed. As noted above, the proposed breakout point is 10 m south of the coral out on the area of dredge spoils. Ten meters further south of the proposed breakout point, the dredge spoils slope steeply away such that at about 40 m south of the proposed breakout point, the water depth would be probably greater than 60 m. The placement of the proposed breakout point completely avoids problems of the surface deployed portion of the cable crossing over coral reef areas within diving depths. It is estimated that the dredge spoils were dumped at this location many years ago, probably as part of routine maintenance of the harbor. These materials appear to be quite stable despite the relatively steep angle of repose.

A small school of spinner porpoise (*Stenella longirostris*; about 20 individuals) were seen more than 100 m seaward of the proposed Kawaihae breakout. This school appeared to be traveling in a southerly direction. The area inshore of the proposed breakout is used by shore fishermen, snorkelers and spear fishermen. Fishing boats are moored in Kawaihae Harbor and transit by the proposed breakout area in their fishing activities.

#### 8. Fishery Resource Use

As noted above, fishermen were seen at most proposed cable alignment sites during our field surveys. Despite the low numbers of users seen, all sites sampled in this study do receive some recreational and fishery use.

In general, the quantitative surveys of these sites found few resources that are usually targeted by fishermen. Most of the targeted species are either too small (juveniles) or the species is not present. Other than the schools of goatfishes or weke and weke'ula (*Mulloides vanicolensis* and *Mulloides flavolineatus*) over the high coral cover ridge adjacent to the Kawaihae breakout point, the fishes elsewhere were too small or nonexistent. A few esteemed invertebrates were also seen at some of the stations; at Kawaihae a pair of he'e (*Octopus cyanea*) were seen and he'e were also noted away from transects at Yokohama Bay, Sandy Beach, Kamala'ula, and old Kaanapali Airstrip sites. One small slipper lobster (*Parribaccus antarcticus*) was seen at Sandy Beach. The mackerel scad or opelu (*Decapterus macarellus*) were seen in the vicinity of several proposed breakout points including Kekaha, the Kili Street, Makaha site, and the Wahikuli site.

One reason for the usually low abundance of fishery resources in the vicinity of most proposed breakout points is that there is little shelter present. Studies conducted on coral reefs in

Hawaii and elsewhere have estimated fish standing crops to range from 20 to 200 g/m<sup>2</sup> (Brock 1954, Brock *et al.* 1979). Eliminating the direct impact of man due to fishing pressure and/or pollution, the variation in standing crop appears to be related to the variation in the local topographical complexity of the substratum. Thus habitats with high structural complexity affording considerable shelter space usually harbor a greater estimated standing crop of coral reef fish; conversely, transects conducted in structurally simple habitats (e.g., sand flats) usually result in a lower estimated standing crop of fish (0.2 to 20 g/m<sup>2</sup>). Goldman and Talbot (1975) noted that the upper limit to fish biomass on coral reefs is about 200 g/m<sup>2</sup>. Ongoing studies (Brock and Norris 1989) suggest that with the manipulation (increasing) of habitat space or food resources (Brock 1987), local fish standing crops may approach 2,000 g/m<sup>2</sup>. Thus under certain circumstances, coral reefs may be able to support much larger standing crops of fishes than previously realized.

It is important to note that despite apparent low abundance of popular food species as found in this study, at other times many of these species can be much more abundant. This study provides a "snapshot" in time of the relative abundance and sizes of species that are of recreational and commercial importance at the study locations. Coastal neritic schooling species such as the opelu may be very abundant on a fish census as a school passes by, but within minutes they have moved elsewhere.

#### 9. Threatened and Endangered Species

Because of low population numbers, the Hawaiian green sea turtle (*Chelonia mydas*) was given protected status under the Federal Endangered Species Act in the mid-1970s. Green turtles as adults are known to forage and rest in the shallow waters around the main Hawaiian Islands. Reproduction in the Hawaiian population occurs primarily during the summer months in the Northwest Hawaiian Islands with adults migrating during the early summer to these isolated atolls and returning in the late summer or early fall. In the main Hawaiian Islands, green turtles rest along ledges, caves or around large coral mounds in coastal waters usually from 5 to 20 m in depth during the day. Under the cover of darkness, turtles will travel inshore to shallow subtidal and intertidal habitats to forage on algae or limu (Balazs *et al.* 1987). The normal range of these daily movements between resting and foraging areas is about one kilometer (Balazs 1980, Balazs *et al.* 1987). In general, appropriate algal forage for these turtles is found in shallow waters inshore of the resting areas. Selectivity of algal species consumed by Hawaiian green turtles appears to vary with the locality of sampling, but stomach content data show *Acanthophora spicifera* and *Amansia glomerata* to quantitatively be the most important (Balazs *et al.* 1987); the preferences may be due to the ubiquitous distribution of these algal species.

The Hawaiian green turtle population has rebounded under the 27+ years of federal protection afforded to it such that today, green turtles are commonly seen in the waters fronting most beaches around the islands. Indeed, green turtles were seen in the waters around some of the proposed alignments. A 60 cm green turtle was seen about 150 m inshore and west of the breakout point offshore of Kili Street in Makaha; two 60 cm turtles were encountered about 100

m inshore of the proposed breakout point offshore of the old Kaanapali Airstrip passing by in a northerly direction, and four turtles (2 at 75 cm and 2 at 50 cm) were seen about 200 m inshore of the proposed Waikeolu, Maui breakout point. These latter four turtles appeared to be in a resting area well removed from the proposed alignment.

Pods of spinner porpoises (*Stenella longirostris*) are frequently encountered along Oahu's ice-ward coast. During the course of vessel transiting for fieldwork, spinner porpoises were seen on several occasions usually about 2 or more kilometers from shore usually traveling parallel to the coast. Offshore of the proposed Kawaihae breakout point, a small pod of about 20 individuals was seen during the field investigations. Like other marine mammals, this species is also protected under the Endangered Species Act. The endangered humpback whale (*Megaptera novaeangliae*) is known to frequent island waters in their annual migrations to Hawaiian wintering grounds. They normally arrive in island waters about December and depart by April. In general, their distribution in Hawaii appears to be limited to the 180 m (100 fathom) isobath and in shallower waters (Nitta and Naughton 1989). Whales were not seen or heard (singing) during any of the field operations for this study. However, they are a common element offshore of these sites during their annual wintering time in the Hawaiian Islands.

#### DISCUSSION

##### 1. Potential Impacts with the Deployment of Fiber Optic Cables

The proposed deployment of SIC fiber optic cables will use directional drilling techniques in the near shore waters. As noted above, directional drilling commences on land adjacent to the shoreline boring a small diameter (several inches) tunnel which runs seaward beneath the shallow marine communities and daylight at some distance and depth offshore. The use of directional drilling avoids problems with deploying cables on the surface of the seafloor and possibly impacting sessile species such as corals. An added benefit to the use of directional drilling is the protection afforded to the cable in the shallow water where storm surf could result in cable failure. In general, directional drilling is used at distances up to about a kilometer, beyond this and depending upon the material through which the drill must pass, precise control of the drill angle becomes more problematic. With the limestones that are often encountered beneath the near shore waters of the older islands (Kauai, Oahu, Molokai and Maui), the one kilometer distance is probably close to the maximum. Thus each proposed alignment will utilize directional drilling thereby avoiding the marine communities and any impact to them in the waters within approximately 1 km of the coastline.

##### 2. Impacts with Deployment

Potential impacts that may occur to marine communities with the deployment of fiber optic cables fall into two general categories: those associated with deployment and those associated with the long-term operation of the cable. The impacts that could occur with deployment are

RECEIVED AS FOLLOWS

primarily those associated with the directional drilling procedures as the cable bore daylight or breaks through the surface of the sand or limestone. Concerns focus on the release of drilling muds or lubricants which assist in the drilling procedure; bentonite is the usual mud or lubricant of choice. The usual drilling procedure is one where bentonite is circulated with water through the bore hole as drilling is occurring. The bentonite/water slurry lubricates the drill head and carries the excavated materials back to the driller on land. Bentonite is a natural fine clay material which is diluted with water for use. To alleviate the escapement of bentonite, the driller stops the input of bentonite as the drill head comes to within 10 to 20 m of the subtidal breakout point (one or two casing lengths) and just circulates water as the sole lubricant. This action reduces the amount of bentonite in the bore thus escaping from the bore as breakout occurs.

Observations by divers working at the breakout points of directional drill operations using bentonite/water lubricants note that no material was evident following breakout on four separate drill sites on the West Oahu coastline. Inspection of the sand surrounding these breakout points found no fine clay or silty material present a day later (R. Rocheleau, Sea Engineering, personal communication).

The primary concern with bentonite escaping from the bore at breakout is with this fine clay material settling on marine species and creating problems for their survival. Thus bentonite may be viewed as being similar to any sedimentary material; sedimentation has been implicated as a major environmental problem for coral reefs. Increases in turbidity may decrease light levels resulting in a lowering of primary productivity. Perhaps a greater threat would be the simple burial of benthic communities that may occur with high sediment loading. Many benthic species including corals are capable of removing sediment settling on them but there are threshold levels of deposition where cleaning mechanisms may be overwhelmed and the individual becomes buried. However, the impact of sedimentation on Hawaiian reefs may be overstated. Dollar and Grigg (1981) studied the fate of benthic communities at French Frigate Shoals in the Northwest Hawaiian Islands following the accidental spill of 2,000 tons of kaolin clay. These authors found that after two weeks there was no damage to the reef corals and associated communities except where organisms were actually buried by the clay deposits for a period of more than two weeks.

Table 1 presents a summary of substratum characteristics around the proposed breakout points and seaward of them for each alignment examined in this study. Also given in this table are the substratum characteristics inshore of the breakout point along the alignment, the abundance of corals on this substratum (expressed as percent cover) and the distance between the breakout point and these corals for each of the proposed sites. At all but the Sandy Beach, Oahu and Pualanala, Makana, Maui sites, the substratum surrounding the proposed breakout points is comprised of sand, coralline rubble and in some cases the calcifying alga, *Halimeda incrassata*. Sand habitats are probably the best from the standpoint of not creating negative impact on surrounding marine benthos with cable deployment. Cables laid on sand substratum will usually "sink" into the sand; the shifting nature of sand and its continual movement will usually bury any deployed cable with time. The marine species found in sand habitats have evolved to live in this continually moving substratum thus placing a cable on this substratum

TABLE 1. Summary of substratum characteristics at the proposed breakout points and offshore of those breakout points out to the limits of visibility (from surface to the bottom). Also given are the development of coral communities (expressed as percent cover) and their nearest distance to the proposed breakout points.

Location	Breakout Substratum	Substratum Offshore	Substratum Inshore
Kekaha Kauai	Sand/rubble	Sand/rubble Little limestone to 33 m deep	Coral 3.4%, 40 m inshore of breakout
Yokohama Bay	Sand	Sand to 30 m deep	Coral 4.1%, 20 m inshore of breakout
Kili Street Makaha	Sand	Sand to 35 m deep	Coral 5.9%, 80 m+ inshore of breakout
Sandy Beach Oahu	Sand/limestone	Sand/limestone to 25 m deep	Coral at breakout, 1.6%
Kailua'ula Molokai	Sand/Halimeda	Sand/Halimeda to 32 m deep	Coral 82%, 30 m inshore of breakout
Kaanapali Airstrip	Sand/Halimeda	Sand/Halimeda to 27 m deep	Coral 2.5%, 15 m inshore of breakout
Wahikuli Lahaina	Sand/Halimeda	Sand/Halimeda to 35 m deep	Coral ~4%, 200 m+ inshore of breakout
Pualanala Makana	Sand/Halimeda	Sand/Halimeda Little limestone to 30 m deep	Coral at breakout, 0.7%
Kawaihae Hawaii	Sand/rubble	Sand/rubble to 60 m deep	Coral 75%, 10 m inshore of breakout

which will become buried will not materially hinder any of these species. These sand/rubble conditions are present at all breakout points and seaward of them except as noted above (i.e., at Sandy Beach and Pualenalena).

Deployment of fiber optic cables across hard substratum could have an impact on species that are covered by the overlying cable. However, fiber optic cables have relatively small diameters (less than one inch) thus cover very little substratum and if they are stable on that bottom (i.e., do not move), will often be covered by bottom dwelling species. The old trans-Pacific communications cables deployed through Hanauma Bay, Oahu crossed areas of hard substratum. Corals that would be susceptible to coverage by these relatively large diameter cables (~2-inch diameter), simply have overgrown the cables such that today old cables run through the middle of coral colonies thus the presence of these cables show no evidence of negative impact.

At the proposed Sandy Beach, Oahu alignment, there are areas of exposed limestone adjacent to the cable breakout point. Mean coral coverage on these hard bottom areas is 1.6%. Moving the breakout point no more than 2 to 5 m into adjacent sand will avoid any direct impact to corals by the construction of the breakout point. The low topographical relief created by the limestone around the Sandy Beach breakout point means that corals recruiting to these hard surfaces are probably subjected to the scouring action of sand during any storm wave event. This could explain why all of the corals seen in this area are small (less than 10 cm in diameter) and probably do not survive beyond a few years before sand abrasion from occasional high surf clears most of these surfaces.

Similarly, at the proposed Pualenalena, Makana, Maui alignment, small corals occur on the hard substratum around the breakout point and have a mean coverage of 0.7%. Deployment of the cable seaward of the breakout point will pass through these sparsely colonized coral communities. It is anticipated that impact to corals at the Pualenalena site seaward of the breakout will be minimal because, once again, the small amount of exposed limestone does not rise much above the surrounding sand and thus is subject to abrasion if high surf occurs. Consequently, all coral colonies seen were small suggesting that physical disturbance from occasional high surf controls the development of these communities in this habitat. Thus deployment of a fiber optic cable through this environment will not impose much of an impact to corals because of their natural paucity and probable near-continuous recruitment. Coral colonies seen on these relatively depauperate limestone areas occur in a range of sizes (from a few centimeters to about 10 cm) suggesting that recruitment continues despite the occasional wave scouring events.

At proposed breakout points for other SIC fiber optic cable alignments besides the Sandy Beach, Oahu and Pualenalena, Maui sites, limestone and corals are encountered from a minimum of 10 m (at Kawahae, Hawaii) to over 200 m (at Waikiki, Maui) inshore of the proposed breakout points. On these limestone substrates, mean coral coverage ranges from about 4 to 75% coverage (Table 1). As noted above, concern during the construction phase on corals is with the possible release of lubricating muds (bentonite) and fluids (freshwater). The drill head carries a global positioning system (GPS), so the driller knows when the drill head is close to the breakout

point. Bentonite is flushed out of the drilling system just prior to breakout thus reducing the opportunity for the release of drilling muds into the environment at that time. From the breakout point shoreward, the cable is under the substratum thus avoiding any impact to marine communities inshore of the breakout point.

### 3. Impacts with Cable Operation

Perhaps the most logical way to address the question of possible impact to marine communities from the operation of a previously deployed fiber optic or older cable, is to examine the existing cables and the communities around them for possible impacts. Over the years many cables have been landed through the Makaha sand channel on Oahu's leeward coast. All of these cables were surface deployed with some trenching into the sand near and through the beach to bury the cable at landfill. In general cables deployed across a sand bottom will slowly settle into the sand but in the case of the Makaha channel, many of these become uncovered by the seasonal movement of sand in shallow water. The proposed directional drilling for all of the SIC fiber optic cables avoids problems with exposure of the cables near the shoreline which could pose a hazard to swimmers at heavily used sites such as Makaha. Having the cables daylight at about a kilometer or more offshore and at depths of 20 m or more avoids problems that could occur in shallow water habitats. In the more offshore waters where the exposed cables cross sand habitats, they are expected to settle into the shifting substratum and with time become buried.

The exposed cables in deeper water could serve as possible substratum for the settlement of corals and other sessile forms. Personal examination of other surface deployed cables in sand habitats has noted little recruitment which is related to the exposure/burial cycle of these cables with the seasonal movement of sand. Recruitment of sessile species to exposed cables probably does occur if the cable is exposed for a sufficient period of time (months to years). Examination of surface deployed cables across hard substratum in Hanauma Bay, Oahu shows a some recruitment by corals but the most important colonizer (by area coverage) are the coralline algae. These cables were deployed in the late 1950's and early to mid-1960's. Obviously, where exposure times are shorter (such as a cable is seasonally covered by sand then uncovered), the community development will be less. Do surface deployed cables pose a problem for motile species moving across substratum? Probably not in sand habitats judging from the observation made by the author in the Makaha, Oahu sand channel where a large leopard cone shell (whose habitat is sand) was seen perched on a cable lying exposed on the sand bottom probably in the process of crossing it.

Concern has been voiced in the past regarding possible impacts that cables may have on the commercially important species found in sand habitats such as the Kona crab (*Ranina ranina*) and the razorfish or nabeia (*Xyrichtys pavo*). In 2000 (the latest reported state commercial landings data available), commercial fishermen reported landing 4,935 pounds of nabeia and selling 3,678 pounds for \$21,439. There was 14,303 pounds of Kona crab reportedly caught statewide, selling 10,130 pounds of this for a total value of \$46,934. These species are culturally important, but

relative to Hawaii's total commercial landings they are small (2000 total reported catch was 24.7 million pounds with a value of \$ 59 million).

Both the Kona crab and the nabeta are highly mobile species but little is known of their life histories. It is known that Kona crab juveniles are often found in shallower (7 to 24 m deep) sand habitats while the adults are usually found in deeper, more offshore waters. The fishery is regulated with a closed season to protect reproducing adults (May through August), there are size limits (4-inch carapace length) and crabs are usually taken using baited nets. Nabeta are not regulated and the fishery for this esteemed species is usually by hook and line from boats drifting across sand areas at depths from 7 to more than 60 m. Because of the mobility of these important species and the small diameter of exposed fiber optic cables (usually less than 1 inch) across or in the sand bottom, it is highly unlikely that the deployment of a fiber optic cable through these sand habitats will have little if any impact to either of these commercially important species.

#### 4. Impact to Threatened and Endangered Species

As noted above, green sea turtles were seen in the vicinity of the proposed Kili Street, Makaha, the Kaanapali Airstrip, and the Waikuli alignments. The area offshore of Waikuli where four turtles were encountered has considerable cover in the form of undercuts, ledges and relatively large coral colonies which probably serve as a diurnal resting site for these turtles. The turtles seen at the other sites appeared to be just passing through the area of the alignment. Where resting habitat is available and being used by turtles, algae or limu is often quite abundant in the areas inshore of the resting habitat. This limu would serve as a food resource for the turtles. The distance of the proposed breakout activities (at a minimum more than 100 m away from these turtles) suggests that deployment of the proposed fiber optic cables will have no impact on the activities of these turtles at these sites.

Both porpoises and whales must be considered when deploying fiber optic cables in island waters. In the case of humpback whales, if deployment were to occur during that part of the year when whales are absent from island waters (May through November) there is no possibility of impact due to deployment. If present, spinner porpoises are obvious because of their behavior on the sea surface. Their presence in the deployment area should be a signal to halt deployment activities until they have left the area. Insofar as impact to these marine mammal species due to fiber optic cable operation, there is no evidence to support the contention that impact does occur with cable operation. Indeed, the available information suggests that no impact occurs because there are a number of previously surface deployed operational fiber optic cables along the leeward coast of Oahu and both whales and porpoises continue to be present in these waters.

RECEIVED AS FOLLOWS

#### LITERATURE CITED

- Balazs, G.H. 1980. Synopsis of biological data on the green turtle in the Hawaiian Islands. NOAA Tech. Memorandum, NMFS. NOAA-TM-NMFS-SWFC-7. 141p.
- Balazs, G.H., R.G. Forsyth and A.K.H. Kam. 1987. Preliminary assessment of habitat utilization by Hawaiian green turtles in their resident foraging pastures. NOAA Tech. Memorandum, NMFS. NOAA-TM-NMFS-SWFC-71. 107p.
- Brock, R.E. 1982. A critique on the visual census method for assessing coral reef fish populations. Bull. Mar. Sci. 32:269-276.
- Brock, R.E. 1987. An assessment of the fishes and macrobenthos off the Kahuku coast, Oahu in relation to an aquaculture effluent. Prepared for AECOS, Inc., Kailua, Hawaii. 16p.
- Brock, R.E. and J.H. Brock. 1977. A method of quantitatively assessing the infaunal community residing in coral rock. Limnol. Oceanogr. 22:948-951.
- Brock, R.E., C. Lewis and R.C. Wass. 1979. Stability and structure of a fish community on a coral patch reef in Hawaii. Mar. Biol. 54:281-292.
- Brock, R.E. and J.E. Norris. 1989. An analysis of the efficacy of four artificial reef designs in tropical waters. Bull. Mar. Sci. 44:934-941.
- Brock, V.E. 1954. A preliminary report on a method of estimating reef fish populations. J. Wildlife Mgmt. 18:297-308.
- Dollar, S.J. and R.W. Grigg. 1981. Impact of a kaolin clay spill on a coral reef in Hawaii. Mar. Biol. 65:269-276.
- Goldman, B. and F.H. Talbot. 1975. Aspects of the ecology of coral reef fishes. In: Jones, O.A. and R. Endean (eds). Biology and geology of coral reefs. Vol. 3, Biology 2:125-154.
- Mitta, E.T. and J.J. Naughton. 1989. Species profiles: life histories and environmental requirements of coastal vertebrates and invertebrates, Pacific Ocean region; Report No. 2, humpback whale, *Megoptera novaeangliae*. Tech. Rept. EL-89-10. Prepared by NMFS, NOAA, Honolulu for the U.S. Army Engineer Waterways Experiment Station, Ms.
- Ricker, W.E. 1975. Computation and interpretation of biological statistics of fish populations. Bull. Fish. Res. Bd. Canada, Bull. No. 191. 382p.

APPENDIX 1. Summary of the 4 x 25 m visual fish census carried out at the 9 locations (11 sites) selected as possible fiber optic cable landing sites around the main Hawaiian Islands. The locations are as follows: Transect 1 at Kekaha, Kauai, 2 at Yokohama Bay, Oahu, 3 at Makaha, Oahu, 4 at Sandy Beach, Oahu, 5 at Kalama'ula, Molokai on sand, 6 at Kalama'ula on coral, 7 at Kaanapali Airstrip, Maui, 8 at Waihihiki, Maui, 9 at Puatenalena, Maui, 10 at Kawaihae, Hawaii on sand and 11 at Kawaihae on coral.

Species	Transect Number										
	1	2	3	4	5	6	7	8	9	10	11
<b>HOLOCENTRIDAE</b>											
<i>Adionyx xanitherythrus</i>				2							13
<i>Myripristis kumtee</i>											
<b>SYNODONTIDAE</b>											
<i>Saurida gracilis</i>			1								
<b>FISTULARIIDAE</b>											
<i>Fistularia commersoni</i>									1		
<b>SCORPAENIDAE</b>											
<i>Dendrochirus barberi</i>			3								
<b>SERRANIDAE</b>											
<i>Pseudanthias thompsoni</i>			37				1				1
<i>Cephalopholis argus</i>											
<b>MALACANTHIDAE</b>											
<i>Malacanthus hoedit</i>										1	
<b>MULLIDAE</b>											
<i>Parupeneus pleurostigma</i>	8	13									
<i>P. multifasciatus</i>	1	20	2							1	
<i>Mulloides vanicolensis</i>											35
<i>M. flavolineatus</i>											27
<b>CHAETODONTIDAE</b>											
<i>Forcipiger flavissimus</i>											4
<i>F. longirostris</i>			2								2
<i>Chaetodon kleinii</i>									4		9
<i>C. multiracatus</i>			2						4		4
<i>C. unimaculatus</i>									4		
<i>C. ornaticaudatus</i>									2		
<b>POMACANTHIDAE</b>											
<i>Centropyge potteri</i>									3		
<b>POMACENTRIDAE</b>											
<i>Dascyllus abietella</i>										3	46
<i>Pteroglyphidodon johnstonius</i>										2	
<i>Chromis vanderbilti</i>										1	
<i>C. hanui</i>										4	7

RECEIVED AS FOLLOWS

APPENDIX 1. Continued.

Species	Transect Number										
	1	2	3	4	5	6	7	8	9	10	11
<b>POMACENTRIDAE (Cont.)</b>											
<i>C. ogilbyi</i>									9		52
<i>Stegastes fasciatus</i>				2							
<b>CIRRIIDAE</b>											
<i>Paracirrhites arcatus</i>	8	20	4	2							
<i>Cirrhites pinnulatus</i>				1							
<b>LABRIDAE</b>											
<i>Chelilinus bimaculatus</i>					1	10		1	1		
<i>C. rhodochrous</i>							1				
<i>Bodianus bimaculatus</i>							2				
<i>Xyrichtys pavo</i>								1			
<i>Cortis venusta</i>	18			1							1
<i>C. gaimard</i>				1							
<i>C. ballleui</i>							4				
<i>Pseudochelinus octotaenia</i>											
<i>P. retrataenia</i>									1		
<i>Pseudojulisoides ceratinus</i>	4					16		3	5	3	
<i>Thalassoma duperrey</i>						6	2				1
<i>Siebojulis bolitaia</i>					5						1
<i>Gomphosus varius</i>								1			
<i>Novaculichthys taenitourus</i>											
<i>Anampses chrysocephalus</i>											
<i>Haliichoeres ornaticaudatus</i>											
<b>SCARIDAE</b>											
<i>Scarus sordidus</i>							5				11
<i>S. pinnatus</i>							4				
<b>ACANTHURIDAE</b>											
<i>Acanthurus nigrofasciatus</i>	4	4	49								
<i>A. olivaceus</i>											
<i>A. thompsoni</i>									20		31
<i>Ctenochaetus strigosus</i>									81		62
<i>C. hawaiiensis</i>									3		1
<i>Zebrafish flavescens</i>									28		27
<i>Naso lituratus</i>									2		1
<i>N. hexacanthus</i>											12
<b>PARAPERIDAE</b>											
<i>Paraperis schauinslandi</i>								2	1	1	



RECEIVED AS FOLLOWS

APPENDIX 1. Continued.

Species	Transect Number										
	1	2	3	4	5	6	7	8	9	10	11
<b>GOBIIDAE</b>											
<i>Plagiotremus ewaensis</i>											1
<b>BALISTIDAE</b>											
<i>Sufflamen bursa</i>	3	10	2			2	1				
<i>Melichthys vidua</i>	3	2				1					1
<i>Xanthichthys mento</i>	3										
<i>Rhinocanthus rectangulus</i>			1								
<b>MONACANTHIDAE</b>											
<i>Caribbea flaviventris</i>	3	2					1				1
<b>OSTRACIDAE</b>											
<i>Ostracion meleagris</i>			1								
<b>TETRAODONTIDAE</b>											
<i>Canthigaster jactator</i>	1	1	3		4		1			1	
<i>C. cornata</i>			1		2						2
<i>Logocephalus logocephalus</i>										1	
<b>Total No. Species</b>	11	16	20	4	3	18	10	3	11	5	21
<b>Total No. Individuals</b>	53	184	109	9	6	183	39	3	16	23	333
<b>Biomass (g/m<sup>2</sup>)</b>	24	44	33	15	0.6	61	37	1	7	8	266

APPENDIX 2. Summary of the benthic survey conducted on limestone inshore of the proposed breakout point for the SIC fiber optic cable at Kekaha, Kauai on 25 September 2002. The location is N21°57.804', W159°43.596'. Results of the 6 m<sup>2</sup> quadrat sampling of the benthic community (expressed in percent cover) are given in Part A; a 50-point analysis in Part B and counts of invertebrates in Part C. A short summary of the fish census is given in Part D. Water depth is 13.4 m; mean coral coverage is 3.4% (quadrat method).

A. Quadrat Survey

Species	Quadrat Number					
	0m	5m	10m	15m	20m	25m
<b>Algae</b>						
<i>Amanita glomerata</i>				3.0	3.5	6.0
<i>Doryella hawaiiensis</i>					0.2	0.2
<i>Kalimeria sp.</i>						
<i>Sphaelaria furcigera</i>	1.1					
<i>Spyridia filamentosa</i>		1.0		0.3	0.7	
<i>Corallina</i> sp.	0.1					
<i>Gracilaria</i> sp.	0.4					
<b>Corals</b>						
<i>Porites lobata</i>	0.2	0.1		0.8	0.6	4.0
<i>Pocillopora meandrina</i>			3.4	4.1		1.8
<i>Pocillopora eydouxi</i>						5.0
<i>Pavona varians</i>	0.1					
<i>Montipora patula</i>						
<b>Bryozoans</b>						
<i>Bugula neritima</i>		0.1		0.2	0.4	0.5
<b>Sand</b>	48.0	76.6	79.6	35.6	63.6	47.5
<b>Rubble</b>	27.0	4.0		2.0		
<b>Hard Substratum</b>	23.1	18.0	17.0	54.0	31.0	35.0

B. 50-Point Analysis

Species	Percent of the Total
<b>Corals</b>	
<i>Porites lobata</i>	2
<i>Pocillopora meandrina</i>	2
<b>Sand</b>	68
<b>Rubble</b>	14
<b>Hard Substratum</b>	14

RECEIVED AS FOLLOWS

APPENDIX 3. Summary of the benthic survey conducted on limestone about 25 m inshore of the proposed breakout point for the SIC fiber optic cable at Yokohama Bay, Oahu on 4 November 2002. The location is NZ1792.468, W158°14.678'. The Yokohama Bay site is one of two examined for a leeward Oahu landing. Results of the 6 m<sup>2</sup> quadrat sampling of the benthic community (expressed in percent cover) are given in Part A; a 50-point analysis in Part B and counts of invertebrates in Part C. A short summary of the fish census is given in Part D. Water depth is 19.8 m; mean coral coverage is 4.1% (quadrat method).

APPENDIX 2. Continued.

C. Macroinvertebrate Census (4 x 25 m)

Species	Number
Phylum Mollusca	
<i>Conus leopardus</i>	2
Phylum Arthropoda	
<i>Carpilius maculatus</i>	1
Phylum Echinodermata	
<i>Tripanistes gratifila</i>	1

D. Fish Census (4 x 25 m)

11 Species  
53 Individuals  
Estimated Standing Crop = 24 g/m<sup>2</sup>

A. Quadrat Survey

Species	Quadrat Number				
	0m	5m	10m	15m	20m 25m
Algae					
<i>Amanita glomerata</i>					5.0
<i>Porolithon onkodes</i>				0.5	
<i>Halimeda opunitia</i>	0.4	0.1		0.2	
<i>Padina japonicum</i>			0.1		
Sponges					
<i>Mycale</i> sp.			0.1		
Corals					
<i>Porites lobata</i>	3.0	5.5	2.1	2.5	2.4
<i>Pocillopora meandrina</i>		0.3		0.2	6.5
<i>Montipora verrucosa</i>			0.1	0.1	
<i>Lepidastrea purpurea</i>		0.8			0.8
Sand	1.0		5.0		100
Hard Substratum	95.6	93.3	92.6	96.7	85.1

B. 50-Point Analysis

Species	Percent of the Total
Corals	
<i>Porites lobata</i>	4
<i>Pocillopora meandrina</i>	2
Sand	20
Hard Substratum	74

APPENDIX 3. Continued.

C. Macroinvertebrate Census (4 x 25 m)

Species	Number
Phylum Mollusca	
<i>Conus imperialis</i>	1
<i>Arca ventricosa</i>	1
<i>Pinctada margaritifera</i>	1
Phylum Arthropoda	
<i>Callinectes latens</i>	1
Phylum Echinodermata	
<i>Cladocora novaezelandiae</i>	1

D. Fish Census (4 x 25 m)

16 Species  
184 Individuals  
Estimated Standing Crop = 44 g/m<sup>2</sup>

APPENDIX 4. Summary of the benthic survey conducted on limestone about 490 m from shore on the limestone substratum along the north edge of the channel at Makaha Beach (location N21°28.498', W158°13.455'). The Makaha or Kiji Drive site is one of two examined for a leeward Oahu landing. This station is about 100 m inshore and north of the proposed breakout point for the SIC cable (N21°28.293', W158°13.680') and is one of two sites examined in the leeward Oahu area. Results of the 6 m<sup>2</sup> quadrat sampling of the benthic community (expressed in percent cover) are given in Part A; a 50-point analysis in Part B and counts of invertebrates in Part C. A short summary of the fish census is given in Part D. Water depth is 8.9 m; mean coral coverage is 5.9% (quadrat method).

A. Quadrat Survey

Species	Quadrat Number					
	0m	5m	10m	15m	20m	25m
Algae						
<i>Anaxia glomerata</i>	4.0	12.0	13.0	2.0	2.2	1.7
<i>Porolithon onkodes</i>			1.0			
<i>Hallimeda opuntia</i>	0.2	0.1		1.0		0.3
<i>Asparagopsis taxiformis</i>				1.0		
<i>Galaxaura fastigata</i>				0.2		

Soft Corals

<i>Anthelia edmondsoni</i>	0.1	0.3		0.1		0.1
----------------------------	-----	-----	--	-----	--	-----

Corals

<i>Porites lobata</i>	2.1	2.0		2.7	1.0	6.0
<i>Porites compressa</i>		0.1				
<i>Pocillopora meandrina</i>	4.0		1.3		3.0	9.0
<i>Montipora verrucosa</i>	0.2	0.1		0.3		0.2
<i>Montipora patula</i>	0.5	2.0		0.7		0.2

Sand	2.0	1.5			1.0	2.0
Rubble	2.4				9.0	
Hard Substratum	84.5	81.7	83.7	84.2	92.8	80.5

B. 50-Point Analysis

Species	Percent of the Total
Corals	
<i>Porites lobata</i>	4
<i>Pocillopora meandrina</i>	4
<i>Montipora patula</i>	2
Sand	6
Hard Substratum	84

RECEIVED AS FOLLOWS

APPENDIX 5. Summary of the benthic survey conducted on limestone at the proposed breakout or exit site for the fiber optic cable offshore of Sandy Beach, Hawaii Kai, Oahu (exit no. 2, location N21°16.9731', W157°39.9497') on 22 October 2002. Results of the 6 m<sup>2</sup> quadrat sampling of the benthic community (expressed in percent cover) are given in Part A; a 50-point analysis in Part B and counts of invertebrates in Part C. A short summary of the fish census is given in Part D. Water depth is 21.3 m; mean coral coverage is 1.6% (quadrat method).

APPENDIX 4. Continued.

C. Macroinvertebrate Census (4 x 25 m)

Species	Number
Phylum Mollusca	
<i>Conus lividus</i>	1
<i>Spondylus tenebrosus</i>	1
<i>Pinctada margaritifera</i>	1
Phylum Arthropoda	
<i>Saron marmoratus</i>	1
Phylum Echinodermata	
<i>Tripneustes gratilla</i>	1
<i>Echinometra maitakei</i>	3
<i>Echinothrix diadema</i>	1

D. Fish Census (4 x 25 m)

20 Species  
109 Individuals  
Estimated Standing Crop = 33 g/m<sup>2</sup>

A. Quadrat Survey

Species	Quadrat Number					
	0m	5m	10m	15m	20m	25m
Algae						
<i>Halimeda opuntia</i>				1.0	1.0	
<i>Lyngbya majuscula</i>				2.0		
Corals						
<i>Porites lobata</i>				2.5		
<i>Pocillopora meandrina</i>				7.0		
Sand	100	100	100	80.5	99.0	
Hard Substratum				7.0		

B. 50-Point Analysis

Species	Percent of the Total
Corals	
<i>Porites lobata</i>	2
Sand	96
Hard Substratum	2

C. Macroinvertebrate Census (4 x 25 m)

Species	Number
Phylum Mollusca	
<i>Spirobranchus giganteus</i>	1

D. Fish Census (4 x 25 m)

4 Species  
9 Individuals  
Estimated Standing Crop = 15 g/m<sup>2</sup>

APPENDIX 6. Summary of the benthic survey conducted on the sand substratum breakout point offshore of Kalamā'ula, Molokai (location N21°03.8180', W156°59.3700'). Results of the 6 m<sup>2</sup> quadrat sampling of the benthic community (expressed in percent cover) are given in Part A; a 50-point analysis in Part B and counts of invertebrates in Part C. A short summary of the fish census is given in Part D. Water depth is 24.4-25.0 m; mean coral coverage is zero (quadrat method).

A. Quadrat Survey

Species	Quadrat Number				
	0m	5m	10m	15m	20m 25m
Algae					
<i>Halimeda incrassata</i>	17.0	27.0	31.0	15.0	34.0 30.0
Sand	83.0	73.0	69.0	85.0	66.0 70.0

B. 50-Point Analysis

Species	Percent of the Total
Algae	
<i>Halimeda incrassata</i>	22
Sand	78

C. Macroinvertebrate Census (4 x 25 m)

Species	Number
Phylum Mollusca	
<i>Conus pulicarius</i>	1
Phylum Echinodermata	
<i>Holothurids atra</i>	1

D. Fish Census (4 x 25 m)

3 Species  
6 Individuals  
Estimated Standing Crop = 0.6 g/m<sup>2</sup>

APPENDIX 7. Summary of the benthic survey conducted on limestone approximately 30 m seaward of the breakout point at Kalamā'ula, Molokai (location N21°03.8180', W156°59.3700'). This sampling station was established in a *Porites/Montipora* dominated coral community which almost surrounds the cable breakout point. Results of the 6 m<sup>2</sup> quadrat sampling of the benthic community (expressed in percent cover) are given in Part A; a 50-point analysis in Part B and counts of invertebrates in Part C. A short summary of the fish census is given in Part D. Water depth is 19.8 m; mean coral coverage is 81.8% (quadrat method).

A. Quadrat Survey

Species	Quadrat Number				
	0m	5m	10m	15m	20m 25m
Corals					
<i>Porites lobata</i>	6.0				
<i>Porites compressa</i>	31.0	31.0	36.0	29.0	41.0 27.0
<i>Pavona varians</i>	3.0				6.0 8.0
<i>Montipora verrucosa</i>	26.0	52.0	43.0	34.0	41.0 36.0
<i>Montipora patula</i>	7.0	8.0	12.0	14.0	
Hard Substratum	30.0	6.0	9.0	23.0	12.0 29.0

B. 50-Point Analysis

Species	Percent of the Total
Corals	
<i>Porites compressa</i>	38
<i>Montipora verrucosa</i>	28
<i>Montipora patula</i>	4
Hard Substratum	30

C. Macroinvertebrate Census (4 x 25 m)

Species	Number
Phylum Annelida	
<i>Spirobranchus gigantea</i>	16
Phylum Echinodermata	
<i>Tripleneustes gratilla</i>	2
<i>Echinometra mathaei</i>	3
<i>Echinohirtis diadema</i>	1

D. Fish Census (4 x 25 m)

18 Species  
183 Individuals  
Estimated Standing Crop = 61 g/m<sup>2</sup>

RECEIVED AS FOLLOWS

APPENDIX B. Summary of the benthic survey conducted in the ecotone or zone of transition between the inshore zone of high coral coverage and the zone of sand and *Halimeda* beds offshore of the old Kaanapali Airport on 17 December 2002. This transect is 15 m (50 feet) inshore of the proposed breakout point for the SIC fiber optic cable (location N20°56.6540' W156°41.7638') and was established parallel to shore. This station is one of two sites examined for a cable landing in the Lahaina, Maui area. Results of the 6 m<sup>2</sup> quadrat sampling of the benthic community (expressed in percent cover) are given in Part A; a 50-point analysis of the B and counts of invertebrates in Part C. A short summary of the fish census is given in Part D. Water depth is 19.5 m; mean coral coverage is 2.5% (quadrat method).

A. Quadrat Survey

Species	Quadrat Number					
	0m	5m	10m	15m	20m	25m
Algae						
<i>Halimeda incrassata</i>	12.0					
Sponges						
<i>Mycale cecilia</i>				0.2		
Corals						
<i>Porites lobata</i>			0.9	7.0	1.2	3.0
<i>Pocillopora meandrina</i>			0.3		0.2	
<i>Montipora verrucosa</i>				1.0		
<i>Montipora patula</i>				1.0		
<i>Lepidastrea purpurea</i>				0.2		
Sand	88.0	98.0	92.8	50.6	77.6	88.0
Rubble	2.0	6.0	28.0	13.0	9.0	
Hard Substratum			12.0	8.0		

B. 50-Point Analysis

Species	Percent of the Total
Corals	
<i>Porites lobata</i>	4
<i>Pocillopora meandrina</i>	2
Sand	76
Rubble	4
Hard Substratum	14

APPENDIX 8. Continued.

C. Macroinvertebrate Census (4 x 25 m)

Species	Number
Phylum Mollusca	
<i>Arca ventricosa</i>	18
<i>Spondylus tenebrosus</i>	1
Phylum Annelida	
<i>Spirobranchus gigantea</i>	40
Phylum Echinodermata	
<i>Chondrocidaris giganteus</i>	1
<i>Echinothrix calamaris</i>	2
<i>Echinothrix diadema</i>	1

D. Fish Census (4 x 25 m)

10 Species  
39 Individuals  
Estimated Standing Crop = 37 g/m<sup>2</sup>

RECEIVED AS FOLLOWS

APPENDIX 9. Summary of the benthic survey conducted in the zone of sand and *Halimeda* beds offshore of Wāhikūi, Lahaina, Maui at the SIC cable breakout point (location N20°54.000', W156°41.568'). This is one of two sites examined for a Lahaina, Maui landing. Results of the 6 m<sup>2</sup> quadrat sampling of the benthic community (expressed in percent cover) are given in Part A; a 50-point analysis in Part B and counts of invertebrates in Part C. A short summary of the fish census is given in Part D. Water depth is 17.1 m; mean coral coverage is zero (quadrat method).

A. Quadrat Survey

Species	Quadrat Number					
	0m	5m	10m	15m	20m	25m
Algae						
<i>Halimeda incrassata</i>	42.0	14.0	41.0	38.0	26.0	33.0
<i>Grateloupia filicina</i>	4.0	1.5	6.0	9.0	4.5	5.0
Sponges						
<i>Halichondria coerulea</i>	0.1					
Sand	53.9	84.5	53.0	53.0	69.5	62.0

B. 50-Point Analysis

Species	Percent of the Total
Algae	
<i>Halimeda incrassata</i>	44
<i>Grateloupia filicina</i>	6
Sand	50

C. Macroinvertebrate Census (4 x 25 m)

Species	Number
Phylum Mollusca	
<i>Conus pulicaris</i>	1
<i>Terebra</i> sp. (juvenile)	1

D. Fish Census (4 x 25 m)

3 Species  
3 Individuals  
Estimated Standing Crop = 1 g/m<sup>2</sup>

APPENDIX 10. Summary of the benthic survey conducted in the zone of sand and *Halimeda* beds at the proposed SIC cable breakout point (location N20°39.8191', W156°26.8201') offshore of Puʻaʻaʻaʻa, Makana, Maui. Also present at this location is a small amount of smooth limestone. Results of the 6 m<sup>2</sup> quadrat sampling of the benthic community (expressed in percent cover) are given in Part A; a 50-point analysis in Part B and counts of invertebrates in Part C. A short summary of the fish census is given in Part D. Water depth is 16.5 m; mean coral coverage is 0.7% (quadrat method).

A. Quadrat Survey

Species	Quadrat Number					
	0m	5m	10m	15m	20m	25m
Algae						
<i>Halimeda incrassata</i>	17.0	31.0	3.0			
<i>Laurencia nidifica</i>	0.3					
<i>Sphaecolaria furcigera</i>	1.2	1.1				
Corals						
<i>Porites lobata</i>			0.7	0.4	3.0	
<i>Montipora verrucosa</i>			0.1			
Sand	100	81.5	65.8	73.3	84.6	57.0
Rubble			2.0	19.0	15.0	23.0
Hard Substratum			4.0			17.0

B. 50-Point Analysis

Species	Percent of the Total
Algae	
<i>Halimeda incrassata</i>	22
Corals	
<i>Porites lobata</i>	2
Sand	72
Rubble	4

RECEIVED AS FOLLOWS

APPENDIX 10. Continued.

C. Macroinvertebrate Census (4 x 25 m)

Species	Number
Phylum Mollusca	1
<i>Conus leopardus</i>	1
<i>Arca ventricosa</i>	43
Phylum Annelida	1
<i>Spirobranchus gigantea</i>	1
Phylum Echinodermata	4
<i>Tripneustes gratilla</i>	4
<i>Eucidaris metularia</i>	1
<i>Echinothrix diadema</i>	14

D. Fish Census (4 x 25 m)

11 Species  
16 Individuals  
Estimated Standing Crop = 7 g/m<sup>2</sup>

APPENDIX 11. Summary of the benthic survey conducted in sand and rubble at the proposed SIC cable breakout point (location N20°02.148', W155°50.314') located offshore of Kawaihae Harbor, Hawaii on 20 May 2003. The selected breakout point is in consolidated dredge tailings directly adjacent to considerable area of live coral. Results of the 6 m<sup>2</sup> quadrat sampling of the benthic community (expressed in percent cover) are given in Part A; a 50-point analysis in Part B and counts of invertebrates in Part C. A short summary of the fish census is given in Part D. Water depth at the breakout point is 19.0 m and the transect ends at a depth of 29.6 m; mean coral coverage is 0.4% (quadrat method).

A. Quadrat Survey

Species	Quadrat Number					
	0m	5m	10m	15m	20m	25m
Corals						
<i>Porites compressa</i>				0.9		
<i>Montipora verrucosa</i>			0.3		0.1	
<i>Montipora patula</i>			0.9			
Sand	9.0			7.0	47.0	56.0
Rubble	91.0	80.9	92.9	53.0	44.0	12.0
Hard Substratum		17.0				

B. 50-Point Analysis

Species	Percent of the Total
Corals	
<i>Porites lobata</i>	2
Sand	38
Rubble	66
Hard Substratum	4



RECEIVED AS FOLLOWS

APPENDIX 11. Continued.

C. Macroinvertebrate Census (4 x 25 m)

Species	Number
Phylum Mollusca	
<i>Octopus cyanea</i>	2
<i>Arca ventricosa</i>	1
Phylum Echinodermata	
<i>Triplaneustes gratilla</i>	6
<i>Echinothrix diadema</i>	1
<i>Holothuria atra</i>	3
<i>Bodactechia viitensis</i>	2

D. Fish Census (4 x 25 m)

5 Species  
23 Individuals  
Estimated Standing Crop = 8 g/m<sup>2</sup>

APPENDIX 12. Summary of the benthic survey conducted in the zone of *Porites compressa* adjacent to (25 m north) the proposed SIC cable breakout point (location N20°02.148', W155°50.314') located offshore of Kawaihae Harbor, Hawaii on 20 May 2003. The selected breakout point is in consolidated dredge tailings directly adjacent to this area of high coral cover. Results of the 6 m<sup>2</sup> quadrat sampling of the benthic community (expressed in percent cover) are given in Part A; a 50-point analysis in Part B and counts of invertebrates in Part C. A short summary of the fish census is given in Part D. Water depth ranges from 13.7 to 15.8 m; mean coral coverage is 75.3% (quadrat method).

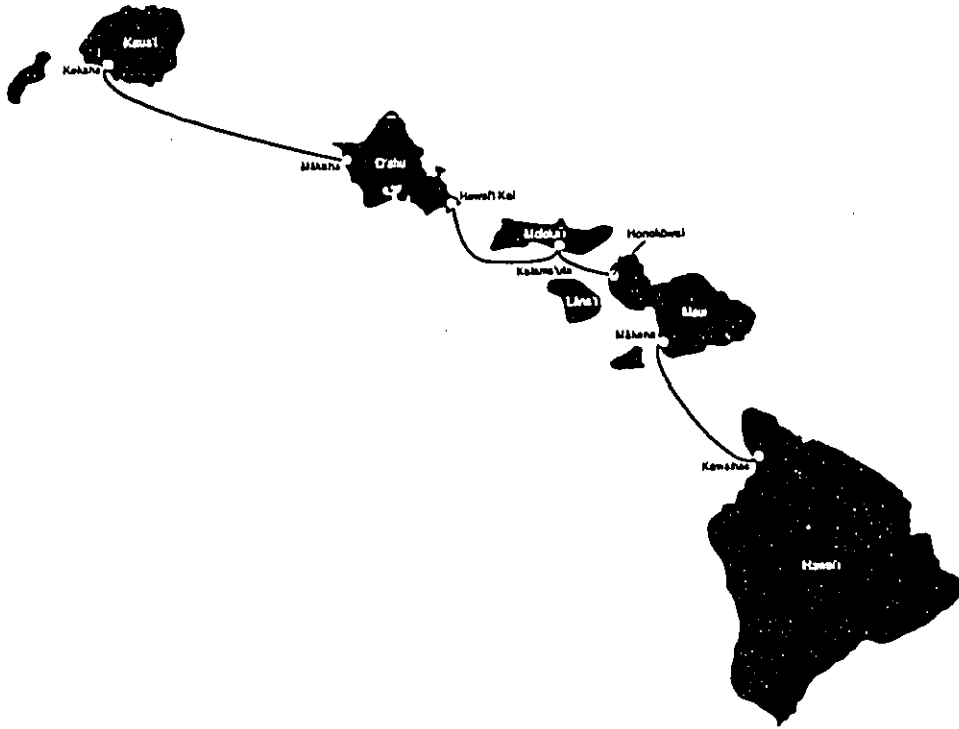
A. Quadrat Survey

Species	Quadrat Number					
	0m	5m	10m	15m	20m	25m
Algae						
<i>Microdictyon japonicum</i>	0.2					
<i>Peyssonellia rubra</i>	2.0	4.0	1.5			
<i>Porolithon onkodes</i>	7.0	9.0	5.0	6.0	4.0	
Corals						
<i>Porites lobata</i>	8.0	12.0	13.0	2.0	17.0	18.0
<i>Porites compressa</i>	83.8	73.5	35.0	41.0	77.5	60.8
<i>Pocillopora meandrina</i>			0.8			1.0
<i>Montipora verrucosa</i>	1.0	1.5	1.0	0.3	1.5	1.2
<i>Montipora patula</i>		2.0				
Hard Substratum			41.2	49.2		19.0

B. 50-Point Analysis

Species	Percent of the Total
Algae	
<i>Porolithon onkodes</i>	6
<i>Peyssonellia rubra</i>	2
Corals	
<i>Porites lobata</i>	12
<i>Porites compressa</i>	68
Hard Substratum	12

RECEIVED AS FOLLOWS



Revision No. 5  
March 13, 2003

Proposed Submarine Cable Landing Sites  
for Sandwich Isles Communications Fiber Optic Network

APPENDIX 12. Continued.

C. Macroinvertebrate Census (4 x 25 m)

Species	Number
Phylum Annelida	
<i>Spirobranchus gigantea</i>	6
Phylum Echinodermata	
<i>Tripleneustes gratilla</i>	68
<i>Echinometra mathaei</i>	19
<i>Heterocentrotus mammillatus</i>	1

D. Fish Census (4 x 25 m)

21 Species  
333 Individuals  
Estimated Standing Crop = 266 g/m<sup>2</sup>

RECEIVED AS FOLLOWS

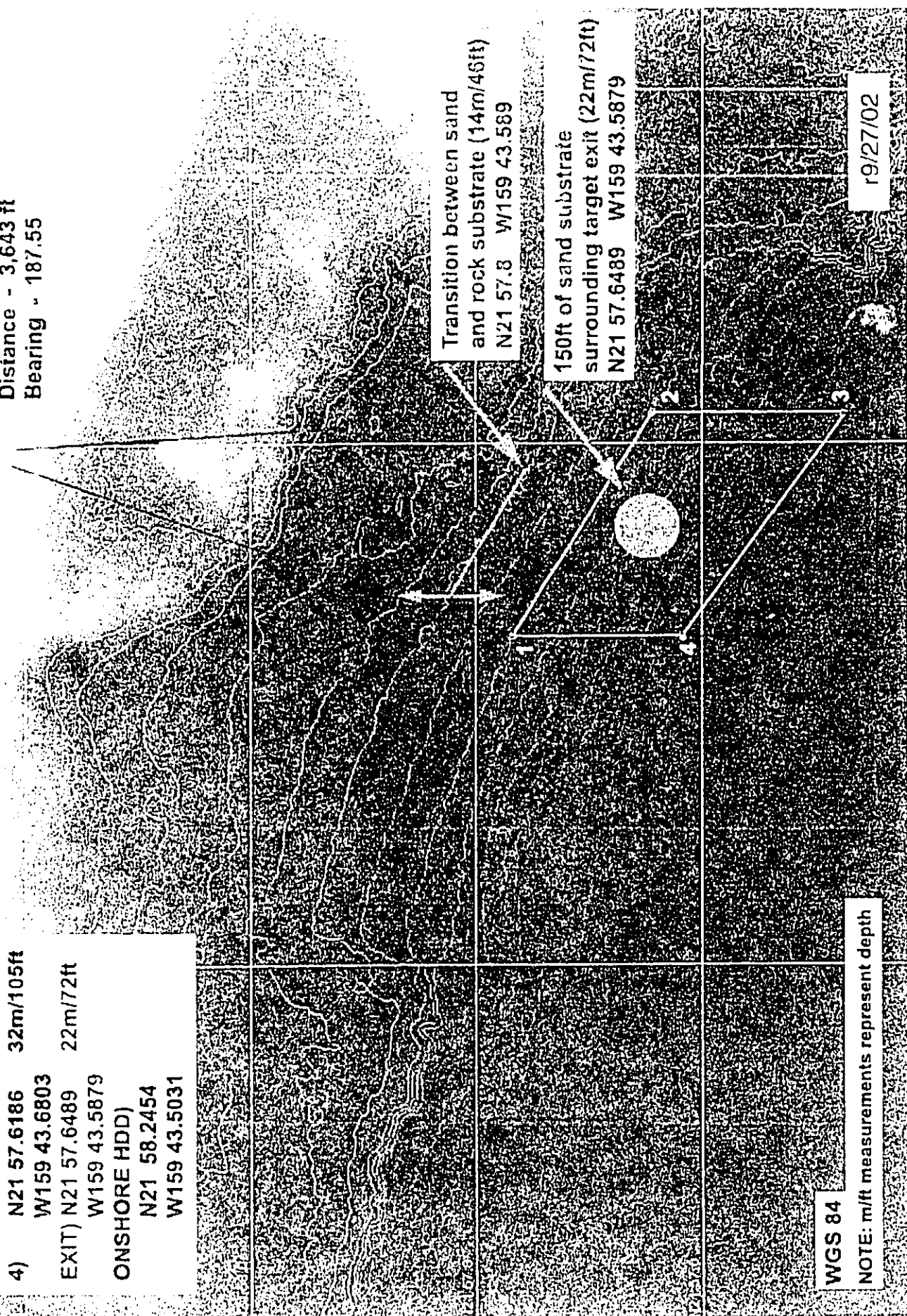
---

FIGURE 2. Overview of the proposed breakout point and alignment for the SIC cable to be deployed at Kekaha, Kauai. Arrow indicates approximate selected breakout point. Figure courtesy of Makai Ocean Engineering.

**KAUAI - KEHAHA**

- 1) N21 57.7654 18m/59ft  
W159 43.6803
- 2) N21 57.6442 18m/59ft  
W159 43.4716
- 3) N21 57.4846 32m/105ft  
W159 43.4716
- 4) N21 57.6186 32m/105ft  
W159 43.6803
- EXIT) N21 57.6489 22m/72ft  
W159 43.5879
- ONSHORE HDD)  
N21 58.2454  
W159 43.5031

From onshore HDD coordinate  
to offshore EXIT coordinate  
Distance - 3,643 ft  
Bearing - 187.55



Transition between sand  
and rock substrate (14m/46ft)  
N21 57.8 W159 43.589

150ft of sand substrate  
surrounding target exit (22m/72ft)  
N21 57.6489 W159 43.5879

r9/27/02

WGS 84

NOTE: m/ft measurements represent depth

RECEIVED AS FOLLOWS

**FIGURE 3.** Overview of the proposed breakout point and alignment for the SIC cable to possibly be deployed at Yokohama Bay, Oahu. "Exit" indicates approximate selected breakout point. Figure courtesy of Makai Ocean Engineering.

RECEIVED AS FOLLOWS

HDD

From onshore HDD coordinate  
to offshore EXIT coordinate  
Distance 2.666 ft  
Bearing 213.93 True

06A110-1000

NP1 628038

W158 119275

NP1 628104

W158 116191

EXIT NP1 628110

W158 116186

NP1 628070

W158 116189



200 ft 200 ft area of sand  
in state surrounding target  
EXIT (center of hole)  
lines from venthan column

With patch coral inside. Tracking in consideration of standards  
of real out zone. Components 150 ft diameter surrounding the ES. This  
is 213.9322  
W158 11769  
(116186-116190)

RECEIVED AS FOLLOWS

---

FIGURE 4. Overview of the proposed breakout point and alignment for the SIC cable to possibly be deployed at Makaha, Oahu (the Kili Street alignment). "Exit" indicates approximate selected breakout point. Figure courtesy of Makai Ocean Engineering.

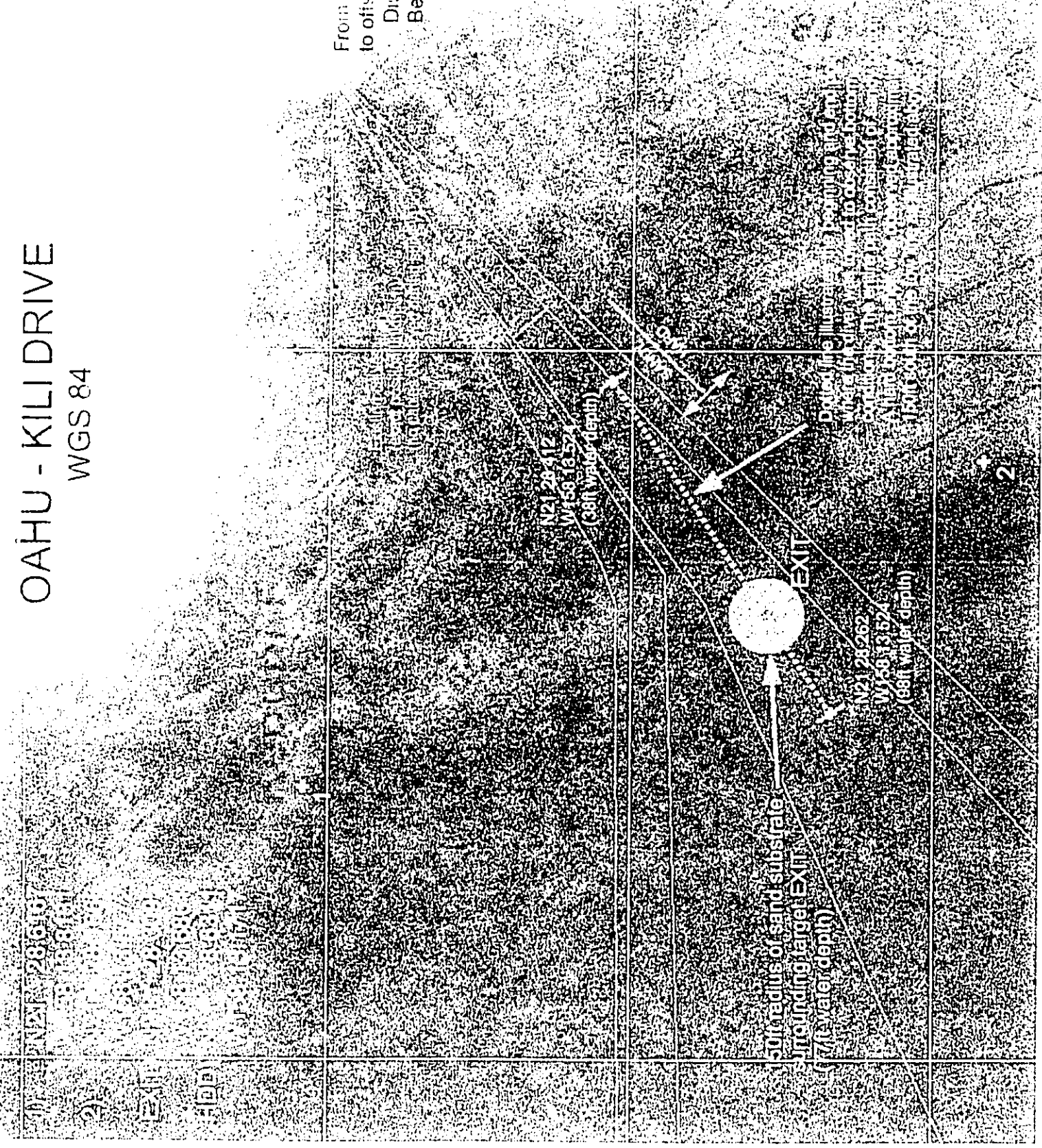
# OAHU - KILI DRIVE

WGS 84

RECEIVED AS FOLLOWS

400

From onshore nautical coordinate  
to offshore EXIT coordinate  
Distance: 3,590 ft  
Bearing: 236.26 True





RECEIVED AS FOLLOWS

---

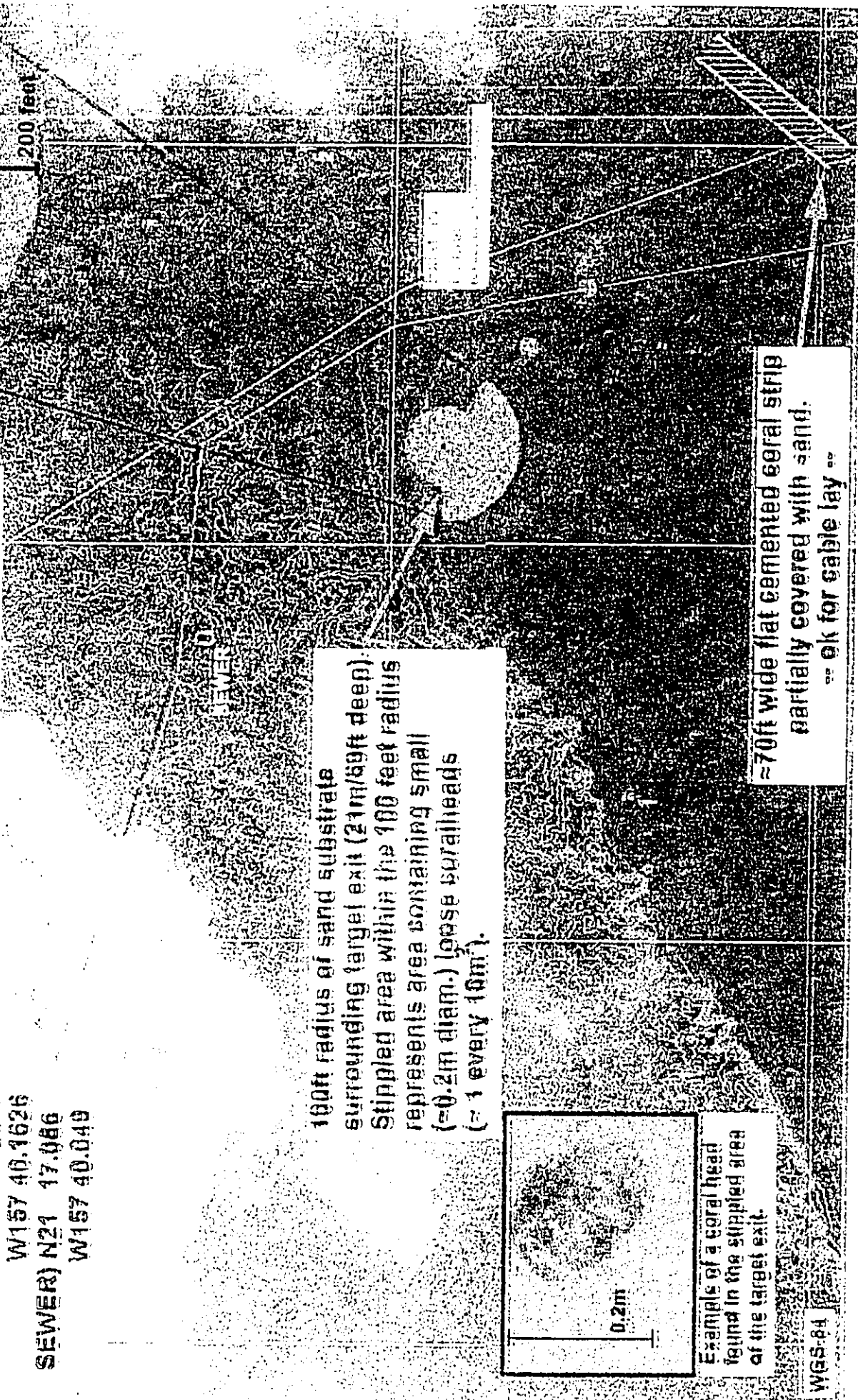
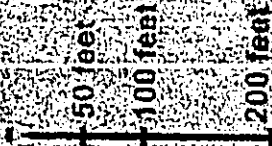
FIGURE 5. Overview of the proposed breakout point and alignment for the SIC cable to be deployed at Sandy Beach, Oahu. "Exit 2" indicates approximate selected breakout point. Figure courtesy of Makai Ocean Engineering.

# OAHU - SANDY BEACH

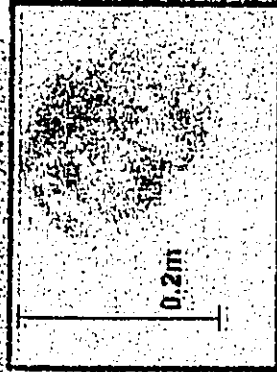
- 1) N21 16.8836  
W157 40.1266
- 2) N21 17.0414  
W157 39.8012
- EXIT) N21 16.9731  
W157 39.9497
- ONSHORE HDD)
- N21 17.2573  
W157 40.1626
- SEWER) N21 17.0866  
W157 40.049

HDD

From onshore HDD coordinate  
to offshore EXIT coordinate  
Distance = 2,102 ft  
Bearing = 144.03



100ft radius of sand substrate  
surrounding target exit (21m/69ft deep).  
Stippled area within the 100 feet radius  
represents area containing small  
( $\approx 0.2m$  diam.) loose coralheads  
( $\approx 1$  every  $10m^2$ ).



0.2m

Examples of a coral head  
found in the stippled area  
of the target exit.

WGS-84

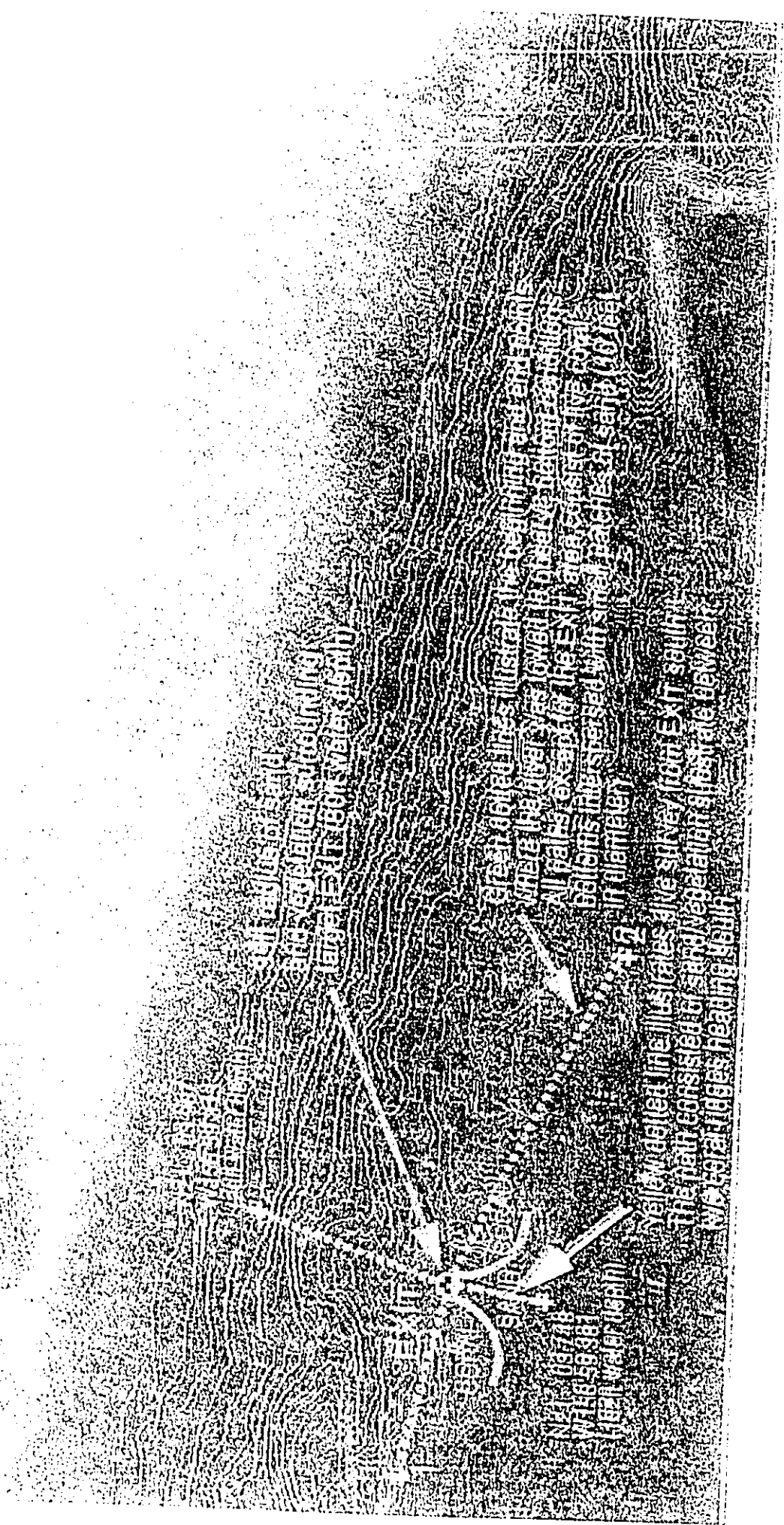
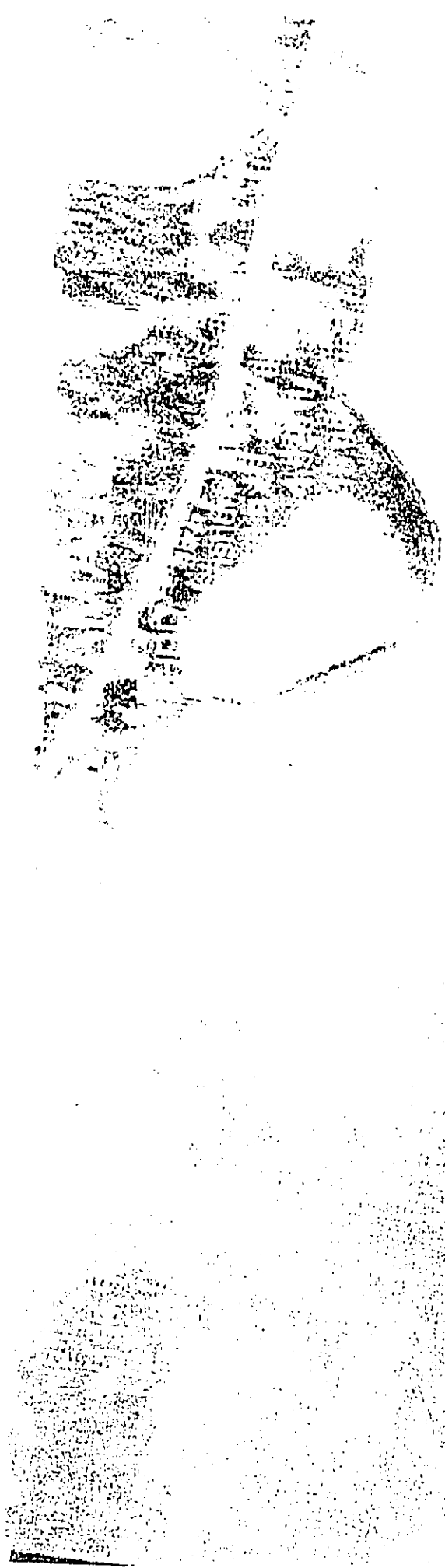
$\approx 70ft$  wide flat cemented coral strip  
partially covered with sand.  
 $\approx$  ok for cable lay  $\approx$

RECEIVED AS FOLLOWS

---

FIGURE 6. Overview of the proposed breakout point and alignment for the SIC cable to be deployed at Kalama'ula, Molokai. "Exit" indicates approximate selected breakout point. Figure courtesy of Makai Ocean Engineering.

RECEIVED AS FOLLOWS



Green dotted lines illustrate the boundary and position of the fossil in the rock.

White dotted lines illustrate the boundary and position of the fossil in the rock.

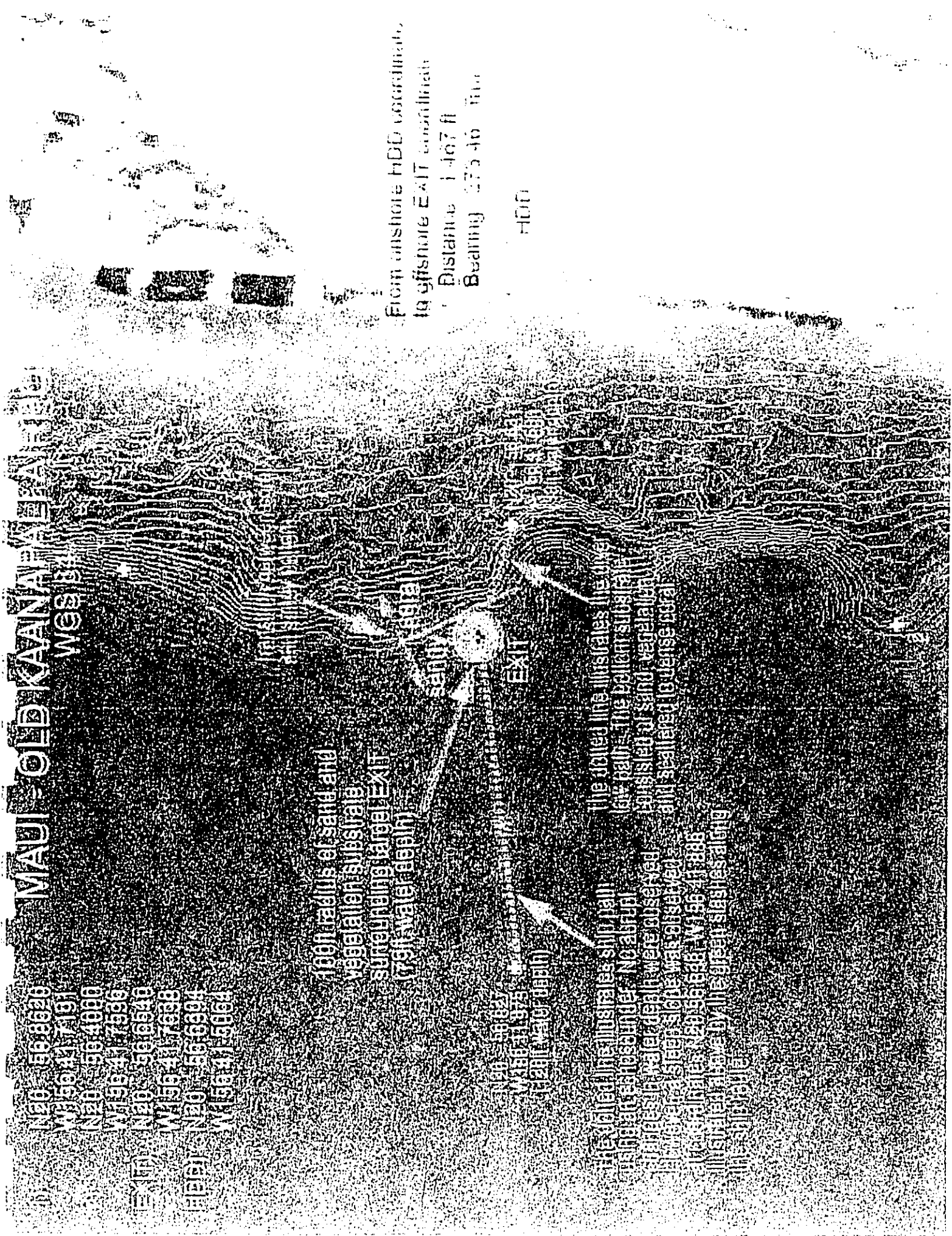
Yellow dotted lines illustrate the survey from EXH south. The pair consisted of sand/vegetation of the same level as the fossil.

EXH 12

RECEIVED AS FOLLOWS

FIGURE 7. Overview of the proposed breakout point and alignment for the SIC cable to possibly be deployed at the old Kaanapali Airport, Lahaina, Maui. "Exit" indicates approximate selected breakout point. Figure courtesy of Makai Ocean Engineering.

RECEIVED AS FOLLOWS



From onshore HDD coordinate,  
 to offshore EXIT coordinate  
 Distance 1467 ft  
 Bearing 275.46 True  
 HDD

100ft radius of sand and  
 vegetation substrate  
 surrounding target EXIT  
 (75ft water depth)

The dotted line illustrates the diver  
 low path. The bottom substrate  
 consisted of sand, vegetation,  
 and scattered dense coral.

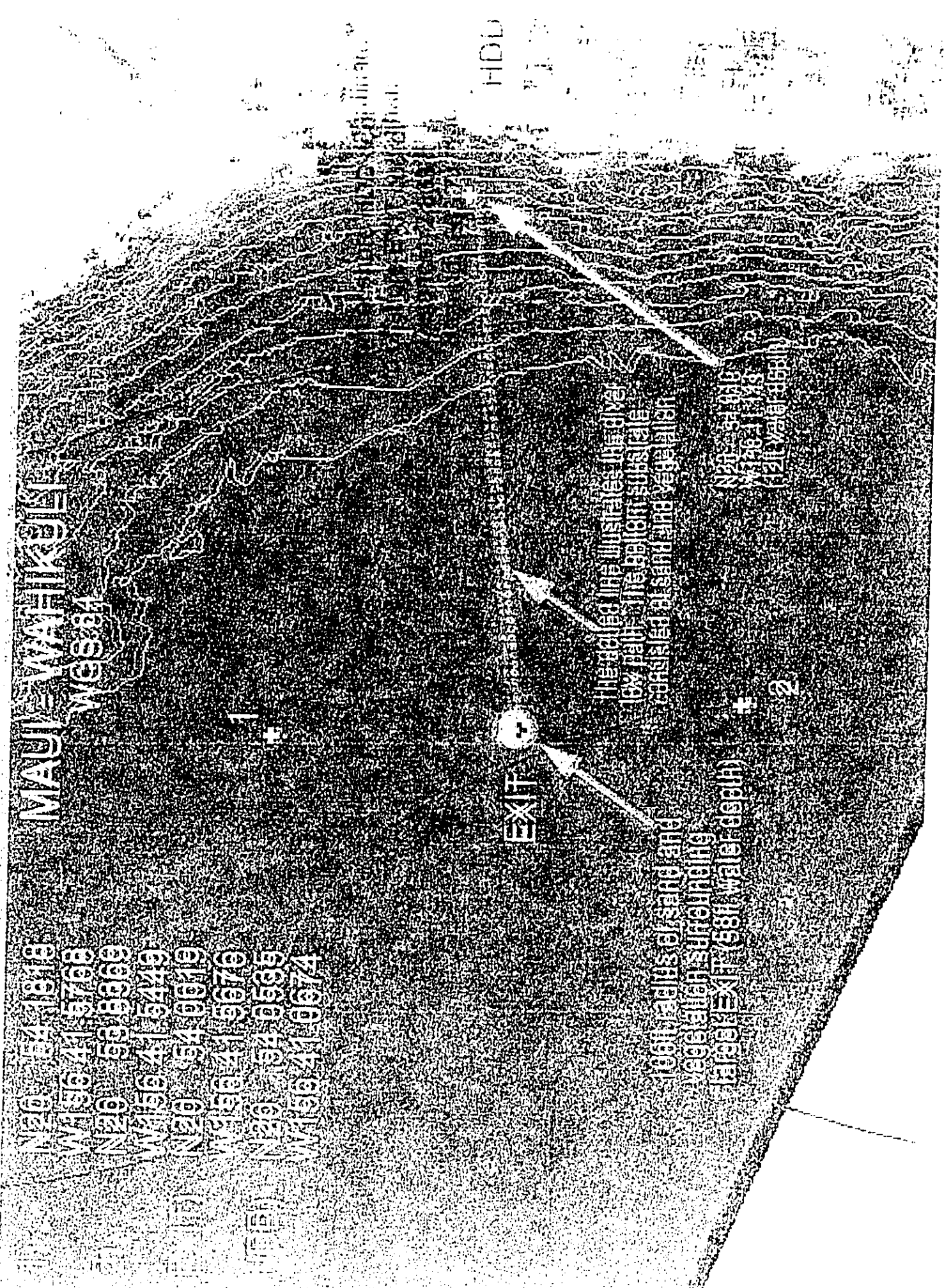
The dotted line illustrates the diver  
 path at 100ft depth. No abrupt  
 changes in water depth were observed.  
 At 100ft depth, the water was observed  
 to be relatively clear. At 100ft depth,  
 the diver observed a great stretch of  
 the shoreline.

RECEIVED AS FOLLOWS

FIGURE 8. Overview of the proposed breakout point and alignment for the SIC cable to possibly be deployed at Wahikuli, Lahaina, Maui. "Exit" indicates approximate selected breakout point. Figure courtesy of Makai Ocean Engineering.



RECEIVED AS FOLLOWS

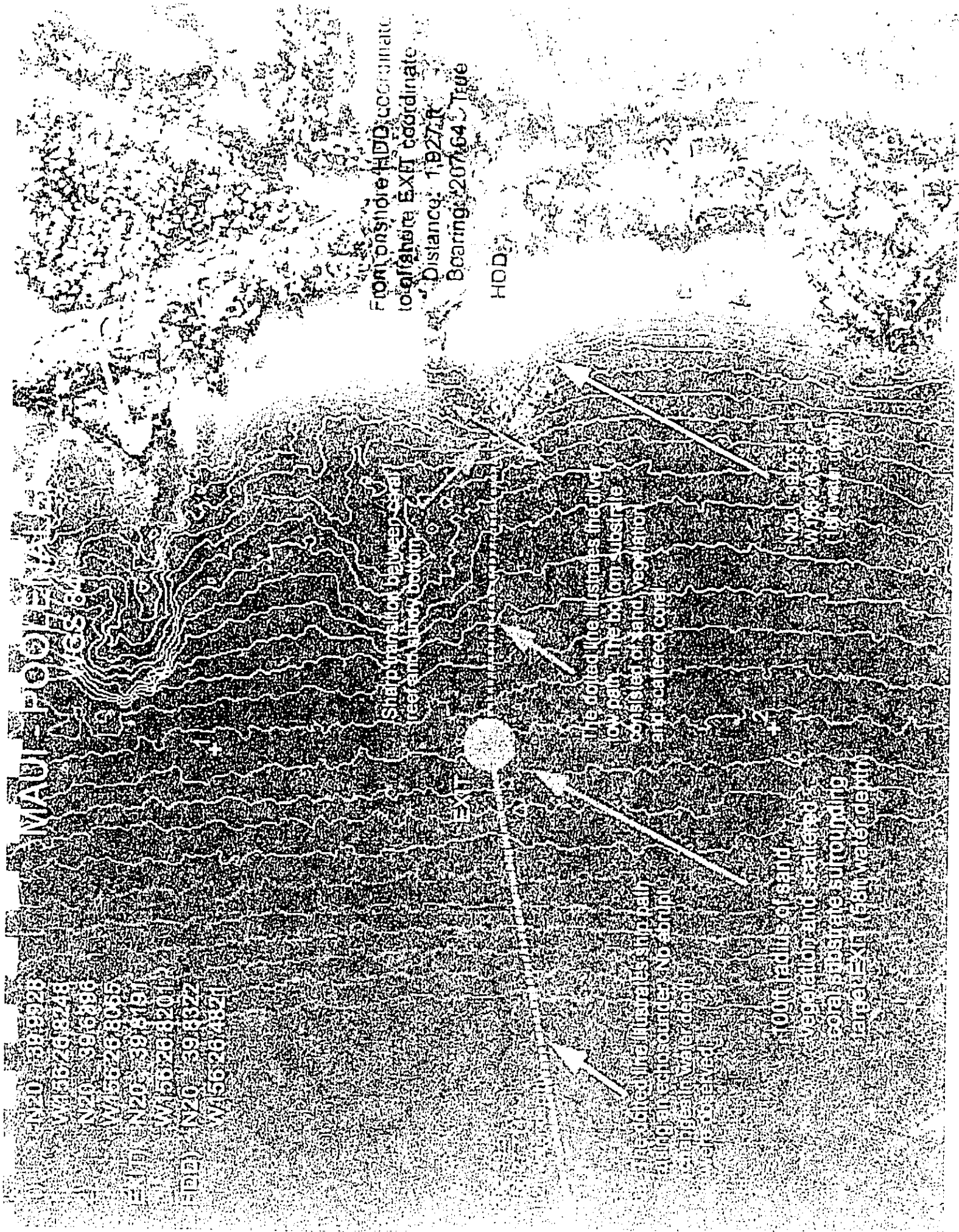




RECEIVED AS FOLLOWS

**FIGURE 9.** Overview of the proposed breakout point and alignment for the SIC cable to be deployed at Pualenalena, Makena, Maui. "Exit" indicates approximate selected breakout point. Figure courtesy of Makai Ocean Engineering.

# RECEIVED AS FOLLOWS



RECEIVED AS FOLLOWS

FIGURE 10. Overview of the proposed breakout point and alignment for the SIC cable to be deployed at Kawaihae, Hawaii. "Exit 1" indicates approximate selected breakout point. Figure courtesy of Makai Ocean Engineering.

RECEIVED AS FOLLOWS

From onshore HDD coordinate  
to offshore EXIT coordinate  
Distance 2832 ft  
Bearing 216.85 True

HDD

Figure 4

Figure 4

200' radius of groggy  
sands surrounding  
target EXIT  
at the water depth

Slope slope  
(20-25%)

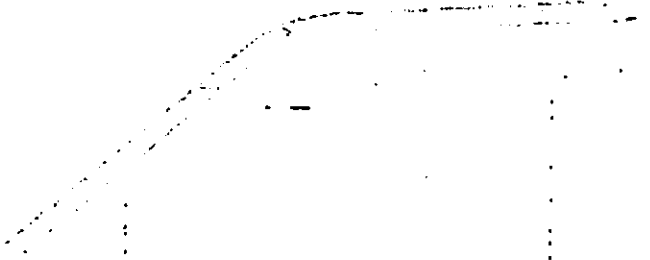
CORAL

EXIT

Location illustrates  
the low path of the  
diver. The route  
consisted of  
interspersed  
coral and rubble.

CORAL

Dredge  
Spoils



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

Appendix 6  
**Hazardous Sites Database Searches**



**Final Environmental Assessment/  
Finding of No Significant Impact**  
Submarine Fiber-Optic Cable Project

RECEIVED AS FOLLOWS

The EDR Radius Map  
with GeoCheck®

Akaloa Rd  
Akaloa Rd/Kaunualii Hwy  
Kekaha, HI 96752  
Inquiry Number: 1012891.1s

July 15, 2003

**EDR** Environmental  
Data  
Resources, Inc.

**The Source  
For Environmental  
Risk Management  
Data**

3530 Post Road  
Souliport, Connecticut 06890  
Nationwide Customer Service  
Telephone: 1-800-352-0050  
Fax: 1-800-231-6802  
Internet: [www.edrnet.com](http://www.edrnet.com)

TABLE OF CONTENTS

SECTION	PAGE
Executive Summary.....	ES-1
Overview Map.....	2
Detail Map.....	3
Map Findings Summary.....	4
Map Findings.....	5
Orphan Summary.....	6
Government Records Searched/Data Currency Tracking.....	GR-1
<b>GEOCHECK ADDENDUM</b>	
Physical Siting Source Addendum.....	A-1
Physical Siting Source Summary.....	A-2
Physical Siting Source Map.....	A-7
Physical Siting Source Map Findings.....	A-8
Physical Siting Source Records Searched.....	A-16

Thank you for your business.  
Please contact EDR at 1-800-352-0050  
with any questions or comments.

**Disclaimer**  
Copyright and Trademark Notice  
This report contains information obtained from a variety of public and other sources. NO WARRANTY EXPRESSED OR IMPLIED IS MADE WHATSOEVER IN CONNECTION WITH THIS REPORT. ENVIRONMENTAL DATA RESOURCES INC. SPECIFICALLY DISCLAIMS THE MAKING OF ANY SUCH WARRANTIES, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE. ALL RISK IS ASSUMED BY THE USER. WHO EVEN SHALL EDR BE LIABLE FOR ANY AND/OR WHETHER ARISING OUT OF ERRORS OR OMISSIONS, NEGLIGENCE, ACCIDENT OR ANY OTHER CAUSE, FOR ANY LOSS OR DAMAGE, INCLUDING, WITHOUT LIMITATION, SPECIAL, INCIDENTAL, CONSEQUENTIAL OR EXEMPLARY DAMAGES.  
E-DR contains copyright 2003 by Environmental Data Resources, Inc. All rights reserved. Reproduction in any media or format, in whole or in part, of any report or map of Environmental Data Resources, Inc. or its affiliates, is prohibited without prior written permission. EDR and the edr logo are trademarks of Environmental Data Resources, Inc. or its affiliates. All other trademarks used herein are the property of their respective owners.

RECEIVED AS FOLLOWS

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc. (EDRI). The report meets the government records search requirements of ASTM Standard Practices for Environmental Site Assessments, E 1527-00. Search distances are per ASTM standard or custom distances requested by the user.

TARGET PROPERTY INFORMATION

ADDRESS

ANANDA BOKKALMALLA HWY  
KEKAYA, HI 96732

COORDINATES

Latitude (North): 21 970290 - 21° 56' 13.0"  
Longitude (West): 159 724200 - 159° 47' 27.1"  
Universal Transverse Mercator Zone 4  
UTM X (Meters): 429228 2  
UTM Y (Meters): 242957310  
Elevation: 11 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property: 2421159-180 KEKAYA OE S, HI  
Source: USGS 7.5 min quad index

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

QUALITY ASSURANCE PROCEDURES

No mapped sites were found in EDR's search of available ("reasonably ascertainable") government records either on the target property or within the ASTM E 1527-00 search radius around the target property for the following databases:

FEDERAL ASTM STANDARD

- NPL..... National Priority List
- Proposed NPL..... Proposed National Priority List Sites
- CERCLIS..... Comprehensive Environmental Response, Compensation, and Liability Information System
- CERCLIS No Further Remedial Action Planned
- CERCLIS RAP..... Corrective Action Report
- CORCONTS..... Resource Conservation and Recovery Information System
- RCHS-TSD..... Resource Conservation and Recovery Information System
- RCHS-LQG..... Resource Conservation and Recovery Information System
- RCHS-SQG..... Resource Conservation and Recovery Information System
- ERMS..... Emergency Response Notification System
- STATE ASTM STANDARD
- SHWS..... Sites List

EXECUTIVE SUMMARY

- SWFLP..... Permitted Landfills in the State of Hawaii
- LUST..... Leaking Underground Storage Tank Database
- UST..... Underground Storage Tank Database

FEDERAL ASTM SUPPLEMENTAL

- CONSENT..... Superfund (CERCLA) Consent Decrees
- ROD..... Records Of Decision
- Diluted NPL..... National Priority List Deletions
- FINDS..... Facility Index System/Facility Identification Initiative Program Summary Report
- HMRIS..... Hazardous Materials Information Reporting System
- MCTS..... Material Licensing Tracking System
- MINES..... Mines Master Index File
- NPL Items..... National Priority List Items
- PAOS..... PCB Activity Database System
- DOD..... Department of Defense Sites
- RAAITS..... RCRA Administrative Action Tracking System
- TRIS..... Toxic Chemical Release Inventory System
- TSCA..... Toxic Substances Control Act
- 5STS..... Section 7 Tracking Systems
- FTTS..... FIFRA/TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

STATE OR LOCAL ASTM SUPPLEMENTAL

- SPALS..... Release Notifications

EDR PROPRIETARY HISTORICAL DATABASES

- Coal Gas..... Former Manufactured Gas (Coal Gas) Sites

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were not identified.  
Unmapped (orphan) sites are not considered in the foregoing analysis.

