

1992-05-23-HI-FEA - Huehue Ranch. Disputed Remnant Parcel CDUA

MAY 23 1992

DISPUTED REMNANT PARCEL
CONSERVATION DISTRICT USE APPLICATION

FEBRUARY 1992

DISPUTED REMNANT PARCEL
CONSERVATION DISTRICT USE APPLICATION

PREPARED FOR:
HUEHUE RANCH ASSOCIATES, L.P.

PREPARED BY: PBR HAWAII

FEBRUARY 1992

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

**DEPARTMENT MASTER APPLICATION FORM
FOR DLNR USE ONLY**

Reviewed by _____
Date _____
Accepted by _____
Date _____
Docket/File No. _____
180-Day Exp. _____
EIS Required _____
PH Required _____
Board Approved _____
Disapproved _____
Well No. _____

(Print or Type)

I. LANDOWNER/WATER SOURCE OWNER
(If State land, to be filled in by Government
Agency in control of property)

DLNR:
1151 Punchbowl St.
Honolulu, HI 96813

Name: Huchue Ranch Associates, L.P. (HRA) &
State of Hawaii, Department of Land & Natural
Resources (DLNR)

Telephone No.: (808) 329-4466 HRA
(808) 587-0401

Address:
HRA DLNR
75-5722 Kuakini Hwy. 1151 Punchbowl St.
Suite 107 Honolulu, HI 96813
Kailua-Kona, Hi
96740

Interest in Property: Disputed Remnant Parcel;
Administrative And Proprietary Interest.

Term (if lease):

*SIGNATURE *ae m Inoue*

Telephone No.: (808) 329-4466 HRA
(808) 587-0401 DLNR

*SIGNATURE

SIGNATURE
• *ae m Inoue*

Date: February 14, 1991

*If for a Corporation, Partnership, Agency or
Organization, must be signed by an authorized officer.

Date: February 14, 1992

II. APPLICANT (Water Use, omit if applicant is
landowner)

Name: Huchue Ranch Associates, L.P. & State
Department of Land and Natural Resources

Address: HRA: 75-5722 Kuakini Highway
Suite 107, Kailua-Kona, HI 96740

III. TYPE OF PERMIT(S) APPLYING FOR

- () A. State Lands
- (X) B. Conservation District Use
- () C. Withdraw Water From A Ground Water
Control Area
- () D. Supply Water From A Ground Water
Control Area
- () E. Well Drilling/Modification

IV. WELL OR LAND PARCEL LOCATION REQUESTED

District: North Kona
Island: Hawaii
County: Hawaii

Tax Map Key: 7-2-04: portion of 5

Area of Parcel: Approximately 8.93 acres
(Indicate in acres or sq. ft.)

MASTER APPLICATION FORM Rev. 2/89

V. Environmental Requirements

Pursuant to Chapter 343, Hawaii Revised Statutes, and in accordance with Title 11; Chapter 200, Environmental Impact Statement Rules for applicant actions, an Environmental assessment of the proposed use must be attached. The Environmental assessment shall include, but not be limited to the following:

- (1) Identification of applicant or proposing agency; Huehue Ranch Associates, L.P., see Page 1 CDUA Application.
- (2) Identification of approving agency, if applicable; Department of Land and Natural Resources, see Page 1 CDUA Application.
- (3) Identification of agencies consulted in making assessment; See attached Appendix A, Environmental Assessment for Disputed Remnant Parcel: Regent Kona Coast.
- (4) General description of the action's technical, economic, social, and environmental characteristics; Please refer to Appendix A, Environmental Assessment for Disputed Remnant Parcel: Regent Kona Coast, sections 1.2 and 2.0.
- (5) Summary description of the affected environment, including suitable and adequate location and site maps;

From historic surveys the title of the parcel for which the use easement is requested has been in dispute. To resolve the matter, this application is being brought forth by the parties claiming interest in the title: Huehue Ranch Associates, L.P. and Department of Land and Natural Resources. The subject parcel is adjacent to Huehue Ranch Associates, L.P. property in Kukio. The proposed park is situated makai of the Regent Kona Coast Resort (previously referred to as Kukio Beach Resort), which is located on the west coast of the island of Hawaii in the North Kona District about six miles north of Keahole Airport and one mile south of Kona Village. The resort comprises approximately 675 acres in Kukio, and is identified as Tax Map Key (TMK) 7-2-04: 05 and 16. The entire resort site is owned in fee simple by Huehue Ranch Associates, L.P.. The proposed use easement for the Disputed Remnant Parcel covers approximately 8.93 acres and extends from the makai boundary of the Regent Kona Coast Resort to the highwater mark. The entire project area is designated as Conservation District Lands. Please refer to Figures 1 and 2 for location and site maps.

The proposed use easement would involve creation of a public park, Kikaua Point Park, to be developed, managed and maintained by Huehue Ranch Associates, L.P.. A public access plan and park development plan are attached as Appendices B and C respectively. Details concerning the affected environment are incorporated in the Environmental Assessment for the Disputed Remnant Parcel, Appendix A.

The area containing the Disputed Remnant Parcel, which is proposed for public park use, is vacant except for a small, run-down, wooden cottage, two barbecue pits, and old, unplumbed restrooms. The site is comprised of lava from the northwest rift zone of Hualalai. Both a'a and pahoehoe lavas are found within the proposed Kikaua Point Park. Vegetation is limited to stands of kiawe and salt tolerant grasses. Rainfall in the Conservation District area averages 10 inches annually, and none of the lands in the area are considered suitable for agriculture, forestry or pasturage.

- (6) **Identification and summary of major impacts and alternatives considered, if any;**
1. No Action would not accomplish the objective of creating a public park and protecting sensitive archaeological features.
 2. Creation of a Park on Another Site would be unfeasible since the point which separates Uluweoweo Bay and Kakapa Bay is unique and the archaeological features on the proposed park site are distinctive to that location. An adjacent parcel is also a candidate for a State Park, and development of the Disputed Remnant Parcel would be an extension of that use, thereby conforming to regional plans of the Department of Land and Natural Resources for public parks in North Kona. In addition, another site would not meet the objectives of either HRA or the State for the Disputed Remnant Parcel.
- (7) **Proposed mitigation measures, if any; See Appendix A, Environmental Assessment for the Disputed Remnant Parcel: Regent Kona Coast.**
- (8) **Determination; See Appendix A, Environmental Assessment for the Disputed Remnant Parcel: Regent Kona Coast.**
- (9) **Findings and reasons supporting determination; See Appendix A, Environmental Assessment for the Disputed Remnant Parcel: Regent Kona Coast.**
- (10) **Agencies to be consulted in the preparation of the EIS, if applicable. Not applicable.**

VI. Summary of Proposed Use (what is proposed)

Huehue Ranch Associates, L.P. is proposing the development of a public park on the Disputed Remnant Parcel by way of use easement extending over the 8.93 acres of the peninsula formed by the point between Uluweoweo Bay and Kakapa Bay. The park site would include a picnic area, a comfort station with outdoor showers, landscaping to enhance the site and improve the viewing of archaeological features which are to be preserved with an interpretive program, and development of a pedestrian circulation system. The proposed use easement would allow installation of potable water lines, electricity and irrigation to increase public enjoyment of the shoreline. Figure 3 provides a graphic depiction of planned park improvements.

INFORMATION REQUIRED FOR ALL USES

I. Description of Parcel

A. Existing structures/Use. (Attach description or map).

A small, dilapidated, wooden cottage used by Huehue Ranch Associates L.P. employees and guests is located near the shoreline of the proposed park area. Two barbecue pits and two unplumbed restrooms, along with one plumbed restroom are located on the site. No other improvements exist on the parcel.

B. Existing utilities. (If available, indicate size and location on map. Include electricity, water, telephone, drainage, and sewerage).

A small brackish well is in use at the proposed park site for limited irrigation and for rinsing. No utility lines or potable water is currently available on the parcel.

C. Existing access. (Provide map showing roadways, trails, if any. Give street name. Indicate width, type of paving and ownership).

Primary access to the proposed park site is through the oil and cinder ranch road. The proposed public access plan would provide passage from Queen Kaahumanu Highway along the southern boundary of the Regent Kona Coast Property to a parking and drop off area near the shore. Details regarding access can be found in the Appendix A, and in the Environmental Assessment for the Disputed Remnant Parcel: Regent Kona Coast, section 3.2.11.

D. Vegetation. (Describe or provide map showing location and types of vegetation. Indicate if rare native plants are present).

Vegetation within the proposed use easement park site consists of fountain grass and common native trees (kiawe and coconut) and shrubs. No rare or endangered plants are anticipated to exist on the site. For complete information, please refer to Appendix A, Environmental Assessment for the Disputed Remnant Parcel: Regent Kona Coast, section 2.2.1.9. Any areas disturbed during development of the park would be re-vegetated within thirty (30) days in accordance with Title 13, Chapter 2, Section 21(14).

E. Topography; if ocean area, give depths. (Submit contour maps for ocean areas and areas where slopes are 40% or more. Contour maps will also be required for uses involving tall structures, gravity flow and other special cases).

There are no slopes along the proposed utility easements having slopes of 40% or more. Within the proposed use easement, the slope is about 1%, rising from mean high water at sea level to about 15 feet above sea level.

F. If shoreline area, describe shoreline. (Indicate if shoreline is sandy, muddy, rocky, etc. Indicate cliffs, reefs, or other features such as access to shoreline).

The shoreline is rocky and characterized by calcified limestone shelf and fractured basaltic rock. A portion of the parcel contains a sandy beach area.

G. Existing covenants, easements, restrictions. (If State lands, indicate present encumbrances.)

Please refer to Appendix B, Title Information, for all encumbrance information relative to the parcel.

H. Historic sites affected. (If applicable, attach map and descriptions).

According to the archaeological survey completed for the Kukio Beach Resort Final Environmental Impact Statement (1986), the majority of the archaeological sites and features are concentrated near the shoreline. Seven archaeological features are located in the proposed park area. These features would be preserved and enhanced by the provision of an interpretive program, viewing areas and footpaths. Other sites which are determined to be good representative examples of feature types may be preserved and become part of the park interpretive program.

II. Description: Describe the activity proposed, its purpose and all operations to be conducted. (Use additional sheets as necessary).

The purpose of the proposed use easement is to provide an improved and well-managed public shoreline park for Hawaii residents and visitors. Restroom facilities, picnic area, landscaping and parking would be provided. In addition, the existing archaeological features would be preserved and enhanced through a pedestrian path and interpretive viewing stations.

Please refer to the attached Appendices and the Environmental Assessment for details concerning public access, park development and park maintenance plans.

III. Commencement Date: Within one year of CDUA approval.

Completion Date: Within three years of use approval.

IV. TYPE OF USE REQUESTED (Mark where appropriate) (Please refer to Title 13, Chapter 2)

- 1. Permitted Use (exception occasional use); DLNR Title 13, Chapter 2, Section 205-2; Subzone: Resource
- 2. Accessory Use (accessory to a permitted use); DLNR Title 13, Chapter 2, Section;
- 3. Occasional Use:
- 4. Temporary Variance:
- 5. Conditional Use:

Area of Proposed Use: Approximately 8.93 acres

Name & Distance of Nearest Town or Landmark: Kailua-Kona, 13 miles

Boundary Interpretation (If the area is within 40 feet of the boundary of the Conservation District, include map showing interpretation of the boundary by the State Land Use Commission). No boundary interpretation was requested due to the disputed status of the subject property.

Conservation District Subzone: R
County General Plan Designation: OS

V. FILING FEE

1. Enclose \$50.00. All fees shall be in the form of cash, certified or cashier's check, and payable to the State of Hawaii.
2. If use is commercial, as defined, submit additional public hearing fee of \$50.00.

INFORMATION REQUIRED FOR CONDITIONAL USE ONLY

- I. Plans: (All plans should include north arrow and graphic scale).
 - A. Area Plan: Area plan should include but not be limited to relationship of proposed uses to existing and future uses in abutting parcels; identification of major existing facilities; names and addresses of adjacent property owners.
 - B. Site Plan: Site plan (maps) should include, but not be limited to, dimensions and shape of lot; metes and bounds, including easements and their use; existing features, including vegetation, water area, roads, and utilities.
 - C. Construction Plan: Construction plans should include, but not be limited to, existing and proposed changes in contours; all buildings and structures with indicated use and critical dimensions (including floor plans); open space and recreation areas; landscaping, including buffers; roadways, including widths; offstreet parking area; existing and proposed drainage; proposed utilities and other improvements; re-vegetation plans; drainage plans including erosion sedimentation controls; and grading, trenching, filling, dredging or soil disposal. Maintenance Plans: For all uses involving power transmission, fuel lines, drainage systems, unmanned communication facilities and roadways not maintained by a public agency, plans for maintenance shall be included.
 - D. Management Plans: For any appropriate use of animal, plant, or mineral resources, management plans are required.
 - F. Historic or Archaeological Site Plan: Where there exists historic or archaeological sites on the State or Federal Register, a plan must be submitted including a survey of the site(s); significant features; protection, salvage, or restoration plans.
- II. Subzone Objective: Demonstrate that the intended use is consistent with the objective of the subject Conservation District Subzone (as stated in Title 13, Chapter 2).

The requested government action is the issuance of a Conservation District Use Permit (CDUP) from the Board of Land and Natural Resources for a use easement to allow creation of a public shoreline park which would lie within Conservation District lands. The use requested is a permitted use under the Resource subzone, Title 13-2-13(c):

- (1) *Lands necessary for providing future parkland and lands presently used for national, State, County or private parks; and*
- (2) *All permitted uses stated in the (P) and (L) subzone.*

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A P P E N D I X A

ENVIRONMENTAL ASSESSMENT

ENVIRONMENTAL ASSESSMENT

FOR

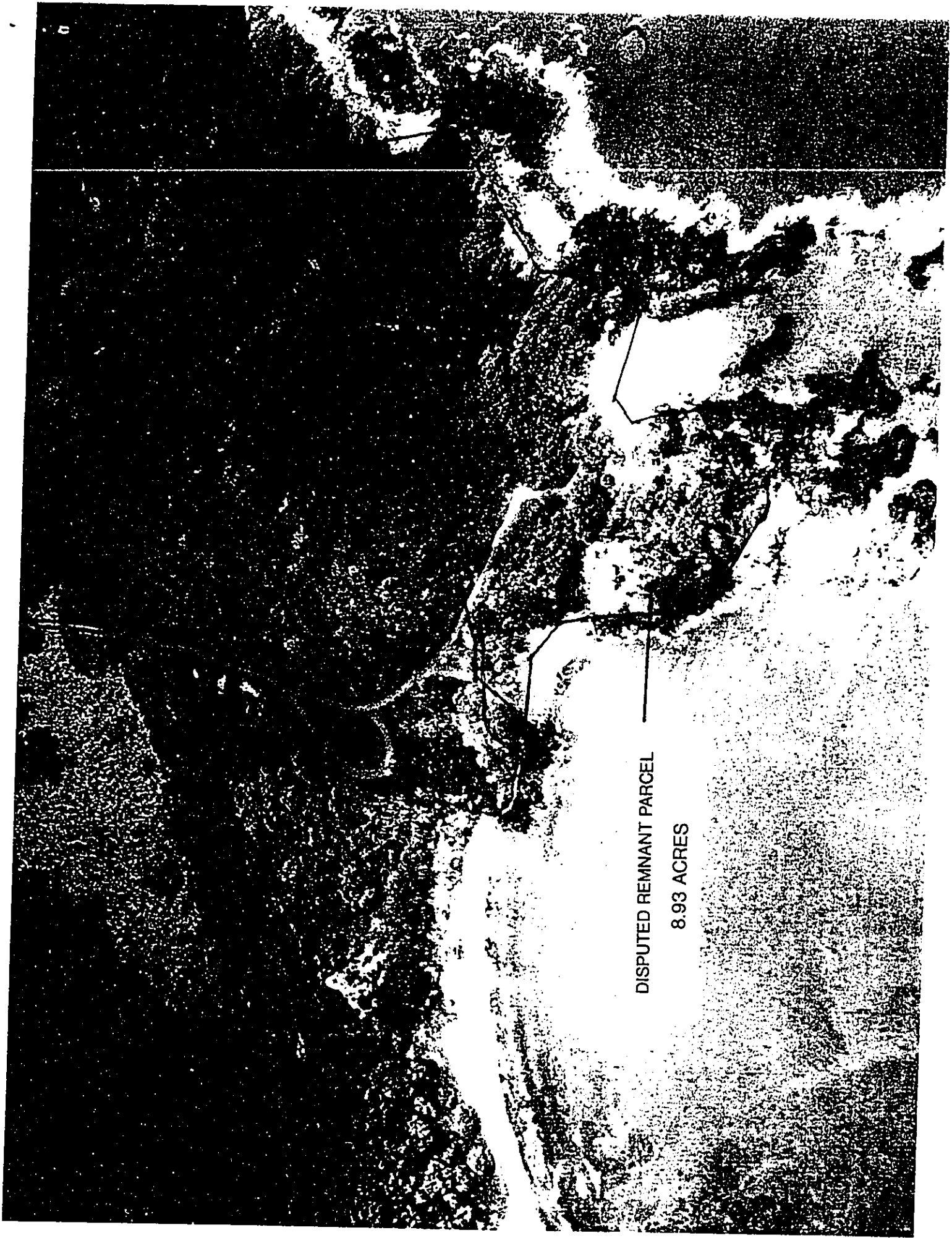
**HUEHUE RANCH ASSOCIATES, L. P.
DISPUTED REMNANT PARCEL**

TMK 7-2-04: portion of 5

Prepared For: Huehue Ranch Associates, L.P.

Prepared By: PBR HAWAII

February 1992



DISPUTED REMNANT PARCEL

8.93 ACRES

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INTRODUCTION

1.0 INTRODUCTION

1.1 PURPOSE AND CONTENT OF THIS DOCUMENT

This Environmental Assessment (EA) has been prepared in support of a State Conservation District Use Application for a use easement on the Disputed Remnant Parcel within the peninsula that separates Uluweoweo Bay and Kakapa Bay on the Island of Hawaii. This EA will discuss the environmental effects which may result from the establishment a public park on the 8.93 acres that comprise the proposed park site.

Preparation of this EA has been in accordance with the provisions of Hawaii Revised Statutes (HRS) Chapter 343, and Title 11, Department of Health, Chapter 200, Environmental Impact Rules, Sections 11-200-9 through 11-200-13.

Contained in this document is a description of the proposed park for which a use easement is requested (action), the affected environment, the alternatives considered to date, proposed mitigation measures, preliminary impact determinations based on the information contained herein, and the reasons supporting those determinations. This information has been drawn from generally available resources regarding the environmental characteristics of the project site and surrounding area.

1.2 REGIONAL SETTING

The proposed project is located on the west coast of the Island of Hawaii in the district of North Kona, approximately six miles north of Keahole Airport and one mile south of Kona Village Resort (Figure 1). The project area is a portion of Tax Map Key (TMK) 7-2-04:5.

The overall project location is shown on Figure 2, adjacent to the planned resort development makai of the area off Queen Kaahumanu Highway which is described in the Kukio Beach Resort Final Environmental Impact Statement (PBR, 1986). Since the issuance of the Kukio Beach Final Environmental Impact Statement, the resort name has been changed to Regent Kona Coast Resort.

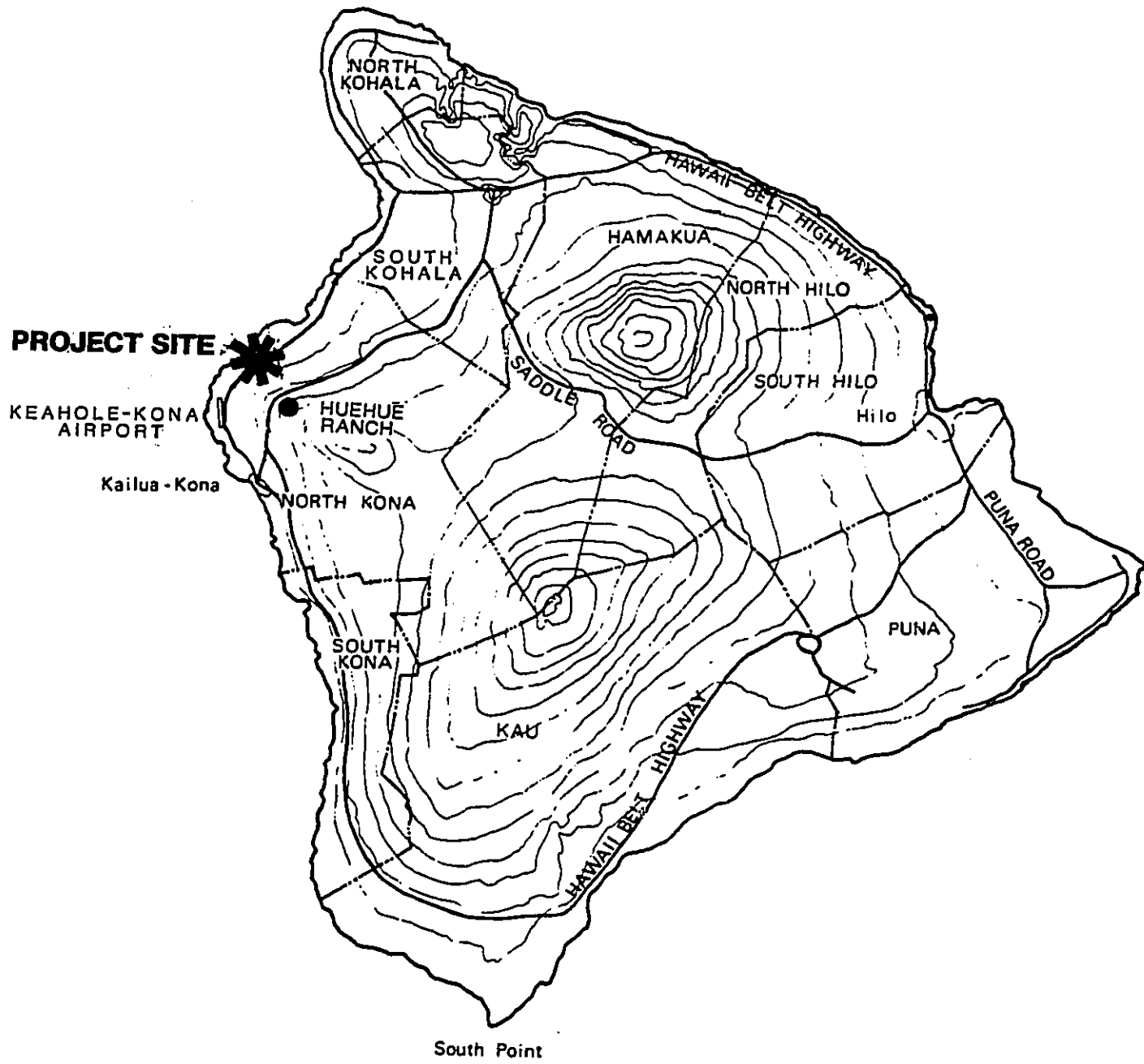
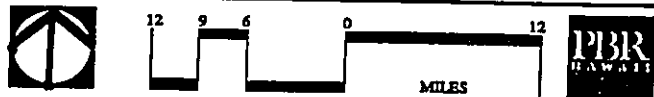


FIGURE 1
ISLAND LOCATION MAP
KIKAUA POINT PARK

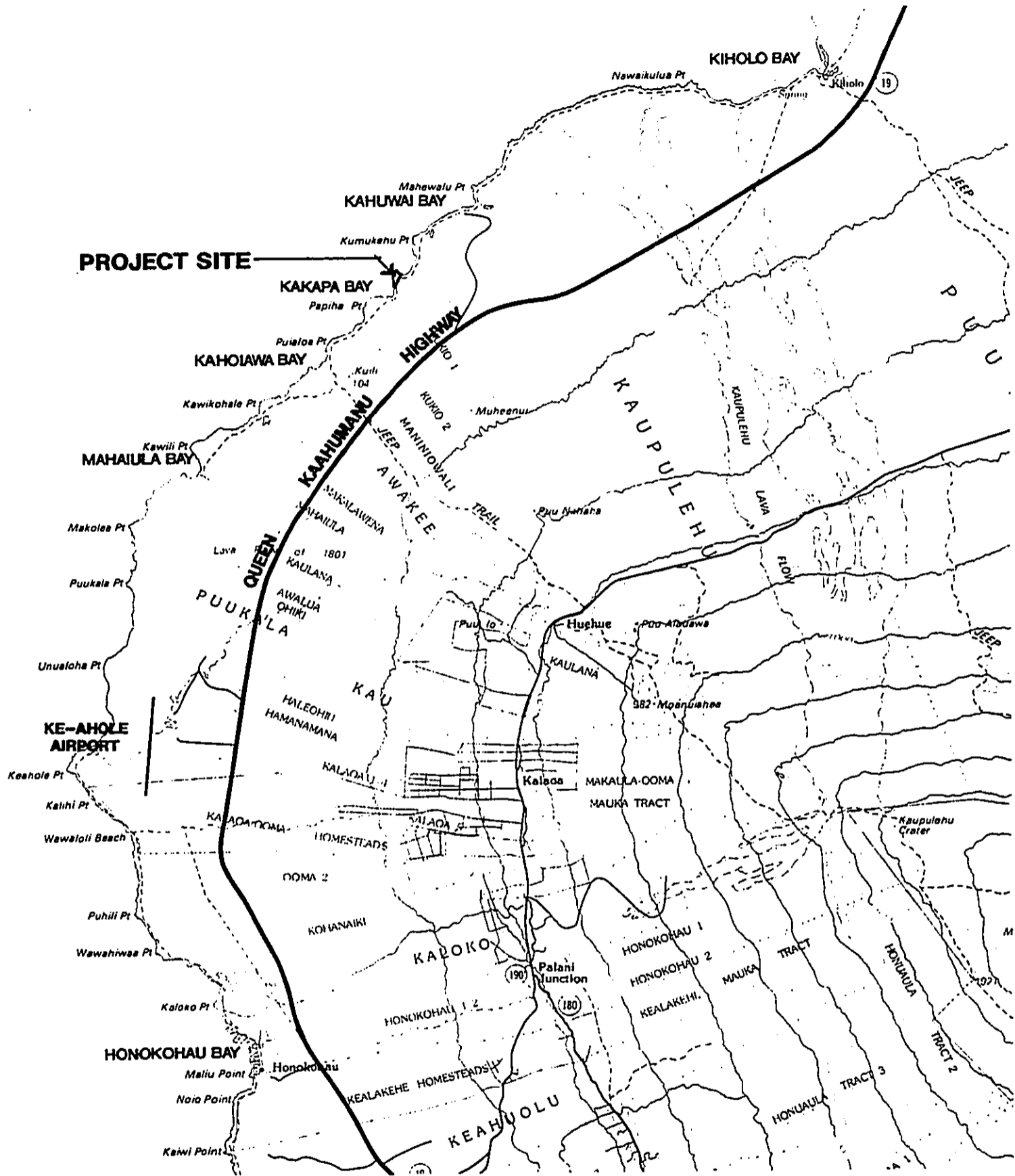
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MILES





Source: USGS 1980

FIGURE 2
 PARK LOCATION
 KIKAUA POINT PARK

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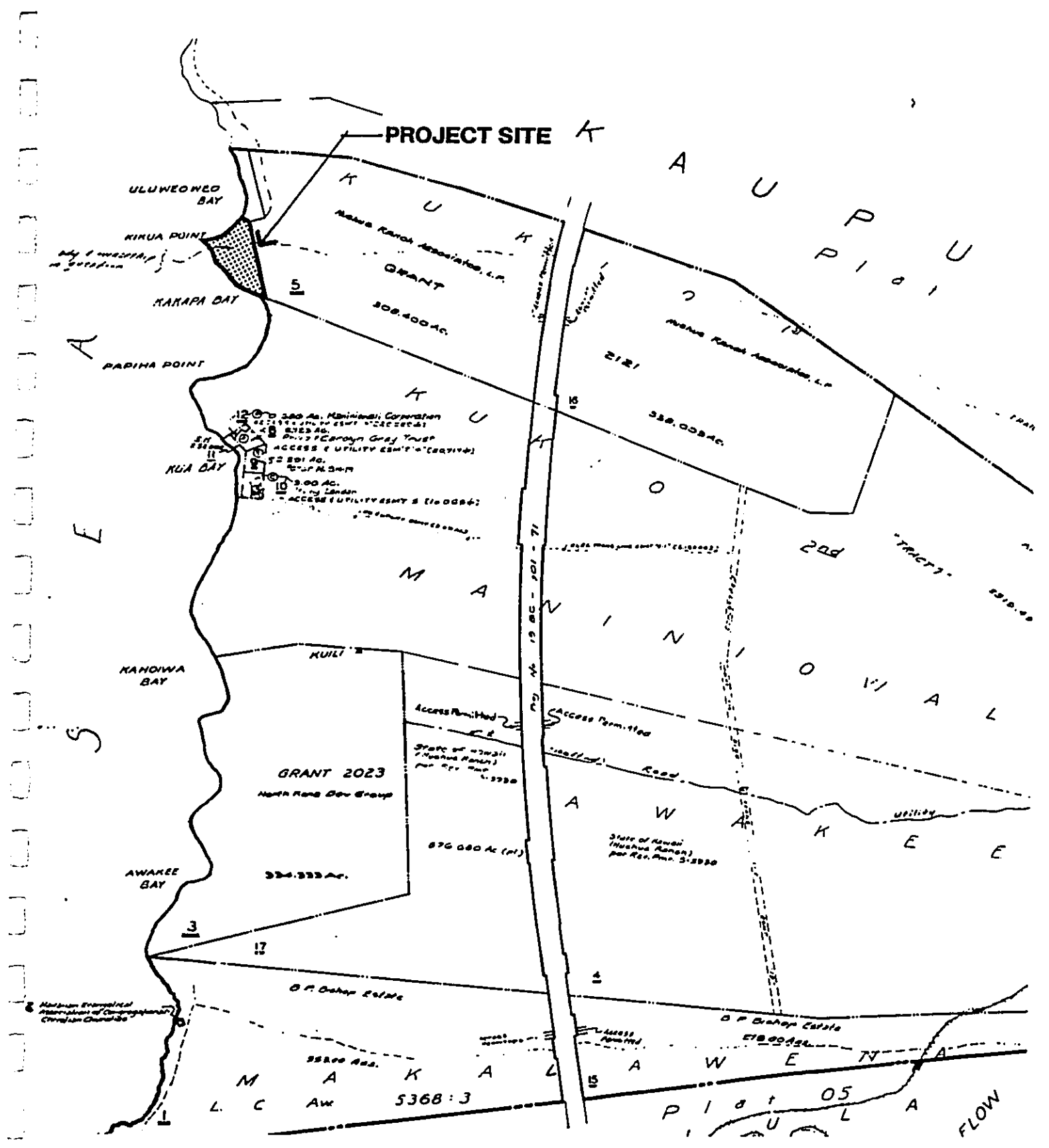


The entire public park would run from the makai boundary of the planned resort development to the Mean High Water (MHW) mark. The north boundary is formed by the shoreline and Uluweoweo Bay, and the southern boundary constituted by Kakapa Bay. The complete parcel is within Conservation District lands and the County Special Management area. The use easement would involve the Conservation District as identified by TMK 7-2-04:portion of 5 (see Figure 3).

1.3 REQUESTED GOVERNMENT ACTION

The requested government action is the issuance of a Conservation District Use Permit (CDUP) from the Board of Land and Natural Resources for a use easement to allow creation of a public shoreline park which would lie within Conservation District lands. The use requested is a permitted use under the Resource subzone, Title 13-2-13(c):

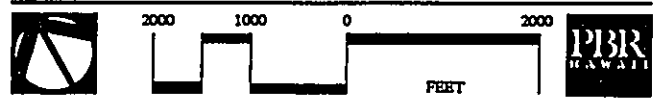
- (1) Lands necessary for providing future parkland and lands presently used for national, State, County or private parks; and*
- (2) All permitted uses stated in the (P) and (L) subzone.*



Source: Tax Map Bureau & Survey Dept., February 1936

FIGURE 3
TAX MAP KEY
KIKAUA POINT PARK

5



1.4 DESCRIPTION AND PURPOSE OF PROPOSED ACTION

Huehue Ranch Associates, L.P. is proposing to obtain a use easement (the action) that would allow the development of a public shoreline park on the Disputed Remnant Parcel within the peninsula bounded by Uluweoweo Bay and Kakapa Bay. The proposed easement would encompass the entire peninsula (about 8.93 acres). The proposed park lands rise from Mean Sea Level (MSL) at the shoreline and slope about 1 percent to an elevation of 15 feet at the mauka boundary.

The purpose of the proposed action is to provide a public shoreline park (referred herein as Kikaua Point Park) with improvements that enhance the recreational and educational uses of the site. The proposed action would furnish access to the site and public parking near the site. A comfort station with outdoor showers, picnic area, pedestrian paths, irrigation and lighting, as well as interpretive stations for the archaeological features located in the park area, would be provided.

Huehue Ranch Associates, L.P. intends to develop a well-planned public shoreline park designed to allow for preservation of archaeological features while allowing recreational use of the area. Further, the intent of the proposed action is to carry out the above objectives in an effective, efficient, and environmentally sound manner.

In concert with State regional park plans and the seven mile shoreline park adjacent to Kikaua Point Park, the proposed improvements to Kikaua Point Park are compatible with existing historical trails and State park objectives for the North Kona coast. Kikaua Point Park will assist in meeting the heavy public demand for beach parks in the area by providing another recreational resource to complement the planned public park areas at Manini'owali, Awake'e, Makalawena, and Mahai'ula.

