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JOHN WAIHEE  
GOVERNOR OF HAWAII



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
P. O. BOX 621  
HONOLULU, HAWAII 96809

Keith W. Ahue  
Chairperson  
BOARD OF LAND AND NATURAL RESOURCES

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- AQUACULTURE DEVELOPMENT PROGRAM
- AQUATIC RESOURCES CONSERVATION AND ENVIRONMENTAL AFFAIRS
- CONSERVATION AND RESOURCES ENFORCEMENT CONVEYANCES
- FORESTRY AND WILDLIFE HISTORIC PRESERVATION PROGRAM
- LAND MANAGEMENT STATE PARKS
- WATER AND LAND DEVELOPMENT

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'94 JUL 29

UFC QUALITY CONTROL

Ref. LM-GYT

July 28, 1994

Office of Environmental Quality Control  
220 South King Street, 4th Floor  
Honolulu, HI 96813

Ladies/Gentlemen:

Subject: **Negative Declaration for Proposed Direct Lease of State Land at Kaimu, Puna, Hawai'i - Tax Map Key:3rd/1-2-06:Portion of 33 Applicant: Roman Catholic Church in the State of Hawai'i**

In accordance with the requirements of Chapter 343, Hawai'i Revised Statutes and Chapter 200 of Title 11, Administrative Rules, a Final Environmental Assessment has been prepared for the subject property.

Notice of availability of the Draft Environmental Assessment for the project was initially published in the April 8, 1994 OEQC Bulletin. Neither the department nor the consultant received any comments on the proposed disposition.

As the proposing agency, we are forwarding herewith, one copy of the OEQC Bulletin Publication Form, and four copies of the Final Environmental Assessment. We have determined that there will be no significant impacts as a result of the project and, therefore, are filing the Final Environmental Assessment as a negative declaration. We respectfully request that public notice of the Final Environmental Assessment be published in the next scheduled OEQC Bulletin.

Very truly yours,

*Keith W. Ahue*  
KEITH W. AHUE

c: Hawai'i Land Board Member  
Land Management Administrator  
Hawai'i District Land Office

98

1994-08-23-HI-PEA-Kalapana Star of AUG 23 1994  
the Sea Church Lease of State Lands

FINAL ENVIRONMENTAL ASSESSMENT

ROMAN CATHOLIC CHURCH IN THE STATE OF HAWAII

for the

PROPOSED ESTABLISHMENT OF THE KALAPANA STAR OF THE SEA CHURCH

KAIMU, PUNA, HAWAII

TAX MAP KEY: 1-2-06: PORTION OF 33

Prepared By:

Sidney Fuke & Associates

June 1994

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June 1994

APPLICATION FOR SPECIAL PERMIT  
COUNTY OF HAWAII  
PLANNING DEPARTMENT - PLANNING COMMISSION

APPLICANT: Roman Catholic Church in the State of Hawaii Star of the Sea  
APPLICANT'S SIGNATURE: [Signature] Robert O. Lippi Sea Star  
ADDRESS: 1154 Bishop Rd Honolulu, Hawaii 96813

TELEPHONE: 533-1791

TAX MAP KEY: 1-2-06: Por 33 AREA: 3± Acres  
(Size of Parcel)

OWNER: State of Hawaii

OWNER'S SIGNATURE: [Signature] DLNR Land Agent - Glenn Taguchi

APPLICANT'S INTEREST, IF NOT OWNERS: \_\_\_\_\_

REQUESTED USE: Establishment of the Kalapana Star of the Sea church

APPLICANT'S REASON(S) FOR REQUESTING SPECIAL PERMIT: (Please attach)

NOTE: The applicant must show that:

- (a) such use shall not be contrary to the objectives sought to be accomplished by the Land Use Law and Regulations;
- (b) the desired use shall not adversely affect surrounding properties;
- (c) such use shall not unreasonably burden public agencies to provide roads and streets, sewers, water, drainage, school improvements, and police and fire protection;
- (d) unusual conditions, trends, and needs have arisen since the district boundaries and regulations were established;
- (e) the land upon which the proposed use is sought is unsuited for the uses permitted within the district;
- (f) the proposed use will not substantially alter or change the essential character of the land and the present use; and
- (g) the request will not be contrary to the General Plan and official Community Development Plan and other documents such as Design Plans.

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EXHIBITS

- Exhibit A - State of Hawaii, Department of Land and Natural Resources - Direct Lease of Government Lands, TMK: 3rd/1-2-06:33 (por); October 16, 1992
- Exhibit B - Botanical Survey Star of the Sea Church at Kalapana TMK: 3rd/1-2-06: 33(Portion) Puna District, Island of Hawai'i, by Winona Char, Char & Associates November 1993
- Exhibit C - Survey of the Avifauna and Feral Animals at a Proposed Relocation Site for Star of the Sea Church, TMK 1-2-06: Portion of 33, Kalapana, Puna, Hawaii, by Phillip L. Bruner, Assistant Professor of Biology 22 October 1993
- Exhibit D - Archaeological Inventory Survey Kalapana Star of the Sea Church, by Paul H. Rosendahl, Inc. November 1993

FIGURES

- Figure 1            Location Map/Tax Map Key
- Figure 2            Land Use Pattern Allocation Guide Map
- Figure 3            Proposed Site Plan
- Figure 4            Flood Insurance Rate Map (FIRM)
- Figure 5            Volcanic Eruption Zone
- Figure 6            Approximate Location of Archaeological Sites Identified

## 1. INTRODUCTION

### 1.1 Applicant

The applicant, the Roman Catholic Church in the State of Hawaii, on behalf of its membership, is requesting a Special Permit for the establishment of the Kalapana Star of the Sea Church to a State-owned parcel located within the Kaimu-Makena Homesteads in the Puna district, Island of Hawaii.

Known also as the Painted Church, the church was located along the Kalapana Black Sand Beach in Kalapana, district of Puna. In the path of oncoming lava flows from Kupaianaha Vent of Kilauea Volcano to the beach where it was formerly located, the church building was moved in May 1990 to a portion of a 137.5 acre parcel (TMK: 1-2-06: 33), along the Pahoa-Kalapana Highway. The proposed location will be located on the same parcel, approximately one (1) mile mauka of the present temporary site.

### 1.2 Approving Agency

An Environmental Assessment was prepared as part of the Special Permit application and eventual subdivision of the subject parcel. As the proposed action involves the use of State land, a Draft Environmental Assessment and this Final Environmental Assessment had been prepared pursuant to the requirements of the State Environmental Impact Statement (EIS) law and associated rules. The approving agency for the Special Permit is the County of Hawaii Planning Commission. The approving agency for the use of State land is the State Land Board, and the subdivision action itself is by the County of Hawaii Planning Department.

### 1.3 Agencies Consulted

The following agencies and organizations were consulted in the process of preparing the environmental assessment:

- \* State
  - Department of Land & Natural Resources
  - Department of Transportation, Highways
- \* County
  - Planning Department
  - Public Works Department
  - Water Supply Department

## 2. DESCRIPTION OF PROPOSED ACTION

### 2.1 Location and Ownership

The subject parcel consists of approximately 137.5 acres. It is located along the Pahoia-Kalapana Highway (Highway 130) within the Kaimu-Makena Homesteads, Kaimu, Puna, Hawaii, and is identified by Tax Map Key: 1-2-6: 33. The request, however, is for a 3-acre portion of the parcel. Specifically, the site of the proposed 3-acre area is located on the east or makai side of the Highway, near the Kaimu Beach and Chain of Craters roads junction (Fig. 1).

The State Department of Land and Natural Resources has approved a lease for the use of the 3-acre portion of parcel 33 by the Roman Catholic's Kalapana Star of the Sea church for sixty-five (65) years (Exhibit A).

If the applicant's request is approved, the parcel will be subdivided to create a new parcel not exceeding three (3) acres for the church site.

### 2.2 Existing Uses

The parcel is currently vacant of structures, and the topography is fairly level. Ohia is the dominant tree on the property, as well as on the adjoining property.

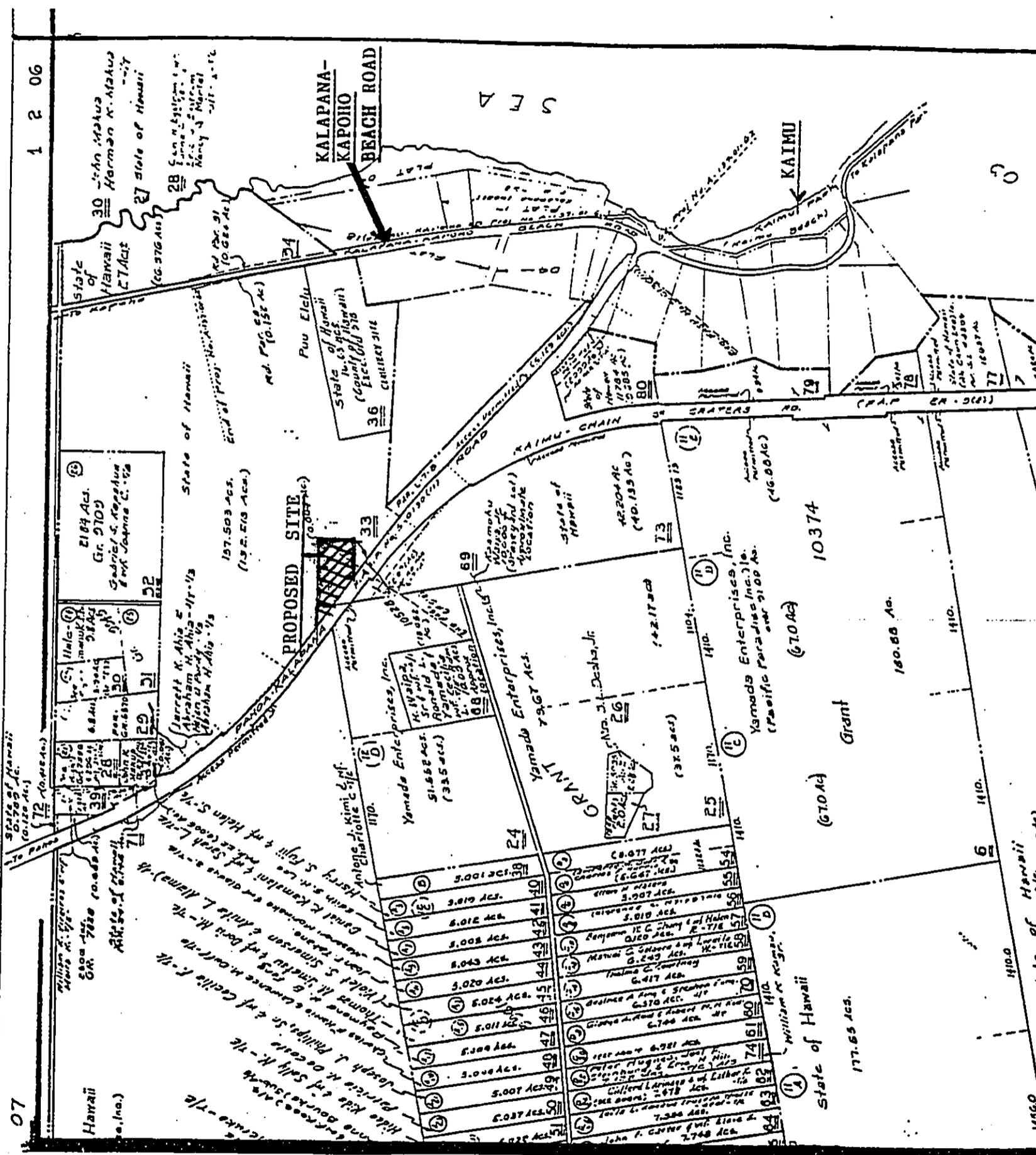
Surrounding land uses include a papaya plant directly across the highway, vacant State-owned lands, and the Kaimu-Makena Homesteads to the south (Fig. 2).

The district of Puna is a rural community with varied agricultural uses, rural-agricultural subdivisions, native forests and barren lava flows scattered throughout this area. The population in 1990 was estimated at over 20,000 people for the district.

### 2.3 Project Description

#### 2.3.1 Historical Description

The Kalapana Star of the Sea church, an historic landmark on Hawaii Island, is also known as the Painted Church. Built in 1931 by Father Evarist Gielsen, SS.CC with the help of the Kalapana people, its Hawaiian



07

1 2 06

SEA

KALAPANA-KAPOHO BEACH ROAD

KAIMU

PROPOSED SITE

GRANT

10374

Grant

(670Ac)

180.88 Ac.

1410.

1410.

1410.

1410.

1410.

1410.

1410.

Hawaii

State of Hawaii

State of Hawaii

2184 Ac.  
Gr. 2100  
Gardner, S. Joseph  
& Mrs. John C. 1/2

197.503 Ac.  
(192.518 Ac.)  
State of Hawaii

Yamada Enterprises, Inc.  
51.88 Ac.  
(33.5 Ac.)  
M. Yamada, Jr.  
Yamada Enterprises, Inc.  
L. Yamada, Jr.  
Yamada Enterprises, Inc.  
L. Yamada, Jr.

Yamada Enterprises, Inc.  
79.67 Ac.

J. J. Desha, Jr.

Yamada Enterprises, Inc.  
(Pacific Paradise) 2100 Ac.  
(16.00 Ac.)

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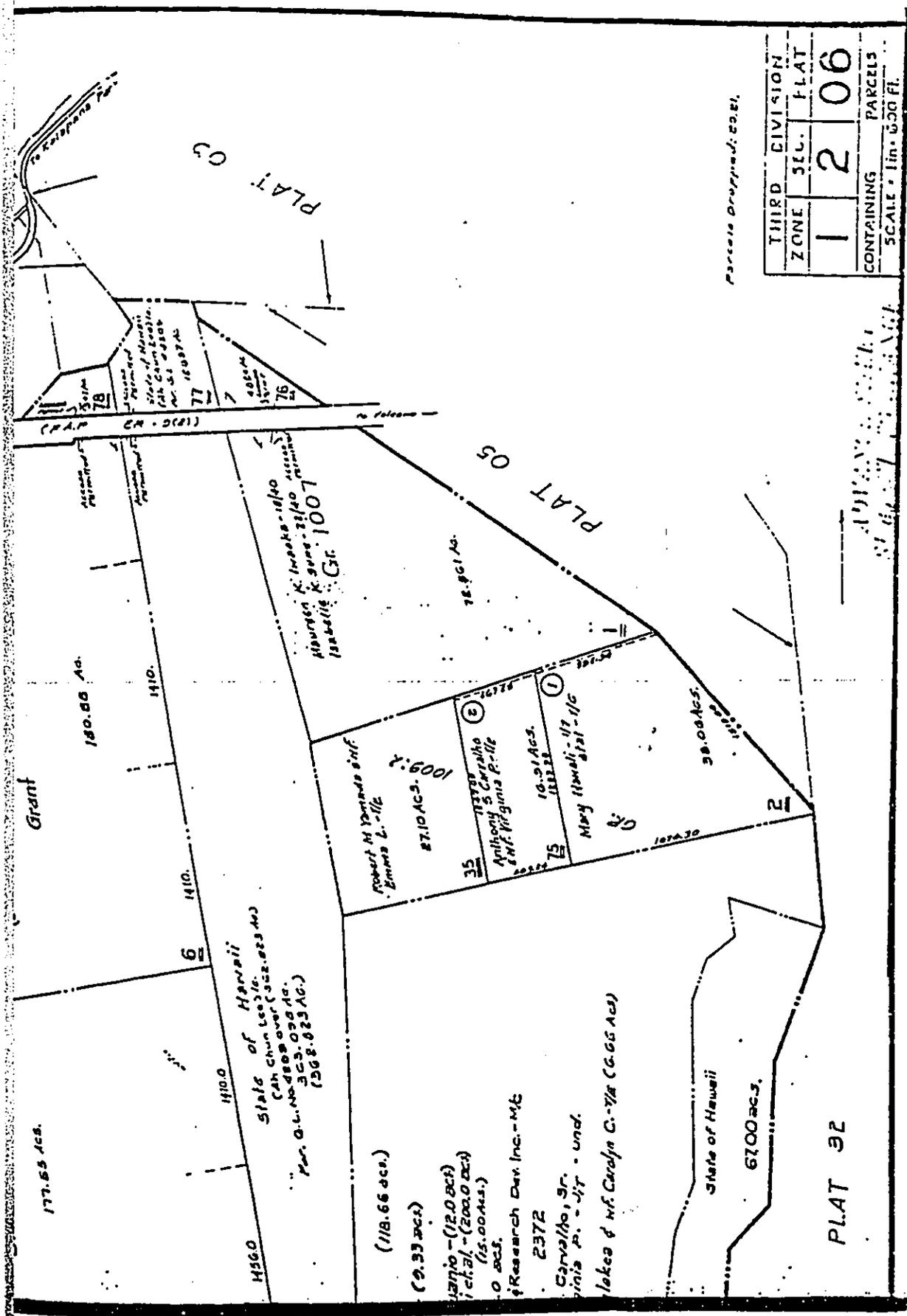


FIGURE 1

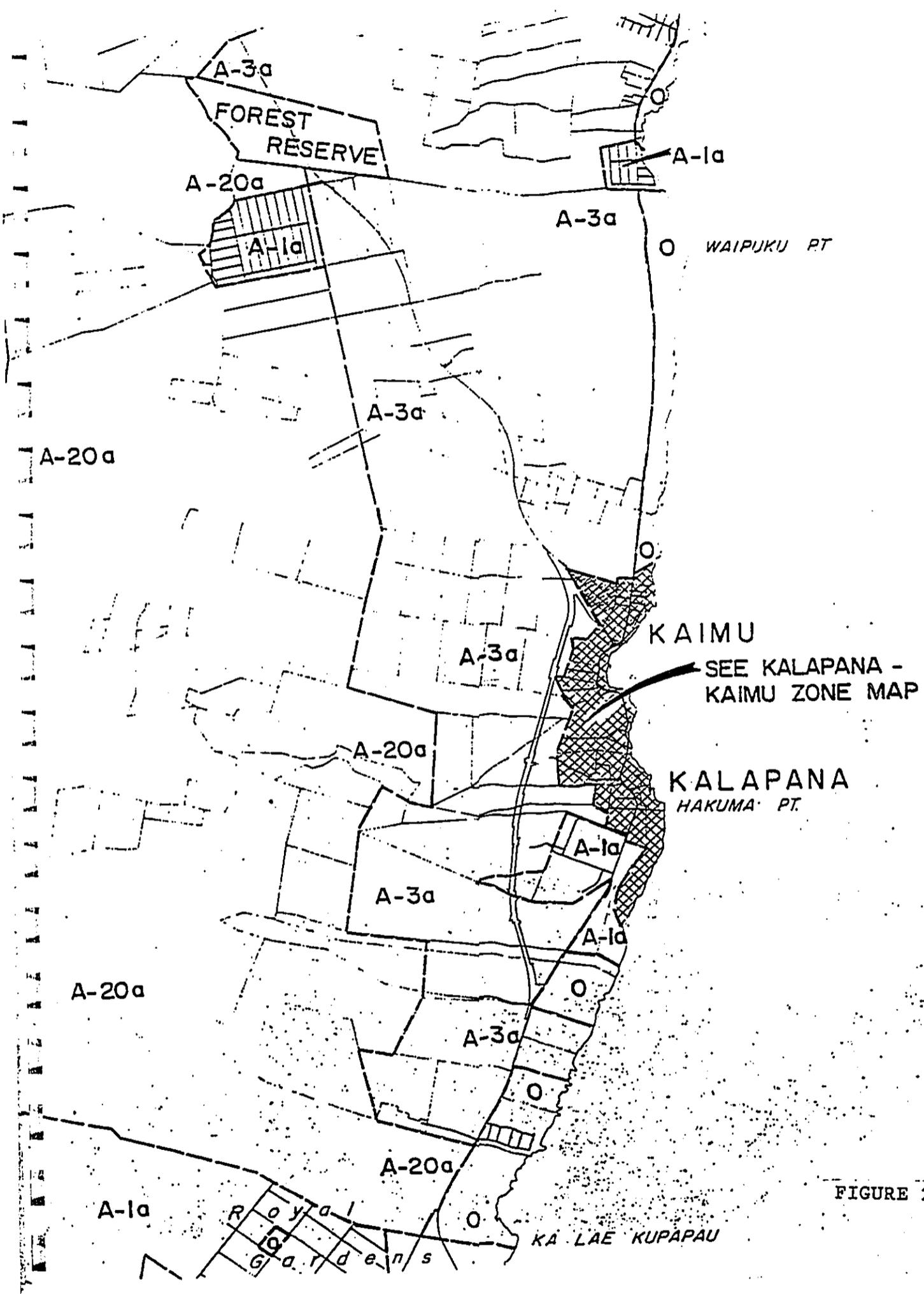


FIGURE 2

congregation as well as visitors to the area frequented the church in its former location along the Kalapana Black Sand Beach. It is well-known for its hand-painted walls and ceiling murals that Father Evarist originally painted that decorate the church.

In May 1990, the church was moved to save it from the volcanic flow of Kupaianaha Vent of Kilauea Volcano. It was moved by church members and volunteers to its temporary site along Pahoa-Kalapana Highway, approximately one mile mauka (north) of its beach site. It is set upon stilts and cement footings and has not been in use since then.

Volcanic activity from Kilauea Volcano is continuing to the present date, necessitating a move to a differing, permanent location for the church. No infrastructure is available to support a move back to the old site.

The church will be relocated a short distance away from its present location on the same State-owned parcel.