RECEIVED AS FOLLOWS

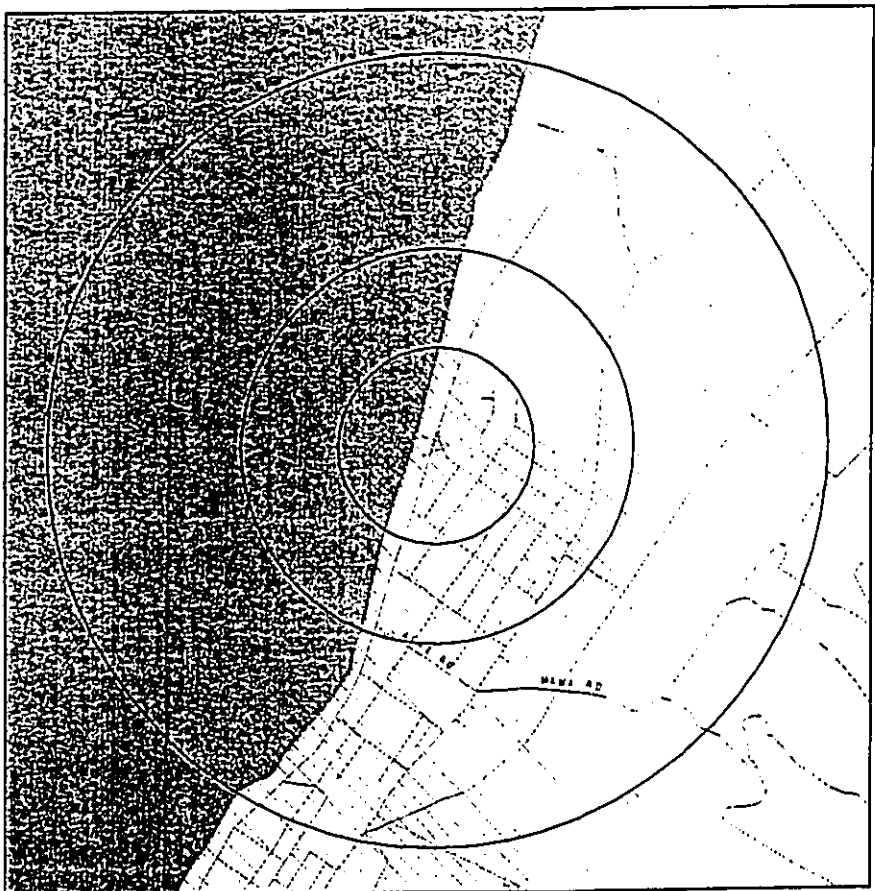
### EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped:

Site Name  
KEKAUA LANDFILL  
KAUAI TEST FACILITY  
KEKAUA LDPL  
KEKAUA LANDFILL PHASE II  
PACIFIC MISSILE RANGE FACILITY  
PACIFIC MISSILE RANGE FACILITY  
PACIFIC MISSILE RANGE FACILITY  
PACIFIC MISSILE RANGE FACILITY  
PACIFIC MISSILE RANGE FACILITY  
PACIFIC MISSILE RANGE FACILITY  
USDOE SANDIA KAUAI TEST FACILITY  
PACIFIC MISSILE RANGE FACILITY

Database(s)  
SIRWS  
SIRWS  
CERC/NRMAP  
SIR/AF, SPILLS  
USIT  
USIT  
USIT  
USIT  
USIT  
USIT  
USIT  
RCRIS-SOC, FINDS  
HAZNET

OVERVIEW MAP - 1012891.1s - Parsons Brinckerhoff



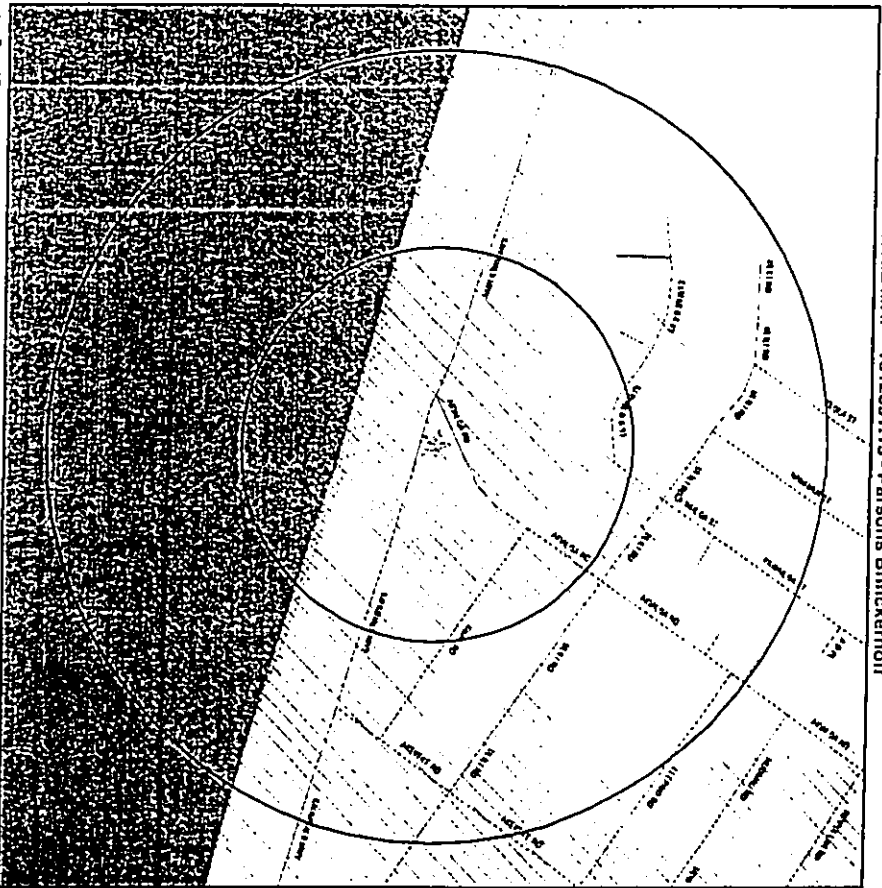
TARGET PROPERTY:	Atiākea Rd	CUSTOMER:	Parsons Brinckerhoff
ADDRESS:	Atiākea Pūkelekaunua Hwy	CONTACT:	Nant Orleans
CITY/STATE/ZIP:	Kaunaloa HI 96752	PROJECT #:	1012891.1s
LOCATION:	21 9700 / 159 7242	DATE:	July 15, 2003 5:43 pm

1012891.1s EXECUTIVE SUMMARY 3



RECEIVED AS FOLLOWS

DETAIL MAP - 1012891.1s - Parsons Brinckerhoff



- 4 Target Property
- 5 Sites at distance greater than or equal to the target property
- 6 Sites at distance less than the target property
- 7 Gas Pipeline Sites
- 8 Surrounding Properties
- 9 National Priority Land Sites
- 10 Landfill Sites
- 11 Dept. Of Energy Sites

TARGET PROPERTY: Atala Rd  
 ADDRESS: Akaha Pukuanaga Hwy  
 CITY/STATE/ZIP: Kaneohe HI 96752  
 LAT/LONG: 21.9703 / 159.7242

CUSTOMER: Parsons Brinckerhoff  
 CONTRACT: NHTD-08-010  
 PROJECT #: 1012891.1s  
 DATE: July 15, 2003 8:43 pm

Copyright © 2003 by Parsons Brinckerhoff, Inc. All rights reserved.

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Meters)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Perched
----------	-----------------	--------------------------	-------	-----------	-----------	---------	-----	---------------

FEDERAL ASTM STANDARD								
NPL	Proposed NPL	1,000	0	0	0	0	0	0
	CERCLIS	0,500	0	0	0	0	0	0
	CERC-A/R/TP	0,250	0	0	0	0	0	0
	CORFACTS	1,250	0	0	0	0	0	0
	RCRIS-TSD	0,500	0	0	0	0	0	0
	RCRIS Lg. Quan. Gen.	0,250	0	0	0	0	0	0
	RCRIS Sm. Quan. Gen.	0,250	0	0	0	0	0	0
	ERMS	TP	NR	NR	NR	NR	NR	0
STATE ASTM STANDARD								
	SWMS	1,000	0	0	0	0	0	0
	State Landfill	0,500	0	0	0	0	0	0
	LUST	0,500	0	0	0	0	0	0
	UST	0,250	0	0	0	0	0	0

FEDERAL ASTM SUPPLEMENTAL								
	CONSENT	1,000	0	0	0	0	0	0
	FOUO	1,000	0	0	0	0	0	0
	Disposed NPL	1,000	0	0	0	0	0	0
	FINDS	TP	NR	NR	NR	NR	NR	0
	HABS	TP	NR	NR	NR	NR	NR	0
	MATS	TP	NR	NR	NR	NR	NR	0
	MILES	0,250	0	0	0	0	0	0
	NPL Leaks	TP	NR	NR	NR	NR	NR	0
	PADS	TP	NR	NR	NR	NR	NR	0
	POD	1,000	0	0	0	0	0	0
	RAAFIS	TP	NR	NR	NR	NR	NR	0
	TRIS	TP	NR	NR	NR	NR	NR	0
	TS/CA	TP	NR	NR	NR	NR	NR	0
	SSIS	TP	NR	NR	NR	NR	NR	0
	FTTS	TP	NR	NR	NR	NR	NR	0

STATE OR LOCAL ASTM SUPPLEMENTAL								
	SPILLS	TP	NR	NR	NR	NR	NR	0

EDR PROPRIETARY HISTORICAL DATABASES								
	Coal Gas	1,000	0	0	0	0	0	0

NOTES:  
 AQL/PL/OW - see EDR Physical Setting Source Addendum  
 TP = Target Property  
 NR = Not Requested at this Search Distance  
 Sites may be listed in more than one database

# RECEIVED AS FOLLOWS

Map ID: MAUP FRODOGS  
 Distance: [Redacted]  
 Distance (ft): [Redacted]  
 Elevation: [Redacted]  
 Site: [Redacted]  
 Dataset(s): [Redacted]  
 EDI ID Number: [Redacted]  
 EPA ID Number: [Redacted]

Coal Use Site Search: No sites were found in a search of Real Property Search's ENVIRONMENTAL database.

NO SITES FOUND

City	EDI ID	Site Name	Site Address	Zip	Distance(s)
KEAWA	310378359	KEAWA LANDFILL PHASE B	KEAWA HIGHWAY / BALDRA RD	96752	HAZNET
KEAWA	1003222414	PACIFIC MISSILE RANGE FACILITY	100 E TRAIL, PACIFIC	96752	USF
KEAWA	100908734	USDOE SANDIA KEAWA TEST FACILITY	OFF KAUHAULA HWY 2 1/4 W OF	96752	CERCLA/RIIS
KEAWA	100878113	KEAWA LDFL	OFF KAUHAULA HWY 2 1/4 W OF	96752	SHWS
KEAWA	100710181	KEAWA LANDFILL	PACIFIC MISSILE RANGE FAC. BARONS	96752	SHWS
KEAWA	100710181	KEAWA TEST FACILITY	TANK 281 KAUHAULA HWY, 50 22 MILES	96752	USF
KEAWA	100341964	PACIFIC MISSILE RANGE FACILITY	TANK 111-A, TANK 711-B KAUHAULA HWY,	96752	USF
KEAWA	100341962	PACIFIC MISSILE RANGE FACILITY	30 22 MILES	96752	USF
KEAWA	100341957	PACIFIC MISSILE RANGE FACILITY	TANK 429 KAUHAULA HWY, 50 22 MILES	96752	USF
KEAWA	100341956	PACIFIC MISSILE RANGE FACILITY	TANK 437 KAUHAULA HWY, 50 22 MILES	96752	USF
KEAWA	100323448	PACIFIC MISSILE RANGE FACILITY	TANK 1285 1286 KAUHAULA HWY 50, 22	96752	USF
KEAWA	100322410	PACIFIC MISSILE RANGE FACILITY	TANK 529 KAUHAULA HWY, 50 22 MILES	96752	USF

ORPHEAN SURVEILLANCE

RECEIVED AS FOLLOWS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate government agency on a monthly or quarterly basis, as noted.

FEDERAL ASTM STANDARD RECORDS

NPL: National Priority List

Source: EPA

Telephone: N/A

National Priority List (Superfund) The NPL is a list of CERCLIS and Unsettled over 1,200 sites for priority cleanup for the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for each site. The boundaries produced by EPA's Environmental Priority Site Interpretation Center (EPC) and regional EPA offices.

Date of Government Version: 04/06/03

Date Made Active at EDR: 06/02/03

Database Release Frequency: Semi-Annually

NPL Site Boundaries

Date of Data Annual at EDR: 06/06/03  
Expired ASTIA days: 28  
Date of Last EDR Contact: 06/09/03

Source: EPA

Telephone: 202-564-7333

EPA Region 1

Telephone: 617-918-1143

EPA Region 2

Telephone: 215-914-5418

EPA Region 4

Telephone: 404-592-8033

Proposed NPL: Proposed National Priority List Sites

Source: EPA

Telephone: N/A

Date of Government Version: 01/06/03

Date Made Active at EDR: 06/02/03

Database Release Frequency: Semi-Annually

Source: EPA

Telephone: 703-413-0273

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System

Source: EPA

Telephone: 703-413-0273

CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priority List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 03/19/03

Date Made Active at EDR: 04/09/03

Database Release Frequency: Quarterly

Source: EPA

Telephone: 703-413-0273

CERCLIS-NPL: CERCLIS No Further Remedial Action Planned

Source: EPA

Telephone: 703-413-0273

As of February 1995, CERCLIS sites designated "No Further Remedial Action Planned" (NFRAP) have been removed from CERCLIS. NFRAP sites may be sites where, following an initial investigation, the contamination was found, but was not serious enough to require Federal Superfund action or NPL consideration. EPA has the core approximately 25,000 NFRAP sites to fill the jurisdictional barriers to the redevelopment of these properties and has archived them as historical records so EPA does not need to repeat the investigations in the future. This policy change is part of the EPA's Brownfields Redevelopment Program to help clean, reuse, reuse, private investors and elected officials to promote economic redevelopment of unproductive urban sites.

Date of Data Annual at EDR: 02/06/03  
Expired ASTIA days: 26  
Date of Last EDR Contact: 05/05/03

EPA Region 8  
Telephone: 314-655-6659

EPA Region 9  
Telephone: 202-312-8774

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 03/18/03  
Date Made Active at EDR: 04/06/03  
Database Release Frequency: Quarterly

CORRECTS: Corrective Action Report

Source: EPA

Telephone: 800-424-9346

CORRECTS: Corrective Action Report

Source: EPA

Telephone: 800-424-9346

CORRECTS: Corrective Action Report

Source: EPA

Telephone: 800-424-9346

CORRECTS: Corrective Action Report

Source: EPA

Telephone: 800-424-9346

CORRECTS: Corrective Action Report

Source: EPA

Telephone: 800-424-9346

CORRECTS: Corrective Action Report

Source: EPA

Telephone: 800-424-9346

CORRECTS: Corrective Action Report

Source: EPA

Telephone: 800-424-9346

CORRECTS: Corrective Action Report

Source: EPA

Telephone: 800-424-9346

CORRECTS: Corrective Action Report

Source: EPA

Telephone: 800-424-9346

CORRECTS: Corrective Action Report

Source: EPA

Telephone: 800-424-9346

CORRECTS: Corrective Action Report

Source: EPA

Telephone: 800-424-9346

CORRECTS: Corrective Action Report

Source: EPA

Telephone: 800-424-9346

CORRECTS: Corrective Action Report

Source: EPA

Telephone: 800-424-9346

CORRECTS: Corrective Action Report

Source: EPA

Telephone: 800-424-9346

CORRECTS: Corrective Action Report

Source: EPA

Telephone: 800-424-9346

CORRECTS: Corrective Action Report

Source: EPA

Telephone: 800-424-9346

CORRECTS: Corrective Action Report

Source: EPA

Telephone: 800-424-9346

CORRECTS: Corrective Action Report

Source: EPA

Telephone: 800-424-9346

CORRECTS: Corrective Action Report

Source: EPA

Telephone: 800-424-9346

CORRECTS: Corrective Action Report

Source: EPA

Telephone: 800-424-9346

CORRECTS: Corrective Action Report

Source: EPA

Telephone: 800-424-9346

CORRECTS: Corrective Action Report

Source: EPA

Telephone: 800-424-9346

CORRECTS: Corrective Action Report

Source: EPA

Telephone: 800-424-9346

CORRECTS: Corrective Action Report

Source: EPA

Telephone: 800-424-9346

RECEIVED AS FOLLOWS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

**Date of Government Version:** 01/09/03  
**Database Release Frequency:** Annually  
**OCULISTED URL:** National Priority List Database  
**Source:** EPA  
**Telephone:** N/A  
 The National Priority List (NPL) is a list of sites where hazardous substances are released from the NPL. In accordance with 40 CFR 300.423 (f), data may be deleted from the NPL where no further response is appropriate.  
**Date of Government Version:** 04/20/03  
**Database Release Frequency:** Quarterly  
**PHMS:** Facility-level System Safety Identification Program Summary Report  
**Source:** EPA  
**Telephone:** N/A  
 The PHMS System Safety Identification Program Summary Report (SSIR) contains both facility information and 'hotspots' to other sources that contain more detailed EDR information. The following PHMS databases in this report: PCS (Process Compliance System), APTS (Automated Information Retrieval System), DOCKET (Department of Justice used to manage and track information on civil judicial enforcement cases), RIMS (Federal Underground Injection Control, C-DOCKET (Commodity Control System), STAIR (State Environmental Laws and Statutes), and PLUS (PCB Activity Data System).  
**Date of Government Version:** 03/19/03  
**Database Release Frequency:** Quarterly  
**HAHRS:** Hazardous Materials Information Reporting System  
**Source:** U.S. Department of Transportation  
**Telephone:** 202-368-4333  
 Hazardous Materials Incident Report System (HAHRS) contains hazardous material spill incidents reported to DOT.  
**Date of Government Version:** 01/21/03  
**Database Release Frequency:** Annually  
**MLTS:** Material Handling Tracking System  
**Source:** Nuclear Regulatory Commission  
**Telephone:** 301-415-7189  
 MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.  
**Date of Government Version:** 04/22/03  
**Database Release Frequency:** Quarterly  
**MHES:** Material Handling Index File  
**Source:** Department of Labor, Mine Safety and Health Administration  
**Telephone:** 303-231-5629  
**Date of Government Version:** 03/11/03  
**Database Release Frequency:** Semi-Annually  
**MPL URES:** Federal Superfund Liens  
**Source:** EPA  
**Telephone:** 202-564-4287  
 Federal Superfund Liens. Under the authority granted the USEPA by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner receives notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.  
**Date of Last EDR Contact:** 04/07/03  
**Date of Next Scheduled EDR Contact:** 01/07/03

**Date of Government Version:** 10/15/91  
**Database Release Frequency:** No Update Planned  
**PADS:** PCB Activity Database System  
**Source:** EPA  
**Telephone:** 202-564-3987  
 PCB Activity Database. PADS identifies generators, transporters, commercial storers and/or brokers and exporters of PCBs who are required to notify the EPA of such activities.  
**Date of Government Version:** 02/28/03  
**Database Release Frequency:** Annually  
**POD:** Department of Defense Sites  
**Source:** USGS  
**Telephone:** 703-646-5970  
 This data set consists of inventory, owned or administered lands, administered by the Department of Defense that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.  
**Date of Government Version:** 04/01/03  
**Database Release Frequency:** Semi-Annually  
**RAAITS:** RCRA Administrative Action Tracking System  
**Source:** EPA  
**Telephone:** 202-564-4104  
 RCRA Administrative Action Tracking System. RAAITS contains records based on enforcement actions based under RCRA pertaining to major violators and includes notifications and orders brought by the EPA, for administrative actions after September 30, 1995, data entry in the RAAITS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAAITS because a database in Agency resources made it impossible to continue the information contained in the database.  
**Date of Government Version:** 04/17/95  
**Database Release Frequency:** No Update Planned  
**TRIS:** Toxic Chemical Release Inventory System  
**Source:** EPA  
**Telephone:** 202-260-1511  
 Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under EPCRA Title III Section 313.  
**Date of Government Version:** 12/31/00  
**Database Release Frequency:** Annually  
**TSCL:** Toxic Substances Control Act  
**Source:** EPA  
**Telephone:** 202-368-4331  
 Toxic Substances Control Act. TSCL identifies manufacturers and importers of chemical substances included on the TSCL Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.  
**Date of Government Version:** 12/31/98  
**Database Release Frequency:** Every 4 Years  
**FTTR MSTR:** FTTR MSTR Tracking System - FTTR MSTR (Federal Trade Commission, Fungicide, & Rodenticide Act/TSCL (Toxic Substances Control Act))  
**Source:** EPA  
**Telephone:** 202-564-4201  
**Date of Government Version:** 04/15/03  
**Database Release Frequency:** Quarterly  
**Date of Last EDR Contact:** 06/27/03  
**Date of Next Scheduled EDR Contact:** 09/25/03

**Date of Last EDR Contact:** 05/20/03  
**Date of Next Scheduled EDR Contact:** 08/11/03

**Date of Last EDR Contact:** 06/27/03  
**Date of Next Scheduled EDR Contact:** 09/25/03

**Date of Last EDR Contact:** 06/27/03  
**Date of Next Scheduled EDR Contact:** 09/25/03

**Date of Last EDR Contact:** 06/27/03  
**Date of Next Scheduled EDR Contact:** 09/25/03

**Date of Last EDR Contact:** 06/27/03  
**Date of Next Scheduled EDR Contact:** 09/25/03

**Date of Last EDR Contact:** 06/27/03  
**Date of Next Scheduled EDR Contact:** 09/25/03

**Date of Last EDR Contact:** 06/27/03  
**Date of Next Scheduled EDR Contact:** 09/25/03

RECEIVED AS FOLLOWS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

ESTS: Section 7 Tracking Systems

Source: EPA  
Telephone: 202-564-5003  
Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 839) requires all registered pesticide-producing establishments to have a monitoring program by March 1st each year. EDRs which report the type and amount of pesticides, active ingredients and devices being produced, and how they have been produced and sold or distributed in the past year.

Date of Government Version: 12/31/00 Date of Last EDR Contact: 06/09/03  
Database Release Frequency: Annually Date of Next Scheduled EDR Contact: 01/21/03

FTTS: FRTAU TSCA Trading System - FRTAU (Federal Insecticide, Fungicide, & Rodenticide Act) TSCA (Toxic Substances Control Act) Source: EPA/Office of Prevention, Pesticides and Toxic Substances  
Telephone: 202-564-7201  
FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FRTAU, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/15/03 Date of Last EDR Contact: 06/23/03  
Database Release Frequency: Quarterly Date of Next Scheduled EDR Contact: 09/22/03

STATE OF HAWAII ASTM STANDARD RECORDS

SHMS: Suez List

Source: Department of Health  
Telephone: 808-596-4218  
Fickler, state or areas in which the Office of Hazard Evaluation and Emergency Response has an interest, has investigated or may investigate under 165C-120 (includes CERCLIS sites)  
Date of Government Version: 07/12/01 Date of Data Arrival at EDR: 09/24/01  
Data Made Active at EDR: 10/16/01 EDRed ASTM date: 22  
Database Release Frequency: Semi-Annually Date of Last EDR Contact: 06/23/03

SWTLE: Permitted Landfills in the State of Hawaii

Source: Department of Health  
Telephone: 808-596-4245  
Solid Waste Landfills in the State of Hawaii. SWTLE type records include an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 1004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 05/03/99 Date of Data Arrival at EDR: 02/11/99  
Data Made Active at EDR: 05/27/99 EDRed ASTM date: 15  
Database Release Frequency: Varies Date of Last EDR Contact: 05/01/03

LUST: Leaking Underground Storage Tank Database

Source: Department of Health  
Telephone: 808-596-4223  
Leaking Underground Storage Tank Incident Report. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.  
Date of Government Version: 01/01/00 Date of Data Arrival at EDR: 02/25/03  
Data Made Active at EDR: 03/12/03 EDRed ASTM date: 19  
Database Release Frequency: Semi-Annually Date of Last EDR Contact: 03/11/03

UST: Underground Storage Tank Database

Source: Department of Health  
Telephone: 808-596-4223  
Registered Underground Storage Tanks. USTs are regulated under Subpart I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 01/01/00 Date of Data Arrival at EDR: 07/25/03  
Data Made Active at EDR: 03/02/00 EDRed ASTM date: 9  
Database Release Frequency: Semi-Annually Date of Last EDR Contact: 03/11/03

STATE OF HAWAII ASTM SUPPLEMENTAL RECORDS

SPILLS: Release Notifications  
Source: Department of Health  
Telephone: 808-596-4218  
Release of hazardous substances to the environment reported to the Office of Hazard Evaluation and Emergency Response since 1988.  
Date of Government Version: 09/01/00 Date of Last EDR Contact: 06/23/03  
Database Release Frequency: Varies Date of Next Scheduled EDR Contact: 09/22/03

EDR PROPRIETARY HISTORICAL DATABASES

Former Manufactured Gas (Coal Gas) Sites: The address and location of Coal Gas sites is provided exclusively to EDR by Real Property Scan, Inc. Copyright 1993 Real Property Scan, Inc. For a technical description of the types of hazards which may be found at such sites, contact your EDR customer service representative.

Disclaimer: Provided by Real Property Scan, Inc.

The information contained in this report has previously been obtained from publicly available sources produced by entities other than Real Property Scan. While reasonable steps have been taken to ensure the accuracy of the report, Real Property Scan does not guarantee the accuracy of the report. Any liability on the part of Real Property Scan is strictly limited to a refund of the amount paid. No claim is made for the actual existence of leaks at any site. This report does not constitute a legal opinion.

STATE OF HAWAII BROWNFIELD'S DATABASES RECORDS

BROWNFIELDS: Hawaii Brownfields Sites  
Source: Office of Planning  
Telephone: 808-596-2423  
Date of Government Version: N/A Date of Last EDR Contact: N/A  
Database Release Frequency: Varies Date of Next Scheduled EDR Contact: N/A

OTHER DATABASES

Depending on the geographic area covered by the report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the presence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

OCRA's Webpages: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as Geodata Digital Line Graphs from 1:100,000 Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.

Electric Power Transmission Line Data

Source: PacifiCorp  
Telephone: (800) 623-6277  
This map includes information copyrighted by PacifiCorp Corporation. The information is provided on a best effort basis and PacifiCorp Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reviewed with the permission of PacifiCorp.

Sensitive Receptors: There are hundreds of sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharge. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR includes known buildings and facilities: schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

RECEIVED AS FOLLOWS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

ANA Hospital:

Source: American Hospital Association, Inc.

Telephone: 312-243-5961

The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing

Source: Centers for Medicare & Medicaid Services

Telephone: 410-716-3000

A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes

Source: National Institute of Health

Telephone: 301-594-4248

Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools

Source: National Center for Education Statistics

Telephone: 202-502-7300

The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools

Source: National Center for Education Statistics

Telephone: 202-502-7300

The National Center for Education Statistics' primary database on private school locations in the United States.

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1998 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as derived by FEMA.

K-12: National Medicaid Directory. This data, available in select counties across the country, was obtained by EDR in 2002 from the U.S. Fish and Wildlife Service.

STREET AND ADDRESS INFORMATION

© 2003 Geographic Data Technology, Inc., RAJ 01/2003. This product contains proprietary and confidential property of Geographic Data Technology, Inc. Unauthorized use, including copying for other than listing and standard listing procedures, of the product is expressly prohibited.

GEOCHECK® - PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

AKUAL OA RD  
AKUAL OA RD, KUALAJUJUNG, JAWA  
KEKAYAH, HI 96752

TARGET PROPERTY COORDINATES

Latitude (North): 21.970289 - 21.57 13.0°  
Longitude (West): 159.724197 - 159.43 27.1°  
Universal Transverse Mercator: Zone 4  
UTM X (Meters): 428229.2  
UTM Y (Meters): 2429573.0  
Elevation: 11 ft. above sea level

EDR's GeoCheck Physical Setting Source Addendum has been developed to assist the environmental professional with the collection of physical setting source information in accordance with ASTM 1527-00, Section 7.2.3. Section 7.2.3 requires that a current USGS 7.5 Minute Topographic Map (or equivalent, such as the USGS Digital Elevation Model) be reviewed. It also requires that one or more additional physical setting sources be sought when (1) conditions have been identified in which hazardous substances or petroleum products are likely to migrate to or from the property, and (2) more information than is provided in the current USGS 7.5 Minute Topographic Map (or equivalent) is generally obtained, pursuant to local good commercial or customary practice, to assess the impact of migration of recognized environmental conditions in connection with the property. Such additional physical setting sources generally include information about the topographic, hydrologic, hydrogeologic, and geologic characteristics of a site, and wells in the area.

Assessment of the impact of contaminant migration generally has two principle investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater velocity is generally impacted by the nature of the geologic strata. EDR's GeoCheck Physical Setting Source Addendum is generally intended for use by environmental professionals in forming an opinion about the impact of potential contaminant migration.

RECEIVED AS FOLLOWS

**GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY**

**GROUNDWATER FLOW DIRECTION INFORMATION**

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If available, it is preferred. If not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

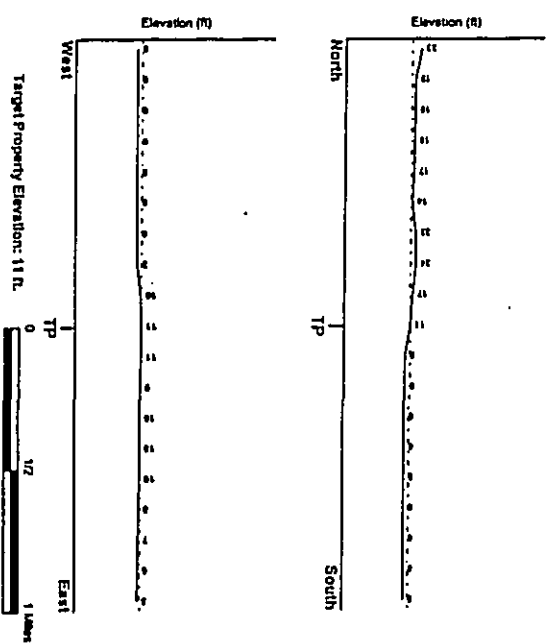
**TOPOGRAPHIC INFORMATION**

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what down-gradient sites might be impacted.

**TARGET PROPERTY TOPOGRAPHY**

USGS Topographic Map: 2421159148 KEKAWA, OE, S, HI  
 General Topographic Gradient: General SSIV  
 Source: USGS 7.5 min quad index

**SURROUNDING TOPOGRAPHY: ELEVATION PROFILES**



Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be used with care.

**GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY**

**HYDROLOGIC INFORMATION**

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what down-gradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

**FEMA FLOOD ZONE**

Target Property County: KAUAI, HI

FEMA Flood Electronic Data: YES - refer to the Overview Map and Detail Map

Flood Plain Panel at Target Property: 1500020152D

Additional Panels in search area: 1500020100C  
1500020156D

**NATIONAL WETLAND INVENTORY**

NWI Quad at Target Property: KEKAWA

NWI Electronic Data Coverage: YES - refer to the Overview Map and Detail Map

**HYDROGEOLOGIC INFORMATION**

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what down-gradient sites might be impacted.

**AQUIFLOW®**

Search Radius: 1,000 Mils.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific nodes. EDR has reviewed reports furnished by environmental professionals to regulatory authorities at selected sites and has entered the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID: Not Reported LOCATION: FROM TP GENERAL DIRECTION: GROUNDWATER FLOW

RECEIVED AS FOLLOWS

**GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY**

**GROUNDWATER FLOW VELOCITY INFORMATION**  
 Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

**GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY**  
 Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

**ROCK STRATIGRAPHIC UNIT**

ERA:	System:	Series:	Code:	Category:
.	.	.	.	.
N/A	(Decoded above as Era, System & Series)			

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schroeder, R.E. Arndt and W.J. Baker, Geology of the Continental U.S. at 1:2,500,000 Scale - a digital representation of the 1974 F.B. King and H.M. Behrman Map, USGS Digital Data Series DDS - 11 (1994).

**DOMAINT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY**

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, analyzing and disseminating soil data. The National Cooperative Soil Survey (NCSS) is a nationwide effort to collect, analyze and disseminate soil data. The following information is based on Soil Conservation Service STATSGO data.

Soil Component Name:	Soil Surface Texture:	Hydrologic Group:	Soil Drainage Class:	Hydric Status:	Corrosion Potential:	Depth to Bedrock Min.:	Depth to Bedrock Max.:
JALICAS	loamy fine sand	Class A - High infiltration rates. Soils are deep, well drained to excessively drained sands and gravels.	Excessively, Soils have very high and high hydraulic conductivity and low water holding capacity. Depth to water table is more than 8 feet.	Soil does not meet the requirements for a hydric soil.	MODERATE	> 60 inches	> 60 inches

**GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY**

Layer	Boundary		Soil Layer Information				Permeability Rate (ft/yr)	Soil Reaction (pH)
	Upper	Lower	Soil Texture Class	Classification	AASHTO Group	Unified Soil		
1	0 inches	18 inches	loamy fine sand	COARSE-GRAINED SOILS: SANDS with less, silty sand.	Gravelly medium to fine sand, silty, or clayey gravel	COARSE-GRAINED SOILS: SANDS with less, silty sand.	Max: 20.00 Min: 6.00	Max: 7.30 Min: 6.00
2	18 inches	60 inches	sand	COARSE-GRAINED SOILS: SANDS, poorly graded	Coarse sand, silty sand, or clayey sand	COARSE-GRAINED SOILS: SANDS with less, silty sand.	Max: 20.00 Min: 6.00	Max: 8.10 Min: 6.00

**OTHER SOIL TYPES IN AREA**

Based on Soil Conservation Service STATSGO data, the following additional suborder soil types may appear within the general area of target property:

Soil Surface Texture:	Soil Surface Texture:	Soil Surface Texture:	Soil Surface Texture:	Soil Surface Texture:	Soil Surface Texture:	Soil Surface Texture:	Soil Surface Texture:
loamy fine sand	loamy sand	loamy sand	loamy sand	loamy sand	loamy sand	loamy sand	loamy sand

**ADDITIONAL ENVIRONMENTAL RECORD SOURCES**  
 According to ASTM E 1527-00, Section 7.2.2, "one or more additional state or local sources of environmental records may be checked. In the discretion of the environmental professional, to enhance and supplement federal and state sources... Factors to consider in determining which local or additional state records, if any, should be checked include (1) whether they are reasonably ascertainable, (2) whether they are sufficiently useful, accurate, and complete in light of the objectives of the records review (see 7.1.1), and (3) whether they are obtained pursuant to local, good commercial or customary practice." One of the record sources listed in Section 7.2.2 is water well information. Water well information can be used to assist the environmental professional in assessing sources that may impact groundwater flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.



RECEIVED AS FOLLOWS

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (feet)
Federal USGS	1000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
B9	USGS023500	1/2 - 1 Mile NE
11	USGS023531	1/2 - 1 Mile ESE

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

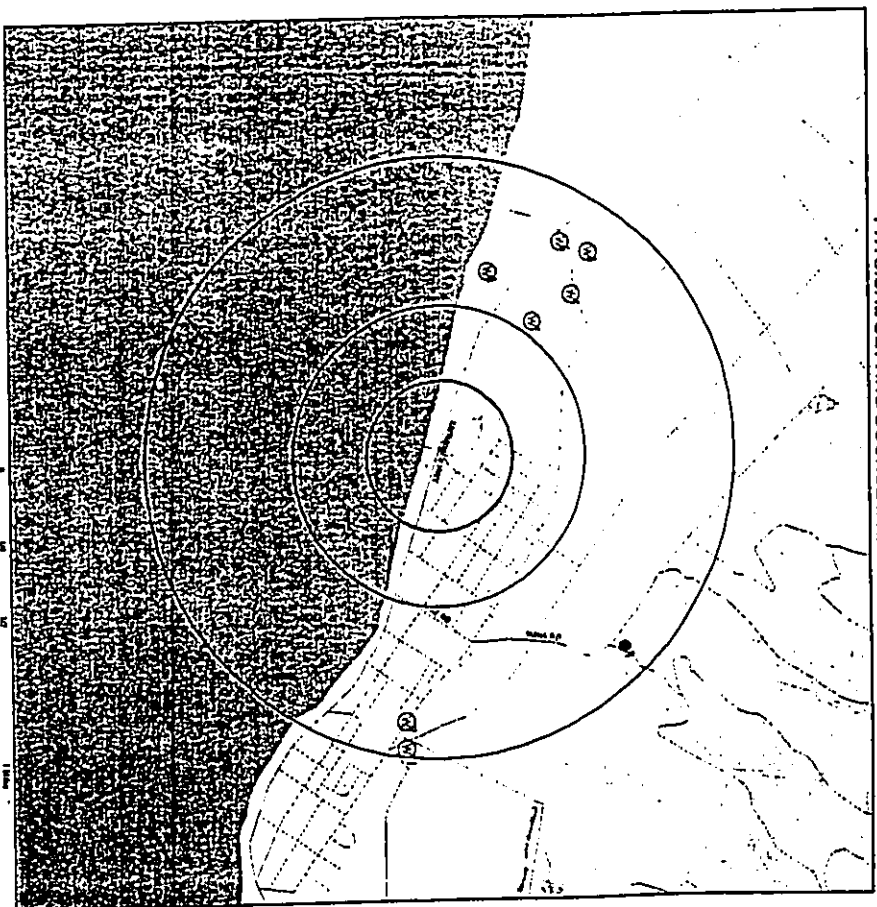
MAP ID	WELL ID	LOCATION FROM TP
B10	H0000100	1/2 - 1 Mile NE

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
1	23841002	1/2 - 1 Mile SW
A2	23841001	1/2 - 1 Mile WNW
4	23841008	1/2 - 1 Mile WNW
5	23841004	1/2 - 1 Mile WNW
6	23841003	1/2 - 1 Mile WNW
7	23841005	1/2 - 1 Mile SW
8	23842001	1/2 - 1 Mile ESE
B9	23843001	1/2 - 1 Mile NE

PHYSICAL SETTING SOURCE MAP - 1012891.1s



- IV County Boundary
- Water Well
- Public Water Supply Wells
- Circle at Wellhead Icon
- Quadrangle Flow Direction
- 1(1) Quadrangle Flow at Location
- 1(2) Quadrangle Flow Values at Location

TARGET PROPERTY: Abilene Rd, Abilene Rd, Abilene Rd, Abilene Rd, Abilene Rd  
 ADDRESS: Abilene Rd, Abilene Rd, Abilene Rd, Abilene Rd, Abilene Rd  
 CITY/STATE/ZIP: Abilene, TX 79602  
 LAT/LONG: 32.8333, -101.7667

CUSTOMER: Parsons Brinckerhoff  
 CONTACT: Matt O'Connell  
 PHONE: 1012891.1s  
 DATE: July 15, 2003 5:44 pm

RECEIVED AS FOLLOWS

GEOCHECK - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID	Database	EDR ID Number
1 NW 1/2 - 1 1/4 Sec 18	HA WELLS	2-5844-002
Well Name:	2-5844-002	
Well ID:	1897	
Well depth:	02	
Well type:	1594102	
Well status:	H	
Well diameter:	Perforation DIA	
Well casing depth:	13	
Well casing diameter:	18	
Well casing material:	RR	
Well casing weight:	245	
Well casing length:	500	
Well casing diameter at base:	360	
Well casing diameter at top:	C	
Well casing diameter at casing head:	Not Reported	
Well casing diameter at casing tail:	Not Reported	
Well casing diameter at casing joint:	Not Reported	
Well casing diameter at casing connection:	Not Reported	
Well casing diameter at casing transition:	Not Reported	
Well casing diameter at casing termination:	Not Reported	
Well casing diameter at casing completion:	Not Reported	
Well casing diameter at casing start:	Not Reported	
Well casing diameter at casing end:	Not Reported	
Well casing diameter at casing middle:	Not Reported	
Well casing diameter at casing section:	Not Reported	
Well casing diameter at casing interval:	Not Reported	
Well casing diameter at casing zone:	Not Reported	
Well casing diameter at casing layer:	Not Reported	
Well casing diameter at casing stratum:	Not Reported	
Well casing diameter at casing horizon:	Not Reported	
Well casing diameter at casing level:	Not Reported	
Well casing diameter at casing stage:	Not Reported	
Well casing diameter at casing grade:	Not Reported	
Well casing diameter at casing datum:	Not Reported	
Well casing diameter at casing benchmark:	Not Reported	
Well casing diameter at casing control point:	Not Reported	
Well casing diameter at casing reference point:	Not Reported	
Well casing diameter at casing monitoring point:	Not Reported	
Well casing diameter at casing check point:	Not Reported	
Well casing diameter at casing test point:	Not Reported	
Well casing diameter at casing observation point:	Not Reported	
Well casing diameter at casing measurement point:	Not Reported	
Well casing diameter at casing location point:	Not Reported	
Well casing diameter at casing identification point:	Not Reported	
Well casing diameter at casing verification point:	Not Reported	
Well casing diameter at casing validation point:	Not Reported	
Well casing diameter at casing confirmation point:	Not Reported	
Well casing diameter at casing approval point:	Not Reported	
Well casing diameter at casing authorization point:	Not Reported	
Well casing diameter at casing certification point:	Not Reported	
Well casing diameter at casing accreditation point:	Not Reported	
Well casing diameter at casing certification point:	Not Reported	
Well casing diameter at casing accreditation point:	Not Reported	
Well casing diameter at casing certification point:	Not Reported	
Well casing diameter at casing accreditation point:	Not Reported	

GEOCHECK - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID	Database	EDR ID Number
1 NW 1/2 - 1 1/4 Sec 18	HA WELLS	2-5844-002
Well Name:	2-5844-002	
Well ID:	1897	
Well depth:	02	
Well type:	1594102	
Well status:	H	
Well diameter:	Perforation DIA	
Well casing depth:	13	
Well casing diameter:	18	
Well casing material:	RR	
Well casing weight:	245	
Well casing length:	500	
Well casing diameter at base:	360	
Well casing diameter at top:	C	
Well casing diameter at casing head:	Not Reported	
Well casing diameter at casing tail:	Not Reported	
Well casing diameter at casing joint:	Not Reported	
Well casing diameter at casing connection:	Not Reported	
Well casing diameter at casing transition:	Not Reported	
Well casing diameter at casing termination:	Not Reported	
Well casing diameter at casing completion:	Not Reported	
Well casing diameter at casing start:	Not Reported	
Well casing diameter at casing end:	Not Reported	
Well casing diameter at casing middle:	Not Reported	
Well casing diameter at casing section:	Not Reported	
Well casing diameter at casing interval:	Not Reported	
Well casing diameter at casing zone:	Not Reported	
Well casing diameter at casing layer:	Not Reported	
Well casing diameter at casing stratum:	Not Reported	
Well casing diameter at casing horizon:	Not Reported	
Well casing diameter at casing level:	Not Reported	
Well casing diameter at casing stage:	Not Reported	
Well casing diameter at casing grade:	Not Reported	
Well casing diameter at casing datum:	Not Reported	
Well casing diameter at casing benchmark:	Not Reported	
Well casing diameter at casing control point:	Not Reported	
Well casing diameter at casing reference point:	Not Reported	
Well casing diameter at casing monitoring point:	Not Reported	
Well casing diameter at casing check point:	Not Reported	
Well casing diameter at casing test point:	Not Reported	
Well casing diameter at casing observation point:	Not Reported	
Well casing diameter at casing measurement point:	Not Reported	
Well casing diameter at casing location point:	Not Reported	
Well casing diameter at casing identification point:	Not Reported	
Well casing diameter at casing verification point:	Not Reported	
Well casing diameter at casing validation point:	Not Reported	
Well casing diameter at casing confirmation point:	Not Reported	
Well casing diameter at casing approval point:	Not Reported	
Well casing diameter at casing authorization point:	Not Reported	
Well casing diameter at casing certification point:	Not Reported	
Well casing diameter at casing accreditation point:	Not Reported	
Well casing diameter at casing certification point:	Not Reported	
Well casing diameter at casing accreditation point:	Not Reported	
Well casing diameter at casing certification point:	Not Reported	
Well casing diameter at casing accreditation point:	Not Reported	

RECEIVED AS FOLLOWS

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID	Direction	Distance	Elevation	Map ID	Direction	Distance	Elevation
102 - 1 104				102 - 1 104			
Wid	2-5444-004	Kanal	14 Blvd 3	Wid	2-5444-004	Kanal	14 Blvd 3
Well name:	1998	02	1594407	Well name:	1998	02	1594407
Yield:	0			Yield:	0		
Qual, msp:	0			Qual, msp:	0		
Longitud:	0			Longitud:	0		
Opic:	0			Opic:	0		
Old number:	0			Old number:	0		
Type:	Percolation D/B			Type:	Percolation D/B		
Source Elev:	13			Source Elev:	13		
Solid casing Depth:	0			Solid casing Depth:	0		
Use:	Not Reported			Use:	Not Reported		
Use year:	98			Use year:	98		
Chloride value:	0			Chloride value:	0		
Pumping Test rate:	0			Pumping Test rate:	0		
Chloride Test:	0			Chloride Test:	0		
Ureic:	0			Ureic:	0		
Annual D/B:	0			Annual D/B:	0		
Geology:	Not Reported			Geology:	Not Reported		
Insulation:	Not Reported			Insulation:	Not Reported		
Water chertus:	Not Reported			Water chertus:	Not Reported		
Min chertus:	Not Reported			Min chertus:	Not Reported		
Bot hole depth:	23			Bot hole depth:	23		
Bot hole depth:	23			Bot hole depth:	23		
Pump Capacity:	Not Reported			Pump Capacity:	Not Reported		
Per meq lay:	1.2-002-002			Per meq lay:	1.2-002-002		
Latest head mt:	0			Latest head mt:	0		
Current CI mt:	0			Current CI mt:	0		
Pump Inst. Date:	Not Reported			Pump Inst. Date:	Not Reported		
Transmissiv:	0			Transmissiv:	0		
Pump depth:	Not Reported			Pump depth:	Not Reported		

Wid	Well name:	Yield:	Qual, msp:	Longitud:	Opic:	Old number:	Type:	Source Elev:	Solid casing Depth:	Use:	Use year:	Chloride value:	Pumping Test rate:	Chloride Test:	Ureic:	Annual D/B:	Geology:	Insulation:	Water chertus:	Min chertus:	Bot hole depth:	Bot hole depth:	Pump Capacity:	Per meq lay:	Latest head mt:	Current CI mt:	Pump Inst. Date:	Transmissiv:	Pump depth:	
2-5444-003	Kanal	14 Blvd 3	1998	02	1594411	0	Percolation D/B	12	0	Not Reported	98	0	0	0	0	0	0	0	0	0	23	23	Not Reported	1.2-002-002	0	0	Not Reported	0	0	Not Reported
18 WELLS																														

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Wid	Well name:	Yield:	Qual, msp:	Longitud:	Opic:	Old number:	Type:	Source Elev:	Solid casing Depth:	Use:	Use year:	Chloride value:	Pumping Test rate:	Chloride Test:	Ureic:	Annual D/B:	Geology:	Insulation:	Water chertus:	Min chertus:	Bot hole depth:	Bot hole depth:	Pump Capacity:	Per meq lay:	Latest head mt:	Current CI mt:	Pump Inst. Date:	Transmissiv:	Pump depth:	
2-5444-003	Kanal	14 Blvd 3	1998	02	1594411	0	Percolation D/B	12	0	Not Reported	98	0	0	0	0	0	0	0	0	0	23	23	Not Reported	1.2-002-002	0	0	Not Reported	0	0	Not Reported
18 WELLS																														

Wid	Well name:	Yield:	Qual, msp:	Longitud:	Opic:	Old number:	Type:	Source Elev:	Solid casing Depth:	Use:	Use year:	Chloride value:	Pumping Test rate:	Chloride Test:	Ureic:	Annual D/B:	Geology:	Insulation:	Water chertus:	Min chertus:	Bot hole depth:	Bot hole depth:	Pump Capacity:	Per meq lay:	Latest head mt:	Current CI mt:	Pump Inst. Date:	Transmissiv:	Pump depth:	
2-5444-003	Kanal	14 Blvd 3	1998	02	1594411	0	Percolation D/B	12	0	Not Reported	98	0	0	0	0	0	0	0	0	0	23	23	Not Reported	1.2-002-002	0	0	Not Reported	0	0	Not Reported
18 WELLS																														

RECEIVED AS FOLLOWS

GEOCHECK - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID	Direction	Distance	Elevation	Database	EDR ID Number
7	NE	1.0	1188	18 WELLS	2-342-001

Well	Brand Name	Well No	Well Name	Well No	Well Name	Well No	Well Name
2	Keolu	2-342-001	Keolu	2-342-001	Keolu	2-342-001	Keolu
1800	Keolu M50	1800	Keolu M50	1800	Keolu M50	1800	Keolu M50
194218	Keolu M50	194218	Keolu M50	194218	Keolu M50	194218	Keolu M50
Y	UTM	Y	UTM	Y	UTM	Y	UTM
PER	Keolu Sugar	PER	Keolu Sugar	PER	Keolu Sugar	PER	Keolu Sugar
10	Keolu Sugar	10	Keolu Sugar	10	Keolu Sugar	10	Keolu Sugar
490	Keolu Sugar	490	Keolu Sugar	490	Keolu Sugar	490	Keolu Sugar
11700	Keolu Sugar	11700	Keolu Sugar	11700	Keolu Sugar	11700	Keolu Sugar
74	Keolu Sugar	74	Keolu Sugar	74	Keolu Sugar	74	Keolu Sugar
2020	Keolu Sugar	2020	Keolu Sugar	2020	Keolu Sugar	2020	Keolu Sugar
130	Keolu Sugar	130	Keolu Sugar	130	Keolu Sugar	130	Keolu Sugar
16	Keolu Sugar	16	Keolu Sugar	16	Keolu Sugar	16	Keolu Sugar
82	Keolu Sugar	82	Keolu Sugar	82	Keolu Sugar	82	Keolu Sugar
110/11918 00 00 00	Keolu Sugar	110/11918 00 00 00	Keolu Sugar	110/11918 00 00 00	Keolu Sugar	110/11918 00 00 00	Keolu Sugar
010/11918 00 00 00	Keolu Sugar	010/11918 00 00 00	Keolu Sugar	010/11918 00 00 00	Keolu Sugar	010/11918 00 00 00	Keolu Sugar
08/11917 00 00 00	Keolu Sugar	08/11917 00 00 00	Keolu Sugar	08/11917 00 00 00	Keolu Sugar	08/11917 00 00 00	Keolu Sugar
0	Keolu Sugar	0	Keolu Sugar	0	Keolu Sugar	0	Keolu Sugar

Map ID	Direction	Distance	Elevation	Database	EDR ID Number
8	NE	1.1	1188	18 WELLS	2-342-001

Well	Brand Name	Well No	Well Name	Well No	Well Name	Well No	Well Name
2	Keolu	2-342-001	Keolu	2-342-001	Keolu	2-342-001	Keolu
1800	Keolu M50	1800	Keolu M50	1800	Keolu M50	1800	Keolu M50
194218	Keolu M50	194218	Keolu M50	194218	Keolu M50	194218	Keolu M50
Y	UTM	Y	UTM	Y	UTM	Y	UTM
PER	Keolu Sugar	PER	Keolu Sugar	PER	Keolu Sugar	PER	Keolu Sugar
10	Keolu Sugar	10	Keolu Sugar	10	Keolu Sugar	10	Keolu Sugar
490	Keolu Sugar	490	Keolu Sugar	490	Keolu Sugar	490	Keolu Sugar
11700	Keolu Sugar	11700	Keolu Sugar	11700	Keolu Sugar	11700	Keolu Sugar
74	Keolu Sugar	74	Keolu Sugar	74	Keolu Sugar	74	Keolu Sugar
2020	Keolu Sugar	2020	Keolu Sugar	2020	Keolu Sugar	2020	Keolu Sugar
130	Keolu Sugar	130	Keolu Sugar	130	Keolu Sugar	130	Keolu Sugar
16	Keolu Sugar	16	Keolu Sugar	16	Keolu Sugar	16	Keolu Sugar
82	Keolu Sugar	82	Keolu Sugar	82	Keolu Sugar	82	Keolu Sugar
110/11918 00 00 00	Keolu Sugar	110/11918 00 00 00	Keolu Sugar	110/11918 00 00 00	Keolu Sugar	110/11918 00 00 00	Keolu Sugar
010/11918 00 00 00	Keolu Sugar	010/11918 00 00 00	Keolu Sugar	010/11918 00 00 00	Keolu Sugar	010/11918 00 00 00	Keolu Sugar
08/11917 00 00 00	Keolu Sugar	08/11917 00 00 00	Keolu Sugar	08/11917 00 00 00	Keolu Sugar	08/11917 00 00 00	Keolu Sugar
0	Keolu Sugar	0	Keolu Sugar	0	Keolu Sugar	0	Keolu Sugar

USGS 2195371594 20101  
2195371594 20101  
2195371594 20101

FRIS PWS 180000108  
180000108  
180000108

Agency: USGS  
Site Name: Keolu Shalt Keolu HI  
Site ID: 2195371594  
Date: 219707  
Dec. Longitude: 158 21418  
Coord Sys: NAD83  
State: HI  
County: Keolu County  
Altitude: 5700  
Hydrologic code: 2077000  
Topographic: Ground water other than Spring  
Site Type: Keolu Shalt  
Well Type: Keolu Shalt  
Primary Aquifer: Keolu Shalt  
Vista depth: Keolu Shalt  
Project no: Keolu Shalt

Agency: PWS SHALT  
Site Name: Keolu Shalt Keolu HI  
Site ID: 180000108  
Date: 180000108  
Dec. Longitude: 158 21418  
Coord Sys: NAD83  
State: HI  
County: Keolu County  
Altitude: 5700  
Hydrologic code: 2077000  
Topographic: Ground water other than Spring  
Site Type: Keolu Shalt  
Well Type: Keolu Shalt  
Primary Aquifer: Keolu Shalt  
Vista depth: Keolu Shalt  
Project no: Keolu Shalt

System Owner/Responsible Party  
MR. RAYMOND SAITO, MANAGER  
DEPT OF WATER  
P.O. BOX 1108  
LAHAE, HI 96766

Treatment Objective: DISINFECTION  
Treatment Process: CASEOUS CHLORINATION, POST  
Source: Ground water

RECEIVED AS FOLLOWS

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Facility Latitude: 21 58 57.0000  
 Facility Longitude: 159 43 1.0000  
 Facility Latitude: 21 59 11.0000  
 Facility Longitude: 159 42 57.0000  
 Facility Latitude: 21 59 23.0000  
 Facility Longitude: 159 43 1.0000  
 City Served: KEKUA  
 Treatment Class: Treated  
 Population: 5955

PWS currently has or had major violation(s) or enforcement: Yes

Violations information not reported.

ENFORCEMENT INFORMATION:

System Name: DW KEKUA  
 Violation Type: Not Reported for Pb and Cu  
 Contaminant: LEAD COPPER NITR  
 Compliance Period: 1992-01-2015-12-31  
 Violation ID: 970001  
 Enforcement Date: 1993-12-15  
 Analytical Value: 0000000 00000000  
 Enforcement ID: 92E0001  
 EIS Action: No Compliance Achieved

State: HI  
 FIC: 172-1 Mts  
 LEV: 1  
 FEO USGS: USG08228331

Agency: USGS  
 Date Reported: 2/26/2015  
 Date: 2/26/2015  
 Dec. Latitude: 21.98250  
 Dec. Longitude: -158.79918  
 Coord SPC: NAD83  
 State: HI  
 County: Kauai County  
 ABL: 9.00  
 Hydrologic code: 20070000  
 Topographic: Not Reported  
 Site Type: Ground water other than Spring  
 Well Type: 19300029  
 Primary Aquifer: Single well, other than collector or Runway Type  
 Aquifer Type: Not Reported  
 Well depth: Not Reported  
 Hole depth: Not Reported  
 Piped in: Not Reported  
 Source: Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS  
 RADON

AREA RADON INFORMATION

Federal EPA Radon Zone for KAUAI County: 3  
 Note: Zone 1 indoor average level >= 4 pCiL  
 : Zone 2 indoor average level >= 2 pCiL and <= 4 pCiL  
 : Zone 3 indoor average level < 2 pCiL

Federal Area Radon Information for Zip Code: 96732

Number of tests tested: 4

Area	Average Activity	% <= 4 pCiL	% <= 20 pCiL	% >= 20 pCiL
Living Area - 1st Floor	0.275 pCiL	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	Not Reported	Not Reported	Not Reported	Not Reported

RECEIVED AS FOLLOWS

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)  
Source: United States Geologic Survey  
EDRI acquired the USGS 7.5' Digital Elevation Model in 2002. 7.5' latitude/longitude correspond to the USGS  
124,000' and 124,000' scale topographic quadrangle maps.

HYDROLOGIC INFORMATION

Flood Zone Data: This data, available in select counties across the country, was obtained by EDRI in 1999 from the Federal  
Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.  
NRI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDRI  
in 2002 from the U.S. Fish and Wildlife Service.

HYDROGEOLOGIC INFORMATION

AQUICLONE Information System  
Source: EDRI proprietary database of groundwater flow information  
EDRI has developed the AQUICLONE Information System (AIS) to provide data on the general direction of groundwater  
flow at specific points. EDRI has reviewed reports submitted to regulatory authorities at select sites and has  
extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table  
information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit  
Source: P.G. Schuben, R.E. Arndt and W.J. Bramec, Geology of the Conterminous U.S. at 1:250,000 Scale - A digital  
representation of the 1974 P.B. King and H.M. Baldwin Map, USGS Digital Data Series DDS-11 (1994)

STATSOG: State Soil Geographic Database

Source: Department of Agriculture, Natural Resources Conservation Service  
The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the national Cooperative  
Soil Survey (PCSS) and is responsible for collecting, storing, maintaining and distributing soil survey  
information for privately owned lands in the United States. A soil map is a representation of  
soil patterns in a landscape. Soil maps for STATSOG are compiled by generalizing more detailed (SSURGO) soil  
survey maps.

ADDITIONAL ENVIRONMENTAL RECORD SOURCES

FEDERAL WATER WELLS

PWS: Public Water Systems  
Source: EPA/Office of Drinking Water  
Telephone: 202-504-3150  
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at  
least 25 people for at least 15 days annually. PWSs provide water from wells, rivers and other sources.

PWS EIR: Public Water System Violation and Enforcement Data

Source: EPA/Office of Drinking Water  
Telephone: 202-504-3150  
Violation and Enforcement Data for Public Water Systems from the State Drinking Water Information System (SDWIS) with  
August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)

This database contains descriptive information on sites where the USGS collects or has collected data on surface  
water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

STATE RECORDS

Ground Water Wells  
Source: Department of Land and Natural Resources  
Telephone: 808-587-0742

RADON

Area Radon Information

Source: USGS  
Telephone: 703-356-4070  
The National Radon Database has been developed by the U.S. Environmental Protection Agency  
(USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey.  
The study covers the years 1986 - 1992. Where necessary, data has been supplemented by information collected at  
private sources such as universities and research institutes.

EPA Radon Zones

Source: EPA  
Telephone: 703-356-4070  
Sections 201 & 203 of RCRA directed EPA to list and identify areas of U.S. with the potential for elevated indoor  
radon levels.

OTHER

Airport Landing Facilities: Private and public use landing facilities

Source: Federal Aviation Administration, 800-457-6556  
Eggenliert, World aeroguide publisher, Pocket 5 for general  
Source: Department of Commerce, National Oceanic and Atmospheric Administration

RECEIVED AS FOLLOWS

The EDR Radius Map  
with GeoCheck®

Kill Drive  
Kill Drive/Farrington Hwy  
Makaha, HI 96792  
Inquiry Number: 1012891.25

July 15, 2003

**EDR**®: Environmental  
Data  
Resources, Inc.

**The Source  
For Environmental  
Risk Management  
Data**

3530 Post Road  
Southport, Connecticut 06890  
Nationwide Customer Service  
Telephone: 1-800-352-0050  
Fax: 1-800-231-6802  
Internet: www.edrme.com

TABLE OF CONTENTS

SECTION	PAGE
Executive Summary.....	ES1
Overview Map.....	2
Detail Map.....	3
Map Findings Summary.....	4
Map Findings.....	5
Orphan Summary.....	6
Government Records Searched/Data Currency Tracking.....	GR-1
<b>GEOCHECK ADDENDUM</b>	
Physical Setting Source Addendum.....	A-1
Physical Setting Source Summary.....	A-2
Physical Setting Source Map.....	A-7
Physical Setting Source Map Findings.....	A-8
Physical Setting Source Records Searched.....	A-18

Thank you for your business.  
Please contact EDR at 1-800-352-0050  
with any questions or comments.

**Disclaimer**

This report contains information obtained from a variety of public and non-public sources. NO WARRANTY, EXPRESS OR IMPLIED, IS MADE BY EDR FOR THE ACCURACY, COMPLETENESS, OR UP-TO-DATE STATUS OF THE INFORMATION. EDR DOES NOT WARRANT MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE. ALL RISK ASSUMED BY THE USER. NO EVENT SHALL EDR BE LIABLE TO ANYONE, WHETHER ARISING OUT OF CONTRACT, NEGLIGENCE, ACCIDENT OR ANY OTHER CAUSE, FOR ANY LOSS OR DAMAGE, INCLUDING, WITHOUT LIMITATION, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR EXEMPLARY DAMAGES. EDR's contents copyright 2003 by Environmental Data Resources, Inc. All rights reserved. Reproduction in any media or format, in whole or in part, of any report or map of Environmental Data Resources, Inc. or its affiliates, is prohibited without prior written permission. EDR and the edr logo are trademarks of Environmental Data Resources, Inc. or its affiliates. All other trademarks used herein are the property of their respective owners.

RECEIVED AS FOLLOWS

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc. (EDRI). The report meets the government records search requirements of ASTMA Standard Practice for Environmental Site Assessments, E 1527-00. Search distances are per ASTMA standard or custom distances requested by the user.

TARGET PROPERTY INFORMATION

ADDRESS

KIU DRIVE/ARRINGTON HWY  
MAWAHA, HI 96792

COORDINATES

Latitude (North): 21.477350 - 21.29 38.5"  
Longitude (West): 158.219490 - 158.13 10.2"  
Universal Transverse Mercator Zone 4  
UTM X (Meters): 580859.9  
UTM Y (Meters): 2775040.8  
Elevation: 10 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property: 242115A-D2 WAWAHE, HI  
Source: USGS 7.5 min quad index

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable") government records either on the target property or within the ASTMA E 1527-00 search radius around the target property for the following databases:

FEDERAL ASTMA STANDARD

- NPL..... National Priority List
- Proposed NPL..... Proposed National Priority List Sites
- CERCLIS..... Comprehensive Environmental Response, Compensation, and Liability Information System
- CERCLIS No Further Remedial Action Planned
- CORACTS..... Corrective Action Report
- RCRIS-TSD..... Resource Conservation and Recovery Information System
- RCRIS-LOG..... Resource Conservation and Recovery Information System
- RCRIS-SQG..... Resource Conservation and Recovery Information System
- ERNS..... Emergency Response Notification System
- STATE ASTMA STANDARD
- SHWS..... SHWS LRI

EXECUTIVE SUMMARY

SWTALF..... Permitted Landfills in the State of Hawaii  
UST..... Underground Storage Tank Database

FEDERAL ASTMA SUPPLEMENTAL

- CONSENT..... Superfund (CERCLA) Consent Decrees
- ROD..... Records Of Decision
- OSHA/NIOSH..... National OSHA/NIOSH Compliance
- FINDS..... Facility Index System's Facility Identification Initiative Program Summary Report
- HMTS..... Hazardous Materials Information Reporting System
- MALTS..... Material Licensing Tracking System
- MIRIS..... Mines Master Index File
- NPL Items..... National Superfund Items
- PADS..... PCB Activity Database System
- DOD..... Department of Defense Sites
- RAAATS..... RCRA Administrative Action Tracking System
- TRIA..... Toxic Chemical Release Inventory System
- ISCA..... Toxic Substances Control Act
- STIS..... Section 7 Tracking System
- SHRP/NIOSH Tracking System - FRPA (Federal Register, Title 42, Chapter 1, Subchapter A)
- FTIS..... Federal Register Act/STCA (Toxic Substances Control Act)

STATE OR LOCAL ASTMA SUPPLEMENTAL

SPILLS..... Release Notifications

EDR PROPRIETARY HISTORICAL DATABASES

Coal Gas..... Former Manufactured Gas (Coal Gas) Sites

SURROUNDING SITES SEARCH RESULTS

Surrounding sites were identified.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. EDR's definition of a site with an elevation equal to the target property includes a tolerance of +/- 10 feet. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property (by more than 10 feet). Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in **bold** italics are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

STATE ASTMA STANDARD

LUST: The Leaking Underground Storage Tank Incident Report contain an inventory of reported leaking underground storage tank incidents. The data come from the Department of Health's Active Leaking Underground Storage Tank Log Listing.  
A review of the LUSTR file, as provided by EDR, and dated 01/01/2003 has revealed that there is 1 LUSTR



RECEIVED AS FOLLOWS

EXECUTIVE SUMMARY

Site within approximately 0.5 miles of the largest property.  
Elevation: MAKAHA CABLE TERMINAL  
Address: 84-250 FAIRINGTON HWY  
Dist/Dir: 1/4 - 127HWY 1  
Map ID: 5  
Page: 5

TC101281128 EXECUTIVE SUMMARY 3

EXECUTIVE SUMMARY

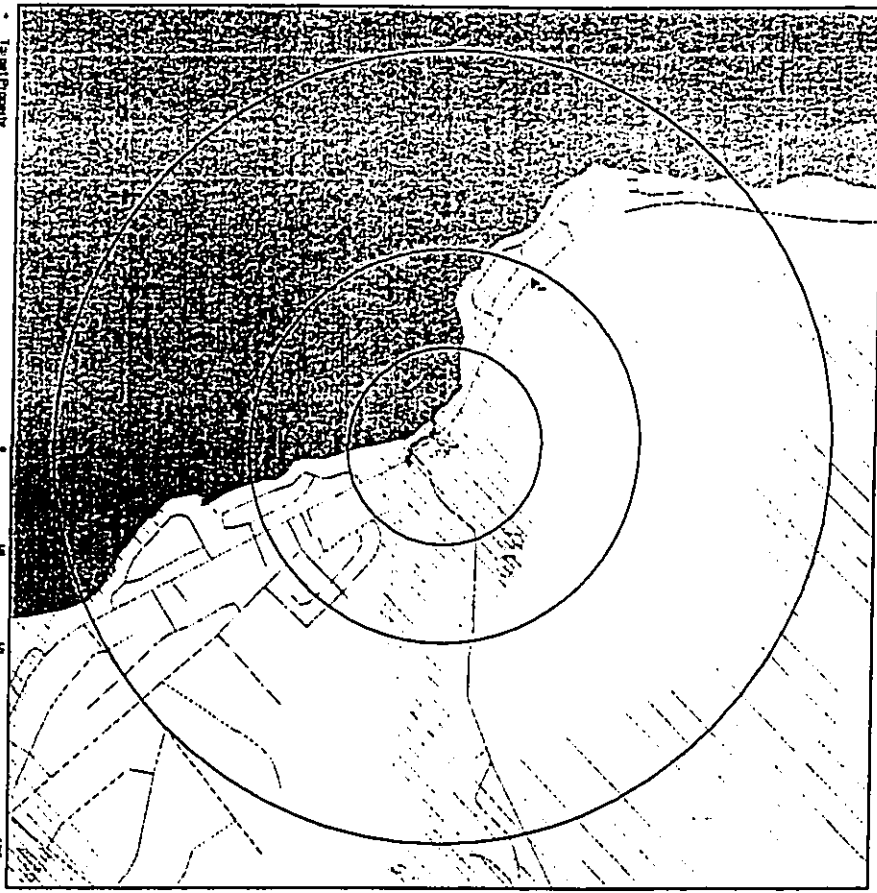
Due to poor or inadequate address information, the following sites were not mapped:

Site Name	Database(s)
USABRY MAKAHA MILITARY RESERVATION	CERCUS, RCRIS-SQG, FINDS, RCRIS-TSD, CORRACTS
HAWAIIAN ELECTRIC CO. INC. KAHE GEN	SHWS, SPILLS
HAWAIIAN ELECTRIC CO. INC. KAHE GEN	SHWS, SPILLS
KAHEIA POINT SATELLITE TRACKING STATION	SHWS, SPILLS
MAVCAUS EASTPAC - LUWALUKEI	SHWS, UST
KAPUKI JUNK YARD	SHWS
TOLEDO TOWN PINE DAIRY	SHWS
UNOCCAL SERVICE STATION, FORBER #524	SHWS
TOP OF THE TRIANGLE	SHWS
P. B. & S. SANITARY HALLING INC.	SHWS, SPILLS, FINDS
MAUI HAI EMERGENCY ACCESS ROAD SITE	SHWS, SPILLS
INDUSTRIAL TECHNOLOGY TIRE PILE	SHWS, SPILLS
MAKAHA MILITARY RESERVATION ORDN. DI	SHWS, SPILLS
TOLEDO DAIRY	SHWS, SPILLS
KAISER CEMENT CORP. WAIAWAE PLT	SHWS, SPILLS
KAHEIA PT SALT TRACKING STA	SHWS, SPILLS
MCS KAREOHE LF-10MCAST LF-0041-05	SHWS, SPILLS
OLD MILWAU LANDFILL	SHWS, SPILLS
NEW MILWAU LANDFILL	SHWS, SPILLS
LEON S. GREENON	SHWS, SPILLS
LEONARD PETROLEUM COMPANY	SHWS, SPILLS
7-11 WAIMANU DEVELOPMENT, LTD	SHWS, SPILLS
WAIMANU POLICE STATION	SHWS, SPILLS
WAIMANU POLICE STATION	SHWS, SPILLS
TESORO GAS EXPRESS #17	SHWS, SPILLS
WAIMANU TIRE STATION	SHWS, SPILLS
LEONARD PETROL EIM	SHWS, SPILLS
WAIMANU SEWAGE TREATMENT PLANT	SHWS, SPILLS
MAVCAUS CENTRAL OFFICE	SHWS, SPILLS
DAVIS MAUI 178 SERVICE	SHWS, SPILLS
WAIMANU VALLEY UNOCCAL-4606	SHWS, SPILLS
SHELL SERVICE STATION	SHWS, SPILLS
LONGS DRUG STORE NO 385	SHWS, SPILLS
TRANS VAC ENVIR ASSOC INC	SHWS, SPILLS
STEARNNS-ROGGER INC HAWAIIAN ELEC CO	SHWS, SPILLS
A1 AND T MAKAHA CABLE STATION	SHWS, SPILLS
HAWAIIAN ELECTRIC CO KAHE GEN STATION	SHWS, SPILLS
	HAZNET

TC101281128 EXECUTIVE SUMMARY 4

RECEIVED AS FOLLOWS

OVERVIEW MAP - 1012891.2s - Parsons Brinckerhoff



- 1. Target Property
- 2. Gas all the national higher than or equal to the target property
- 3. Gas all the national lower than the target property
- 4. Coal Collection Area
- 5. National Priority List Sites
- 6. Landed Sites
- 7. Dept. Defense Sites

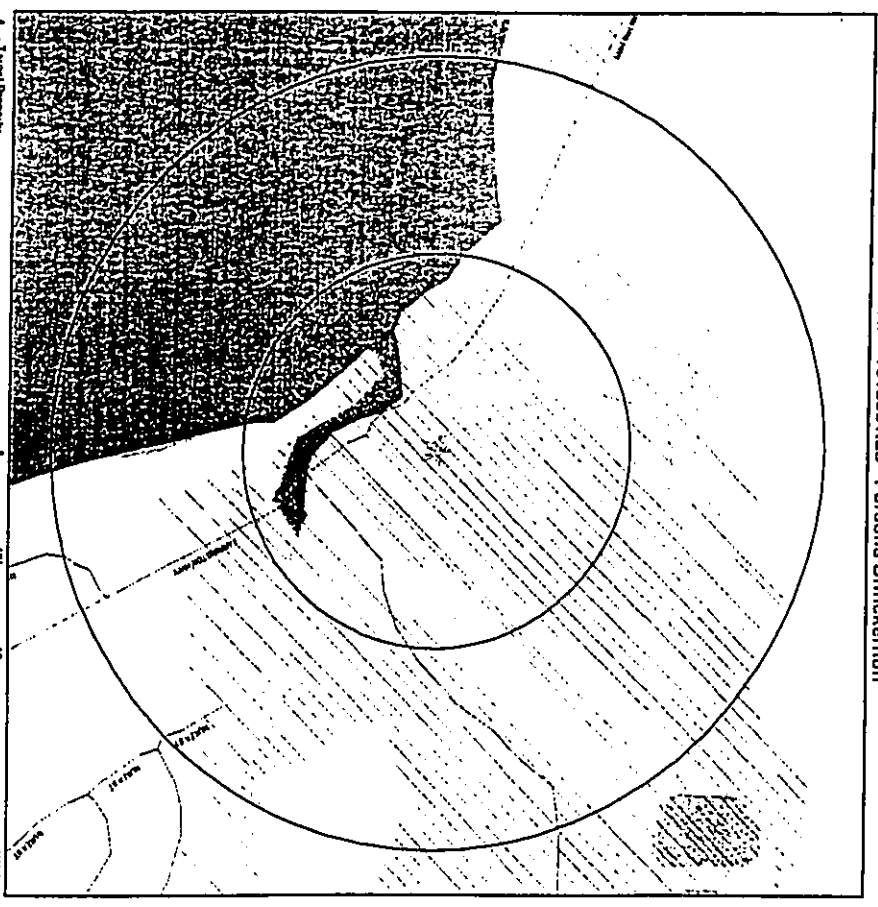
- 1. Oil & Gas pipelines
- 2. 100 year flood zone
- 3. 500 year flood zone
- 4. Federal Wetlands

TARGET PROPERTY:  
 ADDRESS: K&D Drive  
 CITY/STATE/ZIP: K&D Drive/Farrington Hwy  
 LA/VA/DNC: Mahanah 96792  
 21.4774/158.2195

CUSTOMER: Parsons Brinckerhoff  
 CONTACT: Nami Okono  
 REQUEST #: 1012891.2s  
 DATE: July 15, 2003 6:45 pm

Copyright © 2003 IBM, Inc. All rights reserved. IBM, the IBM logo, and the e-business logo are trademarks of International Business Machines Corporation.

DETAIL MAP - 1012891.2s - Parsons Brinckerhoff



- 1. Target Property
- 2. Gas all the national higher than or equal to the target property
- 3. Gas all the national lower than the target property
- 4. Coal Collection Area
- 5. National Priority List Sites
- 6. Landed Sites
- 7. Dept. Defense Sites

- 1. Oil & Gas pipelines
- 2. 100 year flood zone
- 3. 500 year flood zone
- 4. Federal Wetlands

TARGET PROPERTY:  
 ADDRESS: K&D Drive  
 CITY/STATE/ZIP: K&D Drive/Farrington Hwy  
 LA/VA/DNC: Mahanah 96792  
 21.4774/158.2195

CUSTOMER: Parsons Brinckerhoff  
 CONTACT: Nami Okono  
 REQUEST #: 1012891.2s  
 DATE: July 15, 2003 6:45 pm

Copyright © 2003 IBM, Inc. All rights reserved. IBM, the IBM logo, and the e-business logo are trademarks of International Business Machines Corporation.

RECEIVED AS FOLLOWS

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (feet)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Pooled
----------	-----------------	------------------------	-------	-----------	-----------	---------	-----	--------------

FEDERAL ASTM STANDARD

NR	1000	0	0	0	0	0	0	0
PERCEIVED NPL	1000	0	0	0	0	0	0	0
CERCLIS	0,500	0	0	0	0	0	0	0
CERCLIS/RAAP	0,250	0	0	0	0	0	0	0
CORRACTS	0,500	0	0	0	0	0	0	0
RCRIS-TSD	0,500	0	0	0	0	0	0	0
RCRIS-Lg. Data, Gen.	0,250	0	0	0	0	0	0	0
RCRIS Sm. Data, Gen.	0,250	0	0	0	0	0	0	0
ERNS	TP	NR	NR	NR	NR	NR	NR	0

STATE ASTM STANDARD

SHWS	1,000	0	0	0	0	0	0	0
State Landfill	0,500	0	0	0	0	0	0	0
UST	0,500	0	0	0	1	0	0	0
UST	0,250	0	0	0	NR	NR	NR	1

FEDERAL ASTM SUPPLEMENTAL

CONSENT	1,000	0	0	0	0	0	0	0
ROD	1,000	0	0	0	0	0	0	0
Depleted NPL	1,000	0	0	0	0	0	0	0
FINDS	TP	NR	NR	NR	NR	NR	NR	0
HOURS	TP	NR	NR	NR	NR	NR	NR	0
MATS	TP	NR	NR	NR	NR	NR	NR	0
MINES	0,250	0	0	0	0	0	0	0
NPL Data	TP	NR	NR	NR	NR	NR	NR	0
PAOS	TP	NR	NR	NR	NR	NR	NR	0
POD	1,000	0	0	0	0	0	0	0
PAVIS	TP	NR	NR	NR	NR	NR	NR	0
TRIS	TP	NR	NR	NR	NR	NR	NR	0
TRCA	TP	NR	NR	NR	NR	NR	NR	0
STIS	TP	NR	NR	NR	NR	NR	NR	0
FTIS	TP	NR	NR	NR	NR	NR	NR	0

STATE OR LOCAL ASTM SUPPLEMENTAL

SPILLS	TP	NR	NR	NR	NR	NR	NR	0
Coal Gas	1,000	0	0	0	0	0	0	0

EDR PROPRIETARY HISTORICAL DATABASES

Coal Gas	1,000	0	0	0	0	0	0	0
----------	-------	---	---	---	---	---	---	---

NOTES:

ADU/FLOW - see EDR Physical Setting Source Addendum  
 TP = Target Property  
 NR = Not Requested at this Search Distance  
 Slices may be listed in more than one database

MAP FINDINGS

Map ID	Direction	Distance (ft)	Site	Database(s)	EDR ID Number	EPA ID Number
--------	-----------	---------------	------	-------------	---------------	---------------

Case file site search: No site was found in a search of Real Property Search ENVRCHAZ database.

1 WNW 84,310 FARBURTON HWY WADSWORTH, IN 46183 UST U00221875

RELATIVE: Higher  
 ACTUAL: 27 ft  
 PROJECT ORDER: S46

UST:

Facility ID: S-200513  
 Tank Status: Permanently Out of Use  
 Tank Capacity: 15000  
 Date Closed: 8/15/1993  
 Owner: A T & T COMMUNICATION

Facility ID: S-200513  
 Tank Status: Currently in Use  
 Tank Capacity: 10000  
 Date Closed: Not reported  
 Owner: A T & T COMMUNICATION

Facility ID: S-200513  
 Tank Status: Permanently Out of Use  
 Tank Capacity: 15000  
 Date Closed: 8/15/1993  
 Owner: A T & T COMMUNICATION

Facility ID: S-200513  
 Tank Status: Currently in Use  
 Tank Capacity: 10000  
 Date Closed: Not reported  
 Owner: A T & T COMMUNICATION

Facility ID: S-200513  
 Tank Status: Currently in Use  
 Tank Capacity: 10000  
 Date Closed: Not reported  
 Owner: A T & T COMMUNICATION



RECEIVED AS FOLLOWS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Vendor: 03/19/03  
Date Made Active at EDR: 04/09/03  
Database Release Frequency: Quarterly

Date of Data Arrival at EDR: 02/24/03  
Elapsed ASTM days: 15  
Date of Last EDR Contact: 06/23/03

CONTACTS: Corrective Action Report

Source: EPA  
Telephone: 800-424-9346  
CORRECTS: Hazardous waste handlers with RCRA corrective action activity.

Date of Government Vendor: 02/11/03  
Date Made Active at EDR: 05/06/03  
Database Release Frequency: Semi-Annually

Date of Data Arrival at EDR: 04/07/03  
Elapsed ASTM days: 31  
Date of Last EDR Contact: 05/09/03

RCRIS: Resource Conservation and Recovery Information System

Source: EPA  
Telephone: 800-424-9346  
Resource Conservation and Recovery Information System. RCRIS includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA).

Date of Government Vendor: 05/09/03  
Date Made Active at EDR: 07/01/03  
Database Release Frequency: Varies

Date of Data Arrival at EDR: 05/09/03  
Elapsed ASTM days: 53  
Date of Last EDR Contact: 06/26/03

ERNS: Emergency Response Notification System

Source: National Response Center, United States Coast Guard  
Telephone: 202-260-3342  
Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Vendor: 12/01/02  
Date Made Active at EDR: 02/03/03  
Database Release Frequency: Annually

Date of Data Arrival at EDR: 01/27/03  
Elapsed ASTM days: 7  
Date of Last EDR Contact: 04/29/03

FEDERAL ASTM SUPPLEMENTAL RECORDS

BR3: Biennial Reporting System

Source: EPA/AMTIS  
Telephone: 800-424-9346  
The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Vendor: 12/01/99  
Database Release Frequency: Quarterly

Date of Last EDR Contact: 08/16/03  
Date of Next Scheduled EDR Contact: 09/15/03

CONSENT: Superfund (CERCLA) Consent Decrees

Source: EPA/Regional Offices  
Telephone: Varies  
Major legal settlements that establish responsibility and standards for cleanup at Superfund sites. Released periodically by United States District Courts after settlement by parties to litigation records.

Date of Government Vendor: N/A  
Database Release Frequency: Varies

Date of Last EDR Contact: N/A  
Date of Next Scheduled EDR Contact: N/A

R00: Records Of Decision

Source: EPA  
Telephone: 703-416-0223  
Record of Decision. R00 documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Vendor: 01/09/03  
Database Release Frequency: Annually

Date of Last EDR Contact: 04/07/03  
Date of Next Scheduled EDR Contact: 07/07/03

DELISTED NPL: National Priority List Databases

Source: EPA  
Telephone: N/A

The National OR and Hazardous Substance Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425 (e), sites may be deleted from the NPL when no further response is appropriate.

Date of Government Vendor: 04/06/03  
Database Release Frequency: Quarterly

Date of Last EDR Contact: 05/05/03  
Date of Next Scheduled EDR Contact: 08/04/03

FH03: Facility Index System/ Facility Identification Database Program Summary Report

Source: EPA  
Telephone: N/A

Facility Index System. FH03 contains both facility information and pointers to other sources that contain more detail. EDR includes the facility FACS database in the report. FACS (Facility Compliance System), AHS (Automated Information Retrieval System), DOCKET (Electronic Document used to manage and track information on all judicial enforcement cases for all environmental violations), FURS (Federal Underground Injection Control), CDOCKET (Central Document System used to track critical enforcement actions for all environmental statutes), FNS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (Public Agency Data System).

Date of Government Vendor: 03/19/03  
Database Release Frequency: Quarterly

Date of Last EDR Contact: 04/07/03  
Date of Next Scheduled EDR Contact: 07/07/03

H01R3: Hazardous Materials Information Reporting System

Source: U.S. Department of Transportation  
Telephone: 202-366-4555

Hazardous Materials Incident Report System. H01R3 contains hazardous material spill incidents reported to DOT.

Date of Last EDR Contact: 04/23/03  
Date of Next Scheduled EDR Contact: 07/21/03

M01S: Material Handling Tracking System

Source: Mariner Regulatory Commission  
Telephone: 301-415-2188

M01S is maintained by the Mariner Regulatory Commission and contains a list of approximately 8,100 sites which consist of or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Vendor: 04/23/03  
Database Release Frequency: Quarterly

Date of Last EDR Contact: 04/07/03  
Date of Next Scheduled EDR Contact: 07/07/03

M01S3: Material Handling Index File

Source: Department of Labor, Mine Safety and Health Administration  
Telephone: 303-721-9938

Date of Government Vendor: 03/11/03  
Database Release Frequency: Semi-Annually

Date of Last EDR Contact: 03/11/03  
Date of Next Scheduled EDR Contact: 06/20/03

NPL UENS: Federal Superfund Lists

Source: EPA  
Telephone: 202-564-4287

Federal Superfund Lists. Under the authority granted the USEPA by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, the USEPA has the authority to list sites regarding real property in order to recover removal action expenses or when the property owner receives notification of potential liability. USEPA completes a listing of lead releases at Superfund Sites.

RECEIVED AS FOLLOWS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

**Date of Government Vendor:** 10/15/91  
**Database Release Frequency:** No Update Planned  
**Date of Last EDR Contact:** 09/27/03  
**Date of Next Scheduled EDR Contact:** 09/29/03

**PAOS: PCB Activity Database System**  
**Source:** EPA  
**Telephone:** 202-561-3437  
 PCB Activity Database, PAOS identifies generator, transporter, commercial users and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.  
**Date of Government Vendor:** 03/29/03  
**Database Release Frequency:** Annually  
**Date of Last EDR Contact:** 04/12/03  
**Date of Next Scheduled EDR Contact:** 09/11/03

**DDP: Department of Defense Sites**  
**Source:** USDS  
**Telephone:** 203-645-5200  
 This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.  
**Date of Government Vendor:** 04/01/03  
**Database Release Frequency:** Semi-Annually  
**Date of Last EDR Contact:** 09/12/03  
**Date of Next Scheduled EDR Contact:** 09/11/03

**RAA113: RCRA Administrative Action Tracking System**  
**Source:** EPA  
**Telephone:** 202-564-4104  
 RCRA Administrative Action Tracking System, RAA113 contains records based on enforcement actions issued under RCRA pertaining to major actions and includes administrative and civil actions brought by the EPA, or administration of the statute, by other federal agencies. Data entry in the RAA113 database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to harvest RAA113 because a decrease in agency resources made it impossible to continue to update the information contained in the database.  
**Date of Government Vendor:** 04/17/03  
**Database Release Frequency:** No Update Planned  
**Date of Last EDR Contact:** 09/09/03  
**Date of Next Scheduled EDR Contact:** 09/09/03

**TRIS: Toxic Chemical Release Inventory System**  
**Source:** EPA  
**Telephone:** 202-205-1531  
 Toxic Release Inventory System, TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 311.  
**Date of Government Vendor:** 12/01/00  
**Database Release Frequency:** Annually  
**Date of Last EDR Contact:** 09/22/03  
**Date of Next Scheduled EDR Contact:** 09/22/03

**TRCAL: Toxic Substances Control Act**  
**Source:** EPA  
**Telephone:** 202-250-5531  
 Toxic Substances Control Act, TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.  
**Date of Government Vendor:** 12/01/98  
**Database Release Frequency:** Every 4 Years  
**Date of Last EDR Contact:** 09/09/03  
**Date of Next Scheduled EDR Contact:** 09/09/03

**FTIS HSP: FRTM/TSCA Tracking System - FRTM (Federal Hazardous Waste, Fungicide, & Rodenticide Act/TSCA (Toxic Substances Control Act))**  
**Source:** EPA  
**Telephone:** 202-564-2901  
**Date of Government Vendor:** 04/15/03  
**Database Release Frequency:** Quarterly  
**Date of Last EDR Contact:** 09/22/03  
**Date of Next Scheduled EDR Contact:** 09/22/03

5313: Section 7 Tracking System

**Source:** EPA  
**Telephone:** 202-564-5028  
 Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 629) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and how they have been produced and sold or distributed in the past year.  
**Date of Government Vendor:** 12/01/00  
**Database Release Frequency:** Annually  
**Date of Last EDR Contact:** 09/09/03  
**Date of Next Scheduled EDR Contact:** 07/21/03

**FTIS: FRTM/TSCA Tracking System - FRTM (Federal Hazardous Waste, Fungicide, & Rodenticide Act/TSCA (Toxic Substances Control Act))**  
**Source:** EPA/Office of Prevention, Pesticides and Toxic Substances  
**Telephone:** 202-564-2501  
 FTIS tracks administrative cases and pesticide enforcement actions and compliance activities related to FRTM, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR conducts the Agency on a quarterly basis.  
**Date of Government Vendor:** 04/15/03  
**Database Release Frequency:** Quarterly  
**Date of Last EDR Contact:** 09/22/03  
**Date of Next Scheduled EDR Contact:** 09/22/03

STATE OF HAWAII ASTM STANDARD RECORDS

**SHWS: Sites List**  
**Source:** Department of Health  
**Telephone:** 808-586-4218  
 Facilities, sites or areas in which the Office of Hazard Evaluation and Emergency Response has an interest, has investigated or may investigate under HRS 170D (includes CERCLIS sites)  
**Date of Government Vendor:** 07/12/01  
**Data Made Active at EDR:** 10/15/01  
**Database Release Frequency:** Semi-Annually  
**Date of Last EDR Contact:** 09/22/03  
**Date of Next Scheduled EDR Contact:** 09/22/03

SWTLF: Permitted Landfills in the State of Hawaii

**Source:** Department of Health  
**Telephone:** 808-586-4215  
 Solid Waste Facilities/Landfill Sites, SWTLF lists records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.  
**Date of Government Vendor:** 05/02/99  
**Data Made Active at EDR:** 05/25/99  
**Database Release Frequency:** Varies  
**Date of Last EDR Contact:** 05/01/03  
**Date of Next Scheduled EDR Contact:** 05/01/03

LUST: Leaking Underground Storage Tank Database

**Source:** Department of Health  
**Telephone:** 808-586-4228  
 Leaking Underground Storage Tank Incident Reports, LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.  
**Date of Government Vendor:** 01/01/03  
**Data Made Active at EDR:** 03/12/03  
**Database Release Frequency:** Semi-Annually  
**Date of Last EDR Contact:** 03/11/03  
**Date of Next Scheduled EDR Contact:** 03/11/03

UST: Underground Storage Tank Database

**Source:** Department of Health  
**Telephone:** 808-586-4228  
 Regulated Underground Storage Tanks, UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.  
**Date of Last EDR Contact:** 03/11/03  
**Date of Next Scheduled EDR Contact:** 03/11/03

RECEIVED AS FOLLOWS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Vendor: 01/01/03  
Date Made Available at EDR: 02/25/03  
Database Release Frequency: Semi-Annually  
Database Release Frequency: Semi-Annually

STATE OF ILLINOIS ASTHMA SUPPLEMENTAL RECORDS

SPILLS: Release Notifications  
Source: Department of Health  
Telephone: 608-556-4249  
Release of hazardous substances to the environment reported to the Office of Hazard Evaluation and Emergency Response since 1998.  
Date of Government Vendor: 05/01/00  
Database Release Frequency: Varies  
Date of Last EDR Contact: 08/22/03  
Date of Next Scheduled EDR Contact: 08/22/03

EDR PROPRIETARY HISTORICAL DATABASES

Former Manufactured Gas (Coal Gas) Sites: The existence and location of Coal Gas sites is provided exclusively to EDR by Real Property Scan, Inc. (Copyright 1993 Real Property Scan, Inc. For a technical description of the types of hazards which may be found at such sites, contact your EDR customer service representative.

Disclaimer Provided by Real Property Scan, Inc.  
The information contained in this report has predominantly been obtained from publicly available sources produced by entities other than Real Property Scan. While reasonable steps have been taken to insure the accuracy of this report, Real Property Scan does not guarantee the accuracy of this report. Any liability on the part of Real Property Scan is strictly limited to a refund of the amount paid. No claim is made for the actual existence of issues at any site. This report does not constitute a legal opinion.

STATE OF HAWAII BROWNFIELD DATABASES RECORDS

BROWNFIELDS: Visual Brownfield Sites  
Source: Office of Planning  
Telephone: 808-586-4123  
Date of Government Vendor: N/A  
Database Release Frequency: Varies  
Date of Last EDR Contact: N/A  
Date of Next Scheduled EDR Contact: N/A

OTHER DATABASES

Depending on the geographic area covered by the report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

Outlets Pipelines: This data was obtained from EDR from the USGS in 1994. It is referred to by USGS as Geographic Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil and petroleum pipelines.

Electric Power Transmission Line Data

Source: Perennial Corporation  
Telephone: (800) 823-8277  
This map includes information copyrighted by Perennial Corporation. This information is provided on a best effort basis and Perennial Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of Perennial.

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental changes. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

AHA Hospitals:

Source: American Hospital Association, Inc.  
Telephone: 312-262-5991  
This database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals. Medical database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals. Source: Center for Health Care & Medicaid Services  
Telephone: 410-786-3000  
A listing of hospitals with Medicare provider numbers produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.  
Source: National Institute of Health  
Telephone: 301-594-6216  
Information on Medicare and Medicaid certified nursing homes in the United States.  
Public Schools  
Source: National Center for Education Statistics  
Telephone: 202-362-7200  
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.  
Private Schools  
Source: National Center for Education Statistics  
Telephone: 202-362-7200  
The National Center for Education Statistics' primary database on private school locations in the United States.

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal Emergency Management Agency (FEMA). Data depicts 100 year and 500 year flood zones as defined by FEMA.  
NHC: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 from the U.S. Fish and Wildlife Service.

STREET AND ADDRESS INFORMATION

© 2001 Geographic Data Technology, Inc., Fall 07/2002. This product contains proprietary and confidential property of Geographic Data Technology, Inc. Unrestricted use, including copying for other than listing and standard backup procedures, of this product is expressly prohibited.

RECEIVED AS FOLLOWS

GEOCHECK® - PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

KILL DRIVE  
KILL DRIVE/FARQUINGTON HWY  
MAYAGUA, HI 96792

TARGET PROPERTY COORDINATES

Latitude (North): 21 47'35.0" - 21 28' 38.5"  
Longitude (West): 158 21'54.62" - 158 13' 10.1"  
Universal Transverse Mercator: Zone 4  
UTM X (Meters): 500059.9  
UTM Y (Meters): 2375040.8  
Elevation: 10 ft. above sea level

EDR's GeoCheck Physical Setting Source Addendum has been developed to assist the environmental professional with the collection of physical setting source information in accordance with ASTM 1527-00, Section 7.2.1, Section 7.2.2, requires that a current USGS 7.5 Minute Topographic Map (or equivalent, such as the USGS Digital Elevation Model) be reviewed. It also requires that one or more additional physical setting sources be sought when (1) conditions have been identified in which hazardous substances or petroleum products are likely to migrate to or from the property, and (2) more information than is provided in the current USGS 7.5 Minute Topographic Map (or equivalent) is generally obtained, pursuant to local good commercial or customary practice. To assist the target of requests or recognized environmental conditions in connection with the property, additional physical setting sources generally include information about the topographic, hydrologic, hydrogeologic, and geologic characteristics of a site, and wells in the area.

Assessment of the impact of contaminant migration generally has two principle investigative components:

- 1. Groundwater flow direction, and
- 2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata. EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION DETERMINATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

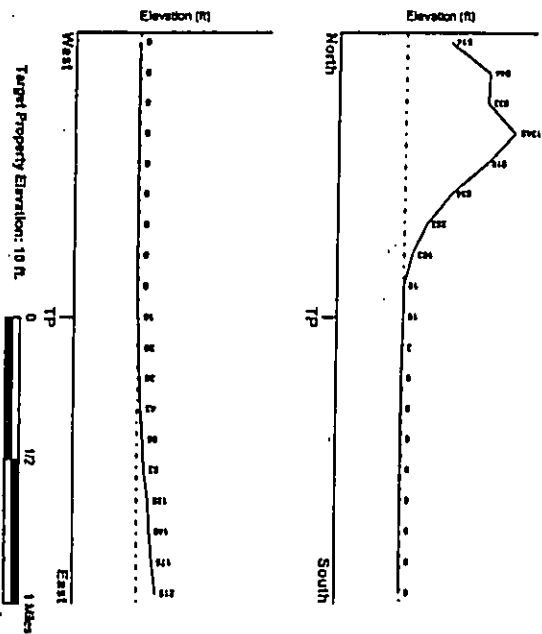
TOPOGRAPHIC INFORMATION

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what down-gradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

USGS Topographic Map: 2421158-02 WAAHUALE, HI  
General Topographic Gradient: General SSW  
Source: USGS 7.5 min. quad index

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES



Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be used verified.



RECEIVED AS FOLLOWS

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

**HYDROLOGIC INFORMATION**

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following the summary for hydrologic information (major waterways and bodies of water).

**FEMA FLOOD ZONE**

Target Property County  
HONOLULU, HI

FEMA Flood  
Electronic Data  
YES - Refer to the Overview Map and Detail Map

Flood Plain Panel at Target Property:

1500010085C

Additional Panels in search area:

Not Reported

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property  
WAAVUW

NWI Electronic  
Data Coverage  
YES - Refer to the Overview Map and Detail Map

**HYDROGEOLOGIC INFORMATION**

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

**AQUIFLOWS**

Search Radius: 1,000 Meters

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at selected sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID Not Reported

LOCATION FROM TIP

GENERAL DIRECTION GEOINFORMATION

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

**GROUNDWATER FLOW VELOCITY INFORMATION**

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil data. If such data are not readily available, it may be necessary to rely on other sources of information, including geologic maps, identification of hydrologic unit and soil characteristics data collected on nearby properties and general soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than clay-dry types of soils.

**GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY**

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

GEOLOGIC AGE IDENTIFICATION

Era:

System:

Series:

Code:

Category:

N/A (Indicated above as Era, System & Series)

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Banko, Geology of the Continental U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Bestman Map, USGS Digital Data Series DDS - 11 (1994).

**DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY**

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps. The following information is based on Soil Conservation Service STATSGO data.

Soil Component Name:	MAWALA
Soil Surface Texture:	stony - clay clay loam
Hydrologic Group:	Class D - Very slow infiltration rates. Soils are dry, have a high water table, or are similar to an impervious layer.
Soil Drainage Class:	Wet drained. Soils have intermediate water holding capacity. Depth to water table is more than 6 feet.
Hydric Status:	Soil does not meet the requirements for a hydric soil.
Corrosion Potential - Uncovered Steel:	MODERATE
Depth to Bedrock Mtc:	> 8 inches
Depth to Bedrock Mac:	> 20 inches

RECEIVED AS FOLLOWS

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information					
Layer	Boundary	Soil Texture Class	Classification	Permeability Rate (cm/hr)	Soil Reaction
1	Upper 0 inches	8 inches silty clay loam	Silt Clay Moderate (more than 25 pct. passing No. 200, Clayey)	Med: 2.00 Max: 6.00	Med: 7.00 Max: 8.00
2	8 inches	19 inches silty clay loam	Silt Clay Moderate (more than 25 pct. passing No. 200, Clayey)	Med: 2.00 Max: 6.00	Med: 7.00 Max: 7.00
3	19 inches	23 inches unweathered bedrock	Not reported	Med: 8.00 Max: 0.70	Med: 0.00 Max: 0.00

OTHER SOIL TYPES IN AREA

Based on Soil Conservation Service STATSGO data, the following additional subsoil types may appear within the general area of target property.

- Soil Surface Textures: silty clay loam  
silty clay  
silty - silty clay
- Soil Surface Textures: silty clay loam  
silty clay  
silty - silty clay
- Soil Surface Textures: silty clay loam  
silty clay  
silty - silty clay
- Soil Surface Textures: silty clay loam  
silty clay  
silty - silty clay

ADDITIONAL ENVIRONMENTAL RECORD SOURCES

According to ASTM E 1527-00, Section 7.2.2, "one or more additional state or local sources of environmental records may be checked. In the discretion of the environmental professional, to enhance and supplement federal and state sources. Factors to consider in determining which local or additional state records, if any, should be checked include (1) whether they are reasonably ascertainable, (2) whether they are sufficiently useful, accurate, and complete in light of the objectives of the records review (see 7.1.1), and (3) whether they are obtained pursuant to local, good commercial or customary practice." One of the record sources listed in Section 7.2.2 is "water well information." Water well information can be used to assist the environmental professional in assessing sources that may impact groundwater flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

WELL SEARCH DISTANCE INFORMATION

SEARCH DISTANCE (miles)  
Federal USGS 1,000  
Federal FROD PWS Maximal PWS within 1 mile  
State Database 1,000

FEDERAL USGS WELL INFORMATION

WELL ID	WELL ID	LOCATION
42	USGS0225021	LOCATION FROM TP
4	USGS0225021	0 - 1/8 Mile South
5	USGS0225037	0 - 1/8 Mile NW
6	USGS0225041	1/8 - 1/4 Mile NW
7	USGS0225034	1/4 - 1/2 Mile NW
8	USGS0225011	1/2 - 1 Mile SE
9	USGS0225019	1/2 - 1 Mile SE
10	USGS0225010	1/2 - 1 Mile SE

FEDERAL FROD PUBLIC WATER SUPPLY SYSTEM INFORMATION

WELL ID	WELL ID	LOCATION
D9	FROD00135	LOCATION FROM TP
		1/2 - 1 Mile ENE

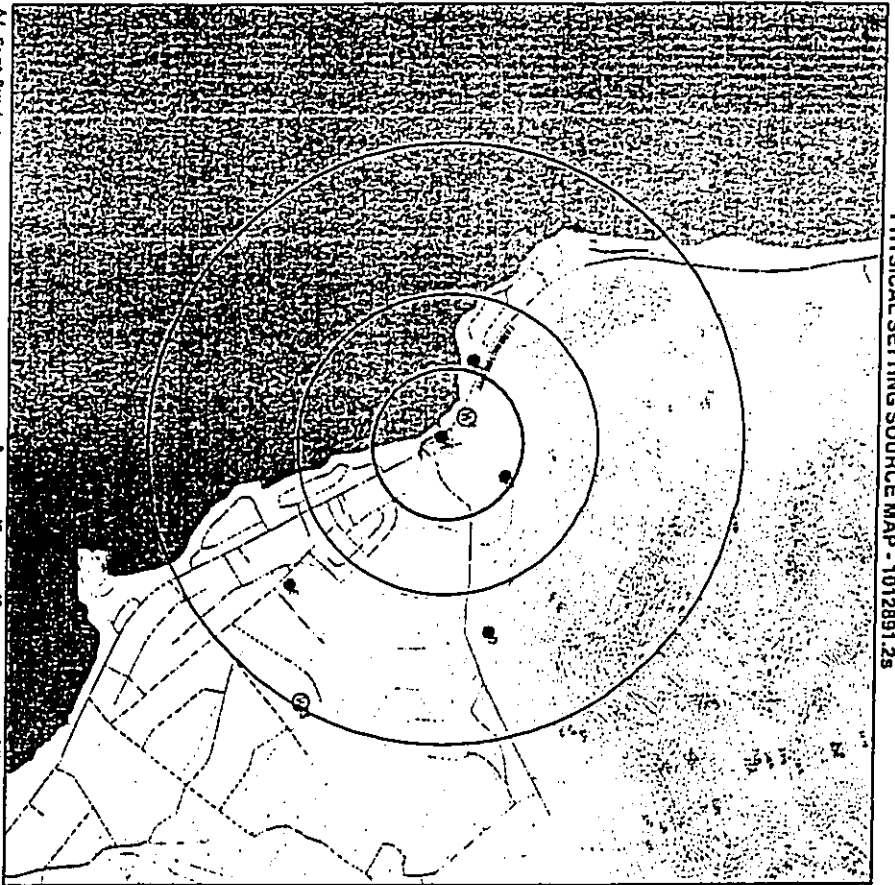
Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

WELL ID	WELL ID	LOCATION
A1	22813-002	LOCATION FROM TP
A1	22813-001	0 - 1/8 Mile South
B4	22813-001	0 - 1/8 Mile WSW
C9	22813-002	1/8 - 1/4 Mile NNE
D10	22813-003	1/4 - 1/2 Mile WNW
E13	22813-001	1/2 - 1 Mile ENE
F15	22813-001	1/2 - 1 Mile SE
G15	22813-004	1/2 - 1 Mile ESE

RECEIVED AS FOLLOWS

PHYSICAL SETTING SOURCE MAP - 1012891.25



- ① County Boundary
- ② Major Road
- ③ Contour Lines
- ④ Drone-based Flow Decision
- ⑤ Indeterminate Drone-based Flow at Location
- ⑥ Well Yield
- ⑦ Public Water Supply Well
- ⑧ Cluster of Multiple Wells

TARGET PROPERTY: 402 Dunes  
 ADDRESS: 101 Driveway at Highway 100  
 CITY/STATE/ZIP: 21472/VA/23033  
 LAT/LONG: 37.2181158, -75.7582185

CUSTOMER: Paragon Brokerhood  
 CONTACT: Matt Ostrom  
 PHONE #: 804.528.9128  
 DATE: July 15, 2003 6:45 pm

Copyright © 2002 USGS, Inc. & 2002 EPA, Inc. All Rights Reserved. All Rights Reserved.

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID	1012891.25	Database	EDR ID Number
Direction		# WELLS	3-2813-002
Distance		Agency	USGS
Elevation		Site Name	3-2813-02-1720
Height		Site Number	2147711
Legend		Doc. Label:	158-21817
		Doc. Language:	190003
		Count D/T:	
		State:	VA
		County:	Henric County
		ASBLID:	15.00
		Hydrologic Code:	20000000
		Topographic:	Not Reported
		Site Type:	Ground-water other than Spring
		Well Type:	15800027
		Well Depth:	Single well, other than cisterns or Runway Type
		Primary Aquifer:	Not Reported
		Aquifer Type:	Not Reported
		Flow Depth:	4.00
		Pumped:	Not Reported

Well ID:	3-2813-02-1720	Well Name:	3-2813-02
Agency:	USGS	Well Name:	3-2813-02-1720
Site Number:	2147711	Well Name:	PACIFIC DRILL
Doc. Label:	158-21817	Well Name:	212949
Doc. Language:	190003	Well Name:	
Count D/T:		Well Name:	
State:	VA	Well Name:	
County:	Henric County	Well Name:	
ASBLID:	15.00	Well Name:	
Hydrologic Code:	20000000	Well Name:	
Topographic:	Not Reported	Well Name:	
Site Type:	Ground-water other than Spring	Well Name:	
Well Type:	15800027	Well Name:	
Well Depth:	Single well, other than cisterns or Runway Type	Well Name:	
Primary Aquifer:	Not Reported	Well Name:	
Aquifer Type:	Not Reported	Well Name:	
Flow Depth:	4.00	Well Name:	
Pumped:	Not Reported	Well Name:	

RECEIVED AS FOLLOWS

GEOCHECK - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID	Direction	Database	EDR ID Number
Agency: USGS	WELL	18 WELLS	3-2813-041
Well Name: Oahu	Well No: 2813-01	Well Name: PACIFIC DRILL	Well No: 2813-01
Well No: 1982	Well Name: PACIFIC DRILL	Well No: 212848	Well No: 212848
County: Hawaii	County: Hawaii	County: Hawaii	County: Hawaii
City: Honolulu	City: Honolulu	City: Honolulu	City: Honolulu
State: HI	State: HI	State: HI	State: HI
Zip: 96808	Zip: 96808	Zip: 96808	Zip: 96808
Well Type: 18	Well Type: 20	Well Type: 20	Well Type: 20
Well Status: 0	Well Status: 0	Well Status: 0	Well Status: 0
Well Depth: 0	Well Depth: 0	Well Depth: 0	Well Depth: 0
Well Source: 0	Well Source: 0	Well Source: 0	Well Source: 0
Well Material: 0	Well Material: 0	Well Material: 0	Well Material: 0
Well Construction: 0	Well Construction: 0	Well Construction: 0	Well Construction: 0
Well Completion: 0	Well Completion: 0	Well Completion: 0	Well Completion: 0
Well Abandonment: 0	Well Abandonment: 0	Well Abandonment: 0	Well Abandonment: 0
Well Location: 0	Well Location: 0	Well Location: 0	Well Location: 0
Well Orientation: 0	Well Orientation: 0	Well Orientation: 0	Well Orientation: 0
Well Depth: 0	Well Depth: 0	Well Depth: 0	Well Depth: 0
Well Source: 0	Well Source: 0	Well Source: 0	Well Source: 0
Well Material: 0	Well Material: 0	Well Material: 0	Well Material: 0
Well Construction: 0	Well Construction: 0	Well Construction: 0	Well Construction: 0
Well Completion: 0	Well Completion: 0	Well Completion: 0	Well Completion: 0
Well Abandonment: 0	Well Abandonment: 0	Well Abandonment: 0	Well Abandonment: 0
Well Location: 0	Well Location: 0	Well Location: 0	Well Location: 0
Well Orientation: 0	Well Orientation: 0	Well Orientation: 0	Well Orientation: 0

Agency: USGS  
 Well Name: Oahu  
 Well No: 1982  
 County: Hawaii  
 City: Honolulu  
 State: HI  
 Zip: 96808  
 Well Type: 18  
 Well Status: 0  
 Well Depth: 0  
 Well Source: 0  
 Well Material: 0  
 Well Construction: 0  
 Well Completion: 0  
 Well Abandonment: 0  
 Well Location: 0  
 Well Orientation: 0

GEOCHECK - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID	Direction	Database	EDR ID Number
Agency: USGS	WELL	FED USGS	USGS0235581
Well Name: Oahu	Well No: 2813-02	Well Name: PACIFIC DRILL	Well No: 2813-02
Well No: 1982	Well Name: PACIFIC DRILL	Well No: 212848	Well No: 212848
County: Hawaii	County: Hawaii	County: Hawaii	County: Hawaii
City: Honolulu	City: Honolulu	City: Honolulu	City: Honolulu
State: HI	State: HI	State: HI	State: HI
Zip: 96808	Zip: 96808	Zip: 96808	Zip: 96808
Well Type: 18	Well Type: 20	Well Type: 20	Well Type: 20
Well Status: 0	Well Status: 0	Well Status: 0	Well Status: 0
Well Depth: 0	Well Depth: 0	Well Depth: 0	Well Depth: 0
Well Source: 0	Well Source: 0	Well Source: 0	Well Source: 0
Well Material: 0	Well Material: 0	Well Material: 0	Well Material: 0
Well Construction: 0	Well Construction: 0	Well Construction: 0	Well Construction: 0
Well Completion: 0	Well Completion: 0	Well Completion: 0	Well Completion: 0
Well Abandonment: 0	Well Abandonment: 0	Well Abandonment: 0	Well Abandonment: 0
Well Location: 0	Well Location: 0	Well Location: 0	Well Location: 0
Well Orientation: 0	Well Orientation: 0	Well Orientation: 0	Well Orientation: 0

Agency: USGS  
 Well Name: Oahu  
 Well No: 1982  
 County: Hawaii  
 City: Honolulu  
 State: HI  
 Zip: 96808  
 Well Type: 18  
 Well Status: 0  
 Well Depth: 0  
 Well Source: 0  
 Well Material: 0  
 Well Construction: 0  
 Well Completion: 0  
 Well Abandonment: 0  
 Well Location: 0  
 Well Orientation: 0

RECEIVED AS FOLLOWS

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Max chdrdr: Not Reported  
 Lin chdrdr: Not Reported  
 Bol hole depth: -19  
 Bol pier depth: Not Reported  
 Pump Capacity: Not Reported  
 Test map ltr: B-4-002 013  
 Label head mt: 0  
 Current CI mt: Not Reported  
 Pump hnd. Date: Not Reported  
 Transmissiv: 0  
 Pump depth: Not Reported

Max CI year: 0  
 Max CI year: 0  
 bol. hole depth: Not Reported  
 Well Capacity: Not Reported  
 Dial (in/ft): Not Reported  
 Aquifer code: 30004  
 Cur head mt: Not Reported  
 Const. Date: 01/01/1992 00 00 00  
 Surveyor: Not Reported  
 Pump hndls elev: Not Reported

C7  
 VINW  
 14 - 172 Mile  
 Higher  
 Agency: USGS  
 State: 3-2813 02  
 Dec. Latitude: 21 4 17.85  
 Dec. Longitude: -158.27236  
 Coord Svc: NAD83  
 State: HI  
 County: Honolulu County  
 Altitude: 10 00  
 Hydrologic code: 20060000  
 Topographic: Not Reported  
 Sea Type: Ground-water other than Spring  
 Const Date: Not Reported  
 Well Type: Single well, other than collector or Recovery Type  
 Primary Aquifer: Not Reported  
 Aquifer type: Not Reported  
 Hole depth: Not Reported  
 Transmissiv: Not Reported

Well ID: SAA ID: 21785415013401  
 Well depth: Not Reported  
 Source: Not Reported

C8  
 WNW  
 M-172 Mile  
 Higher  
 Well ID: 3-2813 003  
 Island Name: Oahu  
 Well name: Kalahe Crpr  
 VI of block: 1992  
 Quad name: Q2  
 Longitude: 158.1337  
 Spec: N  
 Oid number: Not Reported  
 Type: Recovery Dist  
 Ground Elev: 10  
 Island Code: 3  
 Well name: Not Reported  
 Oid name: P RIBELIND  
 Driller: 217854  
 UTM: Y  
 Overviewer: Crpr R  
 Well type: ROT  
 Well date: 4  
 Well depth: 25

HI WELLS 3-2813-003

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Solid casing Depth: 10  
 Use: D04  
 Use year: 92  
 Chdrdr water: Not Reported  
 Purpose 1st lake: Not Reported  
 Character Tree: Not Reported  
 User: Not Reported  
 Well ID: Not Reported  
 Const. Date: Not Reported  
 Installer: Not Reported  
 Max chdrdr: Not Reported  
 Lin chdrdr: Not Reported  
 Bol hole depth: -15  
 Bol pier depth: -15  
 Pump Capacity: 008  
 Test map ltr: B-4-001 015  
 Label head mt: 0  
 Current CI mt: Not Reported  
 Pump hnd. Date: 04/15/1992 00 00 00  
 Transmissiv: 0  
 Pump depth: Not Reported

Ref casing Depth: 25  
 Well Name: Domestic  
 Water Ton Elev: 0  
 Test date: Not Reported  
 Drop in water Lk: Not Reported  
 Temperature: Not Reported  
 Pump Capacity: 25  
 Static Water Lk: Not Reported  
 Geology desc: Not Reported  
 Last Measured: Not Reported  
 Max CI year: 0  
 Lin CI year: 0  
 bol. hole depth: Not Reported  
 Well Capacity: Not Reported  
 Dial (in/ft): Not Reported  
 Aquifer code: 30004  
 Cur head mt: Not Reported  
 Const. Date: 04/15/1992 00 00 00  
 Surveyor: Not Reported  
 Pump hndls elev: Not Reported

PWS ID: H80000115 PWS State: HI PWS Name: Not Reported  
 Data Date: Not Reported  
 Data Source: WADMALEWA/WADMALEWA  
 PWS Name: WADMALEWA/WADMALEWA  
 WADMALEWA, OAHU, HI 96712

Treatment Operator: ORGANICS REMOVAL  
 Treatment Process: ACTIVATED CARBON, CHLORINATION  
 Source: Ground water  
 Address of facility:  
 System Owner/Responsible Party  
 MR. KAZUHIYASHIRO, MANAGER  
 BOARD OF WATER SUPPLY  
 630 SOUTH BERTANIA  
 HONOLULU, HI 96843

Facility Latitude:	21 3 25 0000	Facility Longitude:	158 10 54 0000
Facility Latitude:	21 20 43 0000	Facility Longitude:	158 4 48 0000
Facility Latitude:	21 23 18 0000	Facility Longitude:	158 2 53 0000
Facility Latitude:	21 23 18 0000	Facility Longitude:	158 1 31 0000
Facility Latitude:	21 23 21 0000	Facility Longitude:	158 1 37 0000
Facility Latitude:	21 23 28 0000	Facility Longitude:	158 3 18 0000
Facility Latitude:	21 24 8 0000	Facility Longitude:	158 2 30 0000
Facility Latitude:	21 24 10 0000	Facility Longitude:	158 3 31 0000
Facility Latitude:	21 24 18 0000	Facility Longitude:	158 0 53 0000
Facility Latitude:	21 24 18 0000	Facility Longitude:	158 0 26 0000
Facility Latitude:	21 27 32 0000	Facility Longitude:	158 12 2 0000
Facility Latitude:	21 28 15 0000	Facility Longitude:	158 10 21 0000

RECEIVED AS FOLLOWS

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Agency	Site Name	Site ID	Database	EOR ID Number
USGS	3-2812-03 MAWVVA ELEMENTARY SCHOOL	212824158125401	FED USGS	USGS9225411
USGS	3-2812-01 MAWVVA SHAUL ORNU HS	212824158124301	FED USGS	USGS9226199

Agency	Site Name	Site ID	Database	EOR ID Number
USGS	3-2812-01 MAWVVA SHAUL ORNU HS	212824158124301	FED USGS	USGS9226199



RECEIVED AS FOLLOWS

**GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS  
RADON**

**AREA RADON INFORMATION**

Federal EPA Radon Zone to HONOLULU County: 3  
 Note: Zone 1 Indoor average level = 4 pCi/L  
 : Zone 2 Indoor average level = 2 pCi/L, and = 4 pCi/L  
 : Zone 3 Indoor average level = 2 pCi/L

Federal Area Radon Information for Zip Code: 96702

Number of Data Points: 3

Area	Average Activity	% < 4 pCi/L	% 4-20 pCi/L	% > 20 pCi/L
Living Area - 1st Floor	0.300 pCi/L	100%	0%	0%
Living Area - 2nd Floor	0.200 pCi/L	100%	0%	0%
Basement	Not Reported	Not Reported	Not Reported	Not Reported

**PHYSICAL SETTING SOURCE RECORDS SEARCHED**

**TOPOGRAPHIC INFORMATION**

USGS 1:5' Digital Elevation Model (DEM)  
 Source: United States Geologic Survey  
 EDR acquired the USGS 1:5' Digital Elevation Model in 2002. 7.5-meter DEMs correspond to the USGS  
 124,000- and 125,000-scale topographic quadrangle maps.

**HYDROLOGIC INFORMATION**

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal  
 Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.  
 Note: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR  
 in 2002 from the U.S. Fish and Wildlife Service.

**HYDROGEOLOGIC INFORMATION**

AQUIFLOW® Information System  
 Source: EDR proprietary database of groundwater flow information.  
 EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater  
 flow at specific points. EDR has reviewed reports submitted to regulatory agencies at select sites and has  
 extracted the data of the report, hydrogeologically determined groundwater flow direction and depth to water table  
 information.

**GEOLOGIC INFORMATION**

Geologic Age and Rock Stratigraphic Unit  
 Source: P.O. Scholten, R.E. Arndt and W.J. Beuker, Geology of the Continental U.S. at 1:2,500,000 Scale - A digital  
 representation of the 1974 P.B. King and H.L. Beelman Map, USGS Digital Data Series 005 - 11 (1994).  
 STRATSOIL: Data Soil Geographic Database  
 Source: Department of Agriculture, Natural Resources Conservation Service  
 The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the national Cooperative  
 Soil Survey (NCCSS) and is responsible for collecting, storing, maintaining and distributing soil survey  
 information for privately owned lands in the United States. A soil map is a representation of  
 soil profiles in a landscape. Soil maps for STRATSOIL are compiled by generalizing more detailed (SSURGO) soil  
 survey maps.

**ADDITIONAL ENVIRONMENTAL RECORD SOURCES**

**FEDERAL WATER WELLS**

PWS: Public Water Systems  
 Source: EPA/Office of Drinking Water  
 Telephone: 202-564-3750  
 Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at  
 least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

**PWS ENR: Public Water Systems Violation and Enforcement Data**

Source: EPA/Office of Drinking Water  
 Telephone: 202-564-3750  
 Violation and Enforcement data for Public Water Systems from the State Drinking Water Information System (SDWIS) data  
 August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).  
 USGS Water Wells: USGS National Water Inventory System (NWIS)  
 This database contains descriptive information on wells where the USGS collects or has collected data on surface  
 water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.



RECEIVED AS FOLLOWS

PHYSICAL SETTING SOURCE RECORDS SEARCHED

STATE RECORDS

Ground Water Wells  
Source: Department of Land and Natural Resources  
Telephone: 808-587-2042

RADON

Area Radon Information

Source: USGS

Telephone: 703-336-4000

The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA's State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1980 - 1992. Where necessary data has been supplemented by information obtained at physical sources such as universities and research institutions.

EPA Radon Zones

Source: EPA

Telephone: 703-336-1000

Sections 207 & 209 of RCRA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

OTHER

Airport Landing Facilities: Private and Public Use Landing Facilities

Source: Federal Aviation Administration, 800-437-6634

Scientists: World map/pole operators, Route 5 or greater

Source: Department of Commerce, National Oceanic and Atmospheric Administration

RECEIVED AS FOLLOWS

The EDR Radius Map  
with GeoCheck®

Sandy Beach Park  
Sandy Beach Park  
Hawaii Kai, HI 96825  
Inquiry Number: 10128913s

July 16, 2003

**EDR** Environmental  
Data  
Resources, Inc.

**The Source  
For Environmental  
Risk Management  
Data**

3530 Post Road  
Southport, Connecticut 06890  
Nationwide Customer Service  
Telephone: 1-800-352-0050  
Fax: 1-800-231-6802  
Internet: [www.edrnet.com](http://www.edrnet.com)

TABLE OF CONTENTS

SECTION	PAGE
Executive Summary.....	ES-1
Overview Map.....	2
Detail Map.....	3
Map Findings Summary.....	4
Map Findings.....	5
Orphan Summary.....	7
Government Records Searched/Data Currency Tracking.....	GR-1
<b>GEOCHECK ADDENDUM</b>	
Physical Setting Source Addendum.....	A-1
Physical Setting Source Summary.....	A-2
Physical Setting Source Map.....	A-7
Physical Setting Source Map Findings.....	A-8
Physical Setting Source Records Searched.....	A-22

Thank you for your business.  
Please contact EDR at 1-800-352-0050  
with any questions or comments.

Disclaimer  
Copyright and Trademark Notices

This report contains information obtained from a variety of public and other sources. NO WARRANTY, EXPRESS OR IMPLIED, IS MADE WHATSOEVER IN CONNECTION WITH THIS REPORT. ENVIRONMENTAL DATA RESOURCES INC. SPECIFICALLY DISCLAIMS THE MAKING OF ANY SUCH WARRANTIES, INCLUDING WITHOUT LIMITATION MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE. ALL RISK IS ASSUMED BY THE USER. NO EVENT SHALL EDR BE LIABLE TO ANYONE, WHETHER ARISING OUT OF OR FROM NEGLIGENCE, NEGLIGENCE, ACCIDENT OR ANY OTHER CAUSE, FOR ANY LOSS OR DAMAGE, INCLUDING, WITHOUT LIMITATION, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR EXEMPLARY DAMAGES. EDR and the set logo are trademarks of Environmental Data Resources, Inc. or its affiliates. All other trademarks used herein are the property of their respective owners.

RECEIVED AS FOLLOWS

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc. (EDRI). The report meets the government records search requirements of ASTM Standard Practice for Environmental Site Assessments, E 1527-00. Search distances are per ASTM standard or custom distances requested by the user.

TARGET PROPERTY INFORMATION

ADDRESS SANDY BEACH PARK HAWAII KAUAI HI 96823

COORDINATES

Latitude (North): 21 280200 - 21 17 17.5" Longitude (West): 157 565800 - 157 40 6.0" Universal Transverse Mercator: Zone 4 UTM Y (Meters): 620803.8 UTM X (Meters): 2294167.8 Elevation: 13 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property: 2411157-04 KOKO HEAD, HI Source: USGS 7.5 min quad index

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDRI.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDRI's search of available ("reasonably accurate") government records either on the target property or within the ASTM E 1527-00 search radius around the target property for the following databases:

- FEDERAL ASTM STANDARD
NPL..... National Priority List
Proposed NPL..... Proposed National Priority List Sites
CERCLIS..... Comprehensive Environmental Response, Compensation, and Liability Information System
CERCLA/NFAP..... CERCLA No Further Remedial Action Planned
CORRACTS..... Corrective Action Report
RCRIS-13D..... Resource Conservation and Recovery Information System
RCRIS-13Q..... Resource Conservation and Recovery Information System
RCRIS-30G..... Resource Conservation and Recovery Information System
ERNS..... Emergency Response Notification System
STATE ASTM STANDARD
SWFALF..... Permitted Landfills in the State of Hawaii

EXECUTIVE SUMMARY

UST..... Leaking Underground Storage Tank Database
UST..... Underground Storage Tank Database

FEDERAL ASTM SUPPLEMENTAL

- CONSENT..... Superfund (CERCLA) Consent Decree
DO..... National Oceanic and Atmospheric Administration
DND..... National Defense
DND/NPL..... National Priority List Disasters
FBI/DOJ..... Federal Bureau of Investigation
HAZRD..... Hazardous Waste Identification Information Program Summary Report
HMRB..... Hazardous Materials Information Reporting System
MUTS..... Material Transfer Reporting System
MURIS..... Motor Vehicle Injury - Fatality
NPL..... National Priority List
NPL/Land..... Federal Superfund Sites
PA03..... PCB Activity Database System
POD..... Department of Defense Sites
RAATB..... RCRA Administrative Action Tracking System
TRIS..... Toxic Chemical Release Inventory System
TSCA..... Toxic Substances Control Act
SSTB..... Section 7 Tracking System
FIRW/TSCA Tracking System - FIRW (Federal Insecticide, Fungicide, & Rodenticide Act/TSCA (Toxic Substances Control Act))
FTTB.....

STATE OR LOCAL ASTM SUPPLEMENTAL

SPPLS..... Release Notifications

EDR PROPRIETARY HISTORICAL DATABASES

Coal Gas..... Former Manufactured Gas (Coal Gas) Sites

NEIGHBORING SITES: SEARCH RESULTS

Surrounding sites were identified:

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. EDRI's definition of a site with an elevation equal to the target property includes a tolerance of +/- 10 feet. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property (by more than 10 feet). Page numbers and map identification numbers refer to the EDRI Package Map report where detailed data on individual sites can be reviewed.

Sites listed in bold italics are in multiple databases.
Unmapped (orphan) sites are not considered in the foregoing analysis.

STATE ASTM STANDARD

SHWIS: The State Hazardous Waste Sites records are the states' equivalent to CERCLIS. These sites may or may not strictly be listed on the federal CERCLIS list. Priority sites (permitted for cleanup using state funds (state equivalent of Superfund)) are identified along with sites whose cleanup will be paid

RECEIVED AS FOLLOWS

EXECUTIVE SUMMARY

for by potentially responsible parties. The data come from the Department of Health.

A review of the SHVS list, as provided by EDR, and dated 07/12/2001 has revealed that there is 1 SHVS site within approximately 1 mile of the target property.

Lower Elevation	Address	DIST/DIR	Map ID	Page
EAST HOHOLELU WASTEWATER TREAT	8480 KALANIPANOLE HWY	1A - IZENE	1	5

TC0118011201 EXECUTIVE SUMMARY 3

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped:

Site Name

HAWAII MERCURY  
MOAS TOWER OF JC (MOAS JC-0041-85)  
NEW MILANI LANDFILL  
OLD MILANI LANDFILL  
SANDY BEACH UNKNOWN CYLINDER

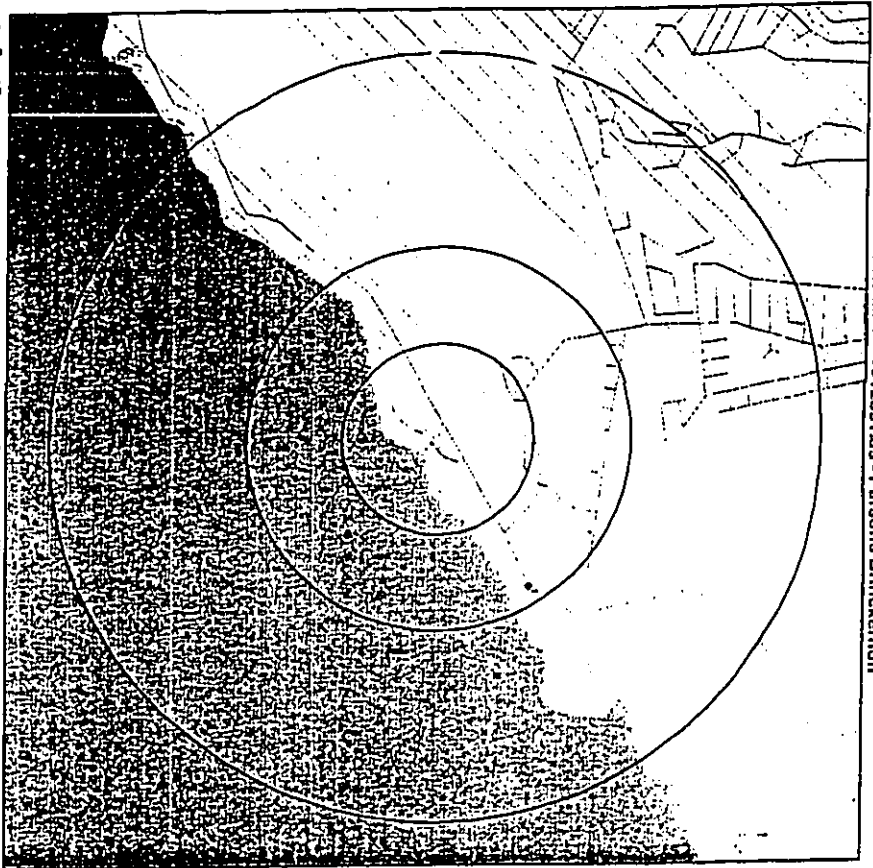
Database(s)

CERCLIS  
SWEET SPILLS  
SWEET SPILLS  
SWEET SPILLS

TC0118011201 EXECUTIVE SUMMARY 4

RECEIVED AS FOLLOWS

OVERVIEW MAP - 1012891.3s - Parsons Brinckerhoff



- ★ Target Property
- ▲ Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- ▲ Coal Gasification Sites
- National Priority List Sites
- Landfill Sites
- Dept. Defense Sites

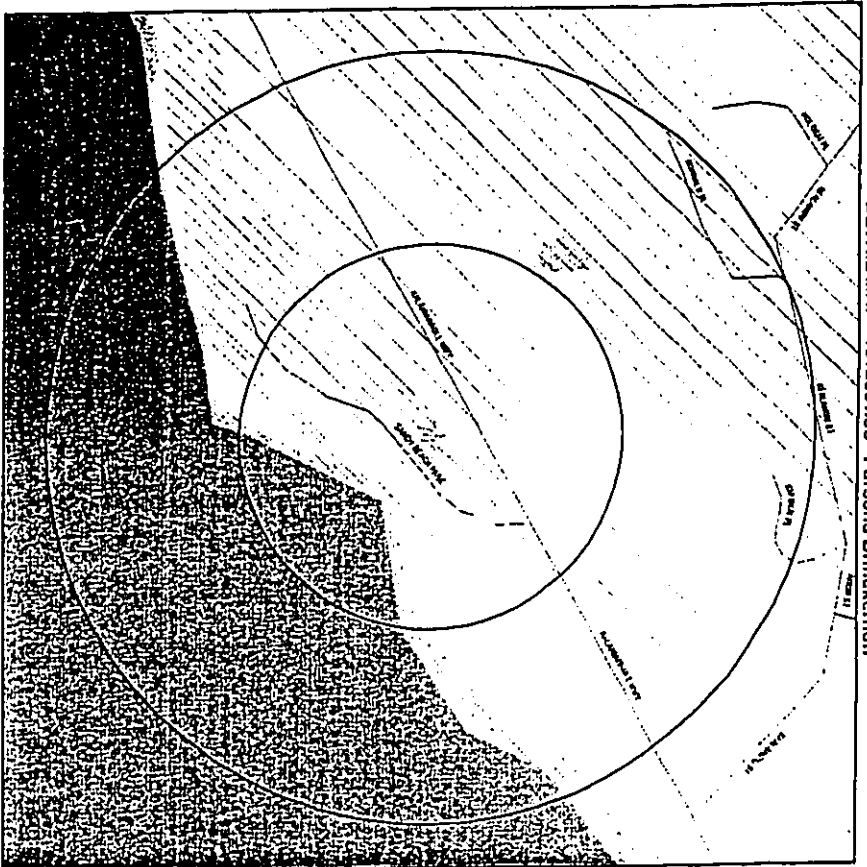
- O&G Gas pipelines
- 100-year flood zone
- 500-year flood zone
- Federal Wetlands

TARGET PROPERTY: Sandy Beach Park  
 ADDRESS: Sandy Beach Park  
 CITY/STATE/ZIP: Hawaii Kailua 96825  
 LAT/LONG: 21.2882 157.6689

CUSTOMER: Parsons Brinckerhoff  
 CONTACT: NAME ON FILE  
 REQUEST #: 1012891.3s  
 DATE: July 16, 2003 4:01 pm

Copyright © 2003 IBM Corp. All rights reserved.

DETAIL MAP - 1012891.3s - Parsons Brinckerhoff



- ★ Target Property
- ▲ Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- ▲ Coal Gasification Sites
- National Priority List Sites
- Landfill Sites
- Dept. Defense Sites

- O&G Gas pipelines
- 100-year flood zone
- 500-year flood zone
- Federal Wetlands

TARGET PROPERTY: Sandy Beach Park  
 ADDRESS: Sandy Beach Park  
 CITY/STATE/ZIP: Hawaii Kailua 96825  
 LAT/LONG: 21.2882 157.6689

CUSTOMER: Parsons Brinckerhoff  
 CONTACT: NAME ON FILE  
 REQUEST #: 1012891.3s  
 DATE: July 16, 2003 4:01 pm

Copyright © 2003 IBM Corp. All rights reserved.

RECEIVED AS FOLLOWS

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Picked
----------	-----------------	-------------------------	-------	-----------	-----------	---------	-----	--------------

FEDERAL ASTM STANDARD

NPL	Proposed NPL	1,000	0	0	0	0	NR	0
	CERCLIS	1,000	0	0	0	0	NR	0
	CERCLIS/RIAP	0,500	0	0	0	0	NR	0
	CORRACTS	0,250	0	0	0	0	NR	0
	RICHIS-TSD	1,000	0	0	0	0	NR	0
	RICHIS-LP, OADR, GEN	0,500	0	0	0	0	NR	0
	RICHIS Sm, OADR, Gen, ERIS	0,250	0	0	0	0	NR	0
	TP	0,250	0	0	0	0	NR	0

STATE ASTM STANDARD

SHWS	State Lead	1,000	0	0	0	1	0	NR
	LUST	0,500	0	0	0	0	NR	0
	UST	0,250	0	0	0	NR	NR	0

FEDERAL ASTM SUPPLEMENTAL

CONSENT	ROD	1,000	0	0	0	0	NR	0
	Disturbed NPL	1,000	0	0	0	0	NR	0
	FINOS	TP	NR	NR	NR	NR	NR	0
	HAURS	TP	NR	NR	NR	NR	NR	0
	MATS	TP	NR	NR	NR	NR	NR	0
	MURIES	0,250	0	0	0	0	NR	0
	NPL Leads	TP	NR	NR	NR	NR	NR	0
	PAOS	TP	NR	NR	NR	NR	NR	0
	OOD	1,000	0	0	0	0	NR	0
	RAATS	TP	NR	NR	NR	NR	NR	0
	TRIS	TP	NR	NR	NR	NR	NR	0
	TS/CA	TP	NR	NR	NR	NR	NR	0
	SS/IS	TP	NR	NR	NR	NR	NR	0
	FTTS	TP	NR	NR	NR	NR	NR	0

STATE OR LOCAL ASTM SUPPLEMENTAL

SP/LS	TP	NR	NR	NR	NR	NR	NR	0
-------	----	----	----	----	----	----	----	---

EDR PROPRIETARY HISTORICAL DATABASES

Coal Gas	1,000	0	0	0	0	0	NR	0
----------	-------	---	---	---	---	---	----	---

NOTES:  
 AQUIFLOW - see EDR Physical Setting Source Addendum  
 TP = Target Property  
 NR = Not Reported at this Search Distance  
 Sites may be listed in more than one database

MAP FINDINGS

Map ID	Direction	Distance	Distance (ft)	Elevation	SHA	Database(s)	EDR ID Number
--------	-----------	----------	---------------	-----------	-----	-------------	---------------

Coal Gas Site Search: No site was found in a search of Real Property Search's ENVIRONMENTAL database.

1 EDR EAST HONOLULU WASTEWATER TREATMENT SHWS 190103744  
 1 EDR 848 KALANIAVAOKE HWY N/A  
 14-1/2 HONOLULU, HI 96815

SHWS:  
 File Section: Not reported  
 Type: Not reported  
 Department 1: Not reported  
 Department 2: Not reported  
 Department 3: Not reported  
 Labels: Not reported  
 Island: Not reported  
 ZIP: Not reported  
 Discovery Assessment and Remediation: Not reported  
 Final Site Screening Team Lead: Not reported  
 ESDT Assigned: Not reported  
 ESDT Date: 11/12/98  
 ESDT Priority: N/A  
 ESDT Label: Not reported  
 ESDT Eligible: Not reported  
 Preliminary Assessment: Not reported  
 PA Lead: Not reported  
 PA Date: Not reported  
 PA Result: Not reported  
 Site Investigation: Not reported  
 RI Lead: Not reported  
 RI Date: Not reported  
 RI Result: Not reported  
 Remediation Action Planned: Not reported  
 VPR: Not reported  
 Document(s): Not reported  
 Agreement: Not reported  
 Remedial Investigation: Not reported  
 RIAA: Not reported  
 Response Action Memo: Not reported  
 REML Lead: Not reported  
 REML Date: Not reported  
 REML Lead Update: Not reported  
 Type By: Not reported  
 Case: 18071023-1543  
 File ID: Not reported  
 Name: Not reported  
 PCDA: Not reported  
 Program: Not reported  
 Priority: Not reported  
 NFA: Not reported  
 Linking: Not reported  
 Cont: Not reported  
 CUI ONLY SHA: Not reported  
 Enticement: Not reported  
 CUI Method: Not reported  
 Ownership: Not reported  
 Tax Map Key: Not reported  
 Form: Not reported

# RECEIVED AS FOLLOWS

Map ID  
 Direction  
 Distance (ft)  
 Division  
 Site

LAMP FIDRINGS

EAST HONOLULU WASTEWATER TREATMENT (Continued)

EPORA :  
 EPORA FILE :  
 Pathways :  
 Targets :  
 Manager :  
 RCRA Status :  
 RCRA ID :  
 Site Code :  
 Event Type :  
 Name :  
 Site :  
 Operator :  
 Current :  
 Compound :  
 Other :

Not reported  
 Not reported  
 Not reported  
 Not reported  
 Not reported  
 Not reported  
 Not reported  
 Not reported  
 Not reported  
 Not reported  
 Not reported  
 Not reported  
 Not reported  
 Not reported  
 Not reported  
 Not reported  
 Not reported  
 Not reported  
 Not reported  
 Not reported

Date(s)  
 EDR ID Number  
 EPA ID Number

10/13/74

EDR ID	Site Name	Site Address	Zip	Date(s)
100180128	HAWAII MERCHANT	KALLOA STREET	96825	
81024233	SANDY BEACH (UNOAHY CHURCH)	EAST OF SANDY BEACH HAWAII KAI	96825	
81024231	MOA KAUAI (UNOAHY CHURCH)	KAUAI BAY	96825	
81024232	NEW HULLMAN LAMPFILL	WARD	96825	
81024234	OLD HULLMAN LAMPFILL	WARD	96825	

RECEIVED AS FOLLOWS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following report and data databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Expired ASTM date: Provides confirmation that the EDR report meets or exceeds the 90-day updating requirement of the ASTM standard.

FEDERAL ASTM STANDARD RECORDS

NPL: National Priority List

Source: EPA

Telephone: N/A

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund program. The sites are categorized by priority. As such, EDR provides polygram coverage for over 1,200 NPL sites located throughout the country. EDR provides polygram coverage for over 1,200 NPL sites located throughout the country. EDR provides polygram coverage for over 1,200 NPL sites located throughout the country.

Date of Government Vendor: 04/09/03  
Date Made Active at EDR: 06/02/03  
Expired ASTM date: 28  
Date of Last EDR Contact: 06/09/03  
Database Release Frequency: Semi-Annually

NPL: Site Boundaries

Source: EPA

Telephone: N/A

Telephone: 202-564-7333

Telephone: 817-918-1113

Telephone: 215-814-5418

Telephone: 004-662-8003

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

Telephone: N/A

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following report and data databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Expired ASTM date: Provides confirmation that the EDR report meets or exceeds the 90-day updating requirement of the ASTM standard.

FEDERAL ASTM STANDARD RECORDS

ROD: Records Of Decision

Source: EPA

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223

Telephone: 704-16-0223



RECEIVED AS FOLLOWS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

**Date of Government Vendor:** 01/02/03  
**Database Release Frequency:** Annually  
**Date of Last EDR Contact:** 07/07/03  
**Date of Next Scheduled EDR Contact:** 10/06/03

**DELISTED NPL: National Priority List Database**  
**Source:** EPA  
 Telephone: N/A  
 The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 302.422 (d), sites may be deleted from the NPL when no further response is appropriate.  
**Date of Government Vendor:** 04/20/03  
**Database Release Frequency:** Quarterly  
**Date of Last EDR Contact:** 05/06/03  
**Date of Next Scheduled EDR Contact:** 08/04/03

**FHQS: Facility Index System/early Identification Initiative Program Summary Report**  
**Source:** EPA  
 Telephone: N/A  
 Facility Index System, FHQS contains both facility information and "indices" to other sources that contain more detail. EDR includes the following FHQS databases in this report: PCS Permit Compliance System, AQS (Automatic Assessment Retrieval System), DOCKET (Enforcement Docket used to manage and track violations on civil judicial enforcement cases for all environmental statutes), FRES (Federal Underground Injection Control, COOCRET (Central Docket System used to track critical enforcement indices for all environmental statutes), FRS (Federal Register Information System), STATE (State Environmental Laws and Statutes), and PADS (PCS Agency Data System).  
**Date of Government Vendor:** 03/19/03  
**Database Release Frequency:** Quarterly  
**Date of Last EDR Contact:** 07/22/03  
**Date of Next Scheduled EDR Contact:** 10/06/03

**HMRIS: Hazardous Materials Information Reporting System**  
**Source:** U.S. Department of Transportation  
 Telephone: 202-366-4555  
 Hazardous Materials Incident Report System (HMIRS) contains hazardous material spill incidents reported to DOT.  
**Date of Government Vendor:** 01/11/03  
**Database Release Frequency:** Annually  
**Date of Last EDR Contact:** 04/09/03  
**Date of Next Scheduled EDR Contact:** 07/21/03

**MLTS: Material Licensing Tracking System**  
**Source:** Nuclear Regulatory Commission  
 Telephone: 301-415-7188  
 MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 1,100 sites which process or use radioactive materials and which is subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.  
**Date of Government Vendor:** 04/22/03  
**Database Release Frequency:** Quarterly  
**Date of Last EDR Contact:** 07/22/03  
**Date of Next Scheduled EDR Contact:** 10/06/03

**OSNE: Ozone Layer Index File**  
**Source:** Department of Labor, Mine Safety and Health Administration  
 Telephone: 303-211-5958  
**Date of Government Vendor:** 03/11/03  
**Database Release Frequency:** Semi-Annually  
**Date of Last EDR Contact:** 08/20/03  
**Date of Next Scheduled EDR Contact:** 08/29/03

**NPL: NPLHS: Federal Superfund Sites**  
**Source:** EPA  
 Telephone: 202-564-4287  
 Federal Superfund Sites. Under the authority granted the USEPA by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner receives notification of potential liability. USEPA completes a listing of final notices of Superfund Sites.  
**Date of Last EDR Contact:** 06/27/03  
**Date of Next Scheduled EDR Contact:** 08/25/03

**PAOS: PCB Agency Database System**  
**Source:** EPA  
 Telephone: 202-564-3817  
 PCB Agency Database, PAOS handles generation, transport, commercial stores and brokers and disposals of PCB's who are required to notify the EPA of such activities.  
**Date of Government Vendor:** 03/28/03  
**Database Release Frequency:** Annually  
**Date of Last EDR Contact:** 09/12/03  
**Date of Next Scheduled EDR Contact:** 09/11/03

**POD: Department of Defense Sites**  
**Source:** USDO  
 Telephone: 703-648-5220  
 This data set consists of privately owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 840 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.  
**Date of Government Vendor:** 04/01/03  
**Database Release Frequency:** Semi-Annually  
**Date of Last EDR Contact:** 05/12/03  
**Date of Next Scheduled EDR Contact:** 08/11/03

**RAATIS: RCRA Administrative Action Tracking System**  
**Source:** EPA  
 Telephone: 202-564-4104  
 RCRA Administrative Action Tracking System, RAATIS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administrative actions after September 30, 1995, data entry in the RAATIS database was discontinued and EPA will make a copy of the database for historical records. It was necessary to transfer RAATIS because a decrease in agency resources made it impossible to continue to update the information contained in the database.  
**Date of Government Vendor:** 04/17/95  
**Database Release Frequency:** No Update Planned  
**Date of Last EDR Contact:** 06/09/03  
**Date of Next Scheduled EDR Contact:** 08/06/03

**TRIS: Toxic Chemical Release Inventory System**  
**Source:** EPA  
 Telephone: 202-389-1131  
 Toxic Release Inventory System, TRIS handles facilities which release toxic chemicals to the air, water and land in reported quantities under SARA Title III Section 312.  
**Date of Government Vendor:** 12/31/00  
**Database Release Frequency:** Annually  
**Date of Last EDR Contact:** 06/21/03  
**Date of Next Scheduled EDR Contact:** 08/22/03

**TSCL: Toxic Substances Control Act**  
**Source:** EPA  
 Telephone: 202-389-4571  
 Toxic Substances Control Act, TSCL handles manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volumes of these substances by plant site.  
**Date of Government Vendor:** 12/31/98  
**Database Release Frequency:** Every 4 Years  
**Date of Last EDR Contact:** 06/09/03  
**Date of Next Scheduled EDR Contact:** 08/08/03

**TTB: TSCA Tracking System - TTRPA (Federal Interstate, Foreign, & Redesignated ADT) TSCA (Toxic Substances Control Act)**  
**Source:** EPA  
 Telephone: 202-564-3201  
**Date of Government Vendor:** 04/15/03  
**Database Release Frequency:** Quarterly  
**Date of Last EDR Contact:** 08/23/03  
**Date of Next Scheduled EDR Contact:** 08/22/03

RECEIVED AS FOLLOWS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

USTI: Section 7 Tracking Systems

Source: EPA
Telephone: 202-564-5008
Section 7 of the Federal Resource, Planning and Development Act, as amended (22 Stat. 437) requires all registered pesticide producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amount of pesticides, active ingredients and devices being produced, and those being used, sold or distributed in the past year.
Date of Government Vendor: 12/1/80
Database Release Frequency: Annually
Date of Last EDR Contact: 06/23/03
Date of Next Scheduled EDR Contact: 07/21/03
FTIS: FFRVA/TSCA Tracking System - FFRVA (Federal Resource, Planning, & Development Act/TSCA Toxic Substances Control Act)
Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-564-5261
FTIS tracks administrative cases and pesticide enforcement actions and compliance activities related to FFRVA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.
Date of Government Vendor: 04/15/03
Database Release Frequency: Quarterly
Date of Last EDR Contact: 06/23/03
Date of Next Scheduled EDR Contact: 06/22/03

STATE OF HAWAII ASTM STANDARD RECORDS

SHWS: Ebas Ltd
Source: Department of Health
Telephone: 808-586-4218
Facilities, uses or areas in which the Office of Hazard Evaluation and Emergency Response has an interest, has investigated or may investigate under HRS 170B (Procedures (CDRQIS Act)).
Date of Government Vendor: 07/12/01
Date of Last EDR Contact: 06/23/03
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 06/23/03
SWELE: Pesticide Landfills in the State of Hawaii
Source: Department of Health
Telephone: 808-586-4215
Solid waste management records. SWELE type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, there may be active or inactive landfills or reports change that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.
Date of Government Vendor: 05/03/99
Date of Last EDR Contact: 06/23/03
Database Release Frequency: Varies
Date of Last EDR Contact: 06/23/03

LUST: Leaking Underground Storage Tank Database

Source: Department of Health
Telephone: 808-586-4228
Leaking Underground Storage Tank Incident Report. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.
Date of Government Vendor: 01/01/03
Date of Last EDR Contact: 06/23/03
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 07/11/03
UST: Underground Storage Tank Database
Source: Department of Health
Telephone: 808-586-4228
Registered Underground Storage Tanks. USTs are regulated under Subtitle 14 of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Vendor: 01/21/03
Date of Data Added at EDR: 03/05/03
Expanded ASTM dtyc: 8
Date of Last EDR Contact: 07/11/03
STATE OF HAWAII ASTM SUPPLEMENTAL RECORDS
SWELE: Release Notifications
Source: Department of Health
Telephone: 808-586-4218
Release of hazardous substances to the environment reported to the Office of Hazard Evaluation and Emergency Response since 1988.
Date of Government Vendor: 08/01/00
Database Release Frequency: Varies
Date of Last EDR Contact: 06/23/03
Date of Next Scheduled EDR Contact: 06/22/03

EDR PROPRIETARY HISTORICAL DATABASES

Former Manufactured Gas (Coal Gas) Sites: The address and location of Coal Gas sites is provided exclusively to EDR by Real Property Scan, Inc. Copyright 1993 Real Property Scan, Inc. For a detailed description of the types of hazards which may be found at such sites, contact your EDR customer service representative.

Disclaimer: Provided by Real Property Scan, Inc.
The information contained in this report has predominantly been obtained from publicly available sources produced by entities other than Real Property Scan. While reasonable steps have been taken to verify the accuracy of this report, Real Property Scan does not guarantee the accuracy of the report. Any liability on the part of Real Property Scan is hereby limited to a refund of the amount paid. No claim is made for the actual existence of hazards at any site. This report does not constitute a legal opinion.

STATE OF HAWAII BROWNTIERS DATABASES RECORDS

BROWNTIERS: Hazard Brownfields Sites
Source: Office of Hazard Evaluation
Telephone: 808-586-5232
Date of Government Vendor: N/A
Database Release Frequency: Varies
Date of Last EDR Contact: N/A
Date of Next Scheduled EDR Contact: N/A

OTHER DATABASES

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the addresses of residential information data in a specific report does not mean that all addresses in the area covered by the report are included. Likewise, the absence of any reported vehicle information does not necessarily mean that vehicles do not exist in the area covered by the report.

OnCall Pipeline: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as Gas-Dens Digital Line Graphs from 1:100,000 Scale Maps. It was extracted from the transportation category including some oil and petroleum gas pipelines.

Electric Power Transmission Line Data
Source: PennWell Corporation
Telephone: (800) 823-6777
This map includes information copyrighted by PennWell Corporation. The information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been acquired with the permission of PennWell.

Sensation Receptors: There are hundreds of thousands of receptors for air quality, noise, and other environmental stressors. These receptors include the ability, the sick, and children. While the location of all receptors cannot be determined, EDR includes from buildings and facilities: schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensation receptors are likely to be located.

RECEIVED AS FOLLOWS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

AHA Hospital:

Source: American Hospital Association, Inc.  
Telephone: 312-265-5001  
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.  
Medical Centers: Provider of Services Listing  
Source: Centers for Medicare & Medicaid Services  
Telephone: 410/785-3000

A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services,  
a federal agency within the U.S. Department of Health and Human Services.  
Source: National Institutes of Health  
Telephone: 301-594-4328

Information on Medicare and Medicaid certified nursing homes in the United States.  
Public Schools  
Source: National Center for Education Statistics  
Telephone: 202-502-7300

The National Center for Education Statistics' primary database on elementary  
and secondary public education in the United States. It is a comprehensive, annual, national statistical  
database of all public elementary and secondary schools and school districts, which contains data that are  
comparable across all states.  
Private Schools  
Source: National Center for Education Statistics  
Telephone: 202-502-7300

The National Center for Education Statistics' primary database on private school locations in the United States.  
Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal  
Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

Note: History of Wetlands Inventory: This data, available in select counties across the country, was obtained by EDR  
in 2002 from the U.S. Fish and Wildlife Service.

STREET AND ADDRESS INFORMATION

© 2003 Geographic Data Technology, Inc., File 07/2002. This product contains proprietary and confidential property of Geographic  
Data Technology, Inc. Unauthorized use, including copying for other than selling and standard backup purposes, of this product is  
expressly prohibited.

GEOCHECK® - PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

SAADY BEACH PARK  
SAADY BEACH PARK  
HAWAII KAI, HI 96825

TARGET PROPERTY COORDINATES

Latitude (North): 21.283200 - 21° 17' 31.5"  
Longitude (West): 157.666100 - 157° 40' 8.0"  
Universal Transverse Mercator: Zone 4  
UTM Y (Meters): 6390031.8  
UTM X (Meters): 2354487.8  
Elevation: 15 ft. above sea level

EDR's GeoCheck Physical Setting Source Addendum has been developed to assist the environmental professional  
with the collection of physical setting source information in accordance with ASTM 1527-00, Section 7.2.3.  
Section 7.2.3 requires that a current USGS 7.5 minute Topographic Map (or equivalent, such as the USGS Digital  
Elevation Model) be reviewed. It also requires that one or more additional physical setting sources be sought  
when (1) conditions have been identified in which hazardous substances may be present, (2) the Topographic Map (or equivalent) is generally outdated, pursuant to local good commercial or customary practice,  
to assess the impact of migration of recognized environmental conditions in connection with the property. Such  
additional physical setting sources generally include information about the topographic, hydrologic, hydrogeologic,  
and geologic characteristics of a site, and wells in the area.

Assessment of the impact of contaminants migration generally has two principle investigative components:

- 1. Groundwater flow direction, and
- 2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics  
of the soil, and other physical setting sources. Groundwater flow velocity is generally impacted by the nature of the geologic strata.  
EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in  
forming an opinion about the impact of potential contaminants migration.

RECEIVED AS FOLLOWS

**GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY**

**GROUNDWATER FLOW DIRECTION INFORMATION**

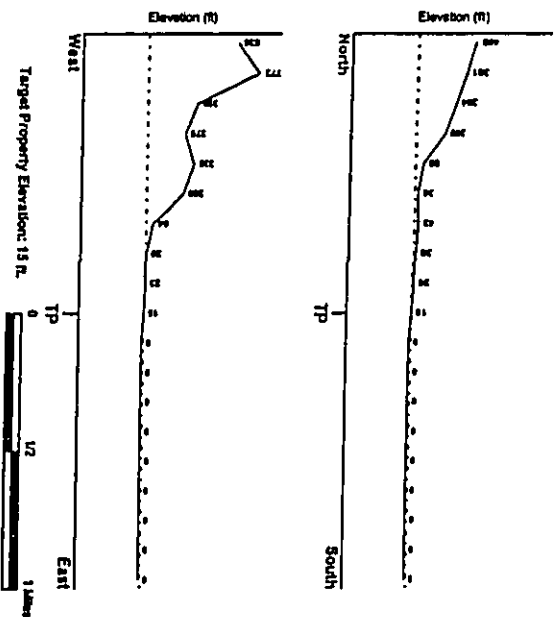
Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

**TOPOGRAPHIC INFORMATION**

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or should contamination exist on the target property, what down-gradient sites might be impacted.

**TARGET PROPERTY TOPOGRAPHY** 2421157-06 KOKO HEAD, HI  
 USGS Topographic Map: General SE  
 Source: USGS 7.5 min quad index

**SURROUNDING TOPOGRAPHY: ELEVATION PROFILES**



Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be used.

**GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY**

**HYDROLOGIC INFORMATION**

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what down-gradient sites might be impacted. Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

**FEMA FLOOD ZONE**

FEMA Flood  
 Target Property County: HOAOLUHI, HI  
 Flood Plain Panel at Target Property: 15000101258  
 Additional Panels in search area: 15000100058  
**NATIONAL WETLAND INVENTORY**  
 NWI Data at Target Property: NWI Electronic Data Coverage  
 YES - refer to the Overview Map and Detail Map

**HYDROGEOLOGIC INFORMATION**

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what down-gradient sites might be impacted.

**AQUIFLW**

Search Radius: 1,000 feet.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

EDRI has developed the AQUIFLW Information System to provide data on the general direction of groundwater flow at specific points. EDRI has reviewed reports submitted by environmental professionals to regulatory authorities at selected sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

**GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY**

**GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY**

**GROUNDMATER FLOW VELOCITY INFORMATION**  
Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminants plumes move most quickly through sandy-gravelly types of soils than silty-clayey types of soils.

**GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY**  
Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

**ROCK STRATIGRAPHIC UNIT** GEOLOGIC AGE IDENTIFICATION

ERA	System	Code	N/A (denoted above as Era, System & Series)	Category
-	-	-	-	-

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schreiner, R.E. Arnold and W.J. Bamler, *Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Gislaman Map, USGS Digital Data Series D05-111(1994).*  
DOCKWURT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSCO are compiled by generalizing more detailed (STATCO) soil survey maps. The following information is based on Soil Conservation Service STATSCO data.

Soil Component Name: **KOKO**

Soil Surface Texture: **silty loam**

Hydrologic Group: **Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse texture.**

Soil Drainage Class: **Well drained. Soils have intermediate water holding capacity. Depth to water table is more than 8 feet.**

Hydric Status: **Soil does not meet the requirements for a hydric soil.**

Corrosion Potential - Uncoated Steel: **MODERATE**

Depth to Bedrock Marc: **> 80 inches**

Depth to Bedrock Marc: **> 80 inches**

Layer	Boundary		Soil Layer Information		Classification	Permeability (ft/d)	Soil Reaction (pH)
	Upper	Lower	Soil Texture Class	AASTHO Group			
1	0 inches	18 inches	sil loam	Silt-Clay Moderate (more than 35 pct. passing No. 200, 50% clay)	Unified Soil by LL	Mar: 2.00 Mec: 0.80	Mar: 7.30 Mec: 6.80
2	18 inches	48 inches	sil loam	Silt-Clay Moderate (more than 35 pct. passing No. 200, 50% clay)	Unified Soil by LL	Mar: 2.00 Mec: 0.80	Mar: 7.30 Mec: 6.80
3	48 inches	58 inches	cloddy	Granular material (PS or less passing No. 200, 50% clay)	COURSE-GRAINED SOILS, Sand, Clean Sands, Poorly graded sand	Mar: 20.00 Mec: 6.00	Mar: 7.30 Mec: 6.80

**OTHER SOIL TYPES IN AREA**  
Based on Soil Conservation Service STATSCO data, the following additional suborder soil types may appear within the general area of target property.

Soil Surface Textures: silty clay loam  
clay loam  
cloddy  
silty clay loam  
clay loam  
clayey clay loam  
cloddy  
silty clay loam

Soil Surface Types: No Other Soil Types

Soil Drainage Class: stratified

**ADDITIONAL ENVIRONMENTAL RECORD SOURCES**  
According to ASTM E 1327-01, Section 7.2.2, "one or more additional state or local sources of environmental records may be checked, in the discretion of the environmental professional, to enhance and supplement federal and state sources... Factors to consider in determining which state or local records to check include, but are not limited to, whether they are satisfactory, useful, accurate, and complete in light of the client's needs (see 7.1.1) and (3) whether they are obtainable, pertinent to the project, and of sufficient quality to be used in the assessment. One of the record sources listed in Section 7.2.2.14 where used, the environmental professional can be used to assist the environmental professional in assessing the potential for any ground-water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells."

RECEIVED AS FOLLOWS

**GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY**

**WELL SEARCH DISTANCE INFORMATION**

**DATABASE** SEARCH DISTANCE (Meters)  
 Federal FWS PWS 1,000  
 State Database Nearest PWS within 1 mile  
 1,000

**FEDERAL FWS PWS INFORMATION**

MAP ID	WELL ID	LOCATION
A2	USGS0224106	W2 - 17 Mile NW
3	USGS0224107	W2 - 17 Mile NW
B5	USGS0224110	W2 - 17 Mile NW
C7	USGS0224113	W2 - 17 Mile NW
D10	USGS0224114	W2 - 17 Mile NW
E12	USGS0224115	W2 - 17 Mile NW
F18	USGS0224117	W2 - 17 Mile NW
G21	USGS0224128	W2 - 17 Mile NW

**FEDERAL FWS PUBLIC WATER SUPPLY SYSTEM INFORMATION**

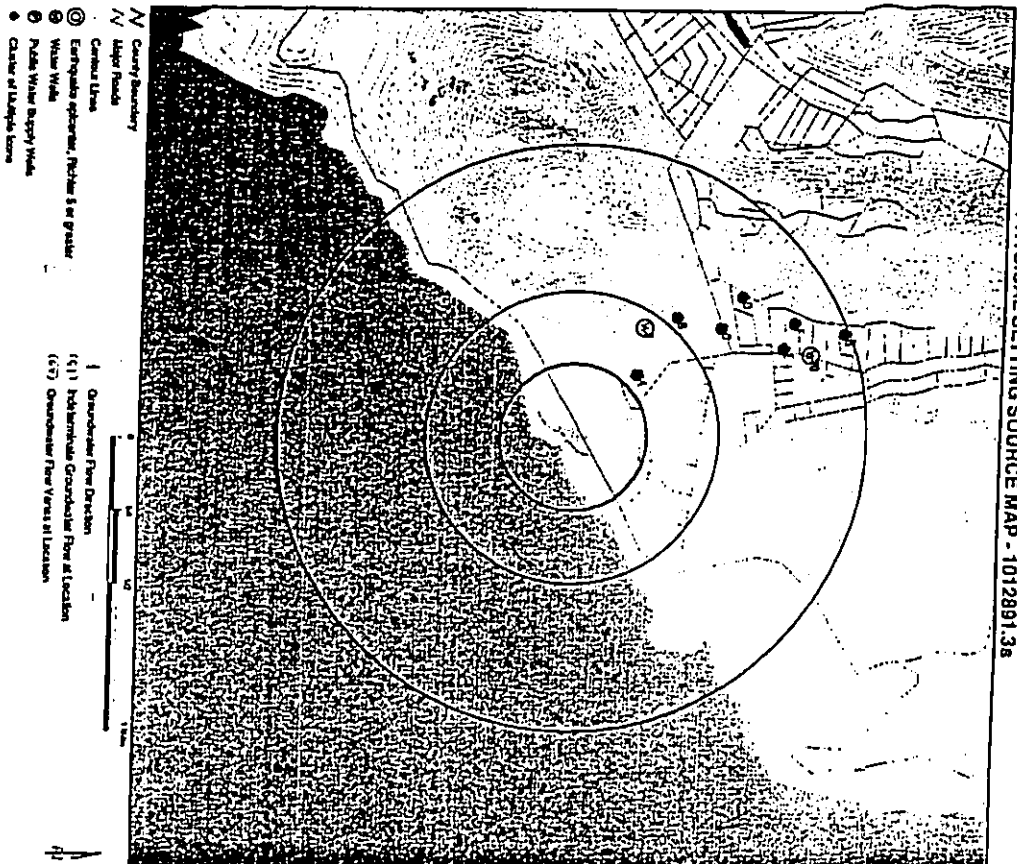
MAP ID	WELL ID	LOCATION
No PWS System Found		

Note: PWS System location is not always the same as well location.

**STATE DATABASE WELL INFORMATION**

MAP ID	WELL ID	LOCATION
A1	3-1140-003	W2 - 17 Mile NW
B4	3-1140-005	W2 - 17 Mile NW
C8	3-1140-004	W2 - 17 Mile NW
D8	3-1140-003	W2 - 17 Mile NW
E11	3-1140-002	W2 - 17 Mile NW
F14	3-1840-002	W2 - 17 Mile NW
G18	3-1840-005	W2 - 17 Mile NW
H18	3-1840-001	W2 - 17 Mile NW
J22	3-1840-007	W2 - 17 Mile NW
K22	3-1840-003	W2 - 17 Mile NW

PHYSICAL SETTING SOURCE MAP - 1012891.3s



**TARGET PROPERTY:** Sandy Beach Park  
**ADDRESS:** Sandy Beach Park  
**CITY/STATE/ZIP:** Newell NE 68603  
**LAT/LONG:** 41.78027 101.76689

**CUSTOMER:** Parsons Brinckerhoff  
**CONTACT:** Nant'Orsme  
**ACQUISITION #:** 1012891.3s  
**DATE:** July 16, 2003 4:02 pm

MapScale: 1:25000  
 Date: 7/16/03 4:02 pm

RECEIVED AS FOLLOWS

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID	Decision	Distance	Elevation	Database	EOR ID Number																																																							
3-1740-001	Not Reported	0	1740	H WELLS	3-1740-001																																																							
<table border="1"> <thead> <tr> <th>Agency</th> <th>Site Name</th> <th>Site ID</th> <th>FED USGS</th> <th>USGS#224196</th> </tr> </thead> <tbody> <tr> <td>USGS</td> <td>3-1740-01 W427 VALUAM</td> <td>211740151740001</td> <td></td> <td></td> </tr> <tr> <td></td> <td>2128128</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>1578778</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>H4083</td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="5"> <table border="1"> <thead> <tr> <th>Agency</th> <th>Site Name</th> <th>Site ID</th> <th>FED USGS</th> <th>USGS#224196</th> </tr> </thead> <tbody> <tr> <td>USGS</td> <td>3-1740-01 W427 VALUAM</td> <td>211740151740001</td> <td></td> <td></td> </tr> <tr> <td></td> <td>2128128</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>1578778</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>H4083</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> </td> </tr> </tbody> </table>						Agency	Site Name	Site ID	FED USGS	USGS#224196	USGS	3-1740-01 W427 VALUAM	211740151740001				2128128					1578778					H4083				<table border="1"> <thead> <tr> <th>Agency</th> <th>Site Name</th> <th>Site ID</th> <th>FED USGS</th> <th>USGS#224196</th> </tr> </thead> <tbody> <tr> <td>USGS</td> <td>3-1740-01 W427 VALUAM</td> <td>211740151740001</td> <td></td> <td></td> </tr> <tr> <td></td> <td>2128128</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>1578778</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>H4083</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>					Agency	Site Name	Site ID	FED USGS	USGS#224196	USGS	3-1740-01 W427 VALUAM	211740151740001				2128128					1578778					H4083			
Agency	Site Name	Site ID	FED USGS	USGS#224196																																																								
USGS	3-1740-01 W427 VALUAM	211740151740001																																																										
	2128128																																																											
	1578778																																																											
	H4083																																																											
<table border="1"> <thead> <tr> <th>Agency</th> <th>Site Name</th> <th>Site ID</th> <th>FED USGS</th> <th>USGS#224196</th> </tr> </thead> <tbody> <tr> <td>USGS</td> <td>3-1740-01 W427 VALUAM</td> <td>211740151740001</td> <td></td> <td></td> </tr> <tr> <td></td> <td>2128128</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>1578778</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>H4083</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>					Agency	Site Name	Site ID	FED USGS	USGS#224196	USGS	3-1740-01 W427 VALUAM	211740151740001				2128128					1578778					H4083																																		
Agency	Site Name	Site ID	FED USGS	USGS#224196																																																								
USGS	3-1740-01 W427 VALUAM	211740151740001																																																										
	2128128																																																											
	1578778																																																											
	H4083																																																											

Map ID: 3-1740-001  
 Decision: Not Reported  
 Distance: 0  
 Elevation: 1740  
 Database: H WELLS  
 EOR ID Number: 3-1740-001

Agency: USGS  
 Site Name: 3-1740-01 W427 VALUAM  
 Site ID: 211740151740001  
 Dec. Latitude: 2128128  
 Dec. Longitude: 1578778  
 Coord Symb: H4083  
 County: H  
 H: Honolulu County  
 FIPS: 1500000  
 Hydrologic code: 22080000  
 Source: Ground-water other than Spring  
 Well Type: Not Reported  
 Pumping Test: Not Reported  
 Annul Disk: Not Reported  
 Label: Not Reported  
 Current CI wire: Not Reported  
 Pump level: Not Reported  
 Transmissibility: Not Reported  
 Pump depth: Not Reported

Well Code: Not Reported  
 Well Name: Not Reported  
 Dec. Latitude: Not Reported  
 Dec. Longitude: Not Reported  
 Coord Symb: Not Reported  
 County: Not Reported  
 FIPS: Not Reported  
 Hydrologic code: Not Reported  
 Source: Not Reported  
 Well Type: Not Reported  
 Pumping Test: Not Reported  
 Annul Disk: Not Reported  
 Label: Not Reported  
 Current CI wire: Not Reported  
 Pump level: Not Reported  
 Transmissibility: Not Reported  
 Pump depth: Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID	Decision	Distance	Elevation	Database	EOR ID Number																																																							
3-1740-005	Not Reported	0	1740	H WELLS	3-1740-005																																																							
<table border="1"> <thead> <tr> <th>Agency</th> <th>Site Name</th> <th>Site ID</th> <th>FED USGS</th> <th>USGS#224201</th> </tr> </thead> <tbody> <tr> <td>USGS</td> <td>3-1740-05 W428-1 KAL</td> <td>211740151740001</td> <td></td> <td></td> </tr> <tr> <td></td> <td>2128155</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>1578778</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>H4083</td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="5"> <table border="1"> <thead> <tr> <th>Agency</th> <th>Site Name</th> <th>Site ID</th> <th>FED USGS</th> <th>USGS#224201</th> </tr> </thead> <tbody> <tr> <td>USGS</td> <td>3-1740-05 W428-1 KAL</td> <td>211740151740001</td> <td></td> <td></td> </tr> <tr> <td></td> <td>2128155</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>1578778</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>H4083</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> </td> </tr> </tbody> </table>						Agency	Site Name	Site ID	FED USGS	USGS#224201	USGS	3-1740-05 W428-1 KAL	211740151740001				2128155					1578778					H4083				<table border="1"> <thead> <tr> <th>Agency</th> <th>Site Name</th> <th>Site ID</th> <th>FED USGS</th> <th>USGS#224201</th> </tr> </thead> <tbody> <tr> <td>USGS</td> <td>3-1740-05 W428-1 KAL</td> <td>211740151740001</td> <td></td> <td></td> </tr> <tr> <td></td> <td>2128155</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>1578778</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>H4083</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>					Agency	Site Name	Site ID	FED USGS	USGS#224201	USGS	3-1740-05 W428-1 KAL	211740151740001				2128155					1578778					H4083			
Agency	Site Name	Site ID	FED USGS	USGS#224201																																																								
USGS	3-1740-05 W428-1 KAL	211740151740001																																																										
	2128155																																																											
	1578778																																																											
	H4083																																																											
<table border="1"> <thead> <tr> <th>Agency</th> <th>Site Name</th> <th>Site ID</th> <th>FED USGS</th> <th>USGS#224201</th> </tr> </thead> <tbody> <tr> <td>USGS</td> <td>3-1740-05 W428-1 KAL</td> <td>211740151740001</td> <td></td> <td></td> </tr> <tr> <td></td> <td>2128155</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>1578778</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>H4083</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>					Agency	Site Name	Site ID	FED USGS	USGS#224201	USGS	3-1740-05 W428-1 KAL	211740151740001				2128155					1578778					H4083																																		
Agency	Site Name	Site ID	FED USGS	USGS#224201																																																								
USGS	3-1740-05 W428-1 KAL	211740151740001																																																										
	2128155																																																											
	1578778																																																											
	H4083																																																											

Map ID: 3-1740-005  
 Decision: Not Reported  
 Distance: 0  
 Elevation: 1740  
 Database: H WELLS  
 EOR ID Number: 3-1740-005

Agency: USGS  
 Site Name: 3-1740-05 W428-1 KAL  
 Site ID: 211740151740001  
 Dec. Latitude: 2128155  
 Dec. Longitude: 1578778  
 Coord Symb: H4083  
 County: H  
 H: Honolulu County  
 FIPS: 1500000  
 Hydrologic code: 22080000  
 Source: Ground-water other than Spring  
 Well Type: Not Reported  
 Pumping Test: Not Reported  
 Annul Disk: Not Reported  
 Label: Not Reported  
 Current CI wire: Not Reported  
 Pump level: Not Reported  
 Transmissibility: Not Reported  
 Pump depth: Not Reported

Well Code: Not Reported  
 Well Name: Not Reported  
 Dec. Latitude: Not Reported  
 Dec. Longitude: Not Reported  
 Coord Symb: Not Reported  
 County: Not Reported  
 FIPS: Not Reported  
 Hydrologic code: Not Reported  
 Source: Not Reported  
 Well Type: Not Reported  
 Pumping Test: Not Reported  
 Annul Disk: Not Reported  
 Label: Not Reported  
 Current CI wire: Not Reported  
 Pump level: Not Reported  
 Transmissibility: Not Reported  
 Pump depth: Not Reported

RECEIVED AS FOLLOWS

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map check date: Not Reported  
 Map check date: Not Reported  
 Bot. hole depth: 1100  
 Pump Capacity: Not Reported  
 Top in well: Not Reported  
 Label: Not Reported  
 Current CI rank: Not Reported  
 Pump Test Date: Not Reported  
 Transmissibility: Not Reported

Map CI year: 0  
 Map CI year: Not Reported  
 Well depth: 10  
 Well depth: Not Reported  
 Diel (mgd): 30105  
 Aquifer code: Not Reported  
 Car head rank: Not Reported  
 Cont. Date: 01/01/1951 00:00:00  
 Surveyor: Not Reported  
 Pump intake elev.: Not Reported

Agency: USGS  
 Site Name: 3-1740-04 W433 KVALM  
 Date: 21/28/22  
 Date: 15/17/1959  
 Coord S1/E: NAD83  
 State: HI  
 County: Honolulu County  
 Assessor: 140 B3  
 Hydrologic code: 20000000  
 Topographic: Not Reported  
 Well Type: Ground-water other than Spring  
 Cont. Date: 19500611  
 Well Type: Spring well, other than collector or Recovery Type  
 Physical/Aquifer: Not Reported  
 Aquifer Type: Not Reported  
 Hole depth: Not Reported  
 Project No: Not Reported

SHA ID: 211725137403901  
 FED USGS USGSR224142

Map CI year: 0  
 Map CI year: Not Reported  
 Well depth: 10  
 Well depth: Not Reported  
 Diel (mgd): 30105  
 Aquifer code: Not Reported  
 Car head rank: Not Reported  
 Cont. Date: 01/01/1951 00:00:00  
 Surveyor: Not Reported  
 Pump intake elev.: Not Reported

Agency: USGS  
 Site Name: 3-1740-04 W433 KVALM  
 Date: 21/28/22  
 Date: 15/17/1959  
 Coord S1/E: NAD83  
 State: HI  
 County: Honolulu County  
 Assessor: 140 B3  
 Hydrologic code: 20000000  
 Topographic: Not Reported  
 Well Type: Ground-water other than Spring  
 Cont. Date: 19500611  
 Well Type: Spring well, other than collector or Recovery Type  
 Physical/Aquifer: Not Reported  
 Aquifer Type: Not Reported  
 Hole depth: Not Reported  
 Project No: Not Reported

SHA ID: 211725137403901  
 FED USGS USGSR224142

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Soil casting Depth: Not Reported  
 Use: Not Reported  
 Use year: 74  
 Chloride value: 604  
 Pumping Test rank: Not Reported  
 Chloride Test: Not Reported  
 UCL: Not Reported  
 Annual Date: Not Reported  
 Geology: Not Reported  
 Residues: Not Reported  
 Map check date: Not Reported  
 Map CI year: Not Reported  
 Bot. hole depth: Not Reported  
 Pump Capacity: Not Reported  
 Top in well: Not Reported  
 Label: Not Reported  
 Current CI rank: 0  
 Pump Test Date: Not Reported  
 Transmissibility: Not Reported  
 Pump depth: Not Reported

Perforating Depth: Not Reported  
 Well Date: Unaud  
 Well Top Elev.: 2.3  
 Well Date: Not Reported  
 Top in well L/E: Not Reported  
 Top in well L/E: Not Reported  
 Pump Capacity: Not Reported  
 State of use L/E: Not Reported  
 Geology: Not Reported  
 Residues: Not Reported  
 Map CI year: Not Reported  
 Map CI year: Not Reported  
 Bot. hole depth: Not Reported  
 Pump Capacity: Not Reported  
 Top in well: Not Reported  
 Label: Not Reported  
 Current CI rank: 30105  
 Pump Test Date: Not Reported  
 Transmissibility: Not Reported  
 Pump intake elev.: Not Reported

Agency: USGS  
 Site Name: 3-1740-03 W433 KVALM  
 Date: 21/28/24  
 Date: 15/17/1978  
 Coord S1/E: NAD83  
 State: HI  
 County: Honolulu County  
 Assessor: 94LO  
 Hydrologic code: 20000000  
 Topographic: Not Reported  
 Well Type: Ground-water other than Spring  
 Cont. Date: 19770819  
 Well Type: Spring well, other than collector or Recovery Type  
 Physical/Aquifer: Not Reported  
 Aquifer Type: Not Reported  
 Hole depth: Not Reported  
 Project No: Not Reported

SHA ID: 211725137403901  
 FED USGS USGSR224142

Agency: USGS  
 Site Name: 3-1740-03 W433 KVALM  
 Date: 21/28/24  
 Date: 15/17/1978  
 Coord S1/E: NAD83  
 State: HI  
 County: Honolulu County  
 Assessor: 94LO  
 Hydrologic code: 20000000  
 Topographic: Not Reported  
 Well Type: Ground-water other than Spring  
 Cont. Date: 19770819  
 Well Type: Spring well, other than collector or Recovery Type  
 Physical/Aquifer: Not Reported  
 Aquifer Type: Not Reported  
 Hole depth: Not Reported  
 Project No: Not Reported

SHA ID: 211725137403901  
 FED USGS USGSR224142



RECEIVED AS FOLLOWS

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

WIC	Well Name	Well ID	Well Code	Well Type	Well Depth	Well Status	Well Depth	Well Status
3-1740-002	Well Name: ...	Well ID: ...	Well Code: ...	Well Type: ...	Well Depth: ...	Well Status: ...	Well Depth: ...	Well Status: ...
3-1740-003	Well Name: ...	Well ID: ...	Well Code: ...	Well Type: ...	Well Depth: ...	Well Status: ...	Well Depth: ...	Well Status: ...

18 WELLS 3-1740-002

WIC	Well Name	Well ID	Well Code	Well Type	Well Depth	Well Status	Well Depth	Well Status
3-1740-002	Well Name: ...	Well ID: ...	Well Code: ...	Well Type: ...	Well Depth: ...	Well Status: ...	Well Depth: ...	Well Status: ...
3-1740-003	Well Name: ...	Well ID: ...	Well Code: ...	Well Type: ...	Well Depth: ...	Well Status: ...	Well Depth: ...	Well Status: ...

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

WIC	Well Name	Well ID	Well Code	Well Type	Well Depth	Well Status	Well Depth	Well Status
3-1840-008	Well Name: ...	Well ID: ...	Well Code: ...	Well Type: ...	Well Depth: ...	Well Status: ...	Well Depth: ...	Well Status: ...
3-1840-009	Well Name: ...	Well ID: ...	Well Code: ...	Well Type: ...	Well Depth: ...	Well Status: ...	Well Depth: ...	Well Status: ...

18 WELLS 3-1840-008

WIC	Well Name	Well ID	Well Code	Well Type	Well Depth	Well Status	Well Depth	Well Status
3-1840-008	Well Name: ...	Well ID: ...	Well Code: ...	Well Type: ...	Well Depth: ...	Well Status: ...	Well Depth: ...	Well Status: ...
3-1840-009	Well Name: ...	Well ID: ...	Well Code: ...	Well Type: ...	Well Depth: ...	Well Status: ...	Well Depth: ...	Well Status: ...



RECEIVED AS FOLLOWS

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID	Direction	Distance	Elevation	Database	EDR ID Number
D19	W	17.1 Mils		FED USCS	USCS8224147
D19	W	17.1 Mils		USCS	3-1840-03 W128 KULAM
Agency:				Site ID:	2118013740301
Site Name:				Agency:	USCS
Dec. Latitude:	2129643			State:	KS
Dec. Longitude:	-157.67643			County:	Harold County
Coord. Syst.:	NAD83			Agency:	USCS
State:	KS			Site Name:	3-1840-03 W128 KULAM
County:	Harold County			Dec. Latitude:	2129643
Hydrologic code:	106.00			Dec. Longitude:	-157.67643
Topology code:	20060000			Coord. Syst.:	NAD83
Site Type:	Not Reported			State:	KS
Coord. Date:	Ground water other than Spring			County:	Harold County
Well Type:	19450813			Agency:	USCS
Primary Aquifer:	Single well, other than collector or Recovery Type			Site Name:	3-1840-03 W128 KULAM
Aquifer Type:	Not Reported			Dec. Latitude:	2129643
Well depth:	Not Reported			Dec. Longitude:	-157.67643
Hyd depth:	Not Reported			Coord. Syst.:	NAD83
Projected nec:	Not Reported			State:	KS

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID	Direction	Distance	Elevation	Database	EDR ID Number
D19	W	17.1 Mils		FED USCS	USCS8224221
D19	W	17.1 Mils		USCS	3-1840-03 W128 KULAM
Agency:				Site ID:	2118013740301
Site Name:				Agency:	USCS
Dec. Latitude:	2129643			State:	KS
Dec. Longitude:	-157.67643			County:	Harold County
Coord. Syst.:	NAD83			Agency:	USCS
State:	KS			Site Name:	3-1840-03 W128 KULAM
County:	Harold County			Dec. Latitude:	2129643
Hydrologic code:	47.00			Dec. Longitude:	-157.67643
Topology code:	20060000			Coord. Syst.:	NAD83
Site Type:	Not Reported			State:	KS
Coord. Date:	Ground water other than Spring			County:	Harold County
Well Type:	19450813			Agency:	USCS
Primary Aquifer:	Single well, other than collector or Recovery Type			Site Name:	3-1840-03 W128 KULAM
Aquifer Type:	Not Reported			Dec. Latitude:	2129643
Well depth:	Not Reported			Dec. Longitude:	-157.67643
Hyd depth:	Not Reported			Coord. Syst.:	NAD83
Projected nec:	Not Reported			State:	KS

RECEIVED AS FOLLOWS

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID	Division	Elevation	Database	EOR ID Number
718	1000	172 - 1 Mile	18 WELLS	3-1840-001
719	1000	172 - 1 Mile	18 WELLS	3-1840-001
720	1000	172 - 1 Mile	18 WELLS	3-1840-007
721	1000	172 - 1 Mile	18 WELLS	3-1840-007
722	1000	172 - 1 Mile	18 WELLS	3-1840-007
723	1000	172 - 1 Mile	18 WELLS	3-1840-007
724	1000	172 - 1 Mile	18 WELLS	3-1840-007
725	1000	172 - 1 Mile	18 WELLS	3-1840-007
726	1000	172 - 1 Mile	18 WELLS	3-1840-007
727	1000	172 - 1 Mile	18 WELLS	3-1840-007
728	1000	172 - 1 Mile	18 WELLS	3-1840-007
729	1000	172 - 1 Mile	18 WELLS	3-1840-007
730	1000	172 - 1 Mile	18 WELLS	3-1840-007
731	1000	172 - 1 Mile	18 WELLS	3-1840-007
732	1000	172 - 1 Mile	18 WELLS	3-1840-007
733	1000	172 - 1 Mile	18 WELLS	3-1840-007
734	1000	172 - 1 Mile	18 WELLS	3-1840-007
735	1000	172 - 1 Mile	18 WELLS	3-1840-007
736	1000	172 - 1 Mile	18 WELLS	3-1840-007
737	1000	172 - 1 Mile	18 WELLS	3-1840-007
738	1000	172 - 1 Mile	18 WELLS	3-1840-007
739	1000	172 - 1 Mile	18 WELLS	3-1840-007
740	1000	172 - 1 Mile	18 WELLS	3-1840-007
741	1000	172 - 1 Mile	18 WELLS	3-1840-007
742	1000	172 - 1 Mile	18 WELLS	3-1840-007
743	1000	172 - 1 Mile	18 WELLS	3-1840-007
744	1000	172 - 1 Mile	18 WELLS	3-1840-007
745	1000	172 - 1 Mile	18 WELLS	3-1840-007
746	1000	172 - 1 Mile	18 WELLS	3-1840-007
747	1000	172 - 1 Mile	18 WELLS	3-1840-007
748	1000	172 - 1 Mile	18 WELLS	3-1840-007
749	1000	172 - 1 Mile	18 WELLS	3-1840-007
750	1000	172 - 1 Mile	18 WELLS	3-1840-007

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Well ID	Well Name	Well Type	Well Depth	Well Status	Well Depth	Well Status
718	1000	172 - 1 Mile	18 WELLS	3-1840-001	3	1840-01
719	1000	172 - 1 Mile	18 WELLS	3-1840-001	3	1840-01
720	1000	172 - 1 Mile	18 WELLS	3-1840-007	3	1840-07
721	1000	172 - 1 Mile	18 WELLS	3-1840-007	3	1840-07
722	1000	172 - 1 Mile	18 WELLS	3-1840-007	3	1840-07
723	1000	172 - 1 Mile	18 WELLS	3-1840-007	3	1840-07
724	1000	172 - 1 Mile	18 WELLS	3-1840-007	3	1840-07
725	1000	172 - 1 Mile	18 WELLS	3-1840-007	3	1840-07
726	1000	172 - 1 Mile	18 WELLS	3-1840-007	3	1840-07
727	1000	172 - 1 Mile	18 WELLS	3-1840-007	3	1840-07
728	1000	172 - 1 Mile	18 WELLS	3-1840-007	3	1840-07
729	1000	172 - 1 Mile	18 WELLS	3-1840-007	3	1840-07
730	1000	172 - 1 Mile	18 WELLS	3-1840-007	3	1840-07
731	1000	172 - 1 Mile	18 WELLS	3-1840-007	3	1840-07
732	1000	172 - 1 Mile	18 WELLS	3-1840-007	3	1840-07
733	1000	172 - 1 Mile	18 WELLS	3-1840-007	3	1840-07
734	1000	172 - 1 Mile	18 WELLS	3-1840-007	3	1840-07
735	1000	172 - 1 Mile	18 WELLS	3-1840-007	3	1840-07
736	1000	172 - 1 Mile	18 WELLS	3-1840-007	3	1840-07
737	1000	172 - 1 Mile	18 WELLS	3-1840-007	3	1840-07
738	1000	172 - 1 Mile	18 WELLS	3-1840-007	3	1840-07
739	1000	172 - 1 Mile	18 WELLS	3-1840-007	3	1840-07
740	1000	172 - 1 Mile	18 WELLS	3-1840-007	3	1840-07
741	1000	172 - 1 Mile	18 WELLS	3-1840-007	3	1840-07
742	1000	172 - 1 Mile	18 WELLS	3-1840-007	3	1840-07
743	1000	172 - 1 Mile	18 WELLS	3-1840-007	3	1840-07
744	1000	172 - 1 Mile	18 WELLS	3-1840-007	3	1840-07
745	1000	172 - 1 Mile	18 WELLS	3-1840-007	3	1840-07
746	1000	172 - 1 Mile	18 WELLS	3-1840-007	3	1840-07
747	1000	172 - 1 Mile	18 WELLS	3-1840-007	3	1840-07
748	1000	172 - 1 Mile	18 WELLS	3-1840-007	3	1840-07
749	1000	172 - 1 Mile	18 WELLS	3-1840-007	3	1840-07
750	1000	172 - 1 Mile	18 WELLS	3-1840-007	3	1840-07

RECEIVED AS FOLLOWS

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Well Name:	3-1949-003	Well Code:	3
Well name:	Calvin	Well name:	1949-003
Yr. drilled:	1948	Driller:	Not Reported
Quad, map:	15	License:	MALUM
Longitude:	1574038	UTM:	211817
Zone:	N	UTM:	Y
Old number:	425	Operator:	Teft T
Type:	Not Reported	Well type:	Not Reported
Ground Elev:	78	Chasing elev:	8
Soil casting Depth:	89	Well depth:	89
Line:	UNU	Perf casing Depth:	Unslud
Use year:	74	Use Desc:	Unslud
Operator name:	Not Reported	Water Top Elev:	Not Reported
Pumping Test date:	Not Reported	Test date:	3
Operator Test:	Not Reported	Depth to water LK:	Not Reported
Notes:	Not Reported	Temperature:	Not Reported
Actual Depth:	Not Reported	Pump Capacity:	Not Reported
Capacity:	Not Reported	Static Water LK:	Not Reported
Insulation:	Not Reported	Capacity/serve:	Not Reported
Motor:	Not Reported	Motor/measure:	Not Reported
Motor chiller:	Not Reported	Motor Desc:	Not Reported
Min. chiller:	-21	Min. Desc:	0
But. joint depth:	Not Reported	But. joint depth:	-21
Pump Capacity:	Not Reported	Well Capacity:	Not Reported
Test map log:	Not Reported	Drill length:	Not Reported
Latest hand note:	0	Actual code:	30105
Current CI note:	Not Reported	Card brand note:	Not Reported
Pump Test Date:	Not Reported	Card Date:	01/01/1948 00:00:00
Transmission:	0	Survey:	Not Reported
Pump depth:	Not Reported	Pump intake elev:	Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS  
RADON

AREA RADON INFORMATION

Federal EPA Radon Zone for HONOLULU County: 3  
 Note: Zone 1 indoor average level > 4 pCiL  
 : Zone 2 indoor average level = 4 pCiL and < 4 pCiL  
 : Zone 3 indoor average level < 2 pCiL

Federal Area Radon Information for ZIP Code: 96825				
Area	Average Activity	% < 4 pCiL	% 4-20 pCiL	% > 20 pCiL
Number of sites tested: 19				
Living Area - 1st Floor	2.105 pCiL	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	4.050 pCiL	100%	0%	0%

RECEIVED AS FOLLOWS

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002. 7.5-minute DEMs correspond to the USGS 124,000- and 123,000-scale topographic quadrangle maps.

HYDROLOGIC INFORMATION

Flood Zone Data: The data, available in select counties across the country, was obtained by EDR in 1999 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.
Note: National Wetlands Inventory: The data, available in select counties across the country, was obtained by EDR in 2002 from the U.S. Fish and Wildlife Service.

HYDROGEOLOGIC INFORMATION

AQUIDOM: Information System
Source: EDR repository developed of groundwater flow information
EDR has developed the AQUIDOM Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has received reports submitted by regulatory authorities at select sites and has extracted the data of the report (hydrogeological) determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schriber, R.E. Ayers and W.J. Beane, Geology of the Conterminous U.S. at 1:250,000 Scale - A digital representation of the 1974 P.G. King and H.L. Behrensmayr, USGS Digital Data Series DDS-111 (1994)

STATSOCC: State Soil Geographic Database

Source: Department of Agriculture, National Resources Conservation Service
The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the national Cooperative Soil Survey (NCS) and is responsible for collecting, storing, analyzing and distributing soil survey information for privately owned lands in the United States. A soil map is a soil survey in a representation of soil patterns in a landscape. Soil maps for STATSOCC are compiled by generating maps called (STATSOCC) soil survey maps.