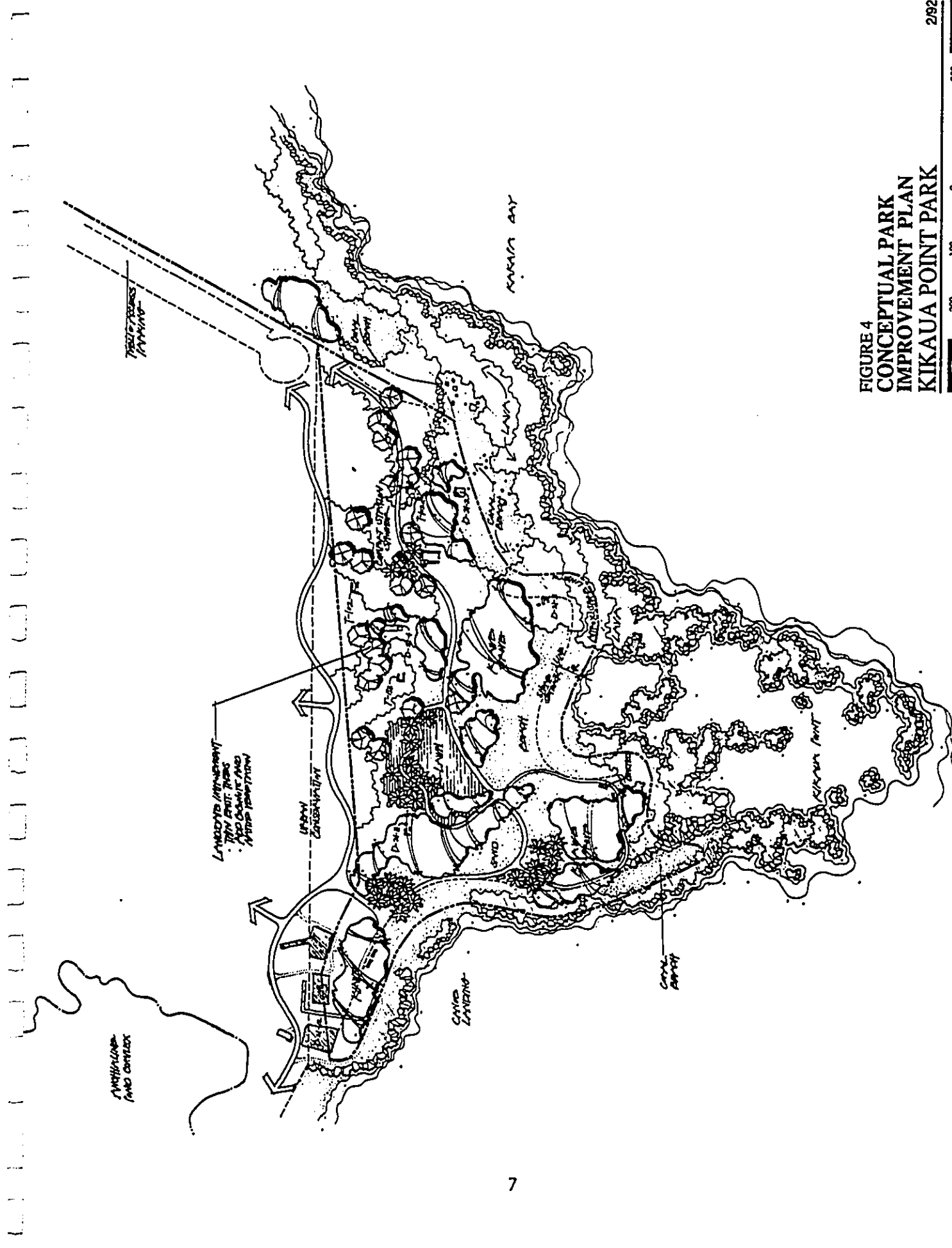
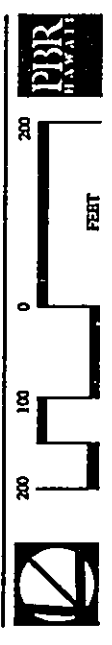


FIGURE 4
 CONCEPTUAL PARK
 IMPROVEMENT PLAN
 KIKAUA POINT PARK



**GENERAL DESCRIPTION OF THE PROPOSED
ACTION'S TECHNICAL, SOCIAL, ECONOMIC,
AND ENVIRONMENTAL CHARACTERISTICS**

2.0 GENERAL DESCRIPTION OF THE PROPOSED ACTION'S TECHNICAL, SOCIAL, ECONOMIC, AND ENVIRONMENTAL CHARACTERISTICS

2.1 DESCRIPTION OF THE SOCIAL AND ECONOMIC CHARACTERISTICS OF THE PROPOSED ACTION

2.1.1 Existing Conditions

The social and economic impacts of the proposed action and the overall park project would be concentrated in West Hawaii and, more specifically, in North Kona. Although agriculture is an important part of the economy of West Hawaii, real estate and visitor industries provide its main economic base. Of the 8,823 visitor units on the island in February of 1988, 81 percent were located in West Hawaii.

Due to the increased economic opportunities offered in West Hawaii, the population has increased tremendously. North Kona, where the project site is located, experienced a 252 percent increase between 1970 and 1989. Population in North Kona was estimated at 23,000 in 1989.

This has placed greater demand on existing public recreation areas. To meet this demand, the Department of Land and Natural Resources has planned beach park development for a seven mile stretch of coastline in North Kona which includes the area of Manini'owali, Awake'e, Makalawena, and Mahai'ula. The proposed park at Kikaua is adjacent to the Manini'owali parcel.

2.1.1.1 Social and Economic Characteristics of the Proposed Action

Establishment of a Kikaua Point Park by way of use easement on the Disputed Remnant Parcel would provide an additional public recreational resource to the beach park areas planned to the south. The social characteristics are, therefore, anticipated to be positive in that the environmental and infrastructural pressures for beach park development will be dispersed over a larger area.

The proposed project is expected to have positive economic characteristics, as the management and maintenance of the park would be provided by Huehue Ranch Associates, L.P., and would not require County or State funds. Some short term construction jobs would be realized as well.

2.2 DESCRIPTION OF THE ENVIRONMENTAL CHARACTERISTICS OF THE PROPOSED ACTION

2.2.1 Existing Conditions

2.2.1.1 Geology and Physiography

The area comprising the Disputed Remnant Parcel and proposed public shoreline park is located on the northwest flank of Mount Hualalai, one of the five volcanoes which form the island of Hawaii. The last eruptions of Hualalai occurred in 1800 and 1801. Historic and older lavas from Hualalai underlie the area. The lands encompassing the project site were formed during the past 3,000 years by lavas flowing from the northwest rift zone of Hualalai. Near the shoreline, coralline sediments constitute the geographic base.

2.2.1.2 Soils and Agricultural Potential

Soils in Hawaii are commonly rated in terms of three classification systems; (1) U.S.D.A. Soil Survey, which reflects land capability, (2) productivity ratings determined by the University of Hawaii Land Study Bureau, and (3) Agricultural Lands of Importance to the State of Hawaii (ALISH). These are discussed below, and graphically represented in Figures 5 and 6.

SOIL SURVEY

The Conservation District lands are made up of three land types identified in a comprehensive soil survey of the Island of Hawaii by the U.S. Department of Agriculture Soil Conservation Service (1973). The three land types are:

(1) A'a Lava Flows (rLV). This lava is generally bare of vegetation and has little soil cover. The molten lava mass moves so slowly that a rough, jagged clinker layer forms on its surface. It is characterized by rough, broken, glassy, sharp fragments piled in heaps. Bulldozers are able to move and crush the a'a surface into relatively smooth surface cobbles from one to four inches in size.

(2) Pahoehoe Lava Flows (rLW). This type of lava is also generally bare of vegetation. The only soil covering found on pahoehoe lava has been transported to cracks and depressions by wind and storm runoff. It is characterized by a relatively smooth surface with a billowy, glassy texture broken by rough hummocks and pressure domes.

(3) Cinder Land (rCL). Cinder lands consist of bedded cinders, pumice, and ash. Cinder is characterized by jagged edges and a glassy appearance. It is either black, red, brown, or variegated in color. Cinder lands sustain grasses, but they are not recommended for pasturage due to a loose consistency. Cinder land is a source of material for surfacing roads.

DETAILED LAND CLASSIFICATION

According to the productivity classification in a Detailed Land Classification, Island of Hawaii (1972); the soils on the site are very poorly suited for agricultural or grazing activities, and are classified in the E series, on a scale of A through E.

ALISH

None of the land within the proposed public shoreline park use easement is classified as agricultural Land of Importance to the State of Hawaii (ALISH).

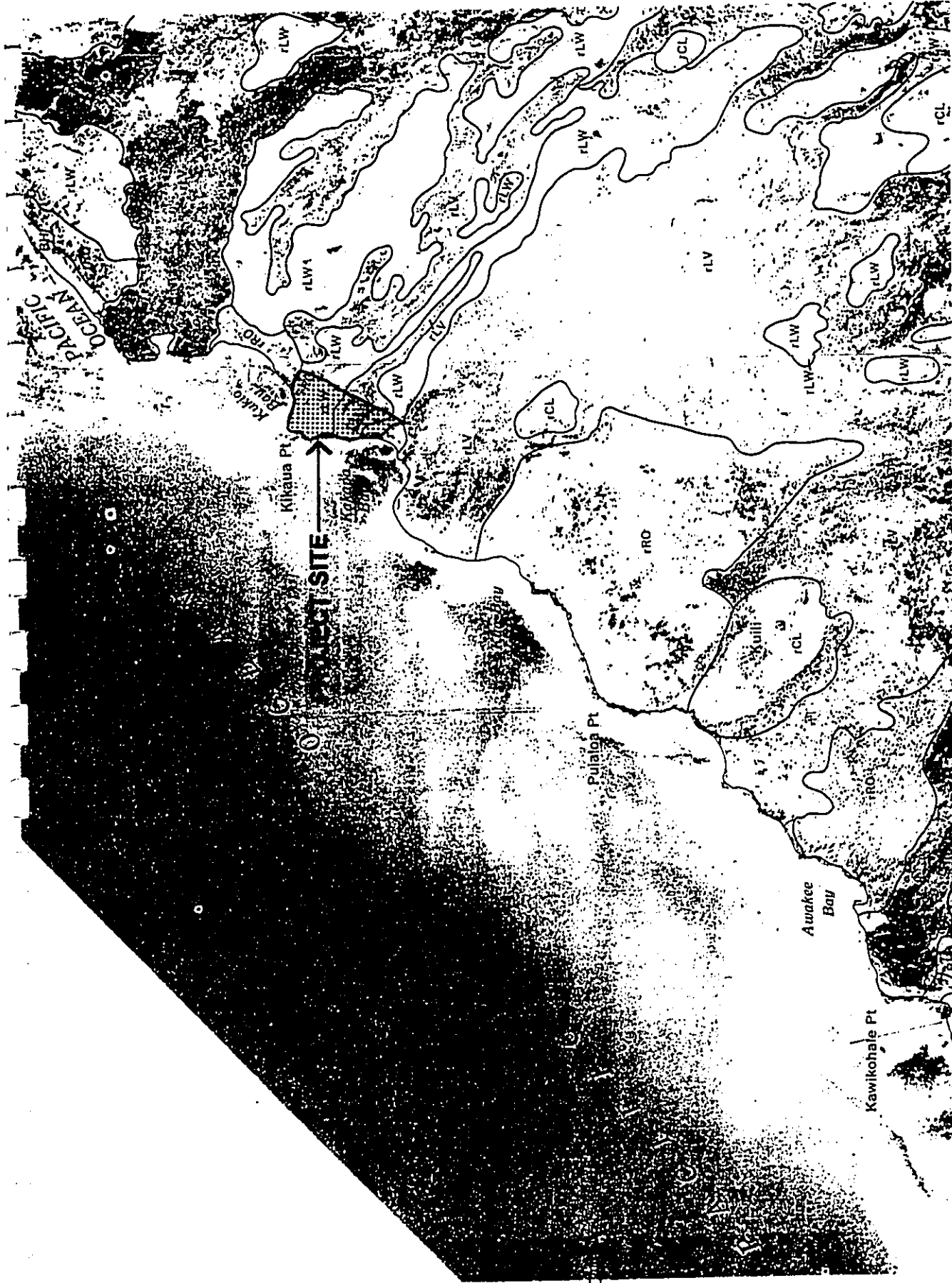
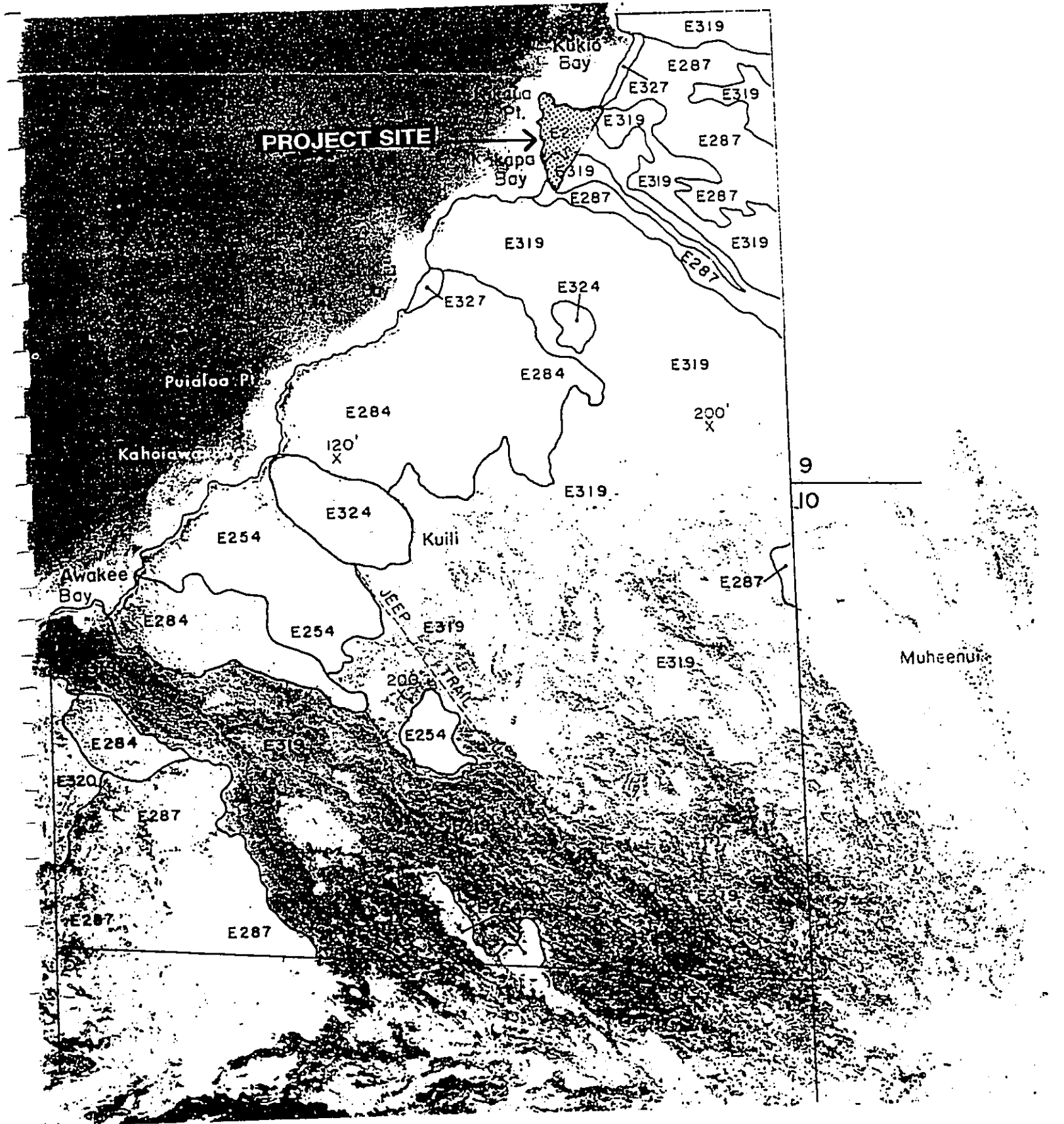


FIGURE 5
SOIL SURVEY
KIKAUA POINT PARK

Source: Soil survey of Island of Hawaii, State of Hawaii
December 1973





Source: Detailed Land Classification, Island of Hawaii
Land Study Bureau, November 1965

FIGURE 6
DETAILED LAND CLASSIFICATION
KIKAUA POINT PARK

2/92



2.2.1.3 Surface Water and Drainage

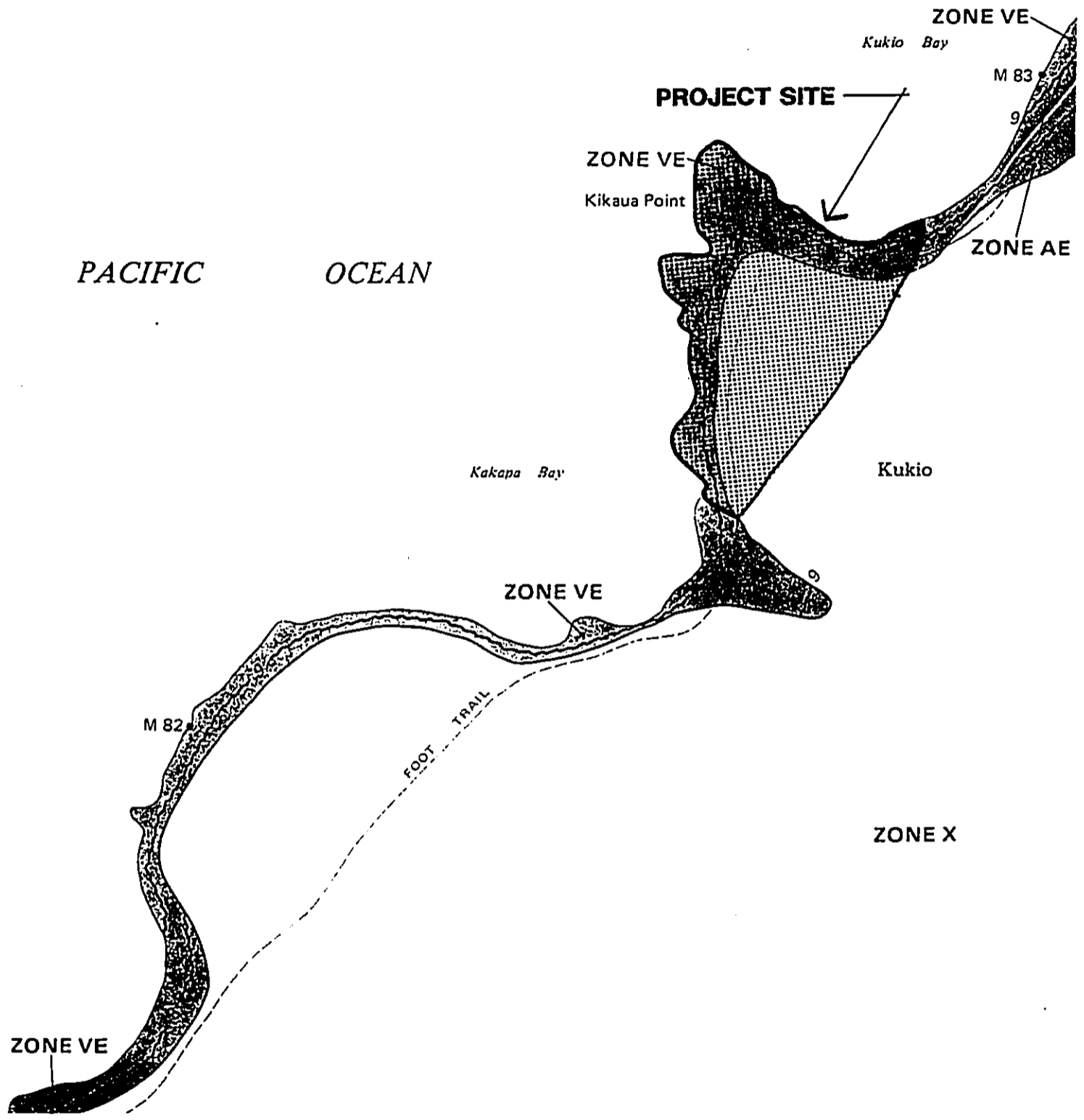
Due to the highly permeable nature of the basalt rock in the project area, surface water will tend to percolate directly downward to the water table. As a result of the low rainfall and highly porous ground conditions, natural runoff from seasonal rainfall is minor and flood hazards are remote. The little surface runoff that occurs during storms is carried as sheet flow before percolating to the groundwater table. The proposed use easement is located in an area identified by the Flood Rate Insurance Maps (FIRM) as being prone to flooding, and is designated as Zone AE. This is shown in Figure 7.

2.2.1.4 Groundwater and Hydrology

The groundwater flow in the general area comprising the Conservation District lands is characteristic of the highly permeable basalts of the Hualalai volcanic series that constitute an aquifer carrying a continuous thin basal lens of brackish water underlain by salt water. The high salinity of the brackish water at the low elevation of the Conservation District project lands renders it unsuitable for domestic consumption or extensive irrigation. Potable water for the public shoreline park project will be provided by three wells located on Huehue Ranch Associates, L.P. lands mauka of the Conservation District. The groundwater in this mauka region is fresh because the head is high enough to prevent sea water intrusion into the core of the lens.

The offsite water system is designed to provide potable water to Huehue Ranch Subdivision and the Regent Kona Coast Resort. The system consists of two existing wells (State wells 4559-01 and 4459-01); a third well being drilled (State Well 4558-01), and two wells which have permits for drilling (HR-4 and HR-5). These wells will contain submersible pumps, with separate motor controls, telemetry equipment, flow recorders, water level recorders, and chlorination systems. An iron ductile pipe system will connect wells to two 500,000 gallon reservoirs. These reservoirs will be constructed of reinforced concrete.

Potable water use by park visitors is estimated at 1,000 to 4,200 gallons per day (gpd), based on the estimated range of park use (75 persons to the carrying capacity of 408 persons). This total is established on the estimated amount of wastewater generated, plus some limited consumption (refer



Source: Flood Insurance Rate Map
September 16, 1988

FIGURE 7
FIRM MAP
KIKAUA POINT PARK

2/92



to section 2.2.1.12). This allocation is included in the water budget for the Regent Kona Coast Resort.

Lines from the well source to storage lines will be pressurized by booster pumps at the lower reservoir. Three 50,000 gallon pressure breaker tanks will be required between the 1,000 foot and 1,500 foot elevations. A 12 inch diameter pipe will be used for transmission above 1,815 foot elevations and an 8 inch diameter pipe will be used to the Regent Kona Coast property. From the resort boundary, a 4 inch line will be used to transmit potable water to the comfort station and outdoor shower area. See Figure 8.

Irrigation water will continue to be provided from the small brackish well existing on site, since landscaping will involve salt tolerant plants.

2.2.1.5 Natural Hazards

Potential natural hazards which could affect the area are volcanic eruptions, earth quakes, and tsunamis. Because of the excessively well-drained nature of the land and soil types, no flooding due to rainwater is expected to occur. The last eruption of Mount Hualalai was in 1800-1801. A small flow that erupted during this time period reached the sea at Kukio and underlies the project site. According to Moore (PBR, 1986), eruptions from Hualalai Volcano occur approximately every 50 years. Within the past 10,000 years Hualalai has erupted approximately 200 times. Consequently, an eruption in the next 200 years and possibly the next few decades must be considered.

The Island of Hawaii is in Seismic Zone III of the Uniform Building Code. The closest large earthquake to the site occurred on October 6, 1929. It was centered under Hualalai Volcano and had an approximate magnitude of 6.5. According to historical data, earthquakes of a magnitude of 6.4 occur on an average of once every 62 years.

The Hawaiian island coasts are exposed to tsunamis, and the area adjacent to the shoreline has been designated within the Zone AE area of flooding and tsunami inundation.

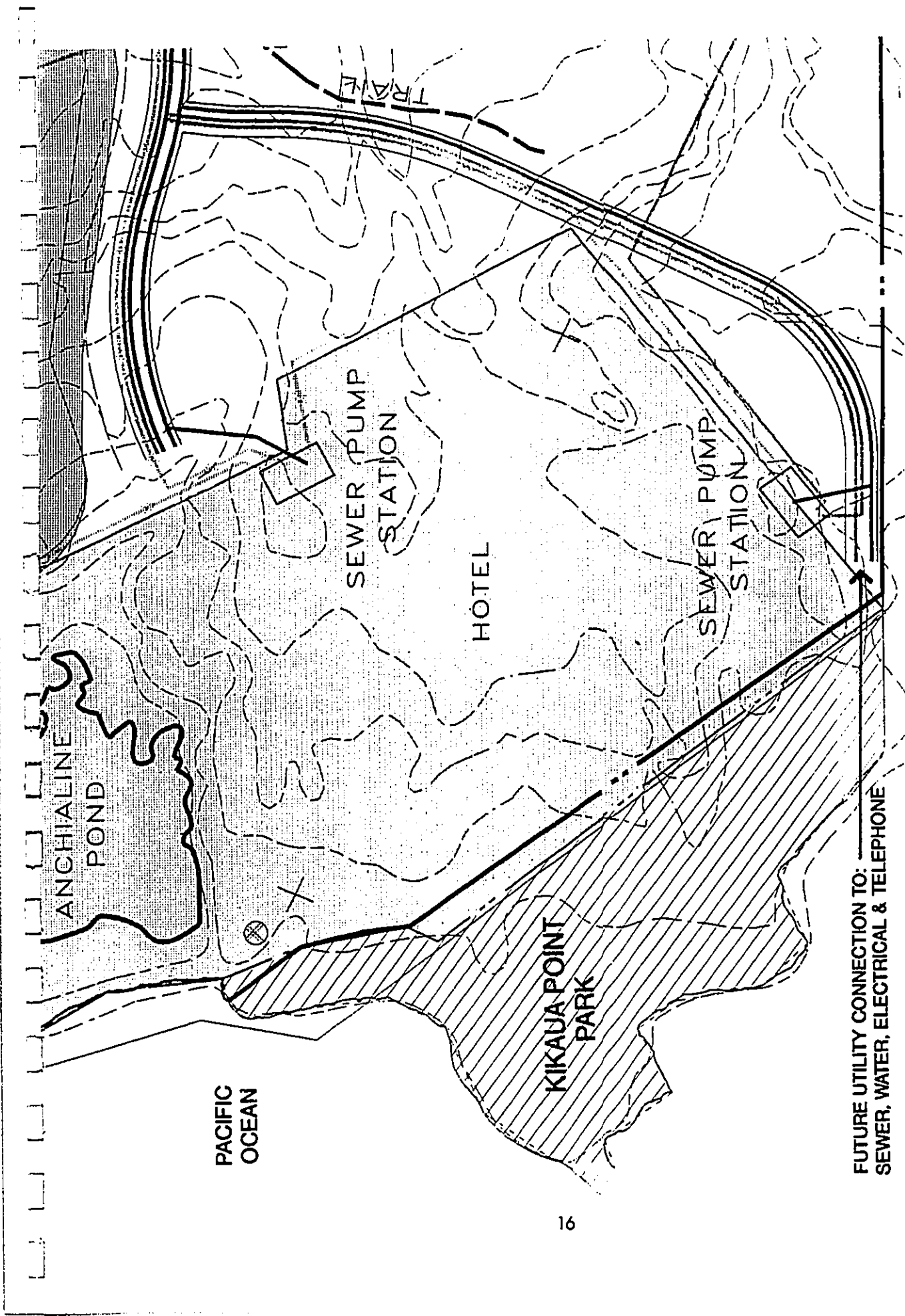


FIGURE 8
COMFORT STATION AREA AND
WATER LINE FROM WELL SITE
KIKAUA POINT PARK

Source: The Regent Kona Coast
Sam O. Hirota, Inc.
January 14, 1992



2.2.1.6 Climate and Meteorology

The Kukio ahupua'a, on which the Disputed Remnant Parcel and proposed public shoreline park project is situated, lie in the wind and rain shadow of Mauna Kea and Mauna Loa, blocking them from the rain-laden northeast tradewinds. This area is known as Kekaha, meaning dry, sunbaked land. The convection process along the slopes of Mount Hualalai causes light and variable winds often blowing off-shore in the morning and on-shore late in the afternoon. Rainfall in the proposed project Conservation District land averages 10 inches annually. The maximum rainfall occurs from May through September. Temperatures run from about 63 degrees F in the evening to about 78 degrees F in the daytime.

2.2.1.7 Air and Noise Quality

In recent years, the air quality in the region has been affected by volcanic emissions from Kilauea Volcano which produce a noticeable haze primarily over the Kona area. According to the State Department of Health, the emissions may irritate the lungs and eyes and may exacerbate existing chronic respiratory conditions. While no specific data describing regional air quality is available, it is estimated that on the days when the volcanic haze does not occur, the air quality in West Hawaii is good. The area comprising the Disputed Remnant Parcel has no stationary emission sources, and there are only low levels of emissions from vehicular traffic along the existing private roadway from Queen Kaahumanu Highway.

Existing noise sources in the project area include low volume traffic along Queen Kaahumanu Highway, infrequent vehicular activity along the existing private roadway, and wind moving through the vegetation.

2.2.1.8 Visual Attributes

The Conservation District lands upon which the Disputed Remnant Parcel and proposed public shoreline-park use easement would be established range from an elevation of MSL to 15 feet. The site is characterized by a small sandy beach area, sharp, rocky outcrops with a kiawe thicket along the mauka boundary of the site. Several coconut trees are well established. Additionally, there are

visible archaeological features on site.

2.2.1.9 Flora and Fauna

A botanical survey (Char, 1988) of the Conservation District in the general area of the proposed action is contained in the Environmental Assessment for Kaupulehu Developments Utility Corridor (BCA, 1989). The more common native trees and shrubs are lama (*Diospyros sandwicensis*), a'ali'i (*Dodonaea viscosa*), 'ohi'a (*Metrosideros polymorpha*), naio (*Myoporum sandwicense*), 'ilima (*Sida fallax*), and nehe (*Lipochaeta lamarum*). The introduced trees and shrubs include silk oak (*Grevillea robusta*), pluchea (*Pluchea symphytofolia*), indigo (*Indigofera suffruticosa*), and lantana (*Lanatan camara*). Another botanical study completed for the Manini'owali Residential Community Draft Environmental Impact Statement (Char, 1991) found two candidate endangered species within the nearby State proposed shoreline park: the pololei fern (*Ophioglossum concinnum*) and 'ohai (*Sesbania tomentosa*). The vegetation occurring in the proposed public shoreline park is likely to be limited to kiawe, and coconut along with weedy species.

A survey of the fauna (Bruner, 1988) of the Conservation District in the general area of the proposed project is contained in the Environmental Assessment for Kaupulehu Developments Utility Corridor (BCA, 1989). This survey documented bird and mammal species occurring or likely to occur in the area.

There were no endemic birds sighted on the property, but it was determined that the Short-eared Owl or Pueo (*Asio flammeus sandwichensis*) could occur within the area, as the Pueo is known to range throughout most of Kona. This species has been classified as endangered on Oahu by the State of Hawaii Department of Land and Natural Resources, but nowhere else in the State of Hawaii. Migratory indigenous birds found in the area were the Pacific Golden Plover (*Pluvialis fulva*) and the Ruddy Turnstone (*Arenaria interpres*). No resident indigenous birds or seabirds were observed on the property. Ten species of exotic birds were observed, the most abundant being the Japanese White-eye (*Zosterops japonicus*).

Similarly, a faunal study conducted for the Manini'owali Residential Community Draft Environmental

Impact Statement (Bruner, 1991) found no threatened or endangered species frequenting that parcel, and recorded corresponding bird and mammal populations as were found in the previous Kuhio study.

2.2.1.10 Historical and Archaeological Resources

In 1986 an archaeological study was completed for the Kukio Lands (FEIS) documenting the sensitive archaeological and historical sites, most of which were situated near the shoreline. Seven sites were recorded on the proposed public shoreline park site: D-21-1, D-21-2, D-21-3, D-21-4, D-21-11, D-21-12, T-102, and T-108. Data has been recovered from each of these sites as part of the approved Phase I: Mitigation Plan for Data Recovery, Interim Site Preservation, and Burial Treatment for Regent Kona Coast Resort. Preservation is recommended for the possible heiau site (D-21-12) near the northeastern boundary of the Disputed Remnant Parcel. This site will be enhanced through the development of interpretive viewing areas and a pedestrian path. Please see Appendix E.

2.2.1.11 Access

Access to the proposed public shoreline park would be from Queen Kaahumanu Highway along the southern boundary of the Regent Kona Coast Resort. Because the highway is planned for improvement to a four lane freeway, eventually access will occur via grade separated interchanges. In the interim, access would include:

- ramp connections and two at-grade T-intersections at Queen Kaahumanu Highway
- turn movements will be restricted to right turn movements only.

The traffic study uses a per acre figure (3.37 trips per acre) in estimating traffic levels for the park. This equals 90 persons per day at 3 persons per vehicle ($8.93 \text{ acres} \times 3.37 \text{ trips per acre} = 30.09 \text{ trips or } 30 \text{ vehicles}$). Using an assumption of a turn-over rate of 2.5 vehicles per day, yields a parking demand of 12 parking spaces. Using a carrying capacity analysis yields a parking demand of approximately 54 stalls. Since the SMA for the hotel requires a maximum of 150 parking stalls (based on number of hotel units and residential lots) parking for the park would be sufficient.

Parking stalls are planned near the southern boundary of the park (a maximum of 50 stalls) and near the beach on the north side of the Regent Kona Coast property boundary (a maximum of 100 stalls). For details, please see Appendix C, Public Access Plan and Appendix F, Traffic Impact Study: Regent Kona Coast Beach Development (1991).

Kikaua Point Park is envisioned as a passive park. Carrying capacity use assumptions, and associated parking requirements, can be generated using the medium density standard per person (160 sq. ft.) employed by the State Comprehensive Outdoor Recreation Plan (SCORP) as shown:

$$\begin{array}{lcl} \text{Usable Area} & = & \text{Users} \\ 160 \text{ sq. ft.} & & \frac{65,340 \text{ sq. ft.}}{160 \text{ sq. ft.}} = 408 \text{ Users} \end{array}$$

If the total useable area in the park amounts to approximately 1½ acres of useable area (subtracting archaeological sites, lava and coralline outcrop area, and facilities), this translates to a maximum of about 408 users per day. When converted to the average parking guidelines (3 persons per vehicle), this equates to 136 parking stalls. Assuming use turn-over is 2.5 vehicles per day, the parking demand relative to park use would be estimated to be about 54 parking stalls, more than the maximum parking required under SMA 311 (150 stalls).

It should be noted that the traffic study calculations of 30 vehicles per day were based on an average rate for beach parks per acre, and not on a carrying capacity basis. The assumption, in other words, is that actual use would be less than maximum carrying capacity. The social characteristics of the proposed action would be positive since Kikaua Point Park would be an addition to recreational facilities in the Kona area.

2.2.1.12 Wastewater

The planned Regent Kona Coast Resort includes the construction of an on-site treatment and disposal facility. The Disputed Remnant Parcel is not expected to generate significant amounts of wastewater in comparison to the volume generated by the resort. Assuming a use of 75 to 408 persons per day approximately 10 gallons of wastewater per person per day would be generated (from Table 1, Dept. of Health, Title 11, Chapter 62, relating to picnic parks with restrooms and showers). Treatment would occur via the Regent Kona Coast Resort wastewater treatment plant.