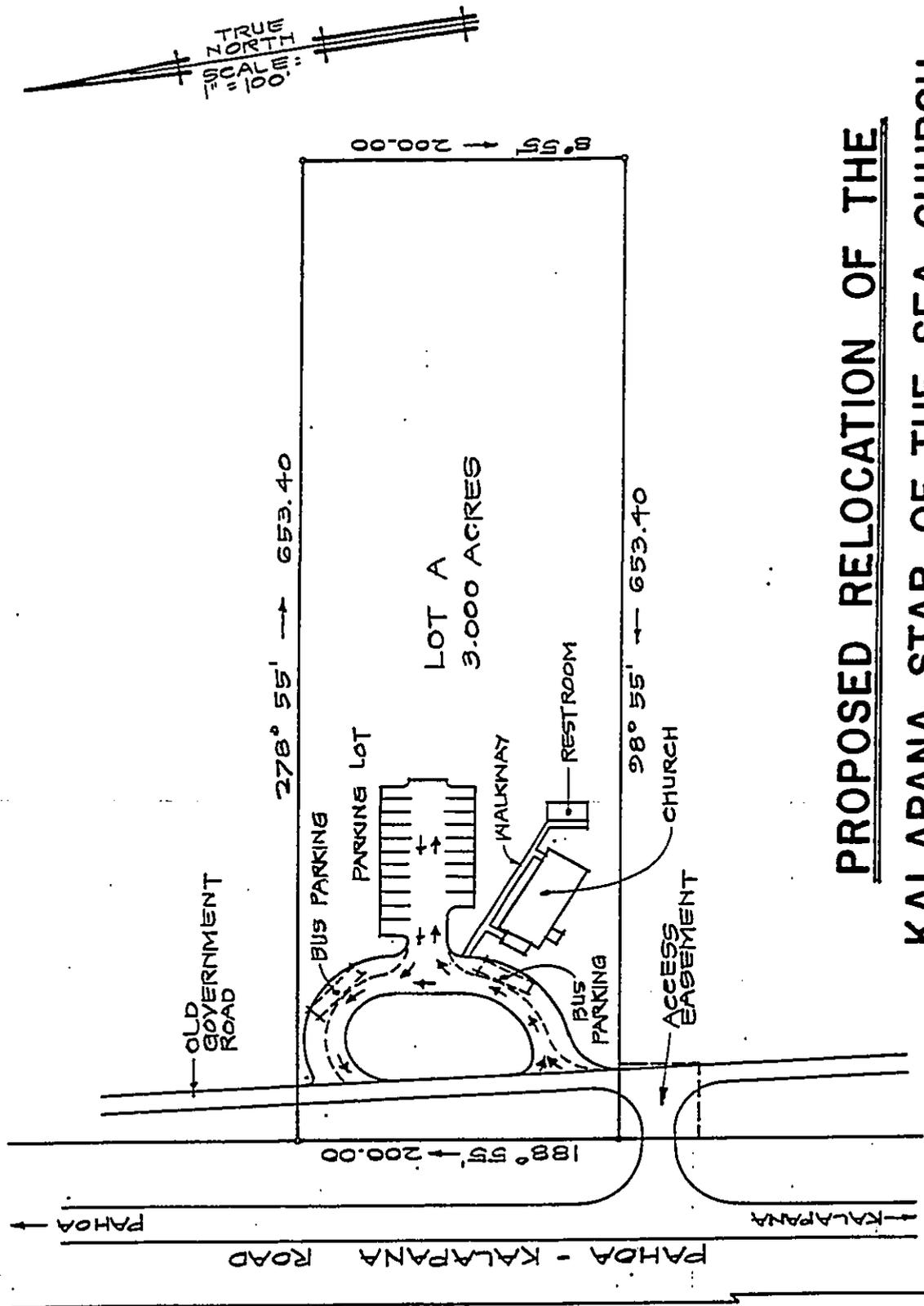
### 2.3.2 Physical Characteristics and Use

The vacant church is approximately 30 feet in width by 50 feet in length. Although a single-storied building, its height - inclusive of its steeple - is about 30 feet. While the church can seat up to 70 persons, the membership is approximately 50 persons.

Traditional Sunday church services will not be scheduled when the church is relocated. Instead, the church will be open on a daily basis for visitors, with one special service to be scheduled during each month. The monthly service will be planned for a weekday.

Proposed plans for the church and related improvements at its relocation site would include two restrooms alongside the church building and a parking area. The parking area would be sufficient to accommodate up to fifteen cars and two tour buses for the church's visitors. No other additional buildings are planned (Figure 3).

Landscaping will be added along the roadside to protect scenic vistas from the roadway.



**PROPOSED RELOCATION OF THE  
KALAPANA STAR OF THE SEA CHURCH**

TAX MAP KEY : 3RD DIV. 1-2-06 · PORTION OF 33  
KAIMU, PUNA, HAWAII

FIGURE 3

Access to the church will be along the Paho-Kalapana Road.

### 2.3.3 Timetable and Cost

The applicant plans to begin the relocation immediately upon securing all necessary County permits. The subdivision process will start now if not after action on the Special Permit. The estimated cost for this effort, including related improvements, should not exceed \$50,000, provided labor is donated. Otherwise, the cost will be higher. Much of it will be voluntary and in-kind contributions, making the actual cash outlay much lower.

## 3 ENVIRONMENTAL SETTING, IMPACT, & MITIGATION MEASURES

### 3.1 Physical Characteristics

#### 3.1.1 Climate

The mean annual rainfall in this area ranges between 75 to 100 inches.

#### 3.1.2 Topography & Soils

The Land Study Bureau's Detailed Land Classification report designates the site E 292, which is essentially poorly suited for intensive agricultural activities. The soil series is almost bare pahoehoe with very little or no soil material. It is well-drained, with slopes generally less than 20 percent. It is very poorly suited for machine tillability.

Under the Agricultural Lands of Importance to the State of Hawaii (ALISH) classificatory system, the subject site is designated "Other Agricultural Land" or not classified.

#### 3.1.3 Natural Hazards

Tsunami, earthquake and subsidence, and lava flow represent the major natural hazards in the Puna District. Of these, lava flow poses the greatest potential hazard to the subject site.

The subject site is located at least one-half mile from the shoreline. As such, it would appear not

to be readily vulnerable to tsunamis and subsidence. According to the Flood Insurance Rate Map (FIRM), the subject site is designated Zone X, areas of minimal floodwater or tsunami hazards (Fig. 4).

Nonetheless, volcanic activity is on-going in the general area. Thus, earthquakes and lava flows do pose potential hazards. According to the Technical Reference Report for the draft Puna Community Development Plan, January 1992, the subject site falls within Zone 2 of the Volcanic Eruption Zones (Fig. 5).

#### 3.1.4 Flora

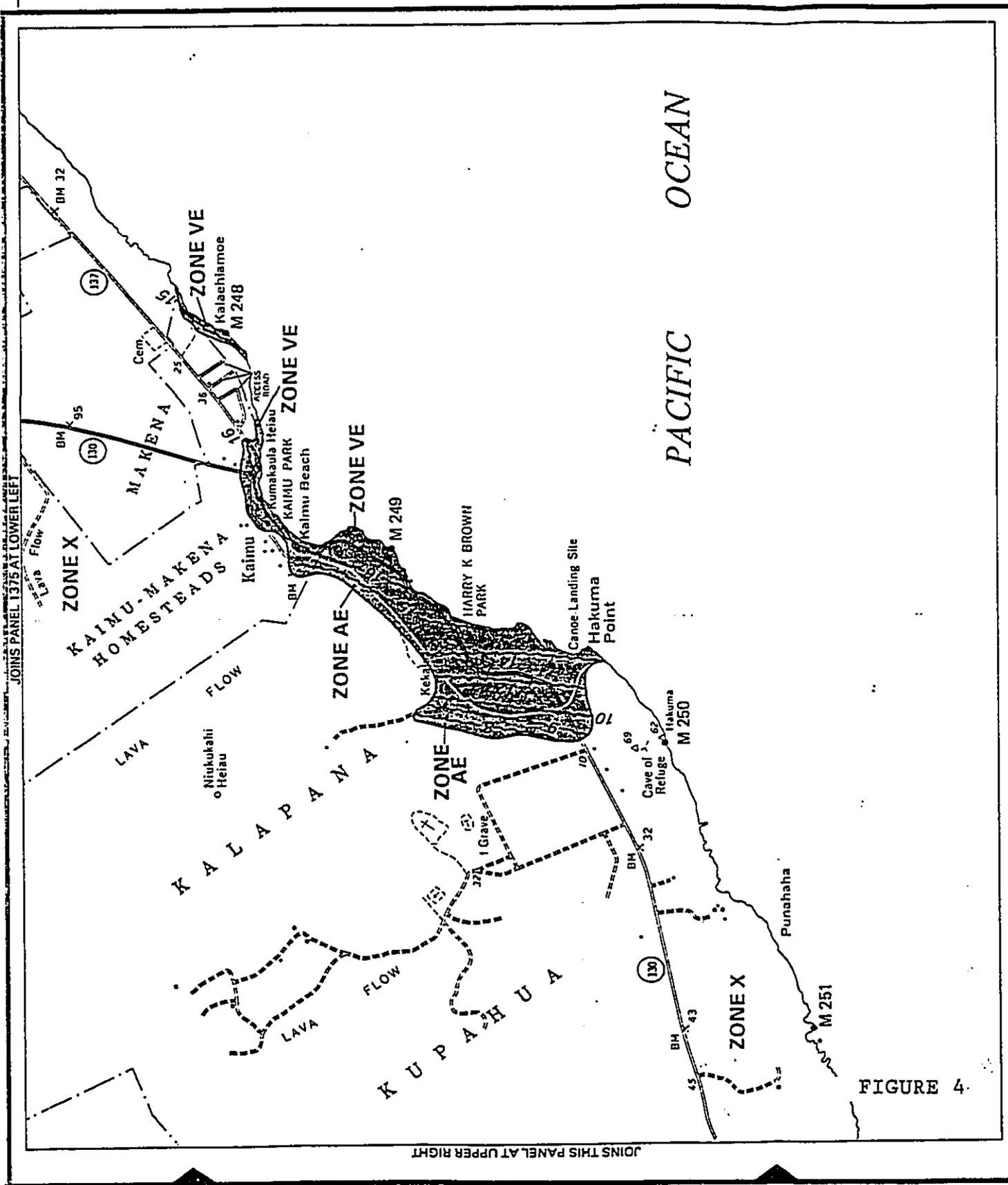
A walk-through field study of the parcel described all of its botanical resources as plants that can be found throughout the Puna area in similar habitats.

Char & Associates conducted a survey to inventory and assess potential significant botanical features of the site on October 22, 1993 (Exhibit B). Based on the study, none of the plants inventoried are listed threatened and endangered species; nor are any proposed or candidate for such status. As such, no restrictions, conditions, or impediments, or recommendations, are discussed for the proposed location for the church.

Ohi'a trees form a canopy cover throughout the parcel over native shrubs, ground cover plants, and lichen.

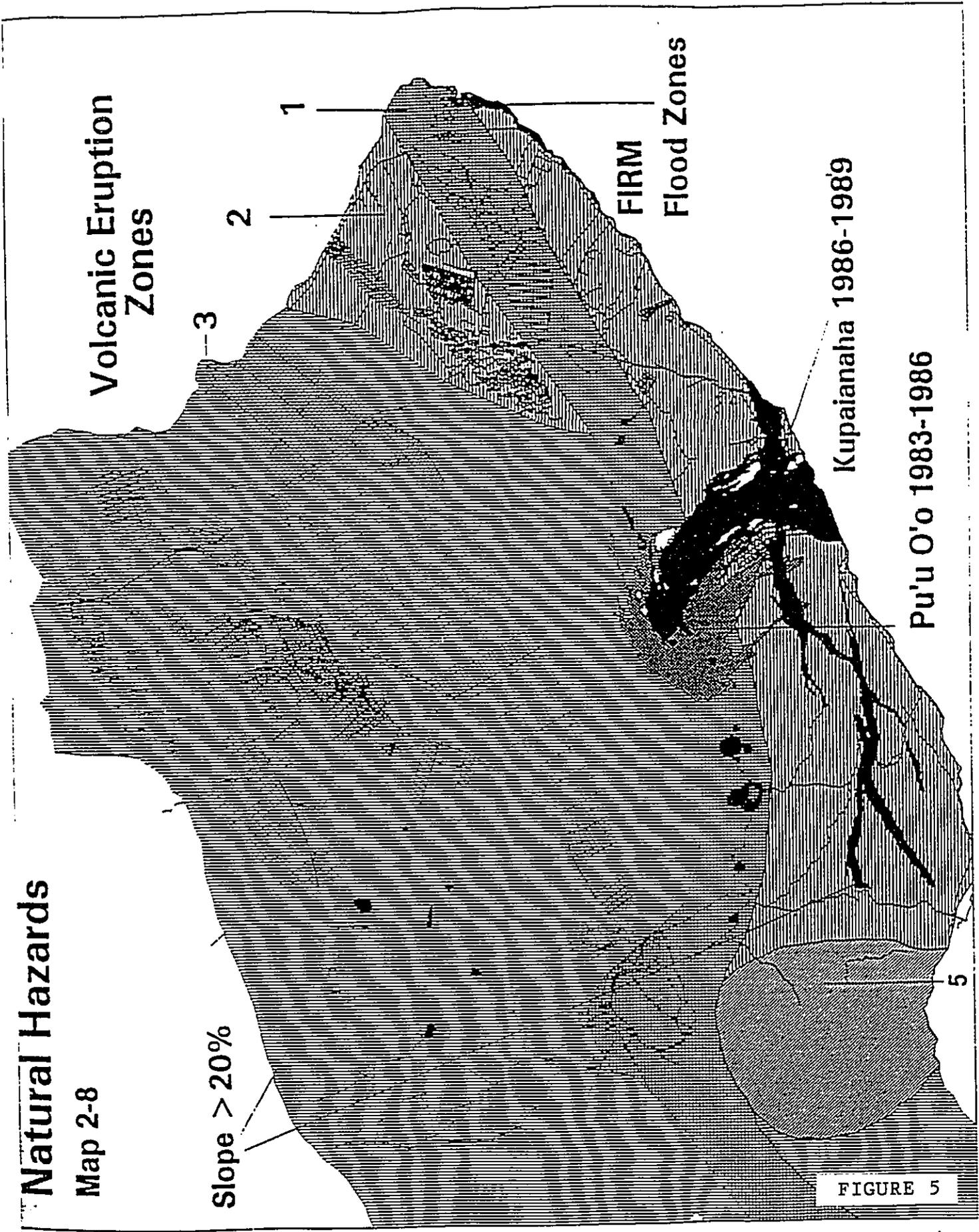
Native shrubs include 'akia (*Wikstroemia sandwicensis*), pukiawe (*Styphelia tameiameia*), and ki'oko'olau (*Bidens hawaiiensis*). Introduced shrubs include guava (*Psidium guajava*) and Christmas berry (*Schinus terebinthifolius*).

Ground covering plants were usually found at the base of 'ohi'a trees. Among them were the 'ala'ala wai nui (*Peperomia leptostachya*), huehue (*Cocculus trilobus*), ko'oko'olau seedlings, and 'ulei (*Ostemeles anthyllidifolia*). Introduced species were less in number except towards the front end of the parcel which has been disturbed by bulldozing. Those plants are the hairy sword fern (*Nephrolepis multiflora*), broomsedge grass (*Andropogon virginicus*), Natal redtop



INSET I

FIGURE 4



(*Rhynchelytrum repens*), 'uhaloa (*Waltheria indica*), molassesgrass (*Melinis minutiflora*), partridge pea (*Chamaecrista nictitans*), bamboo orchid (*Arundina graminifolia*), and sensitive plant (*Mimosa pudica*).

#### 3.1.5 Fauna

A faunal survey was conducted by Dr. Phil Bruner (Exhibit C). The October 1993 survey found two native species on the property. One of these was the Apapane, which is a common native forest bird that is not listed as endangered. The other was an adult 'Io or Hawaiian Hawk. While being on the endangered species list, the 'Io is quite common in the Puna area. No nest was found on the site. Dr. Bruner believed that the 'Io was just foraging in the area.

Some exotic or introduced birds were recorded. These included the House Finch, dove, and myna.

No mammals were observed during the survey. However, the presence of mongoose, feral cats, and mice are likely to be found periodically on the site. The Hoary Bats were also not observed, although they "potentially could occur at this site."

Given the results of the survey, the likelihood of adverse impacts to any endangered faunal species by the proposed establishment of the church would appear not to be overly significant.

#### 3.1.6 Historic/Archaeological Resources

An archaeological inventory survey was conducted of the subject parcel on September 25, 1993 by Paul H. Rosendahl, Inc. (Exhibit D) to identify all sites and site complexes present within the project area; evaluate potential general significance of all identified archaeological remains; determine possible impacts of a proposed development upon any found remains; and define the scope of any subsequent further data collection and/or mitigation work necessary. This survey was done in accordance with the standards for an inventory-level survey as recommended by the Department of Land and Natural Resources, State Historic Preservation Division.

Available historical and archaeological literature was reviewed before a 100% ground survey was conducted of the project area. Limited subsurface testing of selected sites and features that were identified were conducted to determine the presence or absence of potentially significant buried cultural features or deposits, and, for age determination analyses, suitable samples were obtained.

Two single component sites were identified and assigned the respective functional types of transportation and boundary/animal habitation.

Site 19061, a wall built of local aa lava cobbles and boulders, is thought to have had a possible boundary function, to indicate to travelers their passing into someone's land. Two alternative interpretations were that the wall was used for animal control; or possibly was related to a stacked aa platform (a possible burial) on the adjacent property, as noted by Rosendahl in a 1983 survey, but which was not relocated during this survey.

A portion of the wall crosses the project boundary. It is assessed as significant solely for information content, with no further work recommended. Preservation "as is" is suggested, but not mandated.

Site 19060, according to historic maps, is a protohistoric-historic trail over the AD 1750 Heiheiulu aa lava flow, a local branch of the mauka-makai trail that passed through the center of the land of Kaimu. Maps also indicate this trail formed the primary access route to Kalapana before the road was constructed.

The trail is made of flat pahoehoe slabs fitted into a pavement on local aa cobbles, with its present condition ranging from fair to poor in the project area.

This site is assessed as significant for information content, as an excellent example of a site type of the local level, and for cultural significance.

The archaeologist recommended further data collection followed by preservation with interpretive development. Additionally, the report notes that a portion of the trail may be "breached" to allow access.

It should be noted that the location of the church and its related improvements is planned parallel to the highway, away from the two archaeological sites located, which is towards the rear of the parcel (Fig. 6).

#### 3.1.7 Air Quality

The district of Puna does have pollution, some natural and some man-made. The man-made are those associated with the automobile and possibly from geothermal development. The more significant one is a natural one, coming from the fumes of the volcanic activity.

The church should not generate any significant air pollutants. While most of the members will visit the site using an automobile, the membership is too small to make any discernible differences to the air quality. In addition, church services will be held only once a month.

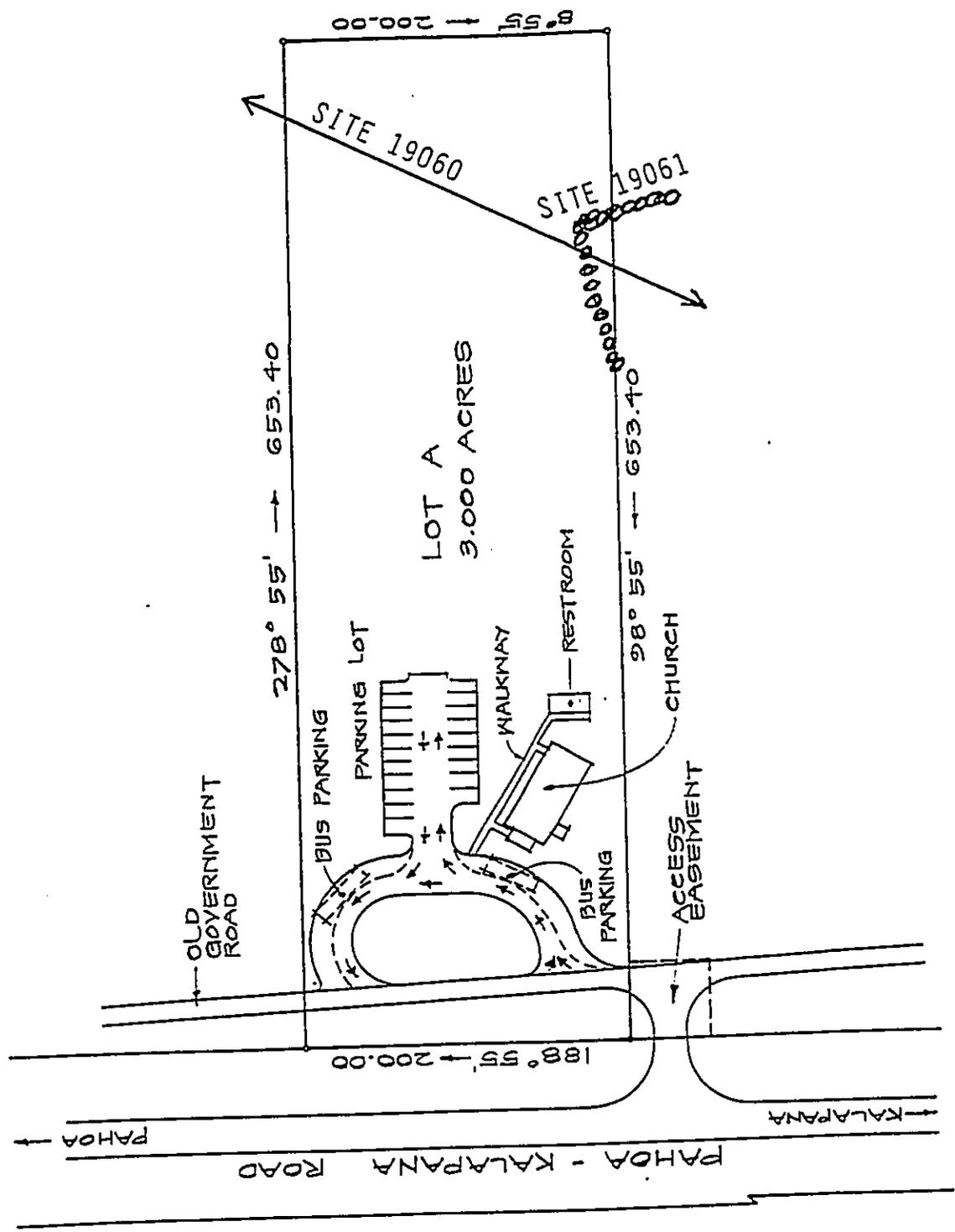
Additionally, the balance of the parcel will be left intact, environmentally reducing potential negative air impact.

It should be noted, however, there may be some air emission pollution generated by visitors to the church that may already be going to other attractions of the area, not primarily the church. The church would be an additional attraction along the way.

#### 3.1.8 Noise

The subject area is very rural, generally with low level ambient noise levels associated with the distant shoreline and volcanic activity. As with the expected impact to the ambient air quality, the location of the church and its use should not significantly affect the overall ambient noise quality of the area. The subject property is a 3-acre portion of 137 acres with the church set back from the highway;

TRUE NORTH  
SCALE: 1" = 100'



APPROXIMATE LOCATION OF IDENTIFIED ARCHAEOLOGICAL SITES  
 \*SITE 19060 - TRAIL \*SITE 19061 - WALL

FIGURE 6

and surrounding land uses not in close proximity to the church's proposed location.

### 3.1.9 Scenic Resources

The relocation and ultimate restoration of the church should add to the scenic and historic quality of the area. It should thus visually enhance any man-made character of the area.

The location of the proposed church will be off the main highway. Beyond the church and on the same parcel of land would be lowland vegetation. The view in this area is more straightfoward or in the direction of the road. This is the view of the coastline and the remnants of Kaimu Beach.

### 3.2 Socioeconomic Characteristics

The proposed action will not involve any relocation of residents, nor will the action induce or inhibit population growth. The proposed church is intended to service the existing population of the area. This is a population who has had to travel to Pahoa and other parts of Puna for its place of worship ever since the church was relocated or stored on its present site.