ADDITIONAL ENVIRONMENTAL RECORD SOURCES

FEDERAL WATER WELLS

PWS: Public Water Systems

Source: Environmental Protection Agency
Telephone: 202-564-5150
Public Water Systems data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS EDR: Public Water Systems Violation and Enforcement Data

Source: Environmental Protection Agency
Telephone: 202-564-5150
Violation and Enforcement data for Public Water Systems from the State Drinking Water Information System (SDWIS) under August 1994. Prior to August 1994, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)

This database contains descriptive information on all wells in the USGS system or has collected data on surface water and/or groundwater. The groundwater data includes information on well, spring, and other sources of groundwater.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

STATE RECORDS

Ground Water Wells
Source: Department of Land and Natural Resources
Telephone: 808-687-0742

RAOON

Area Rules Information

Source: USGS
Telephone: 703-336-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA's National Radon Survey and the National Residential Radon Survey. The survey covers the years 1981 - 1992. Where necessary, data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones

Source: EPA
Telephone: 703-336-4020
Section 207 of the RFA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

OTHER

Airport Landing Facilities: Private and public use landing facilities

Source: Federal Aviation Administration, 800-437-6655

Esplanades: World language esplanades, Ricker 5 or greater

Source: Department of Commerce, National Oceanic and Atmospheric Administration

RECEIVED AS FOLLOWS

The EDR Radius Map  
with GeoCheck®

Oneallii Homesteads  
Oneallii Homesteads  
Kaunakakai, HI 96748  
Inquiry Number: 1012891.4s

July 16, 2003

**EDR** Environmental  
Data  
Resources, Inc.

The Source  
For Environmental  
Risk Management  
Data

3530 Post Road  
Southport, Connecticut 06890  
Nationwide Customer Service  
Telephone: 1-800-352-0050  
Fax: 1-800-231-6802  
Internet: www.edrnet.com

TABLE OF CONTENTS

SECTION	PAGE
Executive Summary.....	ES1
Overview Map.....	2
Detail Map.....	3
Map Findings Summary.....	4
Map Findings.....	5
Orphan Summary.....	6
Government Records Searched/Data Currency Tracking.....	GR-1
<b>GEOCHECK ADDENDUM</b>	
Physical Sailing Source Addendum.....	A-1
Physical Sailing Source Summary.....	A-2
Physical Sailing Source Map.....	A-6
Physical Sailing Source Map Findings.....	A-7
Physical Sailing Source Records Searched.....	A-15

Thank you for your business.  
Please contact EDR at 1-800-352-0050  
with any questions or comments.

Disclaimer

This report contains information obtained from a variety of public and other sources. NO WARRANTY EXPRESSED OR IMPLIED IS MADE WHATSOEVER IN CONNECTION WITH THIS REPORT. ENVIRONMENTAL DATA RESOURCES INC. SPECIFICALLY DISCLAIMS THE MAKING OF ANY SUCH WARRANTIES, INCLUDING WITHOUT LIMITATION, AGENCY FROM BE LIABLE TO FOR A PARTICULAR USE OR PURPOSE. ALL RISK IS ASSUMED BY THE USER. IN NO EVENT SHALL EDR BE LIABLE TO ANYONE, WHETHER ARISING OUT OF ERRORS OR OMISSIONS, NEGLIGENCE, ACCIDENT OR ANY OTHER CAUSE, FOR ANY LOSS OR DAMAGE, INCLUDING, WITHOUT LIMITATION, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR EXEMPLARY DAMAGES. EDR and GeoCheck are trademarks of Environmental Data Resources, Inc. or its affiliates. All other trademarks used herein are the property of their respective owners.

RECEIVED AS FOLLOWS

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc. (EDRI). The report meets the government records search requirements of ASTM Standard Practices for Environmental Site Assessments, E 1527-00. Search distances are per ASTM standard or custom distances requested by the user.

TARGET PROPERTY INFORMATION

ADDRESS

ONEALH HONESTEADS  
KAUNAKAHOA, HI 96748

COORDINATES

Latitude (North): 21.072930 - 21° 4' 22.5"  
Longitude (West): 156.981690 - 156° 58' 54.1"  
Universal Transverse Mercator Zone 4  
UTM Y (Easting): 1095994.2  
UTM X (Northing): 2211410.0  
Elevation: 34 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property: 2421156-A8 KAUNAKAHOA, HI  
Source: USGS 7.5 min quad index

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDRI.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDRI's search of available (reasonably ascertainable) government records either on the target property or within the ASTM E 1527-00 search radius around the target property for the following databases:

FEDERAL ASTM STANDARD

- NPL..... National Priority List
- Proposed NPL..... Proposed National Priority List Sites
- CERCLA..... Comprehensive Environmental Response, Compensation, and Liability Information System
- CERCLA/RIIS..... CERCLA No Further Remedial Action Planned
- COMBACTS..... Chemicals Action Report
- RCRIS-1SD..... Resource Conservation and Recovery Information System
- RCRIS-LDC..... Resource Conservation and Recovery Information System
- RCRIS-SOC..... Resource Conservation and Recovery Information System
- ERMS..... Emergency Response Notification System
- STATE ASTM STANDARD
- SHWS..... Sites List

EXECUTIVE SUMMARY

SWFAL..... Permitted Landfills in the State of Hawaii  
LUST..... Leaking Underground Storage Tank Database  
UST..... Underground Storage Tank Database

FEDERAL ASTM SUPPLEMENTAL

- CONSENT..... Superfund (CERCLA) Consent Decree
- ROD..... Records Of Decision
- Drilled NPL..... Federal Priority List Drillers
- EMIS..... Facility Incident System/ Facility Identification Initiative Program Summary Report
- HAZUS..... Hazardous Materials Information Reporting System
- MTIS..... Hazardous Materials Reporting System
- MINRES..... Mineral Resources Inventory System
- NPL Links..... Federal Superfund Links
- PADS..... PCB Activity Database System
- POD..... Department of Defense Sites
- RAAITS..... RCRA Administrative Action Tracking System
- TRIS..... Toxic Chemical Release Inventory System
- TSCA..... Toxic Substances Control Act
- SSIS..... Section 7 Tracking System
- FFRW TSCA Tracking System - FFRWA (Federal Insecticide, Fungicide, & Rodenticide Act/TSCA (Toxic Substances Control Act))

STATE OR LOCAL ASTM SUPPLEMENTAL

SPLLS..... Release Notifications

EDR PROPRIETARY HISTORICAL DATABASES

Coal Gas..... Former Manufactured Gas (Coal Gas) Sites

SURROUNDING SITES SEARCH RESULTS

Surrounding sites were not identified.  
Unmappable (orphan) sites are not considered in the foregoing analysis.



RECEIVED AS FOLLOWS

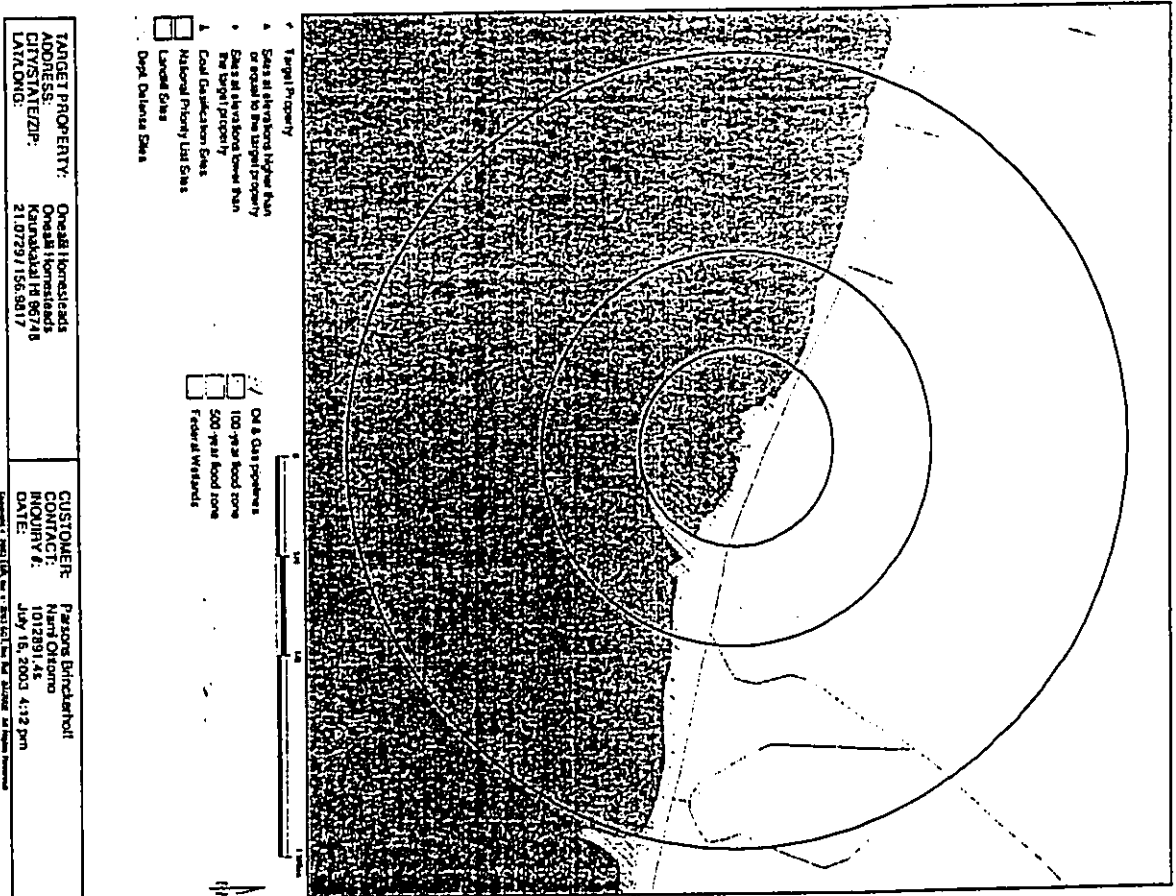
**EXECUTIVE SUMMARY**

Due to poor or inadequate address information, the following sites were not mapped:

Site Name	Databases
KALAPAPA LANDFILL	SHWS, SWFALF
BEN FRANKLIN STORES PROPERTY	SHWS, SWFALF
KALAWAI LANDFILL (LF-0006-98)	SHWS, SWFALF
KALAWAI LIDF	CERCUS, FINDS
HAWAIIAN COMMERCIAL & SUGAR CO.	SWFALF
KAWAIAU LANDFILL	SWFALF
KAWAIAU LANDFILL	SWFALF
MAUI LANDFILL	SWFALF
MOLOKAI LANDFILL (NAWAHA LF LF-0009)	SWFALF, SPLLS
CENTRAL MAUI LF PHASE III LF-0004	SWFALF
MAALEA CDD LF	SWFALF
CENTRAL MAUI LF PHASE IV	SWFALF
KAIUNAWAIA PW BASEYARD	SWFALF
MOLOKAI RANCH LTD	SWFALF
ULUPUE CENTRAL OFFICE	SWFALF
GLENN & CATHEEN SAWAMOTO	SWFALF
KAIUNAWAIA PW BASEYARD	SWFALF
AVIS RENT A CAR	SWFALF
FUNK SEEDS INTERNATIONAL MOLOKAI	SWFALF

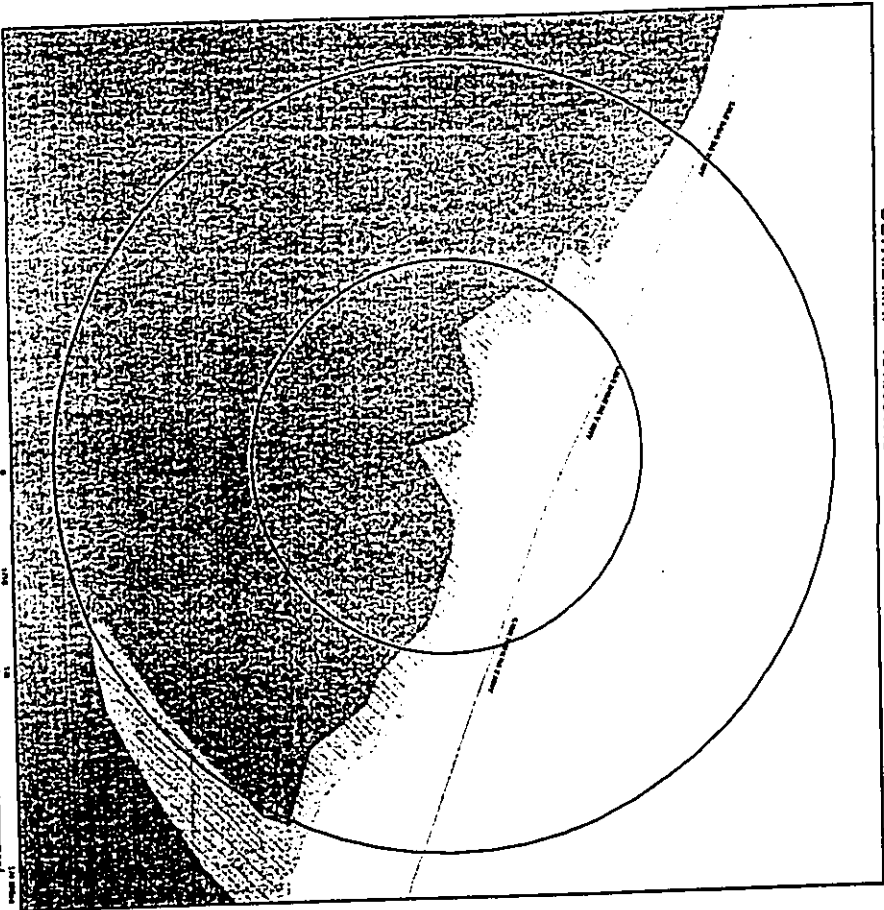
TC017891.4s EXECUTIVE SUMMARY 3

OVERVIEW MAP - 1012891.4s - Parsons Brinckerhoff



RECEIVED AS FOLLOWS

DETAIL MAP - 1012891.4s - Parsons Brinckerhoff



TARGET PROPERTY:  
 Great! Homesteads  
 ADDRESS: Kansas Blvd 96748  
 CITY/STATE/ZIP: 21.0729/156.9817  
 LANDINGS:

CUSTOMER: Parsons Brinckerhoff  
 CONTACT: Nam O'Koro  
 REQUEST: 1012891.4s  
 INQUIRY #: JWP 16.2003 4:12 pm  
 DATE: 7/20/03

Copyright © 2003 by Parsons Brinckerhoff

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (feet)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Permitted
<b>FEDERAL ASTMA STANDARD</b>								
NPL	Proposed NPL	1,000	0	0	0	0	NR	0
	CERCLIS	1,000	0	0	0	0	NR	0
	CERCLA/RIIS	0,500	0	0	0	0	NR	0
	CORRACTIS	0,250	0	0	0	0	NR	0
	RICHS-15D	1,000	0	0	0	0	NR	0
	RICHS 1g, Quan. Gen.	0,500	0	0	0	0	NR	0
	RICHS Sm. Quan. Gen.	0,250	0	0	0	0	NR	0
	ERYS	TP	NR	NR	NR	NR	NR	0
<b>STATE ASTMA STANDARD</b>								
SHWS	State Landfill	1,000	0	0	0	0	NR	0
	UST	0,500	0	0	0	0	NR	0
	UST	0,250	0	0	0	0	NR	0
<b>FEDERAL ASTMA SUPPLEMENTAL</b>								
CONSENT	ROD	1,000	0	0	0	0	NR	0
	Dedicated NPL	1,000	0	0	0	0	NR	0
	FINDS	TP	NR	NR	NR	NR	NR	0
	HAIARS	TP	NR	NR	NR	NR	NR	0
	M.L.T.S	0,250	0	0	0	0	NR	0
	MINRES	TP	NR	NR	NR	NR	NR	0
	NPL Leaks	TP	NR	NR	NR	NR	NR	0
	PAOS	1,000	0	0	0	0	NR	0
	DOO	TP	NR	NR	NR	NR	NR	0
	RAAVS	TP	NR	NR	NR	NR	NR	0
	TRIS	TP	NR	NR	NR	NR	NR	0
	TSCA	TP	NR	NR	NR	NR	NR	0
	SSIS	TP	NR	NR	NR	NR	NR	0
	FTIS	TP	NR	NR	NR	NR	NR	0
<b>STATE OR LOCAL ASTMA SUPPLEMENTAL</b>								
SPILLS	TP	NR	NR	NR	NR	NR	NR	0
<b>EDR PROPRIETARY HISTORICAL DATABASES</b>								
Coal Gas	1,000	0	0	0	0	0	NR	0

NOTES:  
 ACQUISITION - see EDR Physical Siting Source Addendum  
 TP = Target Property  
 NR = Not Requested at the Search Distance  
 Sites may be listed in more than one database



RECEIVED AS FOLLOWS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following Federal and State databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.  
Expired ASTM date: Provide confirmation that the EDR report meets or exceeds the 90-day updating requirement of the ASTM standard.

FEDERAL ASTM STANDARD RECORDS

NPL National Priority List

Source: EPA  
Telephone: N/A  
National Priorities List (Superfund) The NPL is a list of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 04/20/03  
Date Made Active at EDR: 06/20/03  
Database Release Frequency: Semi-Annually  
Date of Data Arrival at EDR: 06/20/03  
Expired ASTM date: 28  
Date of Last EDR Contact: 06/20/03

NPL Site Boundaries

Source: EPA  
EPA's Environmental Photographic Interpretation Center (EPIC)  
Telephone: 202-564-7333

EPA Region 1  
Telephone: 617-918-1143  
EPA Region 3  
Telephone: 215-814-5418  
EPA Region 4  
Telephone: 404-562-8033

EPA Region 6  
Telephone: 214-625-6629  
EPA Region 8  
Telephone: 303-512-8774

Proposed NPL: Proposed National Priority List Site

Source: EPA  
Telephone: N/A

Date of Government Version: 04/20/03  
Date Made Active at EDR: 06/20/03  
Database Release Frequency: Semi-Annually  
Date of Data Arrival at EDR: 06/20/03  
Expired ASTM date: 28  
Date of Last EDR Contact: 06/20/03

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System

Source: EPA  
Telephone: 703-413-9223

CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, and liability (CERCLA). CERCLIS contains data which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 03/19/03  
Date Made Active at EDR: 04/06/03  
Database Release Frequency: Quarterly  
Date of Data Arrival at EDR: 03/24/03  
Expired ASTM date: 15  
Date of Last EDR Contact: 04/23/03

CERCLIS-NTRAP: CERCLIS No Further Remedial Action Planned

Source: EPA  
Telephone: 703-413-9223

As of February 1994, CERCLIS sites designated "No Further Remedial Action Planned" (NTRAP) have been removed from CERCLIS. NTRAP sites may be sites where, following an initial investigation, no contamination was found, contamination was removed quickly without the need for the site to be placed on the NPL, or the contamination was not serious enough to require Federal Superfund action or NPL consideration. EPA has removed approximately 23,000 NTRAP sites to the unremediated barriers to the redevelopment of these properties and has archived them as historical records so EPA does not necessarily repeat the investigations in the future. This policy change is part of the EPA's Brownfields Redevelopment Program to help cities, states, private investors and related others to promote economic redevelopment of unproductive urban sites.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 03/19/03  
Date Made Active at EDR: 04/06/03  
Database Release Frequency: Quarterly  
Date of Data Arrival at EDR: 03/24/03  
Expired ASTM date: 15  
Date of Last EDR Contact: 06/23/03

CONTRACTS: Corrective Action Report

Source: EPA  
Telephone: 800-424-6348

CONTRACTS identifies hazardous waste handlers with RCRA corrective action activity.  
Date of Government Version: 03/19/03  
Date Made Active at EDR: 05/06/03  
Database Release Frequency: Semi-Annually  
Date of Data Arrival at EDR: 04/07/03  
Expired ASTM date: 31  
Date of Last EDR Contact: 06/09/03

RCRS: Resource Conservation and Recovery Information System

Source: EPA/NRIS  
Telephone: 800-424-6348

Resource Conservation and Recovery Information System, RCRIS includes selective information on sites, which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA).  
Date of Government Version: 02/29/03  
Date Made Active at EDR: 07/01/03  
Database Release Frequency: Varies  
Date of Data Arrival at EDR: 05/09/03  
Expired ASTM date: 33  
Date of Last EDR Contact: 06/25/03

ERNS: Emergency Response Notification System

Source: National Response Center, United States Coast Guard  
Telephone: 202-260-2342

Emergency Response Notification System, ERNS records and stores information on reported releases of oil and hazardous substances.  
Date of Government Version: 12/31/02  
Date Made Active at EDR: 02/05/03  
Database Release Frequency: Annually  
Date of Data Arrival at EDR: 01/27/03  
Expired ASTM date: 7  
Date of Last EDR Contact: 04/28/03

FEDERAL ASTM SUPPLEMENTAL RECORDS

BRS: Biennial Reporting System

Source: EPA/NRIS  
Telephone: 800-424-6348

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.  
Date of Government Version: 12/31/99  
Database Release Frequency: Biennially  
Date of Last EDR Contact: 06/16/03  
Date of Next Scheduled EDR Contact: 09/15/03

CONSENT: Superfund (CERCLA) Consent Decree

Source: EPA Regional Offices  
Telephone: Varies

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.  
Date of Government Version: N/A  
Date Made Active at EDR: N/A  
Database Release Frequency: Varies  
Date of Last EDR Contact: N/A  
Date of Next Scheduled EDR Contact: N/A

RDD: Record of Decision

Source: EPA  
Telephone: 703-413-9223

Record of Decision, RDD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

RECEIVED AS FOLLOWS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 01/09/03  
 Database Release Frequency: Annually  
 Date of Last EDR Contact: 07/07/03  
 Date of Next Scheduled EDR Contact: 10/06/03

**OEI/STED HPL: National Priority List Database**  
 Source: EPA  
 Telephone: 18A  
 The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to derive sites from the HPL. In accordance with 40 CFR 300.425 (b), sites may be deleted from the HPL when no further response is appropriate.  
 Date of Government Version: 04/00/03  
 Database Release Frequency: Quarterly  
 Date of Last EDR Contact: 05/05/03  
 Date of Next Scheduled EDR Contact: 08/04/03

**FINOS: Facility Index System's Activity Identification Initiative Program Summary Report**  
 Source: EPA  
 Telephone: N/A  
 Facility Index System (FINOS) contains both facility information and 'incident' to other sources that contain more detail. EDR includes the following FINOS databases in the report: PCS (Permit Compliance System), AHS (Automated Hazardous Material System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control, CDOCKET (Central Docket System used to track criminal enforcement actions for all environmental statutes), FHS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).  
 Date of Government Version: 03/19/03  
 Database Release Frequency: Quarterly  
 Date of Last EDR Contact: 07/02/03  
 Date of Next Scheduled EDR Contact: 10/06/03

**HURIS: Hazardous Material Information Reporting System**  
 Source: U.S. Department of Transportation  
 Telephone: 202-366-4555  
 Hazardous Material Incident Report System (HMIRS) contains hazardous material spill incidents reported to DOT.  
 Date of Government Version: 01/01/03  
 Database Release Frequency: Annually  
 Date of Last EDR Contact: 04/09/03  
 Date of Next Scheduled EDR Contact: 07/12/03

**METS: Material Handling Tracking System**  
 Source: Nuclear Regulatory Commission  
 Telephone: 301-415-7189  
 METS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which postests or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.  
 Date of Government Version: 04/23/03  
 Database Release Frequency: Quarterly  
 Date of Last EDR Contact: 07/02/03  
 Date of Next Scheduled EDR Contact: 10/06/03

**MVES: Mergers Acquisitions Index File**  
 Source: Department of Labor, Mine Safety and Health Administration  
 Telephone: 303-231-5959  
 Date of Government Version: 03/11/03  
 Database Release Frequency: Semi-Annually  
 Date of Last EDR Contact: 06/20/03  
 Date of Next Scheduled EDR Contact: 09/28/03

**NPL/LENS: Federal Superfund Lists**  
 Source: EPA  
 Telephone: 202-564-4787  
 Federal Superfund Lists. Under the authority granted the USEPA by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, the USEPA has the authority to the lists applied real property in order to recover remedial action expenditures or when the property owner requires notification of potential liability. USEPA compiles a listing of listed indices of Superfund Lists.  
 Date of Government Version: 10/15/91  
 Database Release Frequency: No Update Planned  
 Date of Last EDR Contact: 05/27/03  
 Date of Next Scheduled EDR Contact: 08/25/03

**PADS: PCB Activity Database System**  
 Source: EPA  
 Telephone: 202-564-3887  
 PCB Activity Database. PADS identifies generators, transporters, commercial stores and/or brokers and disposers of PCBs who are required to notify the EPA of such activities.  
 Date of Government Version: 03/26/03  
 Database Release Frequency: Annually  
 Date of Last EDR Contact: 05/12/03  
 Date of Next Scheduled EDR Contact: 08/11/03

**DOO: Department of Defense Sites**  
 Source: USDS  
 Telephone: 703-614-5920  
 This data set consists of realty owned or administered lands, administered by the Department of Defense, that have an area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.  
 Date of Government Version: 04/01/03  
 Database Release Frequency: Semi-Annually  
 Date of Last EDR Contact: 05/12/03  
 Date of Next Scheduled EDR Contact: 08/11/03

**RAATS: RCRA Administrative Action Tracking System**  
 Source: EPA  
 Telephone: 202-364-4104  
 RCRA Administrative Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violations and includes administrative and civil actions brought by the EPA. For administrative actions after September 30, 1992, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because it decreases in agency resources made it impossible to continue to update the information contained in the database.  
 Date of Government Version: 04/17/95  
 Database Release Frequency: No Update Planned  
 Date of Last EDR Contact: 06/09/03  
 Date of Next Scheduled EDR Contact: 09/06/03

**TRIS: Toxic Chemical Release Inventory System**  
 Source: EPA  
 Telephone: 202-260-1531  
 Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.  
 Date of Government Version: 12/31/00  
 Database Release Frequency: Annually  
 Date of Last EDR Contact: 08/27/03  
 Date of Next Scheduled EDR Contact: 09/22/03

**TSCL: Toxic Substances Control Act**  
 Source: EPA  
 Telephone: 202-260-5371  
 Toxic Substances Control Act. TSCL identifies manufacturers and importers of chemical substances included on the TSCL Chemical Substances Inventory List. It includes data on the production volume of these substances by plant site.  
 Date of Government Version: 12/1/98  
 Database Release Frequency: Every 4 Years  
 Date of Last EDR Contact: 06/09/03  
 Date of Next Scheduled EDR Contact: 09/06/03

**TTIS: TRIS/TSCL Tracking System - FT/RA (Federal Trade/Release, Fugitive, & Release/Act/TSCL) (Toxic Substances Control Act)**  
 Source: EPA  
 Telephone: 202-564-2901  
 Date of Government Version: 04/15/03  
 Database Release Frequency: Quarterly  
 Date of Last EDR Contact: 06/23/03  
 Date of Next Scheduled EDR Contact: 09/22/03

RECEIVED AS FOLLOWS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

USTB: Section 7 Tracking Systems

Source: EPA  
Telephone: 202-564-5008  
Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act (as amended (92 Stat. EDR) requires all regulated pesticide producing establishments to submit a report to the Environmental Protection Agency by March 1st of each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Vendor: 12/11/00  
Database Release Frequency: Annually  
Date of Last EDR Contact: 05/09/03  
Date of Next Scheduled EDR Contact: 07/21/03  
FTTB: FFR/USCA Tracking System - FFR/USCA Federal Insecticide, Fungicide, & Rodenticide Act/USCA (Toxic Substances Control Act)  
Source: EPA/Office of Prevention, Pesticides and Toxic Substances  
Telephone: 202-564-2501  
FTTB tracks administrative cases and pesticide enforcement actions and compliance activities related to FFR/USCA and EPCRA (Emergency Planning and Community Right to Know Act) to maintain currency. EDR contacts the Agency on a quarterly basis.  
Date of Government Vendor: 04/15/03  
Database Release Frequency: Quarterly  
Date of Last EDR Contact: 06/23/03  
Date of Next Scheduled EDR Contact: 09/22/03

STATE OF ILLINOIS ASTB STANDARD RECORDS

SHWS: State List

Source: Department of Health  
Telephone: 800-566-4219  
Fetters, sites or areas in which the Office of Hazard Evaluation and Emergency Response has an interest. Has investigated or may investigate under JRS 120D (Proctor CERCLIS sites).  
Date of Government Vendor: 01/12/01  
Date of Last EDR Contact: 09/27/01  
Date of Next Scheduled EDR Contact: 06/23/03  
SNFLF: Permitted Landfills in the State of Illinois  
Source: Department of Health  
Telephone: 800-566-4219  
Solid Waste Facilities in the State. SNFLF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.  
Date of Government Vendor: 05/03/99  
Date of Last EDR Contact: 05/01/03  
Date of Next Scheduled EDR Contact: 05/01/03  
Database Release Frequency: Varies

USTI: Leaking Underground Storage Tank Databases

Source: Department of Health  
Telephone: 800-566-4228  
Leaking Underground Storage Tank Incident Reports. USTI records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.  
Date of Government Vendor: 01/01/03  
Date of Last EDR Contact: 07/11/03  
Date of Next Scheduled EDR Contact: 07/11/03  
Database Release Frequency: Semi-Annually

UST: Underground Storage Tank Databases

Source: Department of Health  
Telephone: 800-566-4228  
Regulated Underground Storage Tanks. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Vendor: 01/01/03  
Date of Last EDR Contact: 02/25/03  
Date of Next Scheduled EDR Contact: 07/11/03  
Database Release Frequency: Semi-Annually

STATE OF ILLINOIS SUPPLEMENTAL RECORDS  
SPRLLS: Release Notifications  
Source: Department of Health  
Telephone: 800-566-4219  
Releases of hazardous substances to the environment reported to the Office of Hazard Evaluation and Emergency Response since 1988.  
Date of Government Vendor: 09/01/00  
Date of Last EDR Contact: 06/23/03  
Date of Next Scheduled EDR Contact: 09/22/03  
Database Release Frequency: Varies

EDR PROPRIETARY HISTORICAL DATABASES

Former Manufacturer Gas (Coal Gas) Sites: The existence and location of Coal Gas Sites is provided exclusively to EDR by Real Property Scan, Inc. (Copyright 1993 Real Property Scan, Inc. For a technical description of the types of releases which may be found at such sites, contact your EDR customer service representative.

The information contained in this report has predominantly been obtained from publicly available sources produced by entities other than Real Property Scan. While reasonable steps have been taken to ensure the accuracy of this report, Real Property Scan does not guarantee the accuracy of the report. Any liability on the part of Real Property Scan is strictly limited to a refund of the amount paid. No claim is made for the actual residence of owners at any site. This report does not constitute a legal opinion.

STATE OF ILLINOIS BROWNFIELD DATABASES RECORDS

BROWNFIELD: Hazard Brownfields Sites  
Source: Office of Planning  
Telephone: 800-566-2423  
Date of Government Vendor: N/A  
Date of Last EDR Contact: N/A  
Database Release Frequency: Varies  
Date of Next Scheduled EDR Contact: N/A

OTTEA DATABASES

Depending on the geographic area covered by the report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area have been identified. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.  
OTTEA Spillcheck: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000 Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.  
Electric Power Transmission Line Data  
Source: Permitting Corporation  
Telephone: (800) 823-8277  
This map includes information copyrighted by Permitting Corporation. The information is provided on a best effort basis and Permitting Corporation does not guarantee its accuracy or warrant its fitness for any particular purpose. Such information has been registered with the permission of Permitting Corporation.

Sensitive Receptors: These are individual deemed sensitive receptors due to their fragile human systems and special sensitivity to environmental changes. These sensitive receptors typically include the sick, the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR includes those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - whose occupants who are sensitive receptors are likely to be located.

RECEIVED AS FOLLOWS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

ALIA Hospitals:

Source: American Hospital Association, Inc.

Telephone: 312-263-5981

The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing

Source: Centers for Medicare & Medicaid Services

Telephone: 410/756-3000

A listing of hospitals with Medicare provider numbers, produced by Centers of Medicare & Medicaid Services.

A listing of agencies within the U.S. Department of Health and Human Services.

Source: National Institutes of Health

Telephone: 201-594-4216

Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools

Source: National Center for Education Statistics

Telephone: 202-522-7700

The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools

Source: National Center for Education Statistics

Telephone: 202-522-7700

The National Center for Education Statistics' primary database on private school locations in the United States.

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

INR: National Hydrologic Inventory. This data, available in select counties across the country, was obtained by EDR in 2001 from the U.S. Fish and Wildlife Service.

STREET AND ADDRESS INFORMATION

© 2000 Geographic Data Technology, Inc., Pat. 07/70022. This product contains proprietary and confidential property of Geographic Data Technology, Inc. Unauthorized use, including copying for other than testing and standard backup procedures, of this product is expressly prohibited.

GEOCHECK® - PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

OHEAHLI HOMESTEADS  
OHEAHLI HOMESTEADS  
KAJUNAVKVA, HI 96748

TARGET PROPERTY COORDINATES

Latitude (North): 21.072928 - 21° 4' 22.5"  
Longitude (West): 156.961689 - 156° 56' 54.1"  
Universal Transverse Mercator: Zone 4  
UTM X (Meters): 709694.2  
UTM Y (Meters): 2331410.0  
Elevation: 34 ft. above sea level

EDR's GeoCheck Physical Setting Source Addendum has been developed to assist the environmental professional with the collection of physical setting source information in accordance with ASTM 1527-00. Section 7.2.3, Section 7.2.3 requires that a current USGS 7.5 Minute Topographic Map (or equivalent, such as the USGS Digital Elevation Model) be reviewed. It also requires that one or more additional physical setting sources be sought when (1) conditions have been identified in which hazardous substances or petroleum products are likely to migrate to or from the property, and (2) more information than is provided by the current USGS 7.5 Minute Topographic Map (or equivalent) is generally obtained, pursuant to local good commercial or customary practice, to assist in the collection of physical setting source information to determine if a physical setting source is present. Such additional physical setting source information about the topographic, hydrologic, hydrogeologic, hydrogeologic, and geologic characteristics of a site, and wells in the area.

Assessment of the impact of contaminant migration generally has two principle investigative components:

- 1. Groundwater flow direction, and
- 2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata. EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

RECEIVED AS FOLLOWS

**GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY**

**GROUNDWATER FLOW DIRECTION INFORMATION**

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

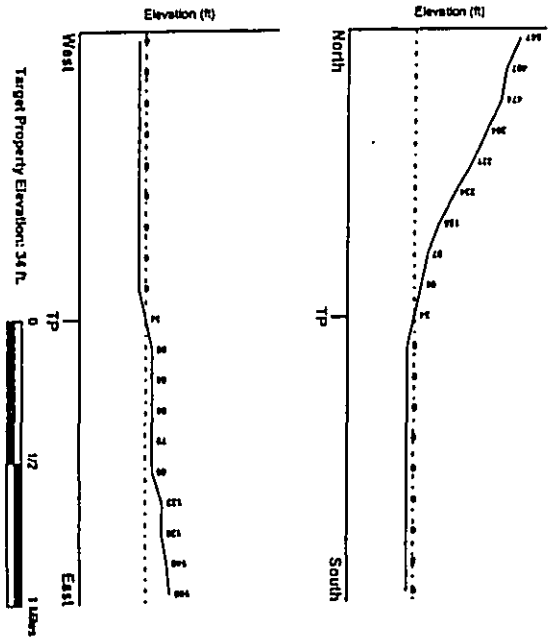
**TOPOGRAPHIC INFORMATION**

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or should contamination exist on the target property, what downgradient sites might be impacted.

**TARGET PROPERTY TOPOGRAPHY**

USGS Topographic Map: 2421156-A8 KAUUNUKAUA, HI  
 General Topographic Contour: General SSW  
 Source: USGS 7.5 min quad index

**SURROUNDING TOPOGRAPHY: ELEVATION PROFILES**



Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

**GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY**

**HYDROLOGIC INFORMATION**

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map (following this summary) for hydrologic information (major waterways and bodies of water).

**FEMA FLOOD ZONE**

Target Property County: KAUAI, HI  
 FEMA Flood Electronic Data: YES - refer to the Overview Map and Detail Map

Flood Plain Panel at Target Property: 1500030085C

Additional Panels in search area: Not Reported

**NATIONAL WETLAND INVENTORY**

MMI Data at Target Property: MM1 Electronic Data Coverage  
 YES - refer to the Overview Map and Detail Map

**HYDROGEOLOGIC INFORMATION**

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

**AQUIFLOW®**

Search Radius: 1,000 Meters

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION	GENERAL DIRECTION
<u>Not Reported</u>	<u>ZROI TP</u>	<u>GROUNDWATER FLOW</u>



RECEIVED AS FOLLOWS

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

**GROUNDWATER FLOW VELOCITY INFORMATION**  
 Groundwater flow velocity information for a contaminant is best determined by a qualified environmental professional using site specific geologic and soil survey data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information. Including geologic soil hydrology, rock stratigraphic unit and soil characteristics data collected on nearby projects and regional well information. In general, contaminants pass more more quickly through sandy-gravelly types of soils than clay-silty types of soils.

**GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY**  
 Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

**ROCK STRATIGRAPHIC UNIT**  
 GEOLOGIC AGE IDENTIFICATION  
 Category: -  
 E.R. System: -  
 Series: -  
 Code: N/A (Decoded above as Era, System & Series)

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schuben, R.E. Arndt and W.J. Bewick, Geology of the Continental U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.H. Bahman Map, USGS Digital Data Series DDS - 11 (1994).

**DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY**

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map is a representation of soil patterns for a geographic area. Soil maps for STA1500 are compiled by generally more detailed (SSURGO) soil survey maps. This following information is based on Soil Conservation Service STA1500 data.

No soil data reported.

**WELL SEARCH DISTANCE INFORMATION**

DATABASE	SEARCH DISTANCE (feet)
Federal USGS	1,000
Federal FROD PWS	Nearest PWS within 1 mile
State Database	1,000

**FEDERAL USGS WELL INFORMATION**

MAP ID	WELL ID	LOCATION FROM TP
A2	USGS02Z724	0 - 1/8 Mile North
B4	USGS02Z731	1/4 - 1/2 Mile ESE
5	USGS02Z720	1/4 - 1/2 Mile SE
C6	USGS02Z725	1/4 - 1/2 Mile NW
D9	USGS02Z726	1/2 - 1 Mile WNW
E10	USGS02Z739	1/2 - 1 Mile East
F12	USGS02Z780	1/2 - 1 Mile WNW

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

**FEDERAL USGS WELL INFORMATION**

MAP ID	WELL ID	LOCATION FROM TP
F1	USGS02Z725	1/2 - 1 Mile WNW

**FEDERAL FROD PUBLIC WATER SUPPLY SYSTEM INFORMATION**

MAP ID	WELL ID	LOCATION FROM TP
No PWS System Found		

Note: PWS System location is not always the same as well location.

**STATE DATABASE WELL INFORMATION**

MAP ID	WELL ID	LOCATION FROM TP
A1	40458-005	0 - 1/8 Mile North
B3	40458-001	1/4 - 1/2 Mile ESE
C7	40458-004	1/4 - 1/2 Mile NW
D4	40458-002	1/2 - 1 Mile WNW
E11	40458-003	1/2 - 1 Mile East
F13	40458-003	1/2 - 1 Mile WNW





RECEIVED AS FOLLOWS

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Well Name	Well No.	Well Code	Well Status	Well Depth	Well Use	Well Construction	Well Location	Well Date	Well Source	Well Contamination
Well Name	40499-004	40499-004	Not Reported							
Well No.	Not Reported	0459-04	Not Reported							
Well Code	Not Reported	Not Reported	Not Reported							
Well Status	Not Reported	Not Reported	Not Reported							
Well Depth	210450	Not Reported	Not Reported							
Well Use	Not Reported	Not Reported	Not Reported							
Well Construction	Not Reported	Not Reported	Not Reported							
Well Location	Not Reported	Not Reported	Not Reported							
Well Date	Not Reported	Not Reported	Not Reported							
Well Source	Not Reported	Not Reported	Not Reported							
Well Contamination	Not Reported	Not Reported	Not Reported							

HWELLS 44459-002

Well Name	Well No.	Well Code	Well Status	Well Depth	Well Use	Well Construction	Well Location	Well Date	Well Source	Well Contamination
Well Name	40459-002	40459-002	Not Reported							
Well No.	Not Reported	0459-02	Not Reported							
Well Code	Not Reported	Not Reported	Not Reported							
Well Status	Not Reported	Not Reported	Not Reported							
Well Depth	Not Reported	Not Reported	Not Reported							
Well Use	Not Reported	Not Reported	Not Reported							
Well Construction	Not Reported	Not Reported	Not Reported							
Well Location	Not Reported	Not Reported	Not Reported							
Well Date	Not Reported	Not Reported	Not Reported							
Well Source	Not Reported	Not Reported	Not Reported							
Well Contamination	Not Reported	Not Reported	Not Reported							

TC101289148 Page A-10

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Well Name	Well No.	Well Code	Well Status	Well Depth	Well Use	Well Construction	Well Location	Well Date	Well Source	Well Contamination
Well Name	40459-017B	40459-017B	Not Reported							
Well No.	Not Reported	0459-017B	Not Reported							
Well Code	Not Reported	Not Reported	Not Reported							
Well Status	Not Reported	Not Reported	Not Reported							
Well Depth	Not Reported	Not Reported	Not Reported							
Well Use	Not Reported	Not Reported	Not Reported							
Well Construction	Not Reported	Not Reported	Not Reported							
Well Location	Not Reported	Not Reported	Not Reported							
Well Date	Not Reported	Not Reported	Not Reported							
Well Source	Not Reported	Not Reported	Not Reported							
Well Contamination	Not Reported	Not Reported	Not Reported							

FED USGS USG5027238

Well Name	Well No.	Well Code	Well Status	Well Depth	Well Use	Well Construction	Well Location	Well Date	Well Source	Well Contamination
Well Name	40459-017B	40459-017B	Not Reported							
Well No.	Not Reported	0459-017B	Not Reported							
Well Code	Not Reported	Not Reported	Not Reported							
Well Status	Not Reported	Not Reported	Not Reported							
Well Depth	Not Reported	Not Reported	Not Reported							
Well Use	Not Reported	Not Reported	Not Reported							
Well Construction	Not Reported	Not Reported	Not Reported							
Well Location	Not Reported	Not Reported	Not Reported							
Well Date	Not Reported	Not Reported	Not Reported							
Well Source	Not Reported	Not Reported	Not Reported							
Well Contamination	Not Reported	Not Reported	Not Reported							

FED USGS USG50272319

Well Name	Well No.	Well Code	Well Status	Well Depth	Well Use	Well Construction	Well Location	Well Date	Well Source	Well Contamination
Well Name	40459-017B	40459-017B	Not Reported							
Well No.	Not Reported	0459-017B	Not Reported							
Well Code	Not Reported	Not Reported	Not Reported							
Well Status	Not Reported	Not Reported	Not Reported							
Well Depth	Not Reported	Not Reported	Not Reported							
Well Use	Not Reported	Not Reported	Not Reported							
Well Construction	Not Reported	Not Reported	Not Reported							
Well Location	Not Reported	Not Reported	Not Reported							
Well Date	Not Reported	Not Reported	Not Reported							
Well Source	Not Reported	Not Reported	Not Reported							
Well Contamination	Not Reported	Not Reported	Not Reported							

TC101289148 Page A-11

RECEIVED AS FOLLOWS

GEOCHECK - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID	Direction	Distance	Elevation	Database	EDR ID Number
411	East	172 - 1 Mile	Higher	H8 WELLS	40458-003
4-0458-003	Well Name:	Madison	Well Code:	4	0458-03
	Well name:	Kamela Th	Well no.:	Not Reported	Not Reported
	Y offset:	03	D well:	MOLOKAI BAYCH	210428
	Quadr. map:	1565222	Label:	Y	7
	Longitude:	N	UTM:	Kamela Pch	8
	Opp:	6-7H	Overlapper:	ROT	9
	Def number:	Not Reported	Well type:	7	Not Reported
	Type:	Rotary Drive	Casting dia:	Other	12
	Ground Elev:	Not Reported	Well depth:	Not Reported	Not Reported
	Solid casing Depth:	Not Reported	Purf casing Depth:	Not Reported	Not Reported
	Use:	OTH	Well Desc:	Other	12
	Use year:	82	Water Top Elev:	Not Reported	Not Reported
	Chloride value:	Not Reported	Test date:	Not Reported	Not Reported
	Purging Test rate:	Not Reported	Drop in water Lvl	Not Reported	Not Reported
	Chloride Test:	Not Reported	Temperature:	Not Reported	Not Reported
	Annul Date:	Not Reported	Pump Capacity:	Not Reported	Not Reported
	Annual Disch:	Not Reported	Static Water Lvl	Not Reported	Not Reported
	Geology:	Not Reported	Geology Desc:	Not Reported	Not Reported
	Bedrock:	Not Reported	Annul Desc:	Not Reported	Not Reported
	Water character:	Not Reported	Material:	Not Reported	Not Reported
	Iron character:	Not Reported	Min Cl year:	Not Reported	Not Reported
	Red. soil depth:	1	Min Cl year:	Not Reported	Not Reported
	Bot. soil depth:	Not Reported	Well depth:	Not Reported	Not Reported
	Pump Capacity:	Not Reported	Drill Inpnt:	Not Reported	Not Reported
	1st map hgt:	5-4-003 028	Agiler code:	4D02	Not Reported
	Lake at head mt:	0	Cur head mt:	Not Reported	Not Reported
	Current Cl mt:	Not Reported	Consl Desc:	Not Reported	Not Reported
	Pump hnd. Desc:	Not Reported	Summer:	Not Reported	Not Reported
	Turbidity:	Not Reported	Pump hnda elev:	Not Reported	Not Reported
	Pump depth:	0			

Agency:	Site Name:	SMS ID:	Agency:	Site Name:	SMS ID:
USGS	40458-03 15	210458155594901	USGS	40458-01	210458156595501
	2107987			2107878	
	-154 894 13			-154 895 8	
	NAD83			NAD83	
	State:			State:	
	Hawaii			Hawaii	
	County:			County:	
	Honolulu			Honolulu	
	Address:			Address:	
	20050000			20050000	
	Hydrologic code:			Hydrologic code:	
	Topographic			Topographic	
	Site Type:			Site Type:	
	Ground water other than Spring			Ground water other than Spring	
	Well Code:			Well Code:	
	Not Reported			Not Reported	
	Well Type:			Well Type:	
	Single well, other than collector or Recovery Type			Single well, other than collector or Recovery Type	
	Well ID:			Well ID:	
	Not Reported			Not Reported	
	Primary Aquifer:			Primary Aquifer:	
	Not Reported			Not Reported	
	Agiler type:			Agiler type:	
	Not Reported			Not Reported	
	Water depth:	13.4		Water depth:	Not Reported
	Source:	Not Reported		Source:	Not Reported
	Project no:	Not Reported		Project no:	Not Reported

GEOCHECK - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID	Direction	Distance	Elevation	Database	EDR ID Number
411	East	172 - 1 Mile	Higher	H8 WELLS	40458-003
4-0459-003	Well Name:	Madison	Well Code:	4	0459-03
	Well name:	Makaha Th	Well no.:	Not Reported	Not Reported
	Y offset:	03	D well:	Not Reported	Not Reported
	Quadr. map:	1565949	Label:	Y	7
	Longitude:	N	UTM:	State DM	72
	Opp:	6-7H	Overlapper:	DMO	77
	Def number:	Not Reported	Well type:	13	Not Reported
	Type:	Rotary Drive	Casting dia:	Unsed	Not Reported
	Ground Elev:	Not Reported	Well depth:	Not Reported	Not Reported
	Solid casing Depth:	Not Reported	Purf casing Depth:	Not Reported	Not Reported
	Use:	OTH	Well Desc:	Unsed	Not Reported
	Use year:	82	Water Top Elev:	Not Reported	Not Reported
	Chloride value:	Not Reported	Test date:	Not Reported	Not Reported
	Purging Test rate:	Not Reported	Drop in water Lvl	Not Reported	Not Reported
	Chloride Test:	Not Reported	Temperature:	Not Reported	Not Reported
	Annul Date:	Not Reported	Pump Capacity:	Not Reported	Not Reported
	Annual Disch:	Not Reported	Static Water Lvl	Not Reported	Not Reported
	Geology:	Not Reported	Geology Desc:	Volcanic non-calcareous sediments	Not Reported
	Bedrock:	Not Reported	Last measured:	Not Reported	Not Reported
	Water character:	Not Reported	Min Cl year:	Not Reported	Not Reported
	Iron character:	Not Reported	Min Cl year:	Not Reported	Not Reported
	Red. soil depth:	1	Well depth:	Not Reported	Not Reported
	Bot. soil depth:	Not Reported	Drill Inpnt:	Not Reported	Not Reported
	Pump Capacity:	Not Reported	Agiler code:	4D03	Not Reported
	1st map hgt:	5-4-003 031	Cur head mt:	Not Reported	Not Reported
	Lake at head mt:	0	Consl Desc:	Not Reported	Not Reported
	Current Cl mt:	Not Reported	Summer:	Not Reported	Not Reported
	Pump hnd. Desc:	Not Reported	Pump hnda elev:	Not Reported	Not Reported
	Turbidity:	Not Reported			
	Pump depth:	0			

Agency:	Site Name:	SMS ID:	Agency:	Site Name:	SMS ID:
USGS	40458-01	210458156595501	USGS	40458-01	210458156595501
	2107878			2107878	
	-154 895 8			-154 895 8	
	NAD83			NAD83	
	State:			State:	
	Hawaii			Hawaii	
	County:			County:	
	Honolulu			Honolulu	
	Address:			Address:	
	10100			10100	
	Hydrologic code:			Hydrologic code:	
	Topographic			Topographic	
	Site Type:			Site Type:	
	Ground water other than Spring			Ground water other than Spring	
	Well Code:			Well Code:	
	Not Reported			Not Reported	
	Well Type:			Well Type:	
	Single well, other than collector or Recovery Type			Single well, other than collector or Recovery Type	
	Well ID:			Well ID:	
	Not Reported			Not Reported	
	Primary Aquifer:			Primary Aquifer:	
	Not Reported			Not Reported	
	Agiler type:			Agiler type:	
	Not Reported			Not Reported	
	Water depth:	Not Reported		Water depth:	Not Reported
	Source:	Not Reported		Source:	Not Reported
	Project no:	Not Reported		Project no:	Not Reported

RECEIVED AS FOLLOWS

**GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS  
RADON**

**AREA RADON INFORMATION**

Federal EPA Radon Zone for Maui County: 1  
 Note: Zone 1 has an average level > 4 pCi/L.  
 : Zone 2 has an average level > 2 pCi/L and <= 4 pCi/L.  
 : Zone 3 has an average level < 2 pCi/L.

Area	Average Activity	% < 4 pCi/L	% 4-20 pCi/L	% > 20 pCi/L
Living Area - 1st Floor	0-200 pCi/L	100% Not Reported	0% Not Reported	0% Not Reported
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	Not Reported	Not Reported	Not Reported	Not Reported

Federal Area Radon Information for Zip Code: 96718  
 Number of sites tested: 2

**PHYSICAL SETTING SOURCE RECORDS SEARCHED**

**TOPOGRAPHIC INFORMATION**

USGS 7.5' Digital Elevation Model (DEM)  
 Source: United States Geologic Survey  
 EDR acquired the USGS 7.5' Digital Elevation Model in 2002. 7.5 Minute DEMs correspond to the USGS  
 121,000- and 125,000-scale topographic quadrangle maps.

**HYDROLOGIC INFORMATION**

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1998 from the Federal  
 Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.  
 Note: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR  
 in 2002 from the U.S. Fish and Wildlife Service.

**HYDROGEOLOGIC INFORMATION**

AQUIFLOW® Information System  
 Source: EDR proprietary database of groundwater flow information.  
 EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater  
 flow at specific points. EDR has reviewed reports submitted by regulatory authorities at select sites and has  
 extracted the data of the report, hydrologically delineated groundwater flow direction and depth to water table  
 information.

**GEOLOGIC INFORMATION**

Geologic Age and Rock Stratigraphic Unit  
 Source: P.G. Schudson, R.E. Arnd and W.J. Basile, Geology of the Conterminous U.S. at 1:250,000 Scale - A digital  
 representation of the 1974 P.L. King and H.M. Bakken Maps, USGS Digital Data Series DDS-111(1994).

**STATSOIL: State Soil Geographic Database**

Source: Department of Agriculture, Natural Resources Conservation Service  
 The U.S. Department of Agriculture (USDA) Soil Conservation Service (SCS) leads the national Cooperative  
 Soil Survey (NCS) and is responsible for conducting, storing, and disseminating soil survey  
 information for privately owned lands in the United States. A soil map is a representation of  
 soil patterns in a landscape. Soil maps for STATSOIL are compiled by generalizing more detailed (SURFAC) soil  
 survey maps.

**ADDITIONAL ENVIRONMENTAL RECORD SOURCES**

**FEDERAL WATER WELLS**

PWS: Public Water System  
 Source: EPA/Office of Drinking Water  
 Telephone: 202-564-5120  
 Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at  
 least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

**PWS EW: Public Water System Violation and Enforcement Data**

Source: EPA/Office of Drinking Water  
 Telephone: 202-564-5120  
 Violation and Enforcement data for Public Water Systems from the State Drinking Water Information System (SDWIS) after  
 August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

**USGS Water Wells: USGS National Water Inventory System (NWIS)**

This database contains descriptive information on wells, springs, and other sources of groundwater,  
 water under groundcover. The groundwater data includes information on wells, springs, and other sources of groundwater.

RECEIVED AS FOLLOWS

PHYSICAL SETTING SOURCE RECORDS SEARCHED

STATE RECORDS

Ground Water Wells  
Source: Department of Land and Natural Resources  
Telephone: 806-587-0212

RADON

Area Radon Information

Source: USGS  
Telephone: 703-306-4070  
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones

Source: EPA  
Telephone: 703-306-4070  
Sections 207 & 209 of RCRA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

OTHER

Airport Landing Facilities: Private and public use landing facilities

Source: Federal Aviation Administration, 800-437-6635

Expansions: World earthquake epicenters, Richter 5 or greater

Source: Department of Commerce, National Oceanic and Atmospheric Administration

RECEIVED AS FOLLOWS

The EDR Radius Map  
with GeoCheck®

Wahikuli  
Wahikuli  
Lahaina, HI 96761

Inquiry Number: 1012891.55

July 17, 2003

**EDR** Environmental  
Data Resources, Inc.

The Source  
For Environmental  
Risk Management  
Data

3530 Post Road  
Southport, Connecticut 06890  
Nationwide Customer Service  
Telephone: 1-800-352-0050  
Fax: 1-800-231-6802  
Internet: [www.edrnet.com](http://www.edrnet.com)

TABLE OF CONTENTS

SECTION	PAGE
Executive Summary.....	ES-1
Overview Map.....	2
Detail Map.....	3
Map Findings Summary.....	4
Map Findings.....	5
Orphan Summary.....	6
Government Records Searched/Data Currency Tracking.....	GR-1
<b>GEOCHECK ADDENDUM</b>	
Physical Setting Source Addendum.....	A-1
Physical Setting Source Summary.....	A-2
Physical Setting Source Map.....	A-7
Physical Setting Source Map Findings.....	A-8
Physical Setting Source Records Searched.....	A-11

Thank you for your business.  
Please contact EDR at 1-800-352-0050  
with any questions or comments.

**Disclaimer**  
Copyright and Trademark Notice  
This report contains information obtained from a variety of public and other sources. NO WARRANTY EXPRESSED OR IMPLIED IS MADE WHATSOEVER IN CONNECTION WITH THIS REPORT. ENVIRONMENTAL DATA RESOURCES INC. SPECIFICALLY DISCLAIMS THE WARRANTY OF ANY SOURCE WHATSOEVER, INCLUDING WITHOUT LIMITATION, ANY GOVERNMENTAL AGENCY, LIABILITY OR FORECAST, FOR A PARTICULAR USE OR PURPOSE. ALL RISK IS ASSUMED BY THE USER. IN NO EVENT SHALL EDR BE LIABLE TO ANYONE, WHETHER ARISING OUT OF NEGLIGENCE, NEGLIGENCE, ACCIDENT OR ANY OTHER CAUSE, FOR ANY LOSS OR DAMAGE, INCLUDING, WITHOUT LIMITATION, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR EXEMPLARY DAMAGES. EDR and the red logo are trademarks of Environmental Data Resources, Inc. or its affiliates. All other trademarks used herein are the property of their respective owners.



RECEIVED AS FOLLOWS

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc. (EDR). The report meets the government records search requirements of ASTM Standard Practice for Environmental Site Assessment, E 1527-00. Search distances are per ASTM Standard or custom distances requested by the user.

TARGET PROPERTY INFORMATION

ADDRESS

WARHOLE  
LAWANNA, IA 50781

COORDINATES

Latitude (North): 20 50'01.19" - 20' 54' 0.4"  
Longitude (West): 156 58'43.10" - 156' 41' 3.5"  
Universal Transverse Mercator Zone 4  
UTM X (Meters): 740878.5  
UTM Y (Meters): 2312684.2  
Elevation: 21 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property: N/A  
Source: USGS 7.5 min quad index

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available (reasonably ascertainable) government records either on the target property or within the ASTM E 1527-00 search radius around the target property for the following databases:

- FEDERAL ASTM STANDARD
  - NPL..... National Priority List
  - Proposed NPL..... Proposed National Priority List Sites
  - CERCLIS..... Comprehensive Environmental Response, Compensation, and Liability Information System
  - CERCLA/NPLAP..... CERCLIS No Further Remedial Action Planned
  - CONRACTS..... Corrective Action Report
  - RCRA/FSI..... Resource Conservation and Recovery Information System
  - RCRA/SLD..... Resource Conservation and Recovery Information System
  - RCRA/SOD..... Resource Conservation and Recovery Information System
  - ERNA..... Emergency Response Notification System
- STATE ASTM STANDARD
  - SIWML..... State List

EXECUTIVE SUMMARY

SIWML..... Permitted Landfills in the State of Iowa  
LIST..... Leaking Underground Storage Tank Database  
UST..... Underground Storage Tank Database

FEDERAL ASTM SUPPLEMENTAL

- CONSENT..... Superfund (CERCLA) Consent Decree
- ROD..... Records Of Decision
- Delisted NPL..... National Priority List Deletions
- PHMS..... Facility Index System/Facility Identification Initiative Program Summary Report
- HAZOP..... Hazardous Materials Information Reporting System
- HAZUS..... Hazardous Unsubstance Tracking System
- NPL List..... Superfund List
- PAQS..... Corrective Action System
- POD..... Department of Defense Sites
- RAA/TE..... RCRA Administrative Site Tracking System
- TRIS..... Toxic Chemical Release Inventory System
- TSCA..... Toxic Substances Control Act
- ASTR..... Section 7 Tracking System
- FTTR..... FERRA TSCA Treaty System - FERRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

STATE OR LOCAL ASTM SUPPLEMENTAL  
SPILL..... Release Notifications

EDR PROPRIETARY HISTORICAL DATABASES

Coal Gas..... Former Manufactured Gas (Coal Gas) Sites

ERRONEOUSLY SITES: SEARCH RESULTS

Surrounding sites were not identified.  
Urnepopple (orphan) sites are not considered in the foregoing analysis.

RECEIVED AS FOLLOWS

**EXECUTIVE SUMMARY**

Due to poor or inadequate address information, the following sites were not mapped:

Site Name	Databases(s)
LAAHUA WASTE WATER PLANT STATION #4	SHWS, SWFAE
KAAIAPAPA LANDFILL	SHWS, SWFAE
BEN FRANKLIN STORES PROPERTY	SHWS, SWFAE
LAHUA LANDFILL (LF-0026-88)	SHWS, SWFAE
HAWAIIAN COMMERCIAL & SUPPLY CO.	SHWS, SWFAE
KAKAWAIIA LANDFILL	SHWS, SWFAE
KALIUKOIA LANDFILL	SHWS, SWFAE
MAYRAKOA LANDFILL	SHWS, SWFAE
MOKOAI LANDFILL (HAWAII LF-0030)	SHWS, SWFAE
CENTRAL MAUI LF, PHASE III LF-0034	SHWS, SWFAE
MAALEA CDD LF	SHWS, SWFAE
CENTRAL MAUI LF, PHASE IV	SHWS, SWFAE
PERLUTION HAWAIIAN HELICOPTERS HELIPORT	SHWS, SWFAE
LAAHUA SPS #2 (HONOKAULAN)	USDT, USI
MAIHI #4 P.S. (MAEA POINT)	USDT, USI
MAIHI #3 P.S. (MAEA POINT)	USDT, USI
MAIHI #2 P.S. (MAEA POINT)	USDT, USI
MAIHI #1 P.S. (HONOKOONA)	USDT, USI
LAAHUA SPS #1 (HONOKOONA)	USDT, USI
MAIHI CENTRAL OFFICE	USDT, USI
MAIHI FERRIS/LE CO HONOKAULA DIV	USDT, USI
	RICHES SQ. FINDS

**OVERVIEW MAP - 1012891.58 - Parsons Brinckerhoff**

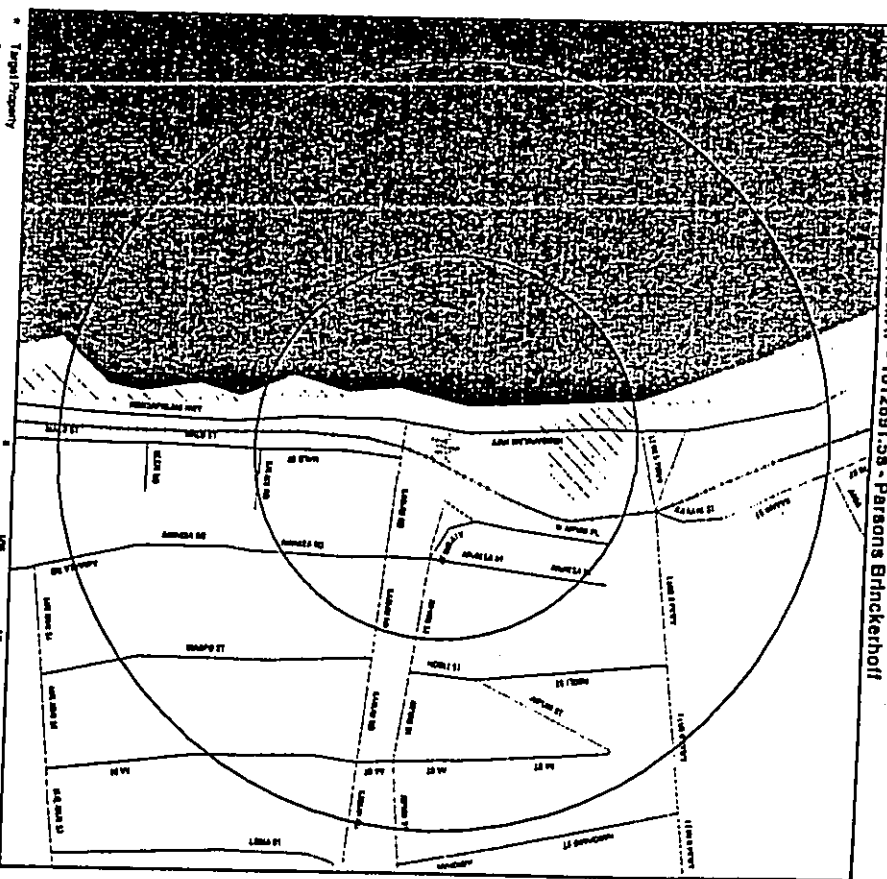


<b>TARGET PROPERTY:</b>	Waipahoehoe	<b>CUSTOMER:</b>	Parsons Brinckerhoff
<b>ADDRESS:</b>	Waipahoehoe	<b>CONTACT:</b>	Nancy Orlando
<b>CITY/STATE/ZIP:</b>	Lanahan HI 96761	<b>PROJECT #:</b>	1012891.58
<b>LAUO/COC:</b>	20 8001 / 156 8043	<b>DATE:</b>	JULY 17, 2003 4:14 pm

Copyright © 2003 USGS, Inc. or 2003 ESRI, Inc. All Rights Reserved. This document is a proprietary document.

RECEIVED AS FOLLOWS

DETAIL MAP - 1012891.5s - Parsons Brinckerhoff



- 1. Target Property
- 2. Sites at elevations higher than or equal to the target property
- 3. Sites at elevations lower than the target property
- 4. Coal Gasification Sites
- 5. Sanitary Receptions
- 6. National Priority List Sites
- 7. Landfill Sites
- 8. Dept. Defense Sites

TARGET PROPERTY: Wabash  
 ADDRESS: Wabash  
 CITY/STATE/ZIP: Lumbia IN 46761  
 LUMORR: 20 5001 / 156 6843

CUSTOMER: Parsons Brinckerhoff  
 CONTACT: Matt Orsino  
 COUNTY: 1012891.5s  
 DATE: July 17, 2003 4:14 pm

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Picked
<b>FEDERAL ASTM STANDARD</b>								
NPL	Proposed NPL	1,000	0	0	0	0	0	0
	CERCLIS	1,000	0	0	0	0	0	0
	CERCLIS-RAIP	0,500	0	0	0	0	0	0
	CONRACTS	1,250	0	0	0	0	0	0
	RICHIS-TSD	0,500	0	0	0	0	0	0
	RICHIS 1st Qum, Gen.	0,250	0	0	0	0	0	0
	RICHIS 5th Qum, Gen.	0,250	0	0	0	0	0	0
	ENHS	TP	NR	NR	NR	NR	NR	NR
<b>STATE ASTM STANDARD</b>								
<b>SHWIS</b>								
	Rural Landuse	1,000	0	0	0	0	0	0
	LUST	0,500	0	0	0	0	0	0
	UST	0,250	0	0	0	0	0	0
<b>FEDERAL ASTM SUPPLEMENTAL</b>								
<b>CONSENT</b>								
	RFD	1,000	0	0	0	0	0	0
	Decided NPL	1,000	0	0	0	0	0	0
	FINDS	TP	NR	NR	NR	NR	NR	NR
	HARDS	TP	NR	NR	NR	NR	NR	NR
	MLTS	TP	NR	NR	NR	NR	NR	NR
	MINES	0,250	0	0	0	0	0	0
	NPL Sites	TP	NR	NR	NR	NR	NR	NR
	PALIS	TP	NR	NR	NR	NR	NR	NR
	DOCS	1,000	0	0	0	0	0	0
	PLATS	TP	NR	NR	NR	NR	NR	NR
	TRIS	TP	NR	NR	NR	NR	NR	NR
	TSCA	TP	NR	NR	NR	NR	NR	NR
	SSIS	TP	NR	NR	NR	NR	NR	NR
	FTS	TP	NR	NR	NR	NR	NR	NR
<b>STATE OR LOCAL ASTM SUPPLEMENTAL</b>								
<b>SPILLS</b>								
	TP	NR	NR	NR	NR	NR	NR	NR
<b>EDR PROPRIETARY HISTORICAL DATABASES</b>								
	Coal Gas	1,000	0	0	0	0	0	0

NOTES:  
 ACQUISITION - see EDR Physical Siting Source Addendum  
 TP = Target Property  
 NR = Not Requested at this Search Distance  
 Sites may be listed in more than one database



RECEIVED AS FOLLOWS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To establish currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.  
Elapsed ASTM days: Provides confirmation that the EDR report needs or exceeds the 90-day updating requirement of the ASTM standard.

FEDERAL ASTM STANDARD RECORDS

NPL: National Priority List

Source: EPA

National Priority List (Superfund): The NPL is a subset of CERCLIS and includes over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may receive priority large area As such, EDR provides polygon coverage for over 1,200 NPL sites boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Vendor: 04/20/03  
Date Made Active at EDR: 06/02/03  
Elapsed ASTM days: 28  
Database Release Frequency: Semi-Annually  
Date of Last EDR Contact: 06/09/03

NPL Site Boundaries  
Source: EPA  
EPA's Environmental Photographic Interpretation Center (EPIC)  
Telephone: 202-564-7233

EPA Region 1  
Telephone: 617-418-1143  
EPA Region 3  
Telephone: 215-814-5418  
EPA Region 4  
Telephone: 404-582-8033

EPA Region 8  
Telephone: 214-655-6659  
EPA Region 9  
Telephone: 202-313-8774

Proposed NPL: Proposed National Priority List Sites  
Source: EPA  
Telephone: N/A

Date of Government Vendor: 04/20/03  
Date Made Active at EDR: 06/02/03  
Elapsed ASTM days: 28  
Database Release Frequency: Semi-Annually  
Date of Last EDR Contact: 06/09/03

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System  
Source: EPA  
Telephone: 703-413-0223

CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 102 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priority List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Vendor: 02/19/03  
Date Made Active at EDR: 04/08/03  
Elapsed ASTM days: 15  
Database Release Frequency: Quarterly  
Date of Last EDR Contact: 06/23/03

CERCLIS/HRAP: CERCLIS No Further Remedial Action Planned  
Source: EPA  
Telephone: 703-413-0223

As of February 1993, CERCLIS sites designated "No Further Remedial Action Planned" (NFRAP) have been removed from CERCLIS. NFRAP sites may be sites where, following an initial investigation, no contamination was found, contamination was removed quickly without the need for the site to be placed on the NPL, or the contamination was not serious enough to require Federal Superfund action or NPL consideration. EPA has received approximately 25,000 NFRAP sites to be the unattended liabilities to the redevelopment of rural properties and has archived these as historical records so EPA does not needlessly impact the investigations in the future. The policy change is part of the EPA's Brownfields Redevelopment Program to help clean, reuse, private investors and selected districts to promote economic redevelopment of urban areas.

Date of Data Arrival at EDR: 02/27/03  
Elapsed ASTM days: 28  
Date of Last EDR Contact: 06/09/03

Date of Data Arrival at EDR: 02/27/03  
Elapsed ASTM days: 15  
Date of Last EDR Contact: 06/23/03

Date of Data Arrival at EDR: 02/27/03  
Elapsed ASTM days: 15  
Date of Last EDR Contact: 06/23/03

Date of Data Arrival at EDR: 02/27/03  
Elapsed ASTM days: 15  
Date of Last EDR Contact: 06/23/03

Date of Data Arrival at EDR: 02/27/03  
Elapsed ASTM days: 15  
Date of Last EDR Contact: 06/23/03

Date of Data Arrival at EDR: 02/27/03  
Elapsed ASTM days: 15  
Date of Last EDR Contact: 06/23/03

Date of Data Arrival at EDR: 02/27/03  
Elapsed ASTM days: 15  
Date of Last EDR Contact: 06/23/03

Date of Data Arrival at EDR: 02/27/03  
Elapsed ASTM days: 15  
Date of Last EDR Contact: 06/23/03

Date of Data Arrival at EDR: 02/27/03  
Elapsed ASTM days: 15  
Date of Last EDR Contact: 06/23/03

Date of Data Arrival at EDR: 02/27/03  
Elapsed ASTM days: 15  
Date of Last EDR Contact: 06/23/03

Date of Data Arrival at EDR: 02/27/03  
Elapsed ASTM days: 15  
Date of Last EDR Contact: 06/23/03

Date of Data Arrival at EDR: 02/27/03  
Elapsed ASTM days: 15  
Date of Last EDR Contact: 06/23/03

Date of Data Arrival at EDR: 02/27/03  
Elapsed ASTM days: 15  
Date of Last EDR Contact: 06/23/03

Date of Data Arrival at EDR: 02/27/03  
Elapsed ASTM days: 15  
Date of Last EDR Contact: 06/23/03

Date of Data Arrival at EDR: 02/27/03  
Elapsed ASTM days: 15  
Date of Last EDR Contact: 06/23/03

Date of Data Arrival at EDR: 02/27/03  
Elapsed ASTM days: 15  
Date of Last EDR Contact: 06/23/03

Date of Data Arrival at EDR: 02/27/03  
Elapsed ASTM days: 15  
Date of Last EDR Contact: 06/23/03

Date of Data Arrival at EDR: 02/27/03  
Elapsed ASTM days: 15  
Date of Last EDR Contact: 06/23/03

Date of Data Arrival at EDR: 02/27/03  
Elapsed ASTM days: 15  
Date of Last EDR Contact: 06/23/03

Date of Government Vendor: 02/19/03  
Date Made Active at EDR: 04/08/03  
Database Release Frequency: Quarterly  
Date of Data Arrival at EDR: 02/27/03  
Elapsed ASTM days: 15  
Date of Last EDR Contact: 06/23/03

CORRECTIVE ACTION REPORT

Source: EPA

CORRECTIVE ACTION REPORT: Identifies hazardous waste numbers with RCRA corrective action activity.

Date of Government Vendor: 02/19/03  
Date Made Active at EDR: 02/06/03  
Elapsed ASTM days: 21  
Database Release Frequency: Semi-Annually  
Date of Last EDR Contact: 06/09/03

RCRA: Resource Conservation and Recovery Information System  
Source: EPA/NTIS  
Telephone: 800-474-8348

Resource Conservation and Recovery Information System (RCRIS) includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA).

Date of Government Vendor: 04/20/03  
Date Made Active at EDR: 07/01/03  
Elapsed ASTM days: 23  
Database Release Frequency: Various  
Date of Data Arrival at EDR: 04/07/03  
Date of Last EDR Contact: 06/26/03

ERNS: Emergency Response Notification System  
Source: National Response Center, United States Coast Guard  
Telephone: 202-260-3242

Emergency Response Notification System (ERNS) records and stores information on reported releases of oil and hazardous substances.

Date of Government Vendor: 12/21/02  
Date Made Active at EDR: 02/02/03  
Elapsed ASTM days: 7  
Database Release Frequency: Annually  
Date of Data Arrival at EDR: 01/27/03  
Date of Last EDR Contact: 04/28/03

Date of Data Arrival at EDR: 01/27/03  
Elapsed ASTM days: 7  
Date of Last EDR Contact: 04/28/03

Date of Data Arrival at EDR: 01/27/03  
Elapsed ASTM days: 7  
Date of Last EDR Contact: 04/28/03

Date of Data Arrival at EDR: 01/27/03  
Elapsed ASTM days: 7  
Date of Last EDR Contact: 04/28/03

Date of Data Arrival at EDR: 01/27/03  
Elapsed ASTM days: 7  
Date of Last EDR Contact: 04/28/03

Date of Data Arrival at EDR: 01/27/03  
Elapsed ASTM days: 7  
Date of Last EDR Contact: 04/28/03

Date of Data Arrival at EDR: 01/27/03  
Elapsed ASTM days: 7  
Date of Last EDR Contact: 04/28/03

Date of Data Arrival at EDR: 01/27/03  
Elapsed ASTM days: 7  
Date of Last EDR Contact: 04/28/03

Date of Data Arrival at EDR: 01/27/03  
Elapsed ASTM days: 7  
Date of Last EDR Contact: 04/28/03

Date of Data Arrival at EDR: 01/27/03  
Elapsed ASTM days: 7  
Date of Last EDR Contact: 04/28/03

Date of Data Arrival at EDR: 01/27/03  
Elapsed ASTM days: 7  
Date of Last EDR Contact: 04/28/03

Date of Data Arrival at EDR: 01/27/03  
Elapsed ASTM days: 7  
Date of Last EDR Contact: 04/28/03

Date of Data Arrival at EDR: 01/27/03  
Elapsed ASTM days: 7  
Date of Last EDR Contact: 04/28/03

Date of Data Arrival at EDR: 01/27/03  
Elapsed ASTM days: 7  
Date of Last EDR Contact: 04/28/03

Date of Data Arrival at EDR: 01/27/03  
Elapsed ASTM days: 7  
Date of Last EDR Contact: 04/28/03

Date of Data Arrival at EDR: 01/27/03  
Elapsed ASTM days: 7  
Date of Last EDR Contact: 04/28/03

Date of Data Arrival at EDR: 01/27/03  
Elapsed ASTM days: 7  
Date of Last EDR Contact: 04/28/03

Date of Data Arrival at EDR: 01/27/03  
Elapsed ASTM days: 7  
Date of Last EDR Contact: 04/28/03

Date of Data Arrival at EDR: 01/27/03  
Elapsed ASTM days: 7  
Date of Last EDR Contact: 04/28/03

Date of Data Arrival at EDR: 01/27/03  
Elapsed ASTM days: 7  
Date of Last EDR Contact: 04/28/03

Date of Data Arrival at EDR: 01/27/03  
Elapsed ASTM days: 7  
Date of Last EDR Contact: 04/28/03

Date of Data Arrival at EDR: 01/27/03  
Elapsed ASTM days: 7  
Date of Last EDR Contact: 04/28/03

Date of Data Arrival at EDR: 01/27/03  
Elapsed ASTM days: 7  
Date of Last EDR Contact: 04/28/03

Date of Data Arrival at EDR: 01/27/03  
Elapsed ASTM days: 7  
Date of Last EDR Contact: 04/28/03

RECEIVED AS FOLLOWS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

**DELETED EPA: National Priority List Database**  
 Date of Government Version: 01/09/03  
 Database Release Frequency: Annually  
 Date of Last EDR Contact: 07/07/03  
 Date of Next Scheduled EDR Contact: 10/08/03

**DELETED EPA: National Priority List Database**  
 Source: EPA  
 Telephone: 202 564-3817  
 The National OR and Hazardous Substances Pollution Contingency Plan (NCP) publishes the report that the EPA uses to delete lists from the NPL. In accordance with 40 CFR 302.623 (b), lists may be deleted from the NPL when no further response is appropriate.  
 Date of Government Version: 04/20/03  
 Database Release Frequency: Quarterly  
 Date of Last EDR Contact: 03/02/03  
 Date of Next Scheduled EDR Contact: 08/04/03

**FR03: Facility Index System Facility Identification Initiative Program Summary Report**  
 Source: EPA  
 Telephone: 202 564-3817  
 The FR03 System, FR03 contains both facility addresses and "posture" to other sources that contain more detailed EDR information. FR03 data is used to generate the Facility Index System, which is a Geographic Information System (GIS) that provides information on the location and posture of facilities. FR03 is used to generate the Facility Index System, which is a Geographic Information System (GIS) that provides information on the location and posture of facilities. FR03 is used to generate the Facility Index System, which is a Geographic Information System (GIS) that provides information on the location and posture of facilities.  
 Date of Government Version: 03/19/03  
 Database Release Frequency: Quarterly  
 Date of Last EDR Contact: 07/22/03  
 Date of Next Scheduled EDR Contact: 10/06/03

**H018: Hazardous Materials Information Reporting System**  
 Source: U.S. Department of Transportation  
 Telephone: 202 366-1111  
 Hazardous Materials Incident Report System, H018's contains hazardous materials spill incidents reported to DOT.  
 Date of Government Version: 01/21/03  
 Database Release Frequency: Annually  
 Date of Last EDR Contact: 04/20/03  
 Date of Next Scheduled EDR Contact: 07/21/03

**MA78: Material Handling Tracking System**  
 Source: Nuclear Regulatory Commission  
 Telephone: 301-415-7188  
 MA78 is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 items which process or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.  
 Date of Government Version: 04/23/03  
 Database Release Frequency: Quarterly  
 Date of Last EDR Contact: 07/02/03  
 Date of Next Scheduled EDR Contact: 10/06/03

**MA95: Airline Incident Index File**  
 Source: Department of Labor, Labor Safety and Health Administration  
 Telephone: 303-231-5558  
 Date of Government Version: 03/11/03  
 Database Release Frequency: Semi-Annually  
 Date of Last EDR Contact: 08/29/03  
 Date of Next Scheduled EDR Contact: 09/29/03

**MP1: UEMS: Federal Superfund Sites**  
 Source: EPA  
 Telephone: 202-564-4317  
 Federal Superfund Sites Under the authority granted by USEPA by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, the USEPA has the authority to add new superfund sites to the list of sites. USEPA updates the list of sites on a quarterly basis. The USEPA also updates the list of sites on a quarterly basis. The USEPA also updates the list of sites on a quarterly basis.  
 Date of Government Version: 04/15/03  
 Database Release Frequency: Quarterly  
 Date of Last EDR Contact: 06/23/03  
 Date of Next Scheduled EDR Contact: 09/22/03

**PA28: PCB Agency Database System**  
 Source: EPA  
 Telephone: 202 564-3817  
 PCB Agency Database System, PA28 provides information on PCBs generated, transported, commercial stores and disposers of PCBs who are required to notify the EPA of such activities.  
 Date of Government Version: 03/26/03  
 Database Release Frequency: Annually  
 Date of Last EDR Contact: 05/12/03  
 Date of Next Scheduled EDR Contact: 08/11/03

**PO0: Department of Defense Sites**  
 Source: USCS  
 Telephone: 703-948-5929  
 This data set consists of land-primarily owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.  
 Date of Government Version: 04/01/03  
 Database Release Frequency: Semi-Annually  
 Date of Last EDR Contact: 05/12/03  
 Date of Next Scheduled EDR Contact: 09/11/03

**RA147E: RCRA Administrative Action Tracking System**  
 Source: EPA  
 Telephone: 202-564-4104  
 RCRA Administrative Action Tracking System, RA147E contains reports based on enforcement actions issued under RCRA. RA147E contains information on RCRA enforcement actions issued under RCRA. RA147E contains information on RCRA enforcement actions issued under RCRA. RA147E contains information on RCRA enforcement actions issued under RCRA.  
 Date of Government Version: 04/17/03  
 Database Release Frequency: No Update Planned  
 Date of Last EDR Contact: 06/09/03  
 Date of Next Scheduled EDR Contact: 09/06/03

**TR03: Toxic Chemical Release Inventory System**  
 Source: EPA  
 Telephone: 202 260-1311  
 Toxic Release Inventory System, TR03 identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under 40 CFR 312 in Section 312.  
 Date of Government Version: 12/11/00  
 Database Release Frequency: Annually  
 Date of Last EDR Contact: 06/27/03  
 Date of Next Scheduled EDR Contact: 09/22/03

**TRCA: Toxic Substances Control Act**  
 Source: EPA  
 Telephone: 202 260-5331  
 Toxic Substances Control Act, TRCA identifies manufacturers and importers of chemical substances included on the TRCA Chemical Substances Inventory list. It includes data on the production volume of these substances by plant.  
 Date of Government Version: 12/01/98  
 Database Release Frequency: Every 4 Years  
 Date of Last EDR Contact: 04/09/03  
 Date of Next Scheduled EDR Contact: 08/06/03

**FTTS INSP: FFRW TRCA Tracking System - FFRW Federal Warehouse, Fungicide, & Pesticide ADYTSCA (Toxic Substances Control Act)**  
 Source: EPA  
 Telephone: 202 564-3201  
 Date of Government Version: 04/15/03  
 Database Release Frequency: Quarterly  
 Date of Last EDR Contact: 06/23/03  
 Date of Next Scheduled EDR Contact: 09/22/03

RECEIVED AS FOLLOWS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

§373: Section 7 Trading Systems

Source: EPA  
Telephone: 202-564-5008  
Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (21 Stat. 1225) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st of each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/1/00  
Database Release Frequency: Annually  
Date of Last EDR Contact: 02/09/03  
Date of Next Scheduled EDR Contact: 07/11/03

§491: FIFRA TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act) TSCA (Toxic Substances Control Act) TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act) Toxics Inventory; EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/15/03  
Database Release Frequency: Quarterly  
Date of Last EDR Contact: 06/23/03  
Date of Next Scheduled EDR Contact: 09/22/03

STATE OF HAWAII ASTM STANDARD RECORDS

§491: State List  
Source: Department of Health  
Telephone: 808-586-4318  
Investigated or may investigate under 1915 (28D Pesticides CERCLAIS Act).

Date of Government Version: 01/12/01  
Date Made Available at EDR: 10/16/01  
Database Release Frequency: Semi-Annually  
Date of Data Arrival at EDR: 09/21/01  
Delayed ASTM Cycle: 22  
Date of Last EDR Contact: 09/23/03

§491: Permitted Landfills in the State of Hawaii  
Source: Department of Health  
Telephone: 808-586-4215  
Solid Waste Facility/Annual Site, SWTAF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive landfills or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 05/03/99  
Date Made Available at EDR: 05/25/99  
Database Release Frequency: Varies  
Date of Data Arrival at EDR: 09/10/99  
Delayed ASTM Cycle: 15  
Date of Last EDR Contact: 09/10/03

§491: Leaking Underground Storage Tank Database  
Source: Department of Health  
Telephone: 808-586-4228  
Leaking Underground Storage Tank Incident Report (LUST) records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 01/01/03  
Date Made Available at EDR: 03/12/03  
Database Release Frequency: Semi-Annually  
Date of Data Arrival at EDR: 02/25/03  
Delayed ASTM Cycle: 15  
Date of Last EDR Contact: 07/11/03

§491: Underground Storage Tank Database  
Source: Department of Health  
Telephone: 808-586-4228  
Registered Underground Storage Tanks (USTs) are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

§491: Release Notifications

Date of Government Version: 01/01/03  
Date Made Available at EDR: 03/06/03  
Database Release Frequency: Semi-Annually  
Date of Last EDR Contact: 07/11/03

§491: Release Notifications  
Source: Department of Health  
Telephone: 808-586-4218  
Releases of hazardous substances to the environment reported to the Office of Hazard Evaluation and Emergency Response since 1988.

Date of Government Version: 09/01/00  
Database Release Frequency: Varies  
Date of Last EDR Contact: 09/23/03  
Date of Next Scheduled EDR Contact: 09/22/03

EDR PROPRIETARY HISTORICAL DATABASES

Former Manufactured Gas (Coal Gas) Sites: The address and location of Coal Gas sites is provided exclusively to EDR by Real Property Scan, Inc. (Copyright 1993 Real Property Scan, Inc. For a technical description of the types of releases which may be found in each state, contact your EDR customer service representative.

§491: Release Notifications  
Source: Department of Health  
Telephone: 808-586-4218  
Releases of hazardous substances to the environment reported to the Office of Hazard Evaluation and Emergency Response since 1988.

Date of Government Version: 09/01/00  
Database Release Frequency: Varies  
Date of Last EDR Contact: 09/23/03  
Date of Next Scheduled EDR Contact: 09/22/03

§491: Release Notifications  
Source: Department of Health  
Telephone: 808-586-4218  
Releases of hazardous substances to the environment reported to the Office of Hazard Evaluation and Emergency Response since 1988.

Date of Government Version: 09/01/00  
Database Release Frequency: Varies  
Date of Last EDR Contact: 09/23/03  
Date of Next Scheduled EDR Contact: 09/22/03

§491: Release Notifications  
Source: Department of Health  
Telephone: 808-586-4218  
Releases of hazardous substances to the environment reported to the Office of Hazard Evaluation and Emergency Response since 1988.

Date of Government Version: 09/01/00  
Database Release Frequency: Varies  
Date of Last EDR Contact: 09/23/03  
Date of Next Scheduled EDR Contact: 09/22/03

§491: Release Notifications  
Source: Department of Health  
Telephone: 808-586-4218  
Releases of hazardous substances to the environment reported to the Office of Hazard Evaluation and Emergency Response since 1988.

Date of Government Version: 09/01/00  
Database Release Frequency: Varies  
Date of Last EDR Contact: 09/23/03  
Date of Next Scheduled EDR Contact: 09/22/03

§491: Release Notifications  
Source: Department of Health  
Telephone: 808-586-4218  
Releases of hazardous substances to the environment reported to the Office of Hazard Evaluation and Emergency Response since 1988.

RECEIVED AS FOLLOWS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

GEOCHECK® - PHYSICAL SETTING SOURCE ADDENDUM

**ADH Hospital:**  
 Source: American Hospital Association, Inc.  
 Telephone: 312-260-5901  
 The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.  
**National Center for Education Statistics (NCES):**  
 Source: National Center for Education Statistics  
 Telephone: 202-502-7200  
 The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data for the comparable across all states.  
**Public Schools:**  
 Source: National Center for Education Statistics  
 Telephone: 202-502-7200  
 The National Center for Education Statistics' primary database on private school locations in the United States.  
**Private Schools:**  
 Source: National Center for Education Statistics  
 Telephone: 202-502-7200  
**Food Zone Data:** This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.  
**NWC - National Wetland Inventory:** This data, available in select counties across the country, was obtained by EDR in 2002 from the U.S. Fish and Wildlife Service.  
**STREET AND ADDRESS INFORMATION**  
 © 2003 Geographic Data Technology, Inc., Fall, 07/2002. This product contains proprietary and confidential property of Geographic Data Technology, Inc. Unauthorized use, including copying for other than listing and standard listing purposes, of the product is expressly prohibited.

TARGET PROPERTY ADDRESS

WABROU  
 WABROU  
 DAVENIA, HI 96761

TARGET PROPERTY COORDINATES

Latitude (North): 20 50 01.20 - 20' 54" 0.4"  
 Longitude (West): 156 08 34.41 - 156' 41" 3.6"  
 UTM Zone: Zone 48  
 UTM X (Meters): 740716.5  
 UTM Y (Meters): 217294.2  
 Elevation: 21 ft above sea level

EDR's GeoCheck Physical Setting Source Addendum has been developed to assist the environmental professional when the collection of physical setting source information in accordance with ASTM E27-02, Section 7.2.3, Section 7.2.3 requires that a current USGS 7.5 Minute Topographic Map (or equivalent physical setting source) be used when (1) conditions have been identified in which hazardous substances or petroleum products are likely to migrate to or from the property, and (2) more information than is provided in the current USGS 7.5 Minute Topographic Map (or equivalent) is generally obtained, pursuant to local good commercial or customary practice, to assess the impact of migration of recognized environmental conditions in connection with the property. Such additional physical setting sources generally include information about the topographic, hydrologic, hydrogeologic, and geologic characteristics of a site, and wells in the area.

Assessment of the impact of contaminant migration generally has two principle investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata. EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.



RECEIVED AS FOLLOWS

**GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY**

**GROUNDWATER FLOW DIRECTION INFORMATION**

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

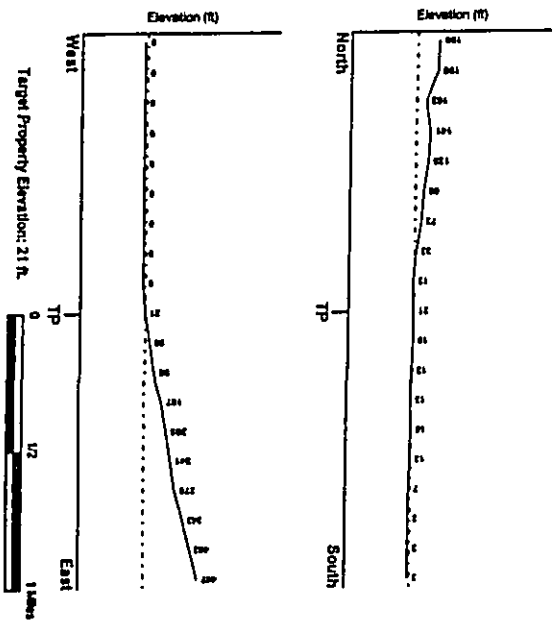
**TOPOGRAPHIC INFORMATION**

Surface topography may be an indicator of the direction of surface groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or should contamination exist on the target property, what down-gradient sites might be impacted.

**TARGET PROPERTY TOPOGRAPHY**

USGS Topographic Map: N/A  
 General Topographic Gradient: USGS 7.5 meter quad index  
 Source: USGS 7.5 meter quad index

**SURROUNDING TOPOGRAPHY: ELEVATION PROFILES**



Source: Topography has been determined from the USGS 7.5 Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

**GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY**

**HYDROLOGIC INFORMATION**

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or should contamination exist on the target property, what down-gradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

**FEMA FLOOD ZONE**

Target Property County: FEMA Flood  
 Flood Zone: No Flood Data  
 Flood Panel at Target Property: 150000101B  
 Additional Panels in search area: 150000130B

FEMA Flood  
 Flood Zone: No Flood Data  
 Flood Panel at Target Property: 150000101B  
 Additional Panels in search area: 150000130B

**NATIONAL WETLAND INVENTORY**

NWI Data at Target Property: NWI Electronic  
 Data Coverage: YES - refer to the Overview Map and Detail Map

NWI Electronic  
 Data Coverage: YES - refer to the Overview Map and Detail Map

**HYDROGEOLOGIC INFORMATION**

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or should contamination exist on the target property, what down-gradient sites might be impacted.

**AQUIFLOW®**

Search Radius: 1,000 Feet

MAP ID: Not Reported  
 LOCATION: FROM TP: GENERAL DIRECTION: GROUNDWATER FLOW

EDR has developed the AQUIFLOW information system to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

RECEIVED AS FOLLOWS

**GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY**

**GROUNDWATER FLOW VELOCITY INFORMATION:**  
Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminants plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

**GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY:**  
Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminants migration may be occurring.

**ROCK STRATIGRAPHIC UNIT:** GEOLOGIC AGE IDENTIFICATION  
Era: -  
System: -  
Subsystem: -  
Code: N/A (Indicates above as Era, System & Series)

Geologic Age and Rock Stratigraphic Unit Source: P. G. Schroeder, R. E. Ayral and W. J. Baecker, Geology of the Conterminous U.S., at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Balsam Map, USGS Digital Data Series DDS - 11 (1994).

**DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY:**

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map is a soil survey in a representation of soil patterns in a landscape. Soil maps for STATSCO are compiled by generalizing more detailed (SSURGO) soil survey maps. The following information is based on Soil Conservation Service STATSCO data.