2.2.1.13 Solid Waste

Currently, the North Kona Area is served by the Kailua landfill located mauka of Queen Kaahumanu Highway near Kailua-Kona. Inasmuch as this site will soon be filled to capacity, the County of Hawaii is currently in the process of selecting a new site for a new sanitary landfill in the Pu'uana'hulu area, which would also serve the proposed public shoreline park. Waste generated at the park will be collected by private contractor through Huehue Ranch Associates, L.P..

2.2.1.14 Electrical Power and Communications Systems

HELCO's existing overhead 69 KV transmission lines located at about 3,000 feet above Queen Kaahumanu Highway would provide electrical power to the Regent Kona Coast Resort and to the proposed Kikaua Point Park via underground utility lines.

Telephone service to the area is provided by Hawaiian Telephone Company via existing pole lines that run the length of the existing oil and cinder road. These communication lines will be placed in underground lines along a new utility easement situated along the northern boundary of the Regent Kona Coast site.

2.2.1.15 Public Schools

There are 11 public schools located in the West Hawaii area. These schools are anticipated to serve students of resort-based families and new employees of the resort.

2.2.1.16 Health Care Facilities

Kona Hospital is the nearest full-service health care facility to the project area. In addition, there are two state-operated hospitals in Kohala.

2.2.1.17 Police and Fire Protection Services

One police station and two fire stations service the project area. A regional police station is located on a 10-acre parcel near Honokohau Harbor, approximately 10 miles south of the project area. One fire station is located near Kailua-Kona and the other is located near Mauna Lani Resort about 15 miles north of the project area.

2.2.1.18 Recreational Resources

West Hawaii contains a variety of recreational facilities. They include golf courses, tennis courts, beaches, small boat harbors, historic sites, hunting areas, hiking trails, and bikeways. The North Kona District has two County beach parks at Pahoehoe and White Sands, the Old Kona Airport State Park, and the Hulihee Palace State Monument.

Currently, the State Department of Land and Natural Resources is planning to develop a seven mile stretch of North Kona shoreline from Manini'owali through Awake'e, Makalawena, and Mahai'ula. A portion of the area at Awake'e is designated for a wilderness park. The proposed park at Kikaua Point (adjacent to Manini'owali) provides an additional public recreational resource as a beach park.

**SUMMARY DESCRIPTION
OF THE AFFECTED ENVIRONMENT**

3.0 SUMMARY DESCRIPTION OF THE AFFECTED ENVIRONMENT

3.1 PROBABLE SOCIAL/ECONOMIC IMPACTS AND MITIGATION MEASURES

The establishment of the proposed Kikaua Point Park use easement on the Disputed Remnant Parcel would provide additional recreational opportunities for residents and visitors which would have a positive social impact on the project area. It would also have a positive impact on the region by resolving an existing parcel "dispute" to the benefit of the public.

Those elements of the overall park development that might cause adverse social impacts on the project area are considered in this EA along with a description of appropriate measures that would be put into effect as needed to mitigate any potential adverse social impacts.

The economic impacts directly and indirectly resulting from the provision of a use easement for a public shoreline park are expected to be positive. First, development of the proposed Kikaua Point Park would provide some short term construction jobs, and long term management and maintenance jobs for Hawaii residents. Second, overall development, management and maintenance of the park would increase public recreational opportunities at no cost to the County and State of Hawaii.

Given the expected positive social benefits and positive economic benefits resulting from a use easement which would allow the development of Kikaua Point Park, no negative social or economic impacts are anticipated, and no mitigation measures are warranted.

3.2 PROBABLE ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

3.2.1 Geology and Physiography

Development of the Disputed Remnant Parcel as a public shoreline park is not expected to impact or be impacted by the geology and physiography of the area, as minimal enhancements to the site are anticipated. No extensive grubbing or grading is planned. Therefore, measures to mitigate potential adverse effects, other than adherence to State and County building codes and regulations, do not appear warranted.

3.2.2 Soils and Agricultural Potential

Presently there are no plans to use the area for agricultural activities, as the soils are unsuited for agricultural use. Development of the proposed public shoreline park is not expected to impact or be impacted by the soils of the area. No expected significant adverse impacts to the soils or agricultural potential of the area, therefore, mitigation measures to minimize potential adverse soil or agricultural impacts do not appear warranted at this time.

3.2.3 Surface Water and Drainage

No paving within the Disputed Remnant Parcel is planned that would cause significant alterations of drainage patterns and increase surface water runoff. The proposed pathways would have a minor effect on the drainage pattern and surface water flow. Therefore, no significant adverse impacts are expected and no mitigation measures, except adherence to County building and road standards are suggested.

3.2.4 Groundwater and Hydrology

The development of the proposed public shoreline park will provide potable water to the park site from the mauka resort development. Approximately 1,000 to 4,200 gallons of potable water demand is anticipated. The proposed action is not expected to impact or be impacted by the hydrology of the area, due to the limited nature of the water use. Accordingly, measures to mitigate potential adverse hydrological impacts are not warranted.

3.2.5 Natural Hazards

Inasmuch as the area comprising the proposed action would be subject to lava flows and earthquakes; design, engineering, and construction measures in adherence to Federal, State, and County rules and regulations to minimize potential risks from this volcanic activity would be implemented. The project will conform with standards for Earthquake Zone III in the Uniform Building Code to minimize risks from earthquake activity. A Civil Defense siren is located along Queen Kaahumanu Highway and serves as a warning to beach-goers in the event of a tsunami.

3.2.6 Climate and Meteorology

Development of the proposed public shoreline park is not expected to have any impact on the climate or meteorology of the project area. Consequently, measures to mitigate potential adverse climatic impacts are not warranted.

3.2.7 Air and Noise Quality

Short term impacts to the air quality could be caused by construction activity involving earth movement that would result in fugitive dust emissions. In addition construction vehicle activity could cause minor automotive pollutant concentrations.

Due to the insignificant amount of soil in the project area, dust generated during construction should be minor. When necessary, dust control measures such as frequent watering would be implemented. Because automotive pollutant concentrations due to construction would be minimal, they are not expected to violate State or Federal air quality standards.

Short term construction activities, including grading and increased vehicular activity, would increase noise levels in the project area.

Due to the fact that the project site would be used for passive recreation and is limited in capacity, as well as the temporary nature of the construction activity, there would be no adverse impacts to the air and noise quality of the area. Consequently, mitigation measures to minimize potential adverse impacts, other than those discussed above, are not warranted.

3.2.8 Visual Attributes

Enhancement of the site by thinning of the kiawe thicket and landscaping would add to the visual attractiveness of the site. The Park Development Plan (Appendix D) presents the conceptual design planned for the Disputed Remnant Parcel as Kikaua Point Park.

3.2.9 Flora and Fauna

Development of the Disputed Remnant Parcel as a public shoreline park would bring about a very minor loss of some of the flora in the area. However, landscaping around the archaeological features and the comfort station would replace the lost vegetation, and increase the diversity of the flora on the site. Most of the flora found within the area is also found throughout the Hawaiian Islands in comparable environments. Further, it appears likely that no endangered or threatened plant species in the project area. Thus, the flora in the area would not be significantly affected and mitigation measures to minimize adverse botanical impacts are not suggested at this time.

Development of the proposed public shoreline park could bring about the loss of some wildlife habitat, due to increased human use of the site. However, landscaping would assist in the creation new wildlife habitat. Where possible, trees and shrubs would be preserved in order to maintain wildlife habitat. The proposed action would have negligible effects on the birdlife or mammal populations in the area, therefore, mitigation measures to minimize adverse habitat impacts are not warranted at this time.

3.2.10 Archaeological and Historical Resources

Seven notable archaeological features are located within the proposed use easement for the Disputed Remnant Parcel. These features have been surveyed and inventoried, and will be preserved. (See Archaeological Mitigation Plan, Appendix E). Any additional significant subsurface archaeological features found during landscape work would be recorded and/or preserved according to the Department of Land and Natural Resources regulations under the State's Historic Site Preservation Office.

3.2.11 Access

The establishment of an intersection at Queen Kaahumanu Highway would be coordinated with the County Department of Public Works and State Department of Transportation, Highways Division in order to assure traffic safety. As described in Section 2.2.1.11, an interim grade T-intersection would provide access until Queen Kaahumanu Highway is upgraded to a four lane freeway. Access during construction will be provided in consultation with appropriate State and County agencies.

Due to the limited capacity of the park and an estimated trip generation of 25 vehicles per day, no significant adverse increase in traffic due to the proposed project, is anticipated. Adequate parking will be provided in conformance with County requirements.

3.2.12 Wastewater Disposal

The proposed public shoreline park will generate an estimated 27,000 gallons per day of wastewater, and would impact the wastewater disposal system planned on the resort site. Due to the limited amount of wastewater generated and the capacity of the planned treatment plant on the resort site, no mitigation measures are necessary. Should the plant not come on line prior to park development, a temporary self-contained system would be provided which would be pumped out regularly.

3.2.13 Solid Waste Disposal

The proposed action is not expected to generate significant solid waste. Accordingly, it would have little impact on solid waste collection or disposal as planned for the Regent Kona Coast Resort and mitigation measures would not be necessary.

3.2.14 Electrical Power and Communication Systems

Sufficient generating capacity from HELCO's existing 69KV overhead transmission line, located at about 3,000 feet from Queen Kaahumanu Highway, exists to serve the proposed public shoreline park project. Power for the park will be provided via lines from the planned Regent Kona Coast Resort.

Similarly, the existing Hawaiian Telephone poles and lines in the area are sufficient to serve the facilities of the proposed park and no significant adverse impact on the telephone system is expected. Since the public shoreline park will have no effect on existing power or telephone systems, mitigating measures to reduce potential adverse impacts are not warranted.

3.2.15 Public Schools

The proposed action would not impact the public schools in the area. Accordingly, measures to mitigate adverse impacts are not warranted.

3.2.16 Health Care Facilities

Health care facilities would not be affected by the proposed public shoreline park. The increase in public beach going created by the proposed Kikaua Park improvements and those planned by the State for adjacent beach areas could contribute to an increase in water-related emergencies. Local health care facilities have the capacity to handle this limited increase. Therefore, specific measures to mitigate potential adverse health care impacts are not warranted.

3.2.17 Police and Fire Protection Services

Security to the park will be provided by Huehue Ranch and Associates, L.P., therefore, the proposed action is not expected to impact the police and fire protection services of the area, therefore, measures to minimize potential adverse impacts are not warranted.

3.2.18 Recreational Resources

The proposed use easement for the Disputed Remnant Parcel as a public shoreline park would provide additional recreational and educational opportunities to West Hawaii residents and visitors. The proposed Kikaua park would be developed, managed and maintained by Huehue Ranch Associates, L.P. at no expense to the public. As such, it would have a positive impact on the recreational resources of the area, and offer supplementary beach park recreation to that planned in the adjacent area by the State. Accordingly, adverse effects are not expected and measures to mitigate adverse recreational effects are not warranted.

**IDENTIFICATION AND SUMMARY OF MAJOR IMPACTS
AND ALTERNATIVES CONSIDERED**

4.0 IDENTIFICATION AND SUMMARY OF MAJOR IMPACTS AND ALTERNATIVES CONSIDERED

4.1 MAJOR IMPACTS

As indicated earlier, the major positive impacts expected to result from the establishment of the proposed use easement for a public shoreline park are:

- o Implementation of an archaeological preservation and interpretive program to enhance and preserve sensitive archaeological features on the site;
- o Implementation of a park development plan by Huehue Ranch Associates, L.P. that would contribute to the recreational opportunities of residents and visitors while minimizing public expenditures;
- o Improvement in the visual character of the area through landscaping and provision of a modern comfort station, outdoor showers and picnic area;
- o An increase in construction and maintenance related jobs;
- o Provision of potable water from the resort area to the planned Kikaua Park.

Potential adverse impacts that could result from the development of the proposed roadway and public shoreline park are:

- o A potential loss of vegetation and wildlife habitat;
- o A potential increase in surface water run-off;
- o A potential impact to sub-surface archaeological sites;
- o An expected increase in resident and visitor use of the proposed public shoreline park;

Further, short-term adverse impacts could result from increased localized noise levels and decreased air quality during construction.

4.2 ALTERNATIVES CONSIDERED

As indicated earlier, the current plan for the establishment of the public shoreline park (Kikaua Park) through a use easement is expected to have positive and/or minimal impacts on the physical, natural, social, and economic environments of the project area. However, in accordance with applicable

EA/EIS rules and regulations and in keeping with sound land planning practices, alternatives that would allow the objectives of the proposed project to be met while minimizing potential adverse environmental impacts, have been considered. The alternatives investigated include "no action", and locating a beach park in another area owned by HRA along the Uluweoweo and Kakapa Bays. These alternatives have been rejected for the following reasons: Locating a shoreline beach park in another area would not resolve the title dispute over the Kikaua Point parcel and would infringe on the anchialine ponds which occur just mauka of the other beach area. This alternative would also have a greater adverse effect on the flora, wildlife habitats, and visual character of the beach because the alternative areas are long and narrow. The alternative of "no action" has been rejected because it would not allow the objectives of the proposed action to be met.

PROPOSED MITIGATION MEASURES

5.0 PROPOSED MITIGATION MEASURES

The mitigation measures proposed to ensure that potential adverse environmental impacts resulting from the establishment of the proposed public shoreline park through a use easement are minimized include:

- Limiting construction activities to daytime hours;
- Adherence to all Federal, State, and County environmental protection, health, safety, and construction rules and regulations;
- Coordination of development plans with appropriate County agencies;
- Landscaping as appropriate;
- Following the prepared archaeological mitigation plan and monitoring during the minimal grading and construction planned for the site using an on-call archaeologist available to examine any sub-surface historical or archaeological features that may be uncovered during construction;
- Implementation of a archaeological site maintenance plan to protect the natural and archaeological resources in the park area;
- Implementation of a park development plan that is responsive to the visual, archaeological and recreational resources inherent in the site and provides for a natural setting for public park beach enjoyment;
- Implementation of a Park Management Plan which would encourage passive recreational use of the site and provides for the safe and efficient management and maintenance of the public park area;
- Xerotropic landscaping; and
- Sedimentation and erosion control plans as part of all grading plans.

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

DETERMINATION

6.0 DETERMINATION

Based on the information available and the type of governmental action requested at present and in the future, it is requested that the Department of Land and Natural Resources determine that because the proposed project would result in positive social, economic, and environmental impacts and would not have a significant negative impact on the environment, that an Environmental Impact Statement (EIS) is not required for the proposed project. It is recognized that compliance with the EIS process, as defined in HRS Chapter 343 and Chapter 200, Department of Health Environmental Impact Statement Rules, is required and is one of the primary reasons that this EA has been prepared.

6.1 FINDINGS AND REASONS SUPPORTING DETERMINATION

In considering the significance of potential environmental effects, the applicant has considered the sum of effects on the quality of the environment and evaluated the overall cumulative effects of the proposed action. The applicant has considered every phase of the proposed action, the expected consequences, both primary and secondary and the cumulative as well as short- and long-term effects of the proposed action. As a result of these considerations, the applicant has determined that:

1. The proposed action does not involve an irrevocable commitment to loss or destruction of any significant natural or cultural resource;
2. The proposed action increases the range of beneficial uses of the environment;
3. The proposed action is in concert with the County's long-term environmental and land use policies, goals and guidelines as expressed in the Hawaii County General Plan;
4. The proposed action does not substantially adversely affect the economic or social welfare of the community of state;
5. The proposed action does not involve substantial secondary impacts, such as population changes or effects on public facilities that are not already contemplated;
6. The proposed action does not substantially affect public health;
7. The proposed action does not involve substantial degradation of environmental quality;
8. The proposed action does not substantially affect rare, threatened or endangered species or habitats;

9. The proposed action does not detrimentally affect air or water quality or ambient noise levels;
10. The proposed action does not substantially affect an environmentally sensitive area such as flood plain, tsunami zone, erosion-prone area, geologically hazardous land, estuary or coastal waters; and,
11. The proposed action is individually limited and cumulatively does not have a considerable effect upon the environment or involve a larger commitment for larger actions.

Further, it appears that the proposed action is compatible with the locality and surrounding project area and appropriate to the physical conditions and capabilities of the area to be served; the existing physical and environmental aspects of the subject area will be preserved; the proposed action will not result in any significant adverse effects to the environment; and the proposed action is in keeping with the objectives and purposes of the project site and area. The applicant will be responsible for and comply with all applicable statutes, ordinances and rules of the federal, State and County governments.

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

REFERENCES

7.0 REFERENCES

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A P P E N D I X B

TITLE INFORMATION

MEMORANDUM RELATING TO
THE MAKAI BOUNDARY OF
KUKIO 1st

April 24, 1986

A. INTRODUCTION

The purpose of this memorandum is to summarize the factors supporting the conclusion that the makai boundary of the ahupuaa of Kukio 1st is the shoreline.

A part of the ahupuaa of Kukio 1st, comprising 690 acres, was granted to Pupule by Grant 2121 from the Hawaiian Government, dated November 12, 1856, and signed by Kamehameha IV and Kaahumanu. The land was sold for the total price of \$86.25.

Grant 2121 is in Hawaiian and contains a metes and bounds description and a map of the area granted (Exhibit 1). In the description of survey in the grant (hereinafter a description of survey will be referred to merely as "description"), three courses and distances relating to the makai boundary are given. The first course extends from the point of beginning at the west corner directly to a station opposite the canoe landing. If only this course and the subsequently described makai courses are considered, it could be argued that the west makai portion of Kukio 1st, containing a substantial portion of Kikaua Point, was intended to be excluded from the grant. Two additional makai courses are, however, written on the map but are omitted from the description. The notation of these two courses shows that the Kikaua Point portion of the grant was surveyed. Because of other discrepancies and ambiguities in the description and the map contained in the grant, the determination of the intended makai boundary depends upon a consideration and reconciliation of all of the survey data in the grant itself as well as in other supporting documents, primarily the original surveyor's description and map upon which the grant was based.

B. THE TWO EXTRA CALLS

Grant 2121 was based on a survey run by surveyor John Fuller which is dated September 27, 1854. Fuller's original description, in English (Exhibit 2), and map (Exhibit 3) are still on file in the State Land Office. As in the grant, Fuller's description gives only three makai courses, beginning at a heap of stones near the sea on the Kukio 1st-Kukio 2nd boundary. On his map, however, in addition to the three courses given in his description, Fuller also has plotted the two calls which are not included in the description. These are indicated by two dotted lines, the first of which is a dotted line from the point of beginning, carrying the notation "N 10 1/2 E". Though no distance is given to complete this call, it can readily be determined to be 15 chains since the

dotted line is 1 1/2 inches long and Fuller's scale is ten chains to an inch. The second of these dotted lines is a complete call which reads "N 76° W 7.62" and terminates at the end of the first course given in the description. These two calls, given only on the map, show that the roughly triangular shaped west corner of Kukio 1st was considered and surveyed. If it was intended that this portion was to be excluded from the grant, there would have been no need to survey it, much less to include the survey data in a survey document and in the grant itself. In this connection, it should be noted that no traverse was needed to connect the beginning point with the station opposite the canoe landing as the topography permits a direct line of sight between those points.

C. THE RED LINE

Fuller's map shows another element not alluded to in his description. This element is a continuous solid red line (see Exhibit 3) which goes from the point of beginning along the otherwise undescribed dotted line to the sea, then follows along the sea, cuts back from the sea along an unidentified path to follow the dotted line which marks the second course given on the map, then continues along the dotted line which plots the second course given in the description, then along the dotted line (but at times along the sea rather than along the line when the line passes over the sea) of the third course given in the description. (See Appendix "A") The red line continues along the remainder of the outline of the grant.

Any reconciliation of the survey data must consider the red line and results in the conclusion that the description of survey as clarified or controlled by the red line determines the boundaries of Grant 2121. It is apparent from other surveys made by Fuller that he invariably intended that the red lines placed on his maps would serve as additional indications of the boundaries of the grants being surveyed.

The circumstances under which the red line clarifies or controls the determination of the Kukio 1st boundary are the following:

(1) When the red line follows the seacoast (as from point B to C as shown on Exhibit 3), the sea is the boundary;

(2) When the red line follows undescribed dotted lines (AB and CD), those lines as they may be placed on the ground are the boundaries, except where the dotted lines are clarified by a natural monument, such as "the bank by the seashore" (as along DE and EF), in which case the monument would then determine the boundary;

(3) When the red line follows solid straight lines, those lines, as further clarified by the use of natural monuments, are the boundaries (all of the inland boundary lines).

These conclusions as to the conditions under which the red line should be taken to determine the boundaries of Kukio 1st are based not only upon a logical reconciliation of the description and map done by Fuller in the instant case, but also upon numerous other surveys and maps done by him of sea-coast and other lands in the Kona area in the same period, 1854 - 1855. In Appendix "B" are listed other known surveys by Fuller in which he used red lines to trace the outlines of the lands surveyed and granted. Some of the more significant of these surveys which support the foregoing conclusions are discussed below.

For example, in Fuller's survey of a part of the land of Awakee to the south of Kukio 1st done on September 28, 1854, the day after the Kukio 1st survey, Fuller used identical survey techniques and similar methods of transcribing his survey data. In surveying Awakee, Fuller ran lines along the makai boundary, describing four courses and distances along the seashore (Exhibit 4). On his map (Exhibit 5) he again used both straight lines and dotted lines to indicate the makai courses corresponding to those in his description, but Fuller's map bears out that the sea was to be the boundary because his characteristic red line follows the deeply indented outline of the seashore, not once following either the broken or solid lines by which the calls were plotted on the map. For instance, in his second course Fuller headed almost directly inland rather than following along the seashore, which was intended to be the boundary. In other words, he did no more than plot a traverse since the boundary was determined by an obvious natural monument.

The end points of Fuller's makai calls in Awakee are placed at distances of approximately 80 to 800 feet from the seashore. His final call along the seashore in his description is, as in Kukio 1st, to "N. cor. heap of stones", a point which on the map is shown to be about $1 \frac{5}{16}$ inches from the sea (roughly about 858 feet according to the scale given). Fuller connects this north corner to the sea with a dotted line. Similarly, in his map of Kukio 1st, Fuller connects the point of beginning (which in Fuller's description is a heap of stones near the seashore) to the sea by a dotted line and, at the point marking the end of the last makai course on the Kukio 1st - Kaupulehu border, another dotted line has been drawn from that point to the sea.

If these heaps of stones at the corners of Awakee and Kukio 1st were intended to indicate the seaward perimeter of the grant, there would have been no need to include the dotted lines connecting these stone heaps to the sea. Their placement at various distances from the shore rather than at the extreme corners of the grant was probably a deliberate attempt to place the heaps where they could remain permanently and could rest undisturbed outside the zone of wave action. The Awakee survey shows clearly that the traverse along the sea bears no relation to the deeply indented seacoast and could not have been intended to replace the natural monument called for--the sea-shore--as the actual boundary. The general legal principle is, of course, that natural monuments prevail over courses and distances.

Fuller's metes and bounds descriptions of both Kukio 1st and Awakee must have been rapidly done because September 25, 1854, two days prior to the survey of Kukio 1st, is the date of Fuller's survey of the land known as Hienaloli 6, which is located several miles down the Kona Coast, and September 28, 1854, the day after the Kukio 1st survey, is the date of Fuller's Awakee survey. (See Appendix "C") Such hurried surveys could not have been intended to be, and were not, descriptions of the true perimeter of the lands but merely traverses locating monuments and points on or near the true perimeter or boundaries.

Fuller surveyed, on October 13, 1854, the land sold by Grant 1651 to Charles Hall. Along the makai boundary of this grant Fuller gave eight courses which are numbered 17-25, respectively, in his description (Exhibit 6). Call No. 16 in his description comes from mauka "through the crater to sea a stone m' x". No. 17 through No. 21 are "along the sea shore" in the description. On the accompanying map (Exhibit 7) these courses and distances are indicated by points connected with dotted lines. Fuller's characteristic red line, however, does not follow the dotted lines but rather follows the many indentations of the seacoast.

Call No. 21 is "along the seashore to the most western point". This point on the map is shown to be some distance from the seacoast but the red line nevertheless curves inward from the seacoast along an unidentified path to connect the seacoast with this point. This is exactly the same kind of line found on the Kukio 1st map (at AB and CD). From this western point on, the next three courses are plotted on the map in solid lines which are situated along the inland border of Hokuano village. The red line comes inland from the seacoast near the south end of the village, runs mauka of the village and returns to the seacoast north of the village, showing a

distinct intention to exclude the village. The same intention, to use the seacoast as a boundary, but to exclude the canoe landing, is shown in the use of the red line in the survey of Kukio 1st.

The last call along the makai boundary, No. 25, is "along the seashore to Hall's ahupuaa". This call is also plotted as a dotted straight line but the red line again traces the seacoast instead of following the straight line distance between the two points of the call.

On the day after the preceding survey for Hall, Fuller surveyed the land contained in Grant No. 1745 to John Cavnah (Exhibit 8). Along the makai boundary of this grant calls No. 9 and No. 10 are along the seashore and are connected by dotted lines (Exhibit 9) while the red line traces the seacoast as the boundary. Call No. 11 is a course and distance "mauka of the landing at Kalukalu". The line between the two points of this call is partially dotted and partially solid. Along the dotted portions the red line goes makai to follow the seacoast but it follows along the straight line portion which cuts off the peninsula where the landing is located from the rest of the grant. In this grant also, the red line coincides with the solid lines excluding another landing and seashore village from the grant.

In Grant 1865 to Kanewa, which Fuller surveyed on February 20, 1855 (Exhibit 10) the makai courses and distances are plotted as straight lines but it seems clear that the indented seacoast which the red line follows was intended to be the boundary (Exhibit 11). Here also Fuller shows on the map certain courses and distances not given in his description.

The consistent peculiarities of Fuller's surveys indicates that the intention in Grant 2121 was to include those portions of seacoast land within the red line.

D. OTHER NORTH KONA GRANTS

In other grants of seacoast lands in North Kona, the seacoast was commonly the boundary. Information concerning these other grants is set out in Appendix "D". No reason appears why the boundary of Kukio should not also be the seacoast.

E. REFERENCE TO ADJOINING LANDS

On his map, Fuller identifies the lands adjoining the portion of Kukio 1st which was being sold. To the east he identifies "The Ahupuaa of Napulehu"; to the south "Govt Land

unsold"; and to the west "The Ahupuaa of Kukio 2d". If the Kikaua Point portion of Kukio was also to be excluded from the grant, Fuller would have similarly identified that portion as land unsold or reserved.

F. CONCLUSION

The above described matters, especially Fuller's original map with its red line tracing the boundaries of Grant 2121, give strong support to the contention that the west makai (Kikaua Point) portion of Kukio 1st was intended to be, and was, included in Grant 2121.

5003H

Appendix "A"

There is an inconsistency in the transcription of the third call in the description of survey of Grant 2121. The three documents which set out this third call are the original of Grant 2121 (handwritten in Hawaiian) which is in the possession of the Stillman Trust, a handwritten copy of Grant 2121 which is on file in the State Land Office and Fuller's original description which is also on file in the Land Office.

The use of ditto marks in the third call raises the question of whether that call was to run "along the seashore" or "along the bank by the seashore". Presumably the former would be further seaward.

The second and third calls in these descriptions read as follows:

(1) The original of Grant 2121 reads:

" 63° 30' " 6.26 " ma kapa o ke kahakai
" 17° 30' " 20.75 " " "
1 ka kihi Akau ika puu pohaku, holo

(2) Copy of Grant 2121 in State Land Office reads:

" 63 30' " 6.26 " ma kapa o ke Kahakai
" 17 30 " 20.75 " " i ke kihi
Akau o ka puu pohaku, alaila

(3) Fuller's description reads:

2 N 63° 30' E 6.26 Chains along the bank by the seashore
3 N 17° 30' E 20.75 " " " " " "
to N. corner heap of stones

It appears from Fuller's use of dittos (under (3) above) that the third call was to run along the seashore rather than along the bank by the seashore. The copy of the grant on file in the State Land Office is consistent with Fuller's use of ditto marks.

This observation is of importance if we are to argue that the northern corner of Grant 2121 is not at the heap of stones called to, but rather is at the end of the dotted line which extends from the heap of stones to the sea, as shown on Fuller's map. "Along the seashore" would presumably place the boundary terminus somewhere out on the peninsula at the northern corner of the grant.

Appendix "B"

<u>Grant No.</u>	<u>Date</u>	<u>Grantee</u>	<u>Land</u>
1652	Nov. 3, 1854	William Johnson	Kawanui 1 & Kuamoo
1731	Sept. 21, 1854	Kahalau	Lanihauiki, Kailua, Kona
1732	Oct. 5, 1854	Julia Kamahiai	Kona
1743	Sept. 12, 1854	Kumukahi	Pahoehoe 4, Kona
1744	Sept. 22, 1854	Kahaimaele	Kona
1745	Oct. 14, 1854	John Cavnah	
1746	Sept. 21, 1854	James Kole	Auhaukeae 2
1747	Sept. 15, 1854	Kekaukalima	Kapalaalaea 2
1748	Sept. 13, 1854	Kapahu	Keamuku in Pahoehoe 2
1749	Sept. 13, 1854	Kipapa	Kaoha in Pahoehoe 3
1751	Sept. 14, 1854	Kahanele	Kamani in Pahoehoe 3
1752	Sept. 25, 1854	Kawelo	Hienaloli 6
1756	Sept. 15, 1854	Keoke	Kapalalaea 2
1757	Sept. 11, 1854	Kanewa	Laaloanui
1759	April 11, 1855	Edward Rooke	Kauiki, Kona
1854	Feb. 22, 1855	Ipunui	Lanihau 2, N. Kona
1855	Feb. 21, 1855	Leleo	Laula, N. Kona
1856	Feb. 21, 1855	Kawaihoa	Koai, N. Kona
1857	Nov. 2, 1854	Paakea	Pahoehoe 1, N. Kona
1858	Feb. 12, 1855	Hanaukama	Kauhako, S. Kona
1859	Feb. 12, 1855	Haaheo	Kauhako, S. Kona
1860	Feb. 14, 1855	Kaanaana	Kauhako, S. Kona
1861		Kahiamoe	Lanihau 2, N. Kona
1862	Oct. 10, 1854	Kapule	Kanakau, Kona
1863	Aug. 17, 1855	Preston Cumings	Kahauloaiki, Kona

<u>Grant No.</u>	<u>Date</u>	<u>Grantee</u>	<u>Land</u>
1864	Feb. 22, 1855	Kialoa	Umihale, Kailua, Kona
1865	Feb. 20, 1855	Kanewa	Laaloanui, Kona
1868	Sept. 20, 1854	Kaupena	Kahalui 1, Kona
1869	Sept. 12, 1854	Kekamakahi	Pahoehoe 4, Kona
1870	Oct. 2, 1854	Hewahewa	Makaula, Kona
2022	Sept. 29, 1854	Puhilaolao	Awalua & Ohiki, Kona
2024	Mar. 8, 1855	Kuaimoku	Pahoehoe 3, S. Kona
2025	Mar. 21, 1855	Pumealani	Pahoehoe 1
2026	Feb. 12, 1855	Kaheana	Kauhako, S. Kona
2034	Feb. 20, 1855	Kaupehe	Pahoehoe 4
2036		Beniamina	Alae 1 & 2, S. Kona
2112		Hopulaau	Awalua
2119	Feb. 28, 1855	Kaiama	Kaulana, N. Kona

Appendix "C"

DATES OF SURVEY BY JOHN FULLER

<u>Date</u>	<u>Name of Land</u>	<u>Grant No.</u>
September, 1854		
Wednesday 20	Kahului 1	1868
Thursday 21	Auhaukeae 2	1746
Friday 22	(Kahaimaele)	1744
Saturday 23	_____	_____
Sunday 24	_____	_____
Monday 25	Hienaloli 6	1752
Tuesday 26	(travel?)	_____
Wednesday 27	Kukio 1st	2121
Thursday 28	Awakee	2023
Friday 29	Awalua and Ohiki	2022
Saturday 30	_____	_____
October, 1854		
Sunday 1	_____	_____
Monday 2	Makaula	1870
Tuesday 3	?	
Wednesday 4	?	
Thursday 5	(Julia Kamahiai)	1732
Friday 6	?	
Saturday 7	_____	_____
Sunday 8	_____	_____
Monday 9	?	
Tuesday 10	Kanakau	1862

Appendix "C"

Appendix "D"

I. THE LANDS

The lands along the North Kona coast from Kaupulehu to Kaloko which are not owned by the State of Hawaii are listed below. Relevant patent or grant numbers, original patentees or grantees, and surveys made are also given.

1. KAUPULEHU

L.C.A. 7715, Apana 10
R.P. 7843 to Lota Kamehameha
Boundary Certificate 160
Survey by J. M. Alexander, 1885

Surveyor J. M. Alexander testified before the Boundary Commission on June 15, 1886 at Keauhou, N. Kona (Book D, No. 5, p. 30) that "I surveyed along the seashore, but do not give the bearings, as the sea is the boundary." The Bishop Estate has, however, J. M. Alexander's "survey notes of Kaupulehu", dated February 1885, which were received by the Estate on December 1, 1885. In these notes Alexander gives courses and distances along the coast of Kaupulehu after leaving Kukio Ist.

2. MAKALAWENA

L.C.A. 5368, Apana 3
R.P. 7731 to Mme Akahi
Boundary Certificate 152
Survey by J. S. Emerson, 1883(?)

At the Boundary Commission hearing (August 12, 1873) two kamaainas testified as to the boundaries. Kahaili (k.) testified that the boundary proceeded "thence to Mokupohaku, or Kaiwi Kohola, a large rock in the surf. Makalawena is bounded makai by the sea, and the land has ancient fishing rights, extending out to sea." The description in the boundary certificate skips over any reference

to the sea boundary: The call coming from mauka along Mahaiula goes to a point at the seashore; the next call begins to go mauka along Awakee. The fishing rights included extend a mile out to sea.

3. KAULANA

Grant 4723 dated February 16, 1903, to J. Kaelemakule, Jr.
Survey by George F. Wright (undated)

The sea boundary is: "Thence along the sea coast to the initial point, the direct bearing and distance being: 4. N. 51° 13' E 2789.7 feet." The boundary line is further outlined on the map in green; the green line follows the seashore.

4. KAU

Mahele Award 13-B to Paaula
R. P. 8265 containing survey and signed by
John Albert Matthewman, August 20, 1909

The call is "Along the sea coast to Makaula boundary".