Although governed by existing zoning and County land use policies the proposed action is also not expected to significantly affect surrounding land values.

### 3.3 Public Facilities, Utilities and Services

#### 3.3.1 Roads

The Pahoa-Kalapana Highway (Highway 130) would serve as the principal access to the church. It is a State-owned roadway with a right-of-way varying from 100 to 120 feet in the general vicinity. The paved section of the right-of-way approximates 24 feet.

The overall road condition generally comports to County standards. Then, too, the anticipated traffic for the church should not be significant, as services will be occasional and not daily.

Access to the church and its parking lot will be paved.

It should be noted that there is a sliver of abandoned road and right-of-way between portions of the subject property and the State Highway. This abandoned portion was the former road leading to and from the area.

### 3.3.2 Water System

There is an existing County water line along the Kalapana-Pahoa main highway fronting the subject site. Potable County water would be available for the proposed use. Water would be used for the restrooms to be constructed on the site.

Potable water was primarily provided by coastal springs, water caves, dew fall, and catchment in the area.

### 3.3.3 Wastewater System

An individual wastewater treatment system will be required to service the church's proposed restroom. The preferred method - due to costs - is the cesspool. Should that alternative not meet with appropriate State requirements, then, a septic tank or comparable system meeting with State Department of Health's requirements will be installed.

### 3.3.4 Drainage System

The subject site is designated Zone X, areas of minimal flood and/or drainage hazards. The proposed parking area should increase the area of semi-impervious surface, and the church's roof should also add to on-site drainage. However, given the existing permeable condition of the land, on-site drainage problems are not anticipated.

Nonetheless, should drywells and/or alternative drainage systems be required by the County in conjunction with the construction of the parking lot, the applicant intends to comply.

### 3.3.5 Solid Waste

The proposed use should not generate a significant amount of waste. Nonetheless, whatever waste is generated, they will be disposed off at one of the County's solid waste transfer station site in Puna. The church also intends to request its members to dispose of their own solid waste generated at the site.

### 3.3.6 Electrical/Telephone

Electrical and telephone services are currently available to the area. As the services will be principally conducted during the day, anticipated electrical use should be minimal.

### 3.3.7 Other Public Facilities

Additional public services should not be required for the proposed use. This area, being partially developed and with its volcanic attraction, already generates fire and police protective services. This proposed use is not expected to significantly add to the demand for those services.

As the proposed use will not have residents living on the site, there should also not be any additional school support services required.

## RELATIONSHIP TO PLANS, POLICIES, AND CONTROLS

### 4.1 State Land Use Law and Special Use Permit

The subject parcel is classified Agricultural by the State Land Use Commission. Since a church is not a permitted use within this District, a Special Permit is required.

As the subject area (3 acres) is less than 15 acres, the County Planning Commission can issue the Special Permit, provided that the established criteria for such a permit can be met.

The requested church use complies with the State Land Use and County Planning Commission's criteria for Special Permits. These criteria and justifications are:

- \* Such use shall not be contrary to the objectives sought to be accomplished by the Land Use Law and Regulations.

One objective of the Land Use Law and Regulations is to "preserve, protect and encourage the development and preservation of lands in the State for those uses to which they are best suited in the interest of public health and welfare of the people of the State of Hawaii."

In this particular situation, the land is not considered prime from an agricultural resources perspective, and it is also not being used agriculturally now. As such, the use of this site for the proposed church would not be inherently violative of this criteria. The church would serve the spiritual needs of the membership.

- \* The desired use shall not adversely affect surrounding properties.

With the exception of a papaya packing and processing plant across of the subject site, the immediate surrounding area is vacant. There are some residences, however, further away from the 3-acre portion of the subject site and in the general vicinity.

The potential impacts to surrounding properties, if any, could be noise and traffic. However, the volume of traffic to be generated by the parishioners should be very low, given its limited seating capacity (70) and with its congregation meeting generally during low peak traffic hours once a month. It should be noted that the bulk of today's traffic is attributable to sightseers. Visitors coming via bus to the church would also be visitors to the general Puna area's attractions. The church would not be a new main visitor attraction.

Any noise associated with the proposed use (choir singing and traffic) should also be quite minimal and not frequent. That factor, combined with the fact that homes in the immediate area are quite sparse, should

not make the requested use an adverse one to the surrounding properties.

- \* Such use shall not unreasonably burden public agencies to provide roads and streets, sewers, water, drainage, school improvements, and police and fire protection.

Access to the subject site is via a State-owned Highway built to County dedicable standards. It has a minimum pavement width of 24 feet. Thus, no road improvements would be required to service the requested church use.

Potable water from the County's water system is also available to the site. Given the projected volume of use - principally, restrooms - the demand should be comparable to a single-family residence of 600 gallons per day (GPD). The request should also not generate additional burden for fire and/or police protective services. This area already has some uses that demand such services (papaya packing plant, some residences, recreational users). Thus, the requested use should not require an extension of this type of public service.

No added school facilities demand should be necessary, as the requested use is a service-oriented one. It is a use that services the existing population and not one that serves as a catalyst for more people to reside in the area.

Any drainage and wastewater requirements will be taken care of by the applicant.

- \* Unusual conditions, trends, and needs have arisen since the district boundaries and regulations were established.

The established use was already a part of the general area which needs a different location due to the volcanic activity which covered the church's former site. That is the unusual condition, for if it were not for the volcanic activity, this request for the relocation of the church would not be needed.

- \* The land upon which the proposed use is sought is unsuited for the uses permitted within the district.

Although the subject parcel is classified and zoned Agriculture, its soil characteristics are not inherently unique and suitable for intensive agricultural activities. Thus, while the site is not totally unsuited for some agricultural activities, its potential for intensive or less intensive agricultural uses is quite limited.

- \* The proposed use will not substantially alter or change the essential character of the land and the present use.

The site (3 acres) is relatively large in relation to the structure. As such, there should be considerable open space and buffer between the church and surrounding properties.

Church or churches are common in communities, and rural/agricultural areas are no exception. This church should thus not be totally visually incongruous with the surrounding area. It would appear - as in its former location - to be a central part of the area.

- \* The request will not be contrary to the General Plan and official Community Development Plan and other documents such as Design Plans.

The subject site is designated Low Density on the County General Plan Land Use Pattern Allocation Guide (LUPAG) map. Churches are considered part of such uses. Accordingly, the requested use would not be inherently inconsistent with the General Plan.

There are no official community development or other plans governing land use for this area.

#### 4.2 Hawaii County General Plan

The County General Plan Land Use Pattern Allocation Guide (LUPAG) map designates the subject area for Low Density development. Such a designation allows consideration for church uses.

#### 4.3 Community Development Plan

There is no official community development plan for

this area. There are two drafts, however. One was prepared in 1979. An updated version was prepared in 1992. The updated version did not take a position and pointed out to several development scenarios.

#### 4.4 Zoning

The County zoning of the subject site is Agriculture, 3-acre (A-3a). The Zoning Code normally requires a Use Permit for church use within the Agriculture zone. However, because the site is also classified Agriculture by the State Land Use Commission, the Special Permit is being required. Section 25-52 of the Zoning Code provides that permits issued pursuant to Chapter 205, HRS - such as the Special Permit - are considered permitted use.

It should be noted that in the event the County also requires a Use Permit, one will be applied for.

The Code also requires vehicular parking for churches at a ratio of one (1) stall for each six (6) seats. In this case, the required parking would be twelve (12) stalls (70 seats divided by 6 = 11+ or 12). The applicant intends to provide at least fifteen (15) stalls plus two (2) stalls for bus parking.

#### 4.5 Other Regulations

The subject area is not located within the County Special Management Area (SMA). Thus, a SMA Use Permit would not be required.

Beyond the Special Permit, other permits required would be the subdivision of the subject parcel, and the applicable building and related permits.

### 5 DETERMINATION WITH SUPPORTING FINDINGS AND REASONS

The proposed church is not expected to cause significant impacts to the environment, pursuant to the significance criteria established by the State Environmental Commission as discussed below. As such, a Negative Declaration was issued by the Department of Land and Natural Resources.

- \* The proposed project will not involve an irrevocable commitment to loss or destruction to any natural or cultural resources.

On the contrary, the requested project would protect

On the contrary, the requested project would protect a very critical cultural resource - the Star of the Sea Church. The site would be the new home for the church, allowing for its continued use and enjoyment.

Furthermore, the site upon which it would be located does not have any significant natural resources.

Portions of two archaeological sites, a wall and a trail, were located within the subject parcel. The location of the church, however, will not breach the two sites and will be located at the opposite end of the parcel, approximately 200 feet away from the nearest point of the wall.

- \* The proposed project will not curtail the range of beneficial uses of the environment.

The requested use would not interfere with any of the existing surrounding uses. Its noise and vehicular impacts will be negligible. Any associated drainage and wastewater requirements will be handled in a manner meeting with the requirements of the appropriate governmental agencies. Thus, environmental options for the surrounding area should still exist in spite of the church.

- \* The proposed project will not conflict with the State's long-term environmental policies.

The requested use complies with the environmental policies and standards of the State. All required improvements - wastewater and drainage - will be done in accordance with the requirements of the State and/or County. There should also be minimal impacts to air and noise quality.

- \* The proposed project will not involve substantial secondary impacts, such as population changes or effects on public facilities.

The requested use is not part of any larger project or phased development. It is intended to service the needs of an existing population. It is not a growth-inducive type of use. Furthermore, all other infrastructural facilities (water, police, etc.) are either present or will be provided by the applicant.

- \* The proposed project will not involve a substantial degradation of environmental quality.

The requested use will not involve extensive on-site improvements. Landscaping will be provided in selected areas. Thus, there should be some visual enhancement to that portion of the site cleared for the church and parking area. All other type of environmental impacts (noise, air, etc.) should be negligible.

- \* The proposed project will not substantially affect any rare, threatened or endangered species of flora or fauna or habitat.

As documented in the accompanying reports, none of the rare or endangered plant or animal life would be threatened by the requested use.

- \* The proposed project will not detrimentally affect air or water quality or ambient noise level.

The only discernible air quality impacts associated with the church would be from the vehicular traffic. The frequency and volume of traffic, however, due to the limited amount of services the church is planning, would be too small to create any appreciable impact.

Like the air impact, possible noise impacts would be due to the vehicular traffic and choir singing. Traffic volume would be insignificant, and church singing would be confined to certain days. The noise ambient level should thus not be significantly affected, particularly in light of a papaya processing plant across the street.

- \* The proposed project is not located in an environmentally sensitive area.

The project is located in a somewhat environmentally sensitive area as nearby areas have been subjected to lava flows, and this area like much of lower Puna, is also potentially vulnerable.

Nonetheless, the requested use does not involve habitation, and if need be - as in the past - the church can be physically relocated. In the meantime,

its use in the area can serve the spiritual needs of people who presently reside in the area.

## 6 FINAL ENVIRONMENTAL ASSESSMENT

A negative declaration of significant environmental impacts was expected by the proposed action by the Kalapana Star of the Sea Church. As such, a Draft Environmental Assessment was submitted to the Office of Environmental Quality Control (OEQC). Bulletin publication occurred on April 23, 1994 for public comment.

No comment was received within the thirty (30) day comment period.

Therefore, the Department of Land and Natural Resources has prepared a Negative Declaration determination for the proposed action.

This Final Environmental Assessment is submitted, with revisions, and a Negative Declaration for publication in the OEQC bulletin for comment on the Department of Land and Natural Resources' determination.

EXHIBIT A

JOHN WAIHEE  
GOVERNOR OF HAWAII



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
DIVISION OF LAND MANAGEMENT  
P.O. BOX 621  
HONOLULU, HAWAII 96809

AQUACULTURE DEVELOPMENT  
PROGRAM  
AQUATIC RESOURCES  
CONSERVATION AND  
ENVIRONMENTAL AFFAIRS  
CONSERVATION AND  
RESOURCES ENFORCEMENT  
CONVEYANCES  
FORESTRY AND WILDLIFE  
HISTORIC PRESERVATION  
PROGRAM  
LAND MANAGEMENT  
STATE PARKS  
WATER AND LAND DEVELOPMENT

May 26, 1993

Mr. Robert O. Lippi, Chief Financial Ofcr.  
ROMAN CATHOLIC CHURCH IN THE STATE OF HAWAI'I  
Chancery Office  
1184 Bishop Street  
Honolulu, O'ahu, Hawai'i 96813-2858

Ref. to: HA-93:617

Dear Mr. Lippi:

Subject: Approval in Principle for a Direct Lease to Roman Catholic Church in the State of Hawai'i on Behalf of Star of the Sea Catholic Church Covering Government Land at Kaimu, Puna, Hawai'i; Tax Map Key: 3rd Div./ 1-2-06:Portion of 33

Since our November 20, 1992 letter addressed to you, the Division of Land Management initiated an appraisal process to determine the annual lease rental for the above-captioned church site based on twenty percent (20%) of the fair market rent for church and ancillary purposes.

Ala Kai Realty, Inc. in conjunction with David Matsunami Appraisals, recently submitted an appraisal report, dated April 6, 1993, covering the relocation site of the Star of the Sea Catholic Church. On May 13, 1993 and May 18, 1993, the Chairperson and Hawai'i member of the Board of Land and Natural Resources (Land Board), State of Hawai'i, respectively, approved the appraiser's estimate of rent value based on twenty percent (20%) of the fair market rent. The 3-acre church site's lease rent for the first twenty (20) years will be \$72.00 per annum as of the date of value or October 16, 1992.

Now that the proposed direct lease's rent for the first twenty (20) years has been set by appraisal at \$72.00 per annum, please submit to the Division of Land Management the following items:

1. Required archaeological and biota studies/surveys covering the church site which are necessary for the preparation of a Draft Environmental Assessment;

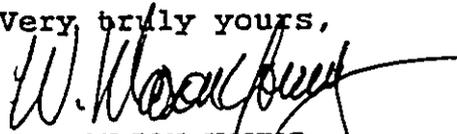
Mr. Robert O. Lippi  
(TMK: 3rd/1-2-06:Por. 33)  
Page 2.

2. Draft Environmental Assessment covering the proposed church site in conformance with Chapter 343, Hawai'i Revised Statutes, as amended, relating to Environmental Impact Statements, and Title 11, Chapter 200, Hawai'i Department of Health Administrative Rules;
3. Preliminary and approved final subdivision plat map from the County of Hawai'i Planning Department covering the subdivision of Tax Map Key: 3rd Div./1-2-06:33 for the purpose of creating a new parcel not exceeding three (3) acres of land area; and,
4. Special Use Permit from the County of Hawai'i Planning Department allowing church and other ancillary church purposes on land zoned for agricultural uses.

Please be aware that the preceding listed items must be submitted to this office prior to requesting final Land Board approval for the issuance of a direct 65-year lease to the Roman Catholic Church in the State of Hawai'i.

Should you have any questions with regards to this matter, please feel free to call Mr. Glenn Abe of our Land Management Division staff at 587-0414.

Very truly yours,



W. MASON YOUNG  
Land Management Administrator

cc: Hawai'i District Land Office  
Hawai'i Land Board Member  
J. Keppeler, II/Deputy

1. Payment of Bill  
2.

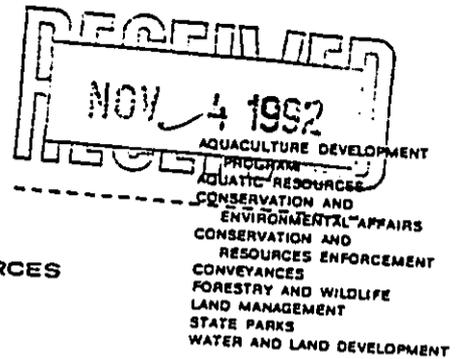
JOHN WAIHEE  
GOVERNOR OF HAWAII



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
DIVISION OF LAND MANAGEMENT

P.O. BOX 936  
HILO, HAWAII 96721-0936

October 30, 1992



Most Reverend Joseph A. Ferrario  
Bishop of Honolulu  
Roman Catholic Church in the  
State of Hawai'i  
Diocese of Honolulu  
1184 Bishop Street  
Honolulu, HI 96813-2858

Dear Bishop Ferrario:

Subject: Roman Catholic Church in the State of Hawai'i Request for Approval in Principal of a Direct Lease of Government Lands Situate at Kaimu, Puna, Hawaii

At its meeting of October 16, 1992, the Board of Land and Natural Resources, under Agenda Item F-2, (copy enclosed) did the following:

- A. Approved in principle, the direct lease of a portion of the government lands at Kaimu, Puna, Hawaii, to the Roman Catholic Church in the State of Hawai'i (Church) for the relocation of the Kalapana Star of the Sea Church, subject to certain terms and conditions;
- B. Authorized the Church, its consultants and/or parishioners to act on behalf of the State of Hawai'i, Department of Land and Natural Resources in filing for and obtaining approvals on the following:
  1. The subdivision of TMK:3rd/1-2-06:33 for the purpose of creating a new parcel, not to exceed three (3) acres, more or less; and
  2. A Special Use Permit to allow church and other ancillary church purposes on the new parcel,

Subject to certain terms and conditions; and

Most Reverend Joseph A. Ferrario  
Bishop of Honolulu  
Roman Catholic Church in the  
State of Hawai'i  
October 30, 1992  
Page 2

- C. Granted the Church, its consultants, contractors and/or parishioners a right-of-entry to TMK:3rd/1-2-06:33 (portion) for the following purposes:
1. For temporary storage of the *Kalapana Star of the Sea Church*;
  2. To locate a temporary electrical pole adjacent to the church building to facilitate the work necessary for the anticipated movement of the church building; and
  3. To conduct the required archaeological and biota studies necessary for the preparation of an environmental assessment,

Subject to certain terms and conditions.

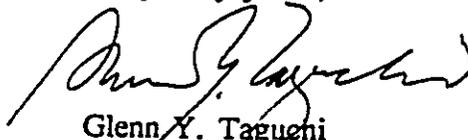
Should you concur with the terms and conditions as listed in Land Board Agenda Item F-2, meeting of October 16, 1992, please do the following:

- A. Indicate your acceptance of the terms and conditions, sign on the appropriate line and return one signed copy of the letter to this office; and
- B. Kindly remit a check for \$500 to defray the cost of having the proposed site appraised. If the cost of the appraisal is in excess of \$500, we will bill you for the balance. If it is less, we will refund you the difference. Please note, we will not commence with the appraisal till the subdivision and Special Permit process is completed and copies of the map and description have been verified by the Survey Division, Department of Accounting and General Services.

Most Reverend Joseph A. Ferrario  
Bishop of Honolulu  
Roman Catholic Church in the  
State of Hawai'i  
October 30, 1992  
Page 3

Should there be any questions, please call me at 933-4245.

Very truly yours,

  
Glenn Y. Taguchi  
Hawai'i District Land Agent

Encls.

c: Hawai'i Land Board Member  
Land Management Administrator  
John Tolmie  
Simeon Enriques ✓  
Planning Department, County of Hawai'i

\_\_\_\_\_ We accept the terms and conditions of Land Board Agenda Item F-2, meeting of  
October 16, 1992.

\_\_\_\_\_ We do not accept the conditions.

ROMAN CATHOLIC CHURCH IN THE STATE OF HAWAII

By Its: \_\_\_\_\_

Date \_\_\_\_\_

JOHN WAIHEE  
GOVERNOR OF HAWAII



RECEIVED  
DIVISION OF  
LAND MANAGEMENT  
OCT 16 11 32 AM '92

STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
DIVISION OF LAND MANAGEMENT  
P. O. BOX 521  
HONOLULU, HAWAII 96809

AQUACULTURE DEVELOPMENT  
PROGRAM  
MARINE RESOURCES  
CONSERVATION AND  
ENVIRONMENTAL AFFAIRS  
CONSERVATION AND  
RESOURCES ENFORCEMENT  
CONVEYANCES  
FORESTRY AND WILDLIFE  
LAND MANAGEMENT  
STATE PARKS  
WATER AND LAND DEVELOPMENT

October 16, 1992

Board of Land and  
Natural Resources  
Honolulu, HI 96813

HAWAII

Subject: Roman Catholic Church in the State of Hawaii  
Request for Approval in Principle of a Direct Lease  
of Government Lands Situate at Kaimu, Puna, Hawaii  
- Tax Map Key:3rd/1-2-06:33 (portion)

STATUTE:

Chapter 171-43.1, Hawaii Revised Statutes, as amended

APPLICANTS:

ROMAN CATHOLIC CHURCH IN THE STATE OF HAWAII (Church)

FOR:

Direct lease of government lands situate at Kaimu, Puna,  
Hawaii, further described as Tax Map Key:3rd/1-2-06:33  
(portion)

STATUS:

Unencumbered

SPECIFIC USE:

For the re-location of the Kalapana Star of the Sea Church and  
other ancillary church purposes.

ZONING:

State Land Use Commission: Agriculture  
County of Hawaii CZO: Agriculture - 3 acres (A-3a)

AREA:

Not to exceed three (3) acres, more or less, subject to survey  
submitted by the Church, same subject to confirmation by the  
Survey Division, Department of Accounting and General  
Services.

APPROVED BY THE  
LAND AND NATURAL  
AT ITS MEETING:

*October 16, 1992*

ITEM F-2

Board of Land and  
Natural Resources  
Direct Lease of Government  
Lands  
TMK:3rd/1-2-06:33 (por.)  
October 16, 1992  
Page 2

LAND TITLE STATUS:

Subsection 5(b) lands

LEASE TERM:

Sixty-five (65) years

ANNUAL LEASE RENTAL:

Twenty percent (20%) of the fair market annual lease rental as determined by an independent appraisal, same subject to the review and acceptance by the Chairperson.

LEASE RENTAL REOPENINGS:

At the end of the 20th, 35th and 50th years of the lease term

ENVIRONMENTAL REQUIREMENTS:

An Environmental Assessment shall be submitted to the Office of Environmental Quality Control prior to the direct issuance of lease.

REMARKS:

As a result of the lava flow from the Kupaihana Vent, the parishioners of the Kalapana Star of the Sea Church with the assistance of many concerned citizens, moved the historic painted church prior to the lava inundating the community of Kalapana. The church building has been temporarily sited on a portion of the subject property fronting the Pahoa-Kalapana Highway. After a recent meeting with the department, a core group of parishioners and a representative of the church met with County officials to discuss the requirements and conditions for the permanent relocation of the church building. The County has agreed to assist in the processing of a special use permit and the required subdivision of the subject property.

The parishioners have identified two potential sites for the permanent home of the painted-church. Both sites will be evaluated in terms of the cost of moving the Church, the presence of historical sites, the presence of endangered plant-life/wild-life, etc.