**Soil Component Name:** MOLOKAI  
**Soil Surface Texture:** silty clay loam  
**Hydrologic Group:** Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.  
**Soil Drainage Class:** Well drained. Soils have intermediate water holding capacity. Depth to water table is more than 6 feet.  
**Hydric Status:** Soil does not meet the requirements for a hydric soil.  
**Corrosion Potential - Unrocked Silt:** MODERATE  
**Depth to Bedrock Mtc:** > 60 inches  
**Depth to Bedrock Msc:** > 60 inches

**GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY**

Soil Layer Information						
Layer	Boundary	Soil Texture Class	Classification	Permeability Rate (cm/hr)	Soil Reaction (pH)	
1	Upper 0 inches	Lower 15 inches	soil dry loam Silt-Clay Materials from than 25 pct. passing No. 200, Clayey Soils	Unified Soil Kcotic silt for ML	Mac: 2.00 Msc: 0.60	Mac: 7.80 Msc: 8.50
2	15 inches	72 inches	soil dry loam Silt-Clay Materials from than 25 pct. passing No. 200, Clayey Soils	Kcotic silt for ML	Mac: 2.00 Msc: 0.60	Mac: 7.80 Msc: 8.50

OTHER SOIL TYPES IN AREA

Based on Soil Conservation Service STATSCO data, the following additional subsoil and soil types may appear within the general area of target property:

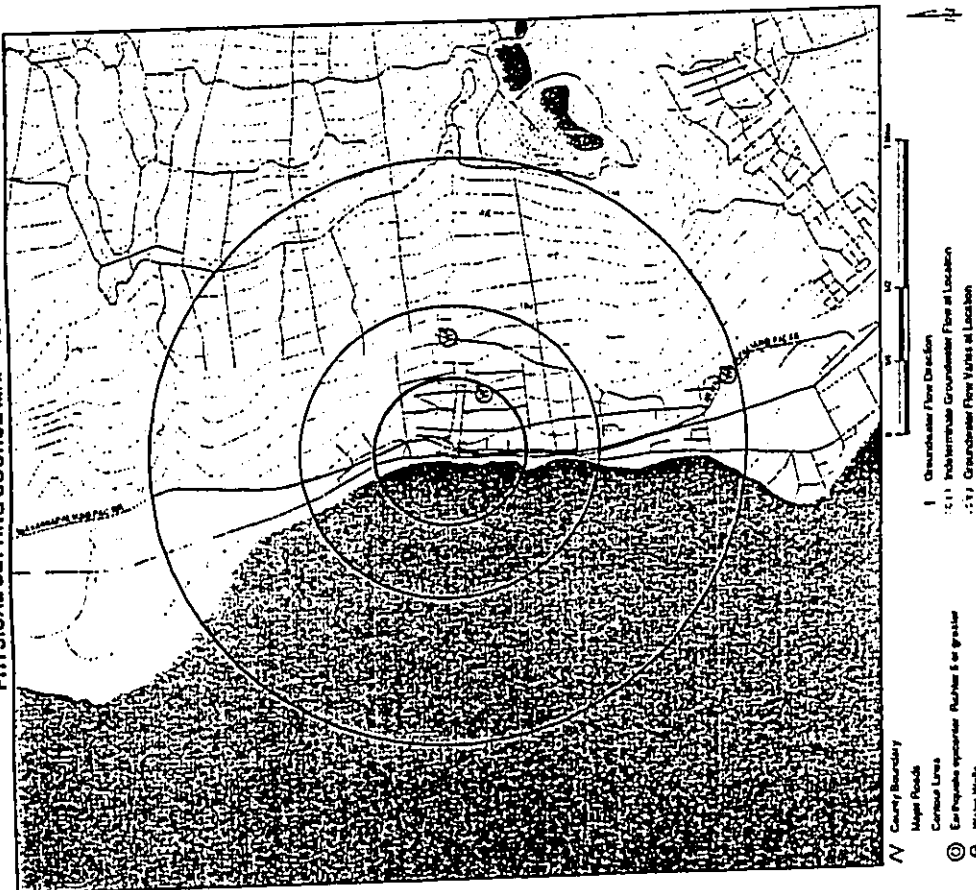
**Soil Surface Texture:** silty clay  
silty - silty clay loam  
silt loam  
**Soil Type:** silty clay  
silty - silty clay loam  
silt loam  
**Shallow Soil Type:** No Other Soil Types  
**Deeper Soil Type:** silty clay  
very gravelly - clay loam  
silt loam  
unweathered bedrock

**ADDITIONAL ENVIRONMENTAL RECORD SOURCES**

According to ASTM E 1527-02, Section 7.2.2, "one or more additional state or local sources of environmental records may be checked in the discretion of the environmental professional, to enhance and supplement federal and state records. Such records may include, but are not limited to, state or local records, if any, that are available to the professional. Such records may include (1) whether they are reasonably ascertainable, (2) whether they are sufficiently useful, accurate, and in local, good commercial or customary practice." One of the record sources listed in Section 7.2.2 is water well information. Water well information can be used to assist the environmental professional in assessing sources that may impact groundwater flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

RECEIVED AS FOLLOWS

PHYSICAL SETTING SOURCE MAP - 1012891.5s



GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

WELL SEARCH DISTANCE INFORMATION

DATABASE SEARCH DISTANCE (radius)  
 Federal USGS 1,000  
 Federal FRDS PWS Measured PWS within 1 mile  
 State Database 1,000

FEDERAL USGS WELL INFORMATION

MAP ID 3 WELL ID USGS027049 LOCATION FROM TP 1/2 - 1 Mile ESE

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

MAP ID No PWS System Found WELL ID No PWS System Found LOCATION FROM TP

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID 1 WELL ID 8-541-002 LOCATION FROM TP 1/8 - 1/4 Mile ESE  
 2 WELL ID 8-540-001 1/4 - 1/2 Mile East

TARGET PROPERTY: Waiheke Waiheke Waiheke HI 96761  
 ADDRESS: Waiheke Waiheke Waiheke HI 96761  
 CITY/STATE/ZIP: Waiheke HI 96761  
 LAT/LONG: 20.90017156 69.43

CUSTOMER: Patricia Brindkerhoff  
 CONTACT: Nani Okamoto  
 PROJECT #: 1012891.5s  
 DATE: July 17, 2003 4:14 pm

RECEIVED AS FOLLOWS

GEOCHECK - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID	Database	ENR ID Number
1818 - U1 M13	18 WELLS	6441493
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
31		
32		
33		
34		
35		
36		
37		
38		
39		
40		
41		
42		
43		
44		
45		
46		
47		
48		
49		
50		
51		
52		
53		
54		
55		
56		
57		
58		
59		
60		
61		
62		
63		
64		
65		
66		
67		
68		
69		
70		
71		
72		
73		
74		
75		
76		
77		
78		
79		
80		
81		
82		
83		
84		
85		
86		
87		
88		
89		
90		
91		
92		
93		
94		
95		
96		
97		
98		
99		
100		

GEOCHECK - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID	Database	ENR ID Number
1818 - U1 M13	18 WELLS	6441493
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
31		
32		
33		
34		
35		
36		
37		
38		
39		
40		
41		
42		
43		
44		
45		
46		
47		
48		
49		
50		
51		
52		
53		
54		
55		
56		
57		
58		
59		
60		
61		
62		
63		
64		
65		
66		
67		
68		
69		
70		
71		
72		
73		
74		
75		
76		
77		
78		
79		
80		
81		
82		
83		
84		
85		
86		
87		
88		
89		
90		
91		
92		
93		
94		
95		
96		
97		
98		
99		
100		

RECEIVED AS FOLLOWS

**GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS  
RADON**

**AREA RADON INFORMATION**

Federal EPA Radon Zone for MAUI County: 3  
 Note: Zone 1 indoor average level > 4 pCi/L  
 ; Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L  
 ; Zone 3 indoor average level < 2 pCi/L

Federal Area Radon Information for Zip Code: 96731

Area	Average Activity	% <= 4 pCi/L	% <= 2 pCi/L	% <= 1 pCi/L
Living Area - 1st Floor	0.030 pCi/L Not Reported	100% Not Reported	0% Not Reported	0% Not Reported
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	Not Reported	Not Reported	Not Reported	Not Reported

**PHYSICAL SETTING SOURCE RECORDS SEARCHED**

**TOPOGRAPHIC INFORMATION**

USGS 7.5' Digital Elevation Model (DEM)  
 Source: United States Geologic Survey  
 EDR acquired the USGS 7.5' Digital Elevation Model in 2002. 7.5 minute DEMs correspond to the USGS  
 1:25,000- and 1:50,000-scale topographic quadrangle maps.

**HYDROLOGIC INFORMATION**

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal  
 Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.  
 NYC: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR  
 in 2002 from the U.S. Fish and Wildlife Service.

**HYDROGEOLOGIC INFORMATION**

ASAP/UDM® Information System  
 Source: EDR proprietary system of groundwater flow information  
 EDR's proprietary (ASAP) (UDM) Information System (UIS) to provide data on the general direction of groundwater  
 flow at specific sites. EDR has reviewed reports submitted to regulatory agencies at select sites and has  
 extracted the date of the report, hydrologically determined groundwater flow direction and depth to water table  
 information.

**GEOLOGIC INFORMATION**

Geologic Age and Rock Stratigraphic Unit  
 Source: P.D. Schalen, R.E. Arndt and W.L. Baswell, Geology of the Conterminous U.S. at 1:250,000 Scale - A digital  
 representation of the 1974 P.D. King and H.L. Balkman Map, USGS Digital Data Series DDS-111(1994).  
 STATSOO: State Soil Geographic Database  
 Source: Department of Agriculture, Natural Resources Conservation Service  
 The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the national Cooperative  
 Soil Survey (NCS) and is responsible for collecting, storing, maintaining and distributing soil survey  
 information for privately owned lands in the United States. A soil map is a representation of  
 soil patterns in a landscape. Soil maps for STATSOO are compiled by generalizing more detailed (SSURGO) soil  
 survey maps.

**ADDITIONAL ENVIRONMENTAL RECORD SOURCES**

**FEDERAL WATER WELLS**

PWS: Public Water Systems  
 Source: EPA/CDC's of Drinking Water  
 Telephone: 202-564-3750  
 Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at  
 least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

**PWS EDR: Public Water Systems Violation and Enforcement Data**

Source: EPA/CDC's of Drinking Water  
 Telephone: 202-564-3750  
 Violation and Enforcement data for Public Water Systems from the State Drinking Water Information System (SDWIS) data  
 August 1998. Prior to August 1998, the data came from the Federal Reporting Data System (FRDS).

**USGS Water Wells: USGS National Water Inventory System (NWIS)**

This database contains descriptive information on wells where the USGS contacts or has collected data on surface  
 water and/or groundwater. The groundwater data includes information on well, depth, and other sources of groundwater.

RECEIVED AS FOLLOWS

PHYSICAL SETTING SOURCE RECORDS SEARCHED

STATE RECORDS

Ground Water Wells  
Source: Department of Land and Natural Resources  
Telephone: 808-587-0212

RADON

Area Radon Information

Source: USGS

Telephone: 703-368-4029

The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA's National Residential Radon Survey and the National Residential Radon Survey. The survey covers the years 1986 - 1992. Where necessary, data has been supplemented by information obtained at private sources such as universities and research institutions.

EPA Radon Zones

Source: EPA

Telephone: 703-368-4029

Sections 207 & 208 of RAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

OTHER

Airport Landing Facilities: Physics and public use landing facilities

Source: Federal Aviation Administration, 800-437-4636

Epidemiology: World earthquake epicenters, Richter 5.0 or greater

Source: Department of Commerce, National Oceanic and Atmospheric Administration

RECEIVED AS FOLLOWS

The EDR Radius Map  
with GeoCheck®

Poolenalena Park  
Poolenalena Park  
Makana, HI 96753  
Inquiry Number: 1012891.6s

July 17, 2003

**EDR** Environmental  
Data  
Resources, Inc.

The Source  
For Environmental  
Risk Management  
Data

3530 Post Road  
Southport, Connecticut 06890  
Nationwide Customer Service  
Telephone: 1-800-352-0050  
Fax: 1-800-231-6802  
Internet: www.edrinc.com

TABLE OF CONTENTS

SECTION	PAGE
Executive Summary.....	ES-1
Overview Map.....	2
Detail Map.....	3
Map Findings Summary.....	4
Map Findings.....	5
Orphan Summary.....	6
Government Records Search/Data Currency Tracking.....	GR-1
<b>GEOCHECK ADDENDUM</b>	
Physical Setting Source Addendum.....	A-1
Physical Setting Source Summary.....	A-2
Physical Setting Source Map.....	A-7
Physical Setting Source Map Findings.....	A-8
Physical Setting Source Records Searched.....	A-24

Thank you for your business.  
Please contact EDR at 1-800-352-0050  
with any questions or comments.

**Disclaimer**  
Copyright and Trademark Notice  
This report contains information obtained from a variety of public and private sources. NO WARRANTY EXPRESSED OR IMPLIED IS MADE WHATSOEVER IN CONNECTION WITH THIS REPORT. ENVIRONMENTAL DATA RESOURCES, INC. SPECIFICALLY DISCLAIMS THE MAKING OF ANY SUCH WARRANTIES, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE. ALL RESULTS ARE PROVIDED BY THE USER. IN NO EVENT SHALL EDR BE LIABLE TO ANYONE, WHETHER ARISING OUT OF ERRORS OR OMISSIONS, NEGLIGENCE, ACCIDENT OR ANY OTHER CAUSE, FOR ANY LOSS OR DAMAGE, INCLUDING, WITHOUT LIMITATION, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR EXEMPLARY DAMAGES. EDR and the red logo are trademarks of Environmental Data Resources, Inc. or its affiliates. All other trademarks used herein are the property of their respective owners.

RECEIVED AS FOLLOWS

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc. (EDR). The report meets the government records search requirements of ASTM Standard Practice for Environmental Site Assessment, E 1527-00. Search distances are per ASTM standard or custom distances requested by the user.

TARGET PROPERTY INFORMATION

ADDRESS

POOLENALENA PARK  
MANKENA, IN 98753

COORDINATES

Latitude (North): 20 662600 - 20 39 45.4"  
Longitude (West): 156 441060 - 156 26 27.8"  
Universal Transverse Mercator: Zone 4  
UTM X (Easting): 766511.8  
UTM Y (Northing): 2285724.0  
Elevation: 10 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property: N/A  
Source: USGS 7.5 min quad index

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available (1) reasonably ascertainable 7 government records either on the target property or within the ASTM E 1527-00 search radius around the target property for the following databases:

FEDERAL ASTM STANDARD

NPL..... National Priority List  
Proposed NPL..... Proposed National Priority List Sites  
CERCLIS..... Comprehensive Environmental Response, Compensation, and Liability Information System  
CERCLIS No Further Remedial Action Planned  
CORRACTS..... Corrective Action Report  
RCRIS-TSD..... Resource Conservation and Recovery Information System  
RCRIS-LOG..... Resource Conservation and Recovery Information System  
RCRIS-SOG..... Resource Conservation and Recovery Information System  
ENRS..... Emergency Response Notification System  
STATE ASTM STANDARD  
SHWS..... State List

EXECUTIVE SUMMARY

SWFLF..... Permitted Landfills in the State of Hawaii  
LUST..... Leaking Underground Storage Tank Database  
UST..... Underground Storage Tank Database

FEDERAL ASTM SUPPLEMENTAL

CONSENT..... Superfund (CERCLA) Consent Decrees  
ROD..... Records Of Decision  
National Priority List Decisions  
FINDS..... Facility Index System/ Facility Identification Initiative Program Summary Report  
HAIRS..... Hazardous Materials Information Reporting System  
MLTS..... Material Licensing Tracking System  
MINES..... Mines Master Index File  
NPL Lerna..... Federal Superfund Lerna  
PADS..... PCB Activity Database System  
DOD..... Department of Defense Sites  
RAAITS..... RCRA Administrative Action Tracking System  
TRIS..... Toxic Chemical Release Inventory System  
TSCA..... Toxic Substances Control Act  
SSTS..... Section 7 Tracking System  
FIFOU TSCA Tracking System - FIFOU (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

STATE OR LOCAL ASTM SUPPLEMENTAL

SPILLS..... Release Notifications

EDR PROPRIETARY HISTORICAL DATABASES

Coal Gas..... Former Manufactured Gas (Coal Gas) Sites

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were not identified.  
Unmapped (orphan) sites are not considered in the foregoing analysis.



RECEIVED AS FOLLOWS

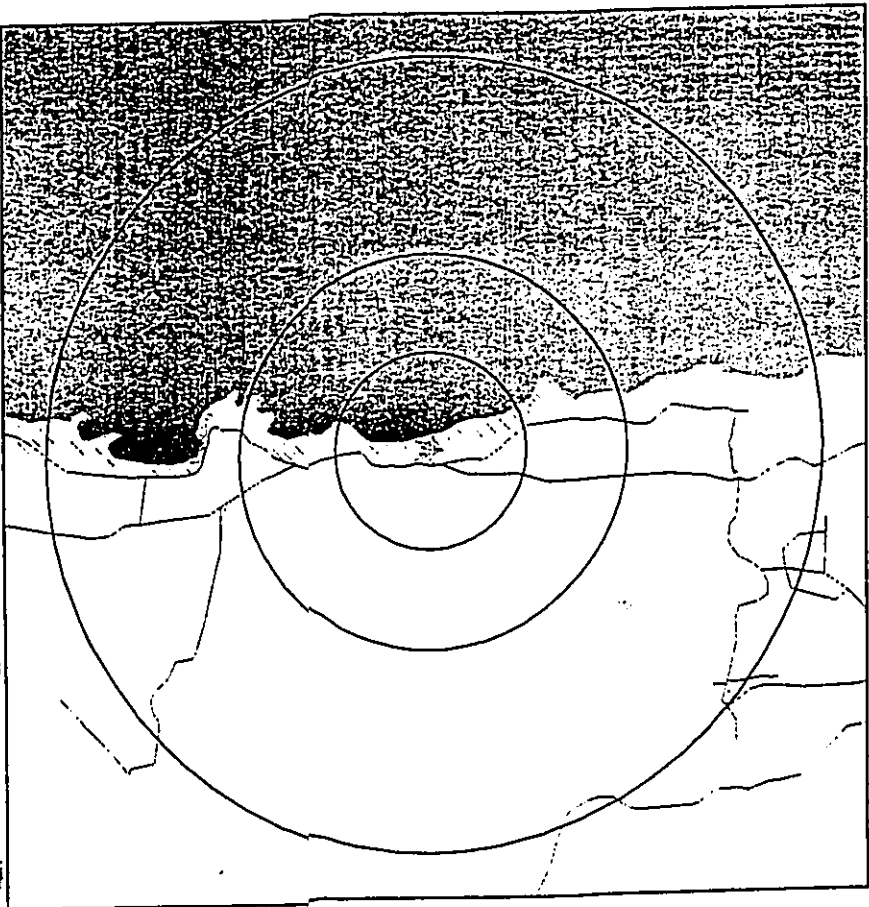
**EXECUTIVE SUMMARY**

Due to poor or inadequate address information, the following sites were not mapped:

- |                                    |                    |
|------------------------------------|--------------------|
| <b>Site Name</b>                   | <b>Database(s)</b> |
| MAALAEA POWER PLANT                | SHWS               |
| SELAND CONSTRUCTION, INC. KIHEI B  | SHWS, SWFAF        |
| KALUPAPAI LANDFILL                 | SHWS, SWFAF        |
| BEH FRANKLIN STORES PROPERTY       | SHWS, SWFAF        |
| LANAI LANDFILL (LF-056-88)         | CERCUS             |
| KAIKOUAWE ISLAND                   | SWFAF              |
| HAWAIIAN COMMERCIAL & SUGAR CO.    | SWFAF              |
| KAWAIAU LANDFILL                   | SWFAF              |
| KALUNOIA LANDFILL                  | SWFAF              |
| MAUNALOIA LANDFILL                 | SWFAF              |
| MOTOKAI LANDFILL (NAWA LF-LF-0030) | SWFAF, SPILLS      |
| CENTRAL MAUI LF PHASE I/II LF-0034 | SWFAF              |
| MAALEA CAD LF                      | SWFAF              |
| CENTRAL MAUI LF PHASE IV           | SWFAF              |
| MAHEHA WASTEWATER PUMP STATION     | UST                |
| KIHEI WWTP                         | UST                |
| MONSANTO - MOKUALE HWY             | HAZNET             |

TC191291166 EXECUTIVE SUMMARY 3

OVERVIEW MAP - 1012891.66 - Parsons Brinckerhoff



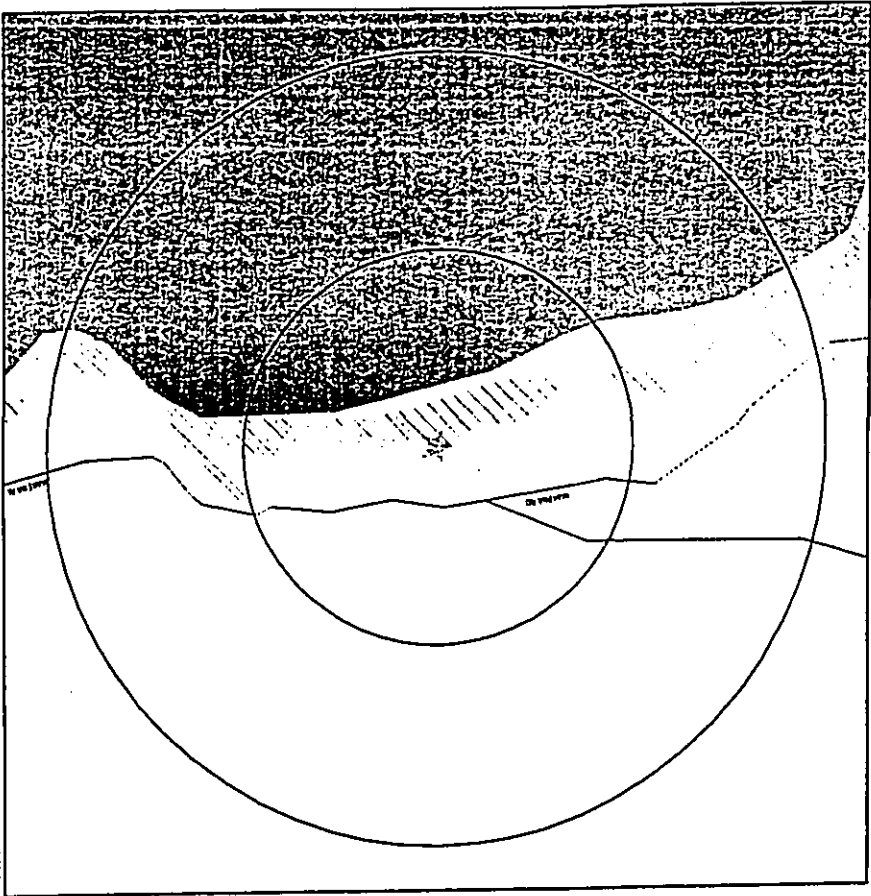
- 1 Target Property
- 2 Sites at elevations higher than or equal to the target property
- 3 Sites at elevations lower than the target property
- 4 Coal Gasification Sites
- 5 National Priority List Sites
- 6 Landfill Sites
- 7 Data Database Sites
- 8 Oil & Gas facilities
- 9 100-year flood zone
- 10 500-year flood zone
- 11 Federal Wetlands

<b>TARGET PROPERTY:</b> ADDRESS: CITY/STATE/ZIP: LAT/LONG:	Podemdena Park Podemdena Park Maheha HI 96753 20 6828 N 158 44 11	<b>CUSTOMER:</b> CONTACT: PHONE/FAX: DATE:	Parsons Brinckerhoff Nancy O'Brien 808/233-1200 July 17, 2003 3:48 pm
---	--	---	--

Copyright © 2003 IBM Corp. or other IBM Corp. All Rights Reserved.

RECEIVED AS FOLLOWS

DETAIL MAP - 1012891.6s - Parsons Brinckerhoff



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- 1. Coal Classification Class
- 2. Sembling Reservoir
- 3. National Priority Land Sites
- 4. Landfill Sites
- 5. Dept. Defense Sites

- 1/1 Oil & Gas Pipelines
- 1/2 100-year flood zone
- 1/3 500-year flood zone
- 1/4 Federal Wetlands

TARGET PROPERTY:  
 ADDRESS: Poodevetana Park  
 CITY/STATE/ZIP: Madras 97503  
 LAT/LONG: 20 6525 156 4411

CUSTOMER: Parsons Brinckerhoff  
 CONTACT: Nam Othomo  
 REQUEST: 1012891.6s  
 DATE: July 17, 2003 3:48 pm

Copyright © 2003 ESRI, Inc. All rights reserved. ESRI, the ESRI logo, and ArcView are registered trademarks of ESRI, Inc.

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (feet)	< 100	100 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Pooled
----------	-----------------	------------------------	-------	-----------	-----------	---------	-----	--------------

FEDERAL ASTM STANDARD

NPL	1,000	0	0	0	0	0	NR	0
Proposed NPL	1,000	0	0	0	0	0	NR	0
CERCLIS	0,500	0	0	0	0	0	NR	0
CERCLIS/RAP	0,250	0	0	0	0	0	NR	0
CORRECTS	1,000	0	0	0	0	0	NR	0
RICHIS-ISO	0,500	0	0	0	0	0	NR	0
RICHIS Lq, Ouant, Gen, RICHIS Sm, Ouant, Gen, ERNS	0,250	0	0	0	0	0	NR	0

STATE ASTM STANDARD

SHWS	1,000	0	0	0	0	0	NR	0
State Landfill	0,500	0	0	0	0	0	NR	0
UST	0,250	0	0	0	0	0	NR	0

FEDERAL ASTM SUPPLEMENTAL

CONSENT	1,000	0	0	0	0	0	NR	0
ROD	1,000	0	0	0	0	0	NR	0
Dechlor NPL	1,000	0	0	0	0	0	NR	0
FINOS	TP	NR	NR	NR	NR	NR	NR	0
HAZUS	TP	NR	NR	NR	NR	NR	NR	0
MLTS	TP	NR	NR	NR	NR	NR	NR	0
MINES	0,250	0	0	0	0	0	NR	0
NPL Lens	TP	NR	NR	NR	NR	NR	NR	0
PAOS	TP	NR	NR	NR	NR	NR	NR	0
POD	1,000	0	0	0	0	0	NR	0
PMATS	TP	NR	NR	NR	NR	NR	NR	0
TRIS	TP	NR	NR	NR	NR	NR	NR	0
TSCA	TP	NR	NR	NR	NR	NR	NR	0
SENTS	TP	NR	NR	NR	NR	NR	NR	0
FTIS	TP	NR	NR	NR	NR	NR	NR	0

STATE OR LOCAL ASTM SUPPLEMENTAL

SPLLS	TP	NR	NR	NR	NR	NR	NR	0
-------	----	----	----	----	----	----	----	---

EDR PROPRIETARY HISTORICAL DATABASES

Coal Gas	1,000	0	0	0	0	0	NR	0
----------	-------	---	---	---	---	---	----	---

NOTES:  
 AQUIFLOW - see EDR Physical Setting Source Addendum  
 TP = Target Property  
 NR = Not Requested at this Search Distance  
 Sites may be listed in more than one database

# RECEIVED AS FOLLOWS

Map ID  
 Direction  
 Distance  
 Distance (ft.)  
 Division

**MAP FINDINGS**

Distance(s)  
 EPA ID Number

Coal Gas Site Search: No sites was found in a search of Real Property Search's ENVIRONMENTAL database.

**NO SITES FOUND**

TC1012801.6k Page 5

TC1012801.6k Page 6

City	EPA ID	Site Name	Site Address	Zip	Distance(s)
KH&E	810451280	KALAPUWA POWER PLANT	KH&E ROAD LAT 39 37 37.70 LONG 126 37 30	96753	SHWS
KH&E	100444449	KANAKAWA WASTE TREATMENT PLANT	5045 MAKENA ALAKA ROAD	96753	USHS
KH&E	100323967	KANAWA WASTEWATER PUMP STATION	CHUKA ROAD BASE YARD	96753	SHWS
KH&E	310451508	PELLAND CONSTRUCTION, INC., KH&E B	2111 PELAND HWY	96753	HA&NET
KH&E	3105082253	MOHANTO - MOHANTO HWY	400 WELBY RD RD/PELAN HWY	96753	USHS
KH&E	U001296905	KH&E HWY 7	FIELD 7181, WALKER	96753	USHS
KH&E	8103793675	KAWAIAWA COMMERCIAL & SUGAR CO.	KAWAIAWA HOLDING	96753	USHS
KH&E	8103793653	KAWAIAWA LANDFILL	KAWAIAWA HOLDING	96753	USHS
KH&E	1000180100	KALAPUWA LANDFILL	KALAPUWA ROAD	96753	USHS
KH&E	8103793654	KALUKOIA LANDFILL	KALUKOIA ROAD	96753	USHS
KH&E	8104514084	BEH FURNACE STONES PROPERTY	KALUKOIA ROAD	96753	USHS
KH&E	1000734484	LAKE LANDFILL (F-056-98)	LAKE	96753	USHS
KH&E	8103793656	KALUKOIA LANDFILL	KALUKOIA ROAD	96753	USHS
KH&E	8103793641	KOLOA LANDFILL PHASE III L-0334	KALUKOIA ROAD	96753	USHS
KH&E	8103793652	CENTRAL LANDFILL PHASE III L-0334	PULKEHEI ROAD	96753	USHS
KH&E	8103793673	KALUKOIA LANDFILL	PULKEHEI ROAD	96753	USHS
KH&E	8103793674	CENTRAL LANDFILL PHASE IV	PULKEHEI	96753	USHS

RECEIVED AS FOLLOWS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state addresses, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.  
Elapsed ASTM days: Provides confirmation that the EDR report meets or exceeds the 90-day updating requirement of the ASTM standard.

FEDERAL ASTM STANDARD RECORDS

NPL: National Priority List

Source: EPA

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Vendor: 04/09/00  
Date Made Active at EDR: 06/02/03  
Database Release Frequency: Semi-Annually  
Date of Data Arrival at EDR: 05/05/03  
Elapsed ASTM days: 28  
Date of Last EDR Contact: 05/05/03

NPL Site Boundaries

Source:

EPA's Environmental Photographic Interpretation Center (EPIC)  
Telephone: 202-564-7333

EPA Region 1  
Telephone: 617-418-1143

EPA Region 2  
Telephone: 215-814-5418

EPA Region 4  
Telephone: 404-521-8033

Proposed NPL: Proposed National Priority List Sites

Source: EPA

Telephone: N/A

Date of Government Vendor: 04/09/00

Date Made Active at EDR: 06/02/03

Database Release Frequency: Semi-Annually

Source: EPA

Telephone: 703-413-0223

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System  
CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Vendor: 03/18/03  
Date Made Active at EDR: 04/08/03  
Database Release Frequency: Quarterly  
Date of Data Arrival at EDR: 03/24/03  
Elapsed ASTM days: 15  
Date of Last EDR Contact: 06/23/03

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned

Source: EPA

Telephone: 703-413-0223

As of February 1993, CERCLIS sites designated "No Further Remedial Action Planned" (NFRAP) have been removed from CERCLIS. NFRAP sites may be sites where, following an initial investigation, no contamination was found, contamination was removed quickly without the need for the site to be placed on the NPL, or the contamination was not serious enough to require Federal Superfund action or NPL consideration. EPA has removed approximately 25,000 NFRAP sites to fit the unburdened burden to the redevelopment of these properties and has archived them as historical records so EPA does not necessarily repeat the investigations in the future. This policy change is part of the EPA's Brownfields Redevelopment Program to help clean, stable, private investors and attached citizens to promote economic redevelopment of unproductive urban sites.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Vendor: 03/19/03  
Date Made Active at EDR: 04/08/03  
Database Release Frequency: Quarterly  
Date of Data Arrival at EDR: 03/24/03  
Elapsed ASTM days: 15  
Date of Last EDR Contact: 06/23/03

CORRECTIVE: Corrective Action Report

Source: EPA

Telephone: 800-424-9348

CORRECTIVE: Identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Vendor: 03/19/03

Date Made Active at EDR: 05/08/03

Database Release Frequency: Semi-Annually  
Date of Data Arrival at EDR: 04/07/03  
Elapsed ASTM days: 31  
Date of Last EDR Contact: 05/09/03

RCRS: Resource Conservation and Recovery Information System

Source: EPA/ANTS

Telephone: 800-424-9348

Resource Conservation and Recovery Information System. RCRIS includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA).

Date of Government Vendor: 05/09/03

Date Made Active at EDR: 07/01/03

Database Release Frequency: Varies  
Date of Data Arrival at EDR: 05/09/03  
Elapsed ASTM days: 53  
Date of Last EDR Contact: 06/25/03

ENRS: Emergency Response Notification System

Source: National Response Center, United States Coast Guard

Telephone: 202-260-2342

Emergency Response Notification System. ENRS records and stores information on reported releases of oil and hazardous substances.

Date of Government Vendor: 12/11/02

Date Made Active at EDR: 02/03/03

Database Release Frequency: Annually  
Date of Data Arrival at EDR: 01/27/03  
Elapsed ASTM days: 7  
Date of Last EDR Contact: 04/28/03

FEDERAL ASTM SUPPLEMENTAL RECORDS

BRS: Biennial Reporting System

Source: EPA/ANTS

Telephone: 800-424-9348

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Vendor: 12/11/99

Database Release Frequency: Biennially  
Date of Data Arrival at EDR: 06/18/03  
Date of Last Scheduled EDR Contact: 09/15/03

CONSENT: Superfund (CERCLA) Consent Decrees

Source: EPA Regional Offices

Telephone: Varies

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Vendor: N/A

Database Release Frequency: Varies  
Date of Data Arrival at EDR: N/A  
Date of Last Scheduled EDR Contact: N/A

RCR: Records of Decision

Source: EPA

Telephone: 703-413-0223

Record of Decision. RDO documents provide a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

RECEIVED AS FOLLOWS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

**Date of Government Vendor:** 01/09/03  
**Database Release Frequency:** Annually  
**Date of Last EDR Contact:** 01/07/03  
**Date of Next Scheduled EDR Contact:** 10/06/03

**DELISTED NPL: National Priority List Database**  
**Source:** EPA  
 Telephone: N/A  
 The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425 (a), sites may be deleted from the NPL where no further response is appropriate.  
**Date of Government Vendor:** 04/00/03  
**Database Release Frequency:** Quarterly  
**Date of Last EDR Contact:** 05/05/03  
**Date of Next Scheduled EDR Contact:** 08/04/03

**FINDS: Facility Index System/ Facility Identification System Summary Report**  
**Source:** EPA  
 Telephone: N/A  
 Facility Index System, FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in the report: PCB (Permit Compliance System), AHS (Automated Hazardous Waste Information System), DOCKET (Enforcement Docket used to manage and track information on the judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), CDOCKET (Chemical Docket System used to track critical enforcement actions for all environmental statutes), FHS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Agency Data System).  
**Date of Government Vendor:** 03/19/03  
**Database Release Frequency:** Quarterly  
**Date of Last EDR Contact:** 07/02/03  
**Date of Next Scheduled EDR Contact:** 10/06/03

**HMRIS: Hazardous Materials Information Reporting System**  
**Source:** U.S. Department of Transportation  
 Telephone: 202-366-4555  
 Hazardous Materials Incident Report System, HMIRS provides hazardous material spill incidents reported to DOT.  
**Date of Government Vendor:** 01/11/03  
**Database Release Frequency:** Annually  
**Date of Last EDR Contact:** 04/09/03  
**Date of Next Scheduled EDR Contact:** 07/21/03

**MUTS: Material Handling Tracking System**  
**Source:** Nuclear Regulatory Commission  
 Telephone: 301-415-7100  
 MUTS is maintained by the Nuclear Regulatory Commission and provides a list of approximately 8,100 sites which consist of waste transfer facilities and which are subject to NRC licensing requirements for material control. EDR contacts the Agency on a quarterly basis.  
**Date of Government Vendor:** 04/23/03  
**Database Release Frequency:** Quarterly  
**Date of Last EDR Contact:** 07/02/03  
**Date of Next Scheduled EDR Contact:** 10/06/03

**MINES: Mines Material Index File**  
**Source:** Department of Labor, Mine Safety and Health Administration  
 Telephone: 303-231-5929  
**Date of Government Vendor:** 03/11/03  
**Database Release Frequency:** Semi-Annually  
**Date of Last EDR Contact:** 06/20/03  
**Date of Next Scheduled EDR Contact:** 09/29/03

**NPL UENR: Federal Superfund List**  
**Source:** EPA  
 Telephone: 205-964-4787  
 Federal Superfund List. Under the authority granted the USEPA by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, the USEPA has the authority to sue liable parties and/or to recover remedial action expenditures or when the property owner meets notification of potential liability. USEPA completes a listing of final notices of Superfund List.  
**Date of Government Vendor:** 10/15/01  
**Database Release Frequency:** No Update Planned  
**Date of Last EDR Contact:** 06/27/03  
**Date of Next Scheduled EDR Contact:** 09/25/03

**PADS: PCB Agency Database System**  
**Source:** EPA  
 Telephone: 202-564-3367  
 PCB Agency Database, PADS handles generation, transport, commercial storage and/or brokers and disposers of PCBs who are required to notify the EPA of such activities.  
**Date of Government Vendor:** 04/01/03  
**Database Release Frequency:** Annually  
**Date of Last EDR Contact:** 09/12/03  
**Date of Next Scheduled EDR Contact:** 08/11/03

**POB: Department of Defense Sites**  
**Source:** USOS  
 Telephone: 703-618-6920  
 The data set consists of hazardous waste or adulterated leach, administered by the Department of Defense, that have any one equal to or greater than 610 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.  
**Date of Government Vendor:** 04/01/03  
**Database Release Frequency:** Semi-Annually  
**Date of Last EDR Contact:** 05/12/03  
**Date of Next Scheduled EDR Contact:** 08/11/03

**RAAITS: RCRA Administrative Action Tracking System**  
**Source:** EPA  
 Telephone: 202-564-4104  
 RCRA Administrative Action Tracking System, RAAITS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administrative actions after September 30, 1995, data entry in the RAAITS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAAITS because it decreases in agency resources. EDR is responsible to continue to update the information contained in the database.  
**Date of Government Vendor:** 04/17/95  
**Database Release Frequency:** No Update Planned  
**Date of Last EDR Contact:** 06/09/03  
**Date of Next Scheduled EDR Contact:** 09/06/03

**TRIS: Toxic Chemical Release Inventory System**  
**Source:** EPA  
 Telephone: 202-260-1331  
 Toxic Release Inventory System, TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.  
**Date of Government Vendor:** 12/01/00  
**Database Release Frequency:** Annually  
**Date of Last EDR Contact:** 06/27/03  
**Date of Next Scheduled EDR Contact:** 09/22/03

**TSCA: Toxic Substances Control Act**  
**Source:** EPA  
 Telephone: 202-260-5521  
 Toxic Substances Control Act, TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substances Inventory list. It includes data on the production volume of these substances by plant.  
**Date of Government Vendor:** 12/01/98  
**Database Release Frequency:** Every 4 Years  
**Date of Last EDR Contact:** 06/09/03  
**Date of Next Scheduled EDR Contact:** 09/06/03

**FTS: FTSA/ TSCA Tracking System - FTSA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)**  
**Source:** EPA  
 Telephone: 202-564-2501  
**Date of Government Vendor:** 04/15/03  
**Database Release Frequency:** Quarterly  
**Date of Last EDR Contact:** 08/23/03  
**Date of Next Scheduled EDR Contact:** 09/22/03

RECEIVED AS FOLLOWS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

§§716: Section 7 Tracking Systems

Source: EPA  
Telephone: 202-564-5008  
Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (FIFRA) requires all registered pesticide products submitted to a state in order to be Environmental Protection Agency (EPA) approved. Each registrant must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/00  
Database Release Frequency: Annually  
Date of Last EDR Contact: 06/29/03  
Date of Next Scheduled EDR Contact: 07/21/03  
§§716: FIFRA TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)  
Source: EPA/Office of Prevention, Pesticides and Toxic Substances  
Telephone: 202-564-2901  
FIFRA tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.  
Date of Government Version: 04/15/03  
Database Release Frequency: Quarterly  
Date of Last EDR Contact: 06/23/03  
Date of Next Scheduled EDR Contact: 09/22/03

STATE OF HAWAII ASTIA STANDARD RECORDS

§§716: State LMI

Source: Department of Health  
Telephone: 808-586-4218  
Factions, sites or areas in which the Office of Hazard Evaluation and Emergency Response has an interest, has investigated or may investigate under §151-1210 (Producers CERCLAIS Act).  
Date of Government Version: 07/12/01  
Date of Last EDR Contact: 09/24/01  
Database Release Frequency: Semi-Annually  
Date of Last EDR Contact: 06/23/03

§§716: Permitted Landfills in the State of Hawaii

Source: Department of Health  
Telephone: 808-586-4215  
Solid Waste Facilities/Landfill Sites. SWFLS type records typically contain an inventory of solid waste disposal facilities or landfills by a particular year. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 1004 criteria for solid waste landfills or disposal sites.  
Date of Government Version: 05/03/99  
Date of Last EDR Contact: 09/10/99  
Database Release Frequency: Varies  
Date of Last EDR Contact: 05/01/03

§§716: Leaking Underground Storage Tank Database

Source: Department of Health  
Telephone: 808-586-4278  
Leaking Underground Storage Tank Incident Report. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.  
Date of Government Version: 01/31/03  
Date of Last EDR Contact: 07/25/03  
Database Release Frequency: Semi-Annually  
Date of Last EDR Contact: 07/11/03

§§716: Underground Storage Tank Database

Source: Department of Health  
Telephone: 808-586-4278  
Regulated Underground Storage Tanks. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be replaced with the state department responsible for administering the UST program. Available information varies by state program.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 01/01/03  
Date of Last EDR Contact: 02/25/03  
Database Release Frequency: Semi-Annually  
Date of Last EDR Contact: 07/11/03

STATE OF HAWAII ASTIA SUPPLEMENTAL RECORDS

§§716: Release Notifications  
Source: Department of Health  
Telephone: 808-586-4218  
Records of Airborne Discharges to the environment reported to the Office of Hazard Evaluation and Emergency Response since 1998.  
Date of Government Version: 09/01/00  
Database Release Frequency: Varies  
Date of Last EDR Contact: 06/23/03  
Date of Next Scheduled EDR Contact: 09/22/03

EDR PROPRIETARY HISTORICAL DATABASES

Former Manufacturer Data (Local Area) State: The address and location of each Gen also is provided exclusively to EDR by Real Property Scan, Inc. (Copyright 1993 Real Property Scan, Inc. for a limited description of the types of hazards which may be found at each site, contact your EDR customer service representative.

Disclaimer: Provided by Real Property Scan, Inc.  
The information contained in this report has predominantly been obtained from publicly available sources produced by entities other than Real Property Scan, Inc. While reasonable steps have been taken to ensure the accuracy of this report, Real Property Scan does not guarantee the accuracy of this report. Any liability on the part of Real Property Scan is strictly limited to a refund of the amount paid. No claim is made for the actual existence of leaks at any site. This report does not constitute a legal opinion.

STATE OF HAWAII BROWNFIELD DATABASES RECORDS

BROWNFIELD: Hawaii Powerfields Sites  
Source: Office of Planning  
Telephone: 808-586-3423  
Date of Government Version: N/A  
Database Release Frequency: Varies  
Date of Last EDR Contact: N/A  
Date of Next Scheduled EDR Contact: N/A

OTHER DATABASES

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Likewise, the existence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

REGULATED SOLID WASTE: This data was obtained from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000 Scale Maps. It was extracted from the transportation category including some oil and petroleum products pipelines.

Electric Power Transmission Line Data

Source: Peninsular Corporation  
Telephone: (808) 823-8277  
This map includes information copyrighted by Peninsular Corporation. The information is provided on a best effort basis and Peninsular Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been provided with the permission of Peninsular Corporation.

Sensitive Receptors: There are hundreds of sensitive receptors due to their fragile terrain systems and special sensitivity to environmental disturbance. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

RECEIVED AS FOLLOWS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

**ADVA Hospitals:**

Source: American Hospital Association, Inc.

Telephone: 312-280-5591

The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Center: Provider of Services Listing

Source: Center for Medicare & Medicaid Services

Telephone: 410-786-5000

A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Marketing: Home

Source: National Institutes of Health

Telephone: 301-594-8206

Public Section on Medicare and Medicaid certified nursing homes in the United States

Source: National Center for Education Statistics

Telephone: 202-502-7200

The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools

Source: National Center for Education Statistics

Telephone: 202-502-7200

The National Center for Education Statistics' primary database on private school locations in the United States.

**Flood Zone Data:** This data, available in select counties across the country, was obtained by EDR in 1979 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

**NW:** National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 from the U.S. Fish and Wildlife Service.

**STREET AND ADDRESS INFORMATION**

© 2003 Geographic Data Technology, Inc., P.O. 07/2002. This product contains proprietary and confidential property of Geographic Data Technology, Inc. Unauthorized use, including copying for one time testing and standard backup procedures, of this product is expressly prohibited.

GEOCHECK® - PHYSICAL SETTING SOURCE ADDENDUM

**TARGET PROPERTY ADDRESS**

POOLEMENA PARK  
POOLEMENA PARK  
MANKEN, IN 96753

**TARGET PROPERTY COORDINATES**

Latitude (North): 20.662600 - 20° 39' 45.4"  
Longitude (West): 156.441055 - 156° 26' 27.6"  
Universal Transverse Mercator: Zone 4  
UTM X (Meters): 766811.0  
UTM Y (Meters): 2296774.0  
Elevation: 10 ft. above sea level

EDR's GeoCheck Physical Setting Source Addendum has been developed to assist the environmental professional in the selection of physical setting source information in accordance with ASTM 1527-00, Section 7.2.1, Section 7.2.2 and the current USGS 7.5 Minute Topographic Map (or equivalent, such as the USGS Digital Elevation Model) for the site. The user may select one or more additional physical setting sources to be sought when (1) conditions have been identified in which these sources may be present, and (2) the user wishes to migrate to or from the property, and (3) more information than is provided by the current USGS 7.5 Minute Topographic Map (or equivalent) is generally obtained, pursuant to local good commercial or customary practice, to assess the impact of migration of recognized environmental conditions in connection with the property. Such additional physical setting sources generally include information about the topographic, hydrologic, hydrogeologic, and geologic characteristics of a site, and wells in the area.

Assessment of the impact of contaminant migration generally has two principle investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata. EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

RECEIVED AS FOLLOWS

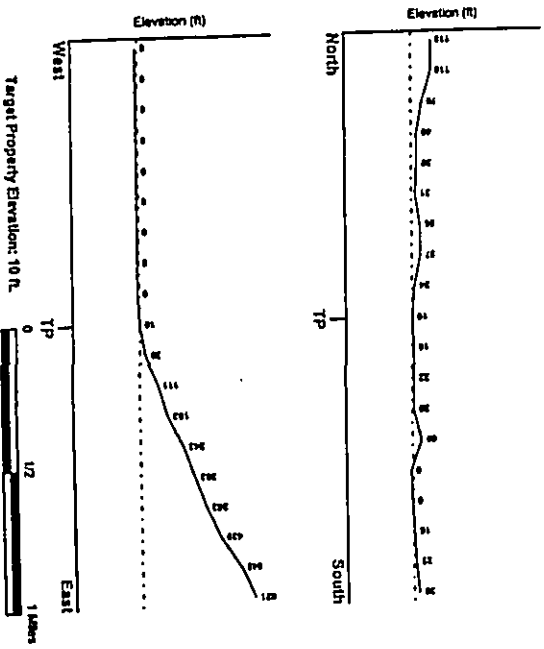
GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

**GROUNDWATER FLOW DIRECTION INFORMATION**  
 Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

**TOPOGRAPHIC INFORMATION**  
 Surface topography may be indicative of the direction of surface groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what down-gradient sites might be impacted.

**TARGET PROPERTY TOPOGRAPHY**  
 USGS Topographic Map: N/A  
 General Topographic Gradient: USGS 7.5 min quad index  
 Source: USGS 7.5 min quad index

**SURROUNDING TOPOGRAPHY: ELEVATION PROFILES**



Source: Topography has been determined from the USGS 7.5 Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be used over flood.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

**HYDROLOGIC INFORMATION**  
 Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what down-gradient sites might be impacted.  
 Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

**FEMA FLOOD ZONE**

Target Property County	FEMA Flood
MAUI, HI	Electronic Data
Flood Plain Panel at Target Property:	YES - Refer to the Overview Map and Detail Map
Additional Panels in search area:	Not Reported
NATIONAL WETLAND INVENTORY	NWI Electronic
NWI Quad at Target Property	Data Changes
NOT AVAILABLE	YES - Refer to the Overview Map and Detail Map

**HYDROGEOLOGIC INFORMATION**  
 Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of hydrogeologic information in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what down-gradient sites might be impacted.

**AQUIFLOW®**

Search Radius: 1,000 Mils.

MAP ID	LOCATION	GENERAL DIRECTION
Not Reported	FICIAL TP	GROUNDWATER FLOW

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.



RECEIVED AS FOLLOWS

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic maps, rock stratigraphic logs and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy/gravelly types of soils than clay-heavy types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

GEOLOGIC AGE IDENTIFICATION

Era: . . . . . Category: . . . . .  
 System: . . . . .  
 Series: . . . . .  
 Code: . . . . .

N/A (Specified above as Era, System & Series)

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schindler, R.E. Arndt and W.J. Barwick, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Behman Map, USGS Digital Data Series DDS - 11 (1994).

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSCO are compiled by generating more detailed (SSURGO) soil survey maps. The following information is based on Soil Conservation Service STATSCO data.

Soil Component Name: PDU PA  
 Soil Surface Texture: very stony - all loam  
 Hydraulic Group: Class A - High infiltration rates. Soils are deep, well drained to excessively drained lands and gravels.  
 Soil Drainage Class: Well drained. Soils have intermediate water holding capacity. Depth to water table is more than 8 feet.  
 Hydraulic Status: Soil does not meet the requirements for a hydric soil.  
 Corrosion Potential - Unrocked Steel: MODERATE  
 Depth to Bedrock (M): > 40 inches  
 Depth to Bedrock (Msc): > 60 inches

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Boundary		Soil Layer Information					
Layer	Upper	Lower	Soil Texture Class	Classification	Permeability Rate (in/hr)	Soil Resection (ft)	
1	0 inches	8 inches	very stony - all loam	AA-SHTO Group Silt-Clay Material (more than 35 pct. passing No. 200, Clayey Soil)	Unified Soil for M.L. Arctic subm for M.L.	Mar: 6.00 Msc: 2.00	Mar: 6.50 Msc: 5.60
2	8 inches	40 inches	very stony - all loam	Silt-Clay Material (more than 35 pct. passing No. 200, Clayey Soil)	Arctic subm for M.L.	Mar: 6.00 Msc: 2.00	Mar: 7.30 Msc: 6.10
3	40 inches	44 inches	argillaceous medial	Granular material (35 pct. or less passing No. 200, Stone Fragments, Gravel and Sand)	COARSE GRAINED SOILS, Gravel, Clean Gravel, Poorly Graded Gravel	Mar: 20.00 Msc: 20.00	Mar: 7.30 Msc: 6.60

OTHER SOIL TYPES IN AREA

Based on Soil Conservation Service STATSCO data, the following additional suborder soil types may appear within the general area of target property.

Soil Surface Textures: extremely stony - all loam  
 extremely stony - silt clay loam  
 extremely stony - silt clay loam  
 extremely stony - all loam  
 extremely stony - silt clay loam  
 Shallow Soil Types: No Other Soil Types  
 Deeper Soil Types: unweathered bedrock

ADDITIONAL ENVIRONMENTAL RECORD SOURCES

According to ASTM E 1527-00, Section 7.2.2, "one or more additional state or local sources of environmental records may be checked. In the discretion of the environmental professional, to enhance and supplement federal and state sources. Factors to consider in determining which local or additional state records, if any, should be checked include (1) whether they are reasonably ascertainable, (2) whether they are sufficiently useful, accurate, and complete in light of the objective of the records review (see 7.1.1), and (3) whether they are obtained, pursuant to local, good commercial or customary practices. One of the record sources listed in Section 7.2.2 is water well information. Water well information can be used to assist the environmental professional in assessing sources that may impact groundwater flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells."

RECEIVED AS FOLLOWS

**GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY**

**WELL SEARCH DISTANCE INFORMATION**

**DATABASE:** SEARCH DISTANCE (feet)  
 Federal FROS PWS 1,000  
 State Database: Natural PWS within 1 mile  
 State Database: 1,000

**FEDERAL USGS WELL INFORMATION**

MAP ID	WELL ID	LOCATION FROM TP
A1	USGS0278328	1/4 - 1/2 1/4 NE
3	USGS0278395	1/4 - 1/2 1/4 SE
B4	USGS0278328	1/4 - 1/2 1/4 SE
C8	USGS0278328	1/2 - 1 1/4 ESE
D9	USGS0278394	1/2 - 1 1/4 SE
E12	USGS0278311	1/2 - 1 1/4 NE
F14	USGS0278393	1/2 - 1 1/4 SE
F18	USGS0278312	1/2 - 1 1/4 NE
G10	USGS0278332	1/2 - 1 1/4 SE
H22	USGS0278333	1/2 - 1 1/4 NE
I23	USGS0278397	1/2 - 1 1/4 NE
I24	USGS0278390	1/2 - 1 1/4 SSE

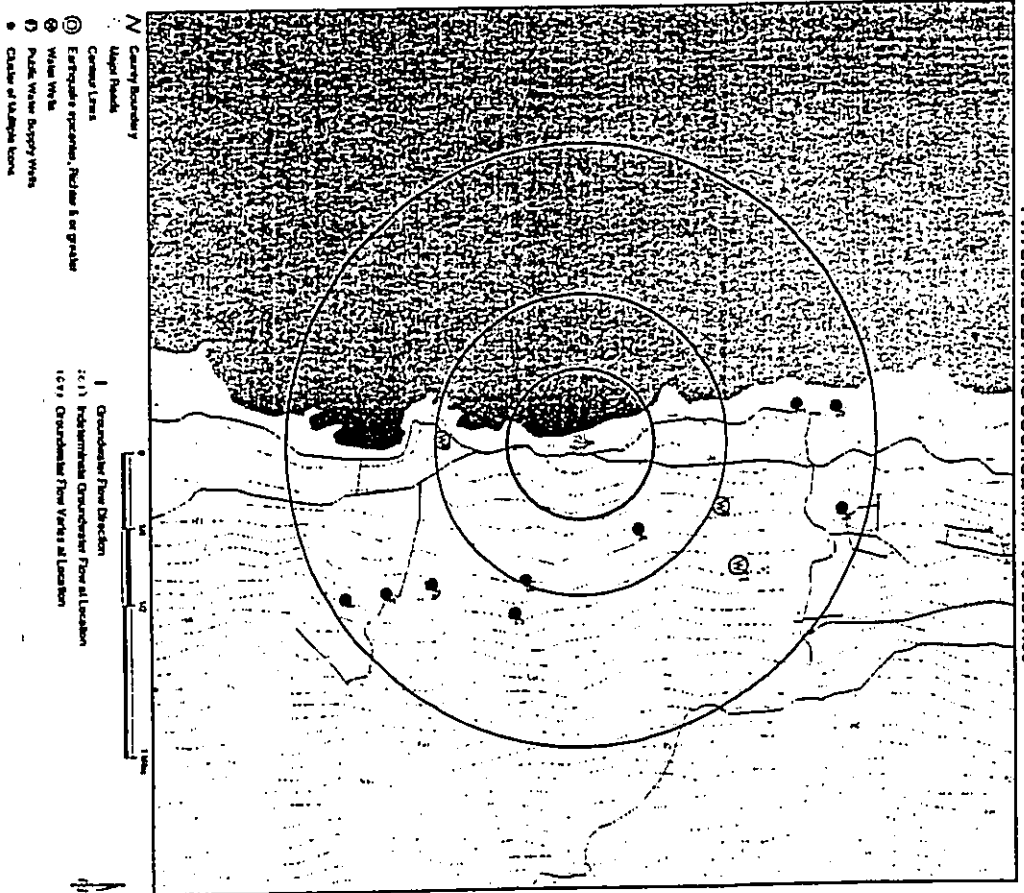
**FEDERAL FROS PUBLIC WATER SUPPLY SYSTEM INFORMATION**

**MAP ID:** \_\_\_\_\_ **WELL ID:** \_\_\_\_\_  
**LOCATION FROM TP:** \_\_\_\_\_  
 No PWS System Found  
 Note: PWS System location is not always the same as well location.

**STATE DATABASE WELL INFORMATION**

MAP ID	WELL ID	LOCATION FROM TP
A2	6-4078-006	1/4 - 1/2 1/4 NE
B5	6-3978-003	1/4 - 1/2 1/4 ESE
6	6-4078-005	1/2 - 1 1/4 NE
C7	6-3978-007	1/2 - 1 1/4 ESE
D10	6-3978-002	1/2 - 1 1/4 SE
E13	6-4078-003	1/2 - 1 1/4 NE
F17	6-3978-005	1/2 - 1 1/4 SE
F18	6-4078-001	1/2 - 1 1/4 NE
G21	6-4028-002	1/2 - 1 1/4 NE
H23	6-4028-004	1/2 - 1 1/4 NE
I24	6-3978-006	1/2 - 1 1/4 SSE

PHYSICAL SETTING SOURCE MAP - 1012891.68



**TARGET PROPERTY:** Podemans Park  
 Podemans Park  
 Madison HI 59753  
 CIVILIAN/EZIP: 20 68267 156.4411  
 LAT/CHG:

**CUSTOMER:** Parsons Brinckerhoff  
**CONTACT:** Hanni Ohlomo  
 1012891.68  
**DATE:** July 17, 2003 3:49 pm

RECEIVED AS FOLLOWS

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID: 64-028-08 WAILEA 7  
 Direction: N  
 Distance: 20 65542  
 Elevation: 156 43663  
 A1: USGS  
 U1 - 1/2 Mile: 156 43663  
 Higher: NAD83  
 State: HI  
 County: Maui County  
 Address: 18300  
 Hydrologic code: 2020000  
 Topographic: 18300  
 Soil Type: 18300  
 C1a Type: 18300  
 C1a Date: 19720101  
 Vial Type: Single well, other than collector or Runway Type  
 Primary Aquifer: Not Reported  
 Aquifer Type: Not Reported  
 Hole depth: Not Reported  
 Project no: Not Reported

Database: EDR ID Number  
 FED USGS USGS02285201

Site ID: 20400715606201

Agency: USGS  
 Date: 64-028-08 WAILEA 7  
 Dec. Latitude: 20 65542  
 Dec. Longitude: -156 43663  
 Coord S'ys: NAD83

A2: HI WELLS 64-028-08  
 NE - 1/2 Mile  
 Higher: NAD83

W1: 64-028-08  
 Island Name: Maui  
 Well name: W1  
 Y1 name: 1975  
 Quad name: 09  
 Longitude: 1560222  
 GFC: N  
 Oid number: Not Reported  
 Type: Percussion Dig  
 Grand Elev: 184  
 Sock casting Depth: 175  
 U1: BR  
 U1a year: 86  
 U1a value: 620  
 U1a year: 700  
 U1a value: 620  
 Pumping Test rate: Not Reported  
 Change Test: Not Reported  
 U1a: Not Reported  
 Annual Date: Not Reported  
 Geology: Not Reported  
 Insects: Not Reported

W2: 4226-08  
 Island Code: Maui  
 Well no: Not Reported  
 Oid name: ROSCOE LADS  
 Date: 204007  
 Label: V  
 Owner/Date: Wellers Oil Ref  
 Well Type: PER  
 Well Year: 12  
 Well Depth: 204  
 Per casing Depth: 192  
 U1a Year: 199  
 U1a Value: 109001875 00 00 00  
 Pumping Test rate: Not Reported  
 Change Test: Not Reported  
 U1a: Not Reported  
 Annual Date: Not Reported  
 Geology: Not Reported  
 Insects: Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID: 64-028-01 MAWENA  
 Direction: N  
 Distance: 20 65542  
 Elevation: 156 43663  
 A1: USGS  
 U1 - 1/2 Mile: 156 43663  
 Higher: NAD83  
 State: HI  
 County: Maui County  
 Address: 18300  
 Hydrologic code: 2020000  
 Topographic: 18300  
 Soil Type: 18300  
 C1a Type: 18300  
 C1a Date: 19720101  
 Vial Type: Single well, other than collector or Runway Type  
 Primary Aquifer: Not Reported  
 Aquifer Type: Not Reported  
 Hole depth: Not Reported  
 Project no: Not Reported

Database: EDR ID Number  
 FED USGS USGS02285195

Site ID: 203023156063001

Agency: USGS  
 Date: 64-028-01 MAWENA  
 Dec. Latitude: 20 65542  
 Dec. Longitude: -156 43663  
 Coord S'ys: NAD83

3: HI WELLS 64-028-01  
 NE - 1/2 Mile  
 Higher: NAD83

W1: 64-028-01  
 Island Code: Maui  
 Well no: Not Reported  
 Oid name: ROSCOE LADS  
 Date: 204007  
 Label: V  
 Owner/Date: Wellers Oil Ref  
 Well Type: PER  
 Well Year: 12  
 Well Depth: 204  
 Per casing Depth: 192  
 U1a Year: 199  
 U1a Value: 109001875 00 00 00  
 Pumping Test rate: Not Reported  
 Change Test: Not Reported  
 U1a: Not Reported  
 Annual Date: Not Reported  
 Geology: Not Reported  
 Insects: Not Reported

W2: 4226-08  
 Island Code: Maui  
 Well no: Not Reported  
 Oid name: ROSCOE LADS  
 Date: 204007  
 Label: V  
 Owner/Date: Wellers Oil Ref  
 Well Type: PER  
 Well Year: 12  
 Well Depth: 204  
 Per casing Depth: 192  
 U1a Year: 199  
 U1a Value: 109001875 00 00 00  
 Pumping Test rate: Not Reported  
 Change Test: Not Reported  
 U1a: Not Reported  
 Annual Date: Not Reported  
 Geology: Not Reported  
 Insects: Not Reported

W3: 64-028-01  
 Island Code: Maui  
 Well no: Not Reported  
 Oid name: ROSCOE LADS  
 Date: 204007  
 Label: V  
 Owner/Date: Wellers Oil Ref  
 Well Type: PER  
 Well Year: 12  
 Well Depth: 204  
 Per casing Depth: 192  
 U1a Year: 199  
 U1a Value: 109001875 00 00 00  
 Pumping Test rate: Not Reported  
 Change Test: Not Reported  
 U1a: Not Reported  
 Annual Date: Not Reported  
 Geology: Not Reported  
 Insects: Not Reported

W4: 64-028-01  
 Island Code: Maui  
 Well no: Not Reported  
 Oid name: ROSCOE LADS  
 Date: 204007  
 Label: V  
 Owner/Date: Wellers Oil Ref  
 Well Type: PER  
 Well Year: 12  
 Well Depth: 204  
 Per casing Depth: 192  
 U1a Year: 199  
 U1a Value: 109001875 00 00 00  
 Pumping Test rate: Not Reported  
 Change Test: Not Reported  
 U1a: Not Reported  
 Annual Date: Not Reported  
 Geology: Not Reported  
 Insects: Not Reported



RECEIVED AS FOLLOWS

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID	Direction	Distance	Elevation	Height	Address	EDR ID Number
D10	SE	1.1 Mile				
Agency:	USGS	Site Name:	6-3976-07 SEB01	Site ID:	203945154290701	
Site Name:	6-3976-07 SEB01	Site Name:	20 65301	Site ID:		
Site Label:	15843248	Site Label:	15843248	Site Label:		
Coord 57E:	NAD83	Coord 57E:	NAD83	Coord 57E:		
State:	HI	State:	HI	State:		
County:	Local County	County:	Local County	County:		
Hydrologic code:	20200000	Hydrologic code:	20200000	Hydrologic code:		
Topographic:	10000 (Lepp)	Topographic:	10000 (Lepp)	Topographic:		
Well Type:	Drum well, other than Spring	Well Type:	Drum well, other than Spring	Well Type:		
Well Date:	19820008	Well Date:	19820008	Well Date:		
Primary Aquifer:	Drum well, other than collector or Runway type	Primary Aquifer:	Drum well, other than collector or Runway type	Primary Aquifer:		
Aquifer Type:	Not Reported	Aquifer Type:	Not Reported	Aquifer Type:		
Well depth:	248	Well depth:	248	Well depth:		
Probe depth:	Not Reported	Probe depth:	Not Reported	Probe depth:		
EDR ID:		EDR ID:		EDR ID:		
Agency:	USGS	Agency:	USGS	Agency:		
Site Name:	6-3976-02 SEB01	Site Name:	20 65307	Site Name:		
Site Label:	15843413	Site Label:	15843413	Site Label:		
Coord 57E:	NAD83	Coord 57E:	NAD83	Coord 57E:		
State:	HI	State:	HI	State:		
County:	Local County	County:	Local County	County:		
Hydrologic code:	20200000	Hydrologic code:	20200000	Hydrologic code:		
Topographic:	10000 (Lepp)	Topographic:	10000 (Lepp)	Topographic:		
Well Type:	Drum well, other than Spring	Well Type:	Drum well, other than Spring	Well Type:		
Well Date:	19770808	Well Date:	19770808	Well Date:		
Primary Aquifer:	Single well, other than collector or Runway type	Primary Aquifer:	Single well, other than collector or Runway type	Primary Aquifer:		
Aquifer Type:	Not Reported	Aquifer Type:	Not Reported	Aquifer Type:		
Well depth:	211	Well depth:	211	Well depth:		
Probe depth:	Not Reported	Probe depth:	Not Reported	Probe depth:		

Well Name:	Well ID:	Well Date:	Well Depth:	Well Type:	Well Status:
Well Name:	6-3976-002	Well Date:	1977	Well Type:	Not Reported
Well ID:	64076-001	Well Date:	1994	Well Type:	Not Reported
Well Date:	1977	Well Date:	1994	Well Date:	
Well Depth:	440	Well Depth:	440	Well Depth:	
Well Type:	Not Reported	Well Type:	Not Reported	Well Type:	
Well Status:	Not Reported	Well Status:	Not Reported	Well Status:	
Well Name:	6-3976-002	Well Name:	64076-001	Well Name:	
Well ID:	64076-001	Well ID:	64076-001	Well ID:	
Well Date:	1977	Well Date:	1994	Well Date:	
Well Depth:	440	Well Depth:	440	Well Depth:	
Well Type:	Not Reported	Well Type:	Not Reported	Well Type:	
Well Status:	Not Reported	Well Status:	Not Reported	Well Status:	

Well Name:	Well ID:	Well Date:	Well Depth:	Well Type:	Well Status:
Well Name:	6-3976-002	Well Date:	1977	Well Type:	Not Reported
Well ID:	64076-001	Well Date:	1994	Well Type:	Not Reported
Well Date:	1977	Well Date:	1994	Well Date:	
Well Depth:	440	Well Depth:	440	Well Depth:	
Well Type:	Not Reported	Well Type:	Not Reported	Well Type:	
Well Status:	Not Reported	Well Status:	Not Reported	Well Status:	

RECEIVED AS FOLLOWS

GEOCHECK - PHYSICAL SETTING SOURCE MAP FINDINGS

Map checker: Not Reported  
 Map checker: Not Reported  
 B/L not depth: 20  
 B/L not depth: 20  
 Pump Capacity: Not Reported  
 Tail map layer: 2-1-008 092  
 Latest head sent: 0  
 Current CI sent: Not Reported  
 Pump test Date: Not Reported  
 Transmissivity: 0  
 Pump depth: Not Reported

Meter CI year: 0  
 Meter CI year: 0  
 Well seal height: 0  
 Well seal height: 0  
 Drill (mpt): Not Reported  
 Agiler code: 60304  
 Car head sent: Not Reported  
 Corol. Date: 02/11/94 00:00:00  
 Surveyor: Not Reported  
 Pump valve elev: Not Reported

E13  
 North  
 1/2 - 1 Mile  
 Higher

Agency: USGS  
 Site Name: 6-4026-03 W69  
 Dec. Latitude: 20 87294  
 Dec. Longitude: -158 48302  
 Coord Sys: NAD83  
 State: HI  
 County: Maui County  
 Name: 110  
 Hydrologic code: 2030200  
 Topographic Code: 796  
 Date Type: Ground-water other than Spring  
 Well Type: 10910101  
 Physical Aquifer: Single well, other than collector or Runway type  
 Aquifer Type: Not Reported  
 Well depth: Not Reported  
 Source: Not Reported  
 Project no: Not Reported

E13  
 North  
 1/2 - 1 Mile  
 Higher

Agency: USGS  
 Site Name: 6-4026-03  
 Dec. Latitude: 20 87294  
 Dec. Longitude: -158 48302  
 Coord Sys: NAD83  
 State: HI  
 County: Maui County  
 Name: 110  
 Hydrologic code: 2030200  
 Topographic Code: 796  
 Date Type: Ground-water other than Spring  
 Well Type: 10910101  
 Physical Aquifer: Single well, other than collector or Runway type  
 Aquifer Type: Not Reported  
 Well depth: Not Reported  
 Source: Not Reported  
 Project no: Not Reported

GEOCHECK - PHYSICAL SETTING SOURCE MAP FINDINGS

Solid casing Depth: 31  
 User: 0  
 Well year: 71  
 Chisel valve: 0  
 Pumping Test: Not Reported  
 Chisel Test: Not Reported  
 Well: Not Reported  
 Annual Date: Not Reported  
 Geology: OH  
 Hydrologic code: Not Reported  
 Meter checker: Not Reported  
 Meter checker: Not Reported  
 Bot. hole depth: Not Reported  
 Bot. hole depth: Not Reported  
 Pump Capacity: Not Reported  
 Tail map layer: Not Reported  
 Latest head sent: 0  
 Current CI sent: Not Reported  
 Pump test Date: Not Reported  
 Transmissivity: 0  
 Pump depth: Not Reported

Perf casing Depth: Not Reported  
 User Desc: Other  
 Well Top Elev: 0  
 Tail date: Not Reported  
 Drop in water Lk: Not Reported  
 Temperature: Not Reported  
 Pump Capacity: Not Reported  
 Static Water Lk: Not Reported  
 Geology desc: Not Reported  
 Last measured: Not Reported  
 Meter CI year: Not Reported  
 Meter CI year: Not Reported  
 bot. well depth: Not Reported  
 Well depth: Not Reported  
 Drill (mpt): Not Reported  
 Agiler code: Not Reported  
 Car head sent: 60304  
 Current Date: 01/01/95 00:00:00  
 Surveyor: Not Reported  
 Pump valve elev: Not Reported

D14  
 1/2 - 1 Mile  
 Higher

Agency: USGS  
 Site Name: 6-3176-03 SEBU 8  
 Dec. Latitude: 20 84459  
 Dec. Longitude: -158 43365  
 Coord Sys: NAD83  
 State: HI  
 County: Maui County  
 Name: 300 45  
 Hydrologic code: 2002000  
 Topographic Code: 156  
 Date Type: Ground-water other than Spring  
 Well Type: 18641130  
 Physical Aquifer: Single well, other than collector or Runway type  
 Aquifer Type: Not Reported  
 Well depth: Not Reported  
 Source: Not Reported  
 Project no: Not Reported

D13  
 1/2 - 1 Mile  
 Higher

Agency: USGS  
 Site Name: 6-3176-03  
 Dec. Latitude: 20 84459  
 Dec. Longitude: -158 43365  
 Coord Sys: NAD83  
 State: HI  
 County: Maui County  
 Name: 300 45  
 Hydrologic code: 2002000  
 Topographic Code: 156  
 Date Type: Ground-water other than Spring  
 Well Type: 18641130  
 Physical Aquifer: Single well, other than collector or Runway type  
 Aquifer Type: Not Reported  
 Well depth: Not Reported  
 Source: Not Reported  
 Project no: Not Reported



RECEIVED AS FOLLOWS

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Solid casing Depth:	200	Per casing Depth:	230
User:	871	Use Desc:	Hydrogen
Use year:	87	Water Top Elev:	9020/1981 00 00 00
Character value:	0	Test date:	Not Reported
Pumping Test rate:	503	Drop in water Lvl:	Not Reported
Character Test:	1050	Temperature:	400
Unit:	Not Reported	Pump Capacity:	Not Reported
Annual Yield:	Not Reported	Static Water Lvl:	Not Reported
Geology:	OH	Geology Desc:	Human volcanics (Intruded eruption, East Main) live flow
Installed:	Not Reported	Water Source:	0
Main elevation:	Not Reported	Water Type:	0
Bottom elevation:	Not Reported	Water Depth:	11
Bottom depth:	119	Well ID year:	Not Reported
Bottom depth:	119	Well ID year:	Not Reported
Pump Capacity:	211,008.078	Well ID year:	Not Reported
Label head note:	Not Reported	Well ID year:	Not Reported
Current CI Desc:	Not Reported	Well ID year:	Not Reported
Pump Well Desc:	Not Reported	Well ID year:	Not Reported
Transmissivity:	0	Well ID year:	Not Reported
Pump depth:	Not Reported	Well ID year:	Not Reported

Agency:	USGS	Site Name:	6-3828-04 SEIBUS	Site ID:	20022150701101	FED USGS	USGS0228592
State:	HI	Dec. Latitude:	20.65292				
County:	Maui County	Dec. Longitude:	-156.43357				
Hydrologic code:	220100	Coord SFC:	NAD83				
Topographic:	20020000	State:	HI				
ESM Type:	Vehicle (Steps)	Agency:	USGS				
Well Type:	Ground-water other than Spring	Dec. Latitude:	20.65292				
Primary Aquifer:	Single well, other than collector or Recovery Type	Dec. Longitude:	-156.43357				
Aquifer Type:	Not Reported	Coord SFC:	NAD83				
Well depth:	Not Reported	State:	HI				
Hyd depth:	Not Reported	County:	Maui County				
Projected no:	Not Reported	Hydrologic code:	220100				
		Topographic:	20020000				
		ESM Type:	Vehicle (Steps)				
		Well Type:	Ground-water other than Spring				
		Primary Aquifer:	Single well, other than collector or Recovery Type				
		Aquifer Type:	Not Reported				
		Well depth:	Not Reported				
		Hyd depth:	Not Reported				
		Projected no:	Not Reported				

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Agency:	USGS	Site Name:	6-4078-02 W71	Site ID:	200404150294401
State:	HI	Dec. Latitude:	20.87514		
County:	Maui County	Dec. Longitude:	-156.44274		
Hydrologic code:	201000	Coord SFC:	NAD83		
Topographic:	20020000	State:	HI		
ESM Type:	Well surface	Agency:	USGS		
Well Type:	Ground-water other than Spring	Dec. Latitude:	20.87514		
Primary Aquifer:	Single well, other than collector or Recovery Type	Dec. Longitude:	-156.44274		
Aquifer Type:	Not Reported	Coord SFC:	NAD83		
Well depth:	Not Reported	State:	HI		
Hyd depth:	Not Reported	County:	Maui County		
Projected no:	Not Reported	Hydrologic code:	201000		
		Topographic:	20020000		
		ESM Type:	Well surface		
		Well Type:	Ground-water other than Spring		
		Primary Aquifer:	Single well, other than collector or Recovery Type		
		Aquifer Type:	Not Reported		
		Well depth:	Not Reported		
		Hyd depth:	Not Reported		
		Projected no:	Not Reported		

Agency:	USGS	Site Name:	6-4078-02	Site ID:	4078-02
State:	HI	Dec. Latitude:	20.87514		
County:	Maui County	Dec. Longitude:	-156.44274		
Hydrologic code:	201000	Coord SFC:	NAD83		
Topographic:	20020000	State:	HI		
ESM Type:	Well surface	Agency:	USGS		
Well Type:	Ground-water other than Spring	Dec. Latitude:	20.87514		
Primary Aquifer:	Single well, other than collector or Recovery Type	Dec. Longitude:	-156.44274		
Aquifer Type:	Not Reported	Coord SFC:	NAD83		
Well depth:	Not Reported	State:	HI		
Hyd depth:	Not Reported	County:	Maui County		
Projected no:	Not Reported	Hydrologic code:	201000		
		Topographic:	20020000		
		ESM Type:	Well surface		
		Well Type:	Ground-water other than Spring		
		Primary Aquifer:	Single well, other than collector or Recovery Type		
		Aquifer Type:	Not Reported		
		Well depth:	Not Reported		
		Hyd depth:	Not Reported		
		Projected no:	Not Reported		



RECEIVED AS FOLLOWS

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID	Database	EDR ID Number
Diction Elevation		
172 - 1 Site		
Agency: USGS	Site ID: 20404158282501	FED USGS USQ502218597
Site Name: 6-1028-004		
State: HI		
County: Maui County		
Address: 159 00		
Hydrologic code: 20000000		
Topographic: Middle (broad)		
Site type: Ground-water other than spring		
Well type: Stream/Well, other than collector or flow-type		
Well ID: Not Reported		
Well depth: 100		
Source: Not Reported		
Primary Aquifer: Not Reported		
Secondary Aquifer: Not Reported		
Other aquifers: Not Reported		
Notes: Not Reported		
Proposed use: Not Reported		

18 WELLS 6-1028-004

Wells	Well ID	Well Name	Well Type	Well Depth	Source
W1	6-1028-004	Well name	Well ID	Well Depth	Source
W2	4628-04	Well name	Well ID	Well Depth	Source
W3	Not Reported	Well name	Well ID	Well Depth	Source
W4	SMGCR-LA/VE	Well name	Well ID	Well Depth	Source
W5	204043	Well name	Well ID	Well Depth	Source
W6	Y	Well name	Well ID	Well Depth	Source
W7	Wahala GR Bas	Well name	Well ID	Well Depth	Source
W8	R01	Well name	Well ID	Well Depth	Source
W9	12	Well name	Well ID	Well Depth	Source
W10	210	Well name	Well ID	Well Depth	Source
W11	200	Well name	Well ID	Well Depth	Source
W12	brigation	Well name	Well ID	Well Depth	Source
W13	104	Well name	Well ID	Well Depth	Source
W14	00/25/1972 00:00:00	Well name	Well ID	Well Depth	Source
W15	117	Well name	Well ID	Well Depth	Source
W16	Not Reported	Well name	Well ID	Well Depth	Source
W17	703	Well name	Well ID	Well Depth	Source
W18	Not Reported	Well name	Well ID	Well Depth	Source
W19	Kula volcanic (Haleakala)	Well name	Well ID	Well Depth	Source
W20	Not Reported	Well name	Well ID	Well Depth	Source
W21	Not Reported	Well name	Well ID	Well Depth	Source

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID	Database	EDR ID Number
Diction Elevation		
172 - 1 Site		
Agency: USGS	Site ID: 6-3278-008	FED USGS USQ502218596
Site Name: 6-3278-008		
State: HI		
County: Maui County		
Address: 159 00		
Hydrologic code: 20000000		
Topographic: Middle (broad)		
Site type: Ground-water other than spring		
Well type: Stream/Well, other than collector or flow-type		
Well ID: Not Reported		
Well depth: 100		
Source: Not Reported		
Primary Aquifer: Not Reported		
Secondary Aquifer: Not Reported		
Other aquifers: Not Reported		
Notes: Not Reported		
Proposed use: Not Reported		

18 WELLS 6-3278-008

Wells	Well ID	Well Name	Well Type	Well Depth	Source
W1	6-3278-008	Well name	Well ID	Well Depth	Source
W2	3978-08	Well name	Well ID	Well Depth	Source
W3	Not Reported	Well name	Well ID	Well Depth	Source
W4	ROSGOE-1A005	Well name	Well ID	Well Depth	Source
W5	203915	Well name	Well ID	Well Depth	Source
W6	Y	Well name	Well ID	Well Depth	Source
W7	Seabur How Inc	Well name	Well ID	Well Depth	Source
W8	FER	Well name	Well ID	Well Depth	Source
W9	12	Well name	Well ID	Well Depth	Source
W10	263	Well name	Well ID	Well Depth	Source
W11	263	Well name	Well ID	Well Depth	Source
W12	brigation	Well name	Well ID	Well Depth	Source
W13	1	Well name	Well ID	Well Depth	Source
W14	00/10/1980 00:00:00	Well name	Well ID	Well Depth	Source
W15	10	Well name	Well ID	Well Depth	Source
W16	Not Reported	Well name	Well ID	Well Depth	Source
W17	400	Well name	Well ID	Well Depth	Source
W18	Not Reported	Well name	Well ID	Well Depth	Source
W19	Not Reported	Well name	Well ID	Well Depth	Source
W20	Not Reported	Well name	Well ID	Well Depth	Source
W21	0	Well name	Well ID	Well Depth	Source
W22	0	Well name	Well ID	Well Depth	Source
W23	11	Well name	Well ID	Well Depth	Source
W24	300	Well name	Well ID	Well Depth	Source
W25	Not Reported	Well name	Well ID	Well Depth	Source
W26	6004	Well name	Well ID	Well Depth	Source
W27	Not Reported	Well name	Well ID	Well Depth	Source
W28	00/10/1980 00:00:00	Well name	Well ID	Well Depth	Source
W29	Not Reported	Well name	Well ID	Well Depth	Source
W30	Not Reported	Well name	Well ID	Well Depth	Source

RECEIVED AS FOLLOWS

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Agency: USGS  
 Site Name: S-3226-08 SERBU W-4  
 Date: 2016/09/28  
 Date Entered: 12/6/17  
 Occur Type: HAD03  
 State: HI  
 County: Maui County  
 District: 214  
 Hydrologic Code: 2020000  
 Topographic Code: 1000000  
 Basin Type: Ground Water  
 Basin Name: Other than Spring  
 Cont. Date: 1989/07/28  
 Well Type: Single well other than collector or recovery type  
 Primary Aquifer: Not Reported  
 Aquifer Type: Not Reported  
 Hole Depth: Not Reported  
 Project No: Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS  
 RADON

AREA RADON INFORMATION

Federal EPA Radon Zones for MAUI County: 3  
 Note: Zone 1 indoor average level > 4 pCiL,  
 Zone 2 indoor average level > 2 pCiL, and < 4 pCiL,  
 Zone 3 indoor average level < 2 pCiL.

Area	Average Activity	% < 4 pCiL	% 4-20 pCiL	% > 20 pCiL
Living Area - 1st Floor	0.010 pCiL	Not Reported	0%	Not Reported
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	Not Reported	Not Reported	Not Reported	Not Reported

RECEIVED AS FOLLOWS

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)  
Source: United States Geologic Survey  
EDR acquired the USGS 7.5' Digital Elevation Model in 2002. 7.5-minute DEMs correspond to the USGS  
124,000- and 125,000-scale topographic quadrangle maps.

HYDROLOGIC INFORMATION

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal  
Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.  
NFI: National Watershed Inventory. This data, available in select counties across the country, was obtained by EDR  
in 2002 from the U.S. Fish and Wildlife Service.

HYDROGEOLOGIC INFORMATION

AQUICLONE<sup>®</sup> Information System  
Source: EDR proprietary database of groundwater flow information  
EDR has developed the AQUICLONE Information System (AIS) to provide data on the general direction of groundwater  
flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has  
extrapolated the data of the report (hydrologically determined groundwater flow direction and depth to water table  
information).

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit  
Source: P. G. Schindler, R. E. Arndt and W. J. Baskin. Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital  
representation of the 1971 P. B. King and H. L. Balkman Maps. USGS Digital Data Series DDS - 11 (1995)  
STATSOCS: State Soil Geographic Database  
Source: Department of Agriculture, Natural Resources Conservation Service  
The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the national Cooperative  
Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey  
information for privately owned lands in the United States. A soil map is a representation of  
soil patterns in a landscape. Soil maps for STATSOCS are compiled by generating more detailed (SSURGO) soil  
survey maps.

ADDITIONAL ENVIRONMENTAL RECORD SOURCES

FEDERAL WATER WELLS

PWS: Public Water Systems  
Source: EPA/Office of Drinking Water  
Telephone: 202-564-3750  
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at  
least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data  
Source: EPA/Office of Drinking Water  
Telephone: 202-564-3750

Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after  
August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)  
This database contains descriptive information on wells where the USGS collects or has collected data on surface  
water and/or groundwater. The groundwater data includes information on well, spring, and other sources of groundwater.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

STATE RECORDS

Ground Water Wells  
Source: Department of Land and Natural Resources  
Telephone: 808-597-0242

RADON

Area Radon Information  
Source: USGS  
Telephone: 703-354-4200  
The National Radon Database has been developed by the U.S. Environmental Protection Agency  
(USEPA) and is a compilation of the EPA's National Radon Survey and the National Residential Radon Survey.  
The study covers the years 1980 - 1992. Where necessary data has been supplemented by information collected at  
private sources such as universities and research institutions.  
EPA Radon Zones  
Source: EPA  
Telephone: 703-354-4200  
Sections 207 & 209 of RUA directed EPA to list and identify areas of U.S. with the potential for elevated indoor  
radon levels.

OTHER

Airport Landing Facilities: Private and public use landing facilities  
Source: Federal Aviation Administration, 800-471-6655  
Eggsellers: World serafuata operators, Fowler 5 or greater  
Source: Department of Commerce, National Oceanic and Atmospheric Administration

RECEIVED AS FOLLOWS

The EDR Radius Map  
with GeoCheck®

Kaewa Place  
Kaewa Place  
Kawailae, HI 96743  
Inquiry Number: 1012891.7s

July 17, 2003

**EDR**®: Environmental  
Data  
Resources, Inc.

**The Source  
For Environmental  
Risk Management  
Data**

3530 Post Road  
Southington, Connecticut 06890  
Nationwide Customer Service  
Telephone: 1-800-352-0050  
Fax: 1-800-231-6802  
Internet: www.edrnet.com

TABLE OF CONTENTS

SECTION	PAGE
Executive Summary.....	ES-1
Overview Map.....	2
Detail Map.....	3
Map Findings Summary.....	4
Map Findings.....	5
Orphan Summary.....	6
Government Records Search/Data Currency Tracking.....	GR-1
<b>GEOCHECK ADDENDUM</b>	
Physical Setting Source Addendum.....	A-1
Physical Setting Source Summary.....	A-2
Physical Setting Source Map.....	A-6
Physical Setting Source Map Findings.....	A-7
Physical Setting Source Records Searched.....	A-14

Thank you for your business.  
Please contact EDR at 1-800-352-0050  
with any questions or comments.

Disclaimer

The report contains information obtained from a variety of public and other sources. NO WARRANTY EXPRESSED OR IMPLIED, IS MADE WHATSOEVER IN CONNECTION WITH THIS REPORT. ENVIRONMENTAL DATA RESOURCES INC. SPECIFICALLY DISCLAIMS THE MAKING OF ANY SUCH WARRANTIES, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE. ALL RISK IS ASSUMED BY THE USER. IN NO EVENT SHALL EDR BE LIABLE TO ANYONE, WHETHER ARISING OUT OF NEGLIGENCE, ACCIDENT OR ANY OTHER CAUSE, FOR ANY LOSS OR DAMAGE, INCLUDING WITHOUT LIMITATION, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR EXEMPLARY DAMAGES. EDR's contents copyright 2003 by Environmental Data Resources, Inc. All rights reserved. Reproduction in any media or format, in whole or in part, of any report or map of Environmental Data Resources, Inc. or its affiliates, is prohibited without prior written permission. EDR and the edr logo are trademarks of Environmental Data Resources, Inc. or its affiliates. All other trademarks used herein are the property of their respective owners.

RECEIVED AS FOLLOWS

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc. (EDR). The report contains the government records search requirements of ASTM Standard Practices for Environmental Site Assessments, E 1527-00. Search distances are per ASTM standard or custom distances requested by the user.

TARGET PROPERTY INFORMATION

ADDRESS

KAEWA PLACE  
KAWAIIHALE, HI 96743

COORDINATES

Latitude (North): 20 04'15.0" - 20' 7' 30.3"  
Longitude (West): 155 03'32.0" - 155 48' 59.8"  
Universal Transverse Mercator Zone 5  
UTM X (Meters): 2088017  
UTM Y (Meters): 22181625  
Elevation: 59 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property: 2400155-A7 KAWAIIHALE, HI  
Source: USGS 7.5 min quad index

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable") government records either on the target property or within the ASTM E 1527-00 search radius around the target property for the following databases:

FEDERAL ASTM STANDARD

NPL..... National Priority List  
Proposed NPL..... Proposed National Priority List Sites  
CERCLIS..... Comprehensive Environmental Response, Compensation, and Liability Information System  
CERCLA..... CERCLA No Further Remedial Action Planned  
CORRECTS..... Corrective Action Report  
RCRIS-750..... Resource Conservation and Recovery Information System  
RCRIS-100..... Resource Conservation and Recovery Information System  
RCRIS-100..... Resource Conservation and Recovery Information System  
ERNS..... Emergency Response Notification System

STATE ASTM STANDARD

SHWS..... Sites List

TC01191171 EXECUTIVE SUMMARY 1

EXECUTIVE SUMMARY

SHWLF..... Permitted Landfills in the State of Hawaii  
USST..... Leaking Underground Storage Tank Database  
UST..... Underground Storage Tank Database

FEDERAL ASTM SUPPLEMENTAL

CONSENT..... Superfund (CERCLA) Consent Decrees  
ROD..... Record Of Decision  
DeListed NPL..... Federal Priority List Deletions  
FINDS..... Facility Index System/ Facility Identification Initiative Program Summary Report  
HMINS..... Hazardous Materials Information Reporting System  
MLTS..... Material Handling Tracking System  
MINES..... Mine Identifier Index File  
NPL Items..... Federal Superfund List  
PCD..... PCL Activity Database System  
PCL..... Department of Defense Sites  
PLANS..... RCRA Administrative Action Tracking System  
RIS..... Toxic Chemical Release Inventory System  
TSCA..... Toxic Substances Control Act  
Section 7 Tracking System  
FIRPV TSCA Tracking System - FIRPA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

STATE OR LOCAL ASTM SUPPLEMENTAL

SPILLS..... Release Notifications

EDR PROPRIETARY HISTORICAL DATABASES

Coal Gas..... Former Manufactured Gas (Coal Gas) Sites

SURROUNDING SITES SEARCH RESULTS

Surrounding sites were not identified.  
Unmapped (orphan) sites are not considered in the foregoing analysis.

TC01191171 EXECUTIVE SUMMARY 2

RECEIVED AS FOLLOWS

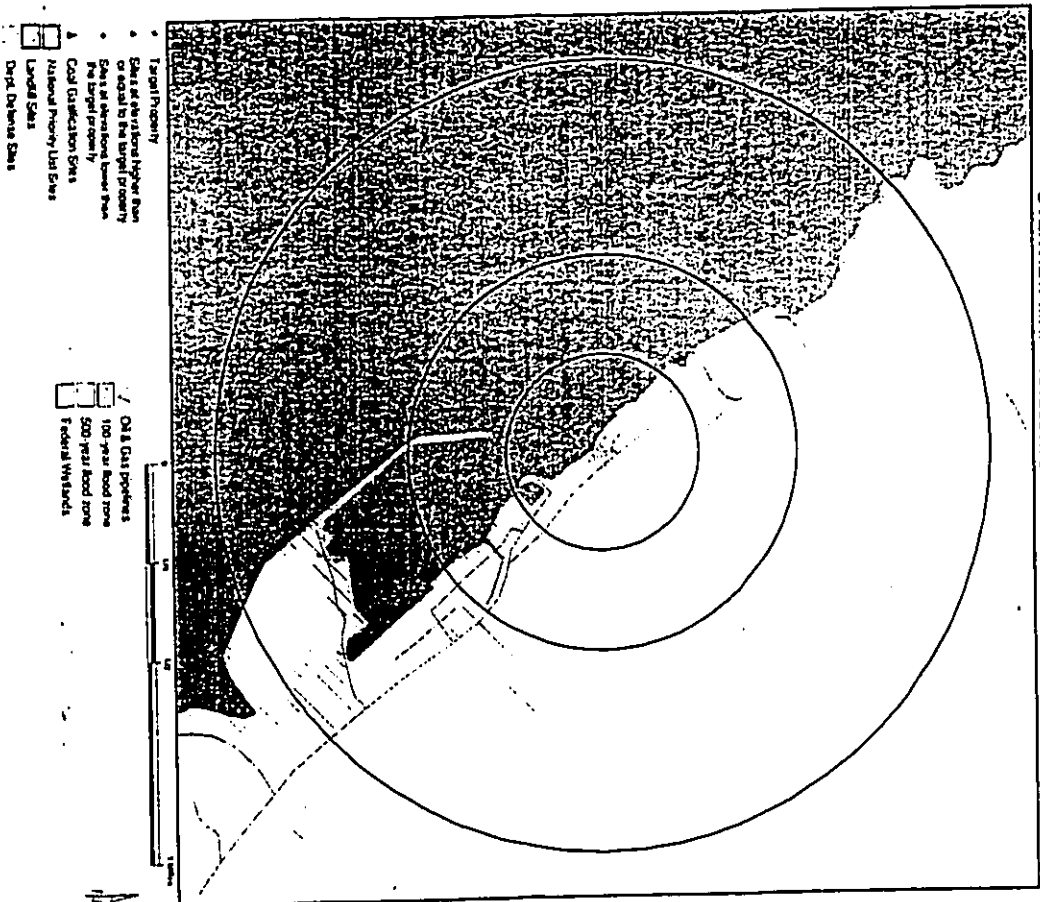
**EXECUTIVE SUMMARY**

Due to poor or inadequate address information, the following sites were not mapped:

Site Name	Databases(s)
YAMADA & SONS TRUCKING DIESEL SPILL	SHWS
PIONEER LUMBER	SHWS
HYATT WAKALOA	SHWS
PIONEER LUMBER	CERC-NR-RAP
WEST HAWAII LANDFILL	SWFALF
DEPT OF HAWAII HOKI LANDS - WE	LUST, UST
KAUUELA VACUUM COOLING COOP. LTD	LUST
L.B. PARTNERS	UST
LUCY HENRIQUES MEDICAL CENTER	UST
AIRFIT STOP KAWAII	UST
KAUUELA VACUUM COOLING COOP. LTD	UST
DON'S PAKE KITCHEN	UST
KAWAIIA CENTRAL OFFICE	UST
KAWAIIA OPERATIONS CENTER	UST
IX PARKER RANCH	UST
CANADA FRANCE HAWAII TELESCOPE	HACNET

10/19/2003 11:26 EXECUTIVE SUMMARY 3

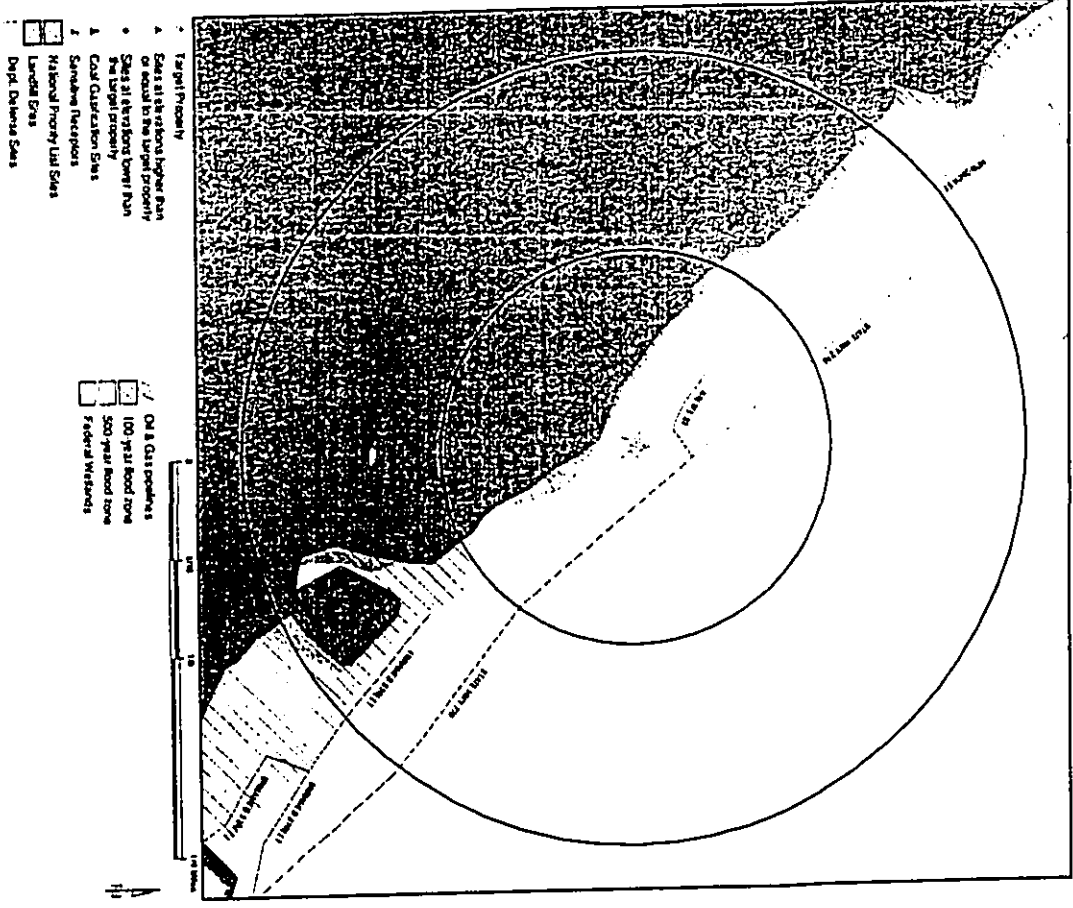
OVERVIEW MAP - 1012891.76 - Parsons Brinckerhoff



<b>TARGET PROPERTY:</b>	Kaiowa Picke Kaiowa Picke Kawahāhā HI 96743 20 0418 / 155 8333 LATAONG	<b>CUSTOMER:</b>	Parsons Brinckerhoff North Oahu 10/12/03 11:26 July 17, 2003 3:47 pm
<b>ADDRESS:</b>		<b>CONTACT:</b>	
<b>CITY/STATE/ZIP:</b>		<b>MOBILE #:</b>	
<b>CITY/STATE/ZIP:</b>		<b>DATE:</b>	

RECEIVED AS FOLLOWS

DETAIL MAP - 1012891.7s - Parsons Brinckerhoff



TARGET PROPERTY: Kaeva Place  
 ADDRESS: Kaeva Place  
 CITY/STATE/ZIP: Kawaiahae HI 96743  
 LAT/LONG: 20.0418 / 155.8333

CUSTOMER: Parsons Brinckerhoff  
 CONTRACT: NARI Olano  
 REQUEST #: 1012891.7s  
 DATE: July 17, 2003 2:47 pm

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Picked
<b>FEDERAL ASTM STANDARD</b>								
NPL		1,000	0	0	0	0	NR	0
Proposed NPL		1,000	0	0	0	0	NR	0
CERCLIS		0,500	0	0	0	NR	NR	0
CERCLIS-NAP		0,250	0	0	0	NR	NR	0
CORRECTS		1,000	0	0	0	NR	NR	0
RICRS-15D		0,250	0	0	0	NR	NR	0
RICRS-15D		0,250	0	0	0	NR	NR	0
RICRS-15D		0,250	0	0	0	NR	NR	0
RICRS Sm. Open. Gen.		TP	NR	NR	NR	NR	NR	0
RICRS Sm. Open. Gen.		TP	NR	NR	NR	NR	NR	0
ENHS		TP	NR	NR	NR	NR	NR	0
<b>STATE ASTM STANDARD</b>								
SIWS		1,000	0	0	0	0	NR	0
State Landfill		0,500	0	0	0	NR	NR	0
LUST		0,500	0	0	0	NR	NR	0
UST		0,250	0	0	0	NR	NR	0
<b>FEDERAL ASTM SUPPLEMENTAL</b>								
CONSENT		1,000	0	0	0	0	NR	0
ROD		1,000	0	0	0	0	NR	0
Deeded NPL		1,000	0	0	0	NR	NR	0
FINDS		TP	NR	NR	NR	NR	NR	0
HAIRES		TP	NR	NR	NR	NR	NR	0
MALTS		TP	NR	NR	NR	NR	NR	0
MINRES		0,250	0	0	0	NR	NR	0
NPL Users		TP	NR	NR	NR	NR	NR	0
PAOS		TP	NR	NR	NR	NR	NR	0
POOD		1,000	0	0	0	NR	NR	0
RAATS		TP	NR	NR	NR	NR	NR	0
RAATS		TP	NR	NR	NR	NR	NR	0
TRUS		TP	NR	NR	NR	NR	NR	0
SCA		TP	NR	NR	NR	NR	NR	0
S71S		TP	NR	NR	NR	NR	NR	0
PTIS		TP	NR	NR	NR	NR	NR	0
<b>STATE OR LOCAL ASTM SUPPLEMENTAL</b>								
SPRIS		TP	NR	NR	NR	NR	NR	0
<b>EDR PROPRIETARY HISTORICAL DATABASES</b>								
Coal Gas		1,000	0	0	0	0	NR	0

NOTES:  
 AQUIFLOW - see EDR Physical Siting Source Addendum  
 TP = Target Property  
 NR = Not Requested at this Search Distance  
 Sites may be listed in more than one database

# RECEIVED AS FOLLOWS

Map ID  
 Division  
 Distance (mi)  
 Elevation  
 Date

MAP FRONCKS

Distance (mi)  
 Elevation  
 Date

EDR ID Number  
 EPA ID Number

Coal Gas Site Search: No sites were found in a search of Real Property Search's ENVIRONMENTAL database.