5. OOMA 2nd

Grant 4536 to J. A. Maguire
Survey by J. S. Emerson, October 10, 1901

The call is "Along the seashore to a point whose direct bearing and distance is...."

6. KOHANAIKI

Grant 3086
Survey by S. C. Wittse, May 30, 1863

The survey of this Grant was dated May 30, 1863, by S. C. Wittse. It began at a large rock at the beach at the corner of Kaloke and Kohanaiki and went mauka, later coming makai to a "point of rocks marked X at the Sea":

"Thence along the Beach,
S 48 1/2° E 25.80 chas
S 34° E 12 chas
S 74° E 650 chas
S 50° E 9.30 chas to the place of begin-
ning. Containing 154. Acres"

In 1958 there was an inquiry concerning the boundaries of this grant and the acreage included in the grant. In the Territorial Surveyor's (James Dunn) letter to H. E. Newton, dated October 16, 1958, the former stated that Wittse must have used 100 feet to a chain and that, though the strip along the seacoast is left out when Wittse's calls along the seacoast are plotted, since the call was "ma ke kahakai" the boundaries should be extended to the seacoast, following the general rule that monuments prevail over courses and distances. Mr. Dunn said further that the grant was in error in noting 154 acres but that Registered Map 1449 showed closer to 491 acres (the Tax Office was claiming that there were 500 acres in the parcel).

7. The remainder of the lands (from Kukio 2nd to Ooma 1st) having boundaries at the sea belong to the State of Hawaii. In Government Lease 2860 these boundaries are described as proceeding "along near the seashore".

HELU 2/21

PALAPALA SILA NOI.

Ma keia Palapala Sila Noi ke hoike aku nei o Kamohamoha IV, ke Alii Nui a ke Akua i kono Inkomakai i
hoonoho ai maluna o ke Hawaii Pae Aina, i na kanaka, a pau, i keia la, nona iho, a oo kona mau hope Alii, ua haawi
iho loa aku oia ma ke ano gladio la *Pepiela* i kona

kanaka i maaoo pono la la, i keia apena sika a pau, a waiho-la ma *Rukio Hona*
ma ke mokupuni o *Hawaii*

a penei hoi ke waiho ana o na Mokuna: *E hoormaka ma ka pua pohaku*

ma ke kiki *Kona* okeia *Aina* *Kokoke* i ke *kae*

e pili ana ma Rukio i ka laila e holo ana i penei

He 20 He 13.75 kaula i ke kiki ma kela Awa kahi i pae aia kama

" *52.30* " *6.25* " ma kapa oke *kahekahe*

" *17.30* " *20.75* " " " " "

He 62 " *He 215* kaula i ka pua pohaku *kahekahe* o *Stapulehu*

" *50.45* " *17.60* " " " "

" *41.30* " *22.60* " " " *iluna o ka pua*

" *39* " " *80.00* " " " "

" *19.45* " *17.00* " " " "

He 50 " *He 20.65* kaula i ka pua pohaku ma *mauka* o ka pua pohaku

" *50.15* " *11.50* " " ke kiki *He 50* kaula

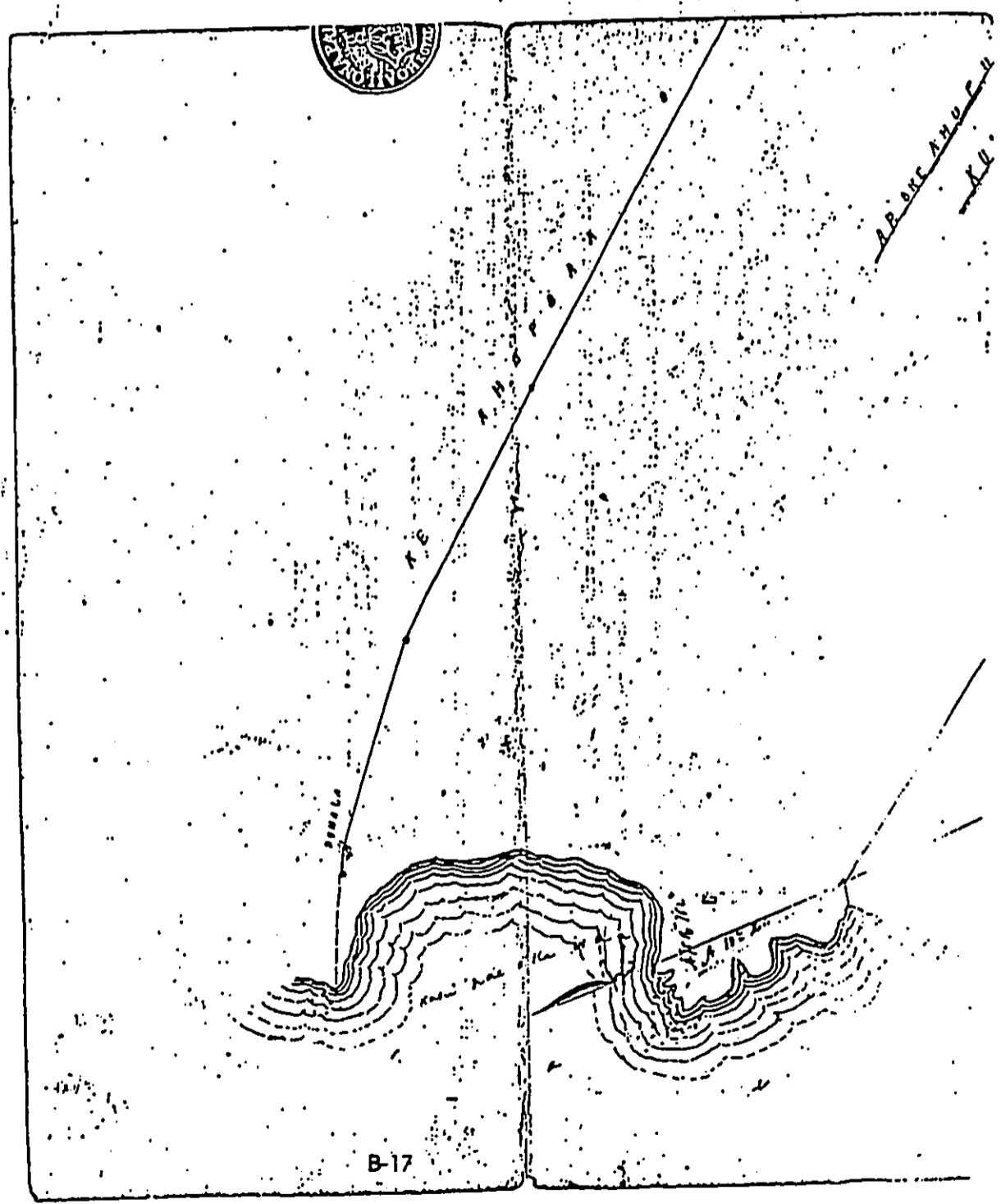
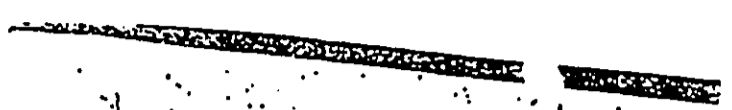
He 35.30 " *10.20* " i ka pua pohaku *mauka*

" *33.30* " *141.50* " e holo a kiki i kahi *mauka*

----- *69 oke* -----

He 20 He 13.75 kaula i ke kiki ma kela Awa kahi i pae aia kama

21700-01



Part of Section 1, sold to Fuller, situated
 in the District of North Kona Island of Hawaii, and
 bounded as follows: Begin at a heap of stones at the
 west corner of this land near the sea, adjoining Keolu's
 and run: 1 N 20° E 12.76 chains to Sta. of Spurill corner landing
 2 N 60° 31' E 6.26 chains along the bank by the sea shore
 3 N 17° 31' E 20.75 "
 4 S 62° E 2.15 "
 5 S 50° 45' E 17.60 "
 6 S 41° 31' E 22.60 "
 7 S 39° E 50.00 "
 8 S 19° 45' E 48.00 "
 9 S 50° W 20.65 "
 10 S 50° 15' W 11.50 "
 11 N 55° 30' W 10.20 "
 12 N 23° 30' W 141.50 "
 containing 690 acres

to a corner heap of stones
 the ancient boundary of Spurill's
 top of the
 to East corner a heap of stones
 to large rock marker of Keolu's Hill
 the most southern corner
 heap of stones - thence
 to point of beginning and

J. Fuller
 Surveyor

Kona Hawaii Sept. 27, 1854.

SURVEYOR JOHN FULLER'S DESCRIPTION AND MAP
 FROM FILES OF LAND MANAGEMENT DIV. DLNR

Document on file in
 Original Patent in
 State Land Office

B-18

Exhibit 2

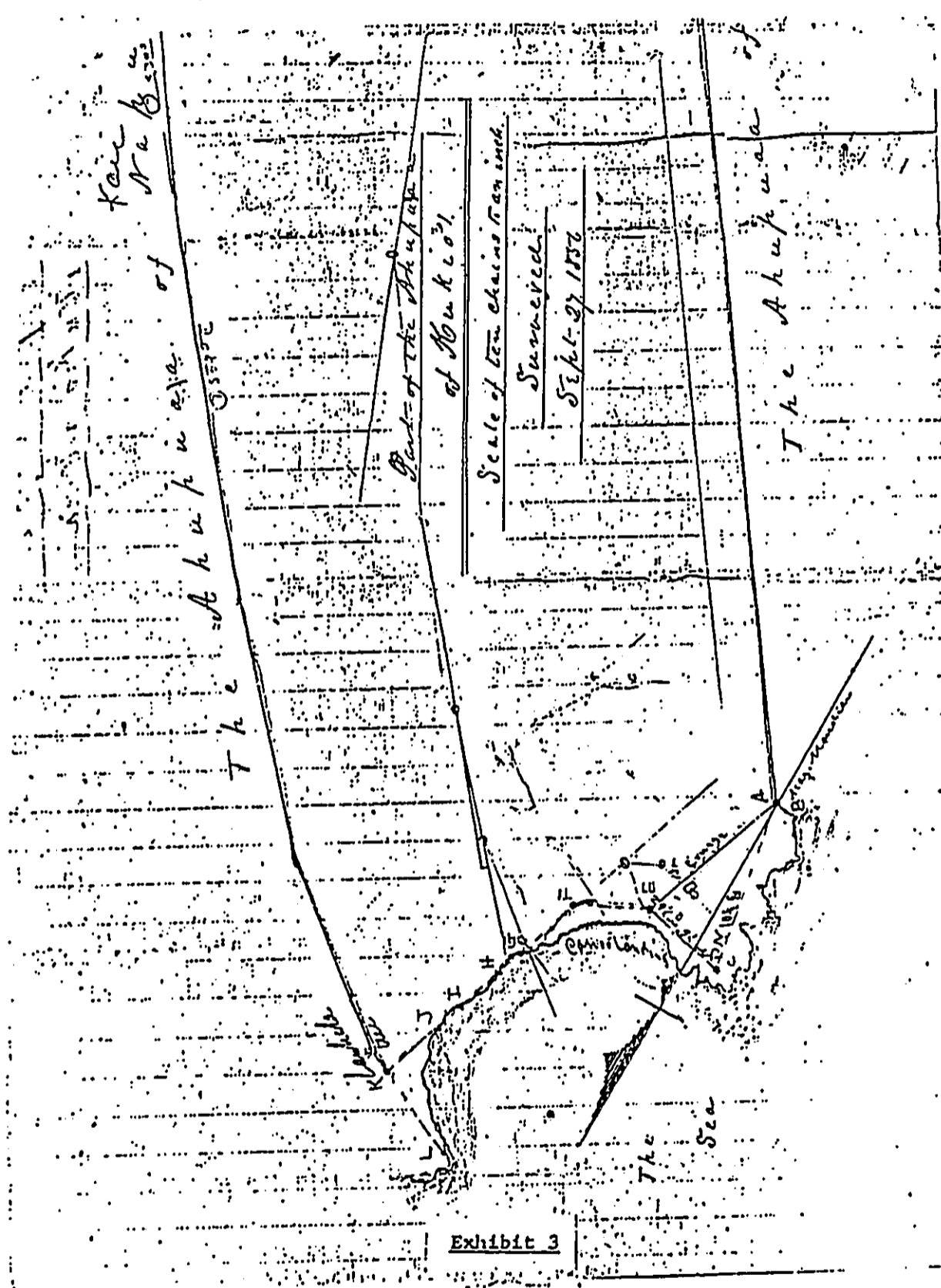


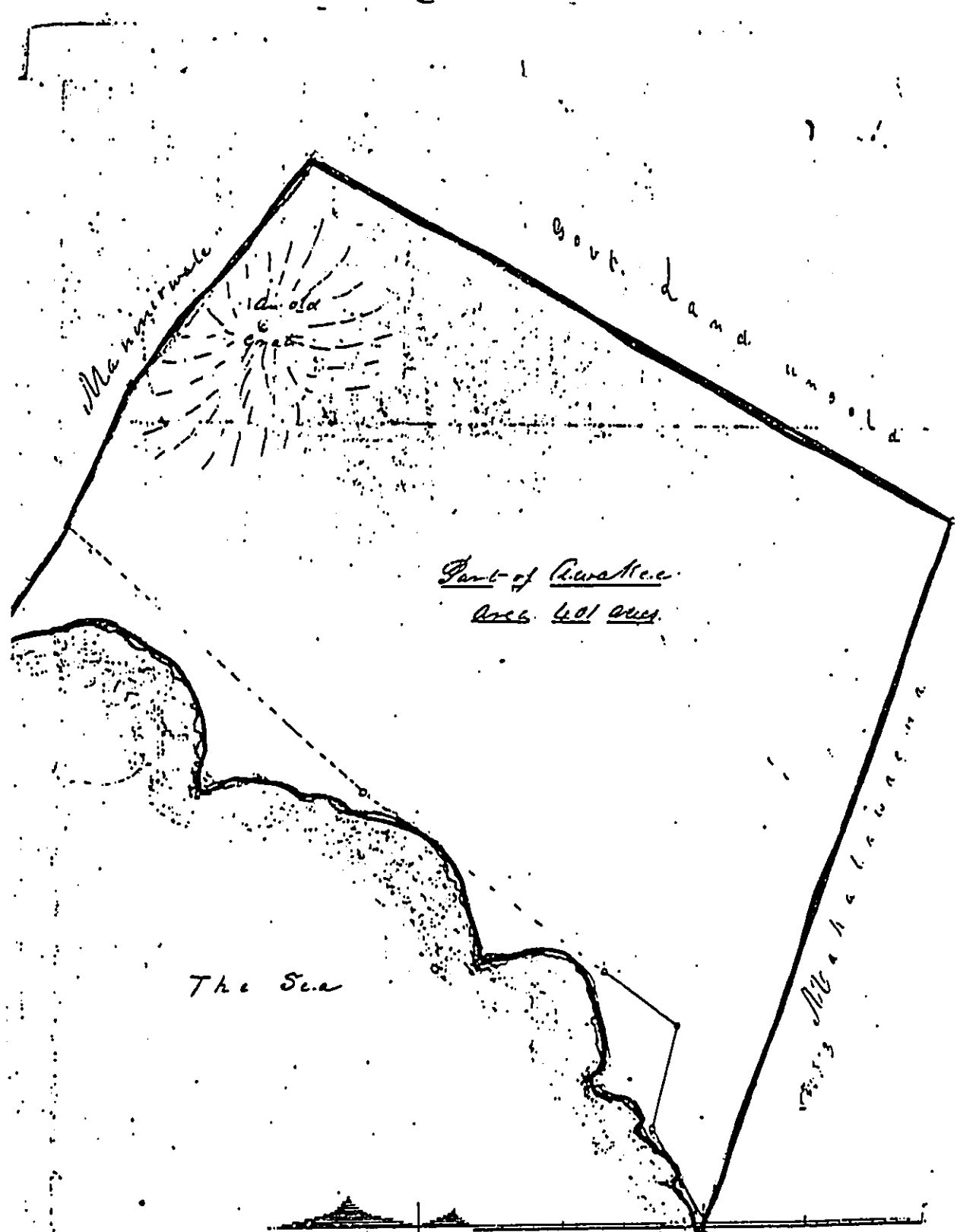
Exhibit 3

Survey of the Ahupua'a of Kaunakakai

A Part of a wahe in the District of North Kona, Hawaii,
 sold to Kahehala and bounded as follows: Begin
 at west corner of this land at heap of stones on the sea
 shore adjoining the ahupua'a of Makalauwaa and run -
 1 N 61° 45' E 9.50 chains along the sea shore -
 2 S 77° 15' E 9.15 " " " "
 3 N 35° E 33.00 " " " "
 4 N 43° 45' E 34.22 " " " " to N. corner of
 5 S 66° 45' E 3.00 " " " " ahupua'a of Makalauwaa
 6 S 66° 45' E 10.41 " " " "
 7 S 53° E 35.00 " " " " ^{N.S.}
 8 S 31° 15' W 62.15 " " " " 15 E corner
 9 N 70° 30' W 64.70 " " " " ahupua'a of Makalauwaa
 to point of beginning and containing 401 acres.

J. Fletcher
 Surveyor

Kona Hawaii, Sept. 28, 1854.



Part of Kawalee
Area 401 acres

The Sea

Scale of 1 inch to 100 feet

Surveyed
Sept. 25, 1884

Exhibit 5

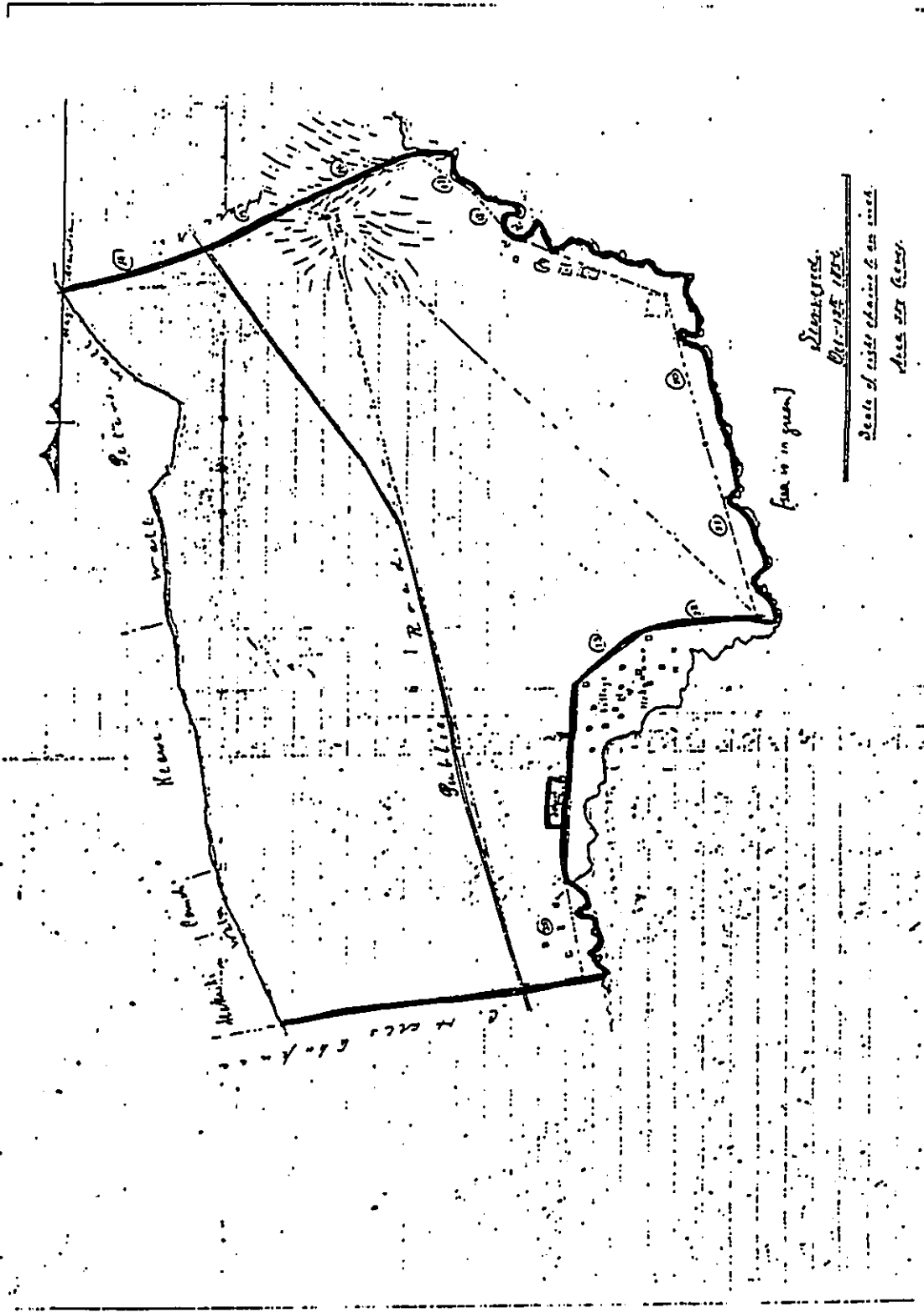
B-21

Part of Heroino soc. Hokukens 1 & 2, & Manamau 1 & 2, below
 the great-wall sold to Chas. Hall, and bounded as follows
 Begin at the north corner of this land a heap of stones
 on the wall adjoining Chas. Hall's Ahupua'a and run

- 1 S 28° 31' E 15.80 chains along the great wall, then
- 2 S 25° 30' E 2.57
- 3 S 15° 31' E 8.09
- 4 S 11° E 15.50
- 5 S 14° 30' E 11.31
- 6 S 11° E 11.70
- 7 S 17° E 8.10
- 8 S 35° W 2.85
- 9 S 6° W 6.80
- 10 S 59° 30' E 2.95
- 11 S 64° E 1.76
- 12 S 69° 31' E 8.10
- 13 S 34° E 3.33
- 14 S 71° 31' W 14.20
- 15 S 62° W 9.16
- 16 S 67° 30' W 12.80
- 17 N 56° 45' W 7.00
- 18 N 38° 45' W 5.50
- 19 N 69° W 16.28
- 20 N 15° W 15.53
- 21 N 16° 15' W 17.90
- 22 N 81° 15' E 14.60
- 23 N 57° 30' E 8.28
- 24 N 1° 31' E 20.75
- 25 N 11° 15' W 10.05
- 26 N 87° 15' E 6.08
- 27 N 85° 31' E 22.96

to East Cor. H.S.
 boundary of Hokukens to road
 to tip of the Cut
 through the Cut to sea
 the sea shore
 to most western point
 the distance border of Hokukens village
 sea shore
 sea shore to Hall's Ahupua'a
 the N. West corner of this land
 boundary of Heroino's (Chas. Hall)
 to point of
 beginning and containing 350 acres
 J. P. Hall
 Surveyor

Thomas Chawan Oct. 13, 1854.



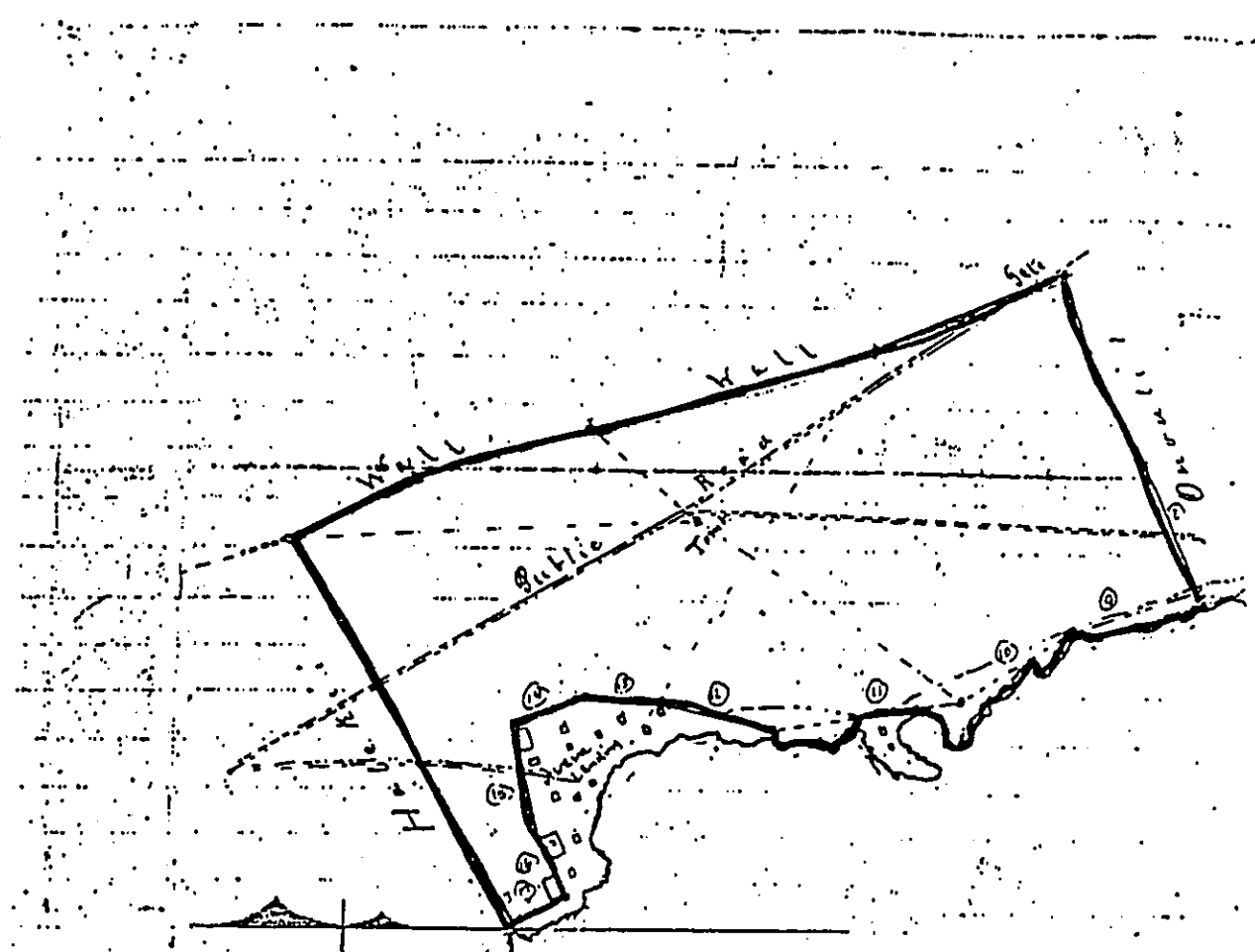
Part of Ohihaku, Keekoo, Kanakau & Kakekaka below the
 great wall, sold to John Carnoch, and bounded as follows
 Begin at heap of stones on the wall, the N. corner of this land
 adjoining the Ahupuae of Halekii and run thence

- 1 S 29° 15' E 8.85 chains along the great wall
- 2 S 16° 15' E 11.75 "
- 3 S 15° E 15.10 "
- 4 S 19° E 9.12 "
- 5 S 33° 45' E 13.40 "
- 6 S 74° 15' W 5.54 " to East corner of this land, a heap of stones
the ancient boundary of Ohihaku 1.
- 7 S 63° W 8.50 "
- 8 S 66° 15' W 9.30 " 15 ch.
- 9 N 30° 11' W 8.60 " See shore
- 10 N 34° W 8.70 "
- 11 N 9° 30' W 12.06 " mouth of the Landing at Kakekaka
- 12 N 13° 30' E 7.00 " village of Ahuwaewa
- 13 N 1° E 6.00 "
- 14 N 28° W 4.40 "
- 15 S 77° W 7.53 "
- 16 S 66° W 4.38 " to sea
- 17 N 31° W 3.56 " the " shore to West corner
- 18 N 60° E 25.10 " boundary of Halekii etc.
to point of beginning and containing 118 acres.

J. G. Miller
 Surveyor

Honolulu Hawaii Oct. 14, 1834.

Exhibit 8



Surveyed
 Oct. 14, 1834.
 — Area 118 Acres —
 Scale of 10 chains to an inch.

Exhibit 9

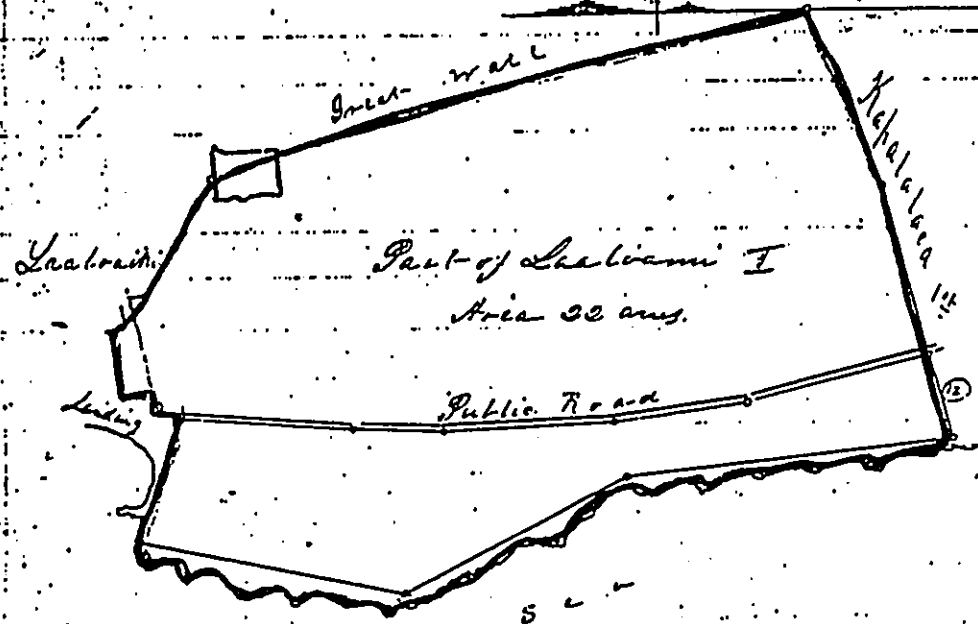
Part of Lualoamii, in Kona Hawaii, being all that part of the Great-wall. sold to Kameha, and bounded as follows: Begin at N.W. corner at sea side south of landing place, a point of rocks and run

- 1 N 71° 12' E 3.57 chains to public road - thence
- 2 N 12° 00' E 0.58 " by the landing place
- 3 N 74° E 0.524 " "
- 4 N 9° W 0.74 " "
- 5 N 80° E 1.62 " along the boundary of Uakouiki
- 6 S 52° E 1.49 " " "
- 7 S 63° 30' E 3.60 " " to little pen
- 8 S 18° E 5.00 " " Great-wall
- 9 S 14° E 11.08 " " to E. corner
- 10 S 68° 30' W 5.15 " along the limit boundary of Hefelohooa-1.
- 11 S 75° 45' W 4.68 " " to road
- 12 S 73° 00' W 3.30 " " to the sea

thence along the sea shore to point of beginning and containing 22 acres.

J. C. Miller
Surveyor

Kona Hawaii Feb. 20, 1835.



Surveyed.

July 30th 1854-

Scale of four chains to an inch.

Exhibit 11

A P P E N D I X C

PUBLIC ACCESS PLAN

Regent Kona Coast Resort
Comprehensive Public Access Plan

Prepared For: Huehue Ranch Associates, L.P.
Prepared By: PBR HAWAII

June 1991

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1.0 INTRODUCTION

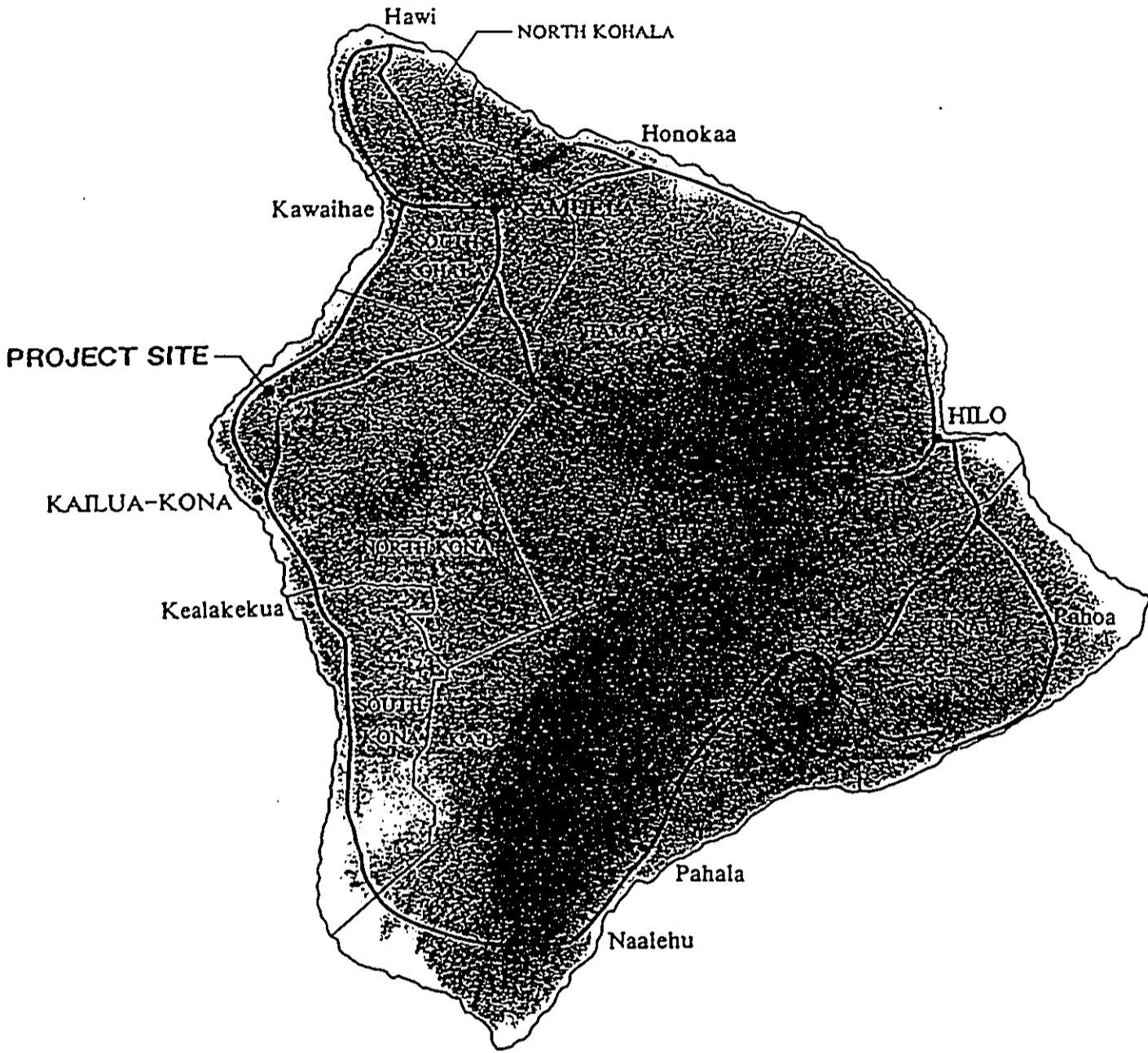
With the population growth and development along the Kona Coast, public concern over the preservation of shoreline access has grown and provisions within entitlement approvals pertaining to public access have become more comprehensive, reflecting a strong public desire to preserve and enhance public access to the shoreline.