Consequently, your staff, with certain conditions is recommending the following, that the Board:

- A. Approve in principle, the direct lease of a portion of the government lands at Kaimu, Puna, Hawaii, to the Roman Catholic Church in the State of Hawaii (Church) for the relocation of the Kalapana Star of the Sea Church;

Board of Land and  
Natural Resources  
Direct Lease of Government  
Lands  
TMK:3rd/1-2-06:33 (por.)  
October 16, 1992  
Page 3

- B. Authorize the Church, its consultants and/or parishioners to act on behalf of the State of Hawaii, Department of Land and Natural Resources in filing for and obtaining approvals on the following:
  - 1. The subdivision of TMK:3rd/1-2-06:33 for the purpose of creating a new parcel not to exceed three (3) acres, more or less; and
  - 2. A Special Use Permit to allow church and other ancillary church purposes on the new parcel.
- C. Grant the Church, its consultants, contractors and/or parishioners a right-of-entry onto TMK:3rd/1-2-06:33 (portion) for the following purposes:
  - 1. For temporary storage of the Kalapana Star of the Sea Church;
  - 2. To locate a temporary electrical pole adjacent to the church building to facilitate the work necessary for the anticipated movement of the Church building; and
  - 3. To conduct the required archaeological and biota studies necessary for the preparation of an environmental assessment.

**RECOMMENDATION:**

That the Board:

- A. Approve in principle, the direct lease of a portion of the government lands at Kaimu, Puna, Hawaii, to the Roman Catholic Church in the State of Hawaii (Church) for the relocation of the Kalapana Star of the Sea Church, subject to the terms and conditions listed above in addition to the following:
  - 1. Resubmittal to the Board for final approval upon the completion of all environmental and archaeological studies, approval for the subdivision of the subject parcel and approval of the Special Use Permit;
  - 2. A sunset clause which shall expire two (2) years from the date of approval unless otherwise extended by the Board;
  - 3. Other terms and conditions as may be prescribed by the Chairperson.
- B. Authorize the Church, its consultants and/or parishioners to act on behalf of the State of Hawaii, Department of Land and Natural Resources in filing for and obtaining approvals on the following:

1. The subdivision of TMK:3rd/1-2-06:33 for the purpose of creating a new parcel, not to exceed three (3) acres, more or less; and
2. A Special Use Permit to allow church and other ancillary church purposes on the new parcel,

Subject to the following terms and conditions:

- a. The Church, its consultants and/or its parishioners shall comply with all applicable statutes, ordinances, rules and regulations of the Federal, State and County of Hawaii governments;
  - b. The Church, its consultants and/or its parishioners shall submit the above-mentioned applications for review, approval and signature by the Chairperson or his designated representative prior to submission to the authorizing agency;
  - c. All cost incurred in obtaining approvals for the above-mentioned applications shall be the sole responsibility of the Church;
  - d. A sunset clause which shall expire two (2) years from the date of approval unless otherwise extended by the Board;
  - e. Such other terms and conditions as may be imposed by the Chairperson.
- C. Grant the Church, its consultants, contractors and/or parishioners a right-of-entry to TMK:3rd/1-2-06:33 (portion) for the following purposes:
1. For temporary storage of the Kalapana Star of the Sea Church;
  2. To locate a temporary electrical pole adjacent to the church building to facilitate the work necessary for the anticipated movement of the church building; and
  3. To conduct the required archaeological and biota studies necessary for the preparation of an environmental assessment,

Subject to the following terms and conditions:

- a. All improvements shall be done by the Church at no cost or expense to the State of Hawaii or the County of Hawaii;
- b. The Church, its consultants, contractors and/or parishioners, shall procure, at its own expense, and maintain during the entire period of this right-of-entry from an insurance

company or companies licensed to do business in the State of Hawaii, a policy or policies of comprehensive public liability insurance, in an amount acceptable to the Chairperson, insuring the State of Hawaii against all claims for personal injury, death and property damage; that said policy shall cover the entire right-of-entry area, including all

improvements and grounds and all roadways or sidewalks on or adjacent to the said right-of-entry area in the control or use of the Church. The Church shall furnish a like certificate upon each renewal of such policy, each such certificate to contain or be accompanied by an assurance of the insurer to notify the State of Hawaii of any intention to cancel any such policy sixty (60) days prior to actual cancellation;

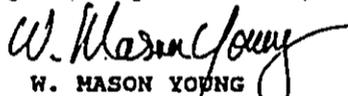
- c. The Church, its consultants, contractors, and/or parishioners shall defend, indemnify and hold the State of Hawaii harmless from and against any loss, liability, claim or demand for property damage, personal injury and death arising out of any act or omission of the Church, its consultants, officers, employees, parishioners, contractors and/or agents under this right-of-entry or relating to or connected with the granting of this right-of-entry;
- d. The Church, its consultants, contractors, and/or parishioners shall comply with all applicable statutes, ordinances, rules and regulations of the Federal, State and County of Hawaii governments;
- e. The Church, its consultants, contractors, and/or parishioners shall submit construction plans to and shall receive approval from the Chairperson prior to the commencement of any construction activity;
- f. In the event any unanticipated sites or remains such as shell, bone or charcoal deposits, human burials, rock or coral alignments, pavings or walls are encountered during this right-of-entry, the Church, its consultants, contractors and/or parishioners shall stop work and contact the State Historic Preservation Division in Honolulu at 587-0047 immediately.
- g. If historic sites are present on the new parcel, the Church, its consultants, contractors and/or parishioners, shall obtain approval of a Historic Sites Mitigation Plan

Board of Land and  
Natural Resources  
Direct Lease of Government  
Lands  
TMK:3rd/1-2-06:33 (por.)  
October 16, 1992  
Page 6

and shall submit two (2) copies of the approved plan to the Hawaii District Land Office prior to the commencement of any construction activity.

- h. Any and all heavy equipment such as bulldozers, backhoes, drilling rigs, graders, dump trucks, etc. shall be prohibited from entering onto the government land covered by this right-of-entry until completion of the environmental assessment review period and the obtaining of approval of a Historic Sites Mitigation Plan;
- i. This right-of-entry is effective for two (2) years from the date of approval unless otherwise extended by the Board;
- j. Such other terms and conditions as may be prescribed by the Chairperson which are in the best interest of the State of Hawaii

Respectfully submitted,



W. MASON YOUNG  
Land Management Administrator

APPROVED FOR SUBMITTAL:



WILLIAM W. PATY, Chairperson

EXHIBIT B

BOTANICAL SURVEY  
STAR OF THE SEA CHURCH AT KALAPANA  
TMK: 3RD/1-2-06:33 (PORTION)  
PUNA DISTRICT, ISLAND OF HAWAI'I

by

Winona P. Char  
CHAR & ASSOCIATES  
Botanical Consultants  
Honolulu, Hawai'i

Prepared for: SIDNEY FUKU & ASSOCIATES

November 1993

BOTANICAL SURVEY  
STAR OF THE SEA CHURCH AT KALAPANA  
TMK: 3RD/1-2-06: 33 (PORTION)  
PUNA DISTRICT, ISLAND OF HAWAI'I

INTRODUCTION

The State of Hawai'i proposes to lease a portion of the government lands at Kaimu, Puna, to the Roman Catholic Church in the State of Hawai'i for the relocation of the Kalapana Star of the Sea Church. This will involve the subdivision of TMK: 3rd/1-2-06: 33 into a new parcel not to exceed three acres. A Special Use Permit will need to be filed for the church and other ancillary church purposes on the new parcel.

Field studies to assess the botanical resources found on the ±3-acre parcel were conducted on 22 October 1993. The primary objectives of the survey were to: 1) describe the vegetation; 2) inventory the flora; 3) search for threatened and endangered species as well as rare and vulnerable plants; and 4) identify areas of potential environmental problems or concerns and propose appropriate mitigation measures.

SURVEY METHODS

The boundaries of the ±3-acre parcel were flagged and staked prior to the field studies. A walk-through survey method was used. Notes were made on plant associations and distribution, substrate type, moisture gradients, topography, exposure, etc. Plants which could not be positively identified were collected for later determination in the herbarium and for comparison with the most recent taxonomic literature.

## DESCRIPTION OF THE VEGETATION

The ±3-acre project site is found on a portion of the 1750 Heiheiahulu Lava Flow. The geologically recent 'a'a lava flow, mapped as "rLV" on soil maps (Sato et al. 1972), supports a medium-stature, open 'ohi'a forest. The 'ohi'a trees (Metrosideros polymorpha) are largely 20 to 30 ft. in height, with a few older, 40-foot tall specimens. Tree canopy cover is about 30% on the front end of the property facing the road, and somewhat denser, about 40% cover, on the back half of the property.

Native shrubs of 'akia (Wikstroemia sandwicensis), pukiaue (Styphelia tameiameia), and ko'oko'olau (Bidens hawaiiensis), from 2 to 12 ft. tall, are common. Introduced shrubs of guava (Psidium guajava) and Christmas berry (Schinus terebinthifolius) are occasional to uncommon.

Ground cover consists of a mixed assemblage of various ferns, grasses, herbs, and smaller shrubs found in scattered pockets, usually at the base of the 'ohi'a trees. The majority of the 'a'a flow, however, is lichen covered; the grayish-white Stereocaulon lichen forms a crusty cover. Among the native ground cover plants are the 'ala'ala wai nui (Peperomia leptostachya), huehue (Cocculus trilobus) -- a vine, many smaller ko'oko'olau seedlings, and low, rambling plants of 'ulei (Osteomeles anthyllidifolia). The introduced or alien species occur in smaller numbers throughout most of the site except along the front end of the property by the road. This area has been disturbed (bull-dozed) and supports a weedy mixture of plants which include hairy sword fern (Nephrolepis multiflora), broomsedge grass (Andropogon virginicus), Natal redtop (Rhynchelytrum repens), 'uhaloa (Waltheria indica), molassesgrass (Melinis minutiflora), partridge pea (Chamaecrista nictitans), bamboo orchid (Arundina graminifolia), and sensitive plant (Mimosa pudica).

A list of all the plants inventoried on the project site is found at the end of the report.

#### DISCUSSION AND RECOMMENDATIONS

The ±3-acre site proposed for the relocation of the Star of the Sea Church is found on a portion of the 1750 Heiheiahulu Lava Flow, an 'a'a flow. The vegetation on the lava flow and the ±3-acre site is still in the somewhat earlier stages of succession, that is, the 'a'a lava substrate is more or less unweathered and lichen-covered; a medium-stature, open-canopy 'ohi'a forest covers the flow.

None of the plants inventoried during the field survey are listed threatened and endangered species; nor are any proposed or candidate for such status (U.S. Fish and Wildlife Service 1989, 1990, 1992). None of the plants are considered rare and/or vulnerable (Wagner et al. 1990). All of the plants can be found in similar habitats throughout the Puna area.

Given the findings above, the proposed use of the site will not have a significant impact on the botanical resources. There are no botanical reasons to impose any restrictions, conditions, or impediments to its proposed use. No recommendations are offered at this time.

## PLANT SPECIES LIST

A checklist of all those terrestrial, vascular plant species inventoried on the project site during the field studies is presented below. The species are arranged alphabetically within each of three groups: Ferns and Fern Allies, Monocots, and Dicots. The taxonomy and nomenclature of the Ferns and Fern Allies are in accordance with Lamoureux (1988); the flowering plants, Monocots and Dicots, follow Wagner *et al.* (1990).

For each species, the following information is provided:

1. Scientific name with author citation.
2. Common English and/or Hawaiian name, when known.
3. Biogeographic status. The following symbols are used:
  - E = endemic = native only to the Hawaiian Islands
  - I = indigenous = native to the Hawaiian Islands and also elsewhere throughout the Pacific
  - X = introduced or alien = all those plants brought to the Hawaiian Islands by humans, intentionally or accidentally, after Western contact (Cook's discovery of the islands in 1778); not native.

| <u>Scientific name</u>                              | <u>Common name</u>             | <u>Status</u> |
|---|--------------------------------|---------------|
| <b>FERNS &amp; FERNS ALLIES</b>                     |                                |               |
| NEPHROLEPIDACEAE (Sword Fern Family)                |                                |               |
| Nephrolepis cordifolia (L.)<br>Presl.               | ni'ani'au                      | I             |
| Nephrolepis multiflora<br>(Roxb.) Jarrett ex Morton | hairy sword fern               | X             |
| POLYPODIACEAE (Common Fern Family)                  |                                |               |
| Phymatosorus scolopendria<br>(Burm.) Pic.-Ser.      | laua'e, lauwa'e                | X             |
| PSILOTACEAE (Whisk Fern Family)                     |                                |               |
| Psilotum nudum (L.) Beauv.                          | moa, pipi                      | I             |
| <b>FLOWERING PLANTS</b>                             |                                |               |
| <b>MONOCOTS</b>                                     |                                |               |
| ORCHIDACEAE (Orchid Family)                         |                                |               |
| Arundina graminifolia (D. Don)<br>Hochr.            | bamboo orchid                  | X             |
| Spathoglottis plicata Blume                         | Philippine ground<br>orchid    | X             |
| POACEAE (Grass Family)                              |                                |               |
| Andropogon virginicus L.                            | broomsedge                     | X             |
| Melinis minutiflora P. Beauv.                       | molassesgrass                  | X             |
| Rhynchelytrum repens (Willd.)<br>Hubb.              | Natal redtop                   | X             |
| Schizachyrium condensatum<br>(Kunth) Nees           | little bluestem,<br>beardgrass | X             |
| Setaria gracilis Kunth                              | yellow foxtail                 | X             |
| <b>DICOTS</b>                                       |                                |               |
| ANACARDIACEAE (Mango Family)                        |                                |               |
| Schinus terebinthifolius<br>Raddi                   | Christmas berry                | X             |
| ARALIACEAE (Ginseng Family)                         |                                |               |
| Schefflera actinophylla (Endl.)<br>Harms            | octopus tree                   | X             |

| <u>Scientific name</u>  | <u>Common name</u>                | <u>Status</u> |
|---|-----------------------------------|---------------|
| ASTERACEAE (Daisy Family)                                     |                                   |               |
| Ageratum conyzoides L.  | maile hohono                      | X             |
| Bidens hawaiiensis A. Gray                                    | ko'oko'olau                       | E             |
| Crassocephalum crepidioides<br>(Benth.) S. Moore              | crassocephalum                    | X             |
| Pluchea symphytifolia (Mill.)<br>Gillis                       | pluchea                           | X             |
| EPACRIDACEAE (Epacris Family)                                 |                                   |               |
| Styphelia tameiameia (Cham.<br>& Schlechtend.) F.v. Muell.    | pukiawe                           | I             |
| EUPHORBIACEAE (Spurge Family)                                 |                                   |               |
| Chamaesyce hirta (L.) Millsp.                                 | hairy spurge                      | X             |
| Chamaesyce hypericifolia<br>(L.) Millsp.                      | graceful spurge                   | X             |
| Phyllanthus debilis Klein<br>ex Willd.                        | niruri                            | X             |
| FABACEAE (Pea Family)   |                                   |               |
| Chamaecrista nictitans (L.)<br>Moench                         | partridge pea,<br>lauki           | X             |
| Desmodium incanum DC.   | Spanish clover, ka'imi            | X             |
| Desmodium tortuosum (Sw.) DC.                                 | Florida beggarweed                | X             |
| Desmodium triflorum (L.) DC.                                  | three-flowered beggar-<br>weed    | X             |
| Mimosa pudica var. unijuga<br>(Duchass. & Walp.) Griseb.      | sensitive plant, pua-<br>hilahila | X             |
| LAMIACEAE (Mint Family)                                       |                                   |               |
| Plectranthus parviflorus Willd.                               | spur flower                       | I             |
| MENISPERMACEAE (Moonseed Family)                              |                                   |               |
| Cocculus trilobus (Thunb.) DC.                                | huehue                            | I             |
| MYRTACEAE (Myrtle Family)                                     |                                   |               |
| Metrosideros polymorpha var.<br>incana (H. Lev.) St. John     | 'ohi'a, 'ohi'a lehua              | E             |
| Metrosideros polymorpha var.<br>glaberrima (H. Lev.) St. John | 'ohi'a, 'ohi'a lehua              | E             |
| Psidium cattleianum Sabine                                    | strawberry guava                  | X             |
| Psidium guajava L.  | guava, kuawa                      | X             |
| PIPERACEAE (Pepper Family)                                    |                                   |               |
| Peperomia leptostachya Hook.<br>& Arnott                      | 'ala 'ala wai nui                 | I             |

| <u>Scientific name</u>  | <u>Common name</u>                         | <u>Status</u> |
|---|--|---------------|
| ROSACEAE (Rose Family)<br>Osteomeles anthyllidifolia (Sm.)<br>Lindl.                        | 'ulei, u'ulei                              | I             |
| RUBIACEAE (Coffee Family)<br>Spermacoce mauritiana Gideon                                   | spermacoce                                 | X             |
| STERCULIACEAE (Cacao Family)<br>Melochia umbellata (Houtt.)<br>Stapf<br>Waltheria indica L. | melochia<br>'uhaloa, hi'aloa,<br>kanakaloa | X<br>I?       |
| THYMELAEACEAE ('Akia Family)<br>Wikstroemia sandwicensis<br>Meisn.                          | 'akia                                      | E             |
| VERBENACEAE (Verbena Family)<br>Lantana camara L.   | lantana, lakana                            | X             |

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EXHIBIT C

SURVEY OF THE AVIFAUNA AND FERAL MAMMALS AT A PROPOSED  
RELOCATION SITE FOR STAR OF THE SEA CHURCH, TMK 1-2-06:  
PORTION OF 33, KALAPANA, PUNA, HAWAII

Prepared for  
Sidney Fuke & Associates

by

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22 October 1993

## INTRODUCTION

The purpose of this report is to provide the findings of a one day (19 October 1993) bird and mammal field survey of approximately three acres located at TMK: 1-2-06: Portion of 33, Kalapana, Puna, Hawaii (Fig. 1). Also included are references to pertinent literature as well as unpublished reports.

The objectives of the field survey were to:

- 1- Document what bird and mammal species occur on the property or may likely be found there given the available habitats.
- 2- Provide some baseline data on the relative (estimated) abundance of each species.
- 3- Determine the presence or likely occurrence of any native fauna particularly any that are considered "Endangered" or "Threatened".
- 4- Examine the value of the site for native wildlife.

#### GENERAL SITE DESCRIPTION

Figure 1 indicates the location of the three acre site. The topography is relatively level. Ohia (Metrosideros polymorpha) is the dominant tree on the property as well as on the adjoining lands. Agricultural fields of papaya are found across the highway to the west. No wetlands occur on the property. An old (Hawaiian?) trail constructed of flat interlaced rocks crosses the east end of the property.

Weather during the field survey was cloudy. Winds were easterly at 15 mph.

#### STUDY METHODS

Field observations were made with the aid of binoculars and by listening for vocalizations. These observations were concentrated during the peak bird activity periods of early morning and late afternoon. At various locations (see Fig. 1) eight minute counts were made of all birds seen or heard. Between these count (census) stations any unusual observations of birds were also noted. These data provide the basis for the relative (estimated) abundance figures given in this report (Table 1). Published and unpublished reports of birds were also consulted in order to acquire a more complete picture

of the possible species that might occur in the area (Pratt et al. 1987; Hawaii Audubon Society 1989; Bruner 1992).

Scientific names used in this report follow those given in Hawaii's Birds (Hawaii Audubon Society 1989); A field guide to the birds of Hawaii and the Tropical Pacific (Pratt et al. 1987); Mammal species of the World (Honacki et al. 1982) and Trees of Hawaii (Kepler 1990).

### RESULTS AND DISCUSSION

#### Resident Endemic (Native) Land Birds:

A light phase adult Hawaiian Hawk ('Io) (Buteo solitarius) was found on the property during the morning portion of the survey. This bird followed, flying from tree to tree, as I moved through the eastern end of the site. Several times it perched as close as ten feet from where I stood. 'Io are endangered and occur only on the island of Hawaii. They are, however, fairly common around Hilo and in the district of Puna. A careful search of the entire project site and portions of nearby lands failed to locate any 'Io nest. Whether or not this individual was territorial in this area or was just passing through could not be determined on this brief survey.

Apapane (Himatione sanguinea) are one of the two most common native Honeycreepers. This is a group of birds that evolved in Hawaii and are one of the best examples of the evolutionary process known as adaptive radiation. They feed on nectar and insects. Ohia trees are an important foraging resource for Apapane. An average of five Apapane were tallied at each census station (Fig. 1) during the morning survey and an average of two were counted on each census station in the afternoon. This species is not endangered.

Two other native species not recorded, but potentially capable of occurring at this location, are the Short-eared Owl or Pueo (Asio flammeus sandwichensis) and the Common Amakihi (Hemignatus virens). Pueo are listed by the State of Hawaii as endangered on the island of Oahu but not elsewhere. Common Amakihi are the most abundant of the surviving Hawaiian Honeycreepers.

Waterbirds:

No waterbirds were recorded. Wetland habitat suitable for waterbirds does not exist on this property.

Migratory Indigenous (Native) Birds:

No open habitat suitable for migratory shorebirds such as Pacific Golden Plover (Pluvialis fulva) occurs at this site. If large lawn

areas are created as part of the proposed development plover may eventually establish "winter" foraging territories (Johnson et al. 1981).

Exotic (Introduced) Birds:

A total of six species of exotic birds were recorded during the field survey. Table One shows their relative abundance. The most numerous were House Finch (Carpodacus mexicanus) also known locally as "Papayabird" and Japanese White-eye (Zosterops japonicus). Based on the location and type of habitat at this site other exotic birds that could occur in this area include: Barn Owl (Tyto alba) and Nutmeg Mannikin (Lonchura punctulata).

Feral Mammals:

No mammals were seen on the survey. Small Indian Mongoose (Herpestes auropunctatus) and feral cats as well as rats and mice likely occur in this area.

Records of the endemic and endangered Hawaiian Hoary Bat (Lasiurus cinereus semotus) are reported from Hilo and Puna (Tomich 1986; Kepler and Scott 1990). None were observed on this field survey but potentially could occur at this site. This species forages on insects and roosts solitarily in trees and occasionally lava tubes.

### CONCLUSION

A brief field survey can provide only a limited perspective. Not all species that occur in the area will necessarily be observed and information on the occurrence of birds at the site must be gathered from brief observations and the available literature. The number of species and the relative abundance of each species may vary throughout the year as well as from year to year due to available food resources and reproductive success (Williams 1987; Moulton et al. 1990). Thus only long term studies can provide a comprehensive view of the bird and mammal populations in a particular area.

The following are some general conclusions related to bird and mammal activity on this property.

- 1- The entire site was covered on foot as well as portions of nearby lands. Census data were obtained during both early morning and late afternoon.
- 2- Two endemic (native) birds were recorded. Apapane (a non-endangered Hawaiian Honeycreeper) and 'Io (the endangered Hawaiian-Hawk).