NO SITES FOUND

TC10128917a Page 5

TC10128917a Page 8

EDR ID	Site Name	Site Address	Zip	Distance (mi)
51078943	WEST HAWAII LANDFILL	NORTH KOHA	96743	UST
5001237015	L.B. PATTERNS	P.O. BOX 1335 / KAAHALAHOA HWY	96743	UST
5001237166	LUCY HENRIQUEZ MEDICAL CENTER	P.O. BOX 1108 / KAAHALAHOA HWY	96743	UST
5002171785	LAUREL STOP KAWAIAE	P.O. BOX 4518 81-3487 / MOHI PALE HWY	96743	SHWS
81054438	YAMADA & SONS TRUCKING DETAIL SPILL	KAWAIAE RD. MILE MARKER 55	96743	SHWS
810372655	1X PARKER BLVD	81-1187 / KAAHALAHOA HWY	96743	HZNST
810372655	CAYUDA FRANCE HAWAII TELESCOPE	55 1258 / KAAHALAHOA HWY	96743	HZNST
5001237015	DEPT OF HAWAIIAN HOME LANDS - WE	KAAHALAHOA HWY / P.O. BOX 125	96743	LUST, UST
5001237107	KAAHALA VACUUM COOLING COOP. LTD	KAAHALAHOA HWY	96743	LUST
5003541831	KAAHALA VACUUM COOLING COOP. LTD	KAAHALAHOA HWY	96743	LUST
5003541832	DOH'S PAVE KITCHEN	KAAHALAHOA HWY	96743	SHWS
100481122	POKONEI LUMBER	KAWAIAE HWY	96743	CENCRFPA
100387945	POKONEI LUMBER	KAWAIAE HWY	96743	UST
500341915	KAWAIAE CENTRAL OFFICE	QUEEN KAWAIAE HWY	96743	SHWS
810424218	HATTI WAKILOA	WAKILOA BEACH RESORT	96743	SHWS
500222223	WAIHEA OPERATIONS CENTER	HWY 18 KAWAIAE RD	96743	UST

ORPHAN SUMMARY



RECEIVED AS FOLLOWS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Expired ASTM days: Provides confirmation that the EDR report meets or exceeds the 90-day updating requirement of the ASTM standard.

FEDERAL ASTM STANDARD RECORDS

NPL National Priority List

Source: EPA  
National Priority List (Superfund): The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Geographic Interpretation Center (EGIC) and regional EPA offices.

Date of Government Vendor: 04/00/03  
Date Made Active at EDR: 06/02/03  
Database Release Frequency: Semi-Annually  
Date of Data Arrival at EDR: 06/05/03  
Expired ASTM days: 28  
Date of Last EDR Contact: 06/05/03

NPL Site Boundaries

Source:

EPA's Environmental Geographic Interpretation Center (EGIC)

Telephone: 202-564-7333

EPA Region 1

Telephone: 617-418-1143

EPA Region 3

Telephone: 215-814-5418

EPA Region 4

Telephone: 404-562-8003

EPA Region 8

Telephone: 214-655-6658

EPA Region 9

Telephone: 202-312-8174

Proposed NPL: Proposed National Priority List Sites

Source: EPA

Telephone: N/A

Date of Government Vendor: 04/02/03

Date Made Active at EDR: 06/02/03

Database Release Frequency: Semi-Annually

Date of Data Arrival at EDR: 06/05/03

Expired ASTM days: 28

Date of Last EDR Contact: 06/05/03

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System

Source: EPA

Telephone: 703-413-0223

CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priority List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Vendor: 03/19/03

Date Made Active at EDR: 04/06/03

Database Release Frequency: Quarterly

Date of Data Arrival at EDR: 03/24/03

Expired ASTM days: 15

Date of Last EDR Contact: 06/22/03

CERCLIS-AIRBAL: CERCLIS No Further Remedial Action Planned

Source: EPA

Telephone: 703-413-0223

As of February 1995, CERCLIS sites designated the Further Remedial Action Planner (FRAP) have been removed from CERCLIS. FRAP sites may be sites where, following an initial investigation, no contamination was found, contamination was removed quickly without the need for the site to be placed on the NPL, or the contamination was not serious enough to require Federal Superfund action or NPL consideration. EPA has removed approximately 25,000 FRAP sites to an unclassified list for the redevelopment of these properties and has archived them as historical records to EPA does not necessarily report the investigations in the future. This policy change is part of the EPA's Brownfields Redevelopment Program to help cities, states, private investors and elected citizens to promote economic redevelopment of unproductive urban sites.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Vendor: 03/19/03  
Date Made Active at EDR: 04/06/03  
Database Release Frequency: Quarterly  
Date of Data Arrival at EDR: 03/24/03  
Expired ASTM days: 15  
Date of Last EDR Contact: 06/22/03

CORRECTS: Corrective Action Report

Source: EPA

Telephone: 800-424-9318

CORRECTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Vendor: 03/11/03

Date Made Active at EDR: 06/09/03

Database Release Frequency: Semi-Annually

Date of Data Arrival at EDR: 04/07/03

Expired ASTM days: 31

Date of Last EDR Contact: 06/09/03

RCRIS: Resource Conservation and Recovery Information System

Source: EPA/ANTS

Telephone: 800-424-9318

Resource Conservation and Recovery Information System. RCRIS produces selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA).

Date of Government Vendor: 04/09/03

Date Made Active at EDR: 07/02/03

Database Release Frequency: Varies

Date of Data Arrival at EDR: 05/09/03

Expired ASTM days: 33

Date of Last EDR Contact: 06/26/03

EBRS: Emergency Response Notification System

Source: National Response Center, United States Coast Guard

Telephone: 202-269-2242

Emergency Response Notification System. EBRS records and stores information on reported releases of oil and hazardous substances.

Date of Government Vendor: 12/01/02

Date Made Active at EDR: 02/05/03

Database Release Frequency: Annually

Date of Data Arrival at EDR: 01/27/03

Expired ASTM days: 7

Date of Last EDR Contact: 04/29/03

FEDERAL ASTM SUPPLEMENTAL RECORDS

BRS: Biennial Reporting System

Source: EPA/ANTS

Telephone: 603-421-8316

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Vendor: 12/01/99

Database Release Frequency: Biennially

Date of Data Arrival at EDR: 09/16/03

Expired ASTM days: 33

Date of Last Scheduled EDR Contact: 09/15/03

CONSENT: Superfund (CERCLA) Consent Decree

Source: EPA Regional Offices

Telephone: Varies

Large legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Vendor: N/A

Database Release Frequency: Varies

Date of Data Arrival at EDR: N/A

Date of Last Scheduled EDR Contact: N/A

ROD: Records Of Decision

Source: EPA

Telephone: 703-413-0223

Records of Decision. ROD documents describe a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

RECEIVED AS FOLLOWS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

**Date of Government Vendor: 01/09/03**  
**Database Release Frequency: Annually**  
**Date of Last EDR Contact: 07/07/03**  
**Date of Next Scheduled EDR Contact: 10/06/03**

**DELISTED NPL: National Priority List Database**  
**Source: EPA**  
**Telephone: NA**  
 The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425 (d), sites may be deleted from the NPL, where no further response is appropriate.  
**Date of Government Vendor: 04/03/03**  
**Database Release Frequency: Quarterly**  
**Date of Last EDR Contact: 06/05/03**  
**Date of Next Scheduled EDR Contact: 09/04/03**

**PHQS: Facility Index System/ Facility Identification Database Program Summary Report**  
**Source: EPA**  
**Telephone: NA**  
 Facility Index System (FIS) contains both facility information and "yields" to other sources that contain more detail. EDR includes the following PHQS databases in its report: PCS (Permit Compliance System), AHS (Automated Enforcement System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental violations), FINS (Federal Underground Injection Control), CDOCKET (Civil Docket System used to track criminal enforcement actions for all environmental violations), FFS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PACT (Pesticide Action Data System).  
**Date of Government Vendor: 02/19/03**  
**Database Release Frequency: Quarterly**  
**Date of Last EDR Contact: 07/02/03**  
**Date of Next Scheduled EDR Contact: 10/06/03**

**HMRIS: Hazardous Materials Hazardation Reporting System**  
**Source: U.S. Department of Transportation**  
**Telephone: 202-364-4323**  
 Hazardous Materials Incident Report System (HMIRS) contains hazardous material spill incidents reported to DOT.  
**Date of Government Vendor: 01/21/03**  
**Database Release Frequency: Annually**  
**Date of Last EDR Contact: 04/09/03**  
**Date of Next Scheduled EDR Contact: 07/21/03**

**MLTS: Material Licensing Tracking System**  
**Source: Nuclear Regulatory Commission**  
**Telephone: 301-415-7189**  
 MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.  
**Date of Government Vendor: 04/22/03**  
**Database Release Frequency: Quarterly**  
**Date of Last EDR Contact: 07/02/03**  
**Date of Next Scheduled EDR Contact: 10/06/03**

**MINES: Mines Identifier Index File**  
**Source: Department of Labor, Mine Safety and Health Administration**  
**Telephone: 303-231-5658**  
**Date of Government Vendor: 02/11/03**  
**Database Release Frequency: Semi-Annually**  
**Date of Last EDR Contact: 06/20/03**  
**Date of Next Scheduled EDR Contact: 09/29/03**

**NPL: UIC/NPL: Federal Superfund Sites**  
**Source: EPA**  
**Telephone: 202-554-4387**  
 Federal Superfund Sites. Under the authority granted the USEPA by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, the USEPA has the authority to file name special fund property in order to recover the costs of clean-up operations or when the property owner receives notification of potential liability. USEPA compiles a listing of listed indices of Superfund Sites.  
**Date of Government Vendor: 02/11/03**  
**Database Release Frequency: Quarterly**  
**Date of Last EDR Contact: 06/20/03**  
**Date of Next Scheduled EDR Contact: 09/29/03**

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

**Date of Government Vendor: 04/15/91**  
**Database Release Frequency: No Update Planned**  
**Date of Last EDR Contact: 05/27/03**  
**Date of Next Scheduled EDR Contact: 05/25/03**

**PAIDS: PCB Activity Database System**  
**Source: EPA**  
**Telephone: 202-561-3887**  
 PCB Activity Database (PAIDS) identifies generators, transporters, commercial storers and/or brokers and disposers of PCBs who are required to notify the EPA of such activities.  
**Date of Government Vendor: 02/27/03**  
**Database Release Frequency: Annually**  
**Date of Last EDR Contact: 04/12/03**  
**Date of Next Scheduled EDR Contact: 09/11/03**

**POD: Department of Defense Sites**  
**Source: USGS**  
**Telephone: 703-648-5820**  
 This data set consists of inventory owned or administered land, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.  
**Date of Government Vendor: 04/21/03**  
**Database Release Frequency: Semi-Annually**  
**Date of Last EDR Contact: 05/17/03**  
**Date of Next Scheduled EDR Contact: 09/11/03**

**RAATS: RCRA Administrative Action Tracking System**  
**Source: EPA**  
**Telephone: 202-564-4104**  
 RCRA Administrative Action Tracking System (RAATS) contains records based on enforcement actions issued under RCRA pertaining to major violators and includes identifying and civil actions brought by the EPA. For administrative actions after September 30, 1985, data entry to the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.  
**Date of Government Vendor: 04/17/85**  
**Database Release Frequency: No Update Planned**  
**Date of Last EDR Contact: 06/09/03**  
**Date of Next Scheduled EDR Contact: 09/06/03**

**TRIS: Toxic Chemical Release Inventory System**  
**Source: EPA**  
**Telephone: 202-260-1531**  
 Toxic Release Inventory System (TRIS) identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.  
**Date of Government Vendor: 12/31/00**  
**Database Release Frequency: Annually**  
**Date of Last EDR Contact: 08/27/03**  
**Date of Next Scheduled EDR Contact: 09/22/03**

**TSCA: Toxic Substances Control Act**  
**Source: EPA**  
**Telephone: 202-260-5521**  
 Toxic Substances Control Act (TSCA) identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant and sale.  
**Date of Government Vendor: 12/31/98**  
**Database Release Frequency: Every 4 Years**  
**Date of Last EDR Contact: 06/09/03**  
**Date of Next Scheduled EDR Contact: 09/06/03**

**TTTS: NPL - FFRPA TSCA Tracking System - FFRPA Federal Inventory, Fungicide, & Rodenticide Act/TSCA (Toxic Substances Control Act)**  
**Source: EPA**  
**Telephone: 202-564-2501**  
 FFRPA TSCA Tracking System - FFRPA Federal Inventory, Fungicide, & Rodenticide Act/TSCA (Toxic Substances Control Act)  
**Date of Government Vendor: 04/15/03**  
**Database Release Frequency: Quarterly**  
**Date of Last EDR Contact: 08/22/03**  
**Date of Next Scheduled EDR Contact: 09/22/03**

RECEIVED AS FOLLOWS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

SS18: Section 7 Trading Systems

Source: EPA  
Telephone: 202-564-5008  
Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (72 Stat. 623) requires all regulated pesticide producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the type, and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/00  
Database Release Frequency: Quarterly  
Date of Last EDR Contact: 06/23/03  
Date of Next Scheduled EDR Contact: 07/11/03  
FT18: FIFRA TSCA Trading System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act) TSCA Substances Control Act  
Source: EPA/Office of Prevention, Pesticides and Toxic Substances  
Telephone: 202-564-2501  
FT18 tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right to Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.  
Date of Government Version: 04/15/03  
Database Release Frequency: Quarterly  
Date of Last EDR Contact: 06/23/03  
Date of Next Scheduled EDR Contact: 08/22/03

STATE OF HAWAII ASTM STANDARD RECORDS

SIWIS: Sani List  
Source: Department of Health  
Telephone: 808-596-4248  
Facilities, sites or areas in which the Office of Hazard Evaluation and Emergency Response has an interest, has investigated or may investigate under HRS 1780 (includes CERCLIS sites).  
Date of Government Version: 01/11/01  
Date Made Active at EDR: 10/18/01  
Database Release Frequency: Semi-Annually  
Date of Data Arrival at EDR: 09/24/01  
Elapsed ASTM days: 22  
Date of Last EDR Contact: 06/23/03  
SWT18: Pesticide Listings in the State of Hawaii  
Source: Department of Health  
Telephone: 808-596-4245  
Statewide, Pesticide Incident Status, SWT18 lists records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive landfills or open dumps that listed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites.  
Date of Government Version: 05/03/99  
Date Made Active at EDR: 05/25/99  
Database Release Frequency: Varies  
Date of Data Arrival at EDR: 05/11/99  
Elapsed ASTM days: 15  
Date of Last EDR Contact: 05/01/03

LIST: Leaking Underground Storage Tank Database

Source: Department of Health  
Telephone: 808-596-4278  
Leaking Underground Storage Tank Incident Reports. LIST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.  
Date of Government Version: 01/01/03  
Date Made Active at EDR: 03/12/03  
Database Release Frequency: Semi-Annually  
Date of Data Arrival at EDR: 02/25/03  
Elapsed ASTM days: 13  
Date of Last EDR Contact: 07/11/03

UST: Underground Storage Tank Database

Source: Department of Health  
Telephone: 808-596-4278  
Regulated Underground Storage Tanks. USTs are regulated under Subtitle 1 of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 01/01/03  
Date Made Active at EDR: 02/05/03  
Database Release Frequency: Semi-Annually  
Date of Data Arrival at EDR: 02/25/03  
Elapsed ASTM days: 8  
Date of Last EDR Contact: 07/11/03

STATE OF HAWAII ASTM SUPPLEMENTAL RECORDS

SP18L: Release Notifications  
Source: Department of Health  
Telephone: 808-596-4249  
Releases of hazardous substances to the environment reported to the Office of Hazard Evaluation and Emergency Response since 1988.  
Date of Government Version: 09/01/00  
Database Release Frequency: Varies  
Date of Last EDR Contact: 06/23/03  
Date of Next Scheduled EDR Contact: 09/22/03

EDR PROPRIETARY HISTORICAL DATABASES

Former Manufactured Gas (Coal Gas) Sites: The evidence and location of Coal Gas sites is provided exclusively to EDR by Real Property Scan, Inc. Copyright 1993 Real Property Scan, Inc. For a technical description of the types of hazards which may be found at such sites, contact your EDR customer service representative.

Outsider: Provided by Real Property Scan, Inc.  
The information contained in this report has predominantly been obtained from publicly available sources produced by entities other than Real Property Scan. While reasonable steps have been taken to insure the accuracy of this report, Real Property Scan does not guarantee the accuracy of this report. Any liability on the part of Real Property Scan is strictly limited to a refund of the amount paid. No claim is made for the actual existence of hazards at any site. This report does not constitute a legal opinion.

STATE OF HAWAII BROWNIEREDS DATABASES RECORDS

BROWNIEREDS: Hazard Brownfields Sites  
Source: Office of Planning  
Telephone: 808-596-3173  
Date of Government Version: N/A  
Date Made Active at EDR: N/A  
Database Release Frequency: Varies  
Date of Last EDR Contact: N/A  
Date of Next Scheduled EDR Contact: N/A

OTHER DATABASES

Depending on the geographic area covered by the report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Likewise, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

ODWS as Pesticides: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as Geospatial Digital Line Graphs from 1:100,000 Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.

Electric Power Transmission Line Data  
Source: PacifiCorp  
Telephone: (800) 823-6277

The map includes information copyrighted by PacifiCorp. This information is provided to EDR by Real Property Scan, Inc. Real Property Scan does not guarantee its accuracy nor warrant its use on a third party basis and Real Property Scan assumes no liability for any errors or omissions that may occur in the data.

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental degradation. These sensitive receptors typically include the elderly, the sick, and children. While the location of sensitive receptors cannot be determined, EDR includes Social Buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

RECEIVED AS FOLLOWS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

**ALIA Hospitals:**

Source: American Hospital Association, Inc.  
Telephone: 312-265-5991  
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.  
Medical Centers: Private and Government  
Source: Center for Medicare & Medicaid Services  
Source Code: 410-786-3000  
A listing of hospitals with Medicare provider numbers, produced by Centers of Medicare & Medicaid Services,  
a federal agency within the U.S. Department of Health and Human Services.  
Nursing Homes  
Source: National Institutes of Health  
Telephone: 301-594-4248

Information on Medicare and Medicaid certified nursing homes in the United States.  
Public Schools  
Source: National Center for Education Statistics  
Telephone: 202-507-7200

The National Center for Education Statistics primary database on elementary  
and secondary public education in the United States. It is a comprehensive, annual, national statistical  
database of all public elementary and secondary schools and school districts, which contains data that are  
comparable across all states.

Private Schools  
Source: National Center for Education Statistics  
Telephone: 202-507-7200

The National Center for Education Statistics primary database on private school locations in the United States.

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal  
Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.  
MHC - National Wetlands Inventory: This data, available in select counties across the country, was obtained by EDR  
in 2002 from the U.S. Fish and Wildlife Service.

**STREET AND ADDRESS INFORMATION**

© 2003 Geographic Data Technology, Inc., Pat. 01/2002. This product contains proprietary and confidential property of Geographic  
Data Technology, Inc. Unauthorized use, including copying for other than testing and standard backup procedures, of this product is  
expressly prohibited.

GEOCHECK ® - PHYSICAL SETTING SOURCE ADDENDUM

**TARGET PROPERTY ADDRESS**

KAEMVA PLACE  
KAEMVA PLACE  
KAWIWAHAE, HI 96743

**TARGET PROPERTY COORDINATES**

Latitude (North): 20 04 17.50 - 20° 2' 30.3"  
Longitude (West): 155 63 32.82 - 155° 48' 59.6"  
Universal Transverse Mercator: Zone 5  
UTM X (Meters): 203600.7  
UTM Y (Meters): 2219402.5  
Elevation: 39 ft. above sea level

EDR's GeoCheck Physical Setting Source Addendum has been developed to assist the environmental professional  
with the collection of physical setting source information in accordance with ASTM 1527-00, Section 11.2.5.3.3, Digital  
Section 7.2.3 requires that a current USGS 7.5 Minute Topographic Map (or equivalent, such as the Digital  
Elevation Model) be reviewed. It also requires that one or more additional physical setting products be sought  
when (1) conditions have been identified in which hazardous substances or petroleum products are likely  
to migrate to or from the property, and (2) more information than is provided on the current USGS 7.5 Minute  
Topographic Map (or equivalent) is generally obtained, past or present, and connected or contiguous parcels,  
to assess the impact of migration or receipt of hazardous substances or petroleum products on the property. Such  
additional physical setting sources generally include information about the topographic, hydrologic, hydrogeologic,  
and geologic characteristics of a site, and wells in the area.

Assessment of the impact of contaminant migration generally has two principle investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics  
of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.  
EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in  
forming an opinion about the impact of potential contaminant migration.

RECEIVED AS FOLLOWS

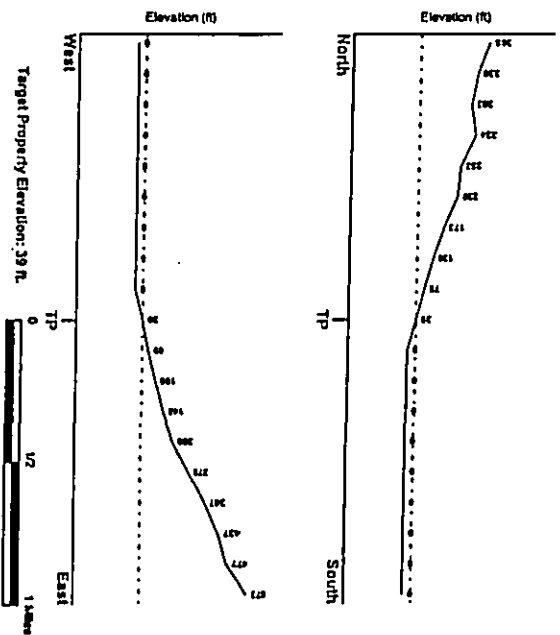
**GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY**

**GROUNDWATER FLOW DIRECTION INFORMATION**  
 Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not available, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

**TOPOGRAPHIC INFORMATION**  
 Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or about contamination exist on the target property; what downgradient sites might be impacted.

**TARGET PROPERTY TOPOGRAPHY** 2470155-AT KAWAIIAE, HI  
 USGS Topographic Map: General SW  
 Source: USGS 7.5 min quad index

**SURROUNDING TOPOGRAPHY: ELEVATION PROFILES**



Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

**GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY**

**HYDROLOGIC INFORMATION**  
 Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or about contamination exist on the target property; what downgradient sites might be impacted.  
 Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

**FEMA FLOOD ZONE**

Target Property County: HAWAII, HI

Flood Plain Panel at Target Property: 1551660137C

Additional Panels in search area: 1551660128C

**NATIONAL WETLAND BENTHONY**

NWI Quad at Target Property: KAWAIIAE

NWI Electronic Data Coverage: YES - Refer to the Overview Map and Detail Map

**HYDROGEOLOGIC INFORMATION**

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or about contamination exist on the target property; what downgradient sites might be impacted.

**AQUIFLOWS**

Search Radius: 1,000 feet.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP TO: LOCATION: GENERAL DIRECTION: FROM TP: GROUNDWATER FLOW:

RECEIVED AS FOLLOWS

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic site identification, rock stratigraphic unit and soil characteristics data compiled on maps by proprietors and regional soil information, in general, contaminant plumes move more quickly through sandy/gravelly types of soils than clay/clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

Era: -

System: -

Series: -

Code: -

N/A (Indicates above as Era, System & Series)

GEOLOGIC AGE IDENTIFICATION

Category: -

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schuchman, R.E. Arnold and W.J. Banko, Geology of the Continental U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.D. King and R.L.M. Beckman Map, USGS Digital Data Series DDS - 111 (1994).

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSCO are compiled by generally more detailed (SSURGO) soil survey maps. The following information is based on Soil Conservation Service STATSCO data.

No soil data reported.

WELL SEARCH DISTANCE INFORMATION

DATABASE SEARCH DISTANCE (miles)

Federal USGS 1000  
Federal FROD PWIS 1000  
State Database 1200

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
A1	USGS02Z23955	0 - 1/8 Mile ESE
A2	USGS02Z4026	0 - 1/8 Mile ESE
B3	USGS02Z23957	0 - 1/8 Mile NE
B6	USGS02Z23959	1/8 - 1/4 Mile NNE
B7	USGS02Z23958	1/8 - 1/4 Mile NNE
B	USGS02Z23956	1/4 - 1/2 Mile East
C9	USGS02Z4027	1/2 - 1 Mile SE

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
11	USGS02Z1021	1/2 - 1 Mile SE
12	USGS02Z1020	1/2 - 1 Mile SE

FEDERAL FROD PUBLIC WATER SUPPLY SYSTEM INFORMATION

MAP ID -

WELL ID -

LOCATION FROM TP -

No PWS System Found

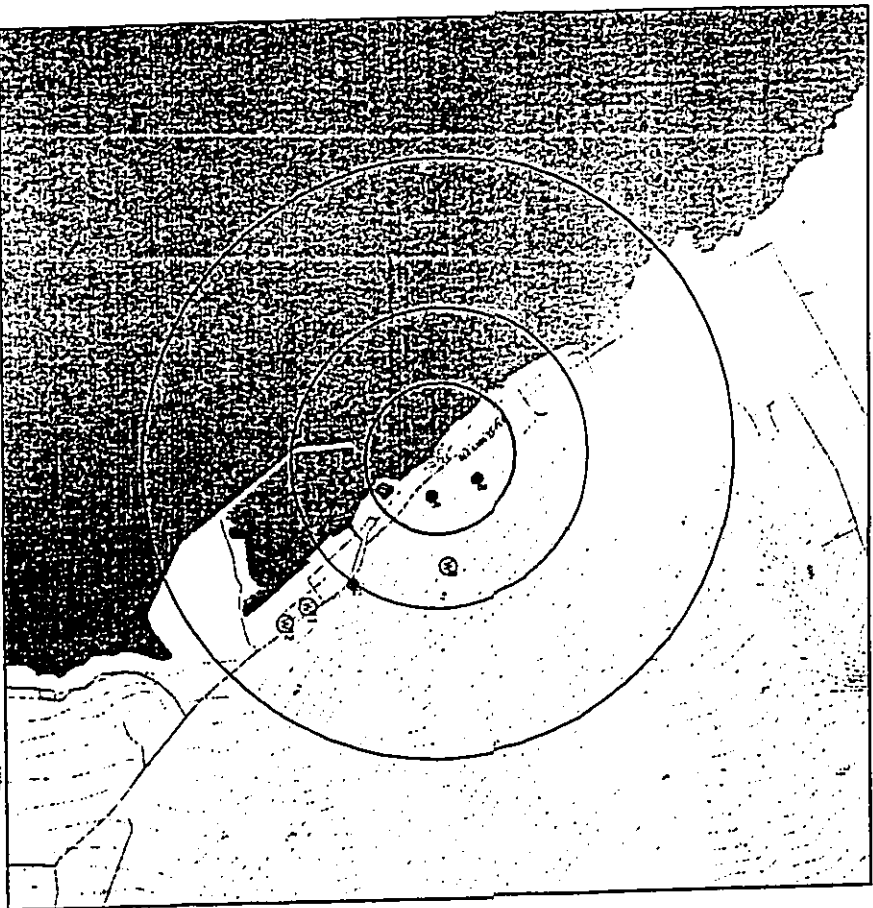
Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
B4	B4250-001	0 - 1/8 Mile NE
A5	B4250-002	1/8 - 1/4 Mile East
C10	B4219-001	1/2 - 1 Mile SE

RECEIVED AS FOLLOWS

PHYSICAL SETTING SOURCE MAP - 1012891.7S



- N County Boundary
- Major Roads
- Contour Lines
- ① Eutrophication Potential, Risked 5 or greater
- ② Wetland
- ③ Public Water Supply Well
- ④ Cluster of Multiple Homes

TARGET PROPERTY: Karna Plaza  
 ADDRESS: Karna Plaza #6743  
 CITY/STATE/ZIP: 2004181/155 8333  
 LAT/LONG: 38.9117, -77.0411

CUSTOMER: Parsons Brinckerhoff  
 CONTACT: Nant Okuma  
 INQUIRY #: 1012891.7S  
 DATE: July 17, 2003 3:47 pm

Map scale is 1:10000. The map is not to be used for any purpose other than that intended.

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID	Location	Distance	Deviation	Date/Issue	EDR ID Number
1012891.7S	155 8333	0.18 Mile	Higher	FED USGS	USGS0223855
Agency:	USGS	SA ID:	200240155500402		
Site Name:	64230101-04				
Doc. Label:	2010113				
Doc. Longcode:	155 8333				
Coord. Svc:	155 8333				
Scale:	1:10000				
County:	Howard County				
State:	MD				
Agency:	USGS				
Hydrologic code:	20010000				
Topographic:	18740101				
Well Type:	Ground-water other than Spring	Issue Date:	Not Reported		
Coord. Date:	18740101	Well Type:	Not Reported		
Well Type:	Shallow well, other than collector or Recovery Type	Well depth:	60.0		
Primary Aquifer:	Not Reported	Source:	Not Reported		
Aquifer Type:	Not Reported				
Issue date:	60.0				
Project no:	Not Reported				

Agency	SA ID	FED USGS	USGS0223855
Agency:	USGS		
Site Name:	64230101-04		
Doc. Label:	2010113		
Doc. Longcode:	155 8333		
Coord. Svc:	155 8333		
Scale:	1:10000		
County:	Howard County		
State:	MD		
Agency:	USGS		
Hydrologic code:	20010000		
Topographic:	18740101		
Well Type:	Ground-water other than Spring	Issue Date:	Not Reported
Coord. Date:	18740101	Well Type:	Not Reported
Well Type:	Shallow well, not completed as a well	Well depth:	180
Primary Aquifer:	Not Reported	Source:	Not Reported
Aquifer Type:	Not Reported		
Issue date:	180		
Project no:	Not Reported		

B1 NE 1/4-1/8 Area  
 Region  
 FED USGS USGS0223855

RECEIVED AS FOLLOWS

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Agency: USGS  
 Site Name: 84250-01 B-2  
 Dec. Label: 2014000  
 Dec. Longitude: -105.83222  
 Coord SFC: NAD83  
 State: HI  
 County: Hawaii County  
 Atlas: 83 00  
 Hydrologic code: 20010000  
 Topographic: (Islands (Island))  
 Site Type: Ground water other than Spring  
 Canal Date: 19740901  
 Well Type: Test hole, not completed as a well  
 Primary Aquifer: Not Reported  
 Aquifer Type: Not Reported  
 Hole depth: 455  
 Project no: Not Reported

Well ID: 200250155500601  
 Well depth: 455  
 Source: Not Reported

84  
 84  
 B-2  
 B-2  
 118 Mils  
 Height

WVC: 84250-01  
 Well Name: Hawaii  
 Well No: Kamehame T1  
 Y1 date: 1974  
 Coord SFC: NAD83  
 Longitude: 155.008  
 State: HI  
 County: Hawaii County  
 Atlas: 83 00  
 Hydrologic code: 20010000  
 Topographic: (Islands (Island))  
 Site Type: Ground water other than Spring  
 Canal Date: 19740901  
 Well Type: Test hole, not completed as a well  
 Primary Aquifer: Not Reported  
 Aquifer Type: Not Reported  
 Hole depth: 455  
 Project no: Not Reported

Well ID: 200250155500601  
 Well depth: 455  
 Source: Not Reported

84250-01  
 Well Name: Hawaii  
 Well No: Kamehame T1  
 Y1 date: 1974  
 Coord SFC: NAD83  
 Longitude: 155.008  
 State: HI  
 County: Hawaii County  
 Atlas: 83 00  
 Hydrologic code: 20010000  
 Topographic: (Islands (Island))  
 Site Type: Ground water other than Spring  
 Canal Date: 19740901  
 Well Type: Test hole, not completed as a well  
 Primary Aquifer: Not Reported  
 Aquifer Type: Not Reported  
 Hole depth: 455  
 Project no: Not Reported

Well ID: 200250155500601  
 Well depth: 455  
 Source: Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID: 84250-02  
 Direction: Not Reported  
 Distance: Not Reported  
 Elevation: Not Reported

Agency: USGS  
 Site Name: 84250-05 KAWAHAHA  
 Dec. Label: 2014418  
 Dec. Longitude: -155.83222  
 Coord SFC: NAD83  
 State: HI  
 County: Hawaii County  
 Atlas: 83 00  
 Hydrologic code: 20010000  
 Topographic: (Islands (Island))  
 Site Type: Ground-water other than Spring  
 Canal Date: 19750901  
 Well Type: Single well, other than collector or recovery type  
 Primary Aquifer: Not Reported  
 Aquifer Type: Not Reported  
 Hole depth: 210  
 Project no: Not Reported

Well ID: 200250155500602  
 Well depth: 210  
 Source: Not Reported

84250-02  
 Well Name: Hawaii  
 Well No: Kamehame  
 Y1 date: 1974  
 Coord SFC: NAD83  
 Longitude: 155.008  
 State: HI  
 County: Hawaii County  
 Atlas: 83 00  
 Hydrologic code: 20010000  
 Topographic: (Islands (Island))  
 Site Type: Ground-water other than Spring  
 Canal Date: 19750901  
 Well Type: Single well, other than collector or recovery type  
 Primary Aquifer: Not Reported  
 Aquifer Type: Not Reported  
 Hole depth: 210  
 Project no: Not Reported

Well ID: 200250155500602  
 Well depth: 210  
 Source: Not Reported

84  
 84  
 WVC: 84250-02  
 Well Name: Hawaii  
 Well No: Kamehame  
 Y1 date: 1974  
 Coord SFC: NAD83  
 Longitude: 155.008  
 State: HI  
 County: Hawaii County  
 Atlas: 83 00  
 Hydrologic code: 20010000  
 Topographic: (Islands (Island))  
 Site Type: Ground-water other than Spring  
 Canal Date: 19750901  
 Well Type: Single well, other than collector or recovery type  
 Primary Aquifer: Not Reported  
 Aquifer Type: Not Reported  
 Hole depth: 210  
 Project no: Not Reported

Well ID: 200250155500602  
 Well depth: 210  
 Source: Not Reported



RECEIVED AS FOLLOWS

GEOCHECK - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID	Direction	Distance	Elevation	Database	EDR ID Number
B7	NE	1/4 Mile		FED USGS	USGS0223934
Agency:	USGS	Site Name:	8-6350-03 B-3	Site ID:	20026153500001
State Name:	20 04418	Dec. Latitude:	-155.83272		
Dec. Longitude:	140083	Coord S/E:	H		
State:	H	County:	Hawaii County		
Hydrologic code:	83 00	Hydrologic code:	20010000		
Topographic:	18260 (100)	Topographic:	Ground-water other than Spring		
State Type:	18140901	State Type:	Test hole, not completed as a well		
Well Type:	Not Reported	Well Type:	Not Reported		
Primary Aquifer:	Not Reported	Primary Aquifer:	Not Reported		
Aquifer Type:	Not Reported	Aquifer Type:	Not Reported		
Well depth:	120	Well depth:	Not Reported		
Probe depth:	Not Reported	Probe depth:	Not Reported		

Map ID	Direction	Distance	Elevation	Database	EDR ID Number
B8	East	1/4 - 1/2 Mile		FED USGS	USGS0223934
Agency:	USGS	Site Name:	8-6349-02 B-1	Site ID:	200243155492001
State Name:	20 04422	Dec. Latitude:	-155.83777		
Dec. Longitude:	140093	Coord S/E:	H		
State:	H	County:	Hawaii County		
Hydrologic code:	147 00	Hydrologic code:	20010000		
Topographic:	18260 (100)	Topographic:	Ground-water other than Spring		
State Type:	18140101	State Type:	Test hole, not completed as a well		
Well Type:	Not Reported	Well Type:	Not Reported		
Primary Aquifer:	Not Reported	Primary Aquifer:	Not Reported		
Aquifer Type:	Not Reported	Aquifer Type:	Not Reported		
Well depth:	210	Well depth:	Not Reported		
Probe depth:	Not Reported	Probe depth:	Not Reported		

GEOCHECK - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID	Direction	Distance	Elevation	Database	EDR ID Number
C18	SE	1/4 - 1/2 Mile		FED USGS	USGS0223934
Agency:	USGS	Site Name:	8-6348-01 A04U	Site ID:	20026153494701
State Name:	20 04015	Dec. Latitude:	-155.82984		
Dec. Longitude:	140083	Coord S/E:	H		
State:	H	County:	Hawaii County		
Hydrologic code:	78 00	Hydrologic code:	20010000		
Topographic:	18260 (100)	Topographic:	Ground-water other than Spring		
State Type:	18140101	State Type:	Test hole, not completed as a well		
Well Type:	Not Reported	Well Type:	Not Reported		
Primary Aquifer:	Not Reported	Primary Aquifer:	Not Reported		
Aquifer Type:	Not Reported	Aquifer Type:	Not Reported		
Well depth:	30.0	Well depth:	Not Reported		
Probe depth:	Not Reported	Probe depth:	Not Reported		

Map ID	Direction	Distance	Elevation	Database	EDR ID Number
C18	SE	1/4 - 1/2 Mile		FED USGS	USGS0223934
Agency:	USGS	Site Name:	8-6348-01 A04U	Site ID:	20026153494701
State Name:	20 04015	Dec. Latitude:	-155.82984		
Dec. Longitude:	140083	Coord S/E:	H		
State:	H	County:	Hawaii County		
Hydrologic code:	78 00	Hydrologic code:	20010000		
Topographic:	18260 (100)	Topographic:	Ground-water other than Spring		
State Type:	18140101	State Type:	Test hole, not completed as a well		
Well Type:	Not Reported	Well Type:	Not Reported		
Primary Aquifer:	Not Reported	Primary Aquifer:	Not Reported		
Aquifer Type:	Not Reported	Aquifer Type:	Not Reported		
Well depth:	30.0	Well depth:	Not Reported		
Probe depth:	Not Reported	Probe depth:	Not Reported		

RECEIVED AS FOLLOWS

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID	Database	EDR ID Number
11 12 - 1 Mile	FED USGS	USG04234921
Agency:	USGS	Site ID: 200218155494001
Site Name:	6-EZ49 01	
Dec. Latitude:	20 03527	
Dec. Longitude:	-155 82543	
Coord Sys:	NAD83	
State:	HI	
County:	Hawaii County	
ASURC:	20 00	
Hydrologic code:	20010000	
Topographic:	Not Reported	
Site Type:	Ground-water other than Spring	
Coord Date:	Not Reported	
Well Type:	Drugs well, other than collector or Recovery type	
Primary Aquifer:	Not Reported	
Secondary Aquifer:	Not Reported	
Water Type:	Not Reported	
Water Depth:	Well depth	
Projected:	Not Reported	

12 13 14 15 16 17 - 1 Mile	Agency:	Site Name:	Dec. Latitude:	Dec. Longitude:	Coord Sys:	State:	County:	ASURC:	Hydrologic code:	Topographic:	Site Type:	Coord Date:	Well Type:	Primary Aquifer:	Secondary Aquifer:	Water Depth:	Projected:
	USGS	6-EZ49 02	20 03416	-155 825	NAD83	HI	Hawaii County	20 00	20010000	Not Reported	Ground-water other than Spring	Not Reported	Not Reported	Not Reported	Not Reported	Well depth	Not Reported
		Site ID:															
		200218155494001															

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS  
RADON

AREA RADON INFORMATION

Federal EPA Radon Zone for Hawaii County: 3  
 Meter Zone 1 Indoor average level > 4 pCiL  
 : Zone 2 Indoor average level > 2 pCiL and < 4 pCiL  
 : Zone 3 Indoor average level < 2 pCiL

Federal Area Radon Information for Zip Code: 96743

Area	Number of sites tested: 8	Average Activity	% < 4 pCiL	% 4.20 pCiL	% > 20 pCiL
Using Area - 1st Floor	0/050 pCiL	Not Reported	100%	0%	0%
Using Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported	Not Reported
Basement	Not Reported	Not Reported	Not Reported	Not Reported	Not Reported

RECEIVED AS FOLLOWS

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)  
Source: United States Geologic Survey  
EDR located the USGS 7.5' Digital Elevation Model in 2002. 7.5 Minute DEMs correspond to the USGS  
1:24,000- and 1:25,000-scale topographic quadrangle maps.

HYDROLOGIC INFORMATION

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal  
Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.  
NWC: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR  
in 2002 from the U.S. Fish and Wildlife Service.

HYDROGEOLOGIC INFORMATION

AQUIFLOW<sup>®</sup> Information System  
Source: EDR proprietary or access of groundwater flow information  
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater  
flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has  
extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table  
information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic List  
Source: P. G. Schuchman, R. E. Wright and W. J. Brame, Geology of the Conterminous U.S. at 1:250,000 Scale - A digital  
representation of the 1974 P. B. King and U.S.A. Balkman Map, USGS Digital Data Series DDS-11 (1994).

STATSO: State Soil Geographic Database  
Source: Department of Agriculture, Natural Resources Conservation Service  
The U.S. Department of Agriculture (USDA) Soil Conservation Service (SCS) leads the national Cooperative  
Soil Survey (PCSS) and is responsible for collecting, storing, maintaining and distributing soil survey  
information for privately owned lands in the United States. A soil map is a soil survey's most important product  
and published in a landscape. Soil maps for STATSO are compiled by generalizing more detailed (SSURGO) soil  
survey maps.

ADDITIONAL ENVIRONMENTAL RECORD SOURCES

FEDERAL WATER WELLS

PWS: Public Water Systems  
Source: EPA/Office of Drinking Water  
Telephone: 202-564-3150  
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at  
least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENR: Public Water Systems Violation and Enforcement Data

Source: EPA/Office of Drinking Water  
Telephone: 202-564-3150  
Violation and Enforcement data for Public Water Systems from the State Drinking Water Information System (SDWIS) after  
August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)  
This database contains descriptive information on sites where the USGS collects or has collected data on surface  
water under ground-water. The ground-water data includes information on wells, springs, and other sources of ground-water.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

STATE RECORDS

Ground Water Wells  
Source: Department of Land and Natural Resources  
Telephone: 800-207-0242

RADON

Area Radon Information  
Source: USGS  
Telephone: 703-336-4020  
The National Radon Database has been developed by the U.S. Environmental Protection Agency  
(USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey.  
The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at  
private sources such as universities and research institutions.

EPA Radon Zones

Source: EPA  
Telephone: 703-336-4020  
Sections 207 & 209 of BAA decided EPA to list and identify areas of U.S. with the potential for elevated indoor  
radon levels.

OTHER

Airport Landing Facilities: Private and public use landing facilities  
Source: Federal Aviation Administration, 800-437-4638  
Epidemiology: Word aerogel records, Rocky 3 or greater  
Source: Department of Commerce, National Oceanic and Atmospheric Administration

Appendix 7  
**Moloka'i Groundwater Impact Assessment**



**Final Environmental Assessment/  
Finding of No Significant Impact**  
Submarine Fiber-Optic Cable Project

**SANDWICH ISLES  
COMMUNICATIONS, INC.**  
Submarine Fiber-Optic Cable Project

**GROUNDWATER IMPACT ASSESSMENT  
for MOLOKA'I SOLE SOURCE AQUIFER**

**SAFE DRINKING WATER ACT  
SECTION 1424 (e) REVIEW**

December 2003

**Groundwater Impact Assessment  
for  
Moloka'i Sole Source Aquifer**

**Safe Drinking Water Act  
Section 1424 (e) Review**

Prepared for:  
Sandwich Isles Communications, Inc.

Submitted by:  
Parsons Brinckerhoff Quade & Douglas, Inc.  
American Savings Bank Tower, Suite 3000  
1001 Bishop Street  
Honolulu, Hawaii 96813

December 2003

PARSONS BRINCKERHOFF



RECEIVED AS FOLLOWS

Table of Contents

EXECUTIVE SUMMARY ..... 1

1. INTRODUCTION AND PROJECT DESCRIPTION ..... 1

2. PROJECT AREA GEOLOGY AND HYDROLOGY ..... 8

3. GROUNDWATER AT THE PROPOSED LANDING SITE ..... 13

4. POTENTIAL CONSTRUCTION IMPACTS ..... 18

5. POTENTIAL OPERATIONAL IMPACTS ..... 19

6. REFERENCES ..... 20

FIGURES

Figure 1: Proposed SIC Fiber-Optic Network ..... 2

Figure 2: Molokai Sole Source Aquifer and Kaunakakai Landing Site ..... 3

Figure 3: Southern Oahu Basal Aquifer and Oahu Cable Landing Sites ..... 4

Figure 4: Typical Landing Site Infrastructure ..... 6

Figure 5: Project Area at Onea'i'i Homesteads Landing Site ..... 7

Figure 6: Generalized Surface Geology of Molokai ..... 10

Figure 7: Generalized Hydrologic Section of Eastern Molokai ..... 11

Figure 8: Occurrence of Groundwater on Molokai ..... 12

Figure 9: Fishponds and Streams in Southeastern Molokai ..... 14

Figure 10: Well Locations in Project Vicinity ..... 15

Figure 11: Aquifer Systems on Molokai and Project Location ..... 16

Figure 12: Test Bore and Proposed Drill Path ..... 17

RECEIVED AS FOLLOWS

EXECUTIVE SUMMARY

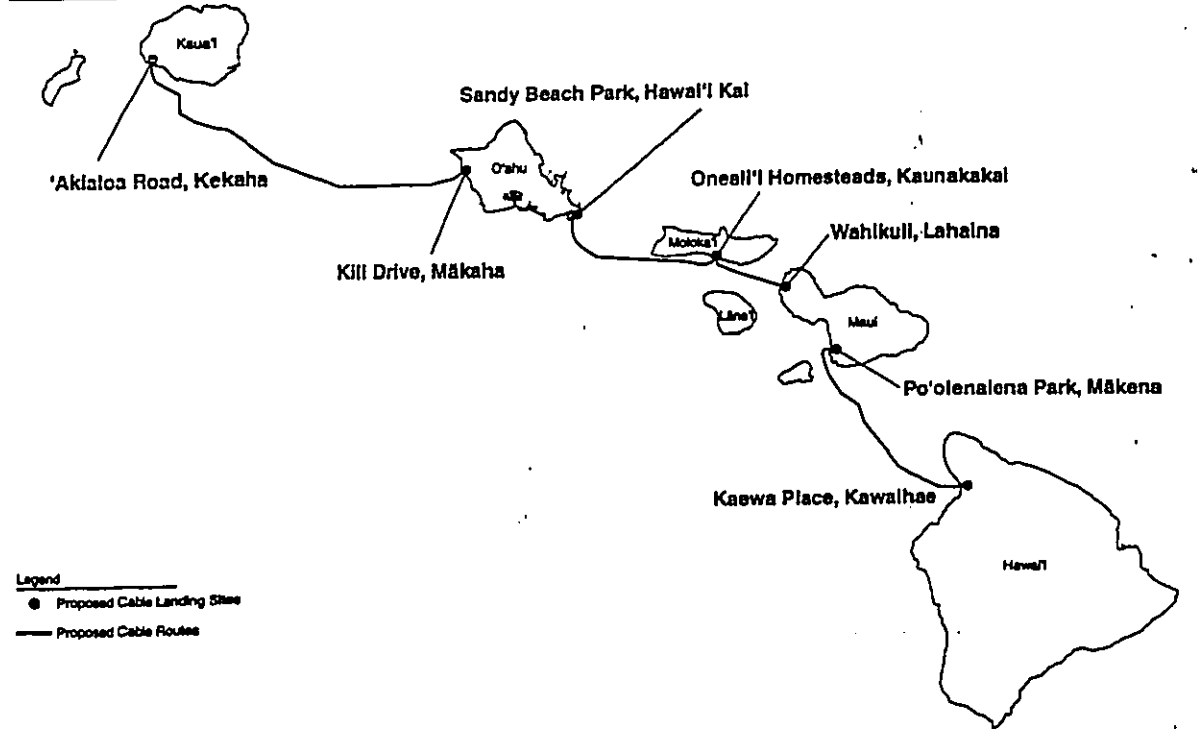
Sandwich Isles Communications, Inc. (SIC) is proposing to create a fiber-optic communications cable network that will link five Hawaiian Islands in order to provide Hawaiian homestead tracts with essential telecommunications services. The Molokai cable landing will occur at the Onea'i'i Homestead site, which overrites the Molokai Sole Source Aquifer, as designated by the U.S. Environmental Protection Agency in May 1994. Because the SIC project is receiving loan assistance from the Rural Utilities Service (RUS) of the U.S. Department of Agriculture (USDA), the project becomes a federal action subject to review for its impacts on designated sole source aquifers. This Groundwater Impact Assessment has been prepared to meet the requirements of the Section 1424(e) Review of the Safe Drinking Water Act.

Along the southern coast of East Molokai, layers of poorly permeable sedimentary rocks, called "caprock," retard the rate of escape of basal groundwater from the much more permeable volcanic rocks below (Searns and MacDonald, 1947; Mink and Leu, 1992). The basal layer, containing the basal groundwater, underlies these surficial materials. By confining the basal water below and inland, the caprock creates artesian conditions. Water quality in this basal aquifer is excellent, and serves as the primary source of drinking water for Molokai. In comparison, water in the caprock aquifers is too saline to be potable.

The project area for the Onea'i'i Homesteads cable landing site remains wholly in the caprock. The potential for contamination of the basal aquifer from surface waters and construction activities above the aquifer is low due to the artesian conditions and the relative impermeability of the caprock. Proposed construction, including the horizontal directional drilling (HDD) to install cable conduits underground, will not penetrate the caprock, introduce potential contaminants, nor otherwise expose the basal aquifer to potential contamination. Once the cable landing site is constructed and operational, no impact to the aquifer is anticipated.

RECEIVED AS FOLLOWS

Groundwater Impact Assessment



Legend  
 ● Proposed Cable Landing Sites  
 — Proposed Cable Routes

 Sandwich Isles Communications, Inc.

Proposed SIC Fiber-Optic Network  
 Submarine Fiber-Optic Cable Project  
 Figure 1

1. INTRODUCTION AND PROJECT DESCRIPTION

This Groundwater Impact Assessment has been prepared to meet the requirements of the Section 1424(e) Review of the Safe Drinking Water Act for the Sandwich Isles Communications, Inc. (SIC) Submarine Fiber-Optic Cable Project. The Groundwater Impact Assessment is intended to provide the U.S. Environmental Protection Agency (EPA) with the necessary information to determine the impact of a federal action on the quality of groundwater in a designated sole source aquifer.

Using funding from loans sponsored by the U.S. Department of Agriculture, Rural Utilities Service (RUS), SIC proposes to create a fiber-optic communications cable network that would link Department of Hawaiian Home Land (DHHLL) properties on five of the Hawaiian Islands. This network would provide essential telecommunications services to DHHLL beneficiaries. When completed, the proposed network would consist of four submarine cable segments, connecting five islands, at seven landing sites. The project action includes laying submarine cables and constructing landing site infrastructure.

Figure 1 is a map of these proposed landing sites and the cable routes by which they would be connected. The following is a list of the landing sites by island:

- Kauai – Kekaha
- Oahu – Mākaha, Hawai'i Kai
- Molokai – Kaunakakai
- Maui – Lahaina, Mākena
- Hawaii – Kawaihae

Of these islands, only Mōkōkaʻi and Oʻahu have designated sole source aquifers.

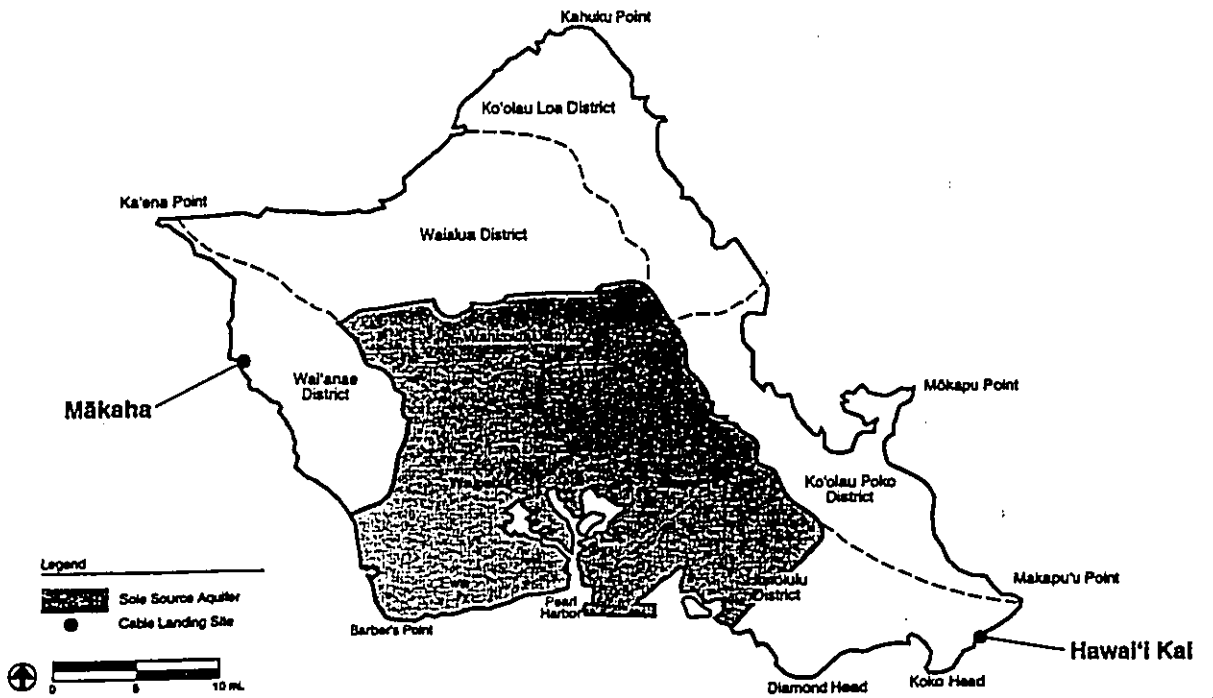
This report examines the project's potential impact on the Mōkōkaʻi Sole Source Aquifer, which was designated by the EPA in May 1994. Although two landing sites are proposed on Oʻahu, a groundwater impact assessment will not be prepared for those sites, because these sites are situated outside the boundaries of the Southern Oʻahu Basal Aquifer (SOBA). Figure 2 shows the location of the Kaunakakai landing site in relation to the Mōkōkaʻi sole source aquifer. Note that the entire island of Mōkōkaʻi overlies the sole source aquifer. The proposed Kaunakakai landing site is Oneali'i Homesteads on the makai side of Kamehameha V Highway. Figure 3 shows the Oʻahu cable landing sites are outside of the SOBA boundaries.

Landing Site Construction Method

Cable landfalls have typically been constructed using open trenches, which disturb the surface of the land and cut through sensitive coastal and nearshore resources such as beaches and coral reefs. In contrast, SIC proposes to use horizontal directional drilling (HDD) to construct underground cable conduits. The HDD process creates guided, rigid, casing-lined underground conduits, leading to exit points on the ocean floor.

RECEIVED AS FOLLOWS

Groundwater Impact Assessment

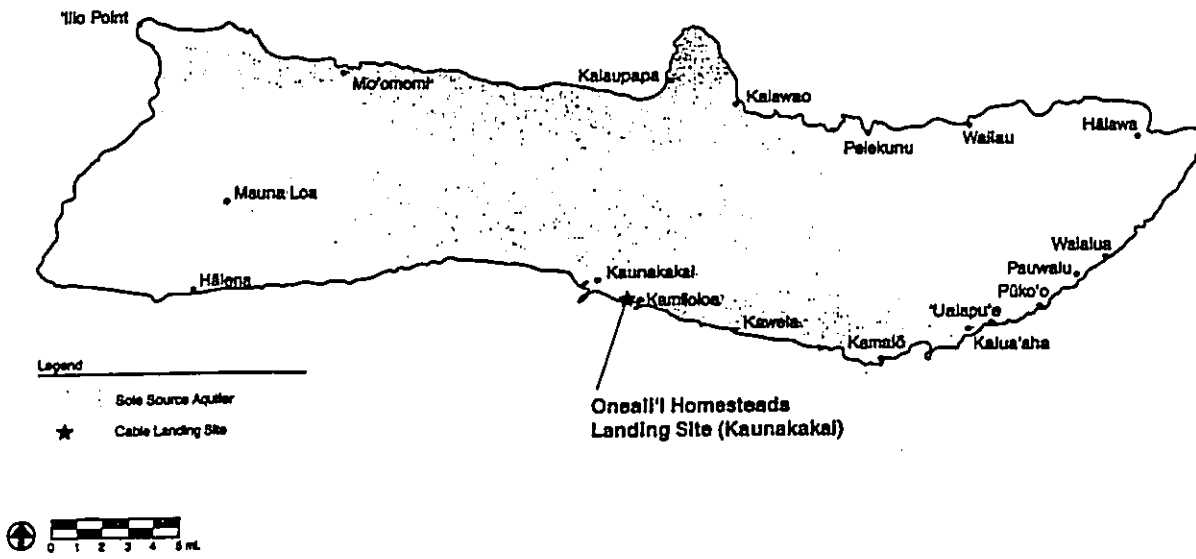


Source: Environmental Protection Agency, November 2001.

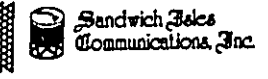


Southern O'ahu Basal Aquifer and O'ahu Cable Landing Sites  
Submarine Fiber-Optic Cable Project  
Figure 3

Groundwater Impact Assessment



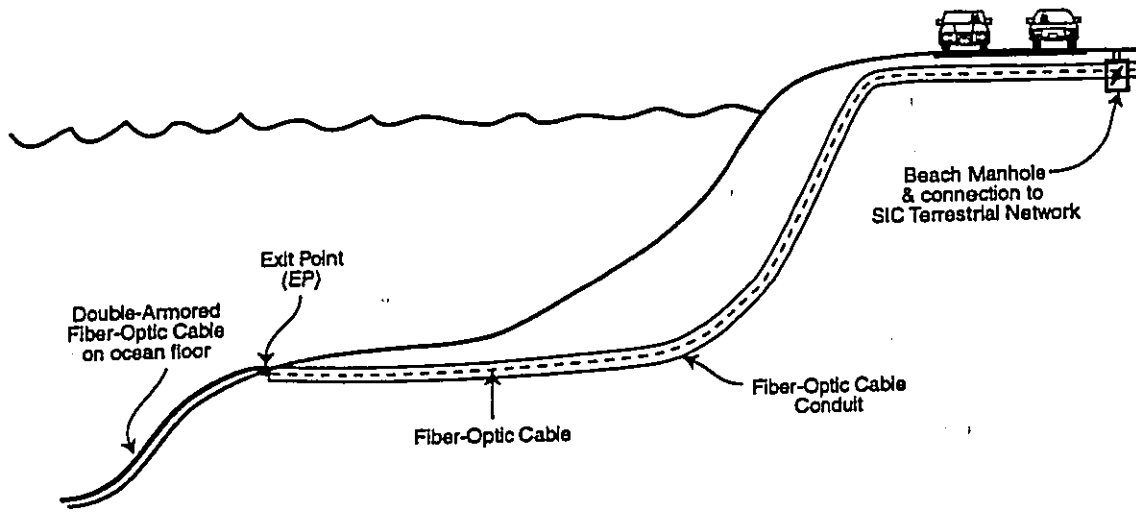
Source: Environmental Protection Agency, November 2001.



Moloka'i Sole Source Aquifer and Kaunakakai Landing Site  
Submarine Fiber-Optic Cable Project  
Figure 2



RECEIVED AS FOLLOWS



Not to Scale

Typical Landing Site Infrastructure  
Submarine Fiber-Optic Cable Project  
Figure 4

The primary benefit of HDD is that it allows installation of underground pipes and conduits with minimal surface disturbance, thereby avoiding adverse effects on coastal and nearshore resources. A work area of less than one acre is needed for mobilization and drilling activities. The construction area would include an entrance pit (or drill site), material storage areas, centrifuges, tanks, and storage for excavated material and other equipment, such as several large trailer or mobile units (typically three units). Additional site equipment includes control stations, pumps, generators, front-end loaders, and trucks.

Disturbance to the community at large is also minimized with HDD. By avoiding trenching in roadway rights-of-way, HDD reduces traffic impacts and traffic control requirements and minimizes the need for construction dewatering. HDD technology is less labor-intensive than trenching, and depending on the substrate encountered during drilling, the process can be completed faster than with trenching. Work would be conducted between 7 a.m. to 6 p.m. on weekdays and 9 a.m. to 6 p.m. on Saturdays. Construction duration would be approximately five months at the Onea'i'i Homesteads landing site, where two HDD bores must be drilled adjacent to each other – one bore would be used by the submarine cable to O'ahu and the other bore by the cable to Maui. Estimated construction duration at other landing sites is roughly three months.

Construction elements of a typical landing site are listed below (see Figure 4):

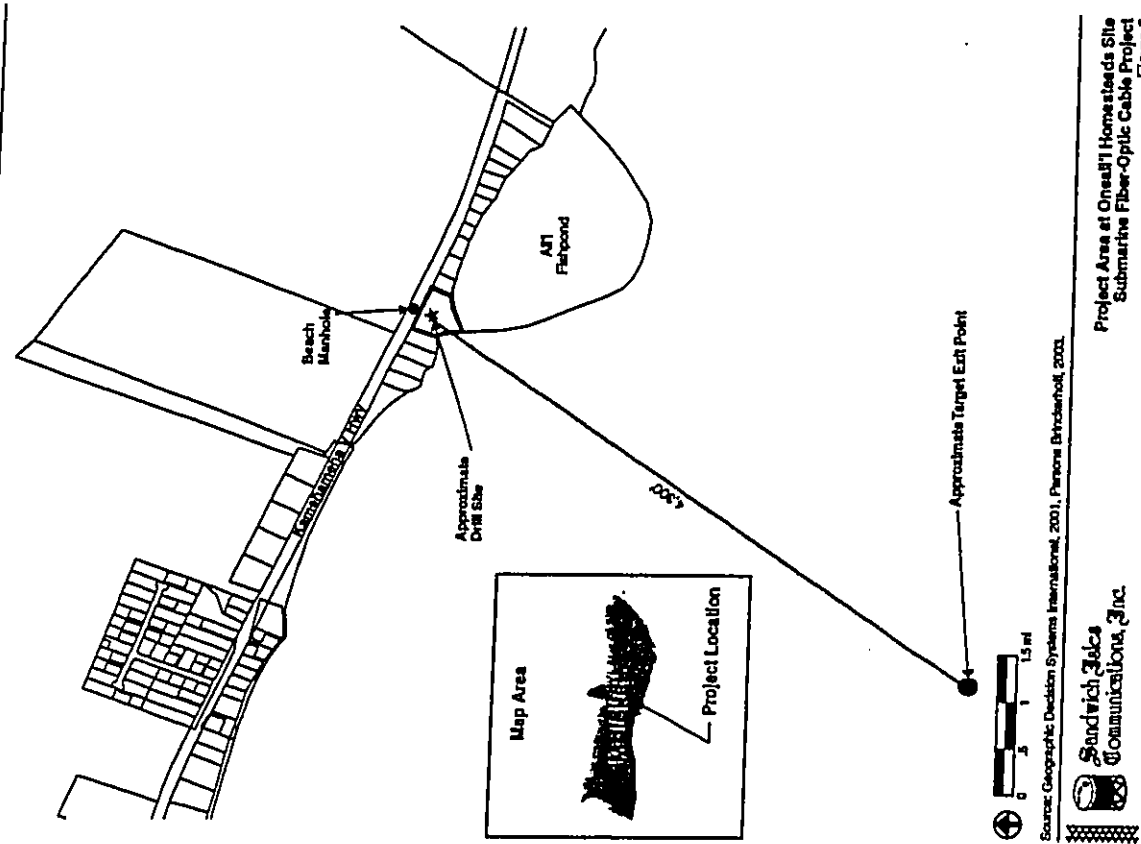
- Horizontal directional drilling (HDD) drill site, to drift the cable conduit between the drill site and undersea exit point (EP);
- Construction of beach manhole; and
- Trench from drill site to beach manhole (the first manhole on land from a submarine cable where the interface between submarine fiber-optic cable and terrestrial cable occurs).

In the case of Onea'i'i Homesteads, there would be two parallel bores. Figure 5 shows the plan view of the Onea'i'i Homesteads landing site, although only one line is shown at this scale.

The following is a summary of the HDD process.

An entrance pit (point of entry for the drill head) is excavated. The pit typically measures no larger than 10 feet by 20 feet and 3 feet deep. An HDD rig drives a rotating shaft, or drill rod, with a mounted cutter head into the entrance pit. From the entrance pit, a remotely controlled drill head bores towards the ocean. A probe located near the drill head allows its position to be monitored at all times. As the drill head bores through soil or rock, it creates a six to eight-inch diameter hole. Sections of pipe are added at the pit to push the drill head along. This drill shaft casing later becomes the fiber-optic cable conduit.

As the drill head bores underground, excavated soil and rock must be removed. The excavated material is called "cuttings". In addition, a slurry or "drilling mud," consisting of water and a naturally occurring, non-hazardous clay (bentonite) is injected into the hole to remove the cuttings, lubricate the pipe, reduce frictional drag, and cool the drill bit. To minimize discharges and to recycle the slurry, the slurry and cuttings are pumped to a centrifuge (called a desander or drilling fluid/mud handling tank) where the cuttings are separated from the slurry.



Project Area at Onea'i'i Homesteads Site  
Submarine Fiber-Optic Cable Project  
Figure 5

The cuttings would be disposed at a local landfill in accordance with all applicable regulations, and the returned slurry is recycled and re-injected into the bore hole. The contractor would make every effort to reclaim all slurry generated during drilling, and recycle it. Other excavated material generated by HDD would be stockpiled on site, and used as backfill or disposed at an onshore landfill in accordance with applicable requirements. Best Management Practices (BMPs) would be designed and implemented to control erosion from this temporary stockpile and the entire work area.

The drill head is guided to the underwater EP at least 60 feet below mean sea level (msl); the threshold depth was selected to reduce the potential for damage to the submarine cables from surface wave action. At the Onea'i'i Homesteads landing site, the two EPs would be about 80 feet under water, and each bore path must travel a horizontal distance of 4,300 feet. When the drill head approaches the EP, the bore is flushed with water to extract all of the slurry back to the onshore cantilever, and the slurry in the bore is replaced with water. Therefore, when the drill head "pops out" into the ocean, there would be no discharge of slurry or cuttings into the ocean. Once the drill head exits the EP, the drill head is removed and the drill casing/cable conduit is capped until a contractor is ready to install the submarine fiber-optic cable.

At Onea'i'i Homesteads, the drill site would be roughly 80 feet from the coastline. The beach manhole would be constructed in the right-of-way of Kamehameha V Highway. A typical beach manhole measures twelve feet long, seven feet wide, and seven feet deep. At Onea'i'i Homesteads, a conduit approximately 300 feet long would be installed between the drill site and the beach manhole using the open trenching method. Open trench construction typically involves excavating a trench about one foot wide and three feet deep.

Some localized, horizontal geologic voids may be encountered during HDD. When the void is small, some slurry may be lost in filling the void. When the slurry does not return at all or does not return with sufficient quantity, the contractor would either alter the slurry mix consistency to make it thicker, or the contractor would grout the void locally.

Once construction is complete, the drill site and trench would be filled, and roadway shoulders and pavement would be resurfaced. Coordination with the State Department of Transportation (DOT) would occur during the design phase, and the segments would be designed to avoid or minimize impacts on water resources and other environmentally sensitive resources. Cable installations in roadways would conform to design requirements in Title 19, Chapter 105 (Accommodation and Installation of Utilities on State Highways and Federal Aid County Highways) of the State DOT's Administrative Rules (DOT 1981) or Standard Details for Public Works Construction (DPW 1984).

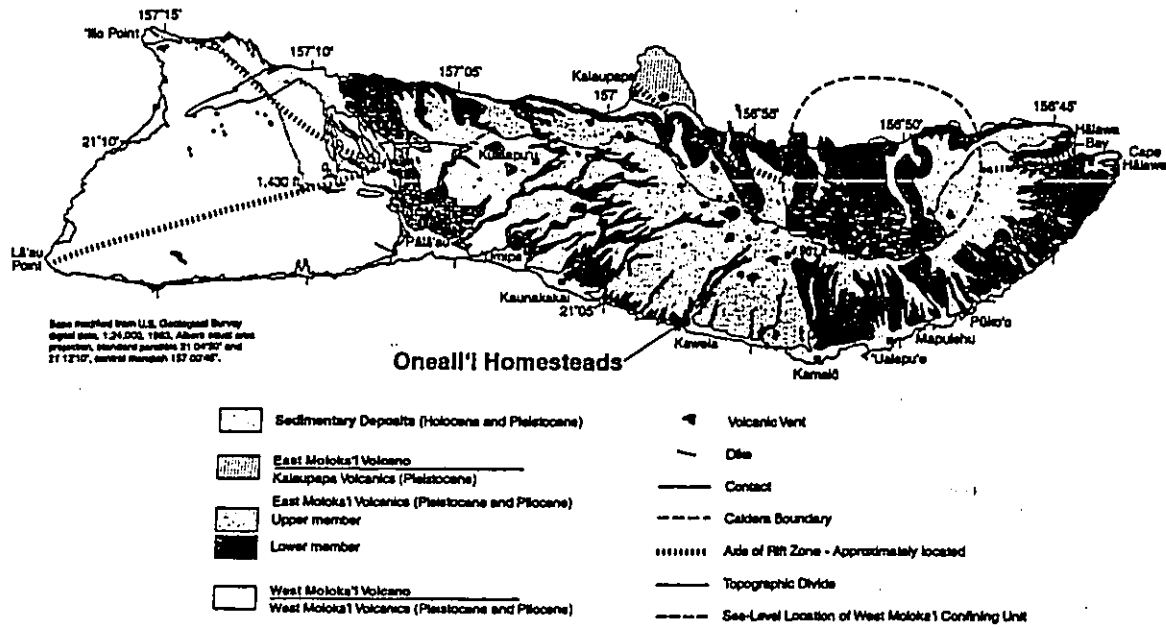
## 2. PROJECT AREA GEOLOGY AND HYDROLOGY

Molokai was formed by the East and West Molokai Volcanoes. Eastern Molokai, covering nearly half the island's total land area, was formed by the younger East Molokai Volcano. The steep slopes and numerous gulches create a rugged landscape. Whereas the northern side of the island is characterized by steep inaccessible topography, the less dramatic slopes that extend to the south shore create a habitable region where most of the island's population resides (Anthony, 1992).

RECEIVED AS FOLLOWS

RECEIVED AS FOLLOWS

Groundwater Impact Assessment



Source: Okl, 1997.



Generalized Surface Geology of Moloka'i Submarine Fiber-Optic Cable Project  
Figure 6

Moloka'i's fresh groundwater occurs in dike-impounded, perched, and basal water. Dike-impounded and perched water is found at high altitudes in volcano calderas and in rift zones, where low-permeability dikes have intruded other rocks, or where freshwater lays perched on low-permeability rocks or ash beds (Gingerich and Okl, 2000). Figure 6 depicts the general surface geology for Moloka'i.

Basalts comprise the principle aquifer type of Moloka'i. Basal groundwater underlies the entire island, with the exception of the rift zones of East Moloka'i, and possibly those of West Moloka'i, where groundwater is confined at high altitudes by dikes (Sleams and MacDonald, p. 54, 1947). Basal groundwater commonly occurs as a lens-shaped body of water that floats on saltwater near sea level. The groundwater permeates downward through rocks, and as it approaches sea level, it meets with the denser salt water, floating on top of it to form a layer of fresh water, in a formation called the Ghyben-Herzberg lens (Sleams and MacDonald, 1947). Figure 7 illustrates that a brackish to fresh basal lens extends inland for roughly 2 miles from the southeastern coast of Moloka'i. The basal water lens is typically thickest inland, with the water table having a gentle slope toward the nearest shore, and such that it is usually less than three feet above sea level at the shore. Because of density differences between freshwater and saltwater, freshwater extends to a depth below sea level of about 40 times the altitude of the water table (Anthony, 1992).

Figure 8 estimates the occurrence of fresh groundwater on Moloka'i. The amount of recharge, the geometry of the system, and the permeability of the rocks in the system determine the size of a basal water body. The basal lens beneath West Moloka'i, the Hooilehua Plain, and the southern shore of East Moloka'i, is entirely brackish, due to low rainfall and recharge rates. In contrast, highly permeable basalts in the middle and eastern end of East Moloka'i carry potable water. Much of Moloka'i's fresh groundwater is believed to be in the rocks of the East Moloka'i Volcano (Sleams and MacDonald, 1947).

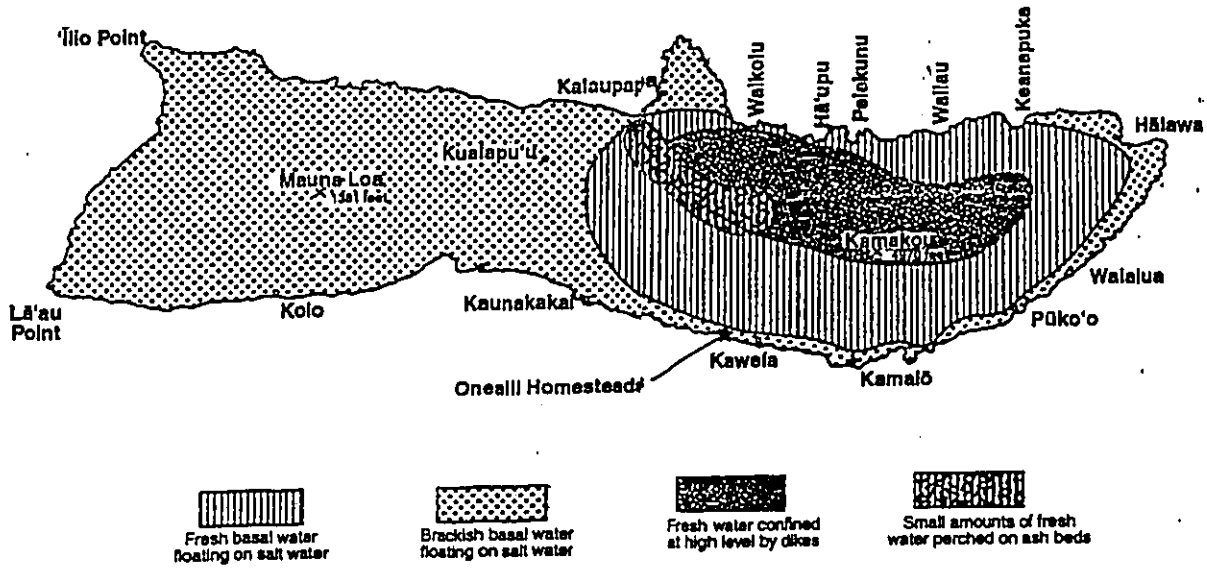
On the southern coast of East Moloka'i, layers of poorly permeable sedimentary deposits act as a weak "caprock", impeding the rate of escape of basal groundwater from the much more permeable volcanic rocks (Sleams and MacDonald, 1947; Mink and Lau, 1992). The retardation of groundwater discharge causes artesian conditions beneath the caprock and impounds unconfined basal water inland of the caprock. As a result, the water table is a few feet higher than it would be if the caprock were absent. (Sleams and MacDonald, p. 14, 1947).

The basal water body in the rocks of the East Moloka'i Volcano is recharged through direct infiltration of rainwater and an almost constant flow of discharge from upgradient dike-impounded water bodies, as shown in Figure 7 (Sleams and MacDonald, 1947; Mink and Lau, 1992; Anthony, 1992). Groundwater from such dike-impounded and perched water bodies near mountain crests flow into streams, springs, and the basal water body before entering the sea.

Perennial streams on the southern slopes of East Moloka'i are fed in their upper reaches by discharge from marsh areas and springs. Many of the streams on the southern slopes of East Moloka'i, are perennial in their upper courses, but become intermittent in their lower courses due to evaporation and seepage. As shown in Figure 6, after flowing over the upper member's poorly permeable andesite lava, streams flow over the more permeable basalts of the lower member in the lower courses (Sleams and MacDonald, 1947). During ordinary weather, these lower courses percolate into the basalts, creating a sort of sub-surface stream.

RECEIVED AS FOLLOWS

Groundwater Impact Assessment

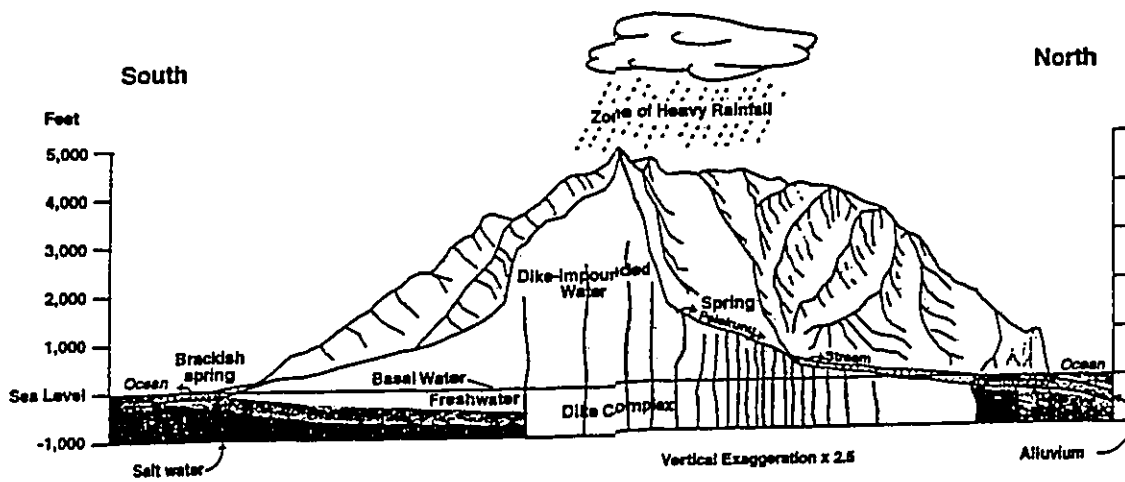


Source: Geology and Groundwater Resources of the Island of Molokai, Hawaii, 1947, Stearns & MacDonald

Sandwich Isles Communications, Inc.

Occurrence of Groundwater on Molokai Submarine Fiber-Optic Cable Project Figure 8

Groundwater Impact Assessment



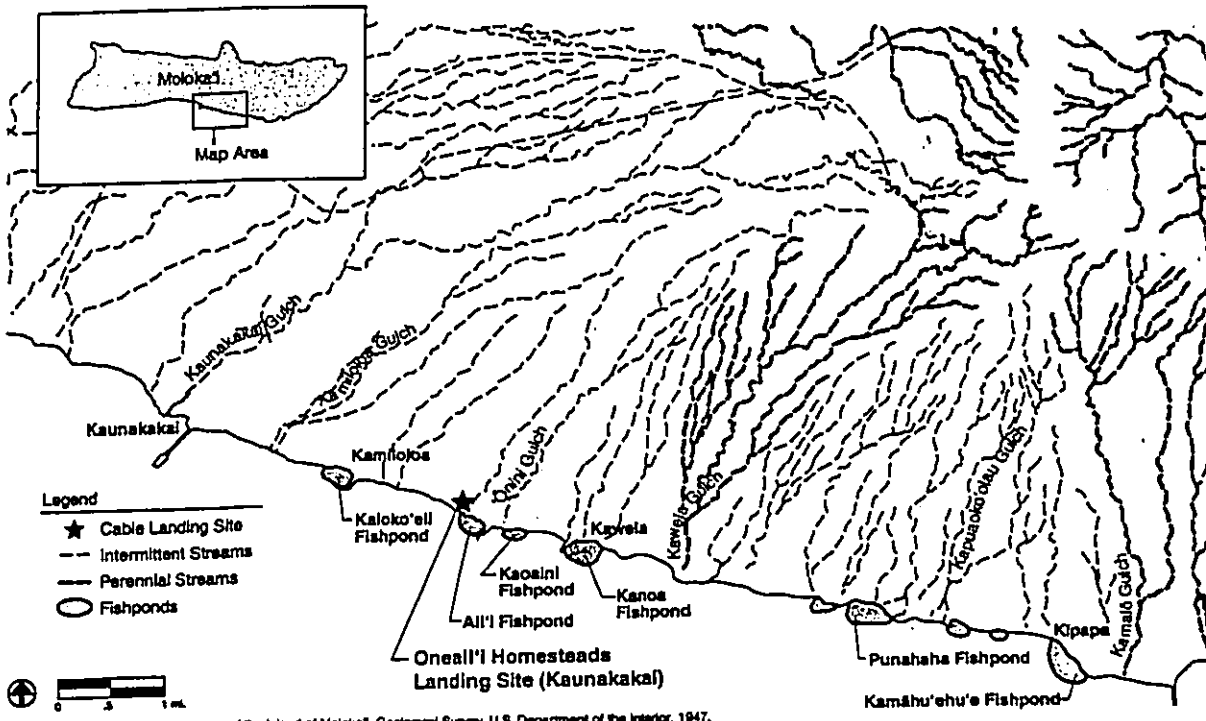
Source: Anthony, 1992.

Sandwich Isles Communications, Inc.

Generalized Hydrologic Section of Eastern Molokai Submarine Fiber-Optic Cable Project Figure 7

RECEIVED AS FOLLOWS

Groundwater Impact Assessment



Source: Geologic & Topographic Map of the Island of Molokai, Geological Survey, U.S. Department of the Interior, 1947.



Fishponds and Streams in Southeastern Molokai  
Submarine Fiber-Optic Cable Project  
Figure 9

Sandwich Isles Communications  
Submarine Fiber-Optic Cable Project

Groundwater Impact Assessment  
for Molokai's Sole Source Aquifer

In addition to the intermittent streams, large numbers of springs along the East Molokai coast feed fresh water into the sea. As mentioned earlier, caprock in this region is characterized as weak, allowing fresh water to escape in spots along the coast. Many such areas are manifested as brackish fishponds along the southern coast of Molokai. Figure 9 shows the numerous fishponds along the shore, indicating locations of escaping basal water.

Numerous wells have been drilled along Molokai's southeast coast for groundwater withdrawal. The locations of these wells are shown on Figure 10. All of these wells are located at higher elevations than the proposed project location at the coast. Because the direction of groundwater flow in the Kaunakakai region is from the upland recharge areas towards the ocean, the proposed project location is down-gradient of all water wells.

3. GROUNDWATER AT THE PROPOSED LANDING SITE

The Oneali'i Homesteads landing site is located roughly two miles from Kaunakakai. Figure 5 shows the project area for the Oneali'i Homesteads site located on the edge of ASI Fishpond.

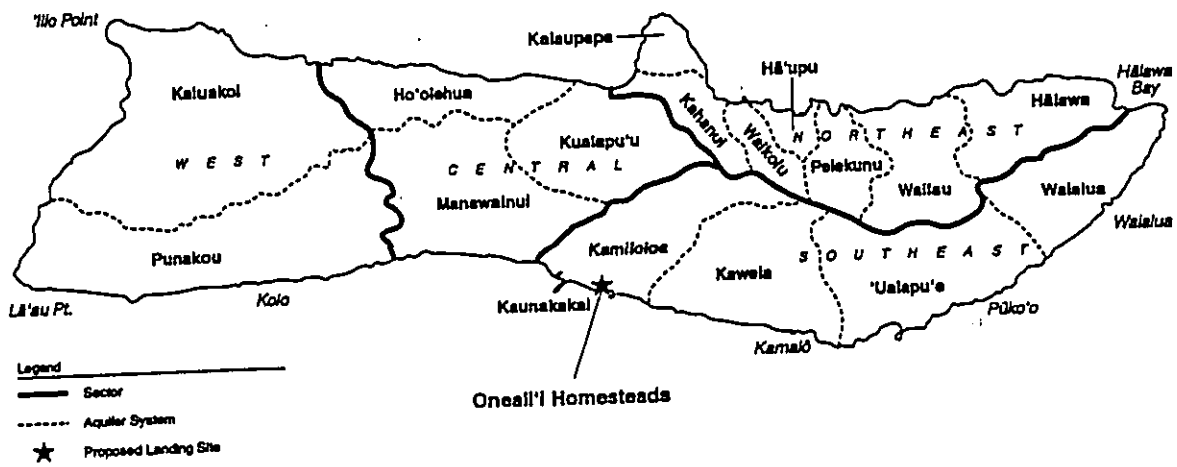
The project area is located within the Kamiloa Aquifer System of the Southeast Aquifer Sector, as shown in Figure 11. The Kamiloa Aquifer System is located between Kaunakakai and Onihuli gulches. The project area overlies the sedimentary layer of the caprock. According to the Hawaii aquifer identification and classification system, this aquifer is identified as being currently used as a source of drinking water. The aquifer is also classified as highly irreplaceable and highly vulnerable to contamination (Mink and Lau, 1992). The Commission on Water Resource Management's *Water Resource Protection Plan* indicates that the estimated sustainable yield of 3 million gallons per day (mgd) potable water is poor for this system.

Rainfall averages 35 inches a year for the entire Kamiloa aquifer system. Much of the important aquifers in this system are contained in the lower member, which are thin-bedded vesicular pahoehoe and a lava flows of the East Molokai volcanic series (Mink and Lau, 1992). These highly permeable beds, dominated by nonporphyritic and porphyritic olivine basalts, range from a few feet to 75 feet thick. The lower member basalts are separated from the upper member by a layer of ash soil 3 to 12 inches thick. As depicted in Figure 6, much of the surface in this system is covered by the upper member, consisting of several flows of andesite and trachyte ranging from 50 to 500 feet thick (Stearns and Macdonald, 1947).

In January 2003, Geolabs, Inc. drilled two test bores at the proposed landing site. A 20-foot bore and a 40-foot bore were taken on the coast near the proposed drill out point. Sand, silt, and coarse gravel-like sandy material comprised the upper layers in the bores. These loose sands and gravels were underlain by a very hard basalt rock formation. The 40-foot bore near the shoreline did not encounter basalt until a depth of 32 feet (Saki, personal communication, 2003). Figure 12 shows a cross-section of anticipated coastal geology at the project site, as determined from available information.

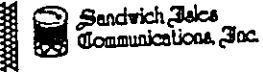
RECEIVED AS FOLLOWS

Groundwater Impact Assessment

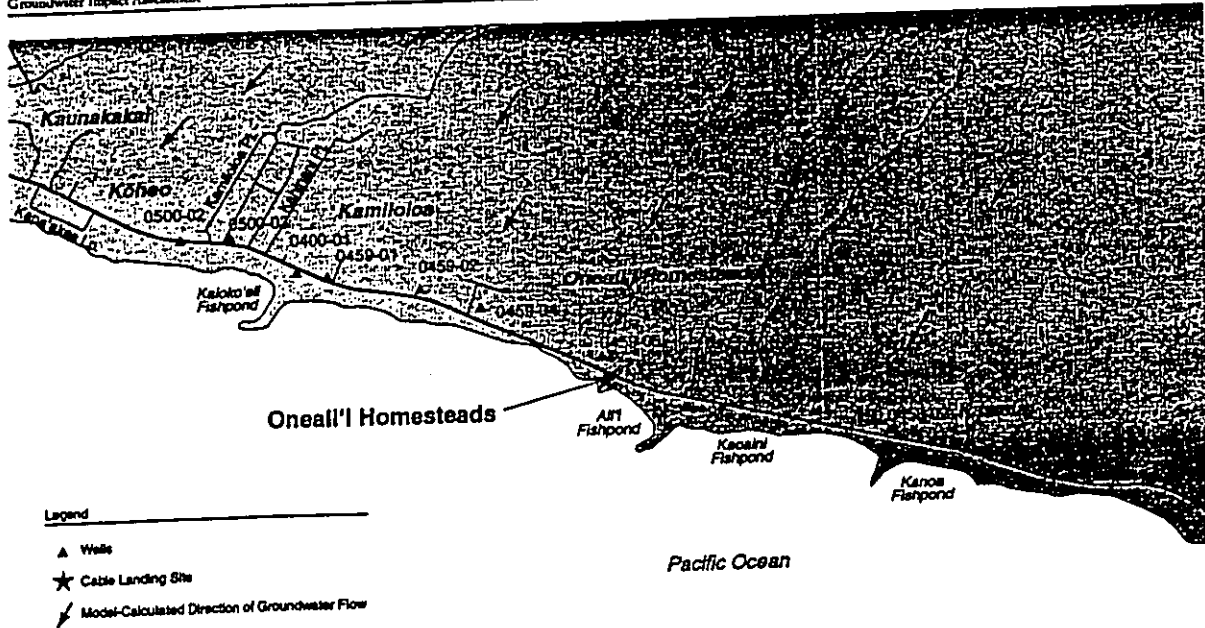


Source: Mink & Lau, 1992.

Aquifer Systems on Molokai and Project Location  
Submarine Fiber-Optic Cable Project  
Figure 11



Groundwater Impact Assessment



Source: Commission on Water Resource Management, Wells Database, December 2000; Oki, 1997.

Well Locations in Project Vicinity  
Submarine Fiber-Optic Cable Project  
Figure 10



4. POTENTIAL CONSTRUCTION IMPACTS

The potential for aquifer contamination by construction activities is low for the following reasons:

- there would be no penetration of the contact between the caprock and the underlying basalt;
- no potential contaminants are expected to be released during construction; and
- potential contaminants would not reach the potable aquifer because the confined aquifer is under artesian pressure, the aquifer's recharge area occurs at higher elevations, and the water gradient flows seaward, away from the island's potable water wells.

No penetration of the caprock/basalt interface

If the drill head were to penetrate the contact between the caprock and the underlying volcanic basalt, the aquifer could be exposed by a pathway for potential contaminants and could be seriously affected. However, the HDD bore would avoid breaching that interface. Figure 12 shows a profile of the presumed coastal geology and the proposed drill path at the Onea'i Homesteads landing site. The bore path must travel a horizontal distance of 4,300 feet before reaching the underwater exit point at a depth of 80 feet below mean sea level.