The following plan for public shoreline access at Kukio has been developed as part of the ongoing planning for the proposed Regent Kona Coast Resort Hotel and in response to issues expressed by both the public and government agencies throughout the regulatory entitlement process, culminating with the Special Management Area (SMA) Use Permit for the Regent Kona Coast Hotel (SMA Use Permit No. 311). One of the Conditions of this permit specifically addressed public access, and this plan shall serve to satisfy this condition.

The Regent Kona Coast Hotel Comprehensive Public Access Plan (CPAC) includes a full description of the public shoreline accesses, parking and related improvements and management procedures.

1.1 SITE DESCRIPTION

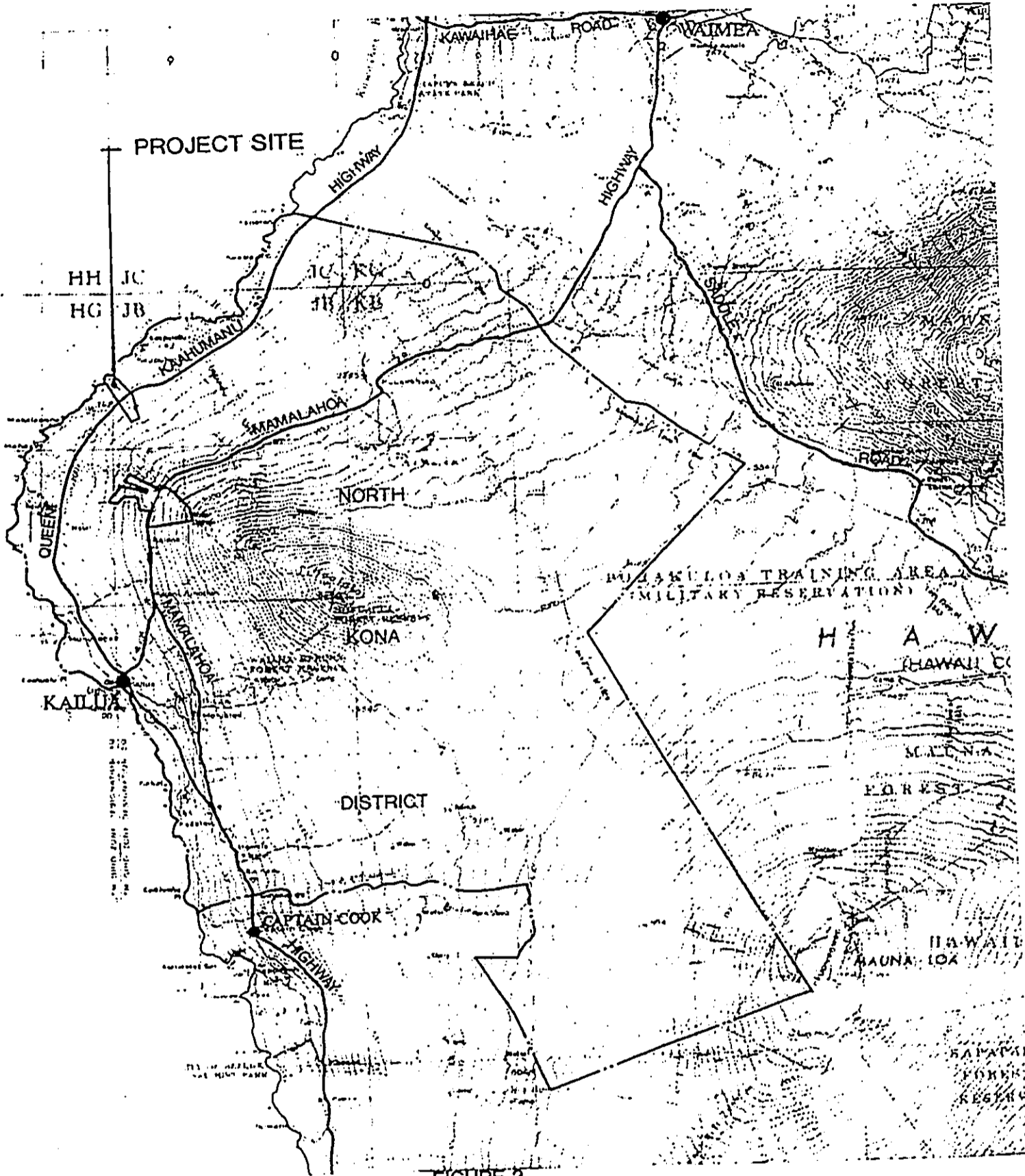
The lands of Kukio are located on the west coast of the island of Hawaii in the district of North Kona, approximately six (6) miles north of Keahole airport and one (1) mile south of the Kona Village Resort (Figures 1 and 2). The property includes Tax Map Keys: 7-2-04: 05 (317.668) and 16 (358.003 acres), Third Division and comprises approximately 675 acres (refer to Figure 3). Separated into two parcels by Queen Kaahumanu Highway, the mauka portion of the property includes 358 acres and the makai portion 317 acres. Lands to the north and east are owned by Bishop Estate and leased to Kaupulehu Developments, Inc., a joint venture of Barnwell Hawaiian Properties and Cambridge Hawaii Limited Partnership. Included within the Kaupulehu lands is the existing Kona Village Resort whose current entry pavilion and portion of the access road are within Kukio. The lands to the south and west are owned by the State of Hawaii.



ISLAND OF HAWAII

FIGURE 1
ISLAND LOCATION MAP
REGENT KONA COAST





**FIGURE 2
REGIONAL LOCATION MAP
REGENT KONA COAST**



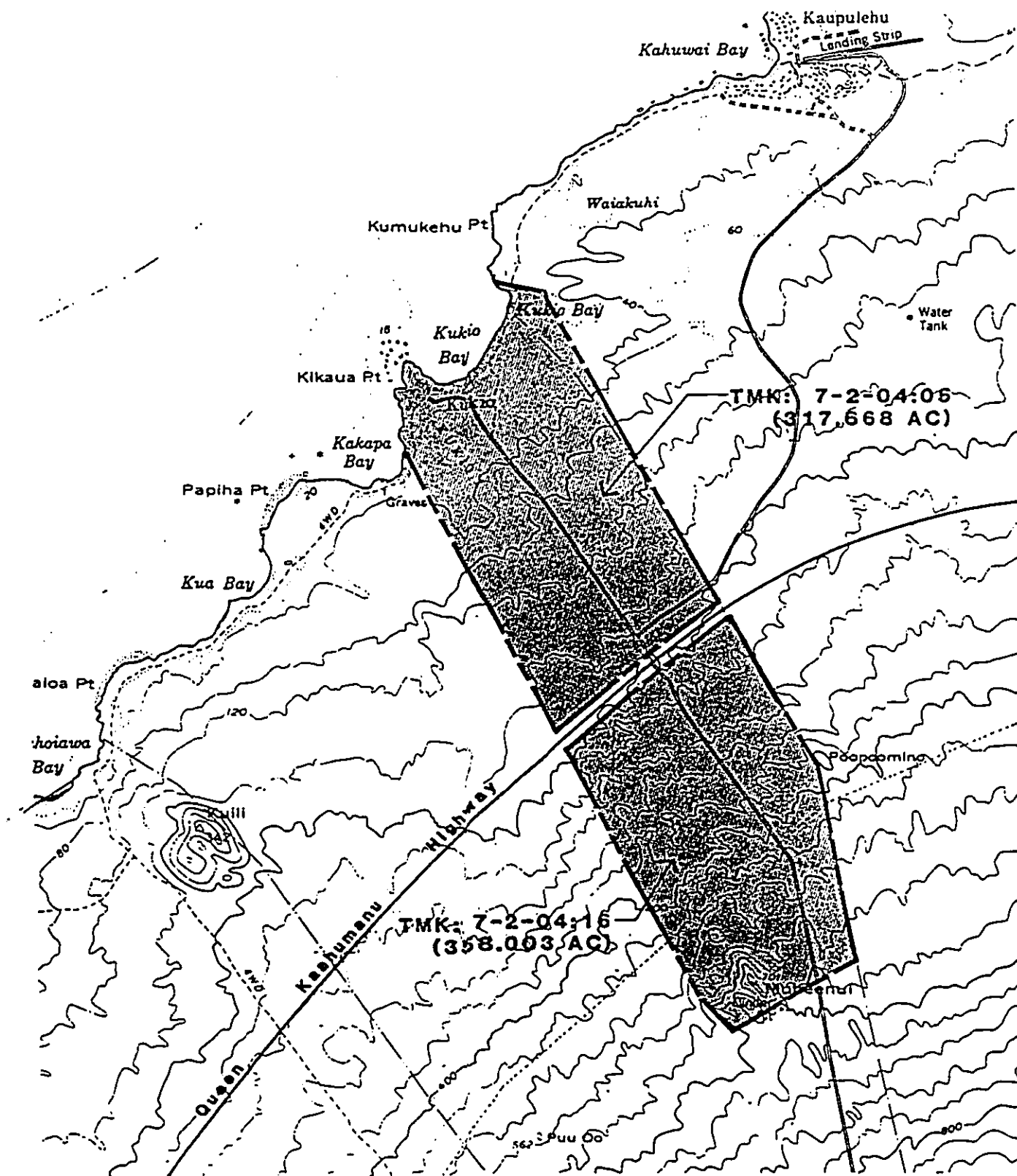


FIGURE 3
 REGIONAL CONTEXT MAP
 REGENT KONA COAST

1.2 SITE CHARACTERISTICS

The bulk of Kukio consists of rough lava land with sparse dry land vegetation concentrated primarily on the mauka portion of the property. The coastal area includes stretches of white sand beach backed by a low lying sand dune and a dense grove of coconut trees and thicket of kiawe.

Located in the central area of the Kukio coastline are a series of anchialine ponds with the grove of coconut trees along their seaward edge. The coastal waters are clear and offshore resources are comparable to other areas along the West Hawaii coastline. Swimming and wading conditions off the beach area are fraught with hazards posed by the loose rock and undulating bottoms, partially exposed and submerged ledges, barnacles, and sea urchins that are common in this area.

Access to the makai lands of Kukio is currently controlled by an entry pavilion that regulates traffic to and from the neighboring Kona Village resort. Currently, the beach area is used frequently by employees of Huehue Ranch and other guests. Although public access from the highway is controlled at the entry pavilion, access to the coastline and beach from the coastline of public and private lands north and south of the Kukio shoreline is unrestricted.

1.3 REGULATORY BACKGROUND

The entitlement process for the resort community at Kukio began in 1986 with the submittal of a petition for an amendment for the County General Plan. The County General Plan Amendment (Ordinance 87-49), which changed the General Plan Land Use Pattern and Allocation Guide (LUPAG) Map designation to reflect the proposed resort, medium and low density land uses, was granted in 1987. The General Plan Amendment Ordinance included no conditions related to public access. Also, in 1986, a petition was submitted to the State Land Use Commission (SLUC) for an amendment to the State Land Use District Boundaries in order to incorporate the project area as part of the SLUC Urban district. The petition was granted in January 1987 with the following condition related to public access.

Condition 4: "Petitioner shall provide a least one mauka- makai public access from Queen Kaahumanu Highway to the shoreline and a continuous trail along the seaward boundary of the property, which trail shall be available to the public for recreational use. No distinction shall be made between the public and hotel guest. The petitioner shall provide space for parking at a location reasonably close to the shoreline for the mauka- makai accesses and shall coordinate plans for shoreline access with the Department of Land and Natural Resources and the County of Hawaii."

In 1988, the Change of Zone Ordinance (88-158) and SMA Use Permit (No. 273) was approved by the County Council. SMA Use Permit No. 273 covered the golf course and infrastructure development, and subdivision of the parcel. A SMA Use Permit application for the hotel development was to be submitted at a later date.

Condition 3 of SMA Use Permit No. 273 pertaining to public access, also reiterated within Ordinance 88-158, Condition P, reads as follows:

Condition 3: "A mauka-makai public access shall be provided. A lateral public access through the length of the property shall also be provided. A minimum of one public shoreline parking stall for every 10 hotel and residential units and a restroom/shower facility shall be provided at the mauka-makai access. An easement shall be recorded with the State Bureau of Conveyances for the public access and parking area. The location, time of construction and/or availability restriction on use, signage, and related improvements for the public shoreline accesses and parking areas shall be approved by the Planning Director. Best efforts shall be used to secure the necessary governmental approvals for the development of an ocean front park on the makai side of the property to the south of the existing beach."

The resort plans at the time of rezoning included plans for two multi-story hotels totaling 1,250 units and single and multi-family developments totaling approximately 1,620 units. Two 18-hole golf courses and hotel and neighborhood commercial centers where also proposed.

In December of 1989, the resort property was sold to a group that included one of the previous owners, EIE International Corp. and Regent International Hotels. With the change of ownership, plans for the resort hotel were modified from that which was planned at the time of zoning approval. Current plans call for a 350-unit, predominately one- to two-story hotel, as opposed to the 1,250-units previously envisioned. Plans for residential development were scaled down as well, with greater emphasis on single family development focused on one 18-hole golf course (Refer to Figure 3, Resort Master Plan).

In October of 1990, Huehue Ranch Associates, L.P. submitted an application for an SMA Use Permit for the Regent Kona Coast Hotel reflecting the current concept for a 350-room hotel. On January 31, 1991, the SMA Use Permit was approved by the County Planning Commission as SMA Use Permit No. 311. Condition 16 of SMA Use Permit No. 311 for the resort hotel expands upon the previous public access conditions. Condition 16 reads as follows:

Condition 16: "A comprehensive public access plan shall be submitted for review and approval by the Planning Department, in consultation with the Department of Land and Natural Resources, prior to submittal of plans for plan approval or subdivision approval, whichever comes first. The comprehensive public access plan shall include, but not be limited to, the delineation of a minimum of two mauka-makai public accesses; lateral shoreline access along the length of the property; location, time of construction and/or availability of public accesses and parking/drop-off areas; restrictions on use; signage and related improvements. Restroom/showers facilities shall be provided at two mauka-makai public accesses. A minimum of one public shoreline parking stall for every ten hotel and residential units shall be provided concurrently with the construction of the units. The unit count shall include that portion of the resort development mauka of Queen Kaahumanu Highway as required by Ordinance Number 88-158 and SMA Use Permit No. 273. An approved easement shall be recorded with the State Bureau of Conveyances for the public access and parking areas."

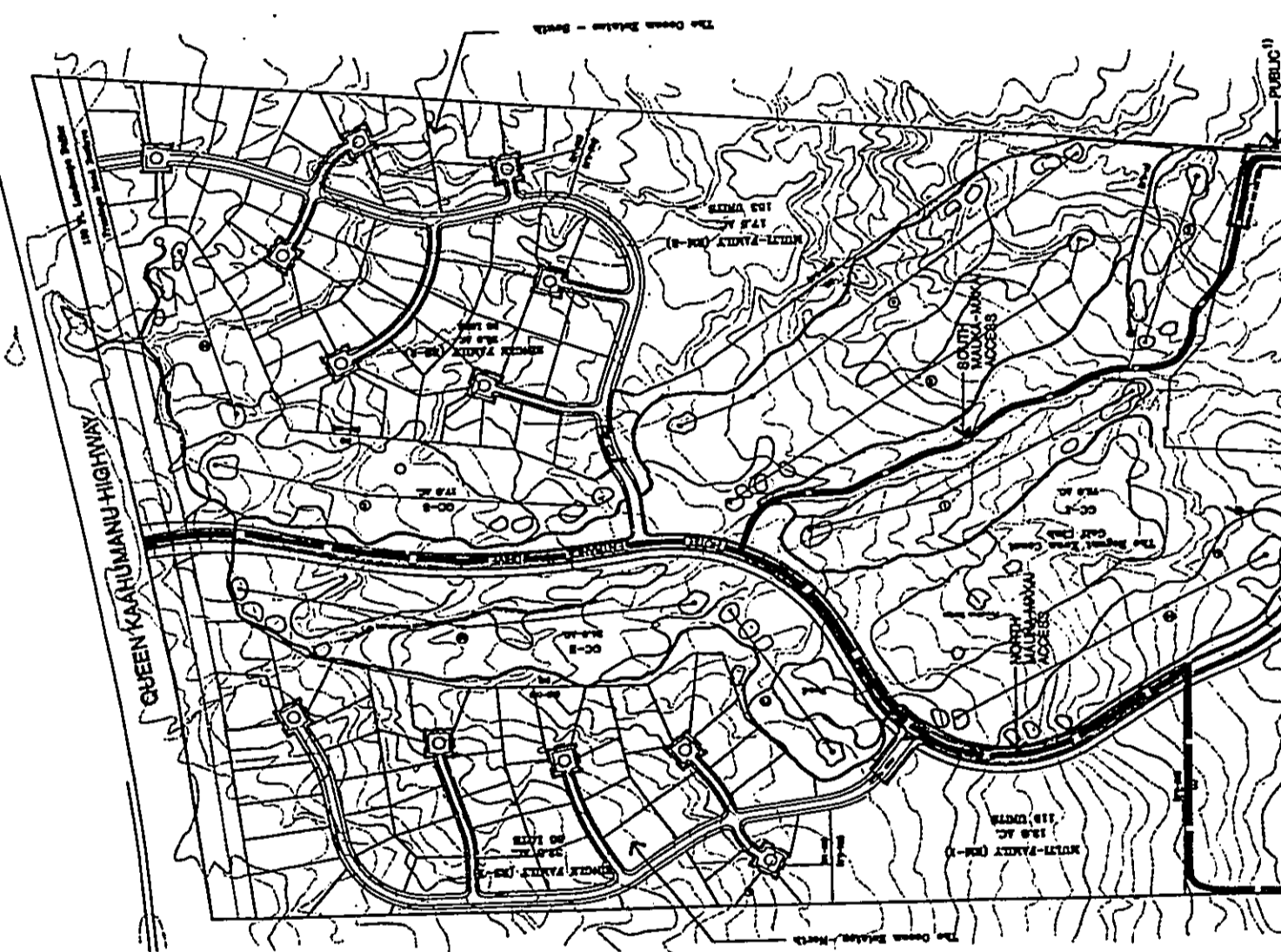
2.0 PUBLIC ACCESS IMPROVEMENTS

The Comprehensive Public Access Plan, as described herein, has been prepared to meet the requirements of SMA Use Permit No. 311 and other regulatory conditions described above and to be consistent with the Anchialine Pond Management and Archaeological Preservation Plans and Interpretive Programs of the development, as well as the shoreline access planning for the adjoining development at Kaupulehu.

2.1 MAUKA-MAKAI PUBLIC ACCESS AND PARKING

As shown in Figures 4 and 5, the Regent Kona Coast Comprehensive Public Access Plan provides for two vehicular public access routes from Queen Kaahumanu Highway to pedestrian drop-off points located approximately 250 feet from the shoreline and public parking provided in as close proximity to the drop-off points as practical. The proposed vehicular public access routes would be accessed off of the main entry road to the resort hotel and provide access to both the northern and southern shoreline areas of the property. Construction of the accesses and drop-off areas would be concurrent with the construction of the resort hotel. Following approval of the proposed Public Access Plan and after construction of the improvements, easements for both accesses will be surveyed, described and recorded with the State Bureau of Conveyances.

In order to meet the resort's total public parking requirements, sufficient land area will be reserved to provide for future public parking spaces in relationship to the maximum planned development to occur both mauka and makai of the highway. Public parking will be provided at a ratio of one parking stall per every 10 hotel and residential units. Parking stalls will be constructed concurrent with the construction of the hotel and residential units. Assuming a total of 1,500 units are developed, the plan provides for sufficient land area to accommodate approximately 100 stalls along the northern boundary and approximately 50 stalls at the southern shoreline access.



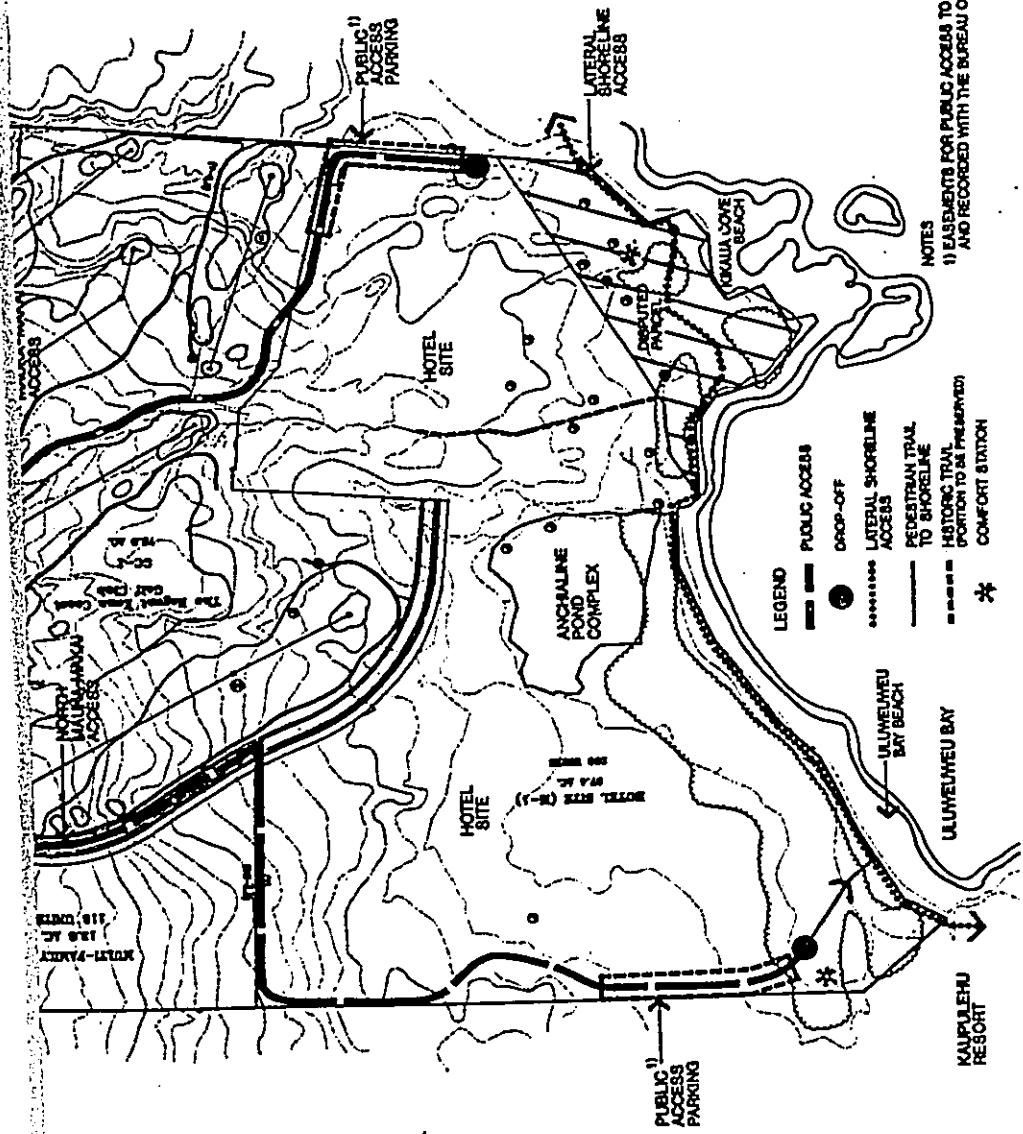
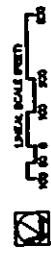


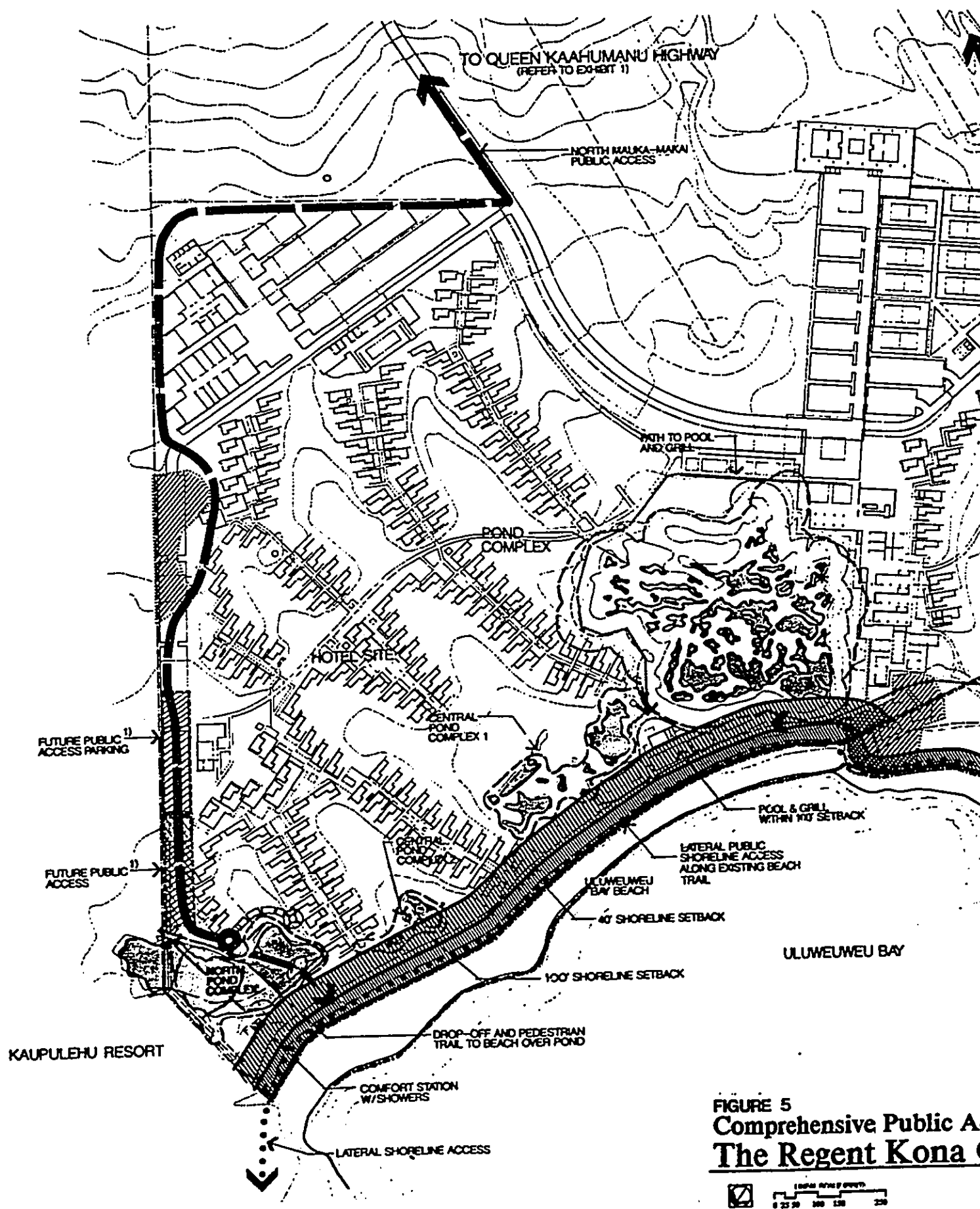
FIGURE 4
Comprehensive Public Access Plan
The Regent Kona Coast

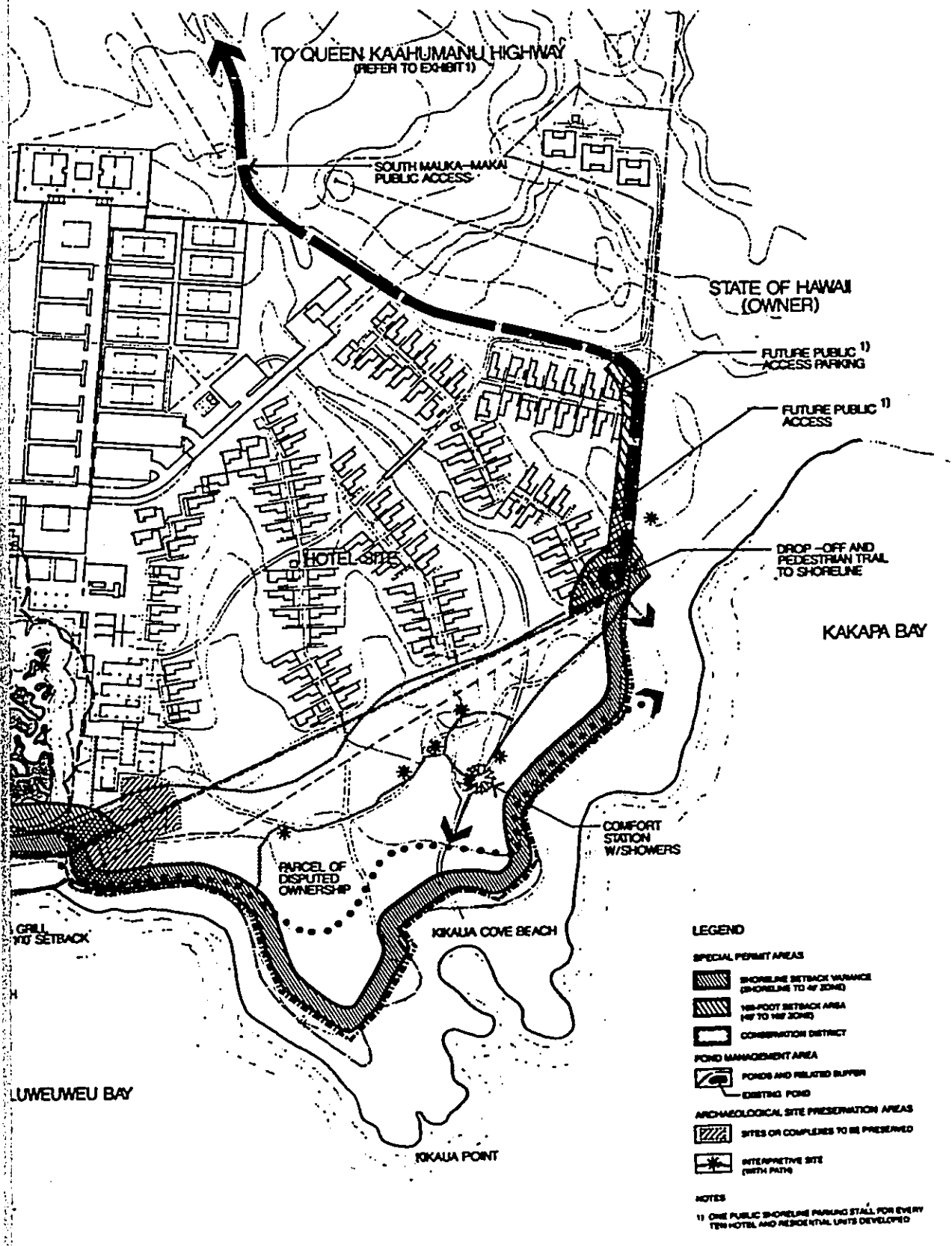


MARCH 11, 1991

Planning/Design Team
 288 HAWAII
 Peter Wilbur & Partners
 3140 Kono, Oahu & Merrill

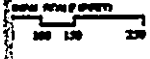
Island Road Associates L.P.
 75-2194 Kono Belt Road
 Kilauea, Oahu, Hawaii 96740
 808-332-1110





**Comprehensive Public Access Plan
Kona Coast**

MARCH 12, 1991



Planning/Design Team
FBI HAWAII
Peter Walker & Partners
Blidmore, Ovinge & Merrill

Shelton Ranch Associates L.P.
73-3490 Kona Rd. Suite 200
Kailua-Kona, Hawaii 96740
808-325-7110

In addition to vehicular access, mauka-makai pedestrian access will be provided from Queen Kaahumanu Highway along the access roadway.

2.2 LATERAL SHORELINE ACCESS

As shown on the Comprehensive Public Access Plan (Figure 5), lateral shoreline access will be provided along the full length of the shoreline in the general area of the current beach path along the top of the beach dune. In order to preserve and protect the integrity of the dune area, however, Huehuc Ranch Associates, L.P. plans to submit an application for a Shoreline Setback Variance in order to allow for construction of a boardwalk to be located generally along the back of the beach dune. At the time of this submittal, County rules and regulations affecting Shoreline Setback Variances are currently under revision, and any application involving a Setback Variance will need to follow the County's adoption of the revised rules and regulations. As noted, all plans for improvements related to the lateral shoreline access have been coordinated with Kaupulehu Development and their Public Access Plans.

2.3 RESTROOM AND SHOWER FACILITIES

Restroom and shower facilities will be provided in close proximity to the proposed drop-off and turn-around areas at both public shoreline accesses, as shown on Figure 5.

These facilities will be sited and designed to meet the following planning and design objectives:

- a. Each public facility, at minimum, should include men and women's restrooms, an outdoor shower, and drinking fountain.
- b. Facilities should provide convenient access to the public and resort guests in relationship to public access routes and their major beach use areas.

- c. Facilities should present minimal visual impacts from the beach and resort use areas.
- d. Facilities should be sited to provide for ease of construction, maintenance, and servicing.
- e. Facilities should be designed to compliment the adjacent uses and resort architecture.
- f. Facilities should be designed to meet all County and State regulations and standards regarding public restroom facilities.

The design for these facilities will reflect a low-scale modest character that is consistent with the resort hotel architecture. All facilities will be maintained by the resort hotel.

2.4 SIGNAGE

Signage, indicating public access routes and parking areas, will be located at strategic locations along the entry roadway and intersections with secondary roadways. Signage will also be provided within the areas of public parking to delineate those areas reserved for public use. The public access signage will be consistent in design and character with that being planned for the overall resort, and, as required under Chapter 3 of the County Code, will meet all County requirements as to placement, size, and lettering. Location of the proposed signage and signage details shall be submitted for approval with plans for the resort hotel.