Apapane were relatively abundant. The 'Io recorded was a light phase adult bird. No 'Io nest was found and it was not possible to tell on such a brief survey if the 'Io was a resident territorial bird at this location or was just passing through the area as it foraged. Two other native landbirds could occur in this area the Pueo and the Common Amakihi. Neither are listed as endangered on the island of Hawaii.

- 3- No migratory shorebirds or resident waterbirds were recorded or are likely to occur on this site due to an absence of suitable habitat.
- 4- The list of exotic species found on the survey was typical of what would be expected for this habitat at this elevation and in this region of the island. Some species which may occur in this area were not recorded. House Finch were abundant perhaps in part due to the nearby papaya fields. This species has been called Papayabird in Hawaii and does some damage to this crop.
- 5- No feral mammals were found on the survey. The endangered and endemic (native) Hawaiian Hoary Bat could occur in this area.

- 6- The patches of native Ohia forest in the Puna district are important foraging resources for native lands birds such as Apapane and Amakihi. 'Io also forage in native forest but will utilize agricultural lands and disturbed second growth habitat. Some habitat for native birds will be lost due to development of this property. Given the size of the site, however, it is not likely that this loss will have direct measurable effect on Apapane populations in the Puna district. However, as each patch of native forest disappears the long term result will be a constriction of the useable habitat for native birds and a decline in their populations.

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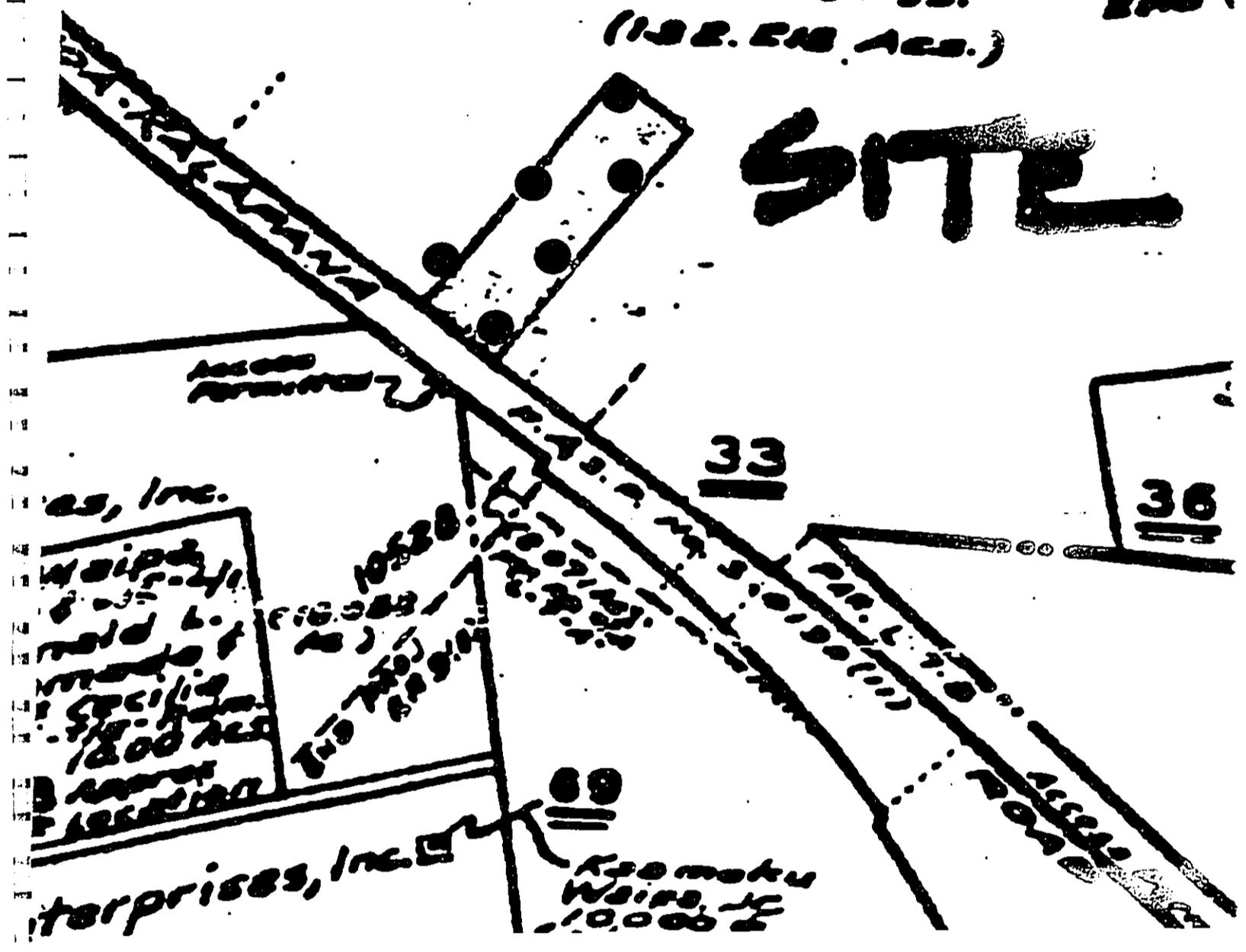


Fig. 1 Location of faunal survey with census stations shown as solid circles.

TABLE 1

Exotic (introduced) birds recorded at TMK 1-2-06: Portion of 33, Kalapana, Puna, Hawaii

| COMMON NAME        | SCIENTIFIC NAME               | RELATIVE ABUNDANCE* |
|--------------------|-------------------------------|---------------------|
| Spotted Dove       | <u>Streptopelia chinensis</u> | U = 2               |
| Zebra Dove         | <u>Geopelia striata</u>       | C = 6               |
| Common Myna        | <u>Acridotheres tristis</u>   | U = 2               |
| Northern Cardinal  | <u>Cardinalis cardinalis</u>  | U = 2               |
| Japanese White-eye | <u>Zosterops japonicus</u>    | A = 10              |
| House Finch        | <u>Carpodacus mexicanus</u>   | A = 13              |

KEY TO TABLE 1

\* Relative (estimate) abundance = Number of times observed during survey or average number on eight minute counts.

A = abundant (ave. 10+)

C = common (ave. 5-10)

U = uncommon (ave. less than 5)

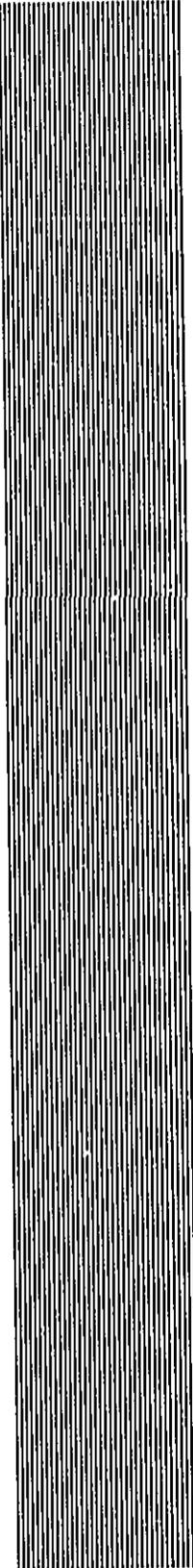
R = recorded (seen or heard at times other than on 8 min. counts or on one count only). Number which follows is the total number seen or heard over the duration of the survey.

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EXHIBIT D

Report 1327-110593



## Archaeological Inventory Survey Kalapana Star of the Sea Church

Lands of Kaimū and Makena  
Puna District, Island of Hawai'i

**PHRI**

Paul H. Rosendahl, Ph.D., Inc.

*Archaeological • Historical • Cultural Resource Management Studies & Services*

# Archaeological Inventory Survey Kalapana Star of the Sea Church

Lands of Kaimū and Makena  
Puna District, Island of Hawai'i  
(TMK:1-2-06:Por.33)

BY

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Kepā Maly • Cultural Resources Specialist*

PREPARED FOR

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DECEMBER 1993

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## SUMMARY

At the request of Sidney Fuke & Associates, on behalf of their client, the Kalapana Star of the Sea Church, Paul H. Rosendahl, Ph.D., Inc. (PHRI) recently conducted an archaeological inventory survey of the approximately three-acre Kalapana Star of the Sea Church proposed site. The site is located in the Lands of Kaimū and Makena, in the Puna District of the Island of Hawai'i. The ground survey portion of this project was conducted on September 25, 1993. Site recording was conducted on October 15 and 22, 1993.

During the field work, two single-component sites, a trail and a wall, were identified. The features were assigned the respective functional types of transportation and boundary.

One site identified during the current project (Site 19061, boundary wall) is assessed as significant solely for information content. No further work is recommended for this site. While preservation of this site is not required, it is suggested that it be considered for incorporation into development landscaping. The second site (Site 19060, a trail) is assessed as significant for information content, as an excellent example of a site type on the local level, and for cultural significance. Further data collection followed by preservation with interpretive development is recommended for this site, although a portion of this site may be "breached" to allow access to the remainder of the property.

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-

# INTRODUCTION

## BACKGROUND

At the request of Sidney Fuke & Associates on behalf of their client, the Kalapana Star of the Sea Church, Paul H. Rosendahl, Ph.D., Inc. (PHRI) recently conducted an archaeological inventory survey of the approximately three-acre Kalapana Star of the Sea Church proposed site. The site is located in the Lands of Kaimū and Makena, in the Puna District of the Island of Hawai'i. The overall objective of the survey was to provide information sufficient for satisfying all historic preservation regulatory review requirements of the Hawaii County Planning Department (HCPD) and the Department of Land and Natural Resources - State Historic Preservation Division (DLNR-SHPD).

The ground survey portion of this project was conducted by Projects Supervisor Leta Franklin, M.A. on September 25, 1993. Site recording was conducted on October 15 and 22, 1993 by Ms. Franklin and Cultural Resources Specialist Kepā Maly. The field work took approximately four labor-hours to complete. Principal Archaeologist Dr. Paul H. Rosendahl provided overall guidance for the project.

## SCOPE OF WORK

The basic purpose of an archaeological inventory survey is to identify—to discover and locate on available maps—all sites and features of potential archaeological significance present within a specified project area. An inventory survey is the initial level of archaeological investigation. It is extensive rather than intensive in scope, and is conducted primarily to determine the presence or absence of archaeological resources. A survey of this type indicates both the general nature and variety of archaeological remains present and the general distribution and density of the remains. It permits a general significance assessment of the archaeological resources and assists in the formulation of recommendations and estimates for any subsequent mitigation work that might be necessary or appropriate. Such mitigative work could include further data collection involving detailed recording of sites and features, and selected test excavations; in addition, mitigation could include further data-recovery excavations, construction monitoring, interpretive planning and development, and/or preservation of sites and features with significant scientific research, interpretive, and/or cultural values.

The objectives of the present survey were fourfold: (a) to identify (find and locate) all sites and site complexes present within the project area; (b) to evaluate the potential general significance of all identified archaeological remains; (c) to determine the possible impacts of proposed development upon the identified remains; and (d) to define the general scope of any subsequent further data collection and/or other mitigation work that might be necessary or appropriate.

Based on a review of readily available background literature, on familiarity with the project area and its vicinity, and based on extensive familiarity with the current requirements of review authorities, the following specific tasks were determined to constitute an appropriate scope of work for the inventory survey:

1. Review archaeological and historical literature relevant to the project area, and conduct limited historical documentary research (emphasis on readily available literature and documentary sources);
2. Conduct 100% ground survey of the project area;
3. Conduct limited subsurface testing of selected sites and features identified within the project area (a) to determine the presence or absence of potentially significant buried cultural features or deposits, and (b) to obtain suitable samples for age determination analyses;
4. Analyze field and historical research data, and prepare report.

The inventory survey was carried out in accordance with the standards for inventory-level survey recommended by the DLNR-SHPD. The significance of the archaeological remains identified in the project area was assessed in terms of (a) the National Register criteria contained in the Code of Federal Regulations (36 CFR Part 60), (b) the criteria for evaluation of traditional cultural values prepared by the National Advisory Council on Historic Preservation, and (c) PHRI Cultural Resource Management (CRM) value modes. All of the above criteria are discussed in detail in the Conclusion section.

## PROJECT AREA DESCRIPTION

The project area consists of a c. three-acre parcel (c. 130 ft AMSL), lying c. 1.1 km (0.7 mile) inland from coastal Kaimū. The parcel is bordered on the west by Highway 130 the Paho-Kalapana Road (Figure 1). An old graded strip crosses a portion of the parcel adjacent to the road. The local terrain is of the Kalapana Undissected Upland physiographic type (def. slopes with little or no surface drainage, Armstrong 1983:37). Annual rainfall in this area averages 75 to 100 inches (Armstrong 1983:27). The parcel itself lies on the AD 1750 Heiheiiahulu aa lava flow (Holcomb 1987:320), the lava flow that formed the Black Sand Beach at Kaimū (Macdonald and Abbott 1970:44, 52), a beach that was, until recently, a popular tourist destination. According to the U.S. Department of Agriculture (Sato et al. 1973:34, Map Plate 162), the soil type in the area of this flow is "Lava Flows, Aa"—lava that is largely bare of soil and covered only with sparse vegetation, consisting of mosses, lichens, ferns, and 'ohi'a lehua (*Metrosideros polymorpha*, *Metrosideros collina*). Figure 2, a photo providing an overview of the project area shows the typical vegetation in the project area.

The AD 1750 flow covered two soil types categorized by Sato et al. (1973:Map Plates 147, 162). These are: Punaluu extremely rocky peat, or "well-drained thin organic soils over pahoehoe lava bedrock" (Sato et al. 1973:48)—typically black peat 4" (10.2 cm) deep, and Malama extremely stony muck, or "well-drained, thin, extremely stony organic soils over aa lava" (Sato et al. 1973:37)—typically about 3" (7.6 cm) deep. Age of the lava bedrock under these soils is 1,500 to 10,000 years BP (Holcomb 1987:269, Figure 12.5g).

Atkinson (1970) describes the vegetation community in the project area as *Metrosideros* Treeland (tree-dominated vegetation with a canopy cover of less than 80%). Secondary species within the project area include scattered 'ākia (*Wikstroemia* sp.), ko'oko'olau (*Bidens* sp.), pukiawe (*Styphelia tameiameia* [(Cham.) F]), and kupukupu or nianiau (sword fern) (*Nephrolepis* spp.). Several herbaceous species, including 'ala'ala wai nui kane (*Peperomia*





Figure 2. Overview of Project Area Showing Typical Vegetation, View to East (4555-5)

spp.) and *laua'e*, or maile-scented fern (*Microsorium scolopendria* (Burm.)), are scattered in the shaded areas. Introduced species include Chinese or Philippine ground-orchids (*Phaius tankervilleae* [Banks] Bl.), grass (*Andropogon* sp.), Christmas-berry (*Schinus terebinthifolius* Raddi), and strawberry guava (*Psidium cattleianum* Sabine).

During an investigation into successional trends of vegetation within lava-flow ecosystems, Atkinson (1970) studied the lava flow on which the project area is located. (His sample transect—1750L—was located across the highway from the present project area, in an area 300 ft above sea level. Highland areas on this same flow (i.e., 900 ft. elevation) possess a more developed vegetation community, with less area in bare lava and overall greater soil development. This difference is largely a factor of greater annual rainfall at the higher elevation.

The project area is situated in the *ahupua'a* of Kaimū (translated as "Ocean gathering") in the district of Puna, on the southeastern shore of the island of Hawai'i. In both prehistoric and recent times, this portion of Puna District has experienced significant changes as a part of the volcanic activities of the east rift zone of Kilauea Volcano. In 1983, an eruption began in the uplands of Kahauale'a, to the south of Kaimū, and over the last 11 years, lava flows from that eruption have covered much of the greater Kalapana region and have inundated coastal Kaimū.

The coast of Puna has also been subject to severe subsidence resulting from earthquakes and landslides (the collapse of coastal lava into the ocean). While the project area is too far inland to have been affected by the subsidence, the coastlines of the *ahupua'a* of Kaimū and Makena have been affected severely. In his description of lower Puna to Pulama, Alfred Hudson (1932:337-338) discusses several relevant accounts:

The whole coastline and particularly the northern part around Kapoho is subject to marked seismological changes. Brigham [1909:112] quotes a letter from Coan of August, 1868 explaining that after the earthquake of the year the "...subsidence along the coast of Puna, from the east cape at Kapoho to Apua on the western line, is four to seven feet..." Whitney [1890:64] says:

"During the great earthquakes of 1868, the whole southern coast of Puna was lowered. Traces of this may be seen in the stumps of cocoanut trees which are left sticking up amid the constant surf."

Cobb [1902:430] writes that fishponds at Kapoho were sunk by subsidence in this year.

A further subsidence, though limited to the area around Kapoho, occurred in April, 1924. Jagger [1924:20] describes a result of the subsidence—a new lagoon at Kapele—as extending 200 feet inland and being from 6 to 8 feet deep. Coconut trees which were formerly 175 feet inland stood in 8 feet of water.

## PREVIOUS ARCHAEOLOGICAL RESEARCH

### **Early Surveys**

Thrum (1908) recorded one *heiau* within the *ahupua'a* of Kaimū and Makena: Kumakaula. This site was described by Thrum (1908:39) as:

... a medium sized heiau of unknown class, a part of which only now remains. It was an ancient temple of the "truncated pyramidal" type, but destroyed in the fifties [1850s] by one Kahuluhulu and his father, for their house site. In early years the tide came up to its base, and at its front was the noted place for akule. It is now one-eighth mile from the sea, the main road running by it, although this coast line for quite a distance subsided in 1868.

In 1919, Stokes (Stokes and Dye 1991:147) supplemented Thrum's description of Kumakaula heiau as follows:

Situated on Kaimu Bay, 200 feet from the sea, on the north side of the road. Hakuma benchmark bears  $34^{\circ} 23'$ , 6517 feet.

This heiau is practically demolished, although enough stones remain in place to show that it had been a terrace, level with the ground at one end and 10 feet high at the other. Measurements of only two sides were possible, as follows: beginning at what may have been the northern corner and running by true azimuth  $335^{\circ} 15'$ , 131 feet, thence  $61^{\circ}$ , 30 feet. This is the heiau referred to by Fornander as the best preserved specimen of the truncated pyramidal form [1969,2:6]. I believe that Fornander confused this site with that of Mahinaakaaka at Keahialaka, 10 miles to the northeast. The heiau of Kumakaula was certainly a terrace. No local history.

Hudson (1932:398-399) recorded three sites within the lands of Kaimū and Makena. He visited Kumakaula heiau (his Site 162; State Site 6211) describing it as "built mostly of aa chunks with occasional sea-worn boulders which may have been used for paving." At the time, the structure was "pitted with hole where the surface had been dug up" (1932:399). This suggests that the heiau had probably been looted. He described the condition of the site, noting that, as of 1932, most of the original structure of Kumakaula heiau had been destroyed, and that (1932:398-399):

The chief feature remaining to-day is the badly disturbed platform built on the summit of a natural elevation with some artificial buttressing on the north side. The platform is about 30 feet above the level of the road and 40 feet wide at the top. It is impossible to say how far inland it extended; it is built back solidly for 45 feet and then gradually dwindles away with loose stones scattered about. However, it is possible to trace the retaining wall on the north side back for 100 feet which gives an indication of the original extent. There are no clear limits on the south except those of the natural slope.

Hudson (1932:393) spoke with Mrs. Dan Kamelamela who told him "there was formerly a heiau named Kahiauauili in Kaimu-Makena about a quarter of a mile east of the north end of Kaimu Beach and 200 feet seaward of the Kalapana-Kapoho road." Hudson was not able to locate this site, and noted that there were no archaeological remains in the area he described.

Hudson's Site 160 "...is a spring of brackish water stoned up around the sides in the form of a well" (1932:395). This site was located c. 50 feet inland on the point that lies to the north of Kaimū Beach. Hudson observed that "the stone work appears to have been recently rebuilt" (1932:395). Site 161 adjoins the well along its north side. Hudson (1932:396) describes it as "a complex maze of low walls, small pens, and one terraced platform 15 feet square built into the side of a lava ledge."

### Recent Archaeological Research

Ten archaeological reconnaissance surveys and eight inventory-level surveys have been conducted within the lands of Kaimū and Makena and in nearby *ahupua'a*. These surveys are summarized in *Table 1*. Of these surveys, twelve surveys comprising eight studies were undertaken within the lands of Kaimū and Makena.

*Table 1. Recent Archaeological Research*

| Year  | Researcher                 | Lands  | Level of Study                    |
|-------|----------------------------|--|-----------------------------------|
| 1972  | Bevacqua and Dye           | All lands from Kapoho to Kalapana              | Reconnaissance survey             |
| 1974  | Ching, Stauder, and Palama | Kalapana and Kaimū                             | Inventory survey                  |
| 1975  | Barrera                    | Kupahua  | Inventory survey                  |
| 1976  | Palama                     | Kalapana and Kaimu                             | Inventory survey                  |
| 1977  | Palama and Bordner         | Kalapana and Kaimu                             | Reconnaissance survey             |
| 1977  | Bordner                    | Kalapana and Kaimū                             | Reconnaissance survey             |
| 1978  | Bordner                    | Kalapana and Kaimu                             | Inventory survey                  |
| 1981  | Barrera                    | Kalapana                                       | Reconnaissance survey             |
| 1981  | Soehren                    | Kalapana                                       | Inventory survey                  |
| 1983  | Rosendahl                  | Kaimu and Makena, Kaimu-Makena homesteads      | Preliminary reconnaissance survey |
| 1985a | Walker and Rosendahl       | Kalapana and Kaimu                             | Reconnaissance survey             |
| 1985b | Walker and Rosendahl       | Kalapana and Kaimu                             | Inventory survey and testing      |
| 1985c | Walker and Rosendahl       | Kalapana and Kaimu                             | Inventory survey                  |
| 1985  | Yent                       | Kalapana                                       | Reconnaissance survey             |
| 1988  | Bonk                       | Kaimu and Makena                               | Reconnaissance survey             |
| 1990  | Bonk                       | Kaimu, Makuu, Kahohe, Kehena, Kaapahu, Kamaili | Reconnaissance survey             |
| 1992  | Neller                     | Kikala-Keokea                                  | Reconnaissance survey             |
| 1992  | Spear                      | Kaimu  | Inventory survey                  |

First, in a survey for the proposed Kapoho-Kalapana Highway, Bevacqua and Dye (1972) found one site (State 2547) within the *ahupua'a* of Kaimū and Makena: a Hawaii state cemetery with c. 200 graves (the Kaipuelelu cemetery). This cemetery was established in 1933, although the cemetery was in use prior to being officially designated. Most graves lie within platforms constructed of aa cobbles and boulders.