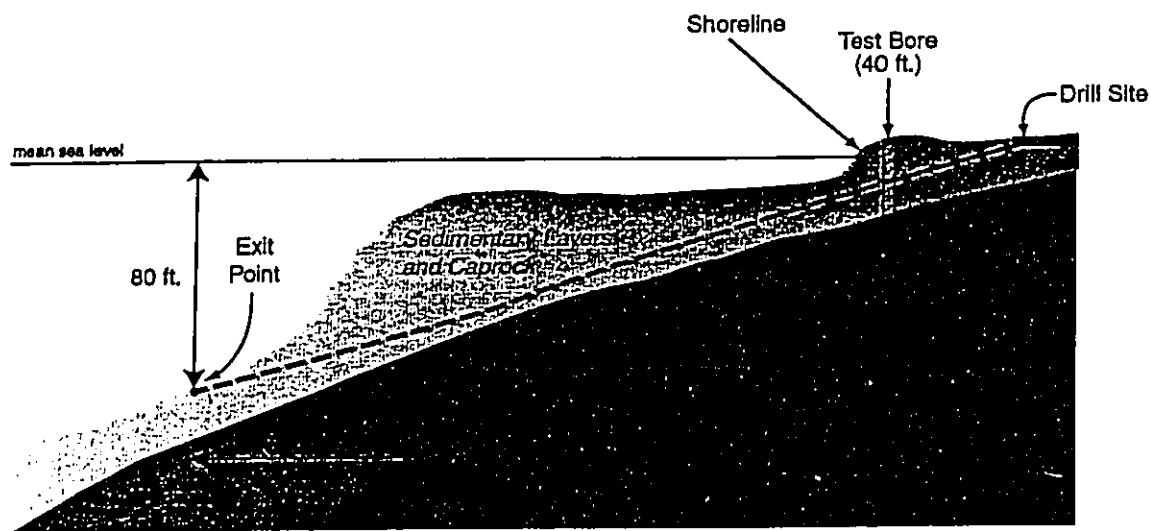
The HDD bore path would be drilled at least ten feet below the ground surface, within the sedimentary layer, but above the estimated profile of the basalt formation. Geotechnical testing revealed that basalt is not encountered until about 32 feet below the ground surface near the coastline (see Figure 12). The directional flexibility of the drill head will allow the operator to maintain a vertical depth that is above the expected contact between the caprock and the basalt. Proper drilling depths would be coordinated with geotechnical engineers before construction to achieve optimal boring depths.

Excavation for the beach manhole and the trench to connect to the beach manhole would also be relatively shallow and well within the sedimentary layer. Installation of a typical beach manhole requires excavation of about ten feet. Open trench construction typically involves excavating a trench about one foot wide and three feet deep.

Potential contaminants

Materials that could be considered as potential contaminants are fuels and lubricants for the construction equipment, including the HDD slurry lubricant made from a mixture of bentonite and water. All such materials would be tightly controlled and monitored throughout construction, in order to avoid spills that could leach into the aquifer. The contractor would be required to take proper precautions as established by industry standards. It should be noted that bentonite is a naturally-occurring clay material, which is non-toxic. If an accidental release of bentonite slurry were to occur (e.g., the drill head encounters a geologic void or there is a surface spill), the contractor would immediately stop drilling and may modify the slurry's thickness, or use grout to seal the source of the leakage or fill the void, among other standard mitigation measures used in the industry.

Aquifer Recharge Areas, Artesian Conditions, and Water Gradient



Not to scale

Source: Parsons Brinckerhoff, 2003.



Legend  
 — Water gradient  
 - - - Drill path

Test Bore and Proposed Drill Path  
Submarine Fiber-Optic Cable Project  
Figure 12

RECEIVED AS FOLLOWS

4. POTENTIAL CONSTRUCTION IMPACTS

The potential for aquifer contamination by construction activities is low for the following reasons:

- there would be no penetration of the contact between the caprock and the underlying basalt;
- no potential contaminants are expected to be released during construction; and
- potential contaminants would not reach the potable aquifer because the confined aquifer is under artesian pressure, the aquifer's recharge area occurs at higher elevations, and the water gradient flows seaward, away from the island's potable water wells.

No penetration of the caprock/basalt interface

If the drill head were to penetrate the contact between the caprock and the underlying volcanic basalt, the aquifer could be exposed by a pathway for potential contaminants and could be seriously affected. However, the HDD bore would avoid breaching that interface. Figure 12 shows a profile of the presumed coastal geology and the proposed drill path at the Oneali Homesteads landing site. The bore path must travel a horizontal distance of 4,300 feet before reaching the underwater exit point at a depth of 80 feet below mean sea level.

The HDD bore path would be drilled at least ten feet below the ground surface, within the sedimentary layer, but above the estimated profile of the basalt formation. Geotechnical testing revealed that basalt is not encountered until about 32 feet below the ground surface near the coastline (see Figure 12). The directional flexibility of the drill head will allow the operator to maintain a vertical depth that is above the expected contact between the caprock and the basalt. Proper drilling depths would be coordinated with geotechnical engineers before construction to achieve optimal boring depths.

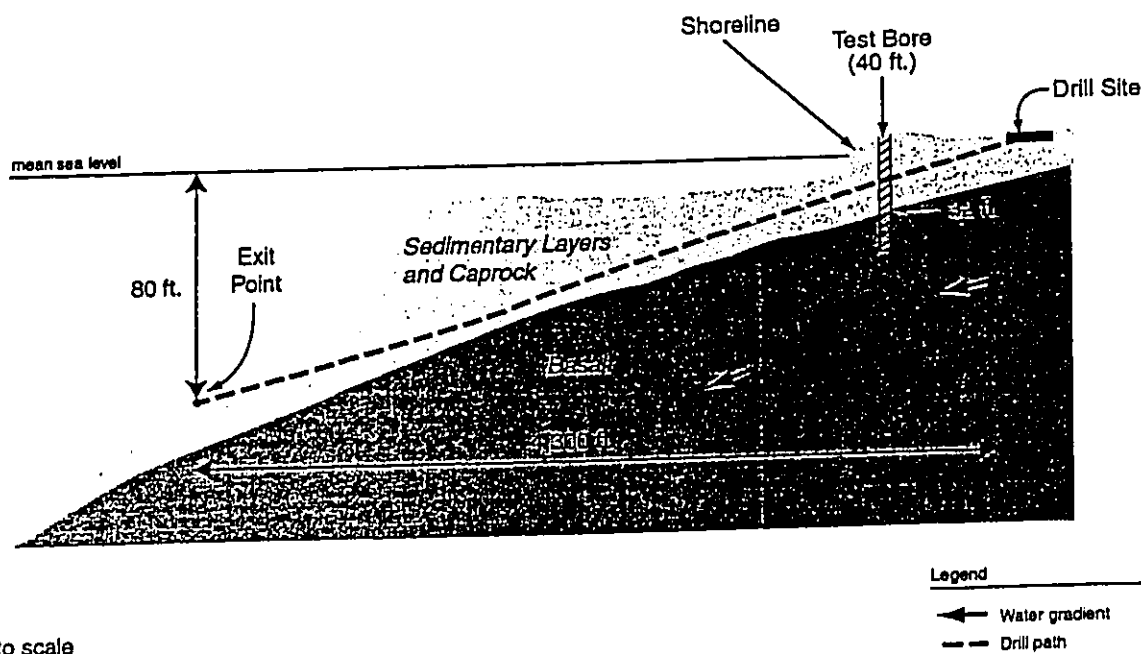
Excavation for the beach manhole and the trench to connect to the beach manhole would also be relatively shallow and well within the sedimentary layer. Installation of a typical beach manhole requires excavation of about ten feet. Open trench construction typically involves excavating a trench about one foot wide and three feet deep.

Potential contaminants

Materials that could be considered as potential contaminants are fuels and lubricants for the construction equipment. Including the HDD slurry lubricant made from a mixture of bentonite and water. All such materials would be highly controlled and monitored throughout construction, in order to avoid spills that could reach into the aquifer. The contractor would be required to take proper precautions as established by industry standards. It should be noted that bentonite is a naturally-occurring clay material, which is non-toxic. If an accidental release of bentonite slurry were to occur (e.g., the drill head encounters a geologic void or there is a surface spill), the contractor would immediately stop drilling and may modify the slurry's thickness, or use grout to seal the source of the leakage or fill the void, among other standard mitigation measures used in the industry.

Aquifer Recharge Areas, Artesian Conditions, and Water Gradient

Groundwater Impact Assessment



Not to scale

Source: Parsons Brinckerhoff, 2003.



Test Bore and Proposed Drill Path  
Submarine Fiber-Optic Cable Project  
Figure 12



Even in the unlikely event that the basal were breached and/or an accidental release of potential contaminants were to occur, there are at least three factors why potential contaminants could not reach the potable water supply: the confined aquifer is under artesian pressure, the aquifer's recharge area occurs at higher elevations, and the water gradient flows seaward, away from the island's potable water wells.

Artesian conditions and relative impermeability of the caprock would help buffer the aquifer. In the case of accidental releases of contaminants, the pressurized conditions in the aquifer makes it unlikely for substances to flow from the surface into the aquifer. Moreover, since the construction site is not located in the aquifer recharge area, inadvertent spills would also have no direct pathway through which they could be introduced into the aquifer.

In addition, the water gradient indicates that any substances that may be inadvertently introduced into the aquifer at the project site would flow away from the aquifer and the water wells. As shown in Figure 10, water wells lie upgradient from the proposed project site. Thus, the path of groundwater flow towards the ocean means substances introduced at the project site would be flushed away from the well locations.

While basal springs feeding fishponds along the coastline suggest that the caprock may be thin in some spots, it is unlikely that any inadvertent releases of construction-related pollutants would contaminate the aquifer through these spots, because the project location is near the coast (removed from recharge areas) and the aquifer gradient flows towards the ocean. (Figure 12). The construction area would be set back from existing surface waters, such as Aiea Fishpond and the ocean. During construction, the implementation of Best Management Practices (BMPs) for stormwater pollution control, in accordance with the National Pollution Discharge Elimination System (NPDES) would prevent construction water runoff from affecting surface waters. The project would comply with all regional water quality standards and waste discharge requirements.

#### 5. POTENTIAL OPERATIONAL IMPACTS

Once the cable landfall site is constructed and operational, no impact to the aquifer is expected. The bores would be sealed by the drill casing which houses the cable. As mentioned earlier, the bores housing the cables would connect to a manhole, allowing for occasional maintenance of the cable line. Maintenance of the cable line would not involve site disturbance.

Although no potential operational impacts to the aquifer are anticipated, there are some implications for the adjacent fishpond. If the HDD were to intercept the basal spring that feeds the fishpond, the spring's flow could be diverted. Diverting the stream's flow would increase salinity in the pond, resulting in an environment within the fishpond no longer suitable for certain types of fish, such as tilapia.

However, intercepting the spring that feeds the fishpond is unlikely, because this spring is most likely located directly below the fishpond. The cable landing site would be located outside and adjacent to the fishpond, and the bores would not travel beneath the fishpond, as shown in Figure 5.

#### 6. REFERENCES

- Anthony, Stephen S. Evaluation of Groundwater Resources From Available Data, 1992. Ensl Molokai, Volcano, Hawaii. U.S. Geological Survey, 1992.
- Commission on Water Resource Management, State of Hawaii Department of Land and Natural Resources. Hawaii Water Plan, Maui County Water Use and Development Plan: Island of Molokai. Review Draft, February 1992.
- Gingerich, S.B. and Delwyn S. Oki. Groundwater in Hawaii. USGS, FS 128-00, 2000.
- Hagemann, Matthew. Technical Support Document for the Review of the Molokai Sole Source Aquifer. Region 9, Groundwater Protection Section, April 1, 1994.
- Mink, John F. and Stephen L. Lau. Aquifer Identification and Classification for Molokai: Groundwater Protection Strategy for Hawaii. Water Resources Research Center Technical Report No. 187, October 1992.
- Oki, D. S. Geohydrology and Numerical Simulation of the Groundwater Flow System of Molokai, Hawaii. U.S. Geological Survey, Water Resources Investigations Report 97-4176, 1997.
- Oki, D.S., S.B. Gingerich and R.L. Whitehead. Groundwater Atlas of the United States. Segment 13, Alaska, Hawaii, Puerto Rico and the U.S. Virgin Islands, HA 730-N.
- Seld, Gerald. Geolabs, Inc. Personal communication, April 18, 2003.
- Stearns, H.T. and G.A. MacDonald. Geology and Groundwater Resources of the Island of Molokai, Hawaii. Hawaii Division of Hydrography, Bulletin 11, 1947.

RECEIVED AS FOLLOWS

Appendix 8  
**Horizontal Directional Drilling Feasibility Study**



**Final Environmental Assessment/  
Finding of No Significant Impact**  
Submarine Fiber-Optic Cable Project

HORIZONTAL DIRECTIONAL DRILLING  
FEASIBILITY REPORT  
LANDING SITES FOR RURAL FIBER OPTIC LINES --  
PHASE II  
(RUS LANDING SITES)  
STATE OF HAWAII (5 ISLANDS)

JULY 16, 2003

HORIZONTAL DIRECTIONAL DRILLING FEASIBILITY REPORT  
LANDING SITES FOR RURAL FIBER OPTIC LINES -- PHASE II  
(RUS LANDING SITES)  
STATE OF HAWAII (5 ISLANDS)

W.O. 4773-00(A) JULY 16, 2003

for

PARSONS BRINCKERHOFF QUADE & DOUGLAS

Prepared for  
PARSONS BRINCKERHOFF QUADE & DOUGLAS



THIS WORK WAS PREPARED BY  
ME OR UNDER MY SUPERVISION.

*(Signature)*  
SIGNATURE  
EXPIRATION DATE  
4-30-04  
OF THE LICENSE



GEOLABS, INC.  
Geotechnical Engineering and Drilling Services  
2006 Kalihī Street • Honolulu, HI 96819  
Hawaii • California

GEOLABS, INC.  
Geotechnical Engineering and Drilling Services

W.O. 4773-00(A)

RECEIVED AS FOLLOWS



**GEOLABS, INC.**

Geotechnical Engineering and Drilling Services

July 16, 2003  
W.O. 4773-00(A)

Mr. Randall Urasaki, P.E.  
Parsons Brinckerhoff Quade & Douglas, Inc.  
Pacific Tower, Suite 3000  
1001 Bishop Street  
Honolulu, HI 96813

Dear Mr. Urasaki:

Geolabs, Inc. is pleased to submit our report entitled "Horizontal Directional Drilling Feasibility Report, Landing Sites for Rural Fiber Optic Lines - Phase II (RUS Landing Sites), State of Hawaii (5 Islands)" for the project.

Our work was performed in general accordance with the scope of services outlined in our revised fee proposal dated May 31, 2002.

Detailed discussion and recommendations are contained in the body of this report. If there is any point that is not clear, please contact our office.

Very truly yours,

GEOLABS, INC.

*Chiyon S. Mimura*  
Chiyon S. Mimura, P.E.  
President

CSM:GS:cj  
01-14700 Series 4773-00(A) 04-1-00 2)

2006 Kalia Street - Honolulu, Hawaii 96819  
Phone: (808) 941-5064 • Facsimile: (808) 947-1749 • E-mail: hawaii@geolabs.net  
Hawaii • California

**HORIZONTAL DIRECTIONAL DRILLING FEASIBILITY REPORT  
LANDING SITES FOR RURAL FIBER OPTIC LINES - PHASES II  
(RUS LANDING SITES)  
STATE OF HAWAII (5 ISLANDS)**

W.O. 4773-00(A) JULY 16, 2003

**TABLE OF CONTENTS**

	Page
<b>SUMMARY OF FINDINGS AND RECOMMENDATIONS</b> .....	iii
<b>1.0 GENERAL</b> .....	1
1.1 Introduction .....	1
1.2 Project Considerations .....	1
1.3 Landing Areas and Sites .....	2
1.4 Purpose and Scope .....	5
<b>2.0 HORIZONTAL DIRECTIONAL DRILLING</b> .....	7
2.1 Introduction .....	7
2.2 Types of HDD Drilling Equipment .....	7
2.3 Work Area Requirements for HDD Equipment .....	9
2.4 Past Installations Using HDD .....	9
<b>3.0 REGIONAL AND SITE GEOLOGY</b> .....	11
3.1 Introduction .....	11
3.2 Regional and Site Geology of Kauai Sites .....	11
3.3 Regional and Site Geology of Oahu Sites .....	13
3.4 Regional and Site Geology of Molokai Sites .....	14
3.5 Regional and Site Geology of Maui Sites .....	15
3.6 Regional and Site Geology of the Big Island Sites .....	16
<b>4.0 SITE TOPOGRAPHY AND BATHYMETRY</b> .....	20
4.1 Introduction .....	20
4.2 Kauai Landing Sites .....	20
4.3 Oahu Landing Sites .....	20
4.4 Molokai Land Sites .....	21
4.5 Maui Landing Sites .....	21
4.6 Big Island Landing Sites .....	21
<b>5.0 SITE FEASIBILITY FOR HORIZONTAL DIRECTIONAL DRILLING</b> .....	23
5.1 Kauai Landing Sites .....	23
5.2 Oahu Landing Sites .....	24
5.3 Molokai Landing Sites .....	24
5.4 Maui Landing Site .....	25
5.5 Big Island Landing Sites .....	25
<b>6.0 CONCLUSIONS</b> .....	26
<b>7.0 LIMITATIONS</b> .....	28

W.O. 4773-00(A)

**GEOLABS, INC.**  
Hawaii • California

Page 1

RECEIVED AS FOLLOWS

RECEIVED AS FOLLOWS

TABLE OF CONTENTS (CONTINUED)

LIST OF PLATES

Plate 1	-	Overall Project Location Map
Plate 2	-	Project Location Map (Kauai - Kekaha Sites)
Plates 3.1 thru 3.3	-	Project Location Map (Oahu - Makaha Sites)
Plate 4	-	Project Location Map (Oahu - Waimanalo Sites)
Plates 5.1 & 5.2	-	Project Location Map (Molokai - Kalamaula Sites)
Plates 6.1 & 6.2	-	Project Location Map (Maui - Honokowai Sites)
Plates 7.1 & 7.2	-	Project Location Map (Maui - Makaha Sites)
Plate 8	-	Project Location Map (Maui - Kahikinui Sites)
Plates 9.1 & 9.2	-	Project Location Map (Big Island - Upolu Point Sites)
Plate 10	-	Project Location Map (Big Island - Kawaihae Sites)
Plate 11	-	Typical HDD Site Layout
Plates 12.1 & 12.2	-	Estimated HDD Alignment Profile (Kauai - Kekaha Sites)
Plates 13.1 & 13.2	-	Estimated HDD Alignment Profile (Oahu - Makaha Sites)
Plate 14	-	Estimated HDD Alignment Profile (Oahu - Waimanalo Sites)
Plates 15.1 & 15.2	-	Estimated HDD Alignment Profile (Molokai - Kalamaula Sites)
Plates 16.1 & 16.2	-	Estimated HDD Alignment Profile (Maui - Honokowai Sites)
Plates 17.1 & 17.2	-	Estimated HDD Alignment Profile (Maui - Makaha Sites)
Plate 18	-	Estimated HDD Alignment Profile (Maui - Kahikinui Sites)
Plates 19.1 & 19.2	-	Estimated HDD Alignment Profile (Big Island - Upolu Point Sites)
Plates 20.1 & 20.2	-	Estimated HDD Alignment Profile (Big Island - Kawaihae Sites)

HORIZONTAL DIRECTIONAL DRILLING FEASIBILITY STUDY  
LANDING SITES FOR RURAL FIBER OPTIC LINES - PHASE II  
(RUS LANDING SITES)  
STATE OF HAWAII (5 ISLANDS)

W.O. 4773-00(A) JULY 16, 2003

SUMMARY OF FINDINGS AND RECOMMENDATIONS

A study was conducted to evaluate the feasibility of utilizing horizontal directional drilling (HDD) for the installation of fiber optic cables at 9 landing areas on five major islands in Hawaii. Each landing area consists of several potential landing sites totaling 36 landing sites. In general, we believe that it is feasible to install the cables using HDD method at the proposed landing sites except for the Honokupu Landing Site on the Big Island.

Horizontal directional drilling is a trenchless, steerable method used for the installation of pipes, conduits and cables in a shallow arc using a surface launched drilling rig. To reduce the risk of cave-ins during cable installation, it is recommended that the drill rods be abandoned in-place after drilling the pilot hole and used as the outer casing for the new cable.

The horizontal distance of the landings from the shore to an ocean depth of 60 feet ranged from about 1,100 to 6,500 feet. Since the horizontal distances are relatively long, we anticipate that the larger size midl type drill rig and maxi type drill rig will be used for the project. Past pipeline installations using HDD have included installation lengths up to about 6,000 feet for pipe diameter size of 24 inches. In addition, fiber optic cables have been installed in abandoned drill rods with drive lengths of up to 7,500 feet. Therefore, we believe that the installation drive lengths for the project are feasible with the appropriate drilling equipment.

The subsurface materials anticipated at the landing sites include lagoonal deposits, beach sands, alluvial deposits, colluvial deposits, and coral and basalt formations. Since cobbles and boulders are typically found within colluvial and alluvial deposits, difficult drilling conditions may be encountered while drilling through these deposits. Voids or cavities may be encountered in the coral and rock formations. The loss of drilling fluid may occur when these voids or cavities are encountered. In addition, it may be difficult to re-start the drill hole on the bottom of the void or cavity, especially when the bottom of the void is at an angle to the drill head. Grouting of the void or re-drilling the borehole may be required.

Hydraulic fracturing of the overburden materials and expulsion of drilling fluids at the ground surface may occur when the ground cover is shallow. For the Pohaku

SUMMARY OF FINDINGS AND RECOMMENDATIONS

Kaanapali landing site, the estimated ground cover of 5 feet is not sufficient to reduce the potential for hydraulic fracturing to occur. It is recommended that the entry point of the landing site be moved further inland to obtain adequate cover depth. If sufficient land space is not available to move further away from the beach, the landing site should be deleted.

The text of this report should be referred to for more detailed discussions and specific site preparation recommendations.

END OF SUMMARY OF FINDINGS AND RECOMMENDATIONS

**SECTION 1.0 - GENERAL**

**1.1 Introduction**

This report presents the results of our horizontal directional drilling feasibility study performed for the RUS Landing Sites for Rural Fiber Optic Lines -- Phase II project on five islands in the State of Hawaii. The general location and vicinity of the project site are shown on the Overall Project Location Map, Plate 1.

This report summarizes our findings and geotechnical engineering recommendations resulting from our desk-top study performed for the cable landing project. These recommendations are intended to assist in determining a preferred landing site at each of the landing areas. The findings and recommendations presented herein are subject to the limitations noted at the end of this report.

**1.2 Project Considerations**

The installation of undersea cables to link Sandwich Isles Communications, Inc.'s (SIC) island-based rural fiber optic telecommunication lines are planned for five major islands in the State of Hawaii. These cables will link the Islands of Kauai, Oahu, Maui, Molokai, and the Big Island. Consequently, potential landing sites for such an undersea cable operation will need to be identified and evaluated to determine their feasibility.

The fiber optic communication line network system consists of cables laid on the ocean bottom, cables installed on land, and cable landings that connect the land and ocean cables. Typically, cable landings consist of the excavation of an open trench for cable installation. This method of cable installation is damaging to existing coral reef formations in shallow waters and also generates suspended solids into the ocean during installation. An alternative method of cable installation consists of horizontal directional drilling (HDD). The HDD method consists of drilling a small diameter hole beneath the ground surface from near the shoreline out to a specified depth of water. The small diameter borehole is then enlarged and a casing pipe is installed. The communication cable is then installed within the casing pipe. Alternatively, after completion of the small diameter borehole, the drill rods are abandoned in-place and used as the outer casing for the new cables. Since the disturbed area using the HDD method is significantly less

RECEIVED AS FOLLOWS

RECEIVED AS FOLLOWS

SECTION 1 - GENERAL

compared to the open trench method, the HDD method is significantly less disruptive to the natural environment. We understand that the HDD installation method for the cable landings is the preferred method of cable installation for the project.

The cable landings will extend from the shore out to a water depth of about 60 feet. We understand that one fiber optic cable will be installed at each landing. The submarine cable varies in size depending on the type of protection and the depth of water. For ocean depths up to 325 to 650 feet, double and single armored cables with diameters of about 2½ and 1½ inch, respectively, are used. Lightweight protected cable with a diameter about 1 inch is used for ocean depths greater than 650 feet. We understand that the lightweight protected cable will be used in the drill rods. However, the larger diameter armored protected cable used for ocean depths up to 325 feet will also extend into a portion of the drill rod casing at the ocean exit of the cable landing.

1.3 Landing Areas and Sites

The project consists of a total of 9 landing areas on the five major islands. In each landing area, there are several potential landing sites being considered. A total of 36 landing sites were evaluated in this study.

There is one area site on the island of Kauai. The Kekaha area site is located on the southwestern shoreline of the island. Five potential landing sites extending from Kekaha Beach Park to Kikiaola Harbor are proposed for the Kekaha area. The approximate horizontal distance of the landings from the shore to an ocean depth of 60 feet range from about 3,000 to 4,800 feet.

On the island of Oahu, there are two area sites: Makaha and Waimanalo. The Makaha site is located on the southeastern shoreline of the island and consists of five potential landing sites extending from Kaena Point State Park to Mauna Lanihale Beach Park. The three proposed landing sites for the Waimanalo area stretches from the Oceanic Institute to Sandy Beach Park along the southeastern shoreline of the island. The landings on Oahu range from about 2,900 to 3,700 feet in horizontal distance.

W.O. 4773-00(A)

GEOLABS, INC.  
Hawaii • California

Page 2

SECTION 1 - GENERAL

There is one area site, Kalamaula, on the island of Molokai. The Kalamaula site is located on the southern shoreline of the island and consists of five potential landing sites that are located between Kamehameha Coconut Grove and the Kaoini Fishpond. The landings on the island of Molokai range from about 4,400 to 6,500 feet in horizontal distance.

A total of three area sites are located on the island of Maui. These sites consist of Honokowai, Makena, and Kahikunui. The Honokowai site is located on the northwestern shoreline of the island and consists of four landing sites stretching from Kahana Point to Waihi State Wayside Park. There are four landing sites within the Makena area that stretches from Kamaole Beach Park to Poolanalea along the southwestern shoreline of the island. The Kahikunui area site is located adjacent to Makena and consists of two landing sites at Kanahena and Kamanamana. The landings on the island of Maui range from about 1,800 to 4,000 feet in horizontal distance.

On the Big Island, there are two area sites: Upolu Point and Kawaihae. There are four potential landing sites at the Upolu Point area site. These landing sites are located on the northern shoreline of the island between Kapaa Beach Park and Upolu Airport. At the Kawaihae area site, four potential landing sites are located between Spencer Beach Park and Honokoa on the northwestern shoreline of the island. The landings range from 1,100 to 4,200 feet in horizontal distance.

A summary of the different landing areas and sites on each of the islands are presented on Table 1. In addition, the project location map for each of the landing areas is shown on the Project Location Maps, Plates 2 through 10.

W.O. 4773-00(A)

GEOLABS, INC.  
Hawaii • California

Page 3

TABLE 1 - SUMMARY OF LANDING AREAS AND SITES	
Island	Landing Area
Kauai	Kekaha
	Akialoa Road Site Alae Road Site Iwa Road Site Akepa Road Site Kikialoa Harbor Site
	Makaha
Oahu	Waimanalo
	Makai Pier Site Kaliwi Site Sandy Beach Park Site
Molokai	Kalamaula
Molokai	Kalamaula
Maui	Honokowai
	Old Kaanapali Airport Site Honokowai Beach Park Site Pohaku Kaanapali Site Waikuli Site
Maui	Makena
	Kamaole Beach Park III Site Hale Kamaole Site Wailea Beach Hotel Site Poolana Park Site
Maui	Kahikunui
	Kanahena Site Kamanamana Site

TABLE 1 - SUMMARY OF LANDING AREAS AND SITES	
Island	Landing Area
Big Island	Upolu Point
	Upolu Airport Site Upolu Point Loran Site Honoiupu Landing Site Kapaa Beach Park Site
Big Island	Kawaihae
	Honokaa Site Kawaihae Harbor Site Spencer Beach Site Kaawa Place Site

**1.4 Purpose and Scope**

The purpose of our desk-top study was to determine the feasibility of using horizontal directional drilling for the installation of the fiber optic cables at the potential landing sites. The desk-top study consists of a review of available geologic maps, topographic maps, and in-house subsurface information at the landing sites for the project. Our work was performed in general accordance with our revised fee proposal dated May 31, 2002. The scope of work for this feasibility study included the following tasks and work efforts:

1. Review of readily available geologic maps for the project sites.
2. Review of available topographic survey maps and ocean depth maps at the landing sites.
3. Review of in-house subsurface information near the landing sites.
4. Evaluation of the feasibility of cable installation using horizontal directional drilling at the various landing sites for the proposed project.
5. Preparation of this feasibility report summarizing our work on the project and presenting our findings and geotechnical engineering recommendations.
6. Coordination of our overall work on the project by a project engineer from our firm.

RECEIVED AS FOLLOWS



RECEIVED AS FOLLOWS

SECTION 1 - GENERAL

- 7. Quality assurance of our work and client/design team consultation by a principal engineer from our firm.
- 8. Miscellaneous work efforts such as drafting, word processing, and clerical support.

END OF GENERAL

SECTION 2.0 - HORIZONTAL DIRECTIONAL DRILLING

2.1 Introduction

Horizontal directional drilling (HDD) is a trenchless, steerable method for the installation of pipes, conduits and cables in a shallow arc using a surface launched drilling rig. Typically, a small diameter pilot hole is first bored using either controlled fluid jetting or fluid assisted mechanical cutting, or combinations of both, at the drill bit. Then, the pilot hole is enlarged by reaming to accommodate the pipe to be installed. After the hole has been enlarged to the proper size, the pipe is pulled into the reamed hole by the drilling machine. Most HDD systems use slurry during drilling to stabilize the walls of the borehole and to reduce the frictional drag on the pipeline being installed. The slurry or drilling mud typically consists of a clay material called bentonite and water. HDD is a steerable method of installation. Steering corrections are made by rotating the slanted cutter shoe to the desired orientation prior to advancing the shoe and drill rods without rotation of the rods.

The HDD installation method being considered for this project consists of drilling a pilot hole and abandoning the drill rods in-place. The steel drill rods will be used as the outer casing with the communication cable installed within the drill rods. This method greatly reduces the risk for installation of the cables compared to the typical HDD installation due to potential collapse of the borehole during the reaming operation for these long distance boreholes. In addition, the amount of suspended solids generated during the drilling work at the ocean exit point will be greatly reduced since back-reaming to a larger diameter borehole will not be performed.

2.2 Types of HDD Drilling Equipment

Horizontal directional drilling equipment generally consists of three systems: solids control, mud pump, and drill rig. The solids control system mixes and cleans the drilling fluid. The used drilling slurry is sucked from the entry pit and cleaned using screen shakers and desilter cones to remove sands and silts in the slurry. The cleaned slurry is then agitated and mixed prior to sending the slurry to the mud pump. Additional bentonite or polymer agent may be added during the mixing. The cleaned drilling slurry is then

pumped with the mud pump through the drill rods to the cutter head. The drill rig system is composed of a drill carriage, power unit, and a control trailer. In addition, a crane is utilized for lifting the drill rods and fittings used in the drill assembly. The three systems are connected and controlled by the driller in the control trailer. The three systems are shown on the Typical HDD Site Layout, Plate 11.

The different sizes of HDD drilling rigs may be generally classified into Mini, Midi, or Maxi drill rigs as presented in Table 2. The smaller drill rigs (Mini) typically have thrust and pullback capacity of up to 20,000 pounds with maximum bore length of about 600 feet. The mini drill rigs are typically used for small diameter pipe installation at relatively short installation lengths. Midi drill rigs have thrust/pullback capacity of up to 100,000 pounds with bore lengths typically from 400 to 2,000 feet. The larger Maxi drill rigs have thrust/pullback capacity greater than 100,000 pounds and are capable of bore lengths greater than 2,000 feet. These drill rigs are typically used for river crossings. Because of the long bore lengths and large diameter drill rods to be utilized, we do not foresee utilizing mini and the lower end midi types of drill rigs for this project.

**TABLE 2 - HDD DRILL RIG CLASSIFICATION**

Drill Rig Classification	Thrust/Pullback Capacity (pounds)	Typical Bore Length (feet)
Mini	Up To 20,000	Up To 600
Midi	Up To 100,000	400 to 2,000
Maxi	Greater Than 100,000	Greater Than 2,000

The HDD borehole is advanced by the jelling and/or cutting performed at the drill bit. The rotational cutting speed of the drill bit is provided through the drill rods connected to the drill motor located at the ground surface. Alternatively, a mud motor may be used. The mud motor is located at the drill bit and is powered by a fairly large volume of drill mud being pumped at a low pressure through the drill rod to the mud motor.

Because of the size of the armor-protected cable (about 1½ to 2½-inch outer diameter) required at each landing site and the HDD drive distance, we anticipate that drill rods ranging in inside diameter from 4 to 6 inches will be used.

The vertical and horizontal alignment of the drill hole is monitored from the surface through a probe located near the drill head containing magnetic and gravitational sensors that measures inclination and azimuth. The signals from the probe are transmitted to a computer located at the surface by a connecting wire running inside the drill rods.

**2.3 Work Area Requirements for HDD Equipment**

The work area requirements will depend on the size of drill rig to be utilized for the cable installation. Ideal and minimum work areas of 100 feet by 150 feet and 60 feet by 100 feet, respectively, are typically used for midi drill rigs. For the larger maxi rigs, an ideal area of 200 feet by 300 feet and a minimum area of 100 feet by 150 feet are typically used. The workspace requirements can vary according to the site conditions and adjustments can be made to suit a particular site. The typical work area requirements for these drill rigs are summarized in Table 3.

**TABLE 3 - TYPICAL HDD WORK AREA REQUIREMENTS**

Drill Rig Classification	Ideal Work Area	Minimum Work Area
Midi	100 feet by 150 feet	60 feet by 100 feet
Maxi	100 feet by 150 feet	100 feet by 150 feet

**2.4 Past Installations Using HDD**

A review of past HDD installations was performed to evaluate the feasibility of the method and length of installation considered for this project. We understand that the length of the installation will generally range from about 1,100 to 6,500 feet. A summary of previous HDD installations is presented on Table 4.

Past installations include pipelines up to 48 inches in diameter to lengths of greater than 3,000 feet. Past fiber optic cable installations have utilized welded steel casing, steel drill rods, and HDPE pipe. A fiber optic cable installation within the steel drill rod has been completed previously to a drive length of about 7,500 feet.

The projects presented in Table 4 were selected to present installations similar to those anticipated for this project. In addition, these past installations provide a range of what is technically feasible at this time.

RECEIVED AS FOLLOWS

TABLE 4 - PREVIOUS HDD INSTALLATIONS

Year	Type of Installation	Location	Drive Length (feet)	Pipe Size (in OD)	Pipe Type	Subsurface Conditions
1997	Sewer Line	Ohio	1300	20	HDPE	limestone, shale
1997	Gas Line	Maryland	1500	12	Steel	sand, clay
1998	Oil Line	Canada	5660	24	Steel	clay, gravel, shale
1998	Fiber Optics	California	2000	8	Steel	na
1998	Fiber Optics	Pa.	2480	5	Steel	rock
1998	Water Line	Missouri	3400	42	Steel	alluvium, limestone
1998	Water Line	Texas	2360	48	Steel	silty sand, clay, gravel
1998	Sewer Line	California	1500	20	HDPE	silty sand, gravel
1998	Fiber Optics	Colorado	7500	5	Drill rod	rock, limestone
1998	Water Line	Oklahoma	1350	8	Steel	limestone, sandstone
1998	Water Line	Virginia	3070	48	Steel	sand, clay
1998	Water Line	Georgia	5375	30	Steel	silty & cemented sand
1999	Water Line	Michigan	2300	20	HDPE	sand, gravel, cobbles
1999	Oil Line	Alaska	4300	20	Steel	na
1999	Waste Line	Hawaii	1300	10	HDPE	na
1999	Sewer Line	Hawaii	1100	22	HDPE	na
2000	Fiber Optics	Tennessee	2000	12	Steel	clay, sand
2000	Fiber Optics	Germany	1750	5.5	Steel	rock, gravel
2000	Water Line	Florida	2276	16	HDPE	na
2000	Sewer Line	Florida	3464	16	HDPE	na
2000	Water Line	Texas	1640	24	Steel	limestone
2000	Fiber Optics	Texas	5375	5	Steel	na
2000	Fiber Optics	Colorado	2511	9	Steel	shale
2000	Oil Line	Mississippi	1770	20	Steel	sand, silt, clay
2000	Oil Line	Texas	3800	20	Steel	sand, clay
2000	Fiber Optics	Colorado	860	10	HDPE	sandstone, limestone
2000	Sewer Line	Hawaii	3120	46	Steel	fill, sand, silt, coral
2000	Gas Line	N. Carolina	6041	24	Steel	rock
2001	Gas Line	Canada	2400	6	Steel	clay, granular soils
2001	Fiber Optics	Oregon	3800	12	Steel	sandy loam and clay
2001	Water Line	Ohio	3000	36	Steel	sand, cobble, gravel
2001	Oil Line	Canada	4000	24	Steel	na
2001	Gas Line	Bolivia	6575	32	Steel	sills, sands, clays
2002	Sewer Line	Hawaii	2050	20	HDPE	clays, sills, sands
2002	Sewer Line	Florida	6060	20	Steel	na

END OF HORIZONTAL DIRECTIONAL DRILLING

## SECTION 3.0 - REGIONAL AND SITE GEOLOGY

## 3.1 Introduction

The Hawaiian Islands form a chain of shield-shaped basaltic domes situated on the basin floor of the Pacific Ocean. The group of islands are generally aligned and formed in a northward direction with Midway Island at the northwestern end and the Big Island of Hawaii at the southeastern end of the chain.

The islands are believed to have been formed by a hot spot on the ocean floor many miles in diameter. As the oceanic plate moved in a northwesterly direction, volcanic islands were formed as the plate passed over the hot spot. The island of Kauai is the eldest of the major islands in the chain with an age of approximately 3.8 to 5.6 million years. The youngest of the islands and still being formed is the Big Island of Hawaii.

The potential landing sites are located on five of the major islands of Hawaii. Landing sites are located on the islands of Kauai, Oahu, Maui, Molokai, and the Big Island. The regional geology of these islands is described below. Also, the site geology for the different landing areas is presented. The site geology is based on geologic maps developed by Harold Stearns. These geological maps provide estimated geologic deposits that may be encountered within the overland portion of the islands.

## 3.2 Regional and Site Geology of Kauai Sites

The island of Kauai is composed of a single basalt shield volcano built by the extrusion of lavas of the Waimea Canyon Volcanic Series during the late Pliocene Epoch (more than 2 1/4 million years before present). Following the cessation of this main shield building phase, there was renewed volcanic activity with the extrusion of basaltic lavas of the post-erosional Koloa Volcanic Series and the concurrent deposition of alluvial sediments of the Palikea Formation.

The majority of the island of Kauai is covered by lavas of the Waimea Canyon Volcanic Series. These lavas consist of four distinct formations: Napali, Olokele, Haupuu, and Makaweli. These formations are comprised of thin-bedded a'a and pahoehoe flows to massive basalt flows that ponded in calderas and graben.

RECEIVED AS FOLLOWS

Rocks of the Koloa Volcanic Series cover most of the eastern half of the island of Kauai. These rocks are generally characterized as thick flows of dense basalt extruded from groups of vents aligned in north-south trends in various locales. Associated with the vents are pyroclastic materials, which usually form low cinder cones at the vent.

During the Pleistocene Epoch (Ice Age), there were many sea level changes as a result of widespread glaciation in the continental areas of the world. As the great continental glaciers accumulated, the level of the ocean fell since there was less water available to fill the oceanic basins. Conversely, as the glaciers receded or melted, global sea levels rose because more water was available. The land mass of Kauai remained essentially stable during these changes and the fluctuations were eustatic in nature. These glacio-eustatic fluctuations resulted in stands of the sea that were both higher and lower relative to present sea level of Kauai.

The higher sea level stands caused the accumulation of deltas and fans of terrigenous sediments in the heads of the old bays, accumulation of reef deposits at correspondingly higher elevations, and lagoonal/marine sediments in the quiet waters protected by fringing reefs.

The basaltic rock built by the extrusion of lavas of the Koloa Volcanic Series are generally characterized by flows of jointed dense vesicular basalt with interbedded thin clinker layers. The weathering process has formed a mantle of residual soils which grade to saprolite with depth. In general, saprolite is composed of mainly silty material and is typical of the tropical weathering of volcanic rocks. The saprolite grades to basaltic rock formation with depth.

The Kekaha area site is located on the western portion of the island of Kauai. Five potential landing sites extending from Kekaha Beach Park to Kikiaola Harbor are proposed for the Kekaha area. Based on the geologic maps, the landing sites are underlain by older non-calcareous sediments and calcareous sediments. The older non-calcareous sediments consist of poorly-consolidated sediments and lagoonal deposits. The calcareous sediments consist of unconsolidated calcareous fragments of marine organisms, primarily beach sand.

W.O. 4773-00(A)

GEOLABS, INC.  
Hawaii • California

Page 12

### 3.3 Regional and Site Geology of Oahu Sites

The island of Oahu was built by the extrusion of basaltic lavas from two shield volcanoes, Waianae and Koolau. The older volcano, Waianae, is estimated to be middle to late Pliocene in age and forms the bulk of the western one-third of the island. The younger shield, Koolau, is estimated to be late Pliocene to early Pleistocene (Ice Age) in age and forms the majority of the eastern two-thirds of the island. Waianae became extinct while Koolau was still active, and its eastern flank was partially buried below Koolau lavas banking against its eastern flank forming a broad plateau, now known as the Schofield Plateau.

During the Pleistocene Epoch, sea levels fluctuated in response to the cycles of continental glaciation. The higher sea level stands caused the formation of deltas and fans of accumulated terrigenous sediments in the heads of old bays, accumulated reef deposits at correspondingly higher elevations, and deposited lagoonal/marine sediments in the quiet waters protected by fringing reefs. The lower sea stands caused streams to carve valleys in the sediments and reef deposits. Subaerial exposure of the sediments and calcareous materials caused consolidation of the lagoonal deposits and induration of the calcareous reef materials.

During the late Pleistocene Epoch, there was a renewal of volcanic activity with the eruptions of vents of the Honolulu Volcanic Series. These vents broke through existing coral reefs and along the mountainsides. The vents of Diamond Head, Sail Lake, Punchbowl, and Koko craters emerged through the coral reef formations. Along the mountainsides, Kaili, Nuuanu, Kanohe, Castle, Tantalus, and Sugar Loaf vents erupted and poured lavas into the nearby valleys.

On the island of Oahu, there are two area sites: Makaha and Waimanalo. The Makaha site consists of five potential landing sites extending from Kaena Point State Park to Mauna Lanihale Beach Park. These sites are generally underlain by unconsolidated non-calcareous deposits and unconsolidated marine calcareous sediments. The non-calcareous deposits are mainly composed of younger alluvial deposits. This deposit also includes colluvial deposits consisting of angular talus

W.O. 4773-00(A)

GEOLABS, INC.  
Hawaii • California

Page 13

RECEIVED AS FOLLOWS

SECTION 3 - REGIONAL AND SITE GEOLOGY

material deposited near the base of the mountainsides. The calcareous sediments consist of beach sand. At the Keaau Beach Park site, the alignment crosses a coral reef formation near the shoreline.

The three proposed landing sites for the Waimanalo site stretches from the Oceanic Institute to Sandy Beach Park. Based on the geologic maps, these landing sites are generally underlain by basalt rock formation of the Koolau Volcanic Series and the Honolulu Volcanic Series. These sites are also underlain by beach and dune sands near the ground surface.

3.4 Regional and Site Geology of Molokai Sites

The island of Molokai was built during the early to middle Pleistocene Epoch by basaltic lava flows from two shield volcanoes: East Molokai Mountain and West Molokai Mountain. The Hoolahua Plain is located between the East and West Molokai Domes. The Hoolahua Plain, or isthmus of Molokai, is composed of lava flows from the East Molokai Volcano banking against the older West Molokai Volcano.

The West Molokai Mountain generally consists of thin-bedded a'a and pahoehoe lavas of the West Molokai Volcanic Series. The younger East Molokai Mountain was formed from lavas of the East Molokai Volcanic Series. The lower member of the East Molokai Volcanic Series generally consists of tholeiitic a'a and pahoehoe. The lower member was overlain by alkalic basalts and trachyte emitted from large cinder cones and domes on the mountainsides. During the late Pleistocene Epoch, a small volcano was formed on East Molokai. The lavas from this volcano are named the Kalaupapa basalt.

During the Pleistocene Epoch (Ice Age), there were many sea level changes as a result of the cycles of glaciation in the continental areas of the world. The lower sea stands caused streams to carve valleys in the sediments and reef deposits. Subaerial exposure of the sediments and calcareous materials caused consolidation of the soft deltaic materials and lagoonal deposits and induration of the calcareous reef materials. In addition, renewed subaerial erosion of the upper areas of the volcanic dome deposited terrigenous alluvial soils under relatively high energy conditions. The higher sea level stands caused the accumulation of deltas and fans of terrigenous sediments

W.O. 4773-00(A)

GEOLABS, INC.  
Hawaii • California

Page 14

SECTION 3 - REGIONAL AND SITE GEOLOGY

at correspondingly higher elevations in areas protected by fringing reefs and beach stands. During periods of no significant sea level changes, continued stream action extended the alluvial deltas and fans seawards.

There is one area site (Kalaia) on the island of Molokai. At the Kalaia area site, there are five potential landing sites located between Kamehameha Coconut Grove and the Kaonani Fishpond. Based on the geologic maps, these landing sites are generally underlain by recent and older alluvial materials.

3.5 Regional and Site Geology of Maui Sites

The island of Maui is comprised of two major volcanoes, the older West Maui (Tertiary Epoch) and the more recent East Maui, also known as Haleakala (Pleistocene Epoch). The isthmus of Maui is a narrow, gently sloping plain located between these two volcanoes.

The older West Maui volcano is generally comprised of three lava flows. The lower unit was formed during the Pliocene to early Pleistocene Epoch and is identified as the Wailuku Volcanic Series. The lavas of the Wailuku Volcanic Series generally consist of thin-bedded a'a and pahoehoe lavas. Overlying this unit are lavas of the Honolulu Volcanic Series (late Pleistocene Epoch) that consist of alkalic lavas and sill trachyte. Volcanic inactivity occurred during the Middle Pleistocene Epoch where weathering of the lavas, carving of canyons, deposition of materials occurred. During the late Pleistocene Epoch, renewal of volcanic activity occurred near the southern coast with lava flows of the Lahaina Volcanic Series. The lavas of the Lahaina Volcanic Series generally consist of olivine-rich basalt and nepheline basanite.

Haleakala was generally built in three distinguishable series of lava flows. The lower unit, the Honomanu Volcanic Series (late Pliocene to early Pleistocene Epoch) consist of thin-bedded, tholeiitic basaltic pahoehoe and a'a lavas. These lavas tend to be very permeable and carry basal water. Overlying this unit is the Kula Volcanic Series (early Pleistocene Epoch), composed primarily of thicker alkalic a'a flows, which may contain many inter-stratified, thin ash-soil layers. A long quiescent period followed, during

W.O. 4773-00(A)

GEOLABS, INC.  
Hawaii • California

Page 15

RECEIVED AS FOLLOWS

SECTION 3 - REGIONAL AND SITE GEOLOGY

which lime canyons were carved in the volcano, although a few eruptions may have occurred during this erosion interval in addition to erosion due to eustatic changes (higher and lower stands of the sea level). At the end of the rest period, copious flows erupted along the southwest and east rifts. This is the third and upper rock unit, known as the Hana Volcanic Series (Pleistocene Epoch). The lavas range in composition from ultra-basic olivine porphyries to non-porphyrific alkalic basalts.

There are a total of three area sites on the island of Maui. These sites consist of Honokowai, Makena, and Kahikunui. The Honokowai site consists of four landing sites stretching from Kahana Point to Waihihiki State Wayside Park. Based on the geologic maps, the Honokowai Beach Park and Old Kaanapali Airport sites are generally underlain by younger alluvial deposits. The Pohaku Kaanapali site is underlain by consolidated dune sands. The landing site at Waihihiki is generally underlain by lavas of the Lahaina Volcanic Series.

There are four landing sites within the Makena area that stretches from Kamaole Beach Park to Poolenalena. In addition, there are two landing sites within the Kahikunui area at Kanahana and Kamanamana. These landing sites are generally underlain by basaltic rock formations of the Hana Volcanic Series and an historic lava flow of 1750.

3.6 Regional and Site Geology of the Big Island Sites

The island of Hawaii, the largest in the Hawaiian Archipelago, covers an area of approximately 4,000 square miles. The island was formed by the activity of five shield volcanoes including the following: Kohala (long extinct), Mauna Kea (some activity during recent geologic time), Hualalai (last erupted in 1801 and is considered to be dormant), and Mauna Loa and Kilauea (both are still active).

The Kohala Volcano was built during the Pleistocene Epoch and is comprised of rocks from two volcanic series. The older Pololu Volcanic Series is generally composed of thin-bedded tholeiitic basalts with some alkalic basalts. The lavas of the younger Hawaii Volcanic Series is mainly composed of mugearites and soda trachytes. A large portion of the southern slope is buried under lavas of the Hamakua series from Mauna Kea.

W.O. 4773-00(A)

GEOLABS, INC.  
Hawaii • California

Page 16

SECTION 3 - REGIONAL AND SITE GEOLOGY

The Mauna Kea Volcano is the highest insular peak in the world. Numerous cinder cones are present near the top of the dome. The lower slope of the mountain is blanketed with volcanic ash deposits. Mauna Kea was formed during the Pleistocene Epoch from lavas of two volcanic series: Hamakua and Lapahoehoe. The older Hamakua series form the majority of the mountain and is mainly composed of tholeiitic basalts with picrite basalts. A blanket of Pahala Ash, about 4 to 15 feet in thickness, separates the lower lavas of the Hamakua series and the overlying lavas of the Lapahoehoe series. The lavas of the Lapahoehoe Volcanic Series are generally composed of hawaiite with some alkali olivine basalt.

Hualalai Volcano is about 17 miles in diameter with numerous cinder and splatter cones on its mountainsides. Hualalai was formed during the Pleistocene Epoch from lavas of the Hualalai Volcanic Series. These lavas are chiefly olivine basalts with some flows of alkalic basalts.

The volume of the Mauna Loa Shield Volcano, extending from the ocean floor, is estimated to be on the order of about 10,000 cubic miles making it possibly the largest volcanic mountain on earth. Furthermore, it is estimated from current lava production that Mauna Loa may have been forming for the past 1 to 2 million years. Mauna Loa is actually composed of two separate shield volcanoes: Mauna Loa and Nihoa. The latter having been covered by Mauna Loa lavas left only a few localized surface expressions visible at present.

The majority of the surface rock exposures at Mauna Loa consist of lavas and volcanic deposits belonging to the Kau Volcanic Series (Pleistocene and Holocene age) and the older Kahuku Volcanic Series (Pleistocene age). In addition, a regional ash deposit, identified as Pahala Ash (Pleistocene age), forms a soil mantle overlying and interbedded within the rocks of the Kau Volcanic Series. The ash deposits typically occur as kipukas (isolated deposits) with some significant layer accumulations ranging up to about 30 feet in thickness.

Pahala Ash is a low plasticity silt derived from the weathering of ash, cinder, and Pele's Hair. Pahala Ash generally has low shear strength, and when the moisture content

W.O. 4773-00(A)

GEOLABS, INC.  
Hawaii • California

Page 17

RECEIVED AS FOLLOWS

SECTION 3 - REGIONAL AND SITE GEOLOGY

is high enough, it loses significant strength when it is remolded (becomes thixotropic). Therefore, the typical Pahala Ash may be potentially liquefiable during seismic events.

Pahoehoe basalt rock is generally the result of thinner, more fluid lava flows. The feeding river lobes of a pahoehoe flow crust over to develop a continuous roof, leaving the interior lava stream to flow through a tunnel of its own making. These remnant flow tunnels or voids are known as lava tubes. The lava tubes feed the advancing lava flow front and margins. As a result, the lava tube may branch or converge generally in a downhill direction to maintain the lava flow. In the waning stages of an eruption, the lava may drain from the main tube system leaving open tunnels ranging from several feet to over 40 feet in diameter. The open tubes resemble tunnels with arched roofs and nearly flat floors. The main lava tubes may extend downslope for several miles, occasionally reaching all the way to the coastline.

Another type of void space that is typically encountered in pahoehoe lava rock is a pocket blister. Rock blisters are typically isolated, closed void structures formed during cooling by trapped volcanic gas within the flow interior. Some blisters may extend a short distance downhill before pinching out and terminating.

The surface of pahoehoe type lava flows are generally smoother than their rough and irregular counterpart, the a'a lava flow. A'a lava flows form from generally more viscous, slower moving lavas and are expressed by a solid rock core sandwiched between an upper and a lower, less dense, clinker layer. The pahoehoe flow surface may be expressed by broad, dome-shaped hillocks created by the heaving and buckling of the flow crust as it approaches obstructions.

Kilauea Volcano is located on the southeastern slope of Mauna Loa. During the Pleistocene Epoch, lavas of the Hiiina Volcanic Series were laid down prior to the deposition of Pahala Ash. The lavas of the Hiiina series generally consist of thin-bedded lava flows and pyroclastic rocks. Lavas of the Puna Volcanic Series overlies the ash deposit. These lava erupted during the late Pleistocene and Holocene, and historic time.

W.O. 4773-00(A)

GEOLABS, INC.  
Hawaii • California

Page 18

SECTION 3 - REGIONAL AND SITE GEOLOGY

There are two area sites on the Big Island of Hawaii that consists of Upolu Point and Kawaihae. There are four potential landing sites at the Upolu Point area site located between Kapaa Beach Park and Upolu Airport. The landing sites are generally underlain by basalt rock formations of the Pohoia Volcanic Series and Hawi Volcanic Series. At the Kawaihae area site, four potential landing sites are located between Spencer Beach Park and Honokoa. Based on the geologic maps, the landing sites are underlain by basalt rock formations of the Hamakua Volcanic Series and Pohoia Volcanic Series.

END OF REGIONAL & SITE GEOLOGY

W.O. 4773-00(A)

GEOLABS, INC.  
Hawaii • California

Page 19

RECEIVED AS FOLLOWS

## SECTION 4.0 - SITE TOPOGRAPHY AND BATHYMETRY

### 4.1 Introduction

The topography of the landing sites were mainly determined from United States Geological Survey (USGS) topographic survey maps that provided rough elevation contours of the on-land portion of the alignment. Some of the USGS maps also provided ocean depth contours that were used to develop alignment profiles. In addition to the USGS maps, Navigation Charts developed by Maptech, Inc. were used to determine ocean depth contours. The site topography and bathymetry for the potential landing sites are described below.

### 4.2 Kauai Landing Sites

The existing ground surface elevation at the shoreline entry point for the landing sites ranges from about +10 to +15 feet Mean Sea Level (MSL). The ocean bottom gently slopes at an average inclination ranging from about fifty horizontal to one vertical (50H:1V) to 140H:1V extending to 60-foot depths. For the Akapa Road and Kikaoa Harbor sites, the ocean bottom increases in inclination between 14H:1V to 17H:1V between 18-foot and 60-foot depths. Based on the topographic survey drawing, the alignment for the Iwa Road landing site will cross a coral reef formation near the shoreline.

### 4.3 Oahu Landing Sites

At the shoreline entry point for the Makaha landing sites, the existing ground surface elevation ranges from about +10 to +30 feet MSL. The ocean bottom generally slopes towards the 60-foot depth with an average slope inclination ranging from about 40H:1V to 45H:1V. For the Makua Beach Park site, the average ocean bottom inclination was about 28H:1V.

The estimated ground surface elevation at the entry point is about +20 feet MSL for the Waimanalo sites. The average slope inclination of the ocean bottom from the shoreline to 60-foot depth ranges between 22H:1V to 50H:1V with the steepest inclination at the Sandy Beach Park site.

W.O. 4773-00(A)

GEOLABS, INC.  
Hawaii • California

Page 20

## SECTION 4 - SITE TOPOGRAPHY AND BATHYMETRY

### 4.4 Molokai Landing Sites

The estimated ground surface elevation for the five landing sites at Kalamaula ranges from about +5 to +10 feet MSL. For four of the alignments, coral reef formation extends from the shoreline out to about 2,600 to 6,000 feet. The ocean bottom then drops to the 60-foot depth within a horizontal distance ranging from about 600 to 1,000 feet. For the Kaunakakai Harbor alignment, the coral reef formation was excavated during the construction of the harbor and harbor entrance.

### 4.5 Maui Landing Sites

The landing sites at Honokowai generally range in ground surface elevation at the entry point from about +10 to +20 feet MSL. The ocean bottom slopes towards the 60-foot water depth with an average slope inclination ranging between about 22H:1V and 42H:1V. Based on the topographic survey plan, the Old Kaanapali Airport alignment will cross a coral reef formation near the shoreline.

At the Makana site, the ground surface elevation is estimated to be about +20 feet MSL for the landing sites. The ocean bottom between the shoreline and 60-foot water depth generally have an average inclination between 32H:1V to 53H:1V.

The ground surface elevation at the Kahikunui landing sites is estimated to range from about +35 to +45 feet MSL. The ocean bottom slopes towards the 60-foot depth with an average inclination ranging from about 17H:1V to 33H:1V.

### 4.6 Big Island Landing Sites

At the Upolu Point site, the estimated ground surface elevation ranges from about +30 to +70 feet MSL at the four landing sites. The ocean bottom slopes downward to the 60-foot depth with an average inclination ranging from 12H:1V to 22H:1V.

W.O. 4773-00(A)

GEOLABS, INC.  
Hawaii • California

Page 21

RECEIVED AS FOLLOWS



SECTION 4 - SITE TOPOGRAPHY AND BATHYMETRY

There are four landing sites at the Kawaihae area. The existing ground elevation at the landing sites range from about +10 to +70 feet MSL with the highest ground elevation at the Honokoa site. At the Honokoa landing site, the ocean bottom slopes towards the 60-foot depth at an average inclination of about 7H:1V. The average inclination of the ocean bottom for the other three landing sites range from about 38H:1V to 58H:1V.

END OF SITE TOPOGRAPHY AND BATHYMETRY

SECTION 5.0 - SITE FEASIBILITY FOR HORIZONTAL DIRECTIONAL DRILLING

The feasibility of utilizing horizontal directional drilling for the installation of the cables at the various landing sites depends on the subsurface conditions, bore length, topography and bathymetry of the site. The feasibility of the landing sites is described in more detail below.

5.1 Kaui Landing Sites

The subsols anticipated at the Kekaha area sites generally consists of older alluvial deposits, beach sand, and coral formation. At deeper depths, basalt rock formation may be encountered. Since cobbles and boulders are typically found in alluvial deposits, some difficulties drilling through the cobbles and boulders may be encountered within these deposits. Voids or cavities may be present in the coral and basalt rock formations. Loss of drilling fluid may occur when voids or cavities are encountered. In addition, it may be difficult to re-start the borehole at the bottom of the void or cavity, especially if the drill head is at an angle to the bottom of the void. Grouting of the void or re-drilling the borehole may be required.

The horizontal distance of the bore for the five landing sites range from about 3,000 to 4,800 feet. This range is within the capabilities of the maxi type drill rigs. The approximate profiles along the proposed alignment of the landing sites are presented on Plates 12.1 and 12.2. The ground surface and ocean bottom profile were determined from the USGS Topographic Survey Maps and navigation charts developed by Maptech, Inc. An estimated HDD alignment profile is also shown on the plates. It should be noted that the profiles shown on the above plates are preliminary. Optical survey, ocean-bottom profiling, and subsurface investigation should be performed for final design. Based on the profiles, the ground cover near the shoreline locations range from 50 to 60 feet. We believe that there is sufficient ground cover to reduce the potential for hydraulic fracturing of the overburden material and expulsion of drilling fluid to the ground surface in these locations.

RECEIVED AS FOLLOWS

SECTION 5 - SITE FEASIBILITY FOR HORIZONTAL DIRECTIONAL DRILLING

5.2 Oahu Landing Sites

Subsoil materials consisting of younger alluvial deposits, colluvial deposits, beach sand, and coral formation are anticipated at the Makaha area site. Numerous subsurface cobbles and boulders are anticipated within the alluvial and colluvial deposits at the Keawaula and Makua Beach Park sites that would make drilling difficult. These sites are located near the base of the mountainsides where large amount of cobbles and boulders may have fallen and accumulated. It is anticipated that the Waimanalo area site is underlain by beach sand and basalt rock formation. The presence of voids and cavities within the coral and rock formations may also pose some difficulties during drilling as discussed in the previous section.

The HDD horizontal distance for the Oahu sites range from 1,800 to 3,700 feet and are within the range of the larger size drill rigs. The approximate ground topography and bathymetry of the landing sites are presented on Plates 13.1, 13.2 and 14. The estimated HDD alignment profiles are also shown on the plates. At the shoreline areas, the cover depth range from about 50 to 60 feet. Therefore, the potential for hydraulic fracturing of drilling fluid at the shoreline surface is minimal.

5.3 Molokai Landing Sites

The Kalamaula area site is generally underlain by younger and older alluvium, and coralline deposits. At deeper depths, it is anticipated that basalt rock formation will be encountered. Difficult drilling may be encountered in the alluvial deposits that may contain cobbles and boulders. In addition, difficult drilling conditions may be encountered within basalt rock formations with voids or cavities. Drilling fluid may be lost when drilling into a void or cavity.

The HDD horizontal distances are the longest for the project at the Molokai sites with distances ranging from 4,400 to 6,500 feet because of the extensive coral reef formation near the shoreline area. Because of the long bore length, a maxi type drill rig will be required for cable installation for these sites. The estimated HDD alignment profiles for the landing sites are presented on Plates 15.1 and 15.2. The cover depths near the

W.O. 4773-00(A)

GEOLABS, INC.  
Hawaii • California

Page 24

SECTION 5 - SITE FEASIBILITY FOR HORIZONTAL DIRECTIONAL DRILLING

shoreline range from 30 to 50 feet. These depths should be sufficient to reduce the potential for hydraulic fracturing near the shoreline area.

5.4 Maui Landing Sites

The subsolls anticipated at the Maui sites generally consist of younger alluvium, dune sands, and basalt rock formation. Some difficulties may be encountered during drilling through the potential cobbles and boulders in the alluvial deposits and through the voids and cavities that may be present within the basalt rock formation.

The HDD horizontal distances for the Maui sites range from 1,700 to 4,000 feet. For these drive lengths, a larger size midi drill rig for the shorter distance and a maxi type drill rig for the longer distances will be required. The estimated HDD alignment profiles for the landing sites are shown on Plates 16.1, 16.2, 17.1, 17.2, and 18. For the Pohaku Kaanapali site, the estimated cover depth is about 5 feet. This cover depth near the shoreline area is not sufficient to reduce the potential for hydraulic fracturing of the drilling fluid near the shoreline area. The landing site should be moved further away from the beach to obtain sufficient cover depth near the beach area. The cover depths for the other landing sites range from about 10 to 50 feet.

5.5 Big Island Landing Sites

The Big Island sites are generally underlain by basalt rock formation. Potential voids and cavities may be encountered in the rock formation that may create some difficulties during drilling as discussed previously.

For the Big Island sites, the horizontal distances for the HDD bores range from about 1,100 to 4,200 feet. A larger-sized midi type drill rig for the shorter distance and a maxi-type drill rig for the longer distance will be required. The estimated HDD alignment profiles are presented on Plates 19.1, 19.2, 20.1 and 20.2. For the Honoipu Landing site, the estimated HDD alignment does not have sufficient cover depth at its present position or within the general vicinity due to the steeper terrain. Therefore, we recommend that this site be deleted as a possible landing site. The cover depths for the other landing sites range from 10 to 55 feet.

END OF SITE FEASIBILITY FOR HORIZONTAL DIRECTIONAL DRILLING

W.O. 4773-00(A)

GEOLABS, INC.  
Hawaii • California

Page 25

RECEIVED AS FOLLOWS

RECEIVED AS FOLLOWS

**SECTION 6.0 - CONCLUSIONS**

The feasibility of utilizing horizontal directional drilling for the installation of fiber optic cables at 36 landing sites located on five major islands of Hawaii were evaluated for the project. The landing sites were situated within 9 landing areas. In general, we believe that it is feasible to use the horizontal directional drilling method for cable installation at the proposed landing sites. It is recommended that the Honoipu landing site on the Big Island be deleted as a possible landing site because of the insufficient cover depth near the shoreline area.

The HDD method of installation typically consists of first drilling a small diameter pilot hole then enlarging the hole by reaming for installation of the larger diameter casing pipe. The cable is installed within the casing pipe. During the reaming and pullback process, borehole cave-ins may occur within unstable deposits that would create difficulties during pullback of the casing pipe. To reduce the risk during cable installation, it is recommended that the drill rods be abandoned in-place after completion of the pilot hole and the drill rods be used as the casing pipe for the new cable.

PLATES

The required distance of the landings is from the shore to a water depth of 60 feet. The estimated horizontal distances for the landings range from 1,100 to 6,500 feet. The HDD drive lengths will be slightly longer in length. Because of the relatively long drive lengths, we anticipate that large midi type drill rig and maxi type drill rig will be used for the landings. Past pipeline installations using HDD have installed larger size pipe at about the same distances. Therefore, we believe that the installation drive lengths for the landings are feasible provided that the appropriate drilling equipment is used with capable drilling personnel.

The subsurface materials anticipated at the landing sites include lagoonal and alluvial deposits, beach sands, colluvial deposits, and coral and basalt rock formations. Cobbles and boulders are typically present in colluvial and alluvial deposits. The presence of the cobbles and boulders may create difficult drilling conditions. In coral and basalt rock formations, voids or cavities may be encountered. When a void or cavity is

RECEIVED AS FOLLOWS

**SECTION 6 - CONCLUSIONS**

encountered, the loss of drilling fluid may occur. In addition, it may be difficult to drill out of the void, especially when the bottom of the void is at an angle to the drill head. The drill head would tend to travel along the bottom surface of the void and bend the drill rods. The void may be grouted to advance the borehole past the void or a new borehole may be re-drilled.

For shallow cover depths along the HDD alignment, there is a potential for hydraulic fracturing of the overburden materials and release of drilling fluid at the ground surface. This usually occurs when the drilling fluid pressure exceeds the overburden pressure. For the Pohaku Kaaupali landing site, the estimated ground cover of 5 feet is not sufficient to reduce the potential for hydraulic fracturing to occur. It is recommended that the entry point of the landing site be moved away from the beach to obtain adequate cover depth. If this is not possible, this landing site should be deleted.

END OF CONCLUSIONS

**SECTION 7.0 - LIMITATIONS**

The analyses and recommendations submitted in this feasibility report are based in part upon information obtained from readily available geologic and USGS topographic survey maps. The profiles presented in this report are preliminary and should be considered accurate only to the degree implied by the methods used. Optical survey, ocean-bottom profiling, and subsurface investigation should be performed for the final design.

This report has been prepared for the exclusive use of Parsons Brinckerhoff Quade & Douglas, Inc. and other project consultants for specific application to the Landing Sites For Rural Fiber Optic Lines - Phase II (RUS Landing Sites) project in accordance with generally accepted geotechnical engineering principles and practices. No warranty is expressed or implied.

This report has been prepared solely for the purpose of assisting the planners and design engineers in the evaluation of the proposed landing sites and the development of the environmental impact statement for the proposed project.

END OF LIMITATIONS

CLOSURE

The following plates are attached and complete this report:

- Plate 1 - Overall Project Location Map
- Plate 2 - Project Location Map (Kauai - Kekaha Sites)
- Plates 3.1 thru 3.3 - Project Location Map (Oahu - Makaha Sites)
- Plate 4 - Project Location Map (Oahu - Waimanalo Sites)
- Plates 5.1 & 5.2 - Project Location Map (Molokai - Kalamaula Sites)
- Plates 6.1 & 6.2 - Project Location Map (Maui - Honokowai Sites)
- Plates 7.1 & 7.2 - Project Location Map (Maui - Makena Sites)
- Plate 8 - Project Location Map (Maui - Kahikinui Sites)
- Plates 9.1 & 9.2 - Project Location Map (Big Island - Upolu Point Sites)
- Plate 10 - Project Location Map (Big Island - Kawaihae Sites)
- Plate 11 - Typical HDD Site Layout
- Plates 12.1 & 12.2 - Estimated HDD Alignment Profile (Kauai - Kekaha Sites)
- Plates 13.1 & 13.2 - Estimated HDD Alignment Profile (Oahu - Makaha Sites)
- Plate 14 - Estimated HDD Alignment Profile (Oahu - Waimanalo Sites)
- Plates 15.1 & 15.2 - Estimated HDD Alignment Profile (Molokai - Kalamaula Sites)
- Plates 16.1 & 16.2 - Estimated HDD Alignment Profile (Maui - Honokowai Sites)
- Plates 17.1 & 17.2 - Estimated HDD Alignment Profile (Maui - Makena Sites)
- Plate 18 - Estimated HDD Alignment Profile (Maui - Kahikinui Sites)
- Plates 19.1 & 19.2 - Estimated HDD Alignment Profile (Big Island - Upolu Point Sites)

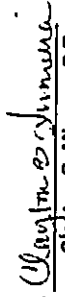
CLOSURE

Plates 20.1 - Estimated HDD Alignment Profile (Big Island - Kawaihae Sites)  
& 20.2

-000000000000000-

Respectfully submitted,  
GEOLABS, INC.

By   
Gerald Y. Seki, P.E.  
Senior Geotechnical Engineer

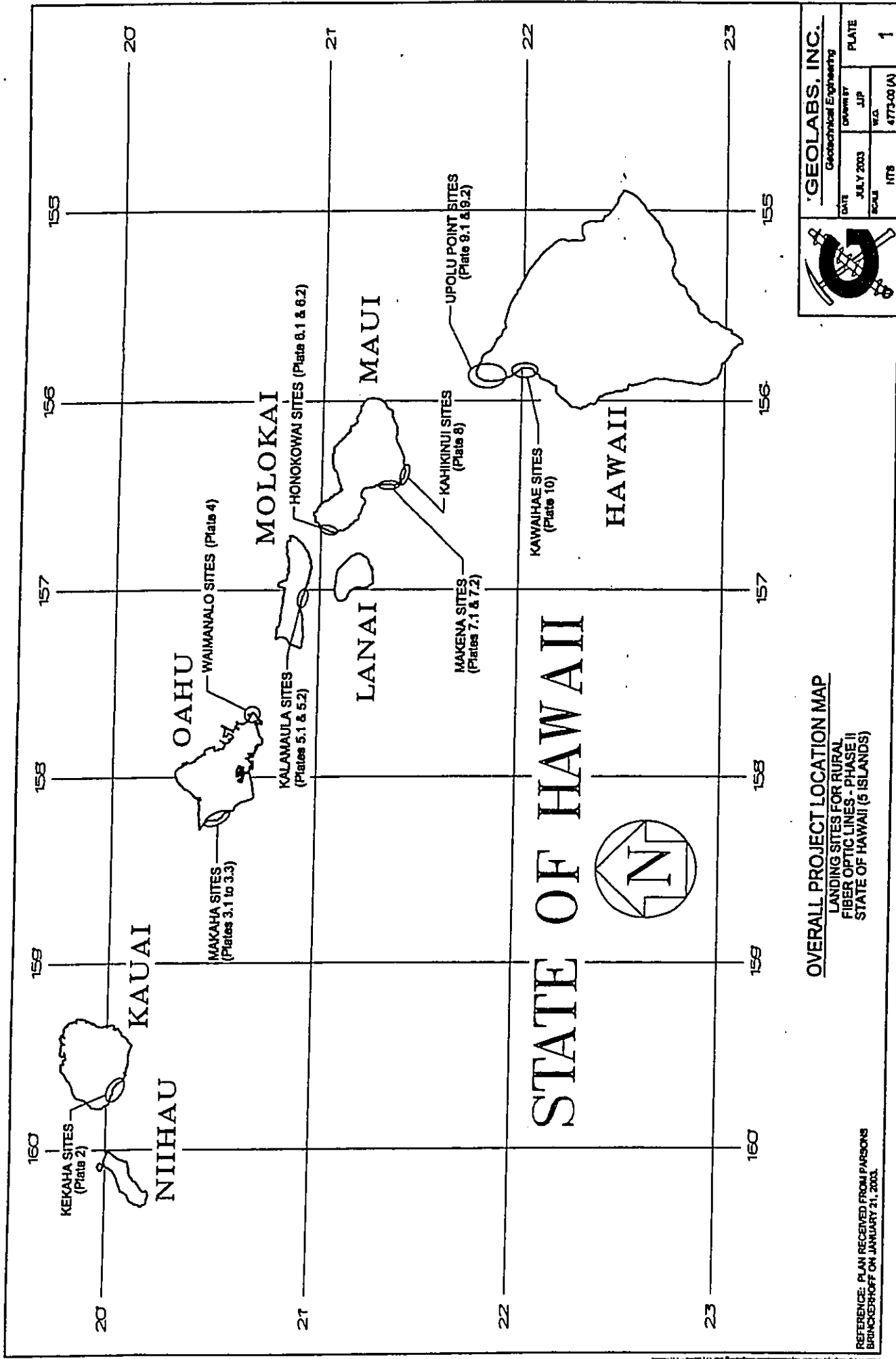
By   
Clayton S. Mimura, P.E.  
President

CSM:GS:cj

P:\1700 54\4773-00(A).pl 1 99.30

RECEIVED AS FOLLOWS

RECEIVED AS FOLLOWS

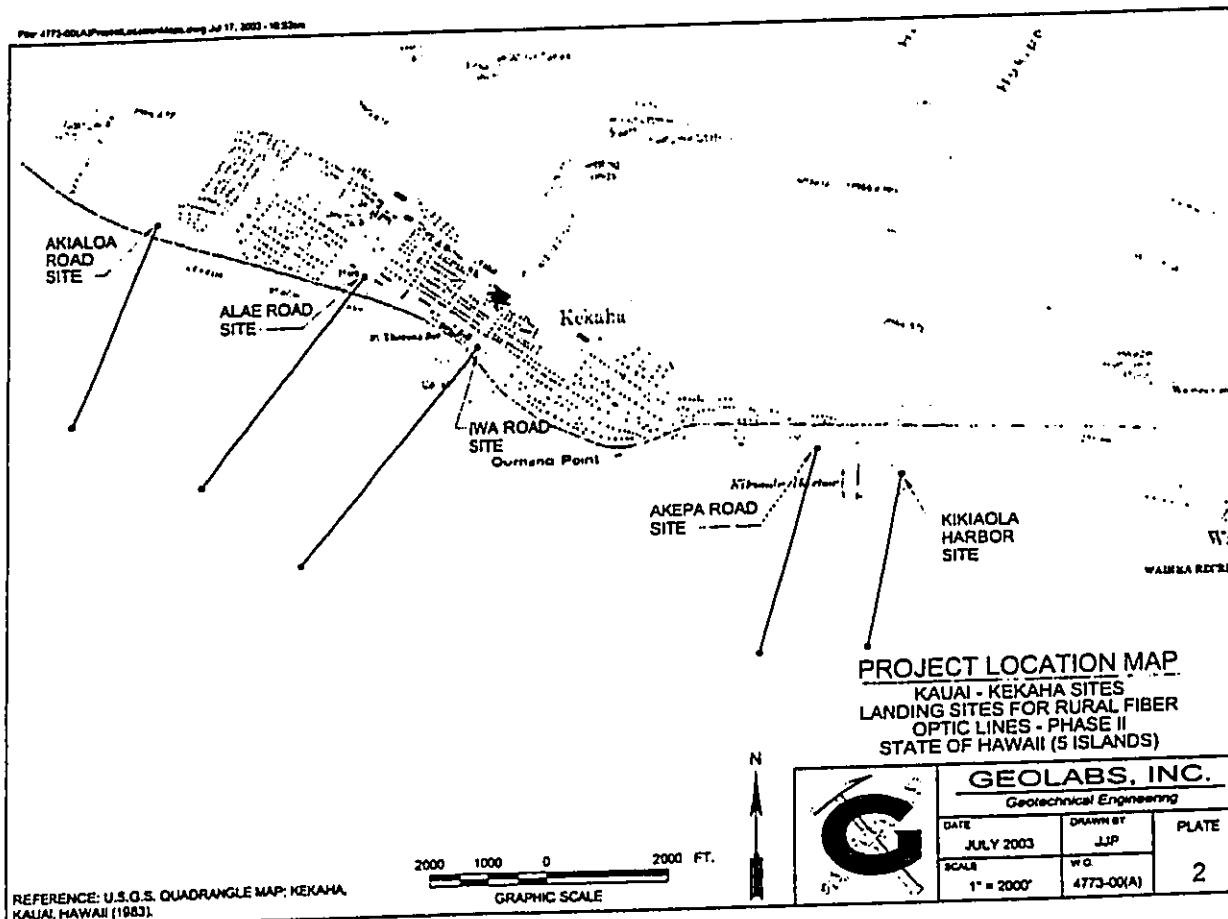
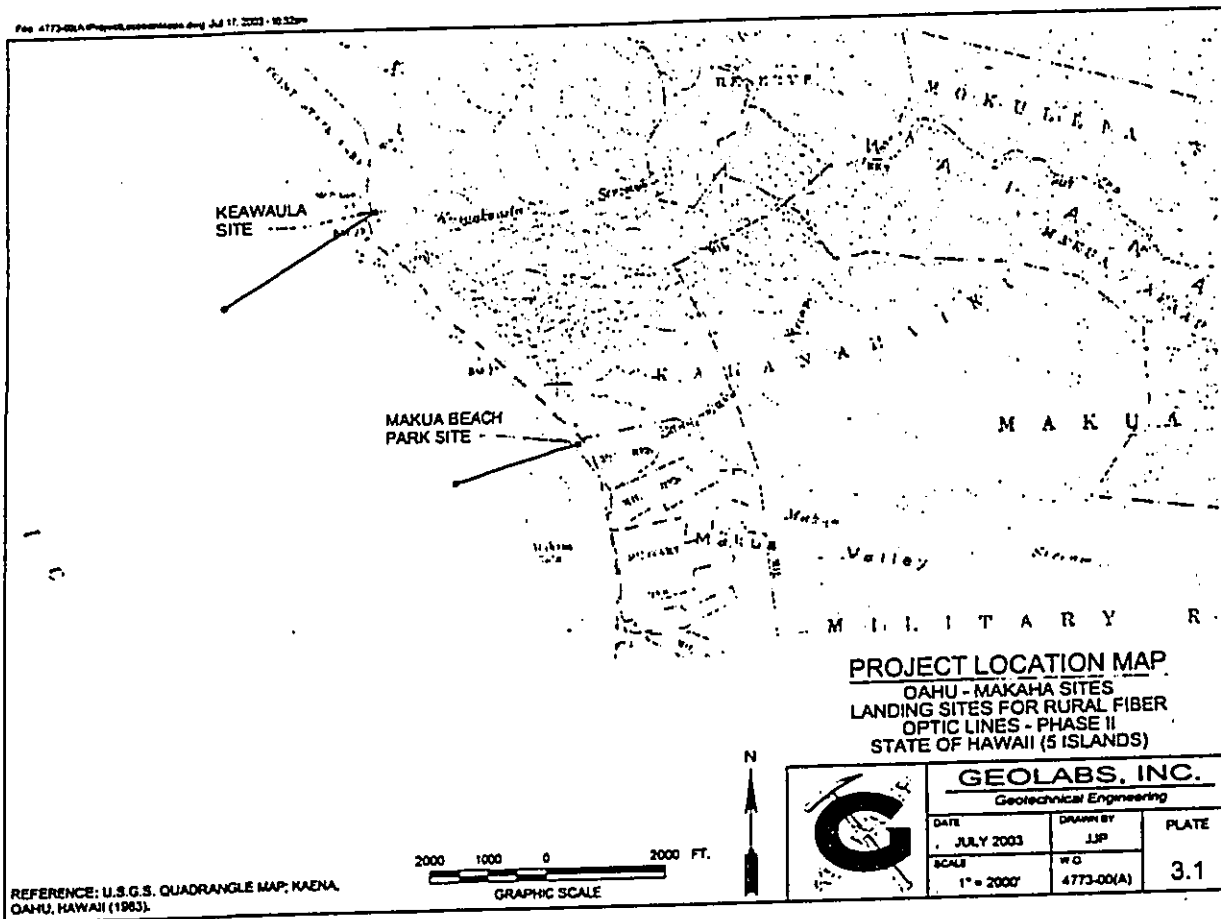


**GEOLABS, INC.**  
Geotechnical Engineering

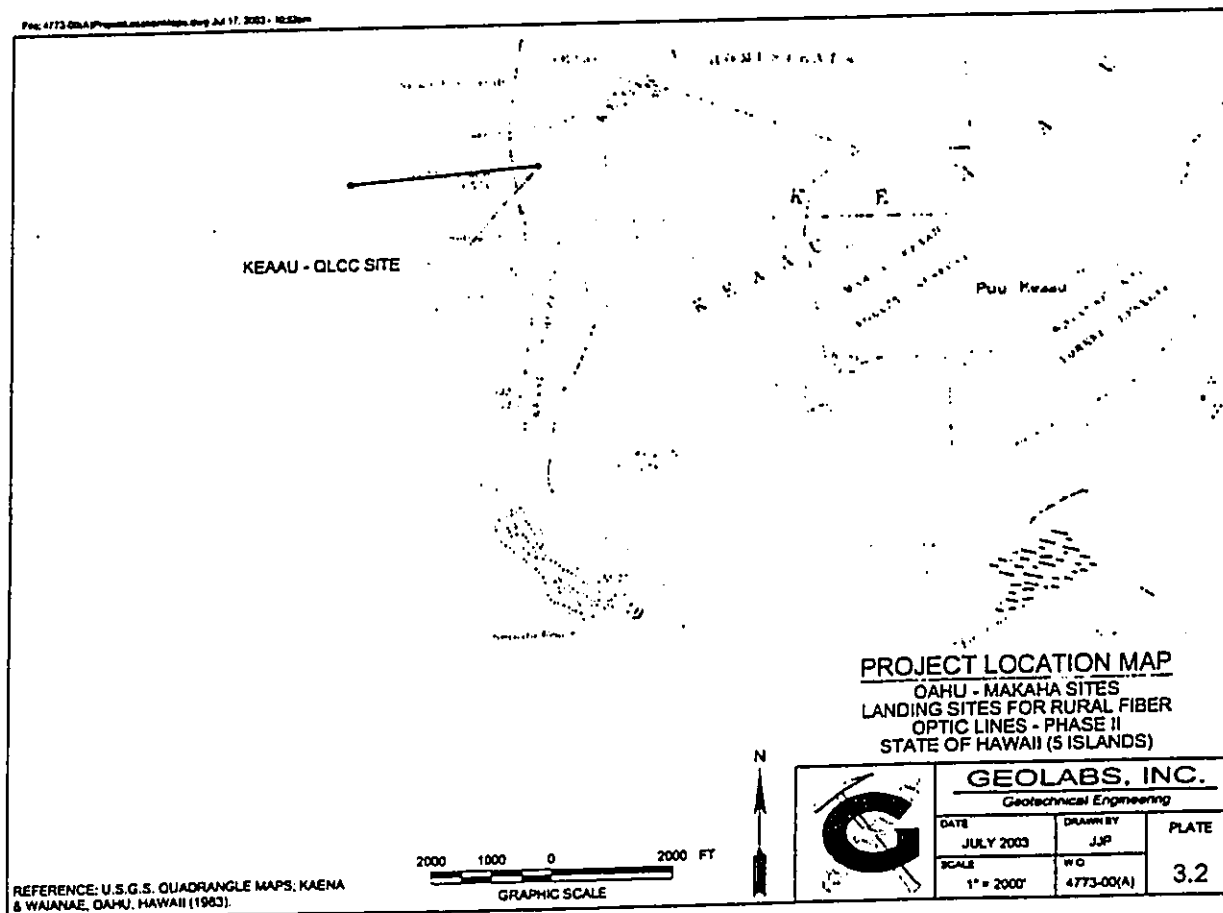
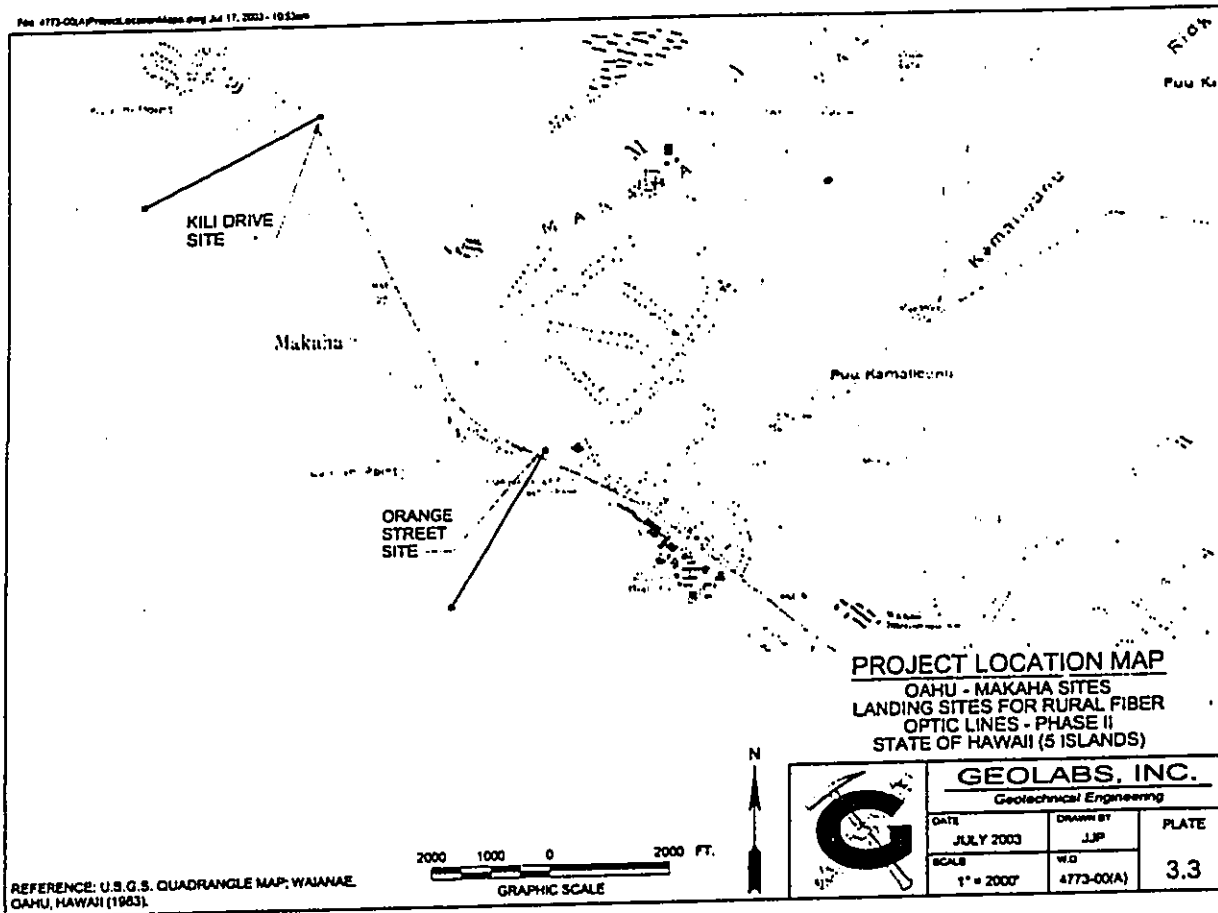
DATE	JULY 2003	DRAWN BY	JJP	PLATE	1
SCALE	1/8" = 1/4" (AS SHOWN)	W.C.			