2.5 RESTRICTIONS ON USES

Access to public parking areas will be limited to daylight hours (dawn to dusk) and security in parking and public use areas will be provided by hotel security staff. Public parking areas, as noted, will be clearly indicated and parking in these areas will be regulated to insure that public parking areas are not used by hotel guests. In addition, public parking areas will be designed so as not to give ready access to hotel units, thus reducing the tendency for use of this area by hotel guests. Generally, cars belonging to hotel guests will be handled by valet parking. When the public access parking is closed, (after dusk) public access to the shoreline will be provided for and managed by the resort hotel.

783acces.pla

A P P E N D I X D

PARK DEVELOPMENT PLAN

DRAFT

**KIKAUA POINT PARK
DEVELOPMENT PLAN**

**Prepared for:
Huehue Ranch Associates, L.P.**

**Prepared by:
PBR HAWAII**

JANUARY 1992

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CHAPTER 1

1.0 INTRODUCTION/BACKGROUND

This development plan describes the proposed improvements to Kikaua Point Park. In general, Kikaua Point Park would be improved to include vehicular drop-off and parking near the south-western boundary, construction of a comfort station (including outdoor showers), and various landscape improvements to improve access, preserve archaeological features, and enhance the area for park use. With the development of the adjacent Regent Kona Coast Resort, access would be provided from the east side of the park site. Refer to Figure 1, Location Map and Figure 2, Public Access Plan.

The proposed Kikaua Point Park parcel, located on the shoreline of the Kukio 1st ahupu'aa, contains approximately 8.93 acres of oceanfront land that has been the subject of disputed ownership between the State of Hawaii and various owners, including the present owners, Huehue Ranch Associates, L.P.. To expedite a resolution of the ownership question and to provide a well-managed, public recreational facility on the shoreline, Huehue Ranch Associates, L.P., through a joint Conservation District Use Application (CDUA) with the State Department of Land and Natural Resources, is applying for a use easement to develop and administer Kikaua Point Park.

The *Final Kukio Beach Resort Environmental Impact Statement* (1986) [herein referred to as the FEIS] included the disputed parcel area and discussed impacts of increased human use in the Kukio Bay area on marine and coastal environments, along with shoreline access and provision of a community park, archaeological feature preservation, and development of historic and cultural information for the public. The *Environmental Assessment for Kikaua Point Park* (1991) and the FEIS meet Chapter 343 requirements for reviewing environmental impacts and mitigation measures concerning the proposed Kikaua Point Park parcel.

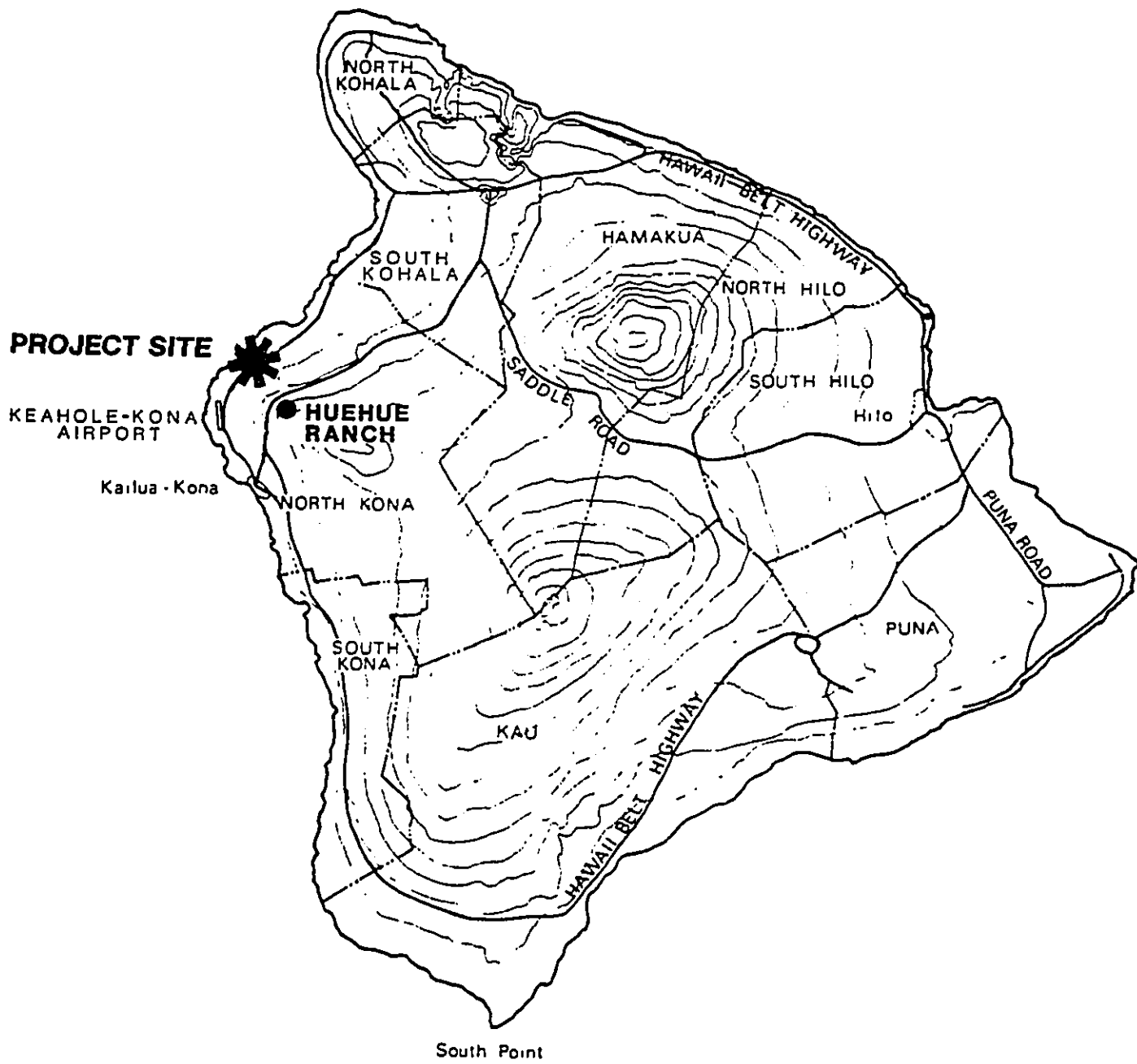
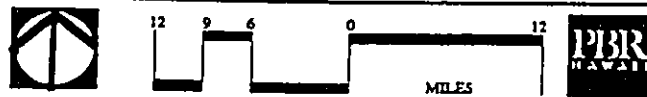
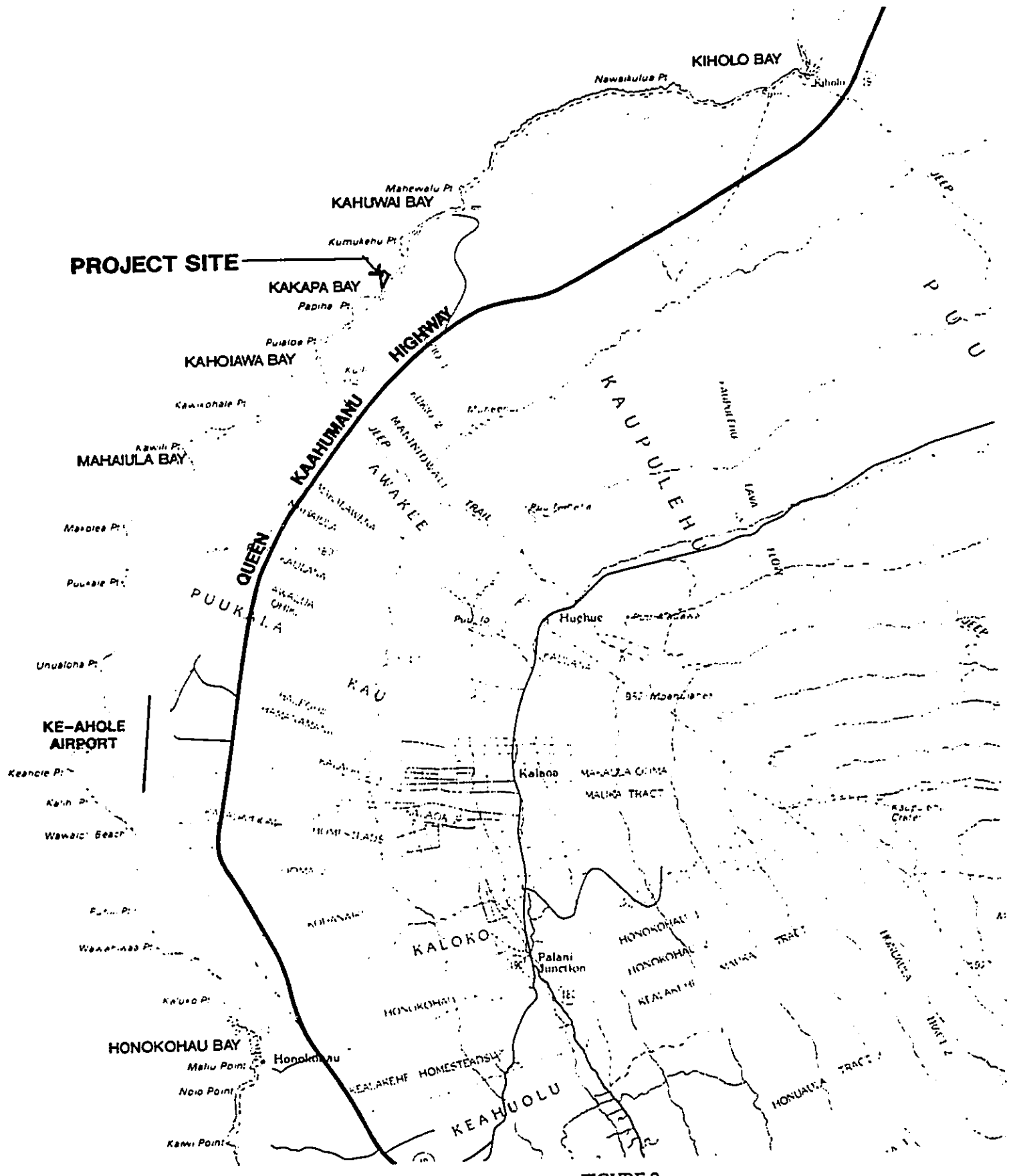


FIGURE 1
ISLAND LOCATION MAP
KIKAUA POINT PARK

2/92

D-4





Source: USGS 1980

FIGURE 2
PARK LOCATION
KIKAUA POINT PARK

2/92



D-5

1.1 EXISTING LAND USES

The site is designated in the Conservation District by the State Land Use Commission. County Zoning is Open. At present the land is vacant except for a small wooden cottage located on the east side of the proposed park peninsula and used by Huchue Ranch employees. Near the cottage is a small barbecue area containing benches.

1.2 EXISTING INFRASTRUCTURE

No major infrastructure exists on the proposed park site. A small brackish water well and storage tank provides limited irrigation and rinse water, as well as cottage water which is heated by a portable gas system. The cottage has solar panels to provide limited electricity. No potable water is available on site.

1.3 EXISTING ENVIRONMENTAL CONDITIONS

Kiawe groves are dense along the eastern boundary of the parcel and occur throughout the interior of the site. The majority of the park area is covered with sharp, clinkerly a'a lava interfering with even passive use of the site. Most of the site shoreline area contain subsurface and dangerous aigal redge reefs near the surface which limits recreational use since the sharp coral shelf is a hazard to swimmers and fishermen (sic). A portion of the perched beach area is safe for wading and swimming, however, the area needs further improvement through removal of sea urchins and smoothing of furrows made by wana (Oceanit Laboratories, 1991).

CHAPTER 2

2.0 PARK DEVELOPMENT PLAN

2.1 LAND USE CONCEPT

The primary land use concept is creation of a public beach park which would be improved and managed by Huehue Ranch Associates, L.P. for passive recreational use. Public shoreline access, in conformance with County requirements, is planned. Creation of a public park with provision for showers, restrooms and picnic facilities allows improved recreational opportunities for Hawaii residents and visitors. Three other land use priorities have also been identified for the site:

- Preservation of archaeological features.
- Enhancement of the natural landscape.
- Development of a pedestrian footpath system coupled with an interpretive program for archaeological sites.

2.2 PARK MANAGEMENT

Park management would be provided by Huehue Ranch Associates, L.P. in accordance with the Kikaua Point Park Management Plan. Principal goals of the management plan are to allow for public use of the park while protecting sensitive archaeological features and preserving a safe park environment. In addition, all park improvements and landscaping would be maintained by Huehue Ranch Associates, L.P..

2.3 PARK ACCESS

2.3.1 ACCESS REQUIREMENTS

Special Management Area (SMA) Permit No. 311 requires a maximum of 150 public parking stalls (1 stall per 10 hotel and resort residential units) and two mauka - makai accesses for the resort. A lateral shoreline access, parking and drop-off areas, restroom and shower facilities, and signage improvements are also required in the SMA permit for

the Regent Kona Coast Resort development.

2.3.2 PROPOSED PARK ACCESS IMPROVEMENTS

Major access improvements associated with park development in accordance with the SMA requirements would consist of extending access from Queen Kaahumanu Highway down the south side of the resort boundary and provision for 50 parking stalls with a drop-off and turn around area approximately 25 feet from the Kikaua Point Park boundary. (The remaining parking requirements would be met at the planned northern mauka - makai access, near the Kaupulehu boundary, in conjunction with the construction of the hotel.)

2.4 PARK IMPROVEMENTS

2.4.1 OFF-SITE INFRASTRUCTURE

Because the existing infrastructure is inadequate for the project, off-site infrastructure will support the park improvements. Both potable water, irrigation and electrical services will be provided through the planned Regent Kona Coast Resort development. Sewage will be provided for through a proposed sewage treatment plant to be located on the Regent Kona Coast Resort site. As discussed above, access will also be provided through the Regent Kona Coast Resort property.

2.4.2 ON-SITE IMPROVEMENTS

On-site improvements planned for Kikaua Point Park include landscaping, a pedestrian footpath, a comfort station with outdoor shower, and various site furnishings. Because of the rough and hazardous nature of the site, actual usable area is limited to a few acres along the shoreline and the developed lawn area in the interior of the peninsula.

Landscaping

The existing kiawe thicket would be thinned to encourage new native plantings and allow for development of interpretive view stations for the archaeological sites. Coconuts would

be planted in the sandy beach area, and a small lawn area of approximately half an acre would be provided for picnic sites.

Comfort Station/Showers

The comfort station and outdoor showers would be centrally located as shown in the Preliminary Park Improvement Plan. All restroom facilities would be constructed in accordance with County Park regulations. A limited irrigation system would also be installed.

Site Furnishings

Picnic tables, benches, water fountains, waste recepticals, lighting (for security and landscaping) signage, along with walkways and paths are planned. All furnishings and site improvements will be constructed and maintained by Huchue Ranch Associates, L.P..

2.5 ARCHAEOLOGICAL FEATURES

Of the eleven potentially archacological significant sites on the Regent Kona Coast Resort parcel, five are listed for preservation, and two of these [104 (T) and 11 (D)], are located within the Kikaua Point Park boundaries. Five other sites on the park property are valuable for information purposes. Interpretive stations connected by a footpath, designed to protect the features while allowing public viewing of the sites, will be constructed.

A P P E N D I X E

ARCHAEOLOGICAL MITIGATION PLAN

**Archaeological Mitigation Program
Regent Kona Coast Resort**

**Phase I: Mitigation Plan for Data Recovery,
Interim Site Preservation, and Burial Treatment**

**Land of Kukio 1st
North Kona District, Island of Hawaii**

by

**Peter M. Jensen, Ph.D.
Associate Senior Archaeologist**

**Alan E. Haun, Ph.D.
Senior Archaeologist**

and

**Paul H. Rosendahl, Ph.D.
Principal Archaeologist**

Prepared for

**Huehue Ranch
c/o PBR Hawaii
Financial Plaza of the Pacific
130 Merchant Street, Suite 1111
Honolulu, Hawaii 96813**

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PHRI

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

Archaeological • Historical • Cultural Resource Management Studies & Services

305 Mohouli Street • Hilo, Hawaii 96720 • (808) 969-1763 • FAX (808) 961-6998

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INTRODUCTION

PROGRAM BACKGROUND

Findings of 1985 PHRI Survey

The most recent archaeological work conducted in the project area was a full reconnaissance survey by PHRI in August 1985 (Walker and Rosendahl 1985). The basic objective of the survey was to identify and evaluate sites and features of potential archaeological significance. The specific objectives of the 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 data collection and/or other mitigation work that might be necessary or appropriate.

Sixty-nine sites comprised of 178+ component features were identified in the project area. Of the 69 sites, 34 (74 features) had been previously recorded, and 35 sites (104 features) were newly identified. Formal feature types encountered within sites included walled shelters and enclosures, cave shelters, overhang shelters, walls, trails, raised stone platforms, cairns, petroglyphs, surface midden concentrations, cleared areas, stone alignments, a brackish well, and anchialine ponds with internal structural modifications.

The sites identified within the project area were summarized, in terms of general distribution, as follows:

Thirty-three sites (97+ component features) located within the immediate coastal area of Parcel 5, an area of c. 80 acres extending to approximately 1,000 ft inland (PHRI Sites T-101 to -107, -117 to -122, -125, -130 to -132, -138, and B.P. Bishop Museum Sites D21-1 to -12, -15, -24, -25). Tentative functional site types include habitation features, recreation features, foot trails (coastal and inland oriented), a possible aquacultural pond system, boundary walls, and a possible *heiau* and/or shrines;

Sixteen sites (38+ component features) located within the inland portion of Parcel 5 (PHRI Sites T-108, -116, -123, -124, -126, -127, -133 to -135, and B.P. Bishop Museum Sites D21-17 to -23). Tentative functional site types include habitation features, burial caves, and foot trails; and

Twenty sites (43+ component features) located within Parcel 16 (PHRI Sites T-110, -114, -115, -136, -137, -139 to -141, Ching (1971) Sites -1196, -1197, -1200 to -1207, -1210, -1211). Tentative functional site types include habitation features and foot trails.

Most of the sites and features (47.8%) were situated in the immediate coastal zone—especially in the south part of the zone. Inland portions of the project area had a distinct paucity of sites and features (inland portion of Parcel 5 = 23.1%, Parcel 16 = 28.9%). Site D21-7, a foot trail, was present in the inland portion of the project area, but it was only included in the immediate coastal area site count.

Functional feature types identified in the project area included temporary habitation features and probable permanent habitation features (walled shelters, cave and overhang shelters, and raised stone platforms) (71.0% of total sites), burial caves (2.9%), foot trails (10.1%), aquaculture sites (2.9%), recreational sites (petroglyphs) (2.9%), a possible ceremonial complex (*heiau*) (1.4%), boundary walls (2.9%), and sites of undetermined function (5.7%). The physical condition and integrity of the the features varied from poor to good; several larger structural features were in quite good condition.

Recommendation for Phased Mitigation Program

An initial mitigation plan was prepared in 1987 (Rosendahl and Haun 1987), based on the findings of the 1985 PHRI survey (Walker and Rosendahl 1985), and on a subsequent Department of Land and Natural Resources (DLNR) review of and concurrence with evaluations and recommendations of that survey (letter of 24 April 1986 from Ralston Nagata, DLNR-State Parks, to Albert Lono Lyman, director, Hawaii County Planning Department; letter of 7 May 1986 from Thomas S. Witten, PBR, to Ralston H. Nagata, DLNR-State Parks; letter of 28 July 1987 from Ralston Nagata, DLNR-State Parks, to Roger Evans, OCEA; and Exhibit 17 (commitment clarification letter of 8 September 1986 from Carl Carlson, Huehue Ranch and DLNR approval response letter of 12 September 1986). The plan consists of two principal elements:

Preservation Plan—A plan for the preservation and interpretive development of two major sites—

a possible heiau complex (Site D21-12) and a pond complex (Site D21-24); and

Data Recovery Plan—A plan for archaeological data recovery work (intensive survey and excavations) to recover significant information from 39 sites for which continued physical preservation would not be required.

Also addressed in the initial plan were two burial caves and seven foot trails that were to be preserved "as is" without interpretive development.

Based on reviews of that initial mitigation plan, and more recent discussions with Dr. Ross H. Cordy—chief archaeologist in the Department of Land and Natural Resources-Historic Sites Section/State Historic Preservation Office (DLNR-HSS/SHPO) (August 22, 1989), and with Ms. Virginia Goldstein—staff planner and historic sites specialist in the Hawaii County Planning Department (HCPD) (August 24, 1989), concerning current standards and procedures for mitigation work, it was agreed that a phased archaeological mitigation program would constitute an appropriate means for the treatment and preservation of the significant cultural information and materials which remained at 50 of the 69 sites identified in the Kukio 1st project area.

The basic purpose of the phased program would be to accomplish, to the appropriate standards, all archaeological mitigation work required by the HCPD and the DLNR-HSS/SHPO in connection with the development of the Regent Kona Coast Resort. As agreed, the phased Archaeological Mitigation Program would consist of four, generally sequential, phases:

- | | |
|-----------|--|
| Phase I | Preparation of a formal Mitigation Plan—including (a) data recovery, (b) interim site preservation, and (c) burial treatment elements; |
| Phase II | Archaeological Data Recovery work, including mobilization, historical documentary research, field work, data analyses, and preparation of Interim and Final Reports; |
| Phase III | Preparation of a Site Preservation Plan, upon completion of Phase II data recovery work, to provide for long-term site preservation concerns; and |

- | | |
|----------|---|
| Phase IV | Archaeological Monitoring, as appropriate, of construction activities that potentially might impact significant archaeological remains. |
|----------|---|

The present document comprises Phase I of the Archaeological Mitigation Program.

PROJECT AREA DESCRIPTION AND SUMMARY OF PREVIOUS RESEARCH

Project Area Description

The project area consists of two parcels (c. 675 ac) situated on a lower slope of Hualalai Volcano, in the Land of Kukio 1st, North Kona District, Island of Hawaii (TMK:3-7-2-04:5,16) (Figure 1). The parcels, which include Land Grant 2121, are separated by the Queen Kaahumanu Highway, which cuts across the Land of Kukio 1st roughly along the 200-ft elevation contour. The seaward parcel (Parcel 5) is c. 317 ac, and the inland parcel (Parcel 16) is c. 358 ac (Figure 2, at end). The overall project area extends c. two miles (3.2 km) inland, from the shore of Kukio Bay (Uluweu Bay) to the prominent cinder cone of Muheenui, and varies in width from c. 0.4 miles (0.67 km) to 0.6 miles (0.98 km). Annual rainfall in the project area ranges from c. 10 in at the coast to c. 25 in at the project area's inland limit (Armstrong 1973:57).

The terrain of the project area, rising a maximum of c. 700 ft from sea level to the top of Muheenui, is characteristically open, rugged, and barren. Excepting Muheenui, classified as cinderland (Sato et al. 1973), the terrain is almost entirely exposed rockland formed by recent (post Pleistocene) basaltic pahoehoe, and by aa lava flows of the prehistoric member of the Hualalai Volcanic Series. Except for the narrow sand beach at Kukio Bay, there are essentially no soils within the project area.

Introduced grasses cover most of the project area. Also present are scattered *kiawe* (*Prosopis pallida* [Humb. and Bonpl. ex Willd.] HBK.) and *koa-haole* (*Leucaena leucocephala* [Lam.] de Wit)—both introduced species, the native tree *lama* (*Diospyros ferrea* var. *sandwicensis* [A.D.C.] Fosb.), and the native shrub, *'ilima* (*Sida fallax* Walp.). The portion of the project area immediately inland of the beach at Kukio Bay (in the immediate coastal zone) supports a dense stand of *kiawe* and *milo* (*Thespesia populnea* L.), under which, above the high waterline, grows a cover of *naupaka-kahakai* (*Scaevola sericea* Vahl) and *pohuehue* (*Ipomoea pes-caprae* [L.]). On the beach at Kukio Bay is a grove of scattered coconut palms (*Cocos nucifera* L.). In the

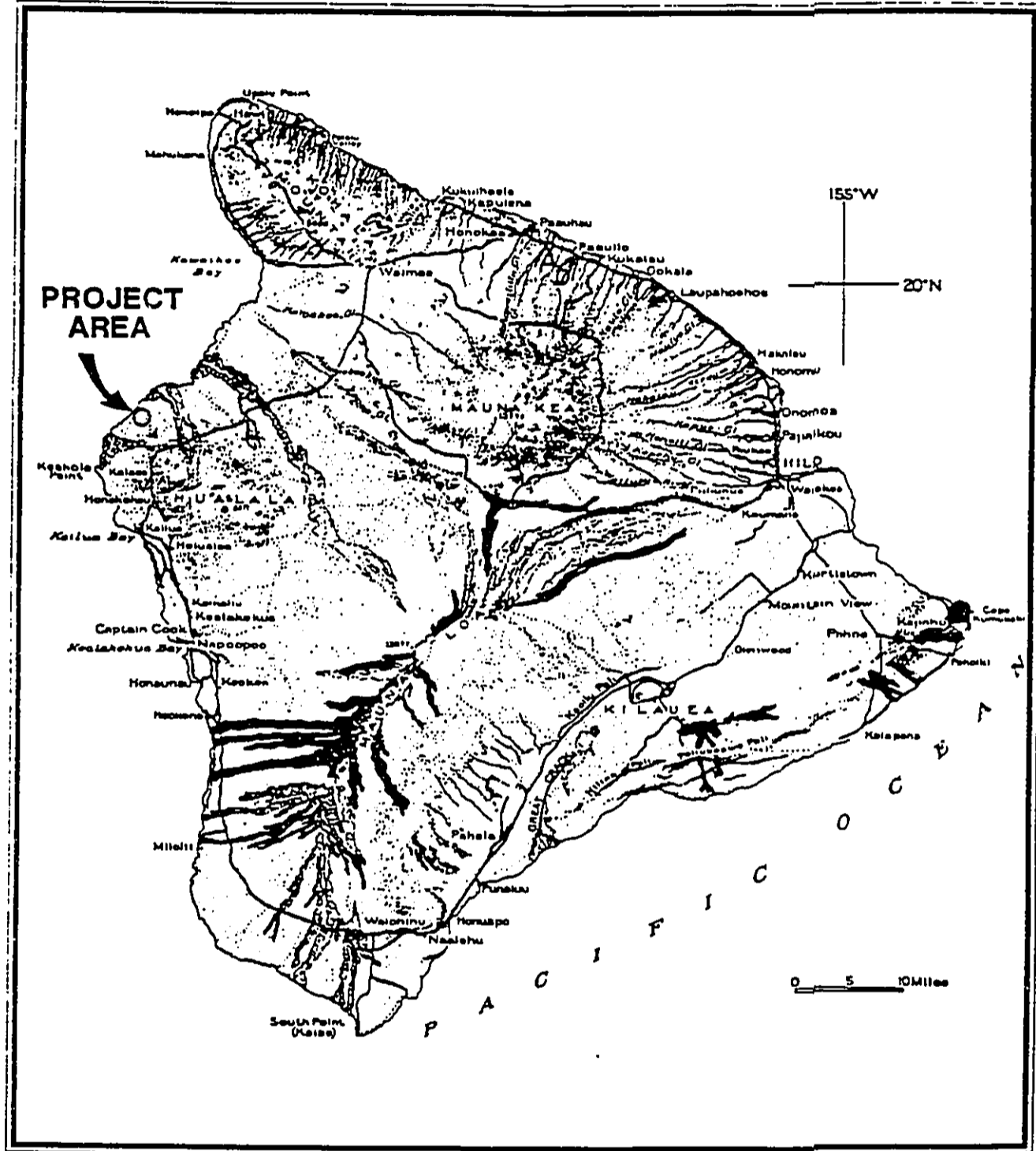


Figure 1. PROJECT AREA LOCATION MAP
 Archaeological Mitigation Program
 Regent Kona Coast Resort
 Land of Kukio Ist, North Kona District
 Island of Hawaii (TMK:3-7-2-04:5,16)

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central portion of the immediate coastal zone is a group of shallow anchialine ponds bordered by *hala* (*Pandanus odoratissimus* L.f.), *kiawe*, *milo*, and various grasses and sedges.

Previous Archaeological Work

The most recent archaeological work conducted in the project area was a full reconnaissance survey by PHRI in August 1985 (Walker and Rosendahl 1985). Prior to this survey, PHRI had conducted in November 1984 a preliminary archaeological reconnaissance survey of the present project area for PBR Hawaii and Huehue Ranch (Rosendahl 1985). The objectives of the preliminary survey were to generally assess (a) the presence/absence of sites/features of potential archaeological significance within the project area, and (b) the need for subsequent archaeological work that might be appropriate and/or required in order to obtain desired State and County development approvals.

The preliminary survey included inspection of three portions of the project area: c. 60 ac in the immediate coastal zone, c. 25 ac in the far inland portion of Parcel 5, and c. 20 ac in Parcel 16. Seventeen previously recorded sites and 13 newly identified sites were recorded. Formal feature types recorded included: walled shelters and enclosures, cave shelters, overhang shelters, walls, foot trails, raised stone platforms, cairns, petroglyphs, surface midden concentrations, cleared areas, a stone alignment, a brackish well, and anchialine ponds with internal structural modifications. Based on the findings of the preliminary reconnaissance survey, it was obvious that a full survey of the project area was necessary to identify all potentially significant sites that might be present and to determine appropriate treatments for those sites.

Archaeological field work within the Land of Kukio 1st prior to the November 1984 PHRI preliminary reconnaissance survey includes four surveys conducted between 1930 and 1975. John E. Reinecke, while conducting a survey along the west coast of Hawaii Island in 1929-30 for B.P. Bishop Museum, recorded several sites along the shoreline of Kukio 1st (Reinecke Ms.). Reinecke inspected only the most immediate shoreline area—no more than a few hundred feet inland, and his recording of sites in the area of Kukio Bay was sketchy. Only three or four sites were designated (Sites 115-117, possibly 118), and the descriptions for the sites were so brief as to prevent definite correlation with the sites subsequently recorded in the area. Reinecke's sites were later included in an inventory of Hawaii Island sites prepared by B.P. Bishop Museum in 1970 for the Hawaii County Planning Department (Emory 1970). That

inventory was based entirely on existing records in the Department of Anthropology, and did not involve field work.

In July and August of 1970, Robert C. Renger conducted a limited archaeological reconnaissance survey of the coastal portion of Kukio 1st as part of B.P. Bishop Museum's archaeological and historical study of Kaloko and Kukio for Huehue Ranch (Renger 1970). Concurrent historical background research for the project was done by Marion Kelly (1971). Renger's survey covered the coastal portion of Parcel 5, from the shoreline to a maximum of 4,000 ft (1,220 m) inland. Renger identified 24 sites and feature complexes within his survey area (Sites D21-1 thru -24).

In June-October 1970, the Parks Division of the State Department of Land and Natural Resources conducted a surface survey of the Kailua-Kawaihae road corridor for the State Department of Transportation (Ching 1971). In the inland portion of the 3000-ft-wide corridor, in the area comprising the north corner of Parcel 16, fourteen sites were identified (Ching 1971:77 [Map 16, Enlargement 11]); the sites were mainly foot trails and temporary habitation shelters associated with the trails. The Queen Kaahumanu Highway subsequently was constructed in a seaward portion of the road corridor, thus avoiding the sites identified by Ching.

Late in 1975, Ross H. Cordy, as part of his dissertation research, conducted coastal survey and testing within the project area (Cordy 1978, 1981). He apparently recorded a single additional site (which he designated Site D21-25) at Kukio Bay. Cordy collected volcanic glass samples from the surfaces of previously identified Sites D21-2 and D21-12 for hydration-rind dating (nine samples; reported range AD 1692-1899), and also collected a few indigenous and historic artifacts from the surface of Site D21-12 (Cordy 1981:244,250).

Archaeological work previously conducted in the general immediate vicinity of the project area includes recent reconnaissance surveys of shoreline areas in Kaupulehu (Carter 1985, Komori 1981), an early survey in Kaupulehu and Makalawena by Soehren (1963), reconnaissance surveys of Awakee (Donham 1987a) and Makalawena (Donham 1986), and more recent survey and test excavations at Kaupulehu (Walker and Rosendahl 1988). Based on the findings of the latter work, a phased mitigation program similar to the one proposed here for the Kukio 1st project area was initiated at Kaupulehu and is currently in progress (Jensen and Rosendahl 1989).

SITE SIGNIFICANCE ASSESSMENTS AND RECOMMENDED TREATMENTS

The 1985 PHRI survey findings and preliminary conclusions, including tentative evaluations and recommendations, were formally reviewed and approved by DLNR-HSS/SHPO and HCPD. General significance assessments and recommended treatments, as presented in the initial mitigation plan prepared by PHRI in 1987 (Rosendahl and Haun 1987:8-11), were recently reviewed and concurred with in discussions with Dr. Cordy of DLNR-HSS/SHPO (August 22, 1989) and with Ms. Goldstein of HCPD (August 24, 1989). These agreed upon significance assessments and recommended treatments which constitute an acceptable general mitigation plan, are summarized here in Table 1.

Based on the findings and preliminary conclusions of the 1985 PHRI survey, the archaeological remains found within the Kukio 1st project area appear to be, for the most part, of limited to moderate significance in terms of potential scientific research, interpretive, and cultural values. Exceptions to this general evaluation were the following sites:

D21-4 Complex—potentially high research value for cave shelter with cultural deposit (extent of remaining intact portion to be determined);

D21-12 Complex—high research, interpretive, and cultural values, possible heiau complex comprised of three large platforms, later historic-period house site atop one platform;

D21-18 Complex—high cultural value, due to reported presence in one cave shelter of human burial remains with known direct local descendants (pers. comm., H. Springer);

D21-24 Pond Complex—potentially high interpretive value, especially in association with adjacent D21-12 complex; significance of pond's internal structural modifications to be determined;

T-124 Burial Cave—high cultural value, due to presence in cave shelter of ten or more human burials and cultural remains; and

Various Foot Trails (D21-7, -23; T-133, -134, -141; 1193, 1197, 1200)—potentially high interpretive and cultural values.

Excepting the sites and features specified above, sites identified during the 1985 PHRI survey appear to be sites for

which continued physical preservation is not essential. Most of the archaeological remains in the project area could be handled adequately by recovering from the sites and features, through further data collection, the significant data present—thereby preserving valuable archaeological information, rather than the physical remains themselves. Archaeological remains of limited significance in terms of value modes could be considered for preservation and inclusion into development landscaping.