Second, Ching, Stauder, and Palama (1974) and Palama (1976) conducted archaeological surveys for the proposed Kaimū-Kalapana Beach Park improvements, recording eleven sites within the lands of Kaimū and Makena. These include two cisterns (6205, 6206); Kumakaula *heiau* (6211) and a possibly related habitation complex (6210); two trails (6212—a steppingstone trail located northeast of Kumakaula *heiau*, and 6221—a wide historic trail); four walls (6207, 6208, 6209, 6220); and one flat, cleared area with deep soil deposits and lacking architecture; it may have once been taro fields (6222).

Next, surveys for the proposed Kaimū-Chain of Craters Road (Bordner 1977, 1978) located one site within the lands of Kaimū and Makena: State Site 6454, an agricultural complex comprising 80+ mounds and 33 short wall-sections.

Fourth, Palama and Bordner (1977) surveyed the proposed emergency escape road corridor through Kalapana and Kaimū, locating two sites in Kaimū: 6280 (a wall) and 6282 (a house complex; Features A & B lie in Kaimū—the remaining portions of this site lie in Kalapana). Walker and Rosendahl (1985a, 1985b, 1985c) conducted additional recording and evaluative work at Site 6282 as part of mitigative work for the Kalapana Store Powerline Extension Corridor. Because Walker and Rosendahl recommended the site for further work, no test excavations were undertaken at this phase of the investigations. The site was destroyed by lava flows in 1990.

M.L.K. Rosendahl (1983) performed a reconnaissance survey that included the c. three acres comprising the present project area. Rosendahl located one site within the current project area, a trail paved with pahoehoe slabs. No permanent SIHP number was assigned at the time, because the investigation was only a preliminary reconnaissance survey. An isolated platform (possible burial function) was noted in the parcel of land adjacent to the southwest side of the project area. As shown in her letter report, the platform appears to lie in an area on the same side of the road as the project area, directly off the road from where the Kalapana Star of the Sea Church has stood since 1990.

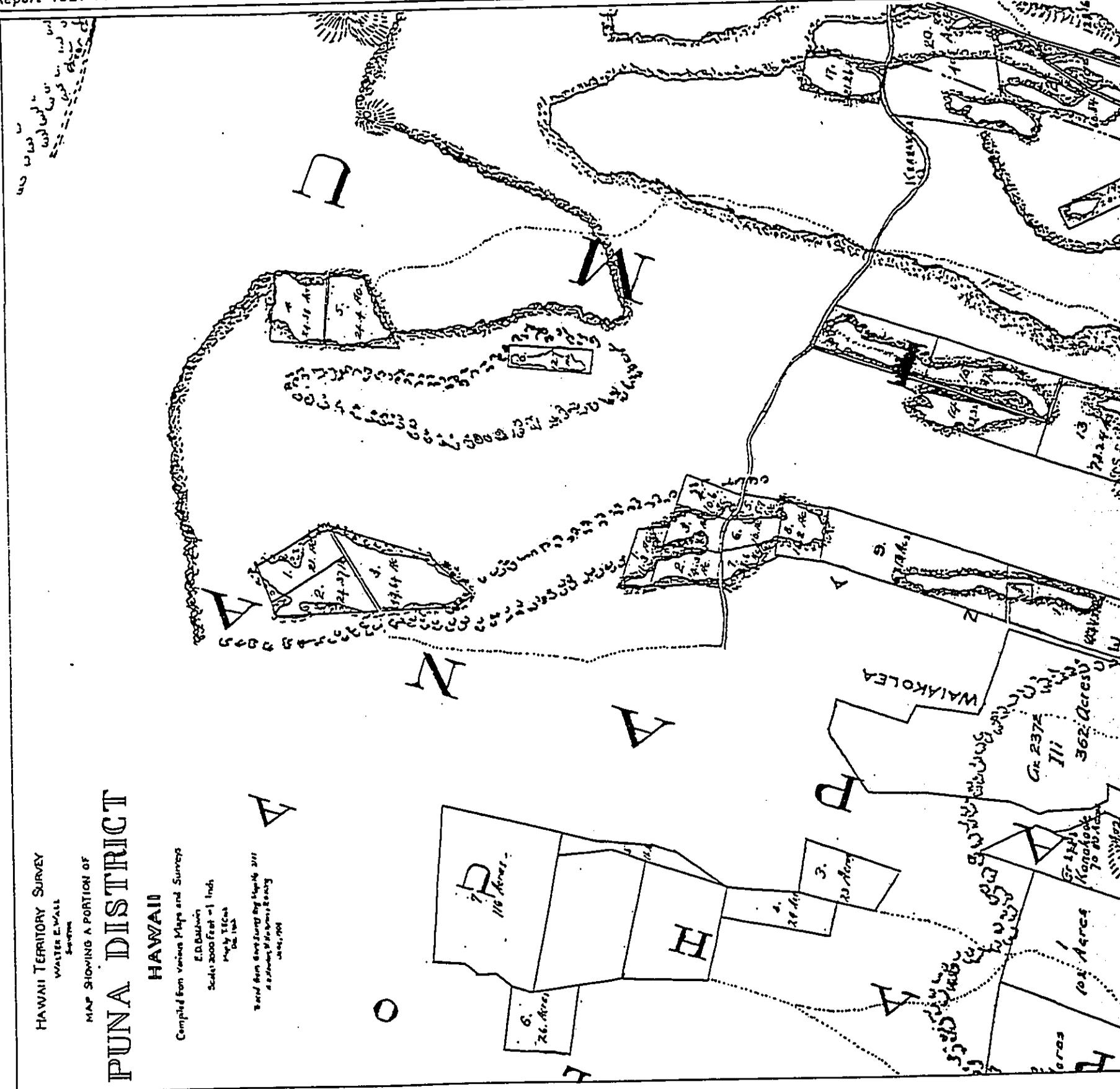
The last two studies were reconnaissance surveys conducted by Bonk in the upland portion of Kaimū (Bonk 1988, 1990), which resulted in negative findings of archaeological resources, and a survey by Spear (1992) that covered a 3.8 acre parcel near the ocean, a parcel that is bounded on one side by the AD 1750 aa flow. Four sites were found: a C-shape (Site 18525), a C-shape and a mound (18526), a wall (18527), and a modified lava blister (18528). The findings suggested temporary habitation and limited agricultural activities in the area.

## HISTORICAL DOCUMENTARY RESEARCH

The following section is a limited overview of legendary and historical references for the Kaimū project area, including Land Commission Award (LCA) records, and readily available previous archaeological or ethnographic studies. The section provides information on (a) the prehistoric environment and settlement in the region, (b) use of land and ocean resources, and (c) changes in land use and in the environment following western contact.

In ancient times, the Kaimū-Kalapana area was an important population center in Puna, and there are several legendary accounts that describe the nature of the ancient communities. Legendary references indicate that prior to the c. AD 1750 lava flow the project area may have been inhabited by people engaged in various types of dryland agriculture. Records from the Māhele (Division of Lands) of 1848, which allowed native tenants to acquire homesteads in fee simple, and records from the Hawaiian Homestead Act of 1884, support these possible land uses in areas surrounding the project area.

As noted in the discussion of previous archaeological work, a trail paved with slabs of pahoehoe crosses the southeastern portion of the project area (see Figures 3 and 4; also, Rosendahl 1983). The section of the trail within the project area is an offshoot of what appears to be the main *mauka-makai* trail of Kaimū *ahupua'a*. This section of the trail continues east into the uplands, running through the 'ili (land parcel) of Mokuhulu. It is well documented in both legendary and historic-period references that throughout Puna, coastal-zone residents maintained agricultural parcels in the uplands, which they reached by trails.



HAWAII TERRITORY SURVEY

WALTER E. WALL  
Surveyor

MAP SHOWING A PORTION OF

# PUNA DISTRICT

## HAWAII

Compiled from various Maps and Surveys

E. D. BASHAM

Scale: 3000 feet = 1 inch

Map by T. E. C. C.

Dec. 1924

Based from surveying by Joseph H. III

of the Hawaiian Survey

1891, 1900







Recently, the growth of the community had led to changes on the land in the vicinity of the project area, including roadways, houselots, and utilities. Though change is occurring, large portions of Puna and the immediate project area are for the most part, still covered by forest of varying density. The forest is a mix of native plants in various stages of growth (dependent on ages of the base lava flows), and the more-recently introduced plant species, which compete with the native plants.

### **Hawaiian Settlement and Land Use**

Current theory places Polynesian settlement voyages between Hawai'i and *Kahiki* (the ancestral homelands of the Hawaiian gods and people) in two major periods, AD 300 to 600 and AD 1100 to 1250 (Emory IN Tatar 1982:16-18). The ethnographer and authority on Hawaiian practices, E.S.C. Handy, speculates that when the first settlers reached the Hawaiian islands, they found a flora that was much like that of their homeland (Handy and Handy 1972:12), but the topography of the islands was notably different. The broad watered flatlands of Kaua'i, O'ahu, and Maui, and the expansive cultivable mountain slopes of Kona and Ka'u, on Hawai'i, permitted the development of a systematic and elaborate planting system that reached a higher level in Hawai'i than in other Polynesian islands (ibid.:16).

It is believed that for generations following initial settlement, the population clustered along the well-watered windward shores of the major Hawaiian Islands, areas well suited to agriculture, and where access to marine resources was good. Clustered around small bays were groups of houses where fishermen and their families lived (Handy and Handy 1972:287). Only after the best areas were fully utilized (c. AD 800 to 1000) did the Hawaiians begin settling more remote, and less desirable areas.

In this part of Puna where the project area is located, potable water was primarily provided by coastal springs, water caves, dew fall, and catchment. The rains were the primary source of water for irrigation. The upland forests were extensively planted in taro and other crops, and on the coastal plains, sweet potatoes and other less water-dependent crops were planted (Handy and Handy 1972:541-542). Indeed, the political prehistory of Puna indicates that it was not a favorable area for establishment of a kingdom seat.

Ethnographer Dorothy Barrere has made a life study of Puna, and she comments:

We find that Puna, as a political unit, played an insignificant part in shaping the course of history of Hawai'i Island. Unlike the other districts of Hawai'i, no great family arose upon whose support one or another of the chiefs seeking power had to depend for his success. Puna lands were desirable, and were eagerly sought, but their control did not rest upon conquering Puna itself, but rather upon control of the adjacent districts of Ka'u and Hilo (Barrere 1959:15).

When the Hawaiian settlers came to Hawai'i from Kahiki, they brought with them many things that were necessary for their survival. Among these purposeful introductions were staple crop plants such as dryland and wet-land taros, sweet potatoes, yams, gourds, breadfruit, coconuts, 'awa, sugar canes, and *wauke*. Pukui also felt that her ancestors brought with them numerous non-material things that were of importance to ancient life:

It is impossible to enumerate the hundreds of gods and goddesses of old Hawai'i. Some of the gods were inherited from exceedingly ancient times,

from our ancestors who came from southern islands and they can be said to have been 'brought' along by them, just as truly as were the material things in the canoes because they [the gods and goddesses] were in their minds and souls... (M.K. Pukui Ms., Page 2).

### **Hawaiian Land Management and Divisions of Labor**

The district of Puna is one of the six major traditional districts, or *moku o loko* (literally: interior island) on the island of Hawai'i. On each island, the large districts were divided into 'okana and/or kalana (regions smaller than the *moku-o-loko*, yet composed of several other units of land). The next traditional unit of land was the *ahupua'a*; sub-divisions of land that were usually marked by an altar featuring a pig image. The *ahupua'a* were usually wedges of land stretching from the ocean to the interior of the island, and like the larger land units, the *ahupua'a* were divided into smaller, more manageable parcels. These small land units such as the 'ili, 'ili lele, kähāpai, māla, kō'ele, and mo'o, were inhabited and managed by the *maka'āinana* (people of the land) and their extended families. The common people who lived within individual *ahupua'a* generally had access to all of the resources from mountain slopes to the ocean.

Entire *ahupua'a*, or portions of them, were generally under the jurisdiction of appointed *konohiki* or lesser chief-landlords, who answered to an *ali'i-'ai-ahupua'a* (chief who controlled the *ahupua'a* resources). The *ali'i-'ai-ahupua'a* in turn answered to an *ali'i-'ai-moku* (chief who claimed the abundance of the entire district); thus *ahupua'a* resources also supported the royalty of the regional and island kingdoms. This form of district subdividing was integral to Hawaiian life and was the product of strictly adhered to resources management planning.

Handy and Handy (1972) provide a general overview of the division of labor in the Hawaiian community:

Although women cultivated small sweet-potato patches by the shore and in the vicinity of dwellings, farming was essentially men's work. With their digging sticks they prepared the land for cultivation, excavated and constructed ditches and *lo'i* (irrigated terraces) for wet taro, and cleared land on the slopes and in the upland where dry taro was planted along with sweet potato, breadfruit, banana, and sugar cane. The selection of varieties suitable for particular locations and soils was the responsibility of men, and likewise the decisions as to time of planting and harvesting. Women's work was mat plaiting and cloth making, the gathering of shellfish, salt, and seaweed to enrich the diet, and the nursing of children. Men worked in the fields and did the fishing (Handy and Handy 1972:20).

Crops such as sweet potatoes, sugar cane, bananas, yams, breadfruit, gourds, and coconuts provided the "bread" of the Hawaiian diet. On the upper slopes were grown the endemic *olonā* (*Touchardia latifolia*) for cordage, and 'awa (*Piper methysticum*) for ceremonial and domestic use, and from the upland forests various woods and resources were collected, which were used for spears, paddles, canoes, and tools etc.

It is interesting to note that legendary accounts describe Puna as one of the richest agricultural regions on Hawai'i (Handy and Handy 1972:542). An ancient proverb from the legend of Ka-Miki (published in the Hawaiian language newspaper *Ka Hōkai o Hawai'i*)

describes Puna as land that was embraced by the god Kāne, the creative force of nature who was responsible for the waters of life, sunshine, and called upon for assistance in many aspects of life:

*Puna ka 'āina i ka houpo o Kāne* - Puna is the land held in the bosom of Kāne

(Puna is a land which was greatly loved and honored) (May 26, 1916)

### Legends

There are many legends that are centered in, or cite events associated with Puna. Of these narratives, several mention the Kaimū area; among them are texts recorded by Fornander (1919) and Wise and Kihe, and in the Legend of Ka-Miki (below). Briefly summarized, Fornander's retelling of the legend of Halemano describes Puna c. AD 1475, and comments on the popularity of surfing at Kaimū. Halemano was the royal son of Kukanihilo and Wahiawā, of the O'ahu line of chiefs. Through a dream, he met with the beautiful and sacred chiefess Kamalālāwalu of Puna. Falling in love with Kamalālāwalu, Halemano described her to his supernatural sister Laenihi, who consented to travel to Puna and make preparations for Halemano to meet with the chiefess:

At this time, Huaa was the king of Puna, and Kulukulua was the king of Hilo. Both of these kings were courting Kamalālāwalu, giving her large quantities of properties from Puna and Hilo, with the idea that in time one of them would win her hand and take her to wife (Fornander 1919 Vol. V-Part II:228).

Kamalālāwalu and her brother Kumukahi (also the name of the eastern-most point of Puna) were born at, and lived in Kapoho, Puna. Kamalālāwalu greatly enjoyed surfing at Kaimū and her brother enjoyed playing on the shore there. When Laenihi arrived at Kamalālāwalu's residence, she called upon the winds and ocean to stir up surfing waves at Kaimū. Hearing of the good surf, Kamalālāwalu went to go surfing, and this is how Laenihi came to meet Kamalālāwalu and how she arranged for Halemano to marry the Puna chiefess (Fornander 1919 Vol. V-Part II:228-232).

In 1914, two Hawaiian historians, J.W.H.I Kihe and John Wise contributed *Ka 'ao Ho'oniua Pu'uwai no Ka-Miki* (The Heart Stirring Story of Ka-Miki) to the Hawaiian language newspaper *Ka Hōkai o Hawai'i*. The legend is an account of two supernatural brothers who traveled around the island of Hawai'i along the *ala loa* and *ala hele* (pathways) that encircled and crossed the island. Along the way, the brothers challenged disreputable *olohe* (experts in fighting and competitions) and priests whose actions had offended the gods. The legend is set in the 12th to 13th century and documents place name origins and many aspects of ancient Hawaiian life.

The following is translated from the legend of Ka-Miki. The translations are a synopsis of the Hawaiian texts with emphasis on the main events and characters of the Hawaiian narratives.

Kai-mū (Sea gathering; describes those who gathered to watch the surfing competitions). The lands of Kaimū were named for Kaimū one of two guardians of the chief and master fighter, Keahialaka who was the grandson of Kaniahiku. Kaunaloa was Kaimū's partner and the other guardian of Keahialaka (10/28/1915).

Pali-uli (Green, forested cliff [the region of Paliuli is generally associated with the uplands between Kaimū-Kalapana and Kapa'ahu])

The chief Kahauale'a challenged Ka-Miki to a running contest, in which certain unique items were to be brought back to Pū'ula as proof of having reached certain destinations. From Paliuli, they were to bring back some of the sacred water of the spring of Waka (Ka wai o ka punawai kapu o Waka-keaka-i-ka-wai), and describe the forest setting of the spring (1/6/1916).

Ka-Miki was carried to Pali-uli on the supernatural 'ōhi'a tree form of his ancestress named 'Ōhi'a-nui-moe-awakea. This was the place where the sacred chiefesses Lā'ie-wai and Lā'ie-lohelohe were raised by their grandparents Waka-keaka-i-ka-wai and Ka-puka-i-haoa-ka-lā-olalo. This was an exceedingly sacred area, guarded by Waka-keaka-i-ka-wai and surrounded by rainbows, with 'i'iwi, 'ō'ō birds, and all manner of plants. When the mists and rainbows settled upon the forest of Pali-uli they were sign of the presence of this sacred family.

'Ōhi'a-nui-moe-awakea set Ka-Miki at the sacred spring of Keaka-i-ka-li'u-lā (The image seen in the reflection), he then took a leaf of the pāpākoalekoa 'e taro, and folded it into an 'a'apu lā'alo (taro leaf cup) to hold the water. As Ka-Miki gathered the water he saw the largest 'anae (mullet) and awa (milk fish) he had ever seen, and he thought to take the 'anae to use as a pūpū 'awa ('awa drink condiment) that evening.

Ka-Miki asked 'Ōhi'a-nui-moe-awakea if this would be possible, and she told him, "No do not do that, for these fish are sacred, they are the guardians of the spring." 'Ōhi'a-nui went on to tell Ka-Miki, "You may take some other item from this place, but not the fish, for they are body forms of Waka-keaka-i-ka-wai."

On the lands around the spring were grown the prostrate sugar cane called Mikioi-o-lehua, the bananas called Mānai-'ula-i-ka-wao, the taro called Pāpākoalekoa'e-o-lele-kea, and the 'awa called Waimaka-a-ka-manu o Puna (1/13/1916).

[Having obtained the required items, Ka-Miki returned to the chief Pū'ula and described the beauty of Puna as seen from upland Pali-uli:]

*Mai uka o Pali-uli a hō'ea i kai o nā 'ili'ili nehe o 'A'alāmanu i ka wai ko'olihilihi o Hōpoe, e ho'olewa ala i Hā'ena*

From the uplands of Pali-uli all the way to the sea which nestles the pebbles of 'A'alāmanu, which is there in the water which props up the eyelashes of Hōpoe who dances at Hā'ena (2/3/1916).

### **Historic Period References and an Account of the Catholic and Congregational Churches of Kalapana**

In 1823, the Reverend William Ellis traveled around the island of Hawai'i, and recorded in his journal (1963) his impressions and experiences in the village of Kaimū and the surrounding area:

Kaimu is pleasantly situated near the sea shore, on the S.E. side of the island, standing on a bed of lava considerably decomposed, and covered with a light and fertile soil. It is adorned with plantations of cocoa-nuts, and clumps of kou-trees. It has a fine sandy beach, where canoes may land with safety; and, according to the houses numbered to-day, contains about 725 inhabitants. Including the villages in its immediate vicinity, along the coast, the population would probably amount to 2000; and, if water could be procured near at hand, it would form an eligible missionary station... The extent of cultivation in the neighborhood, together with the decent and orderly appearance of the people, induced us to think they are more sober and industrious than those of many villages through which we have passed (1963.:196-197).

About three p.m. we approached Kaimu. This was the birth-place of Mauae [Ellis' guide], and the residence of most of his relations...The old people from the houses welcomed him as he passed along, and numbers of the young men and women came out to meet him, saluted him by touching noses, and wept for joy at his arrival. Some took off his hat, and crowned him with a garland of flowers; others hung around his neck wreaths of a sweet-scented plant resembling ively, or necklaces composed of the nut of the fragrant pandanus oddoratissime.

When we reached the house where his sister lived, she ran too meet him, threw her arms around his neck, and having affectionately embraced him, walked hand in hand with him through the village.

Multitudes of young people and children followed, chanting his name, the names of his parents, the place and circumstances of his birth, and the most remarkable events in the history of his family...(Ellis 1963:191).

While being hosted at the home of Maua'e's father, Ellis and his companions met with the natives in worship services, and also learned about some of their beliefs and the events that had occurred around Kaimū. Ellis notes that it was during the time of the chief Alapa'i (c. AD 1736-1754) that Kaimū was overrun by lava (Ellis 1964:194). Ellis and his companions were also told of a great earthquake that had struck about two months earlier. A four foot thick stone wall that surrounded a garden on the north side of the village had been demolished, and Ellis also went to a house site of sixteen by twelve feet through which a chasm had passed (ibid.:195). Ellis offers the following description:

We examined the aperture, that still remained open at one end of the house, and found its sides perpendicular, and its breadth one foot and eleven inches. The north-west corner of the house was broken by the shock.

We next traced its course through the fields of potatoes. in some places the ground seemed hardly disturbed, yet it sunk six or eight inches beneath our tread. At other places we saw apertures upwards of two feet wide. The potatoes that were growing immediately in the direction of the fissure, were all spoiled. Several roots of considerable size were thrown out of the ground, and, according to the representations of the natives, appeared as if they had been scorched... (ibid.:195-196).

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One year after Ellis' tour, the American Board of Commissioners for Foreign Missions established a base church in Hilo. From this church (Hāili Church), the missionaries traveled to the more remote areas of the Hilo and Puna Districts. David Lyman, who came to Hawai'i in 1832, and Titus Coan, who arrived in 1835, were two of the most influential Congregational missionaries in Puna and Hilo (Langlas 1990:17-18). By 1840, the Hawaiian Church at Kalapana was built. Lyman IN Langlas (1990) provides the following description of the church:

The house consists of a common open stone wall, with a thatched roof, and a door at each end, and a rough pulpit of hewed boards at one side (Lyman n.d., Book III:10 IN Langlas 1990:18).