**OVERALL PROJECT LOCATION MAP**  
LANDING SITES FOR RURAL  
FIBER OPTIC LINES - PHASE II  
STATE OF HAWAII (5 ISLANDS)

RECEIVED AS FOLLOWS

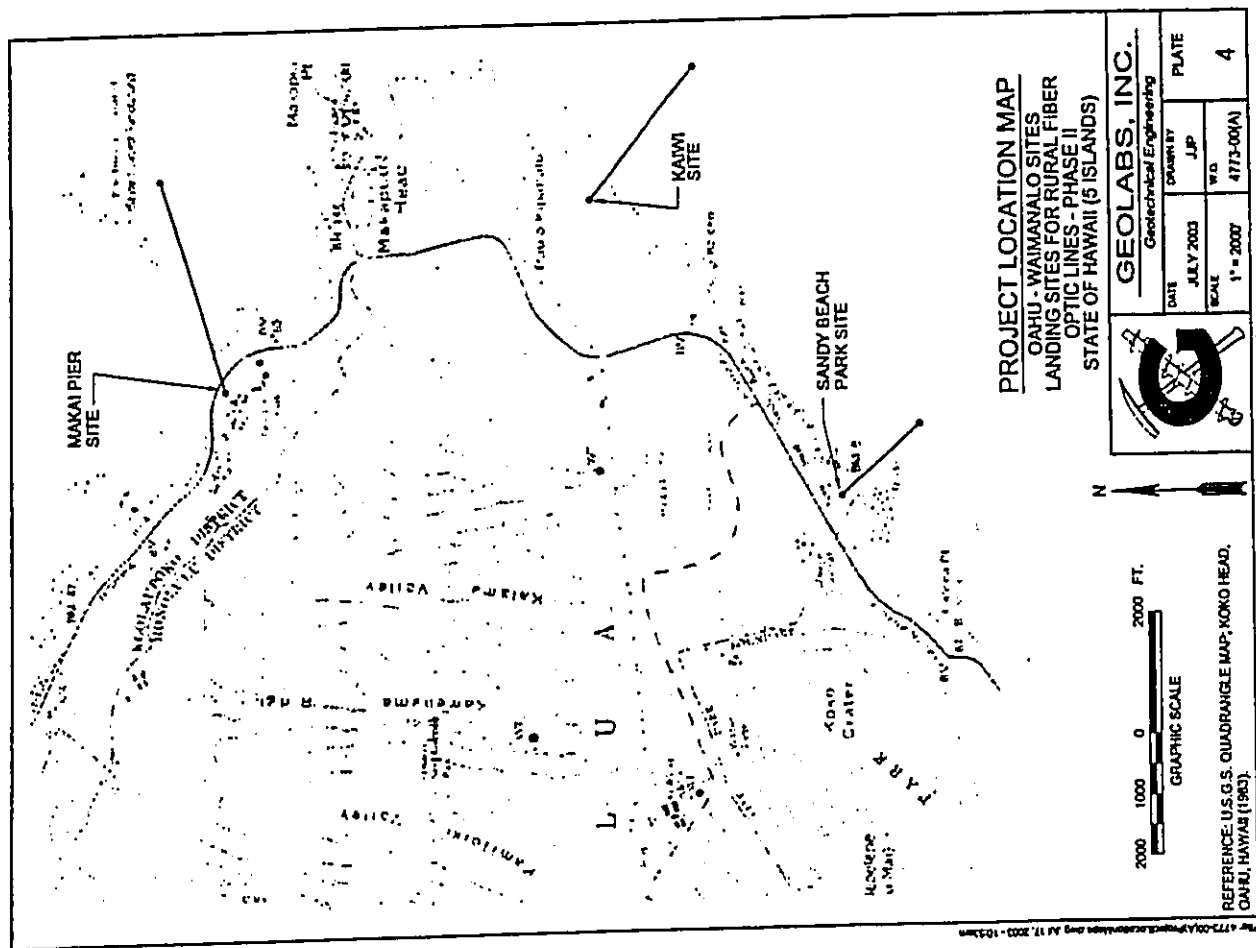
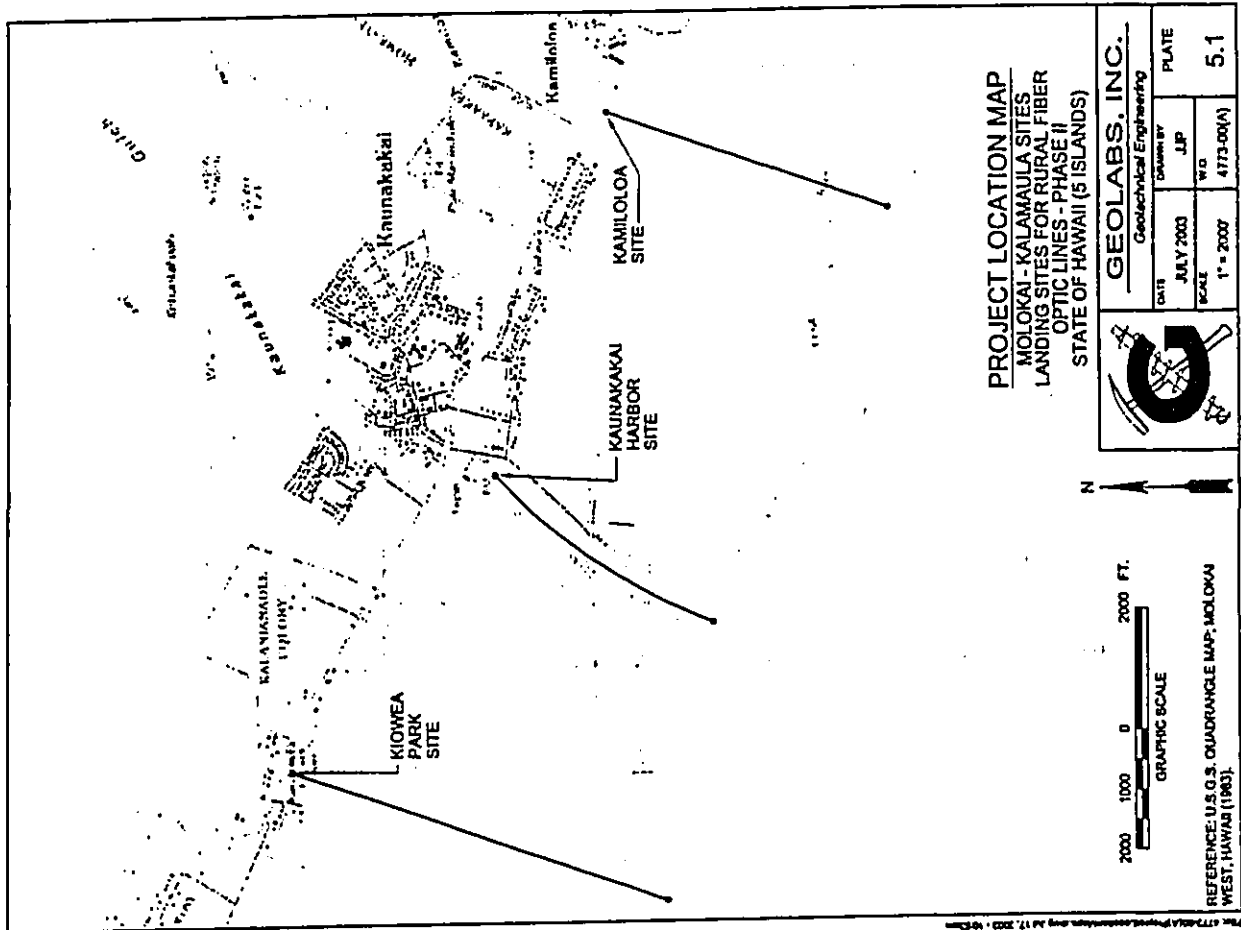


RECEIVED AS FOLLOWS

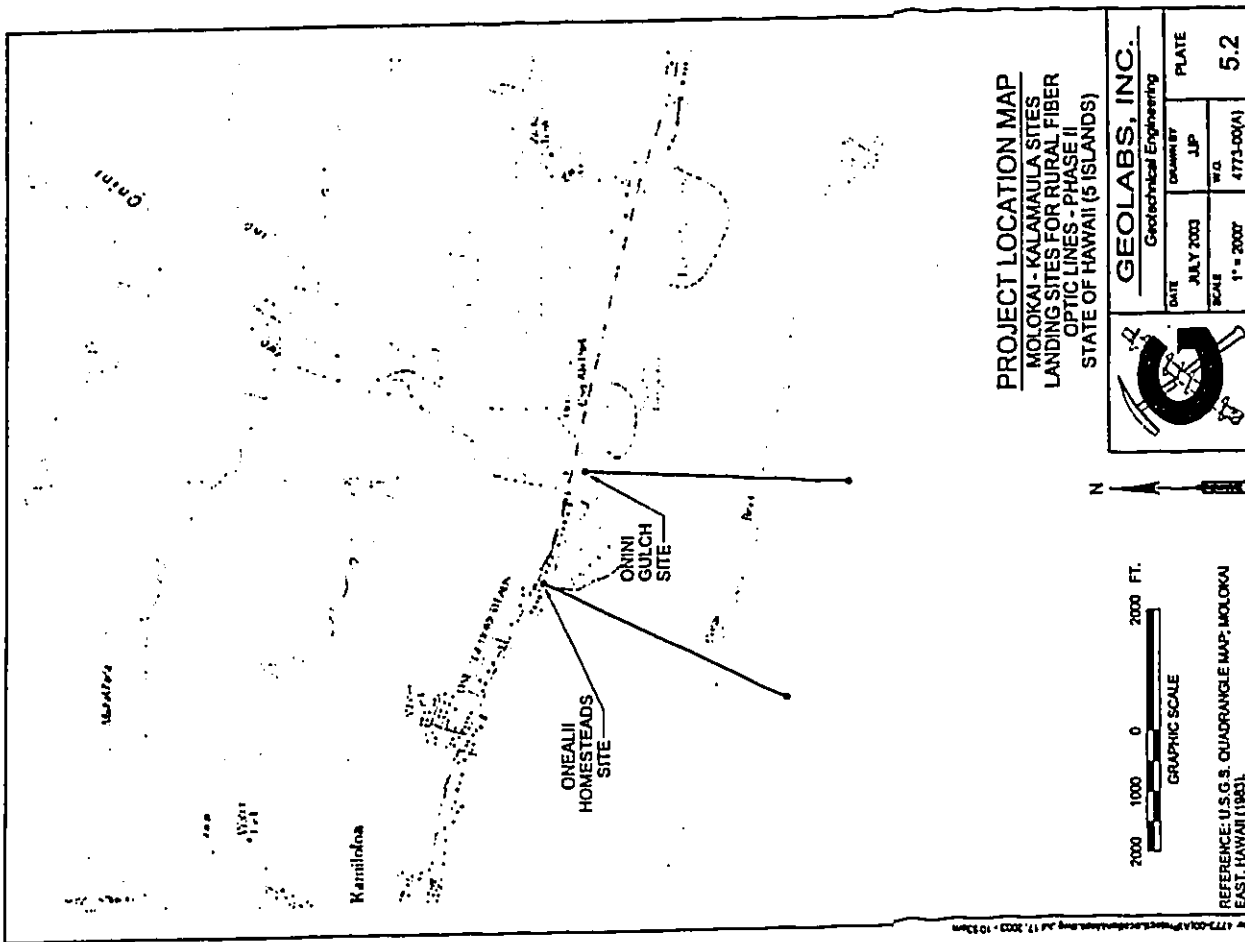
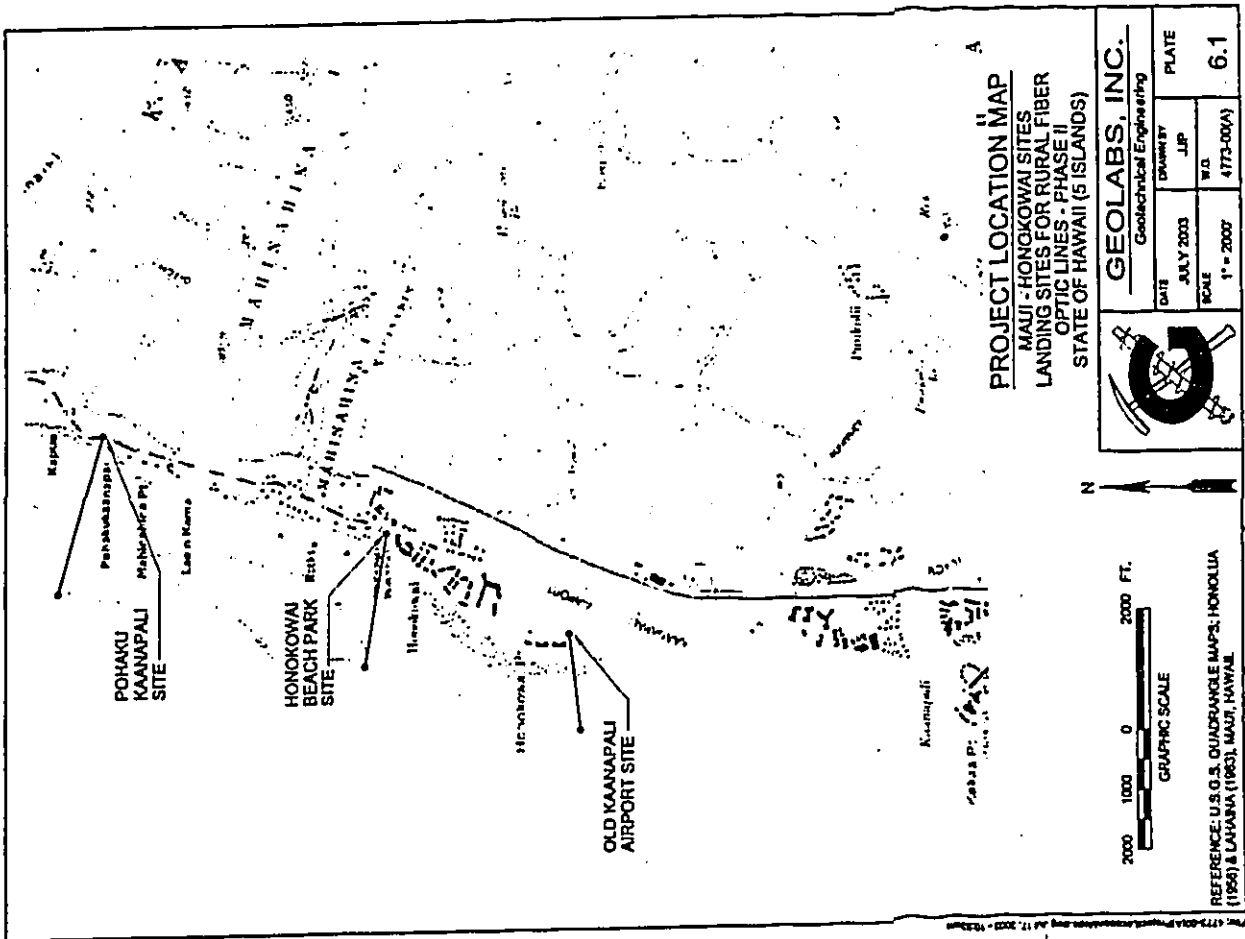




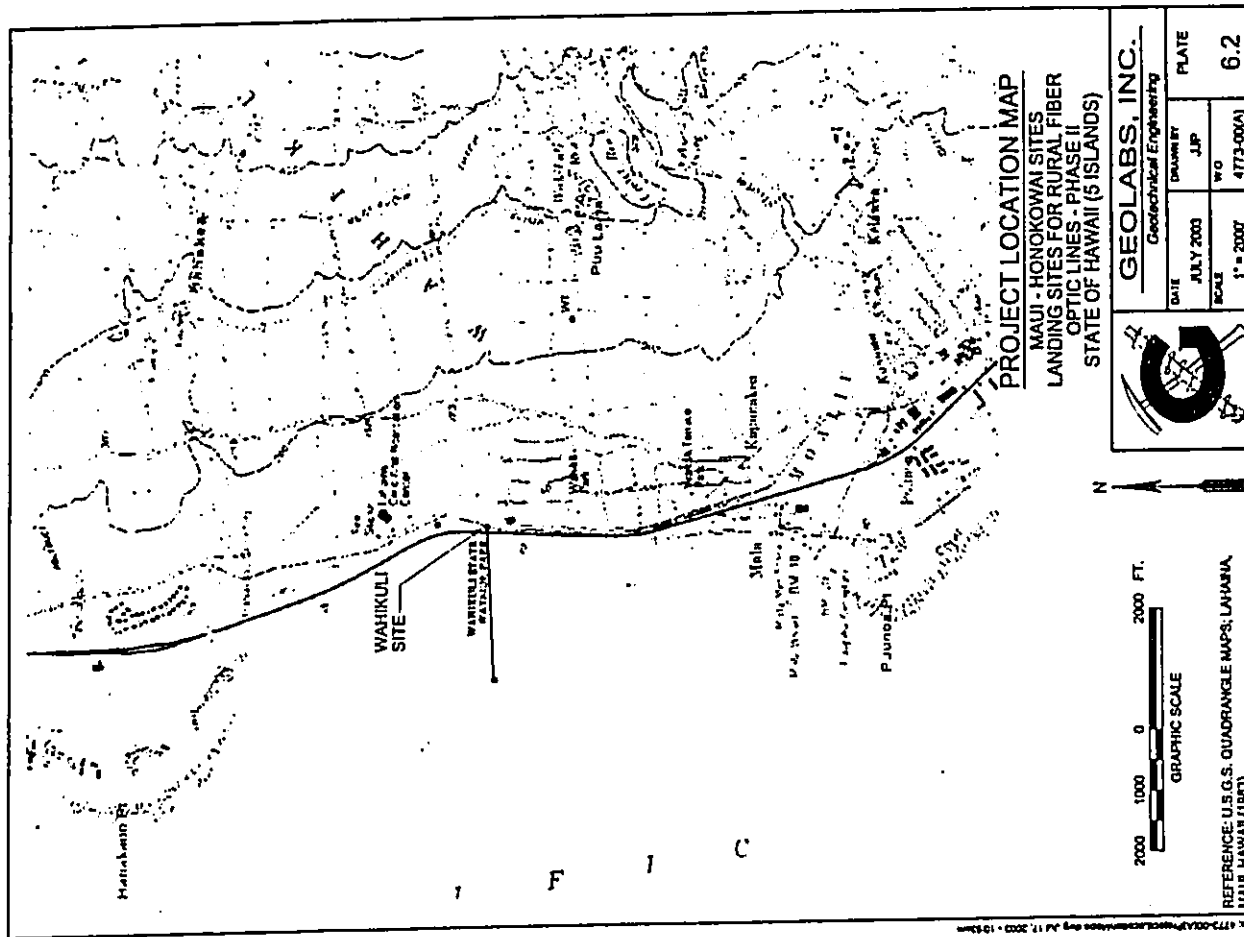
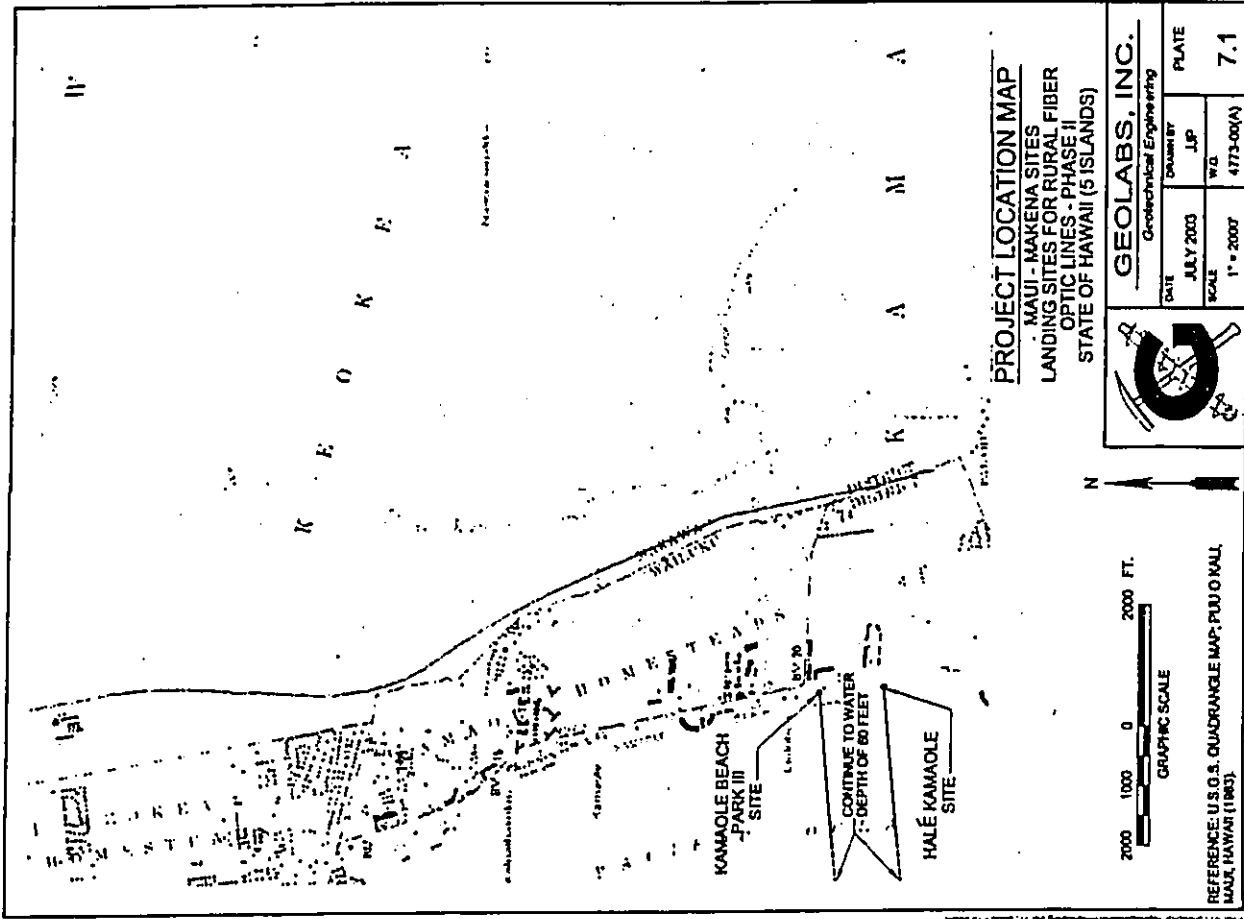
RECEIVED AS FOLLOWS



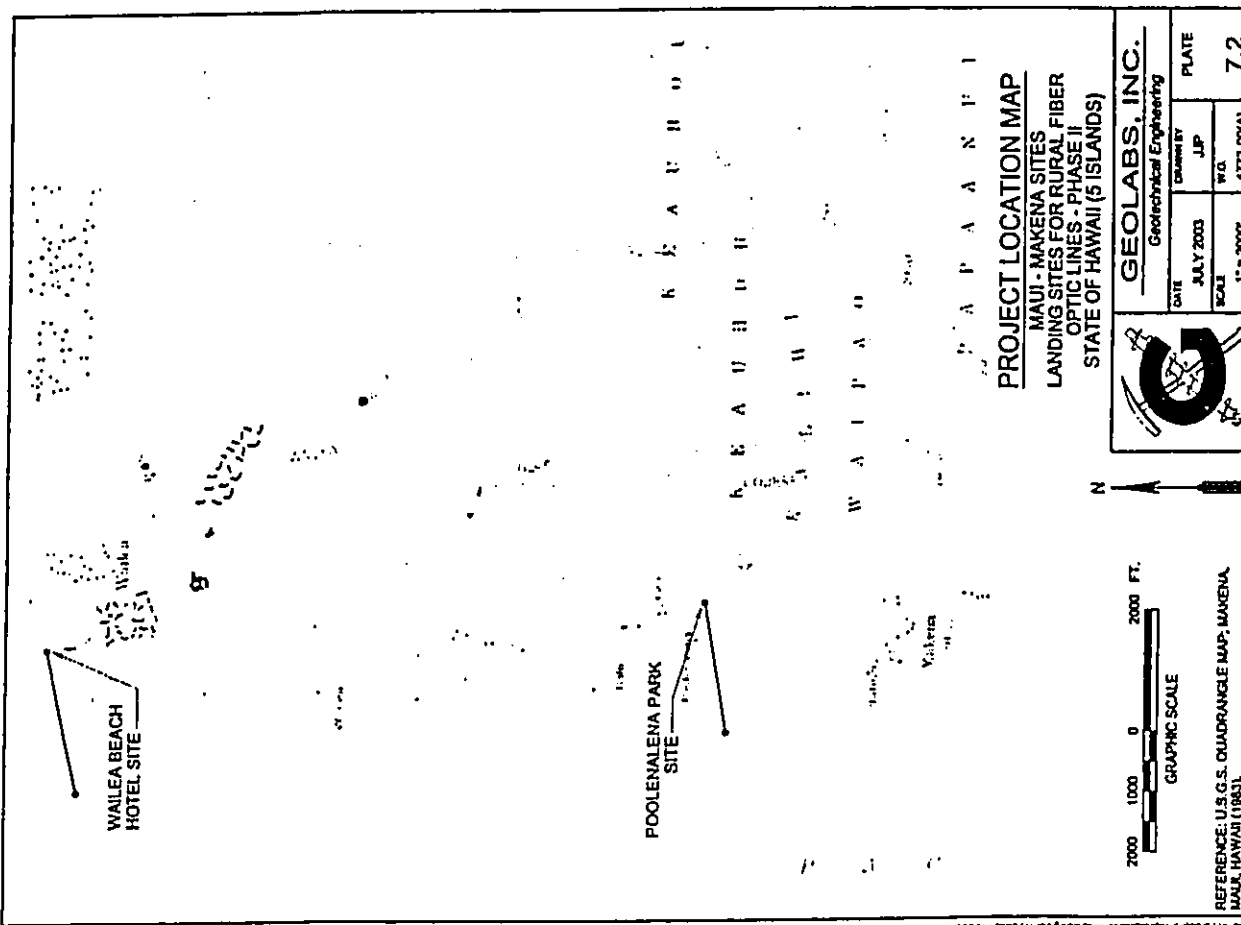
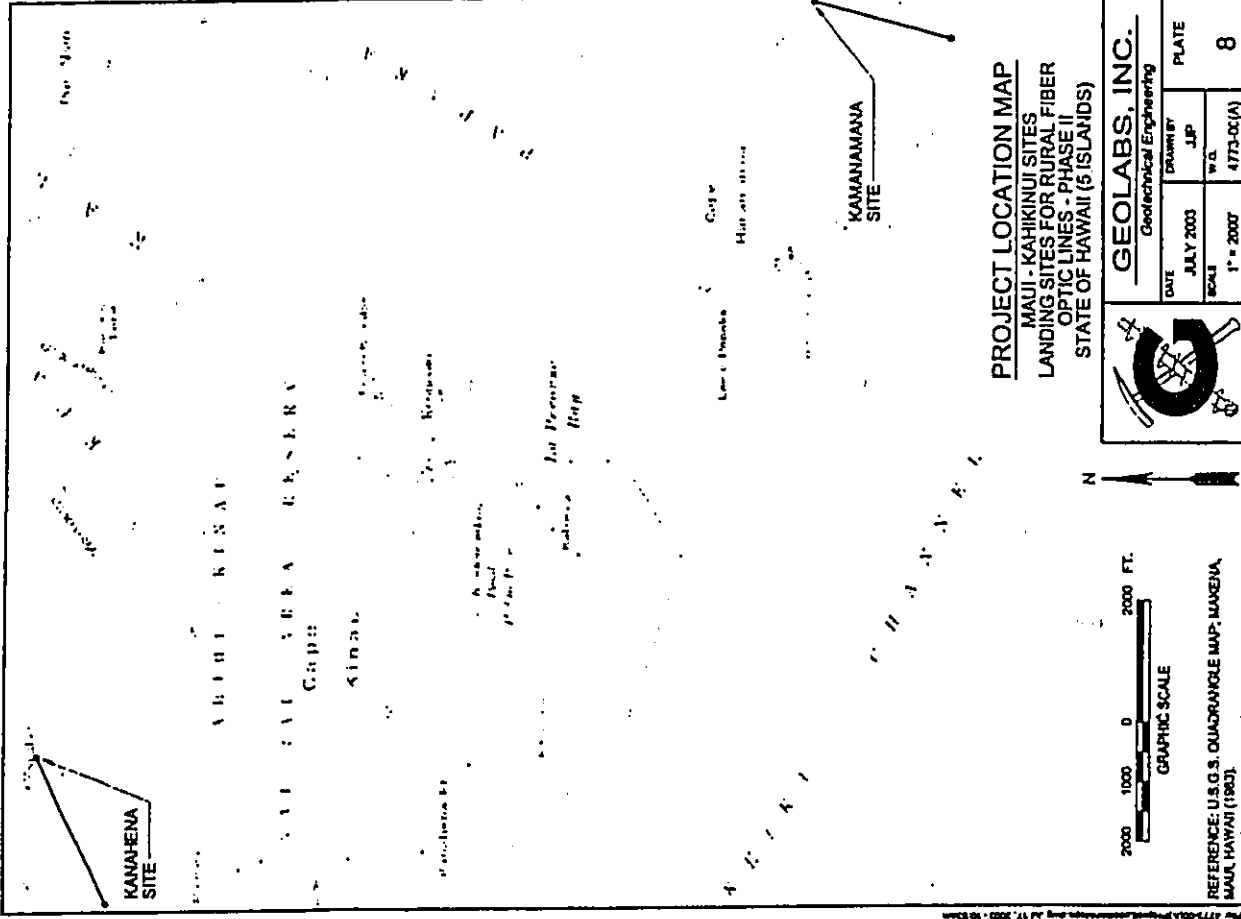
RECEIVED AS FOLLOWS



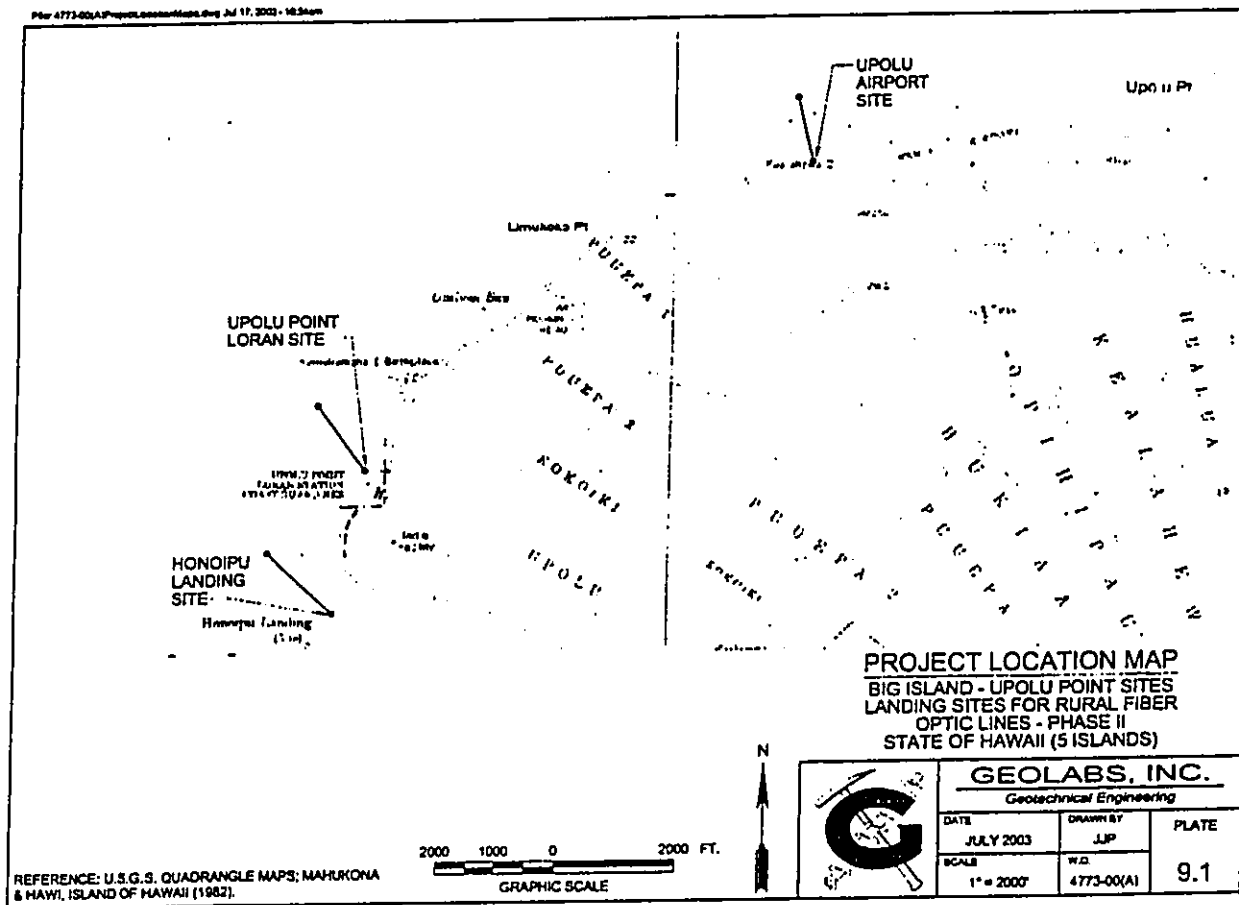
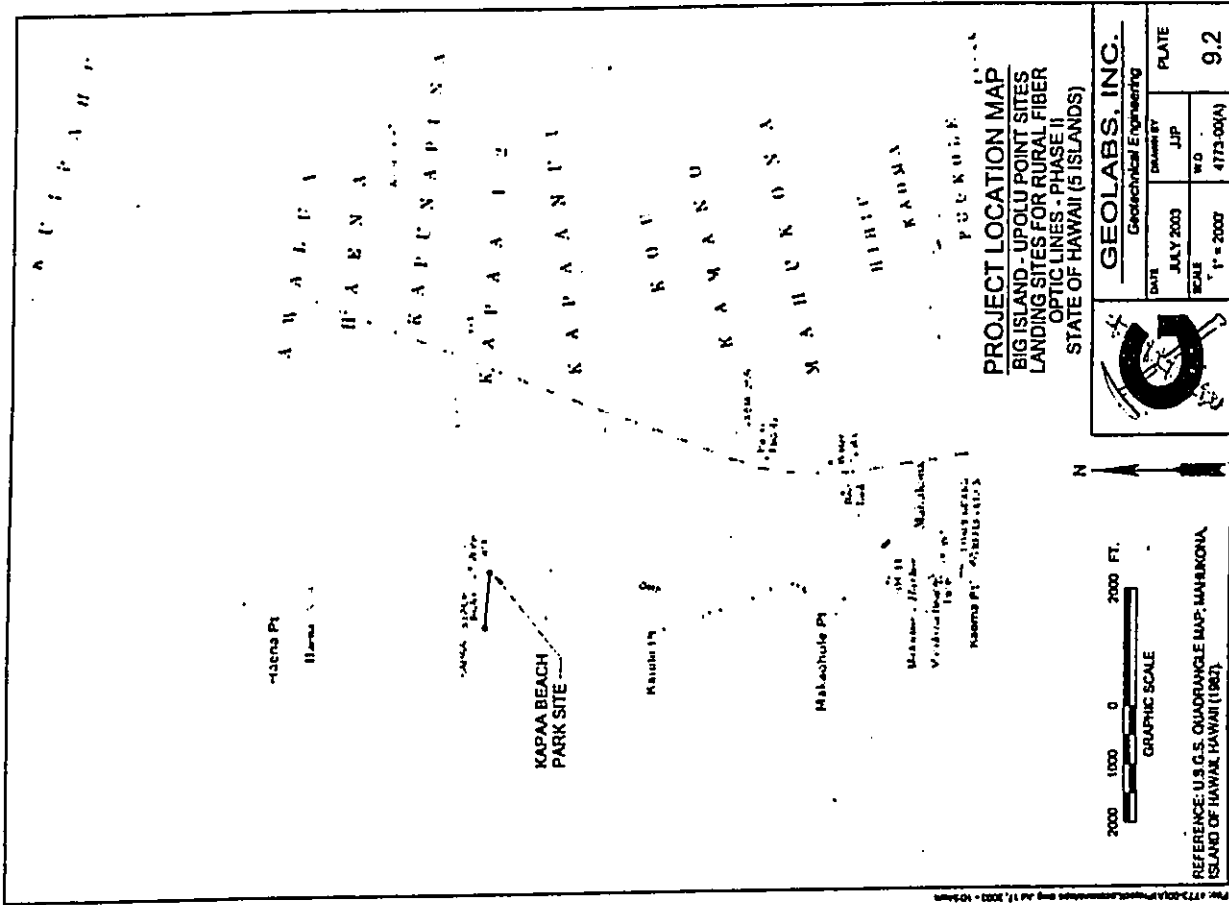
RECEIVED AS FOLLOWS



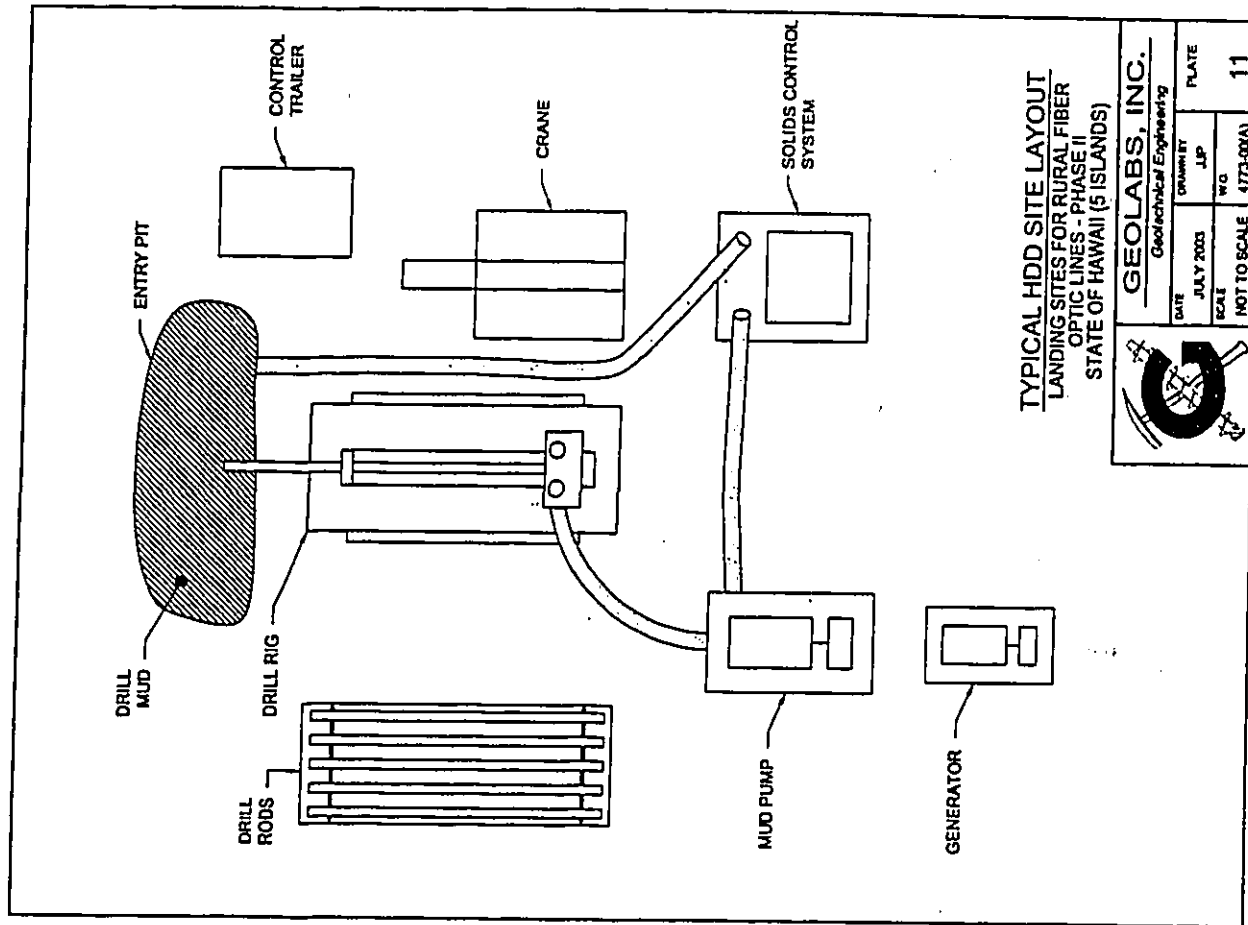
RECEIVED AS FOLLOWS



RECEIVED AS FOLLOWS



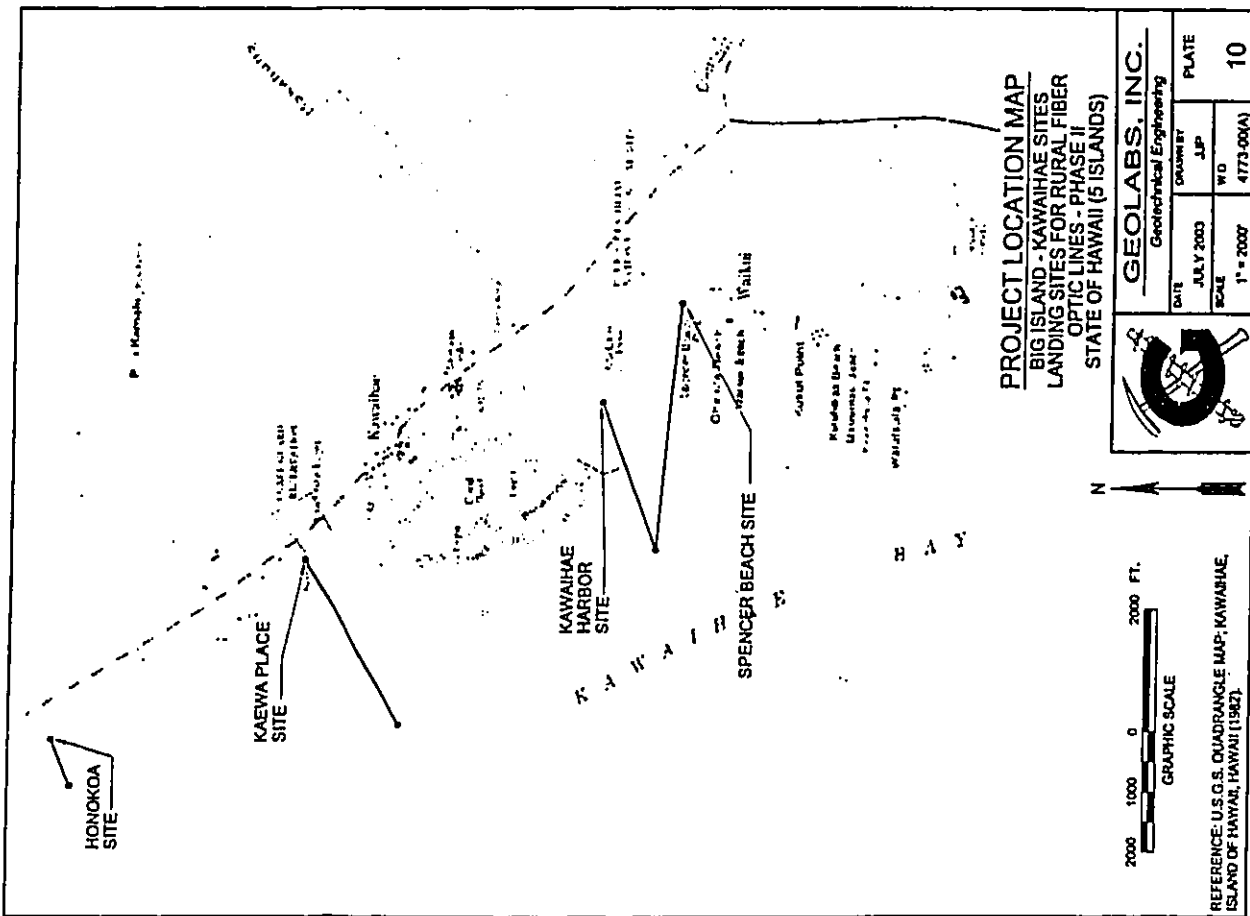
RECEIVED AS FOLLOWS



TYPICAL HDD SITE LAYOUT  
LANDING SITES FOR RURAL FIBER  
OPTIC LINES - PHASE II  
STATE OF HAWAII (5 ISLANDS)

**GEOLABS, INC.**  
Geotechnical Engineering

DATE	DRUMBY	PLATE
JULY 2003	JLP	11
SCALE	W.D.	
NOT TO SCALE	4773-00(A)	



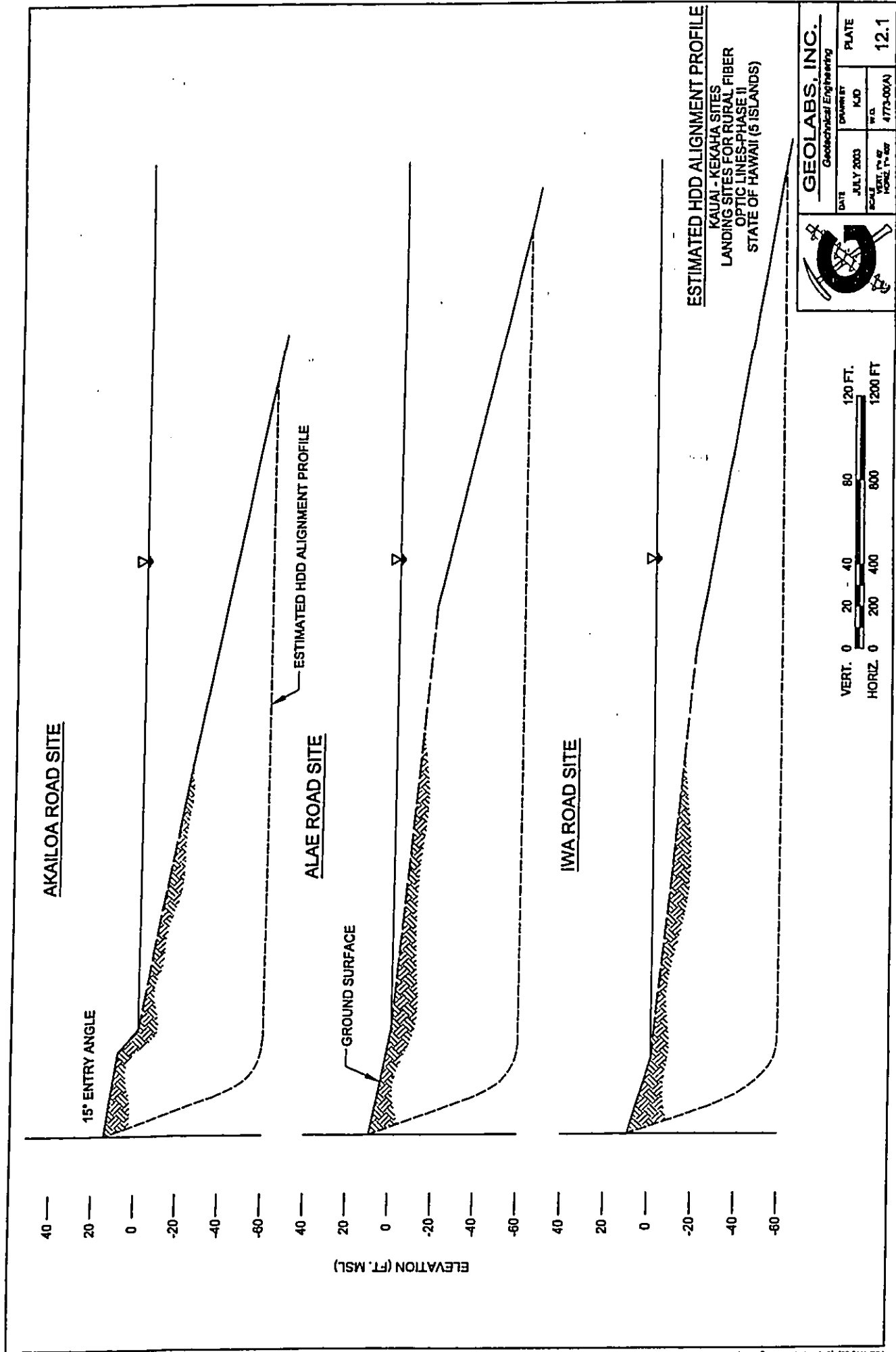
PROJECT LOCATION MAP  
BIG ISLAND - KAWAIIA SITES  
LANDING SITES FOR RURAL FIBER  
OPTIC LINES - PHASE II  
STATE OF HAWAII (5 ISLANDS)

**GEOLABS, INC.**  
Geotechnical Engineering

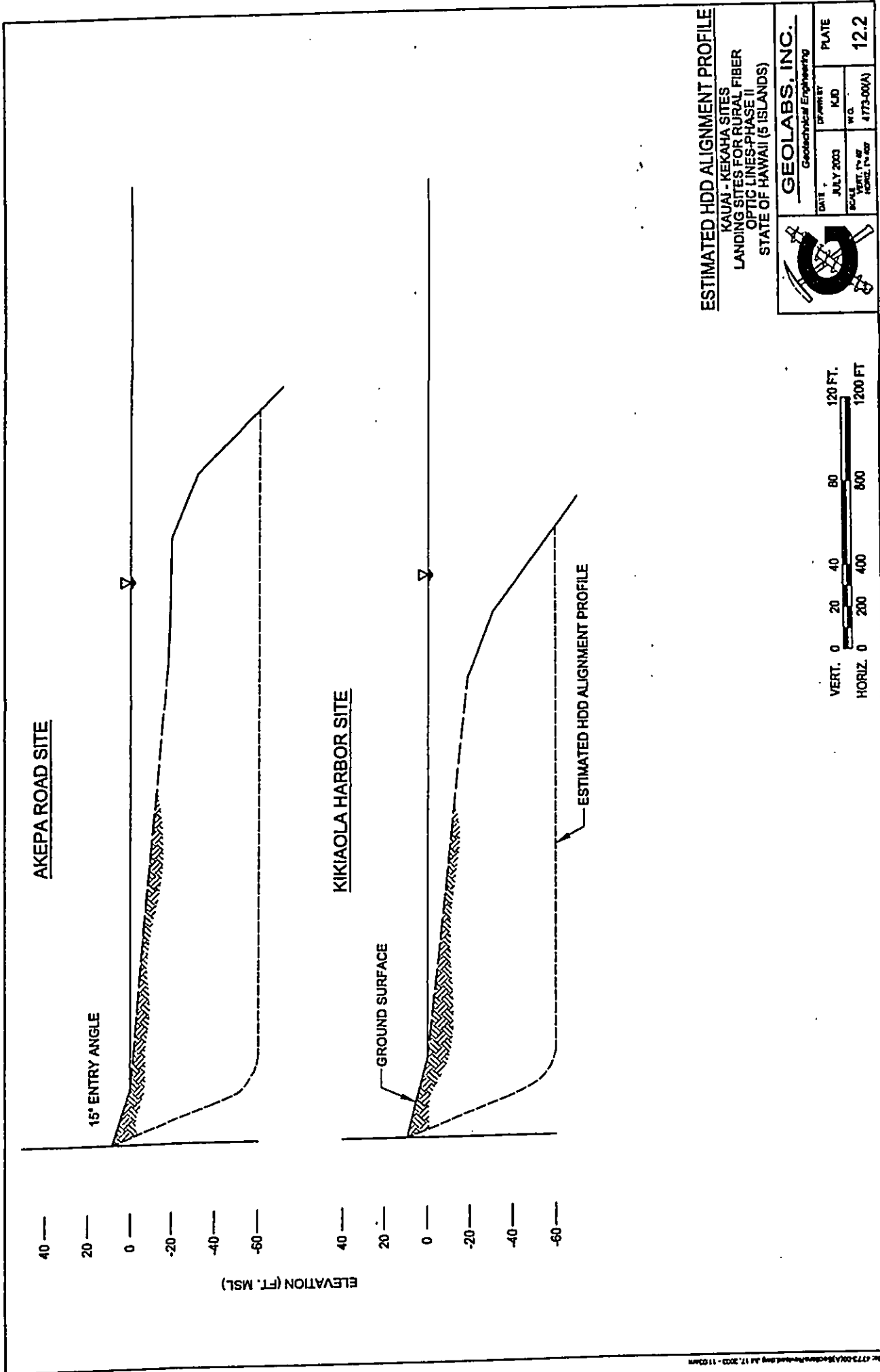
DATE	DRUMBY	PLATE
JULY 2003	JLP	10
SCALE	W.D.	
1" = 200'	4773-00(A)	

REFERENCE: U.S.G.S. QUADRANGLE MAP: KAWAIIA, ISLAND OF HAWAII, HAWAII (1982).

RECEIVED AS FOLLOWS



RECEIVED AS FOLLOWS



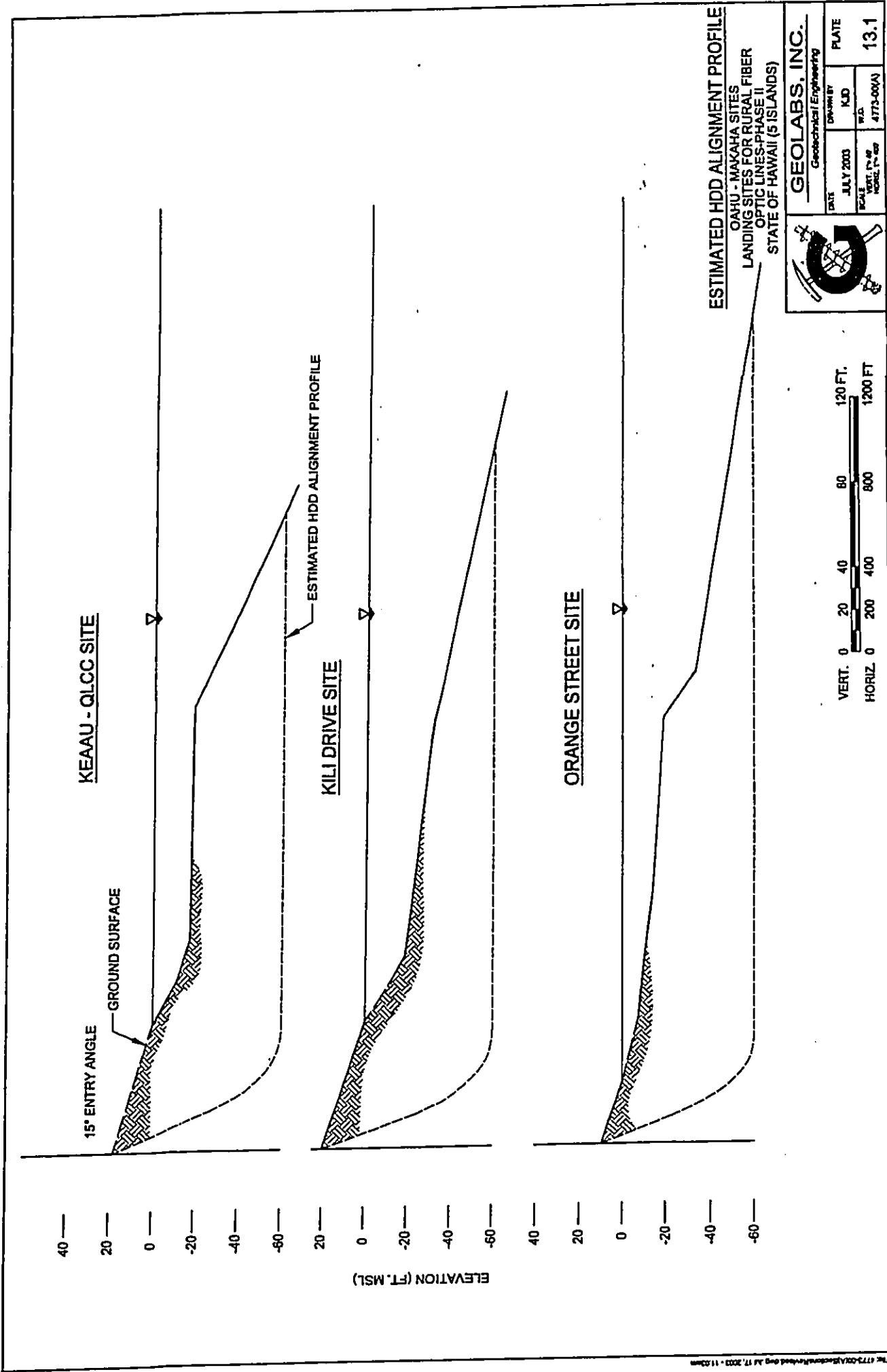
**ESTIMATED HDD ALIGNMENT PROFILE**  
KAUAI - KEKAHA SITES  
LANDING SITES FOR RURAL FIBER  
OPTIC LINES-PHASE II  
STATE OF HAWAII (5 ISLANDS)



<b>GEOLABS, INC.</b> Geotechnical Engineering	
DATE	12/20/03
BY	KJD
SCALE	VERT. 1" = 40' HORIZ. 1" = 200'
W.D.	4773-000(A)
PLATE	12.2



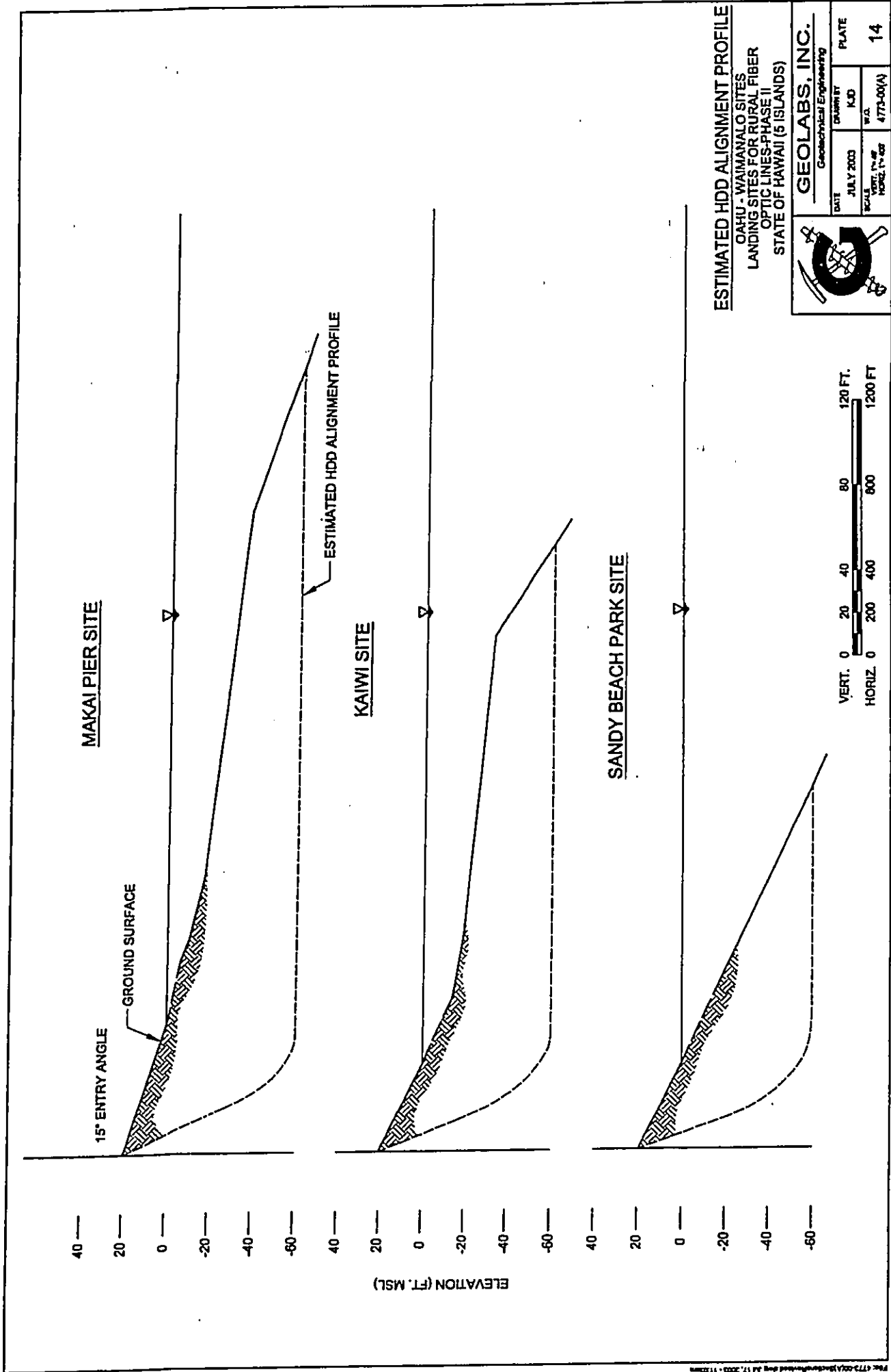
RECEIVED AS FOLLOWS



File: 4773-000A/Revised/Rev.dwg At 17, 2003 - 11:23am



RECEIVED AS FOLLOWS

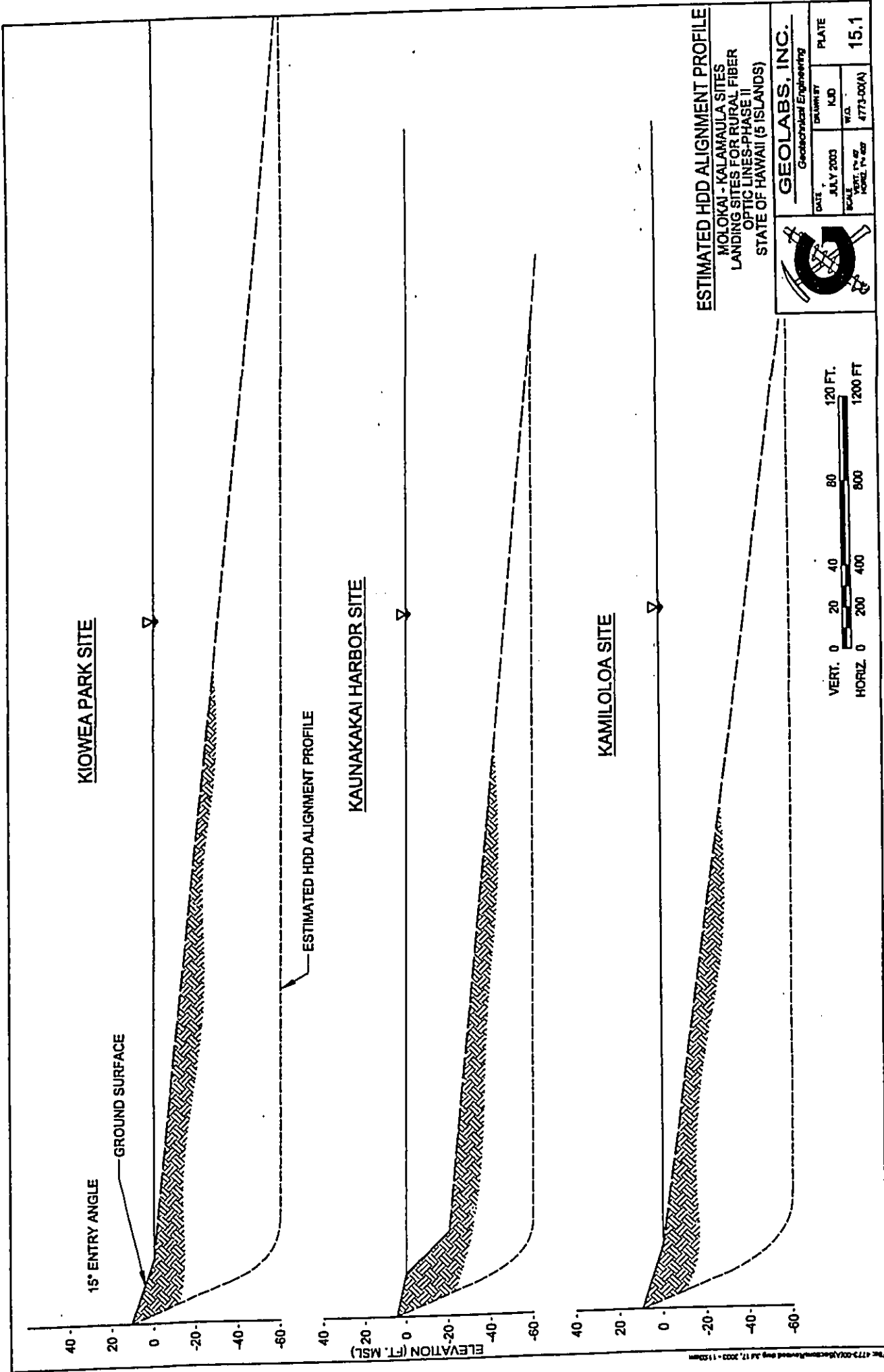


**ESTIMATED HDD ALIGNMENT PROFILE**  
OAHU - WAIMANALO SITES  
LANDING SITES FOR RURAL FIBER  
OPTIC LINES-PHASE II  
STATE OF HAWAII (5 ISLANDS)

	<b>GEOLABS, INC.</b> Geotechnical Engineering		DATE	DATE BY	PLATE
	JULY 2003	KJD	4773-00(A)	14	
SCALE		VERT. 1"=40'	HORIZ. 1"=400'		

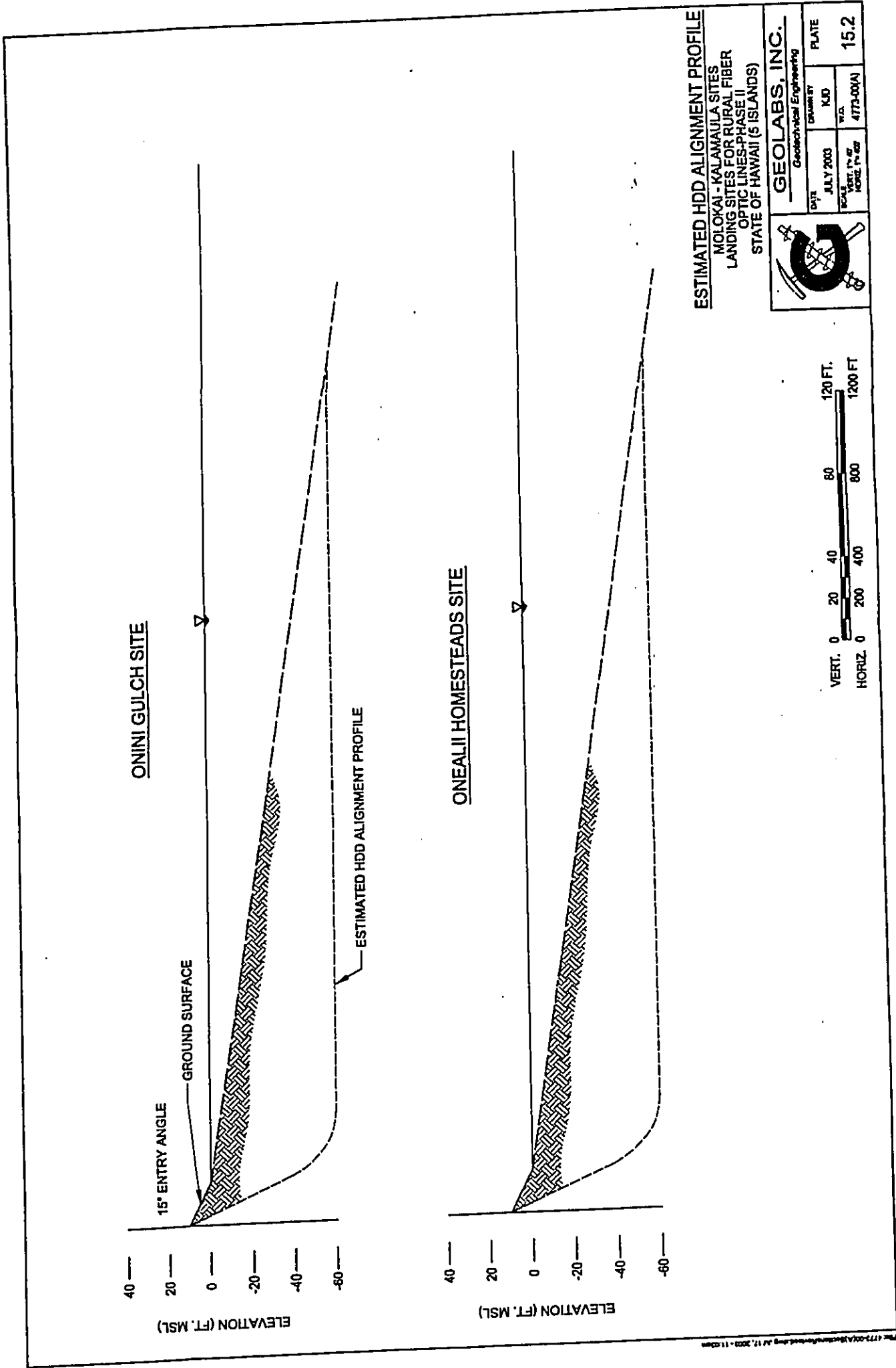
FILE: 6773-00(A)Subcontract.dwg At 17, 2003 - 11:23am

RECEIVED AS FOLLOWS



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

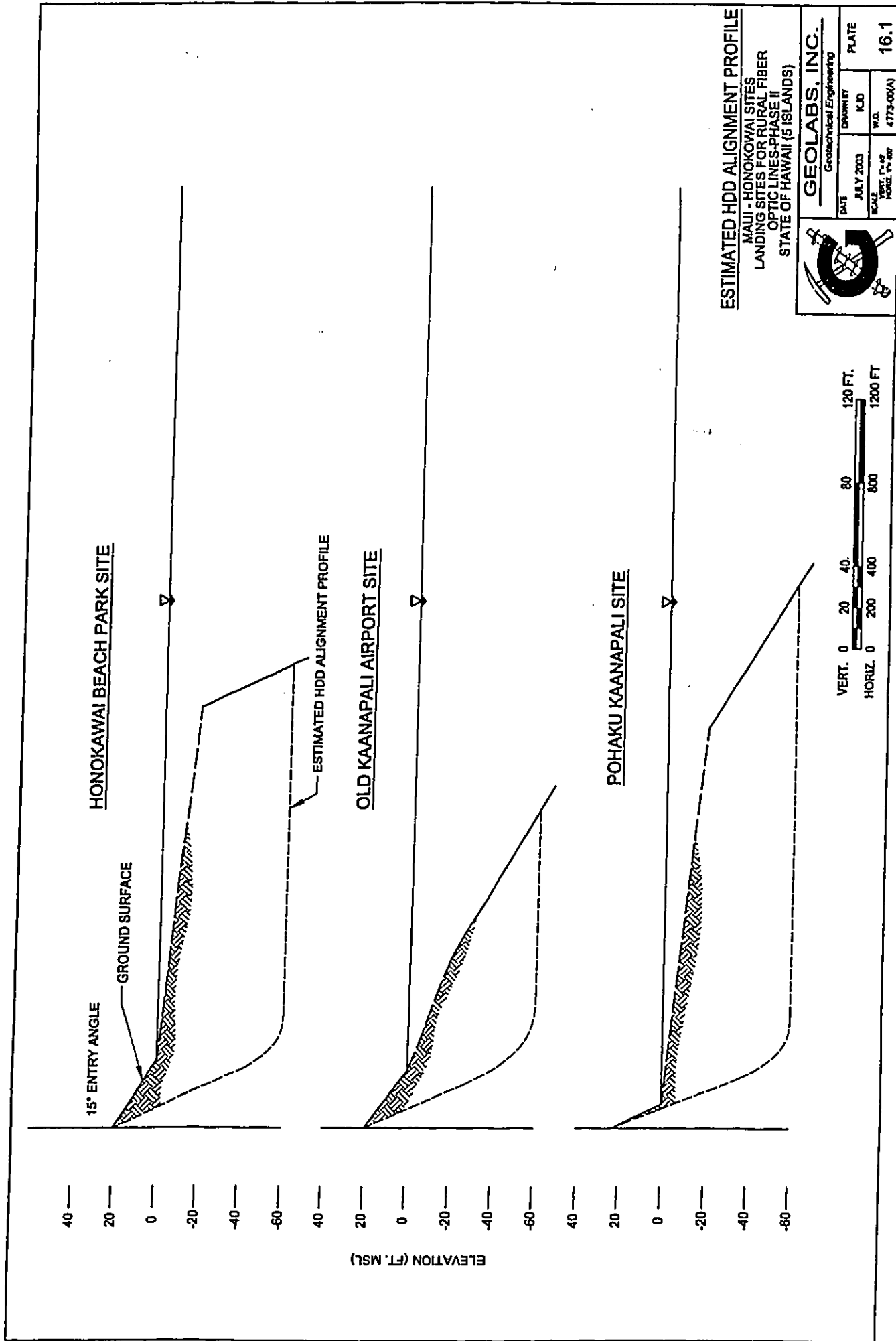
RECEIVED AS FOLLOWS



**ESTIMATED HDD ALIGNMENT PROFILE**  
MOLOKAI - KALAMAULA SITES  
LANDING SITES FOR RURAL FIBER  
OPTIC LINES-PHASE II  
STATE OF HAWAII (5 ISLANDS)

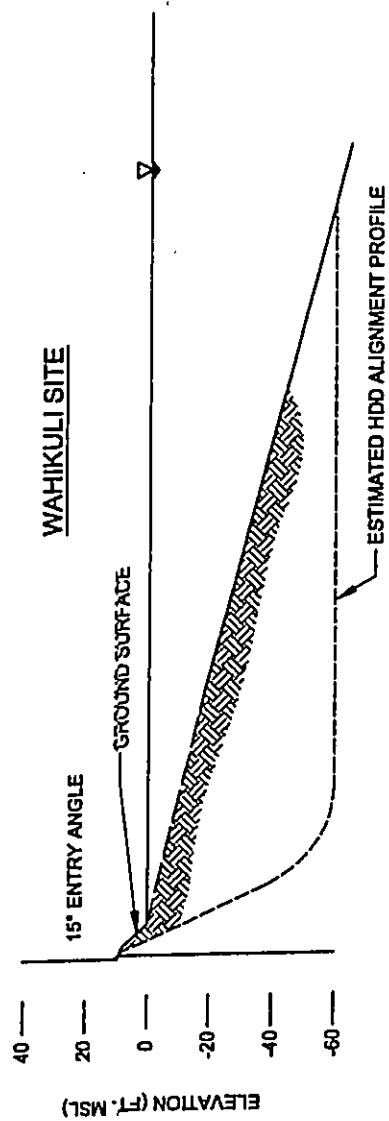
	Geotechnical Engineering		DATE	DATE	DATE
	JULY 2003	KJO	W.D.	41773-001(A)	15.2
GEOLABS, INC.			SCALE: 1" = 40'	41773-001(A)	

RECEIVED AS FOLLOWS



File: 4773-00(A)MachdonHawaii.dwg At 11/20/03 - 11:04am

RECEIVED AS FOLLOWS



**ESTIMATED HDD ALIGNMENT PROFILE**

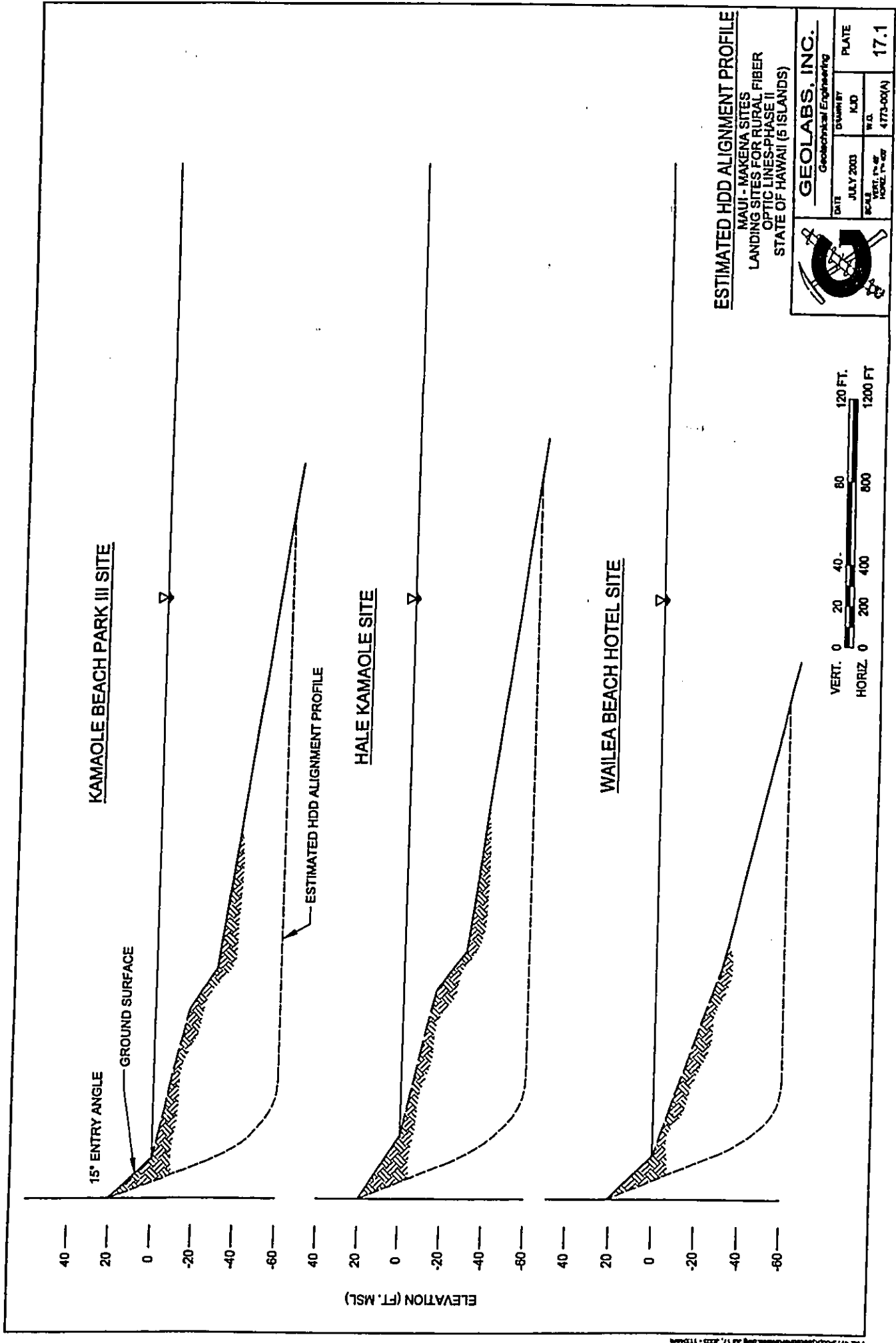
MAUI - HONOKOWAI SITES  
LANDING SITES FOR RURAL FIBER  
OPTIC LINES-PHASE II  
STATE OF HAWAII (5 ISLANDS)



**GEOLABS, INC.**  
Geotechnical Engineering

DATE	JULY 2003	CREATED BY	KJO	PLATE	16.2
SCALE	VERT. 1" = 40' HORIZ. 1" = 200'	W.D.	4773-000(A)		

RECEIVED AS FOLLOWS



**ESTIMATED HDD ALIGNMENT PROFILE**  
MAUI - MAKENA SITES  
LANDING SITES FOR RURAL FIBER  
OPTIC LINES-PHASE II  
STATE OF HAWAII (5 ISLANDS)

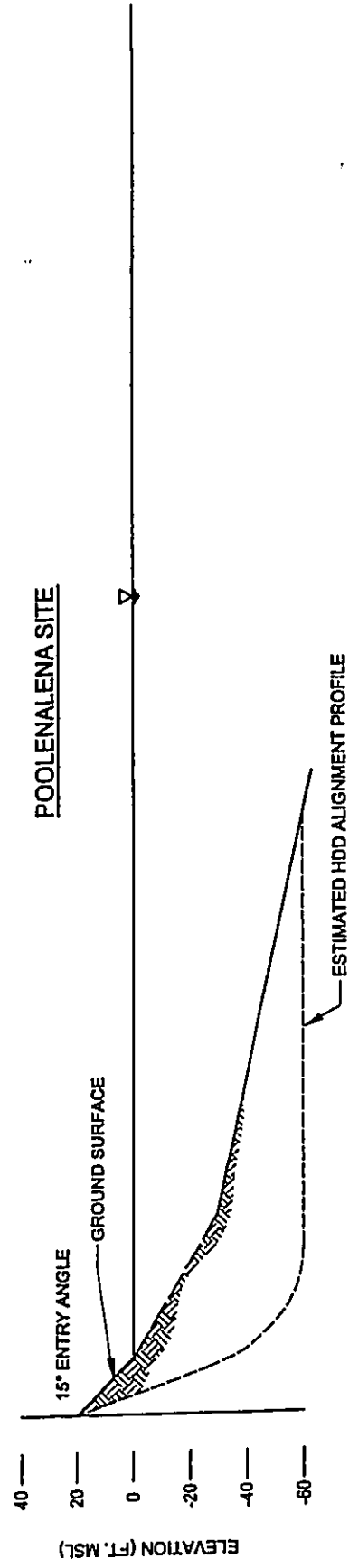
	<b>GEOLABS, INC.</b> Geotechnical Engineering	
	DATE	DESIGNED BY
JULY 2003	KJO	PLATE
SCALE	W.D.	17.1
NO. OF SHEETS	4773-00(A)	

Plot: 4773-00(A)Sheet/Profile.dwg At: 17, 2003 - 11:04am

17.1



RECEIVED AS FOLLOWS

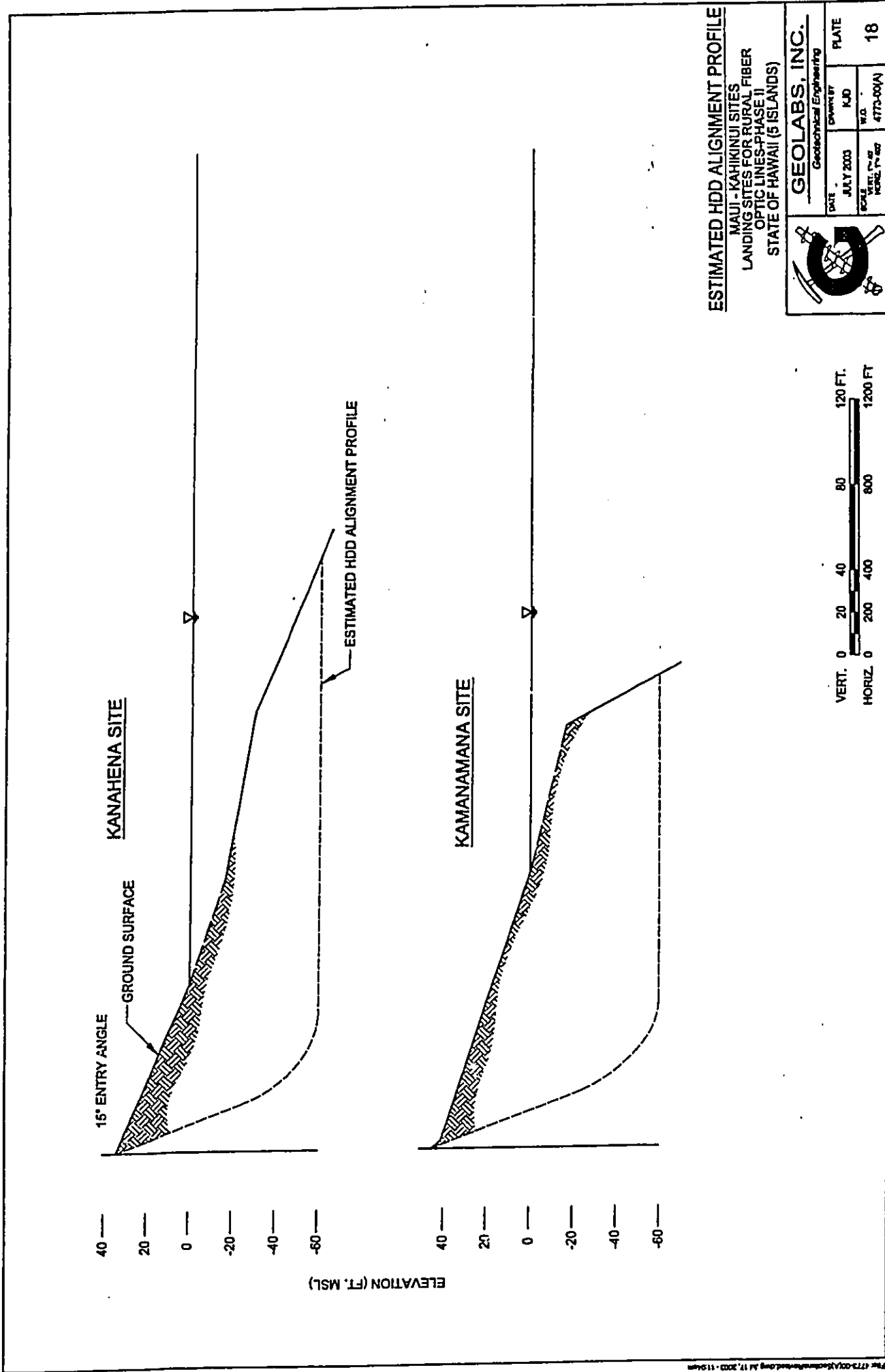


**ESTIMATED HDD ALIGNMENT PROFILE**  
 MAUI - MAKENA SITES  
 LANDING SITES FOR RURAL FIBER  
 OPTIC LINES-PHASE II  
 STATE OF HAWAII (5 ISLANDS)

		<b>GEOLABS, INC.</b>	
Geotechnical Engineering			
DATE	DESIGNED BY	PLATE	
JULY 2003	KJD		17.2
SCALE: VERT. 1" = 40'	W.C.L.		
HORIZ. 1" = 200'	4773-001A		


FIG. 4773-001A/Geotechnical Engineering At 17, 2003 - 11/04mm

RECEIVED AS FOLLOWS

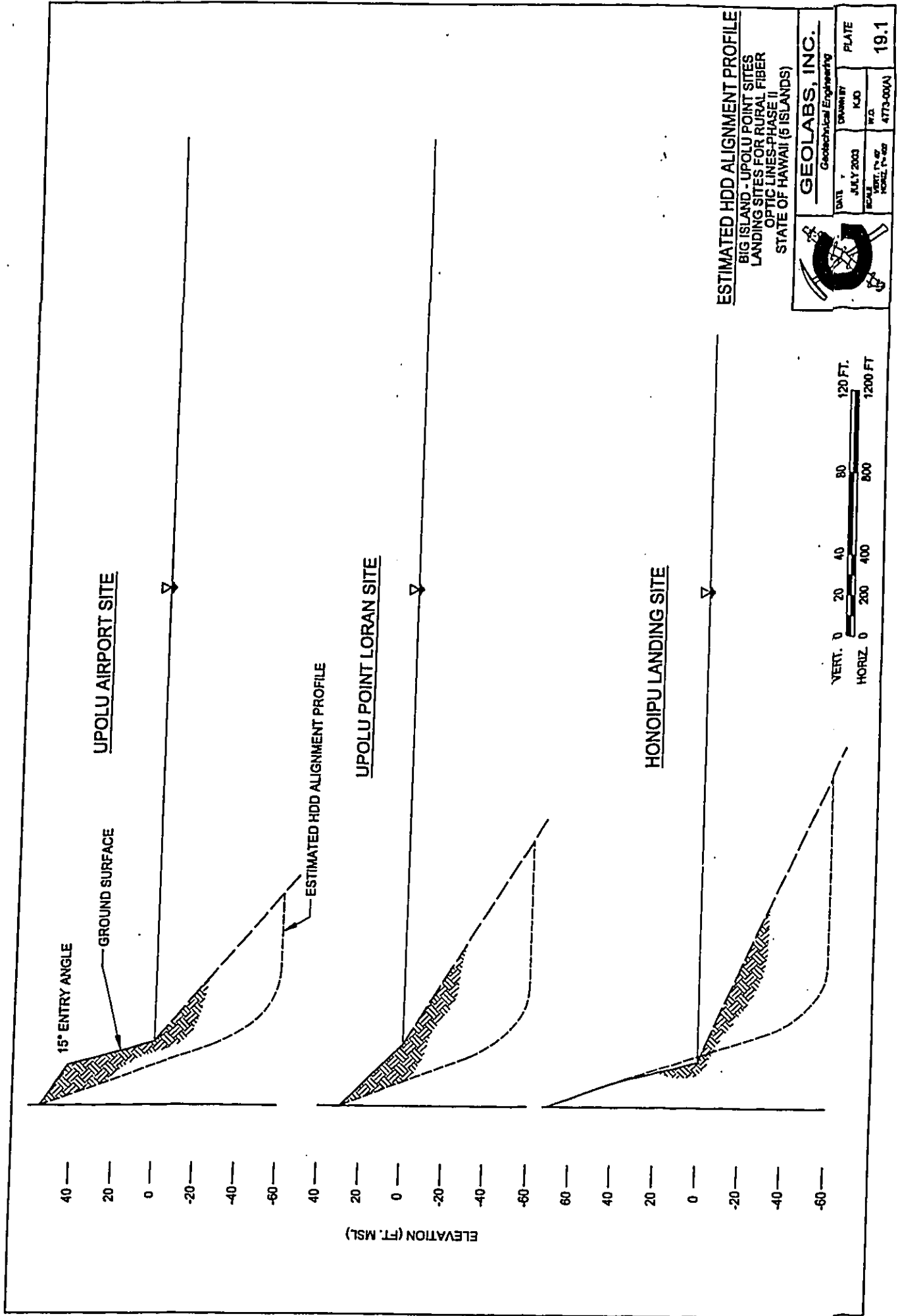


**ESTIMATED HDD ALIGNMENT PROFILE**

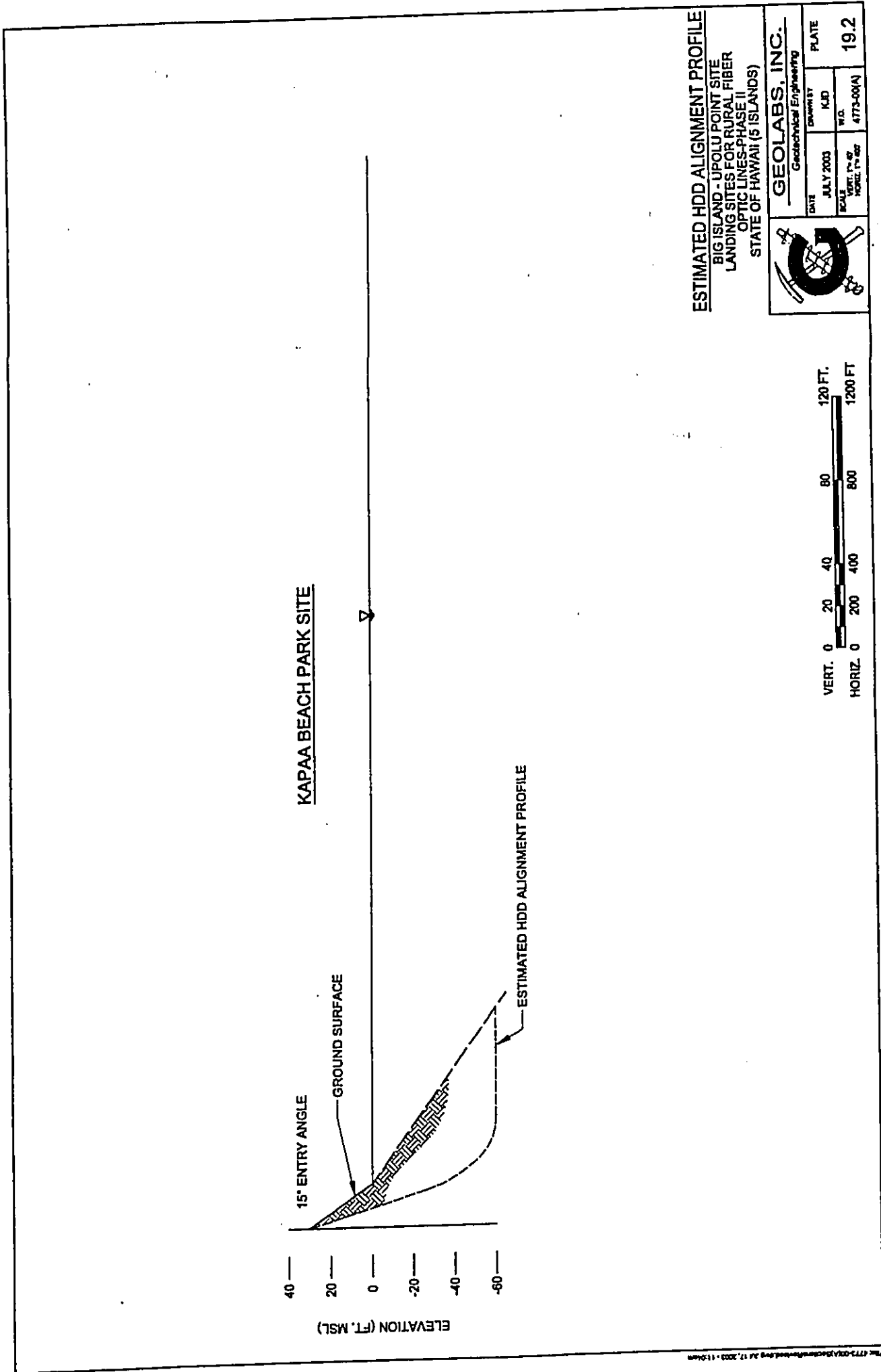
MAUI - KAHIKINI SITES  
LANDING SITES FOR RURAL FIBER  
OPTIC LINES-PHASE II  
STATE OF HAWAII (5 ISLANDS)

		
<b>GEOLABS, INC.</b>		
Geotechnical Engineering		
DATE	DRAWN BY	PLATE
JULY 2003	KJD	18
SCALE	W.D.	
VERT. 1"=40'	4773-00(A)	

RECEIVED AS FOLLOWS



RECEIVED AS FOLLOWS



**ESTIMATED HDD ALIGNMENT PROFILE**  
BIG ISLAND - UPOLU POINT SITE  
LANDING SITES FOR RURAL FIBER  
OPTIC LINES-PHASE II  
STATE OF HAWAII (5 ISLANDS)

		<b>GEOLABS, INC.</b> Geotechnical Engineering	
DATE	ENGINEER	FLATE	
JULY 2003	KJD		
SCALE	W.D.		19.2
1/8" = 1' - 0"	1/8" = 1' - 0"		
4773-00(A)	4773-00(A)		

RECEIVED AS FOLLOWS

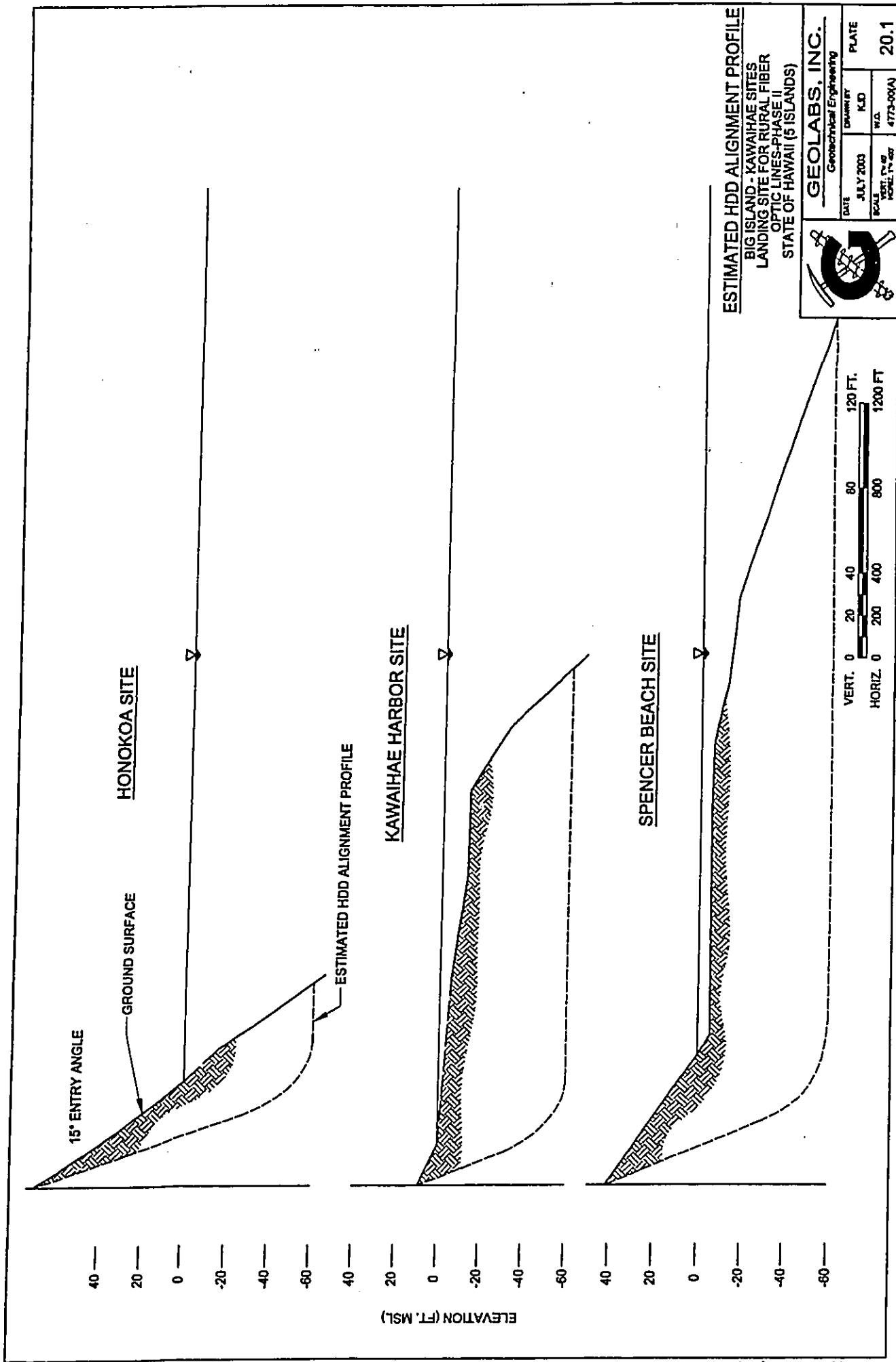
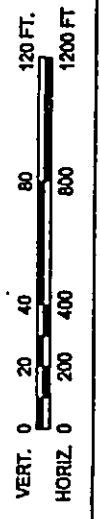
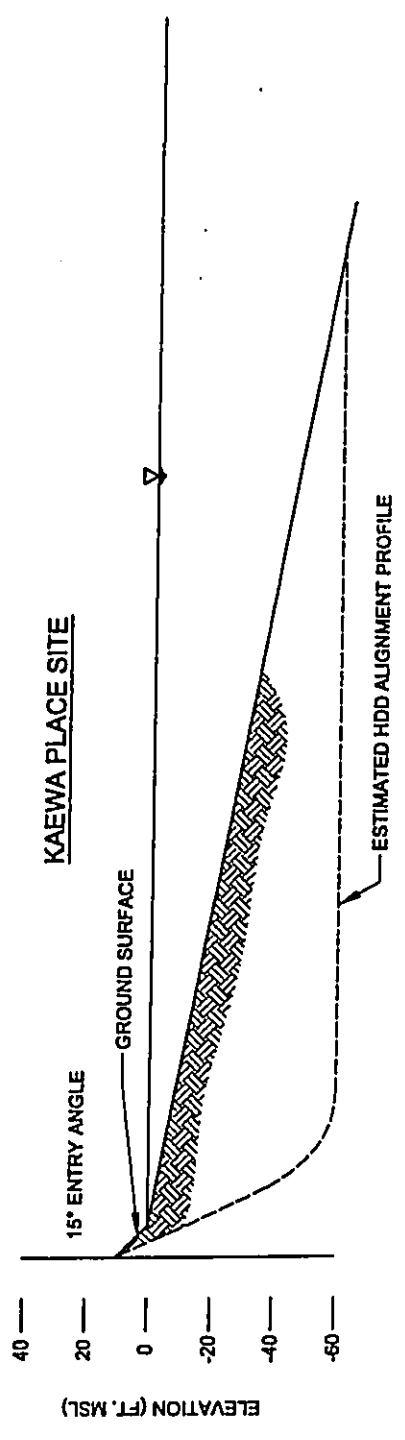


FIG 4773-00(A) 1/25/03 11:54 AM

RECEIVED AS FOLLOWS



**ESTIMATED HDD ALIGNMENT PROFILE**  
BIG ISLAND - KAWAHAE SITES  
LANDING SITES FOR RURAL FIBER  
OPTIC LINES-PHASE II  
STATE OF HAWAII (5 ISLANDS)

		<b>GEOLABS, INC.</b> Geotechnical Engineering	
DATE	DRAWN BY	PLATE	
JULY 2003	KJD		20.2
SCALE	W.D.		
1" = 20'	4773-00(A)		