No further work was recommended for 19 of the 69 sites investigated, while further work was recommended for 50 sites. Following further data collection, preservation "as is" was recommended for nine sites (T-124, T-133, T-134, T-141, D21-7, D21-18, D21-23, 1197, 1200), and preservation with some level of interpretive development was recommended for two other sites (D21-12, D21-24). For the remaining 39 sites, further data collection (and possibly subsequent data recovery excavations) without subsequent preservation was recommended. The locations of the 50 sites for which further work has been recommended are indicated on Figure 2 (at end). Three general categories of general treatment may be defined for these 50 sites.

I. Further Data Collection - Preservation "As Is" and/or With Interpretive Development

Two caves originally utilized as habitation sites, and subsequently as burial sites, would undergo further data collection, to be followed with protection and preservation "as is". Further data collection work would focus on the habitation remains present, and on recording of the burial remains and associated goods. None of the skeletal remains or associated goods would be removed even temporarily for purposes of analysis without permission from identified direct lineal descendants.

HRHP Number	Prior Designation	Site Type
-	T-124	Habitation/burial
-	T-133	Foot trail
-	T-134	Foot trail
-	T-141	Foot trail
-	D21-7	Foot trail
-	D21-18	Habitation/burial
-	D21-23	Foot trail
1197	-	Foot trail
1200	-	Foot trail

Seven foot trails were originally list for further data collection, to be followed by preservation "as is"; however, increasing interest in and concern for preservation and

Table 1.

**SUMMARY OF GENERAL SIGNIFICANCE ASSESSMENTS
AND RECOMMENDED GENERAL TREATMENTS**

Site Number	Significance Category				Recommended Treatment			
	A	X	B	C	FDC	NFW	PID	PAI
T-102	+	-	-	-	+	-	-	-
T-103	+	-	-	-	+	-	-	-
T-104	+	-	-	-	+	-	-	-
T-105	+	-	-	-	+	-	-	-
T-106	+	-	-	-	+	-	-	-
T-107	+	-	-	-	+	-	-	-
T-108	+	-	-	-	+	-	-	-
T-114	+	-	-	-	+	-	-	-
T-115	+	-	-	-	+	-	-	-
T-118	+	-	-	-	+	-	-	-
T-119	+	-	-	-	+	-	-	-
T-122	+	-	-	-	+	-	-	-
T-130	+	-	-	-	+	-	-	-
T-132	+	-	-	-	+	-	-	-
T-138	+	-	-	-	+	-	-	-
T-139	+	-	-	-	+	-	-	-
D21-1	+	-	-	-	+	-	-	-
D21-2	+	-	-	-	+	-	-	-

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, region, 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, and limited excavations, and possibly subsequent data recovery/mitigation excavations);
- NFW = No further work of any kind necessary, sufficient data collected, archaeological clearance recommended, minimal preservation potential (possible inclusion into landscaping suggested for consideration);
- PID = Preservation, with some level of interpretive development recommended (including appropriate related data recovery work); and
- PAI = Preservation "as is," with no further work (possible inclusion into landscaping suggested for consideration).

Table 1. (cont.)

Site Number	Significance Category				Recommended Treatment			
	A	X	B	C	FDC	NFW	PID	PAI
D21-3	+	-	-	-	+	-	-	-
D21-4	+	-	-	-	+	-	-	-
D21-5	+	-	-	-	+	-	-	-
D21-6	+	-	-	-	+	-	-	-
D21-9	+	-	-	-	+	-	-	-
D21-10	+	-	-	-	+	-	-	-
D21-11	+	-	-	-	+	-	-	-
D21-15	+	-	-	-	+	-	-	-
D21-17	+	-	-	-	+	-	-	-
D21-21	+	-	-	-	+	-	-	-
D21-22	+	-	-	-	+	-	-	-
D21-25	+	-	-	-	+	-	-	-
1196	+	-	-	-	+	-	-	-
1201	+	-	-	-	+	-	-	-
1202	+	-	-	-	+	-	-	-
1203	+	-	-	-	+	-	-	-
1205	+	-	-	-	+	-	-	-
1206	+	-	-	-	+	-	-	-
1207	+	-	-	-	+	-	-	-
1210	+	-	-	-	+	-	-	-
1211	+	-	-	-	+	-	-	-
Subtotal: 39	39	0	0	0	39	0	0	0
T-133	+	-	+	-	+	-	-	+
T-134	+	-	+	-	+	-	-	+
T-141	+	-	+	-	+	-	-	+
D21-7	+	-	+	-	+	-	-	+
D21-23	+	-	+	-	+	-	-	+
D21-24	+	-	+	-	+	-	+	-
1197	+	-	+	-	+	-	-	+
1200	+	-	+	-	+	-	-	+
Subtotal: 8	8	0	8	0	8	0	1	7
D21-12	+	-	+	+	+	-	+	-
Subtotal: 1	1	0	1	1	1	0	1	0

Table 1. (cont.)

Site Number	Significance Category				Recommended Treatment			
	A	X	B	C	FDC	NFW	PID	PAI
T-124	+	-	-	+	+	-	-	+
D21-18	+	-	-	+	+	-	-	+
Subtotal: 2	2	0	0	2	2	0	0	2
All others	-	+	-	-	-	+	-	-
Subtotal: 19	0	19	0	0	0	19	0	0
Total: 69	50	19	9	3	50	19	2	9

accessibility of trails on the part of various government agencies and private groups suggests that some degree of interpretive development should be considered. Preservation and interpretive development of trails could involve portions of various trails—though not necessarily all portions of all trails, and could be accomplished by physically protecting them and placing signs along appropriate sections. Exact specification of trail portions to be preserved and interpreted would have to wait until detailed development plans for the location and conformation of structures, golf courses, landscaping, and various amenities are finalized. The final interpretive plan (Phase III - Site Preservation Plan) of the overall mitigation program will deal with the blending of major portions of trails into the golf courses, various development areas, and the public access system.

II. Further Data Collection - Preservation with Interpretive Development

Further data collection is needed at two major sites for the purpose of gathering additional information to evaluate further the specific nature and level of interpretive development which would be appropriate for each of the sites. Site D21-12—a possible heiau complex comprised of several large platforms and terraces—was determined to be significant for information content, as an excellent example of a site type, and for cultural value. Site D12-24—an anchialine pond complex comprised of numerous ponds, low walls, cairns, and platforms—was determined to be significant for information content and as an excellent example of a site type.

HRHP Number	Prior Designation	Site Type
-	D21-12	Heiau complex
-	D21-24	Pond complex

Further data collection work at both sites will produce the specific information content to be utilized in interpretive development. The final interpretive plan (Phase III - Site Preservation Plan) of the overall mitigation program will address the details of an appropriate interpretive development program, which would include four essential, equally important components—interpretive themes, site preparation, interpretive focus, and interpretive mechanisms.

III. Data Recovery Excavations - No Preservation

Further work, in the form of data collection and/or data recovery excavations, is needed at 39 sites containing cultural deposits and remains significant for information content. Preservation "as is", or preservation with some level of interpretive development, will not follow completion of this work, which is designed to recover all of the significant information which remains at these 39 sites. None of these sites are known to contain human burial remains; if any such remains were to be revealed in the course of the further data collection/data recovery work, they would be handled according to the procedures outlined in the Burial Treatment Plan.

HRHP Number	Prior Designation	Site Type
-	T-102	Habitation complex
-	T-103	Recreation complex
-	T-104	Habitation complex
-	T-105	Pond wall (?)
-	T-106	Habitation complex
-	T-107	Habitation complex
-	T-108	Habitation complex
-	T-114	Habitation
-	T-115	Enclosure
-	T-118	Habitation complex
-	T-119	Habitation complex
-	T-122	Cairn complex
-	T-130	Habitation complex
-	T-132	Habitation
-	T-138	Habitation
-	T-139	Habitation complex
-	D21-1	Habitation complex
-	D21-2	Habitation complex
-	D21-3	Habitation complex
-	D21-4	Habitation complex
-	D21-5	Habitation
-	D21-6	Habitation complex
-	D21-9	Habitation complex
-	D21-10	Habitation complex
-	D21-11	Habitation complex
-	D21-15	Habitation
-	D21-17	Habitation complex
-	D21-21	Habitation
-	D21-22	Habitation complex
-	D21-25	Habitation complex
1196	-	Recreation complex
1201	-	Habitation complex
1202	-	Habitation complex
1203	-	Habitation
1205	-	Habitation
1206	-	Habitation complex
1207	-	Habitation
1210	-	Habitation complex
1211	-	Habitation complex

For the 50 sites requiring further work—including both data collection in connection with preservation “as is” and/or with interpretive development at nine sites (Category I), or preservation with interpretive development at two sites (Category II), and data recovery excavations with no preservation at 39 sites (Category III), the following Data Recovery Plan outlines relevant research questions to be addressed and research methods to be employed. For all eleven sites to be preserved “as is” or with some level of interpretive development (Categories I and II), the following Interim Site Preservation Plan details short-term measures to be taken to protect these sites during construction, and during the time period of implementation of the additional field research outlined in the Data Recovery Plan. The actual site preservation and interpretive development plans will be presented as Phase III - Site Preservation Plan of the Archaeological Mitigation Program; this plan will be prepared upon completion of the Phase II data recovery work. Lastly, for the two sites known to contain human remains (Category I, Sites T-124 and D21-18), the following Burial Treatment Plan details the approach which will be taken in the recording, evaluation, and treatment of these remains. As well, this plan identifies the approach which will be taken in the event that additional, previously unidentified burial remains are encountered during the course of data collection and/or data recovery work.

DATA RECOVERY PLAN

Of the total 69 sites identified within the project area, 50 retain additional information which can be easily recovered and which is considered important to the understanding and appreciation of local and regional prehistory and history. Thirty-nine of these 50 sites are scheduled for further data collection and/or data recovery excavations, and neither preservation nor interpretive development will follow implementation of that work. The other eleven sites are scheduled for further data collection, following which two will be preserved "as is", while two others will be preserved with interpretive development, and the remaining seven will either be preserved "as is" or with some level of interpretation. The specific level of interpretive development for various sites will be presented in Phase III - Site Preservation Plan of the Archaeological Mitigation Program.

GENERAL RESEARCH TOPICS AND DATA REQUIREMENTS

Chronology, Culture History, Complex Society Development

At present, only two sites (D21-2, -12) within the project area have been dated (Cordy 1981), and these span the late prehistoric and early historic periods (c. AD 1690-1900). Therefore, chronological data from sites in the immediately adjacent Land of Kaupulehu might be looked to with instruction. The dating of Kaupulehu sites presently suggests initial occupation of the area as early as AD 1030 (Site 10959), with the greatest intensity of occupation occurring during the 300 year period between about AD 1500 and AD 1800. These results, with which the available Kukio dates agree, are roughly equivalent with those obtained from coastal areas to the north at Anaehoomalu (Jensen 1988, 1989b) and Kalahuipuaa (Jensen 1989a, Welch 1989). Moreover, the presumed intensification of occupation within these latter areas, initially suggested by Barrera (1971) and subsequently confirmed by Kirch (1979), appears also to have occurred at Kaupulehu, at least on the basis of present evidence (Walker and Rosendahl 1988a:197).

Current dating of Kaupulehu sites, however, is based on only 44 volcanic glass evaluations and ten radiocarbon assays, while the microenvironmental control data recently advocated by Welch (1989) for dating sequences based on a high percentage of volcanic glass estimates was not secured during the data collection program which accompanied the inventory survey. Such microenvironmental data may prove to be critical in further refinement of the sequence. In

short, it has been demonstrated that volcanic glass samples can produce divergent dates under varying microenvironmental conditions (Welch 1989), and the potential effects of such microenvironmental variability must be further evaluated before concluding that existing dating information for Kaupulehu, and forthcoming new dating information for Kukio, is completely accurate. Furthermore, a higher percentage of the datable site components at both Kukio and Kaupulehu need to be dated in order to establish a settlement chronology which can be used to place this area within a broader regional chronological framework.

A general developmental sequence for the Kekaha area of West Hawaii—the northern part of North Kona and the southern part of South Kohala Districts—was synthesized by Donham (1987b:142-145) on the basis of her work at Ooma II (Donham 1987b) and Awakee (Donham 1987a), and previous research by Cordy (1978, 1981, 1986), Hommon (1976), and Kirch (1980, 1985). In this general developmental sequence, initial occupation of the northern end of North Kona occurred at Anaehoomalu around AD 900. This initial occupation of the dry, leeward coast of Hawaii Island is believed to have occurred in response to expanding agricultural activities along the windward coast of the Island. This windward expanding agriculture, according to Kirch (1985), resulted in an increased demand for additional agricultural lands, eventually leading to the exploitation of less suited agricultural areas such as North Kona. The dating results at Kaupulehu appear generally to conform with the model's expectation, with initial occupation of Site 10959 occurring at c. AD 1030. Although the population of West Hawaii remained low and fairly stable until around AD 1200, a significant increase in population density appears to have begun around AD 1200 and to have continued through AD 1600. Due to the generally arid, rocky environment and lack of available fresh water in the Kekaha area, however, the population increase between AD 1200-1600 was uneven, with the greatest increases occurring in the area of Anaehoomalu and probably at Kiholo, Kaupulehu, and Kukio, although no comparable dating information is currently available for coastal sites at Kiholo and Kukio.

Cordy has suggested that as population increased in certain favorable areas, substantial uninhabited buffer zones were created between the primary population centers (Cordy 1981:173). Within these buffer zones, initial settlement was delayed until around AD 1400, as at Kohana-Iki and Ooma II (Cordy 1981:168). Between about AD 1400-1600, the population increased within these previous "buffer" areas in a manner comparable to population expansion in the areas

which had initially been occupied along the coast (e.g., Anaehoomalu and Kalahuipuaa). Again, information from Kaupulehu generally supports these existing models, suggesting an increase in the local population during the period between about AD 1500-1800; the place of Kukio within this general sequence, however, is uncertain and must wait for dating results that would derive from the proposed data recovery research.

Evidence for an increase in the complexity of the local social organization concomitant with increased population is lacking at Kaupulehu. No large structural features are present which would have required mobilization of large social units, while permanent habitation sites at Kaupulehu do not contain status indicators, such as contrasting structural complexity or appropriate portable items. It has been suggested that Kaupulehu did not emerge as politically important until the late prehistoric period, when Kameciamoku, a chief and advisor to Kamehameha I, resided in the area (Walker and Rosendahl 1988a:200). But this tentative conclusion begs the question as to the processes which might have been involved. The place of Kukio—which does have at least one large structural complex (the possible heiau, Site D21-12) and several habitation sites which might represent permanent occupation—in such a sequence is presently uncertain, but potentially available from the proposed data recovery investigations. One possible explanation for the contrasting results which have been obtained from areas such as Anaehoomalu and Kalahuipuaa, on the one hand, and Kaupulehu, on the other, is that the availability of specialized resources may have played a significant role in stimulating the development of complex society in West Hawaii. Such resources, in the form of major anchialine pond systems, are present at both Anaehoomalu and Kalahuipuaa, but are much less prominent features at both Kaupulehu and Kukio.

Concurrent upland and coastal residential settlement seems not to have characterized either the initial period of occupation at Kaupulehu, nor the early historic era. A number of potential research issues relate to this finding. It has been generally accepted that upland settlement did not occur on the islands of Hawaii, Oahu, and Molokai until c. AD 1400-1550 (Hommon 1976:249). For West Hawaii, Rosendahl (1972:499) suggests that developing agricultural technology and associated agricultural expansion allowed permanent settlement of upland communities to occur at Lapakahi in the North Kohala District around AD 1500. Based on the presence and dating of upland habitation and agricultural sites in Kealakehe (Walker and Rosendahl 1988b), it seems likely that initial upland occupation of Kaupulehu, and perhaps Kukio, could have occurred at a roughly similar time period, c. AD 1550-1650.

Moreover, it is also generally assumed (e.g., Hommon 1976:258) that during the period of inland expansion, coastal residences were not abandoned but coexisted with inland sites, and that inland and coastal sites exchanged their specialized commodities. However, the precise nature of the interrelationships among upland and coastal sites during the period of upland agricultural expansion has not been adequately determined. Work by Rosendahl (1972) suggests a general absence of permanent habitation in the barren rocklands between the coast and the uplands, but no studies have confirmed that coastal and upland zones were occupied by the same household groups. It is even possible that temporary habitation sites within the barren intermediate zone were occupied prior to the establishment of permanent households within the coastal area, particularly if the initial impetus for occupation of the region was a response, as has been suggested by Kirch and others, to increasing demand for additional agricultural land.

The investigation of these topics entails, in part, analyzing and interpreting site-specific information such as dating results, subsurface horizontal feature distribution, and qualitative/quantitative values of various portable artifact types and midden constituents. Utilizing this information to further define the following specific objectives would ultimately contribute significantly to the understanding of the research issues outlined above:

1. Age, duration, and intensity of occupation at individual sites and features;
2. Portable artifact assemblages present at individual sites and features;
3. Ecofactual remains, including in particular the relative percentage of marine and terrestrial resources present, at individual sites and features;
4. A refinement in the existing assessment of the variety of cultural activities conducted at various sites and features at different time periods; and
5. A refined evaluation of the nature and sequence of occupation at individual sites and features—whether temporary, extended, or permanent, and whether single, or recurrent, episodes of occupation are represented.

Human Ecology

This topic would deal with the definition of subsistence adaptation to the generally arid environmental setting, a setting comprised of a variety of local resource zones,

including the anchialine ponds, the littoral and pelagic offshore waters, and the immediate terrestrial zones. Although limited in relation to areas such as Anaehoomalu and Kalahuiipuaa, the project area does contain several—similar to Kaupulehu, anchialine ponds (*wai 'opae*) of various sizes and depths, and most sites in the coastal zone (including all of those sites considered to have been permanently occupied) are located near such ponds. Many contain molluscs and crustaceans, and one or more may have provided a minimal habitat for waterfowl and shore birds. Specific research questions relevant to the pond resource zone include the following:

1. How and for what purposes were the ponds exploited, both prehistorically and historically?
2. What is the extent of structural variability at modified ponds?
3. Have cultural modifications caused or aided changes in pond ecosystems?

In evaluating the relevance of Kukio data to broader research issues, it will be necessary to accomplish the following tasks:

1. Define the specific resources which were exploited;
2. Determine the intensity of exploitation relative to both marine and terrestrial resources;
3. Compare and contrast with other West Hawaii sites the material culture elements associated with that exploitation; and
4. Ascertain the methods and techniques of exploitation which were actually employed. This latter task will require:
 - a. Characterization of the local marine environment through (1) documentary research of available marine environment sources and references, and (2) consultations with local informants and knowledgeable individuals;
 - b. Formulation of a model of marine resource exploitation strategies. The model would require specification of the range of resources exploited,

the intensity of exploitation, the methods and techniques employed, and the associated material hardware, and would be formulated by combining this information with (1) documentary research involving ethnohistoric and ethnographic sources, (2) review and analysis of comparable data from other areas, and (3) an evaluation of any special conditions which characterize the local marine environment.

Evidence for terrestrial exploitation of flora and fauna within the similar and immediately adjacent Kaupulehu area includes species found near the coast (coconut, pandanus, and gourd) and species which are concentrated further inland (*kukui*). Preliminary historical documentary research (Kelly 1985) indicates that residents may also have exploited sweet potato, watermelon, and tobacco during the early historic period, although the relationship of these purported activities to prehistoric patterns of use/exploitation remain undetermined.

Osteological Studies

The human burials identified within the project area appear to reflect both possibly prehistoric as well as early historic period ceremonial practices of the Kukio population. Data recovery could yield osteological material useful for evaluating several hypotheses which were developed during the inventory survey concerning burial feature types—caves, platform monuments, and/or terraces. As well, available osteological material could be useful for addressing additional research questions such as the following:

1. Status differentiation reflected in burial location, burial feature type, or associated grave goods;
2. Existence of a high frequency of aberrant causes of death (e.g., related to activities such as warfare or epidemics);
3. The general time period of site use during which burials also occur;
4. Anthropomorphic, demographic, and pathological aspects of the population represented; and
5. Development of inferences regarding the territorial extent of the contributing population, based on a comparison of statistical indices of the skeletal population.

DATA RECOVERY METHODS AND TECHNIQUES

Data for addressing the research topics outlined above are derivable from archaeological excavations and laboratory analyses of recovered artifactual, ecofactual, and osteological materials. Already available for the project area is archaeological survey data, including (a) information on site and feature types and their distributions, (b) amount and types of surface artifactual and ecofactual materials, (c) and general environmental data. Excavations would contribute additional information on artifacts, ecofacts, materials for absolute dating, stratigraphic information, additional specifics concerning site/feature types and construction methods, and intensity of occupation of individual sites and features throughout the project area. Laboratory data would include age determination analyses, artifact and ecofact analyses, soil studies, and specialized studies of floral and faunal materials.

Excavations

Limited testing involves a combination of formal excavation units and informal shovel test pits, designed to evaluate deposits and feature components for the presence of human burial remains, and to evaluate the depth and contents of cultural deposits not previously evaluated during the initial testing which accompanied the inventory survey field work.

Excavations will take place at sites that have already been determined to contain intact cultural deposits. Test units will be excavated by cultural/natural stratigraphic layers. If necessary, excavation by arbitrary 10 cm levels will be employed for very thick or stratigraphically complex layers. All fill will be screened through 1/8-inch screen, and a minimum 25% sample of the screened material will be retained for laboratory analysis.

Subsurface features will be numbered sequentially within excavations; i.e., the first horizontal feature encountered in each excavation will be designated HF-1, the second HF-2, and so on. The features will be plan mapped, excavated, and sampled for laboratory analysis samples. When possible, given the confines of a one-meter-square excavation unit, subsurface features will be sectioned, and appropriate cross-section drawings will be prepared.

Cross-section drawings will be prepared for a minimum one test unit face within each excavated site. Layer descriptions will be compiled through a combination of field examination

and subsequent laboratory analysis of representative fill samples, in accordance with Munsell Color Notation and U.S. Soil Conservation Service guidelines. Excavations will be documented, and a photographic record will be kept. Locations of all test units will be plotted on the appropriate site map. Non-portable features encountered during excavation will be plan mapped, drawn in profile and cross-section, and photo-documented.

Representative soil samples and bulk samples will be collected for specialized analyses. Where present, samples of datable materials (charcoal, volcanic glass) will be collected for age determination.

Suspected burials will be evaluated, according to the Burial Treatment Plan presented below. Generally, structural features containing such remains will be subjected to partial dismantling in order to evaluate and determine contents. If human remains are determined to be present, then the evaluative and recovery procedures will shift to those outlined in the Burial Treatment Plan.

Subsurface excavation testing is recommended along beach deposits wherever present along the seaward edge of the project area in order to determine whether or not subsurface buried cultural deposits and/or burials are present within this area. Field work would involve auger core testing to depths ranging from 1-2 meters, depending on local conditions.

Laboratory

All recovered artifacts and midden remains, whether recovered during limited testing, subsurface testing, or excavations, will be cleaned and sorted in the laboratory. Artifacts will be sketched (when appropriate), classified as to type and material, weighed, and characterized in terms of metric attributes. Midden samples will be sorted and weighed by major category (e.g., bivalves, gastropods, fish, mammal, etc.), with identifications made to the most specific levels appropriate or possible. This strategy may be modified if abundant materials are recovered, in which case a representative sample of the ecofactual remains would be analyzed.

Dating analyses will include radiocarbon age (including C-13/C-12 stable isotope ratio determinations) and volcanic glass age determinations by hydration-rind measurements. Carbon samples will be preliminarily sorted, weighed, and described prior to submission to Beta Analytic for dating. Volcanic glass will likewise be processed in the laboratory before submission for dating.

Soil samples will be analyzed according to established procedures. Floral and/or faunal samples will be submitted for specialized analysis, if such analysis is determined appropriate.

Historical Documentary Research

Historical documentary research appropriate to mitigation-level data recovery will be undertaken. This research will involve limited work with available local informants, and further examination of relevant historical sources (including published and unpublished reports and records, and historic maps) related to the project area.

Report Preparation

The final report will present findings of the Data Recovery Plan, as outlined in the draft guideline standards for Archaeological Data Recovery Studies and Reports prepared by DLNR-HSS (DLNR 1987). Emphasis will first be on interpreting individual sites in terms of function and age, and then on determining interrelations among sites within the Kukio project area, and between Kukio and other areas in West Hawaii. The specific research questions outlined above will be addressed.

Treatment of Recovered Materials

All materials recovered during the present project would be handled in compliance with Section 66.3(b) of the National Park Service's "Recovery of Scientific, Prehistory, Historic, and Archaeological Data: Methods, Standards, and Reporting Requirements" which recommends that recovered materials "...should be maintained by a qualified institution or institutions as close as possible to their place of origin, and made available for future research" (CFR). With the firm belief of the local community of Hawaii Island archaeologists and other concerned residents that all recovered material should be retained on Hawaii Island, it is the intention that the material recovered during the current project, along with copies of all records concerning these materials, be repositied on Hawaii Island, and that copies of these records be provided to the Hawaii State Historic Preservation Office (SHPO). While at present there is no officially designated repository on Hawaii Island, the University of Hawaii-Hilo Campus has agreed for the immediate future to hold recovered materials within the Archaeological Materials Storage section of the Department of Anthropology-Archaeology Laboratory.

INTERIM SITE PRESERVATION PLAN

Of the total of 69 sites identified within the project area, eleven are considered potentially significant for information content, as well as representative of particular site types or significant for cultural value as burial sites. These sites have therefore been designated for preservation (either total or selective), either "as is" or with some level of interpretive development. Further data collection, but no mitigative data recovery excavations, is needed at all of these sites in order to provide additional information relevant to some level of interpretive development. The proposed level of further data collection at individual sites will allow (a) assessment of any additional research which would be necessary and appropriate prior to preservation of particular resources, (b) more accurate interpretation of site functions so that signs or other interpretive developments are accurate, and (c) final selection of the most appropriate feature-specific treatment—whether preservation "as is", preservation with some level of interpretive development, incorporation of particular sites/features into proposed landscaping plans, or—in the case of multiple component sites—which few selected features might be excluded from preservation on the basis of not being essential to the interpretive presentation of a specific site.

Until the data collection research has been completed, however, all eleven sites will require interim protection from the potential adverse effects of construction and other activities associated with resort development. Furthermore, if any construction activities are begun prior to completion of the data recovery work scheduled for the other 39 sites, similar interim protection would be needed. Interim preservation, which will include all features of multiple

component sites, will be insured by adopting the following general protective measures:

1. Accurate plotting and locating of all sites on grading plans prior to initiation of grubbing and grading activities, and appropriate notation included on the grading plans;
2. Establishing an appropriate buffer zone around the identified and mapped site perimeters, within which construction activity would not be allowed. An appropriate buffer (from 20 ft to as much as 100 ft, as appropriate to each individual site) would be set up around flagged site perimeters. In some cases, it may be appropriate to construct a temporary physical construction barrier (e.g., a fence) around the sites in place of a mapped buffer zone. The latter could be necessary to insure avoidance of damage to particularly sensitive sites and/or features within sites;
3. Explicit notification of construction supervisors and other resort development personnel as to the nature and location of the sites, the significance of the buffer zones, and the color and meaning of any site perimeter flagging tape; and
4. On-site monitoring of grubbing and grading in the immediate vicinity of the historic sites shall take place to assure preservation of flagged sites.

BURIAL TREATMENT PLAN

Of the total of 69 sites identified within the project area, two are known to contain human burial remains. Site T-124, a small cave initially utilized as a prehistoric habitation site, contains an estimated ten historic period burials (with associated historic grave goods) and several possibly prehistoric and/or early historic period burials. At Site D21-18, a complex with several small caves having habitation remains, one of the larger cave features (Feature 3) is partially sealed with boulders, and contains at least five burials with associated wooden poles and planks.

The plan recommends preservation of the two above burial sites. Should disinterment of remains and burial goods occur for some unforeseen reason, the disinterment will be in compliance with the requirements listed below.

In addition to these documented human remains, the proposed data collection and data recovery excavations could result in the identification of additional, previously unidentified burial remains. The evaluation, recording, and reinterment of designated remains will (a) be guided by a specific set of research objectives, (b) comply with various Hawaii State Statutes, and (c) be undertaken in consultation with any identified lineal descendants, affected Native Hawaiian groups and organizations, and appropriate State and County agencies.

PRE-DISINTERMENT COORDINATION AND COMPLIANCE

Disinterment of human remains requires compliance with Chapter 338: Section 25-5 and Chapter 6E: Section 43 (as amended by Act 265 S.L.H. 1988), Hawaii Revised Statutes). Compliance with Chapter 338:25-5 requires obtaining a disinterment permit from the State Department of Health. If a decision to disinter any burials is made, then a disinterment permit would be first obtained from the Hawaii State Department of Health. Chapter 6E:43 also require coordination with the Department of Land and Natural Resources-Historic Sites Section (DLNR-HSS); the revised Chapter 6E requires that DLNR-HSS be notified and that DLNR-HSS contact the Office of Hawaiian Affairs (OHA) if it appears that the remains are those of native Hawaiians. DLNR-HSS has already been made aware of the burials present within the project area and would, as part of the mitigation program, consult with OHA prior to the initiation of field work for any proposed disinterment activities.

Chapter 6E:43 also requires that a burial mitigation plan (the present document) be prepared in consultation with DLNR-HSS; it further stipulates that the plan must provide for osteological analysis, for reporting of results, and for the final disposition of the remains, and must be reviewed and approved by DLNR-HSS prior to its implementation. Lastly, both Chapters 338:25-5 and 6E:43 require a search for lineal descendants, the search to minimally consist of publishing a public notice in a newspaper of general circulation to notify possible lineal descendants. If lineal descendants are found, osteological analyses are to be subject to their wishes. If a decision to disinter any burials is made, appropriate public notice would be published in the *West Hawaii Today* newspaper.

Local informant information presented in Appendix B (Springer 1985) of the report on the 1985 PHRI survey (Walker and Rosendahl 1985) indicated that several local informants knew of the cave burials present within the Kukio 1st project area, and that the treatment of these burials was one of their major concerns. The possible need to disinter burials was understood by informants, who stressed that any remains which had to be moved should remain in the immediate local area and might perhaps be reinterred in the existing cemetery behind Kakapa Bay to the south in the adjacent Land of Kukio 2nd. Further consultations with available local informants concerning the treatment of burials within Kukio 1st will be carried out as part of the mitigation program, with first priority being given to the wishes of any identified lineal descendants, and second priority to those of older local informants and/or local Hawaiian community groups.

RESEARCH TOPICS

Research topics designed to guide burial disinterment have already been outlined in the Data Recovery Plan. Generally, relevant research topics are concerned with obtaining additional information on the culture history and lifeways of the prehistoric and early historic period Hawaiian population which occupied the area, as summarized below:

1. Initial human presence in the area;
2. The nature of the occupation;
3. Population history;
4. Social organization; and
5. Subsistence adaptations.

The extent to which the burials present within the project area might actually contribute to the understanding of these general research topics, as well as such additional research topics as prehistoric demography, nutrition, or social organization, is unknown, and may be limited owing to the small sample size. Nevertheless, it can be expected that additional information from the present project area concerning Topics No. 1, 3, and 4, above, could be recovered by evaluating the age, sex, and health status of individuals represented. In addition, grave goods such as artifacts and other items would also provide evidence directly relevant to further refining an understanding of Topics No. 2 and 5.

DISINTERMENT

Prior to any disinterments, a blessing would be conducted at the project area by appropriate Hawaiian representatives. During disinterment, archaeological personnel would adhere to the highest standards of professional conduct, displaying respect and sensitivity during the removal and curation of the remains.

Disinterment would be conducted in a scientific manner by professional archaeologists, using controlled archaeological excavation techniques. Detailed and comprehensive records, including field notes, detailed recording on standard recording forms, maps, and photographs documenting the location, orientation, condition, and other aspects of each burial, would be maintained throughout the disinterment procedures.

CURATION, ANALYSIS, AND REPORTING

Following disinterment, the remains would be temporarily curated at the PHRI laboratory in Hilo, a location reasonably proximate to the site of disinterment. The temporary curation facility would be appropriate for insuring the physical preservation of the remains, and would be adequate for conducting post-field osteological recording and analyses.

Subject to the agreement of any identified lineal descendants, osteological analysis of remains would be carried out by a qualified physical anthropologist in a timely manner. The analysis would consist of recordation of standard metric and non-metric traits and would include

assessments of age, sex, and pathology. All aspects of the analysis would be documented by way of written records (including appropriate forms), drawings, and photographs.

The analysis results would be presented in the Final Report on the archeological data recovery efforts. The results would either be included within the body of the report or would be included as an appendix to it. Reporting would include presentation of basic data and the methods used in developing that data. Interpretations based on the analysis of the data would also be presented, particularly as they relate to the research topics presented in the present Data Recovery Plan.

REINTERMENT

After completion of all laboratory analysis, the remains would be reinterred. For burials that have been claimed by legitimate lineal descendants, the claimants would be consulted with regard to specific reinterment wishes. For all other remains, it is recommended that they be reinterred at a location (an appropriate cave site) within the project area that could be preserved and protected. All available associated grave goods recovered during the present project would be reinterred with their respective burials.

Reinterment procedures, including physical treatment of the remains (i.e., type of container), grave preparation and marking, and ceremonies/blessings, would be determined through consultation with OHA and appropriate local informants and/or lineal descendants, with preference being given to the wishes of the latter. It is possible that final disposition of any disinterred remains would involve reinterment at one of the two known burial caves that have been recommended for protection and preservation "as is" within the overall Regent Kona Coast Resort project area.

Prior to reinterment, the reinterment cave would be mapped to the appropriate archaeological standards. After the remains are reinterred, the exact locations of the remains should be plotted on this map, which could be made available to qualified archaeologists with legitimate reasons for consulting the map. Subsequent to mapping, the portion of the proposed reinterment cave site containing the burial remains should be sealed, if possible, with a dry masonry rock wall.