In 1840, the Catholic missionaries began work on the island of Hawai'i, and in 1841 Father Walsh visited Puna, but it was not until 1864 that a permanent Catholic church was established in the Kalapana area. The first Catholic church was a "mortar church with a thatched roof," built at Kapa'ahu by Father Damien (of Kalaupapa fame); the original name of the church was St. Joseph's (Langlas 1990:21). In the 1880s-1890s, a church was built in Kalapana Village, where the congregation became centered (ibid.:22).

The Star of the Sea Catholic church was built during the years 1930 and 1931, under the direction of Father Evarist. As recorded by Charles Langlas (1990), from the recollections of Kalapana area families, Father Evarist was well liked and made a good impression on families of the area. It was Father Evarist who originally painted the walls and ceiling of the church (Langlas 1990:61). When Father Evarist left Puna in 1942, informants noted that many of the community activities that the priest had initiated, came to an end (ibid.:64). Eventually, the Catholic church and rectory at Pahoa became the main parish in the area, and the priest from Pahoa traveled to Kalapana to conduct the services (Langlas 1990:22).

In 1990, lava flows from the eruption in the east rift zone of Kilauea Volcano began entering the Kalapana community. In April of 1990, the congregation of The Star of the Sea Church decided that it should be moved to protect it from the approaching lava flows. The church was moved to a site along State Highway 130, a short distance from the proposed relocation site, which is the subject of this report.

### Land Tenure

In the period between 1790 and the 1840s, western ideas gained more and more influence over the *ali'i*, and land management and land use were changing radically. Following the death of Kamehameha I, American missionaries arrived and Hawaiian cultural values, practices, and history became less and less important. As western influences reshaped the Hawaiian sense of community, Hawaiian settlements reflected missionary concepts regarding proper communities; i.e. that it was beneficial to live close to churches, under the watchful eyes of church leaders, and in "civilized" villages and towns. Thus churches were established in populated areas, and these churches and native settlements became gathering places—the village centers.

Western land-use practices quickly began replacing Hawaiian practices, and by the middle 1800s, families who lived in many of the remote communities in Puna were leaving. The great earthquake of April 1868 destroyed several communities, hastening the exodus from Puna. In 1848, a Western-style system of land ownership system was established. Before this change (known as the Māhele of 1848), a division of land among the crown, the government, lesser chiefs [*kono'hiki*], and native tenants, all land and natural resources were held in trust by the high chiefs. Use of the lands prior to the Māhele was given at the prerogative of the high chiefs

(*ali'i 'ai ahupua'a* or *ali'i 'ai moku*) and their representatives, or land agents (*konohiki*), who were generally lesser chiefs as well.

This radical restructuring of the Hawaiian land management system redefined the land interests of the King (Kamehameha III), the high-ranking chiefs, and the *konohiki*, (who were originally those in charge of tracts of land on behalf of the king or a chief) (Chinen 1958:vii and Chinen 1961:13). More than 250 of the highest-ranking chiefs and *konohiki* in the kingdom participated, with Kamehameha III, in this division. The first Māhele was signed on Jan. 27, 1848 by Kamehameha III and Princess Victoria Kamāmalu, and by her guardians Mataio Kekūanaō'a and Ione [John Papa] I'i. The last Māhele was signed by the King and E. Enoka on March 7, 1848 (Chinen 1958:16).

The Māhele did not convey title to any land. The chiefs and *konohiki* were required to present their claims to The Land Commission to receive awards for lands quit claimed to them by Kamehameha III. They were also required to pay commutations to the government in order to receive royal patents on their awards. Until an award was issued, title remained with the government. The lands awarded to the lesser chiefs and *konohiki* became known as Konohiki Lands. Because there were few surveyors in Hawai'i at the time of the Māhele, the lands were identified by name only, with the understanding that the ancient boundaries would prevail until the land could be surveyed. This expedited the work of the Land Commission and speeded the transfers (Chinen 1961:13).

During this process all land was placed in one of three categories: Crown Lands (for the occupant of the throne), Government Lands, and Konohiki Lands. These were all "subject to the rights of the native tenants," (Laws of Hawaii 1848:22). The native tenants, or *hoa'āina*, were the common Hawaiian people who lived on the land and worked it for their subsistence and for the welfare of the chiefs. Questions concerning the nature of the rights of these native tenants began to arise as the King, the government, and *konohiki* began selling parcels of land to foreigners. On December 21, 1849 the Privy Council attempted to clarify the situation by adopting four resolutions intended to protect the rights of native tenants referred to in the 1848 law (Chinen 1958:29).

These resolutions (IN Kingdom of Hawaii 1850:123-124) authorized the Land Commission to award fee simple title to all native tenants who occupied and improved any portion of Crown, Government, or Konohiki lands. These awards were to be free of commutation except for house lots located in the districts of Honolulu, Lāhainā, and Hilo (Chinen 1958:29). Before receiving their awards from the Land Commission, the native tenants were required to prove that they cultivated the land for a living. They were not permitted to acquire wastelands or lands that they cultivated "with the seeming intention of enlarging their lots." Once a claim was confirmed, a survey was required before the Land Commission was authorized to issue any award. The lands of the native tenants became known as "Kuleana Lands."

The *ahupua'a* of Kaimū, 'Āpua, 'Ola'a, and the *'ili* (land parcel) and fishpond of Waiakōlea in Kalapana were designated as "Crown Lands," lands set aside for the personal pleasure of the sovereign ruler (Board of Commissioners 1929:25). Additionally, 37 other Puna *ahupua'a*, several of them surrounding Kaimū, were designated as "Government Lands" (Board of Commissioners 1929:29-37). The Land Commission Award (to a commoner) nearest the project area was Royal Patent 8029, to Haka, in the *ahupua'a* of Kehena, a little over three miles away.

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Commoners were required to provide proof of land use and habitation, but royal and government claims rarely included any documentation of land use or settlement. This requirement of proof by the commoners resulted in a series of volumes of registry and testimony. Today, these volumes are often of help to researchers seeking to understand land use practices, the nature of crop production, resource harvesting, and to learn what structures were on the land at the time. Because the *ahupua'a* of Kaimū and Makena were designated Crown Land, there was no requirement of proof, and there appears to be no readily available documentation.

## LAND USE FROM THE MĀHELE TO THE PRESENT

Shortly after the Māhele, in 1850, foreigners were awarded the right to own land, provided they swore an oath of loyalty to the Hawaiian Monarch (Kame'eiehiwa 1992:300). With land ownership open to foreign businesses, (most of which were American), the stage was set for the full-scale development, including development of Hawai'i's sugar industry. Sugar played an important role in the upland forested areas of Puna where there is abundant rich soil.

### **The Homestead Act of 1884**

Following the Māhele, additional efforts were made by the crown to place people on parcels of land to which they would hold alodial (fee simple) title. It appears that as early as 1852, Land Grants were being awarded for certain lands in the Kalapana area of Puna. By 1884, it was seen that the Māhele and subsequent efforts to get native Hawaiians on parcels of land to which they held title had fallen short of expectations. In retrospect, this failure was in part due to the belief by Hawaiians that no one owned the land, and that the chiefs served as stewards of the land and people for the gods and creative forces of nature. The Homestead Act of 1884: L. 1884, c. 45., was established to "Facilitate the Acquiring and Settlement of Homesteads." The Act opens with the following statements:

Whereas, there are many persons of small means in the Kingdom who are without permanent homes and are desirous of procuring homesteads...Be it Enacted by the King...Sec.1. That the minister of the Interior is hereby authorized and instructed to cause portions of the public lands which are suitable for the purpose and not at this time held by any person under lease from the government, to be surveyed and laid out in lots not over twenty and not less than two acres in extent in dry or kula land, and not over two acres in extent in wet or kalo land, with convenient roads in connection therewith... (Hawaii Revised Laws of 1888:2200).

Langlas (1990) provides the following overview the evolution of the Kaimū Homesteads:

The crown land of Kaimū *ahupua'a* and the government lands of Kikala and Kēōkea were not sold until after 1900 (with the exception of a single parcel in Kikala). After 1893, when Queen Lili'uokalani was overthrown and the Republic was proclaimed, all crown land was transferred to the government. The land Act of 1895 then provided that government land in rural areas be surveyed and given out as homesteads to Hawaiians and non-Hawaiians, to encourage the settlement of rural farmers... The lots at Kaimū Bay were opened to homesteaders by 1906 (when the first one was bought), but the last

one was not bought until 1935, even though the tenant had lived there since 1900. The Right of Purchase Lease and the Cash Freehold, on the other hand, required payment by an agreement of sale, with set times for payment. Cash Freeholds for the areas east and north of Kaimū village were given out at public auction between 1918 and 1924. By 1935, most of the land which had been surveyed and divided into lots by the 1895 Act had been sold, mainly to the old Hawaiian families of the area.

An examination of the sources (including the 1916 Index of Land Sale Grants, microfilms of later Land Sale Grants, and early tax maps) shows that the various areas were surveyed and opened up for homesteading at different times. In 1904, or earlier, three areas were opened, the shore of Kaimū Bay (Kaimū-Makena Homesteads) and two long-used upland taro areas (Kaimū-Ki'ula Homesteads, Upper Kupahu'a). Many of the Kaimū Bay homesteads included a separate piece of taro land up at Mokuhulu as well... (Langlas 1990:25).

### *Agriculture and Settlement in the 1930s*

In the 1930s, Handy and Handy (1972) conducted extensive ethnographic studies on all of the major Hawaiian Islands. In Puna, the researchers had the benefit of several knowledgeable informants, and the following narrative is an excerpt from their work (1972:541):

Taro was still, in 1935, grown on homesteads in 'Opihikao and Kamaili, and beyond them in upper Kaimu, Makena, and Kalapana, as far as the forested slopes behind the village of Kapa'ahu. One energetic Hawaiian of Kapa'ahu had cleared 'ohi'a forest, at a place called Kaho'onoho about 2.5 miles inland, and had a good stand of taro, bananas, and sugar cane in two adjacent clearings... However, the whole forest land northeast of Kapa'ahu, with the exception of sections destroyed by lava flows, is capable of supporting taro and used to be covered with plantations... Kupahua, now a homesteading area, formerly supported taro, as did upper Kalapana and upper Kaimu. Makena and lower Kaimu supported sweet potatoes but not taro...

Legendary references also document that sweet potatoes were cultivated at Kaimū. One such reference to the sweet potatoes of Kaimū may be found in the legend of Kaipalaoa, who was the famous contest riddler and son of Halepāki and Waile'a of Hilo (Fornander 1917). This reference was used while Kaipalaoa was competing against the foremost riddling champions of the chief Kalaniali'iloa of Kaua'i:

*Ka i'a ka'a poepoe o Kalapana  
Īna'i 'uala aku o Kaimū*

The round fish of Kalapana  
Is served with the sweet potatoes of Kaimū  
(Fornander 1917).

Between September 10 and December 17, 1929, a Hawaiian writer submitted a series of articles to the Hawaiian language newspaper, *Ka Hōkai o Hawai'i* which was published in Hilo from 1906 to 1948. The series was entitled "*Huaka'i Māka'ika'i a 'ike i ka Hē o ko'u Kupunawahine Aloha o Mauhonua Lapuwale*" (A Sightseeing Journey To See The Places Once

Traveled By My Beloved Grandmother Mauhonua Lapuwale). The following selections concerning the Kaimū area were translated by Mary Kawena Pukui (Barrere 1959:32-33):

[October 15, 1929] We came to Kaimu, and there I met my uncle Harry Kelihoomalū, who told me of the important places of Kaimu. He told me that where the Catholic Church stands is Pu'ulima Pahoehe. On this side is found the fragrant *lipoa* seaweed of Kalauonaona. On the west side of Kaimu lies Kalapana. He said, "Where the sea is, was once all land from this side to that to the extent of half a mile. It is now under sea."

Where also was the bathing pool of Makawai, an ancient pool, but through the thoughtlessness of the sea, it was battered and it disappeared, never to be found again. The stones are still to be found. Above this lost pool is the bathing pool of Lono-wai. It is near the home of my aunt, Keala Keli'ihō'omalū.

October 29, 1929: As you leave Kaimu and begin to go on, one comes to the hala grove of Kahao. My uncle told me that this was a place of refuge in time of war. A person who ran to this place was saved from death.

In the legend of Ka-Miki (cited earlier in this report), readers are told that the place name 'Āpua includes not only the southwestern-most land division of Puna, but is also a general name for the slopes and flatlands that extend from Kilauea towards Keahialaka. Ka papa lohi o 'Āpua (The long flatlands of 'Āpua) appears to be an 'okana (an ancient land division), a regional place name that encompasses many *ahupua'a* including Kaimū (9/2 and 11/4, 1915). An expression of love and praise offered by the people of this land for their home is found in the ancient Hawaiian proverb:

*Ka papa lohi o 'Āpua o Puna Pā'ia 'ala i ka hala me ka hinano*

The long plain of 'Āpua, Puna is walled (surrounded) by the fragrant groves of *hala* and *hinano* (IN Ka-Miki 10/14/1915).

One of the most famous attributes of Puna was its verdant groves of *pū hala* (*Pandanus odoratissimus* trees). The people who lived in this part of Puna were known as master weavers, and the most famous mat of Puna was one which was called *puahala* (G.S. Kahānai IN Fornander 1919 Vol. V-Part III:626). This mat was woven from the leaf sheaths of the *pua hinano* (male pandanus tree blossoms), and it was particularly favored because of its silky texture and pleasant fragrance. To this day, Puna is known for its growth of *hala*, and the floors and furniture of some households at Kaimū are still covered with fine woven mats and cushions. Weaving remains an important occupation of Puna families as well.

Though the land has gone through much change recently, the love that the native people have for their home remains strong, and they accept the whims and moods of the volcano. When the Star of the Sea Church was moved out of the way of the advancing lava flows in 1990, the families of Kaimū-Kalapana and greater Puna preserved a small part of their past, a reminder of days gone by. And as these families look to the future, their place of fellowship and worship will serve as a link between their past and future in Puna, *Ka 'āina i ka houpo o Kāne* (The land held in the bosom of Kāne).

## POSTULATED SETTLEMENT PATTERNS

Settlement pattern studies chart the complex interactions between environmentally determined land use alternatives and constraints, and the human technological and socio-cultural adaptations developed to either live within, or alter, these parameters. The settlement pattern approach uses historical and physiographic data to project patterns of historic land use back into time to predict where sites might be found. Then, these projections (or hypotheses) concerning land use can be tested using current survey data.

Settlement patterns within the *ahupua'a* of Kaimū and Makena are considered in the present study. The lands of Kaimū and Makena stretch inland c. 6.5 km (four miles) from the coast to an elevation of 1,370 to 1,400 ft at its inland boundary with the Puna Forest Reserve. The extent of these lands prior to the establishment of the Puna Forest Reserve is not known. The coastal portion of the lands of Kaimū and Makena consists of c. 2.0 km (1.3 miles) of low-lying coast, with excellent access to the sea. Until recently, Kaimū and the adjacent *ahupua'a* of Kalapana boasted one of the finest black sand beaches in Hawai'i.

McEldowney's (1979) research on Hawaiian land use patterns in Puna has been recognized as a useful model for discussing settlement patterns in this region (Spear 1992; Dunn, Franklin, and Goodfellow, in prep.). McEldowney's model is based on the identification of ecological zones and on documented patterns of land use within these zones during early historic times. For McEldowney, the initial step in evaluating prehistoric and protohistoric patterns of settlement and land use involves dividing the region into geographic zones, each of which is characterized by documented differences in traditional Hawaiian land use and settlement, as well as physiographic differences that constrain land use. Five zones are defined for Puna: Coastal Settlement, Upland Agricultural, Lower Forest, Rain Forest, and Sub-alpine (or montane). Only the first two zones, Coastal Settlement and Upland Agriculture, fall within the *ahupua'a* Kaimū and Makena; the present project area lies within the Coastal Settlement zone.

The Coastal Zone is defined as extending inland approximately one kilometer. This zone contained the region's highest population density in the early historic period. McEldowney (1979) points out that because this is where population was densest, this zone contains a great variety of structural and settlement types, including both permanently and temporarily occupied features that are found singly, clustered in small groups, and along the coast, grouped into true villages. Access to marine resources and fresh or brackish water has been suggested as the critical variable in siting the villages and smaller residential settlements and complexes. Site types typically identified in the coastal zone include habitation, ceremonial, structures relating to direct use of the sea (i.e., canoe sheds and aquaculture ponds), and agricultural features. The second zone defined by McEldowney, the upland agricultural zone, stretches from one kilometer inland to the forest line, which lies at roughly the 1,500 ft. elevation contour. This zone is characterized by scattered residential features, with a much higher density of associated agricultural components than in the coastal zone.

Ecological factors for settlement have been skewed by the whims of Pele, and certain *ahupua'a* within Puna have suffered greater impacts from lava flows throughout the period of human occupation than others. The lands of Kaimū and Makena fall into this category, as can be seen on *Figure 3*—the 1852 surveyor's map of this area. The aa flow of AD 1750 covered large sections of valuable, coastal agricultural land as well as better-watered, inland agricultural land. The high density of homesteads wedged between the fingers of the historic flows,

as well as the great number of recorded agricultural and habitation features on the land adjacent to the historic flows, attest to the value of the remnant areas of older substrates within this *ahupua'a*. Coastal subsidence has also altered the character of the coast throughout Puna, destroying coastal sites and altering near-shore marine habitats. As the present project area lies on this AD 1750 flow, we would naturally expect to find only protohistoric to historic features on this property. Such features might include walls, trails, and possibly burials. No agricultural features would be expected. One trail has already been noted as crossing this land (Rosendahl 1983).

## FIELD METHODS AND PROCEDURES

On September 25, 1993, Supervisory Archaeologist Leta Franklin, M.A. conducted a 100% pedestrian survey of the project area. Because of the excellent ground visibility, 15 m-wide transects were adequate to cover the subject property. These transects ran roughly E-W (perpendicular to the road), and were easy to discern as the project boundary had been previously surveyed and marked with pink flagging tape by Island Survey, Inc. of Hilo. The two archaeological sites encountered during the survey were recorded on October 15 and 22, 1993 by Leta Franklin and Kepā Maly.

All identified sites were described on standard PHRI site survey record forms and were photographed using 35 mm black-and-white film (PHRI Roll No. 4555). Detailed recording of the sites included clearing, followed by written descriptions, measurements, and plan maps. Each site was marked with pink and blue flagging tape, and a wooden stake marked with blue flagging tape and an aluminum tag bearing the temporary site number, the letters "PHRI" and the PHRI project number (93-1327), the date, and the initials of the recorder was left at each site. The sites were assigned PHRI temporary field numbers (1327-1 and 1327-2), and were subsequently assigned permanent State Inventory of Historic Places (SIHP) site numbers\* (Table 1).

To aid in determining archaeological settlement patterns, the sites located during inventory surveys are examined to determine their approximate temporal age, and are categorized under four periods (dates after Kirch 1985): (1) Prehistoric—up to the end of the Expansion Period, c. AD 1650, (2) Protohistoric, c. 1650 to 1795, (3) Early Historic, c. 1795 to 1850, and (4) Historic, c. 1850 to 1945. Assignment of temporal ages to features is based on a number of factors. These factors include formal site type, the presence or absence of portable remains, site condition, early historic accounts of the region, and proximity to LCAs. If a site is determined to overlap more than one period, this is designated by listing the framing time periods connected by a dash (e.g., Prehistoric–Early Historic). If data are insufficient to determine which time period a site belongs to, the probable periods that frame this age span are listed connected by a slash (e.g., Prehistoric/early historic).

Prehistoric period sites are generally differentiated from Protohistoric and Early Historic native Hawaiian sites in the field based on (1) the absence of early historic artifacts; (2) the relatively poor condition of the features (e.g., a high amount of displacement by tree roots); (3) the nature of the midden and portable artifacts, if present; (4) a lack of references to use of this land in early historic accounts or LCA claims; and (5) the dated age of the substrate.

\* SIHP numbers (State Inventory of Historic Places) are five-digit numbers prefixed by 50-10-55 (50=State of Hawaii; 10=Island of Hawaii; 55=USGS 7.5' series quad map ["Pahoa South, Hawaii"]).

The sites were examined to determine their formal type (e.g., wall, platform, terrace, cairn) and functional type (e.g., boundary, habitation, agriculture, *ahu*). If the data are not sufficient to determine the exact functional type of a feature, the two possible interpretations are connected by a slash (e.g., habitation/agriculture). If a feature's function cannot be narrowed down to two possibilities, it is listed as "indeterminate." If a feature served two or more functions, these posited functions are connected by a dash (e.g., habitation-burial).

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## FINDINGS

Two single-component sites were identified in the project area, both lying within the lands of Kaimū and Makena. *Figure 5* illustrates site locations within the project boundary. One site, SIHP Site 19060 (a protohistoric-historic trail), was previously identified by Rosendahl (1983), although it was not given a state site number at that time. *Figures 3 and 4*, presented earlier, show the location of this historic trail on early state surveyors' maps. The second site, SIHP Site 19061 (a protohistoric/historic wall) is newly identified. *Table 2* summarizes the sites in terms of component features, formal and functional types, PHRI Cultural Resource Management (CRM) value mode assessments, and recommended field work tasks. Appendix A provides detailed descriptions for each site. The presence of these two feature indicate that there was at least proto-historic through historic period use of the project area parcel.

*Table 2. Summary of Identified Sites and Features*

| *SIHP Site No. | PHRI Temp. No. | Formal Site/Feature Type | Tentative Functional Interpretation | #CRM Value Mode Assess. |   |   | +Field Work Tasks |    |    |
|----------------|----------------|--------------------------|-------------------------------------|-------------------------|---|---|-------------------|----|----|
|                |                |                          |                                     | R                       | I | C | DR                | SC | EX |
| 19060          | 1327-1         | Trail                    | Transportation                      | H                       | M | H | +                 | -  | -  |
| 19061          | 1327-2         | Wall                     | Boundary                            | M                       | M | M | -                 | -  | -  |

\* *State Inventory of Historic Places (SIHP) numbers. SIHP numbers are five-digit numbers prefixed by 50-10-55 (50=State of Hawai'i; 10=Island of Hawai'i, 55=USGS 7.5' series quad map ["Pahoa South, Hawaii"])*

# *Cultural Resource Management*

*Value Mode Assessment*

—*Nature:* R = scientific research  
I = interpretive  
C = cultural

—*Degree:* H = high  
M = moderate  
L = low

+ *Recommended Field Work Tasks:*

DR = detailed recording  
SC = surface collections  
EX = test excavations

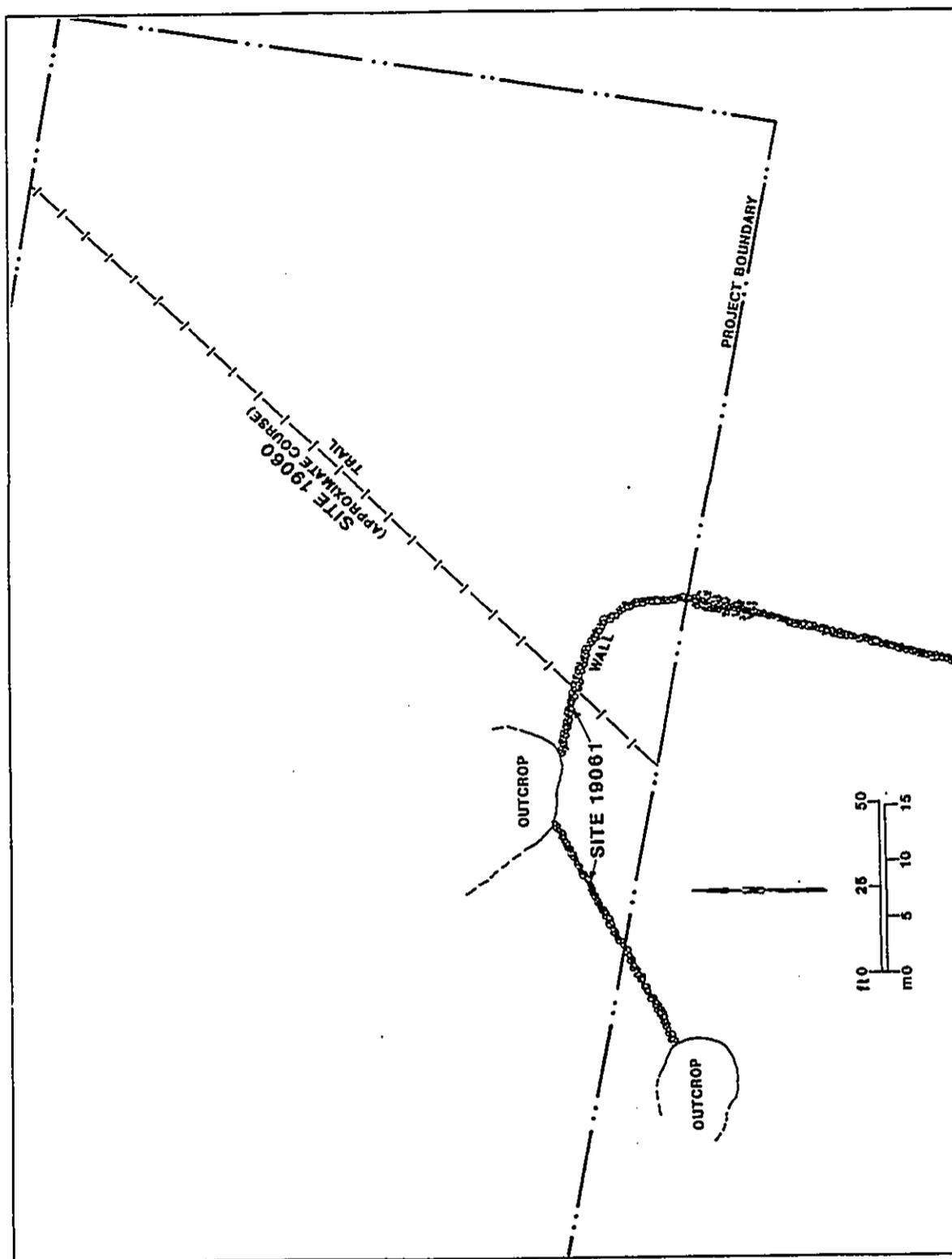


Figure 5. Site Location Map

Site 19060 is a protohistoric-historic trail over the AD 1750 aa flow, in the Lands of Kaimū and Makena. Historic maps indicate that the trail is a local branch of the *mauka-makai* trail. The main *mauka-makai* trail passed through the center of the historic land of Kaimū to reach homesteads in the *mauka* portion (see Figure 3). It is not known if the trail continues off of the AD 1750 flow (that area lies outside of the present project area), although Apple (1965:65) notes that often only a recognizable trace of a trail may remain in areas that pass over soil.

This trail lies 0.8 to 1.0 km inland, running across the width of the AD 1750 aa flow. The trail consists of flat pahoehoe slabs fitted into a pavement atop local aa. Aa cobbles fill in spaces among the pahoehoe slabs, and there is some slight kerbing in places, formed by aa boulders. Trail width varies from 0.5 to 0.8 m, depending on terrain (averaging 0.7 m). In at least one portion in the project area the trail is raised on a retaining wall (made of local aa cobbles) in order to minimize the relief of the trail. In addition, the route meanders slightly to avoid outcrops. An overview photograph of a portion of the trail is shown in Figure 6. Figure 7 presents a plan sketch of a portion of the trail.

Age determination is based on the age of the lava flow taken with the fact that habitation in the areas on either side of the flow predates the AD 1750 flow. That is, the trail is posited to date not long after the AD 1750 flow as access to lands on either side would have been reestablished fairly soon after the flow. Use through historic times is indicated by the 1892 Baldwin map (Figure 3).

Present vegetation on the trail is dominated by *Andropogon* grass, Chinese or Philippine ground orchid, and sword fern; 'ohi'a *lehua* trees with scattered 'ākīa, *ko'oko'olau*, Christmas-berry, and strawberry guava also occur on the trail. At the time of construction, the land would have been unvegetated. Condition of the trail is fair to poor within the project area; existing sections to the northeast and southwest are in fair to good condition. The integrity of the trail is unaltered within the project area, although it has been destroyed 500 ft. southwest of the project boundary by a modern quarry/dump. Overall site dimensions (across the AD 1750 flow) are c. 550 m long (NE-SW) by 0.7 m wide by 0.10 m high (varies—some portions are built on retaining walls). Of the total length of the trail, c. 72 m cross project area.

Based on Cordy's work in the *ahupua'a* of Keauohana (1987:16), the extant network of trails in this portion of Puna (i.e., those that have not been destroyed by lava flows in recent times) are considered as excellent examples of site types, valuable for their information content, and as culturally significant native Hawaiian resources. This trail may be contrasted with the steppingstone trail type, which typically consists of flat slabs of pahoehoe roughly one meter apart (e.g., Cordy 1987). A steppingstone trail requires less effort to construct than a paved slab trail and is not designed to accommodate travelers on horseback (Apple 1965). Waterworn boulders are integrated into portions of the trail in such a way to suggest that Site 19060 was originally built as a steppingstone trail, then upgraded to its present form. A rusted mule shoe was noted near the trail on the parcel of land south of the project boundary, which indicates that both foot traffic and shod hoofed animals (horses and mules) were indeed used on this trail. Thus, this trail appears to fit into Apple's Type AB category—that is, a Type A trail that has been widened and leveled to accommodate horses (Apple 1965:65). As horses were on trails in Hawai'i only after 1820\* (Apple 1965:64), if this trail was upgraded from a Type A steppingstone trail, it probably occurred at or shortly after this time. Apple also notes that mules

\* Prior to 1840, only chiefs and non-natives would have had access to the use of horses.



Figure 6. Site 19060 (Trail), View to Northeast (4555-2)

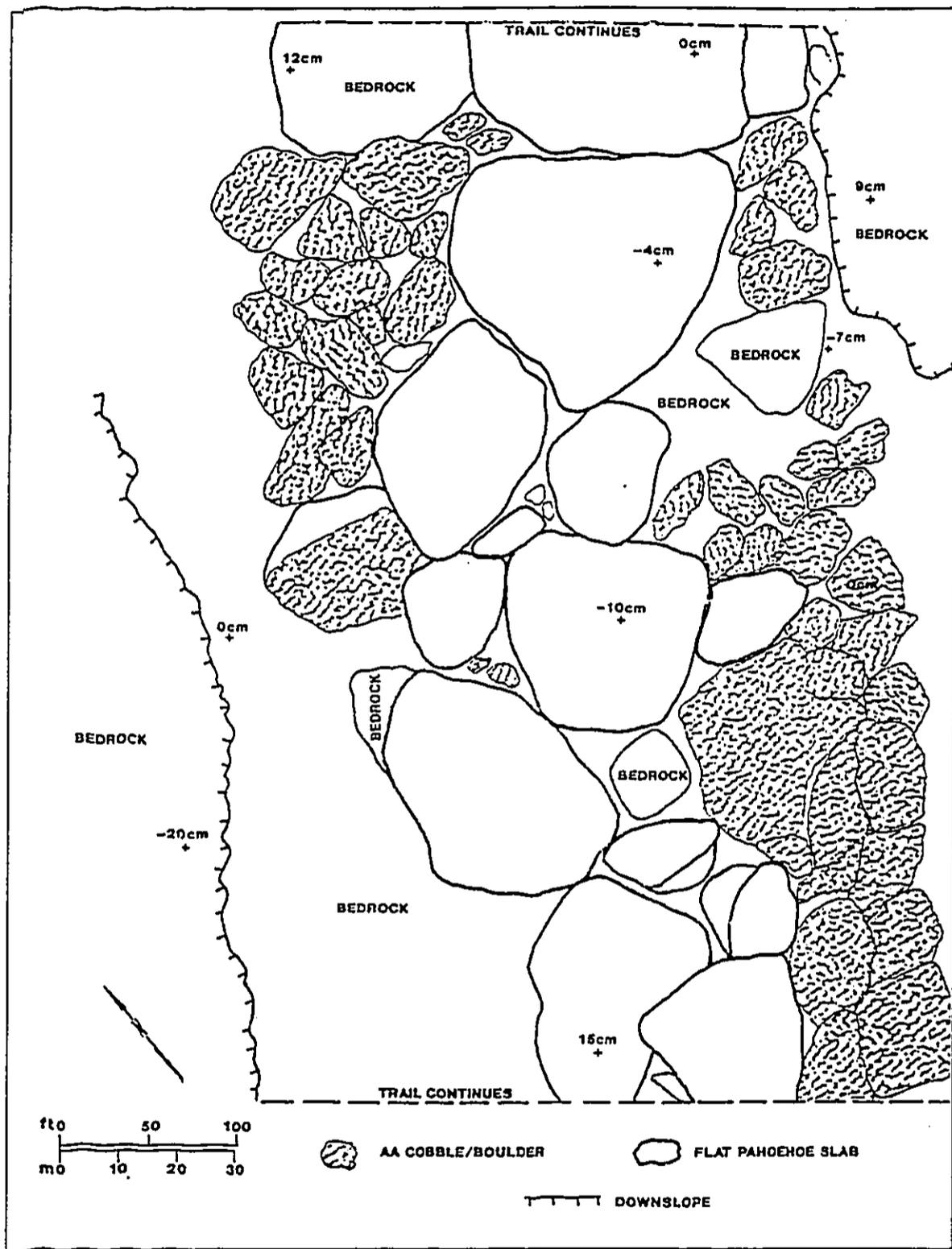


Figure 7. Site 19060, Plan of Construction Detail

were also used on trails after 1841 (1965:64). As indicated on historic maps, this trail formed the primary access route to Kalapana before the road was constructed.

Site 19061 is a wall built of local aa lava cobbles and boulders, constructed in the shape of a large "C." The wall crosses the trail in an area c. 0.8 km inland on the *makai* side of Highway 130. The wall is constructed of piled, poorly size-sorted aa cobbles and boulders, ranging from 10 to 60 cm, with an average size of 30 to 40 cm. The wall was built taking advantage of whatever size aa boulders were available in the immediate area, as well as utilizing outcrops and fissures in the aa flow. Thus, the size and configuration of the wall varies slightly throughout its length. Overall wall length is c. 242 m (C-shaped). Wall height, as built, appears to be c. 1.0 m, with an average width of 1.2 m. One area is partially collapsed, measuring c. 0.4 m high and 2.2 m wide. Overall site dimensions are c. 140 m (NW-SE) by 100 m (NE-SW). The wall may be associated with the trail, forming a C-shape that opens out to the southwest portion of the trail.

The wall crosses the trail (Site 19060) opening out to the southwest (*makai*). Because of this, the wall is posited to have a possible boundary function—to indicate to the travelers on the trail that they are passing into someone's land. However, the location of the wall does not correspond with any historically-recorded property boundaries. Alternative interpretations may be considered, including its having served some type of animal control function or possibly being related to a possible stacked aa burial platform on the adjacent property, and noted by Rosendahl (1983:2). (This platform was not relocated during the current study.) *Figure 7* shows the shape and location of the wall in relation to the trail. *Figure 8* illustrates a portion of the wall near where it crosses the project boundary.

The wall is in fair to good condition, and is of unaltered integrity except, possibly, where it crosses the trail; the wall may have once blocked the trail and subsequently been partially dismantled to re-establish access over the trail. In this area, the wall appears to have been built over the trail, and thus post-dates the trail by an unknown period of time. The wall is posited to date to as early as the protohistoric period and as late as the historic period.



Figure 8. Site 19061 (Wall), View to Southeast (4555-8)

## CONCLUSION

### DISCUSSION

A pattern of higher density coastal than inland land use is posited for this region (after McEldowney 1979), as well as opportunistic use of all land not covered by protohistoric flows. Soils in these remnant areas would have been suitable for the cultivation of dryland crops, and the coastal area would have possessed abundant marine resources and easy access to the sea for fishing.

As the present project area lies almost a kilometer inland and is overlain by the AD 1750 aa flow, we did not expect to find any historic resources, other than the previously noted paved pahoehoe slab trail, within the project area. The identification of an aa wall crossing a portion of this trail was, therefore, unexpected. The location of the wall does not correspond with any historically recorded property boundaries or any historically mapped features. The wall may have been placed along a property boundary that existed before the AD 1750 flow, or may be related to an aa platform (of unknown function) noted on the adjacent property; or it may have been directly related to the trail (i.e., some form of animal control device—designed to keep animals either off or on the trail).

The trail across the protohistoric aa flow was built to facilitate movement across the rough surface of the lava. Stokes (1910:277 IN Apple 1965:9) describes a steppingstone trail across aa, writing, "The ancient native trail leading past this spot [2 miles east of Punalu'u, Kā'u] crossed a flow of aa. To add to the comfort of the barefooted traveler, a line of smooth water-worn stones had been placed on the sharp clinkers about two and one-half feet apart." As this trail is what Apple (1965:65) terms a Type AB trail, it may have been originally a simple steppingstone trail that was upgraded sometime after 1820 to accommodate horses. At least one section appears to be built up on a causeway in order to minimize the relief.

### GENERAL SIGNIFICANCE ASSESSMENTS AND RECOMMENDED GENERAL TREATMENTS

To aid in outside review, general significance assessments and recommended general treatments for all identified sites are summarized in *Table 2*. Significance categories used in the site evaluation process are based on the National Register criteria for evaluation, as outlined in the Code of Federal Regulations (36 CFR Part 60). The Hawaii State Historic Preservation Office uses these criteria for evaluating cultural resources. Sites determined to be potentially significant for information content (Category A, *Table 2*) fall under Criterion D, which defines significant resources as ones which "have yielded, or may be likely to yield, information important in prehistory or history" (36 CFR Sec. 60.4). Sites potentially significant as representative examples of site types (Category B) are evaluated under Criterion C, which defines significant resources as those which "embody the distinctive characteristics of a type, period, or method of construction...or that represent a significant and distinguishable entity whose components may lack individual distinction" (36 CFR Sec. 60.4).

**Table 3. Summary of General Significance Assessments and Recommended General Treatments**

| SIHP<br>No. | Significance Category |   |   |   | Recommended Treatment |     |     |     |
|-------------|-----------------------|---|---|---|-----------------------|-----|-----|-----|
|             | A                     | X | B | C | FDC                   | NFW | PID | PAI |
| 19060       | +                     | - | + | + | +                     | -   | +   | -   |
| 19061       | -                     | + | - | - | -                     | +   | -   | *   |

**General Significance Categories:**

- A = Important for information content, further data collection necessary (PHRI=research value)
- X = Important for information content, no further data collection necessary (PHRI=research value, SHPO=not significant)
- B = Excellent example of site type at local, regional, island, state, or national level (PHRI=interpretive value); and
- C = Culturally significant (PHRI=cultural value)

**Recommended General Treatments:**

- FDC = Further data collection necessary (detailed recording, surface collections, additional historical research, and/or limited excavations as appropriate; and/or subsequent data recovery/mitigation excavations);
- NFW = No further work of any kind necessary, sufficient data collected archaeological clearance recommended, no preservation potential;
- PID = Preservation with some level of interpretive development recommended (including appropriate related data recovery work);
- PAI = Preservation "as is", with no further work (and possible inclusion into landscaping), or possibly minimal further data collection necessary

\* Because this site straddles the project boundary, and a large portion of it lies within the adjacent parcel of land, preservation "as is" is suggested, but is not required

Sites with potential cultural significance (Category C) are evaluated under guidelines prepared by the Advisory Council on Historic Preservation (ACHP) entitled "Guidelines for Consideration of Traditional Cultural Values in Historic Preservation Review" (Draft Report, August 1985). The guidelines define cultural value as "...the contribution made by an historic property to an ongoing society or cultural system. A traditional cultural value is a cultural value that has historical depth" (1985:1). The guidelines further specify that "[a] property need not have been in consistent use since antiquity by a cultural system in order to have traditional cultural value" (1985:7).

Based on the above federal criteria, of the two sites identified during the current project, one is assessed as significant solely for information content (Site 19061). No further work is recommended for this site. While preservation of this site is not required, it is suggested that it be considered for incorporation into development landscaping. As a native Hawaiian resource, it may enhance the setting of the church grounds.

The second site (Site 19060) is assessed as significant for information content, as an excellent example of a site type, and for cultural significance. Further data collection followed by preservation with interpretive development is recommended for this site. Further data collection might involve collection of oral history concerning use of the trail; clearing the vegetation off the trail; examining the trail for portable remains (such as pieces of coral) or petroglyphs; and examining the trail for evidence of multiple building phases (i.e., upgrading from a Type A to a Type AB trail). To minimize cost, the field work portion could utilize volunteer assistants supplied by the Kalapana Star of the Sea Church. Preservation with interpretive development could involve restoring the trail, or a portion of the trail, for the education and enjoyment of the parishioners, while at the same time discouraging people from following the trail off of the church grounds (and hence hastening the trail's demise).

To further facilitate client management decisions regarding the subsequent treatment of resources, the general significance of the archaeological sites identified during the current survey was also evaluated in terms of potential scientific research, interpretive, and/or cultural values (PHRI Cultural Resource Management [CRM] value modes). *Research value* refers to the potential of archaeological resources for producing information useful in the understanding of cultural history, past lifeways, and cultural processes at the local, regional, and interregional levels of organization. *Interpretive value* refers to the potential of archaeological resources for public education and recreation. *Cultural value* refers to the potential of archaeological resources to preserve and promote cultural and ethnic identity and values. CRM assessments for individual sites are presented in *Table 2*.

Prior to further work in the project area, as an important initial step, it is recommended that all identified sites be accurately located and plotted, by professional surveyors, with the aid of an archaeologist, on an appropriately scaled topographic map of the project area. This locational plotting would greatly aid in development planning by allowing determinations regarding further archaeological work (further data collection, data recovery and/or preservation) to be more accurately considered on a site-by-site basis.

The assessments and recommendations presented here have been based on the findings of an inventory survey of the project area. There is always the possibility, however remote, that potentially significant, unidentified surface and subsurface cultural remains could be encountered in the course of further archaeological investigations or subsequent development activities. In such situations, archaeological consultation should be sought immediately.

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## APPENDIX A

### SITE DESCRIPTIONS

SITE NO.: State 19060

PHRI: 1327-1

SITE TYPE: Trail

TOPOGRAPHY: Gently undulating aa

VEGETATION: Vegetation on the trail is dominated by andropogon grass, Chinese or Philippine ground orchid, and sword fern; 'ohi'a lehua trees with scattered 'ākia, ko'oko'olau, Christmas-berry, and strawberry guava also occur on the trail.

CONDITION: Fair to poor within project area; sections to the northeast and southwest are in fair to good condition

INTEGRITY: Unaltered within project area; destroyed 500 ft. southwest of project boundary by modern quarry/dump

PROBABLE AGE: Protohistoric-historic

AHUPUA'A: Kaimū and Makena

FUNCTIONAL INTERPRETATION: Transportation

DESCRIPTION: This trail lies 0.8 to 1.0 km inland, running across the width of the AD 1750 aa flow. The trail consists of flat pahoehoe slabs fitted into a pavement atop local aa. Trail width varies from 0.5 to 0.8 m, depending on local terrain (averaging 0.7 m). The trail is raised on a retaining wall (made of local aa cobbles) in at least one portion in order to minimize the relief, and the route meanders slightly to avoid outcrops. A rusted mule shoe was noted c. 100 m southwest of the project boundary, which taken with evidence of the trail having been built up in places to minimize relief, indicates that this trail was either built or upgraded to accommodate both foot and shod animal traffic. Thus, this trail is categorized as Apple's Type AB (Apple 1965:65): a possible post-1820 upgrade of a Type A trail.

If is not known if the trail continues off of the AD 1750 flow (that area lies outside of the present project area), although Apple (1965:65) notes that often only a recognizable trace of a trail may remain in areas that pass over soil. Portions to the northeast of the project area are in better condition, including one area where paving is three slabs abreast.

Overall site dimensions are c. 550 m long (NE-SW) by 0.7 m wide by 0.10 m high (varies—some portions are built on raised causeways). Of the total length of the trail, c. 72 m run across project area.

REFERENCES: Shown on two historic maps (Baldwin 1892, Awana 1952); Noted by Rosendahl (1983)

SITE NO.: State 19061

PHRI: 1327-2

SITE TYPE: Wall

TOPOGRAPHY: Gently undulating aa

VEGETATION: 'Ohi'a lehua, sword fern, strawberry guava, Christmas-berry

CONDITION: Fair to good

INTEGRITY: Unaltered, except, possibly, where it crosses the trail (Site 19060). It may have once blocked the trail and been subsequently partially dismantled to re-establish access over the trail.

**PROBABLE AGE:** Protohistoric/historic

**AHUPUA'A:** Kaimū and Makena

**FUNCTIONAL INTERPRETATION:** Possible boundary

**DESCRIPTION:** This site lies c. 0.8 km inland on the *makai* side of Highway 130. The site consists of a wall of piled aa cobbles and boulders, poorly size-sorted, and ranging from 10 to 60 cm with an average size of 30 to 40 cm. Construction of the wall takes advantage of whatever size aa boulders were available in the immediate area, as well as outcrops and fissures in the aa flow. Thus, the size and configuration of the wall varies throughout its length. The wall may be associated with the trail, forming a C-shape that opens out to the southwest portion of the trail.

Overall wall length is c. 242 m (C-shaped). Wall height, as built, appears to be c. 1.0 m, with an average width of 1.2 m. One area is partially collapsed, measuring c. 0.4 m high and 2.2 m wide. Site dimensions are c. 140 m (NW/SE) by 100 m (NE/SW).

Age determination is based on the age of the lava flow, although sufficient data to discern if the wall dates to the protohistoric or historic period is lacking. Wall appears to post-date the trail (Site 19060), however.