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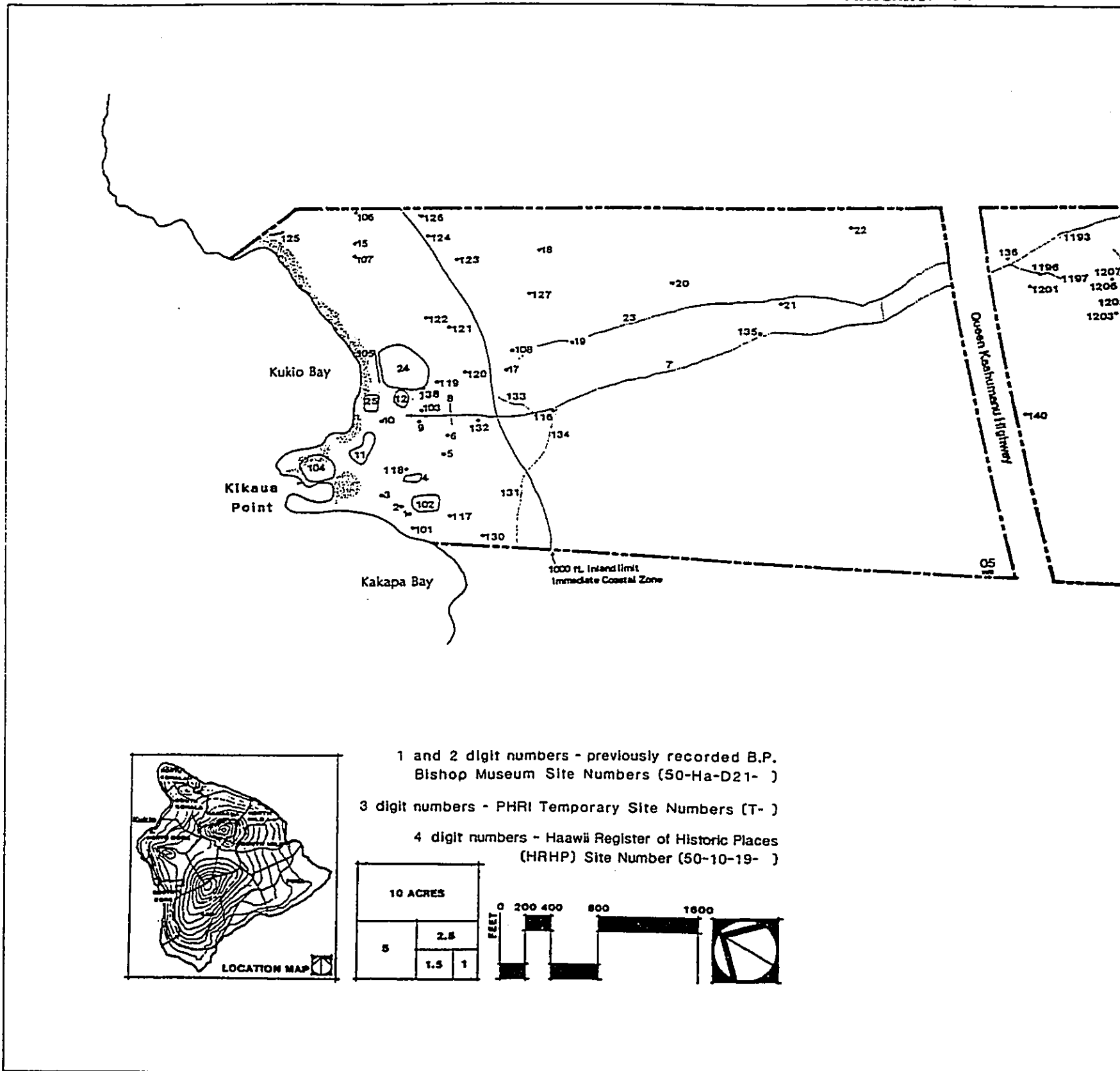
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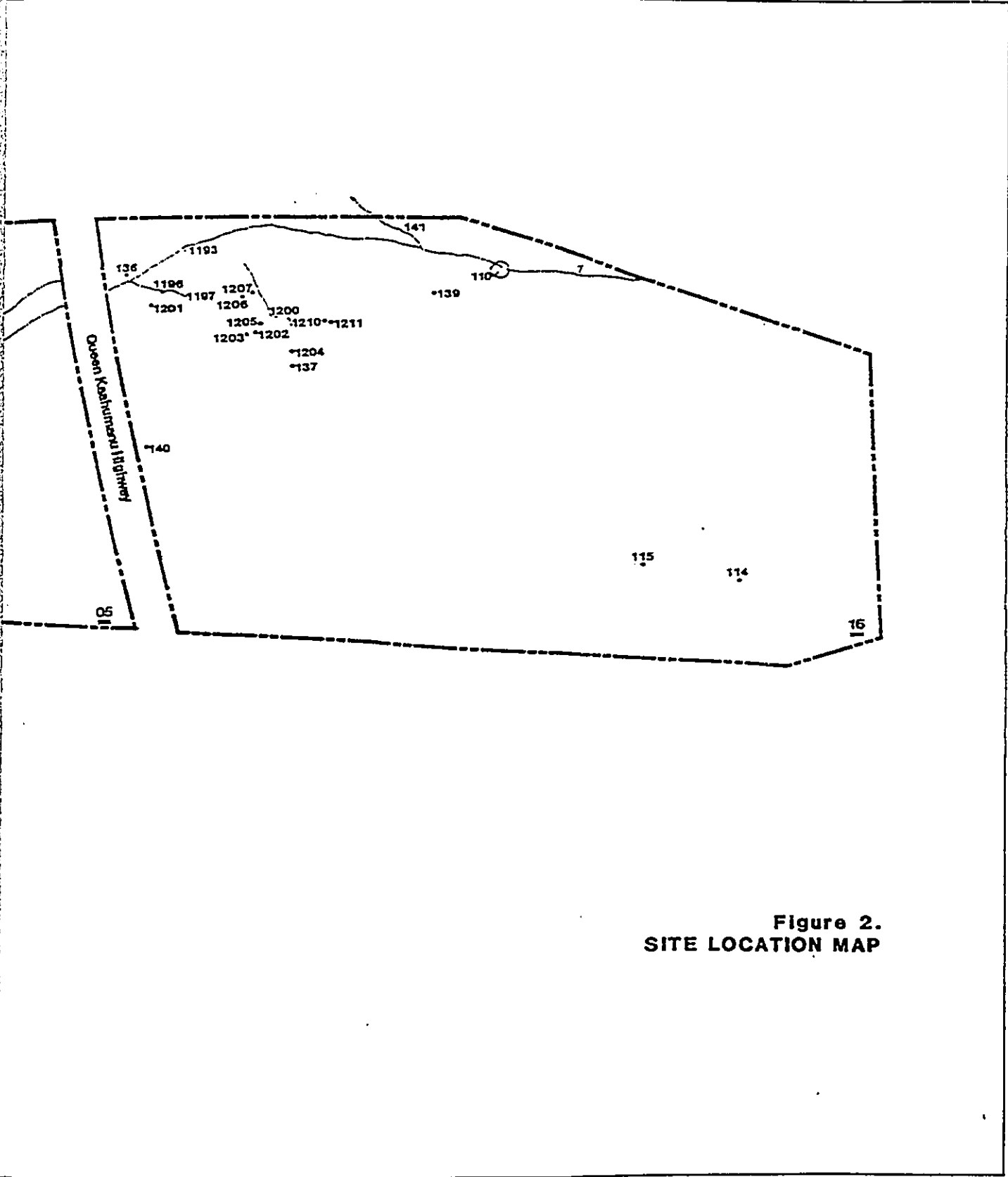


Figure 2.
SITE LOCATION MAP

ADDENDUM**ADDITIONAL CONDITIONS****Archaeological Mitigation Program
Regency Beach/Kona Coast Resort - Phase I**

The following four conditions should be considered an integral part of the mitigation program. They were initially presented to the Department of Land and Natural Resources, Historic Preservation Program (DLNR-HPP) in a letter, dated 21 November 1989, from Dr. Paul H. Rosendahl to Dr. Ross H. Cordy. The DLNR-HPP subsequently approved the mitigation plan with the stipulation that (along with two other alterations) the four conditions be incorporated.

1. Buffer zones for all sites addressed by the Interim Preservation Plan element of the Phase I - Mitigation Plan would be specified for each site to be preserved. These buffer zones would be approved by DLNR-HPP and HCPD prior to (a) implementation of the interim preservation work, and (b) any land alteration work or construction work;
2. Phase II - Archaeological Data Recovery work would include implementation of interim preservation work. DLNR-HPP and HCPD would verify successful execution of both the interim preservation work and the data recovery work. If necessary, verification of Phase II data recovery work could be done in two steps: (a) upon completion of field work, a check that all field tasks were done, and (b) subsequent of draft final report, upon completion of data analyses/report preparation;
3. The Phase III - Site Preservation Plan would be reviewed and approved by DLNR-HPP and HCPD prior to final preservation plan implementation; and
4. DLNR-HPP and HCPD would verify subsequent implementation of the Phase III-Site Preservation Plan.

A P P E N D I X F

TRAFFIC STUDY

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**DRAFT REPORT
TRAFFIC IMPACT STUDY**

**REGENT KONA COAST
BEACH DEVELOPMENT
(ALTERNATIVE 3)**

North Kona, Hawaii

Prepared for:
Huehue Ranch Associates L.P.

Prepared by:
Parsons Brinckerhoff Quade & Douglas, Inc.

July 1991

**REGENT KONA COAST
BEACH DEVELOPMENT
(ALTERNATIVE 3)**

INTRODUCTION

This study was conducted for Huehue Ranch Associates L.P., to assess the traffic impacts of the Regent Kona Coast Beach development located adjacent to Queen Kaahumanu Highway on the Kawaihae coast of the island of Hawaii. Current land use designations on 1537-acres of land allow for the development of 451 single family residential lots, 736 resort condominium dwelling units, and a 350 room hotel (see Figure 1).

The portion of the Regent Kona Coast Beach project located east (mauka) of Queen Kaahumanu Highway is referred to as the Upper Beach. Proposed for development within the Upper Beach are 273 single family residential lots, 465 resort condominiums, a 4-court tennis center, approximately 11-acres of park area, a 30,000 square foot commercial center, and a portion of an 18-hole golf course.

The portion of the Regent Kona Coast Beach project located west (makai) of Queen Kaahumanu Highway is referred to as the Lower Beach. Proposed for development within the Lower Beach are 178 single family residential lots, 271 resort condominiums, a portion of an 18-hole golf course with club house, approximately 15-acres of park area, and a 350-room hotel.

At full build-out in the year 2010, access to the Regent Kona Coast Beach development is assumed to be provided through frontage roads and interchanges to Queen Kaahumanu Highway located both north of and south of the project site. It is our understanding that the State Department of Transportation (SDOT) is currently undertaking a study to identify locations where these grade separated interchanges and frontage roads should be constructed when Queen Kaahumanu Highway is improved to a four-lane freeway. Until the study is complete and Queen Kaahumanu Highway is improved to a four-lane freeway, access to the project from Queen Kaahumanu Highway is proposed through at-grade intersections. Our analyses, therefore, includes a recommended interim connection from the project area to Queen Kaahumanu Highway.

This interim connection to the existing two-lane Queen Kaahumanu Highway is proposed through ramp connections and two at-grade T-intersections to Queen Kaahumanu Highway where turn movements will be restricted to right-turn movements only. A grade separated crossing of Queen Kaahumanu Highway is also proposed for construction within the project to link the Upper Beach with the Lower Beach.

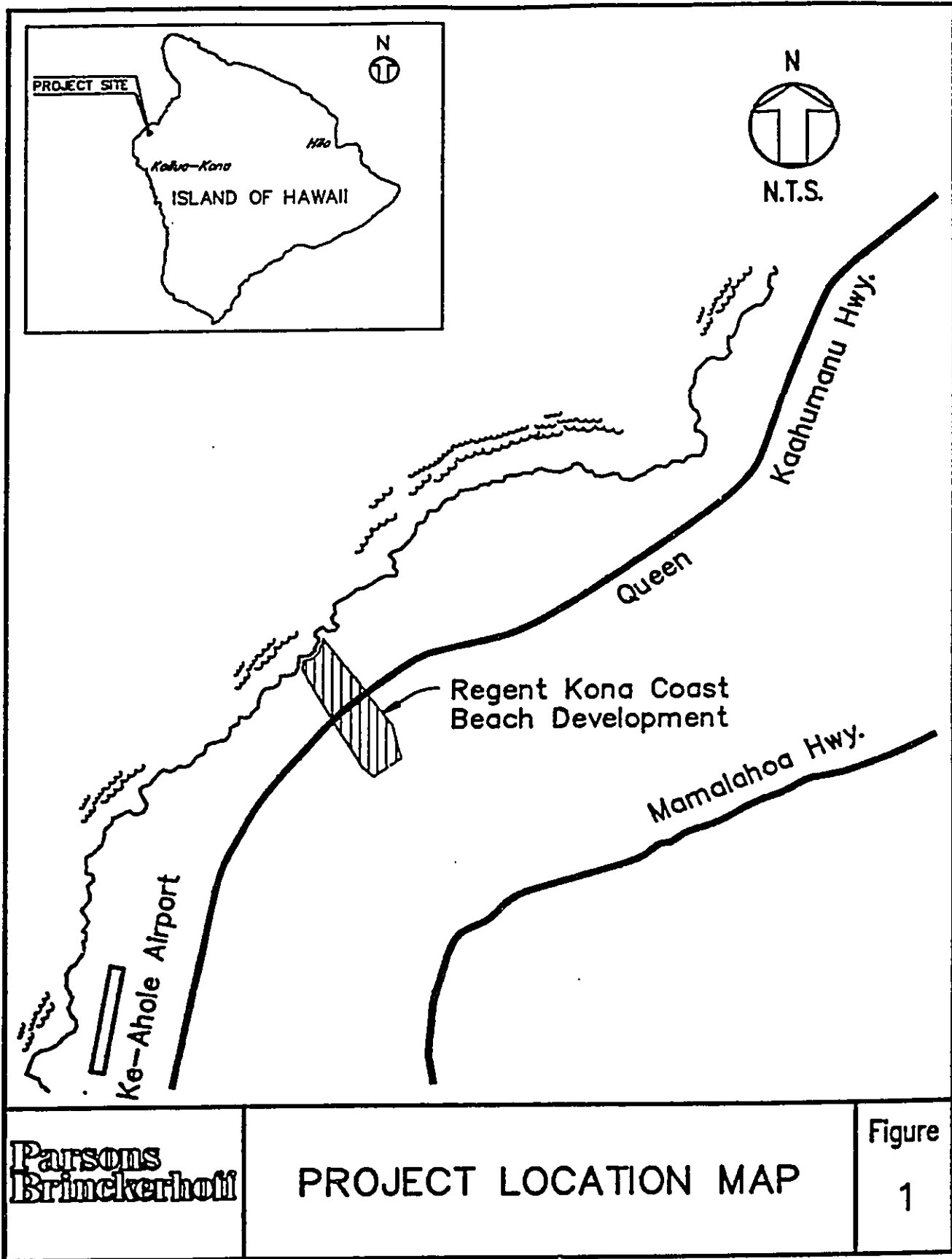
Existing and future conditions were evaluated on Queen Kaahumanu Highway and at the proposed frontage road intersection to determine the traffic impacts of the project. Intersection capacities were also evaluated at various intersections formed by internal project roadways. It was assumed that this project would be a phased development that will be complete and occupied by the future year 2010.

Trip generation rates published by the Institute of Transportation Engineers were applied to the development to estimate the number of trips attributed to the proposed project. Project generated trips were then distributed to/from the study area. Levels of service on roadways and at unsignalized intersections were identified using procedures outlined in the 1985 Highway Capacity Manual¹ (HCM).

Levels of service are defined as qualitative measures which describe traffic operational conditions considering traffic interruptions and delays, driver comfort and convenience, and safety. The analysis for unsignalized intersections evaluates gaps in the major street traffic flow, and calculates the capacities available for left-turns from the major street and capacities available for minor street traffic wishing to enter or cross the major street.

Traffic signal warrants were also evaluated on the proposed interim connection at the southbound ramp connection/PR-1 intersection and the northbound ramp connection/PR-2 intersection following criteria outlined in the Manual of Uniform Traffic Control Devices² (MUTCD).

Because peak hour traffic conditions tend to demonstrate the worst case, both the a.m. peak and the p.m. peak hours were analyzed for capacity operations and signal requirements.



EXISTING CONDITIONS

In the vicinity of the proposed project, Queen Kaahumanu Highway is a two-lane arterial roadway that is generally aligned in the north-south direction. It provides regional access between the areas of Waimea, Kawaihae, and Kailua-Kona on a lower coastal (makaai) alignment. The speed limit on Queen Kaahumanu Highway is posted at 55 mph.

The project site and surrounding area is generally undeveloped with much of the land having been covered over by lava flows. The only existing development within the study area is the Kona Village Resort located north of the project site, along the coast.

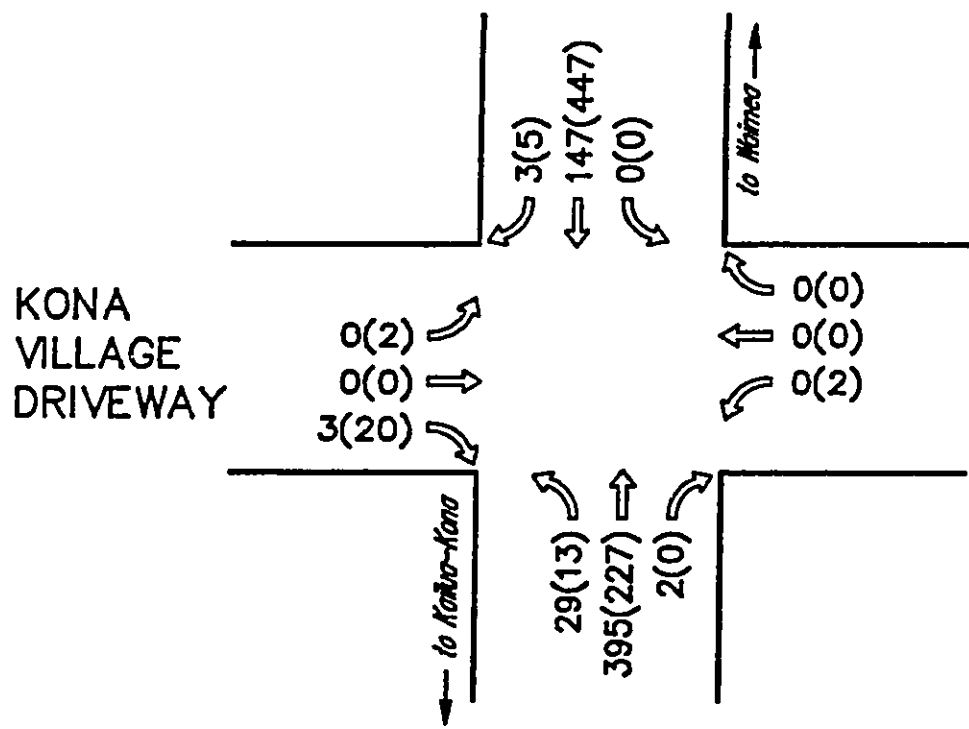
Existing traffic volumes on Queen Kaahumanu Highway during both the a.m. peak and p.m. peak hours at the Queen Kaahumanu Highway/Kona Village Driveway intersection were conducted on January 1991 by Pacific Planning and Engineering. These peak hour traffic volumes are summarized in Figure 2.

Unsignalized intersection capacity analysis was conducted at Queen Kaahumanu Highway/Kona Village Driveway intersection using the methodologies outlined in the HCM. Analysis reveals that the left-turn movement from Kona Village Driveway onto Queen Kaahumanu Highway operates at LOS A during the a.m. peak hour and LOS B during the p.m. peak hour. The left-turn movement from Queen Kaahumanu Highway onto the Kona Village Driveway operates at LOS A during both the a.m. and p.m. peak hours.

Roadway capacity analysis, as outlined in the HCM, was conducted on Queen Kaahumanu Highway in the vicinity of the project site. Analysis reveals that this roadway is currently operating at an acceptable LOS C or better during both the a.m. and the p.m. peak hours.



QUEEN KAAHUMANU HIGHWAY



Legend

- 000 - AM Peak Hour
- (000) - PM Peak Hour

Parsons
Brinckerhoff

REGENT KONA COAST
Existing 1991 Traffic Volumes

Figure
2

BASE YEAR 2010 CONDITIONS

The base year condition (no-build) assumes that the Regent Kona Coast Beach project site would continue to remain undeveloped. As such, only nominal traffic volumes would be generated by the site. Access to the site would be provided through frontage roads and interchanges that connect to Queen Kaahumanu Highway. It is anticipated that these grade separated interchanges to Queen Kaahumanu Highway would be constructed both north of and south of the Regent Kona Coast Beach development.

Adjoining properties are anticipated to develop, generating additional traffic, and causing volumes on Queen Kaahumanu Highway to increase. These projects include the Kaupulehu and Kona Village developments north of the project site and the Maniniowali project south of the project site.

Historic traffic count information on Queen Kaahumanu Highway, collected from the State Department of Transportation (SDOT), revealed a growth rate of 6.25 percent per year. A review of the information presented in the SDOT's Island of Hawaii, Long-Range Highway Plan Draft Report³ revealed that, with the recommended roadway improvements, traffic volumes on Queen Kaahumanu Highway are projected to be 20,400 vehicles per day in the build-out year 2010. This build-out traffic volume represents an average annual growth of approximately 10 percent.

Roadway improvements, recommended in the SDOT's Long-Range Highway Plan, assumed to be implemented by the future year 2010, include widening Queen Kaahumanu Highway to a four-lane freeway with grade separated interchanges and frontage roads. It was also assumed that primary access to the adjoining Kaupulehu and Maniniowali projects would be accommodated through separate grade separated interchanges constructed within their respective project areas. Future year traffic volumes on Queen Kaahumanu Highway at build-out in the year 2010 was assumed to be 20,400 vehicles per day as presented in the SDOT's Island of Hawaii, Long-Range Highway Plan Draft Report.

Proposed for development within the Kaupulehu project are 602 single family residential lots, 700 resort condominium units, a 728-room hotel, a 500-room hotel, a tennis center, a beach club, a restaurant, a 10,800 square foot commercial center, and four 18-hole golf courses. Expansion of the Kona Village development to a 290-room hotel is also anticipated with access to the project accommodated at the proposed Kaupulehu

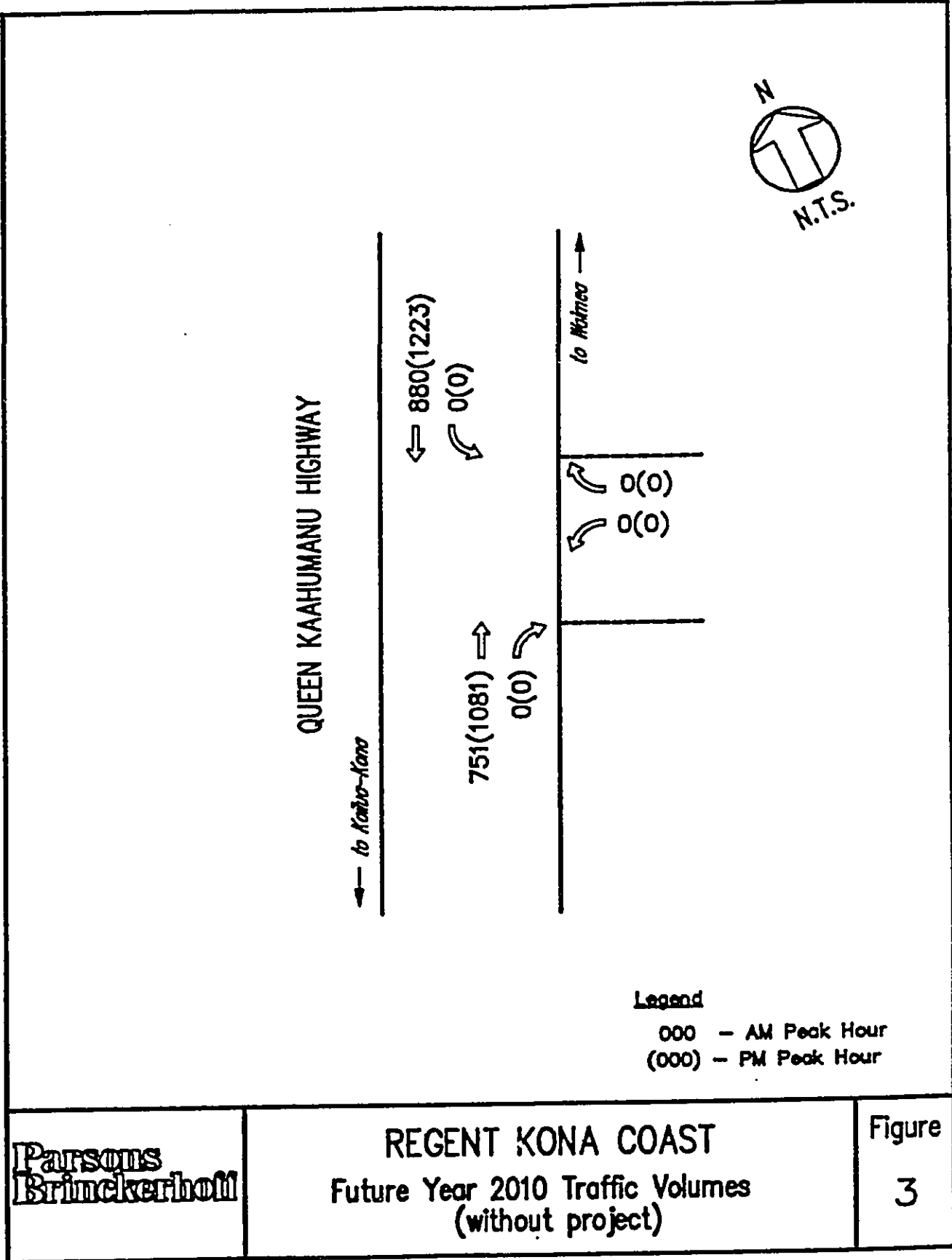
interchange. The existing Kona Village access that passes through the Regent Kona Coast Beach project site would be abandoned.

Since planning efforts for the Maniniowali project are still on going, a definitive project description was not available. This project was, therefore, assumed to consist of 150 single family, 550 multi-family, and 300 condominium residential dwelling units as well as an 18-hole golf course and tennis center. Traffic generated by these proposed developments were estimated and included in base year 2010 traffic conditions.

The resulting traffic volumes on Queen Kaahumanu Highway, given the no-build conditions, appears in Figure 3. Roadway capacity analysis conducted on Queen Kaahumanu Highway for base year 2010 conditions revealed that this section of roadway will operate at LOS A during both the a.m. peak and the p.m. peak hours.

In the Base Year 2010 conditions, the existing Regent Kona Coast access would form a T-intersection with the proposed frontage roads to be constructed on either side of Queen Kaahumanu Highway. Since the project site would remain undeveloped and interchanges were assumed to be constructed within adjoining developments, only nominal traffic volumes are anticipated to pass through these intersections. All movements at these intersections are, therefore, anticipated to operate at LOS A in future year 2010 without project conditions.

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FUTURE YEAR 2010 WITH PROJECT

The Regent Kona Coast Beach development is located on the Kawaihae coast adjacent to Queen Kaahumanu Highway. The current development proposal for the Beach project includes construction of 451 single family residential lots, 736 resort condominium dwelling units, an 18-hole golf course with club house, a 4-court tennis center, approximately 27-acres of park area, a 30,000 square foot commercial center, and a 350 room hotel.

The Regent Kona Coast Beach project will be a private community with gated entrances to the residential portions of the development. It is anticipated that the majority of the single family residential lots and the resort condominiums will be purchased as second homes. The volume of traffic generated by the proposed project will, therefore, be significantly less than if these residential dwelling units were primary residences.

The proposed project will be a phased development. Full build-out and occupancy of homes constructed on the 451 single family residential lots is anticipated by the year 2010.

Proposed Roadway System

Project Road 1 (PR-1) and Project Road 2 (PR-2) are the primary roadways through the Beach development. Ultimately, they will connect to Queen Kaahumanu Highway through frontage roads and grade separated interchanges.

The desired locations for these grade separated interchanges to Queen Kaahumanu Highway is currently being evaluated by the SDOT. For our analyses, it was assumed that grade separated interchanges to Queen Kaahumanu Highway will be constructed both north of and south of the Regent Kona Coast project site and that access to these interchanges will be provided through a frontage road to be constructed on the makai-side of Queen Kaahumanu Highway. Operations at the intersection formed by the project roadway and the frontage road was evaluated and identified.

Grade separated interchanges located at the northern and southern limits of the region in which major developments are proposed would minimize the "back-tracking" required of motorists. Since the Regent Kona Coast Beach development is located between

two adjoining major developments, it was assumed that interchanges would be constructed north of the project site within the Kaupulehu development and south of the project site within the Maniniowali development.

PR-1 is generally aligned in the mauka-makai direction. It will intersect the frontage road, pass through the Lower Beach development, and provide access to the 350-room hotel. On its mauka-end, PR-1 continues on as PR-2 passing under Queen Kaahumanu Highway and through the Upper Beach development. Subdivision Road 1 (SR-1) and Subdivision Road 2 (SR-2) will provide direct access to residential lots and resort condominiums within the Lower Beach development.

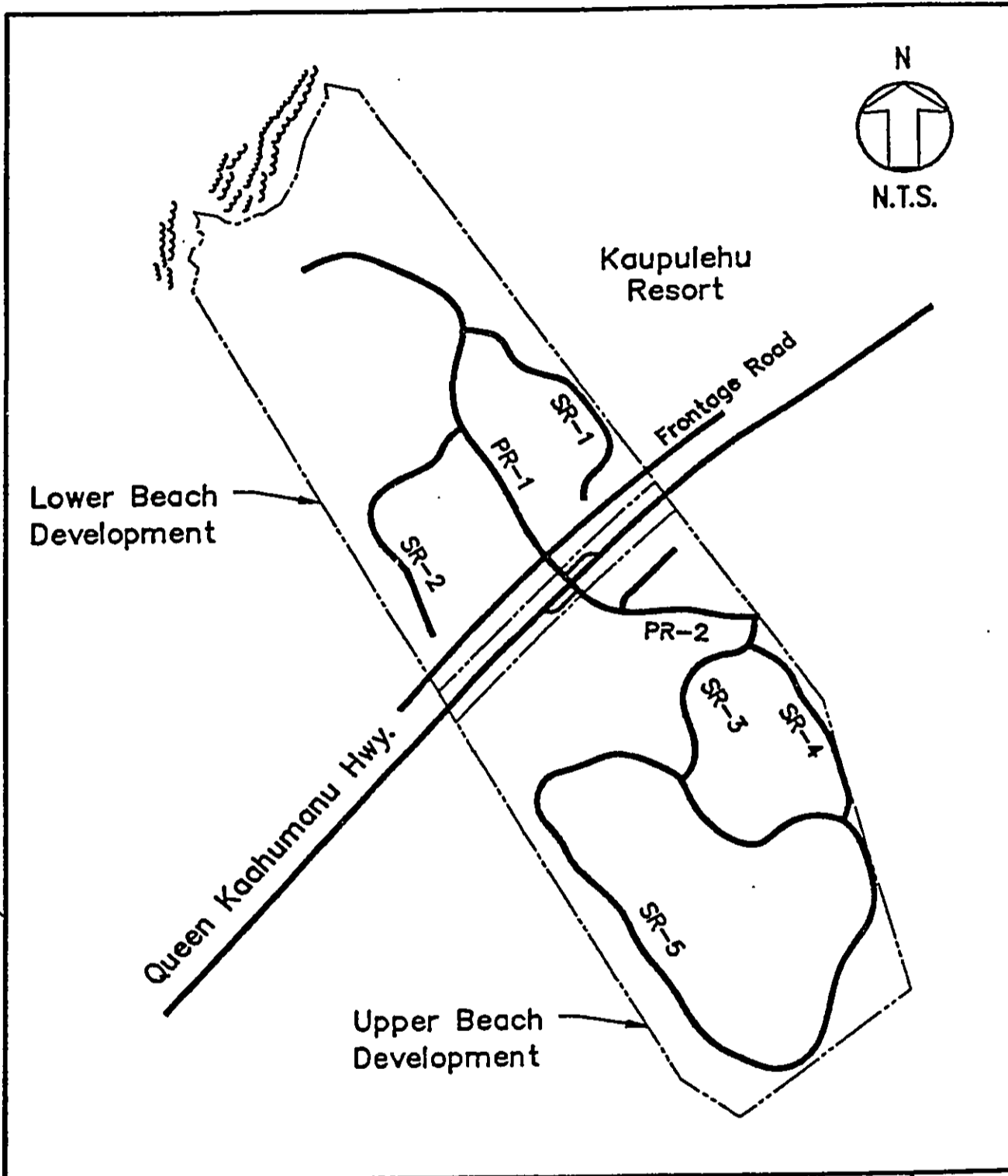
PR-2 is also generally aligned in the mauka-makai direction. It will intersect the frontage road, pass under Queen Kaahumanu Highway as a grade separated crossing, and continue through the Upper Beach development. On its makai-end, PR-2 continues as PR-1 passing through the Lower Beach development. Access to the residential lots and resort condominium developments within the Upper Beach portion of the project will be provided through Subdivision Road 3 (SR-3), Subdivision Road 4 (SR-4), Subdivision Road 5 (SR-5), and other local residential roadways. Project roadways are shown in Figure 4.

Subdivision roads within the residential portions of the project will connect to PR-1 and PR-2 providing direct access to residential lots, resort condominiums, and other uses proposed for development. These subdivision roads will be privately maintained with gated entrances to the various residential portions of the project.

Trip Generation

Trip generation is the determination of vehicular trips attracted or produced by the project. Trip generation rates promulgated by the Institute of Transportation Engineers in the Trip Generation Manual, Fourth Edition⁴ were used to estimate the volume of traffic generated by the proposed Beach development. The appropriate trip rates used to determine the traffic generated by the proposed project are shown in Table 1.

The majority of the single family residential lots and resort condominiums are anticipated to be purchased as second homes. Trip generation rates for these uses were, therefore, assumed to be similar to the recreational homes category identified in the Trip Generation Manual.



Parsons Brinckerhoff	PROJECT SITE PLAN	Figure 4
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TABLE 1

TRIP GENERATION FOR BEACH DEVELOPMENT

	LAND USE	PEAK HOUR	NUMBER	UNITS	TOTAL TRIPS	GEN RATES	PROJ TRAFFIC	
							IN TRIPS	OUT TRIPS
UPPER BEACH	SINGLE FAMILY (210)	AM	273	UNIT	85	0.3120	57	28
		PM	273	UNIT	107	0.3930	44	63
	MULTI-FAMILY	AM	465	UNIT	145	0.3120	97	48
		PM	465	UNIT	183	0.3930	75	108
	TENNIS COURTS (491)	AM	4	COURTS	6	1.4290	3	3
		PM	4	COURTS	16	3.9360	8	8
	PARK (411) City Park	AM	7.5	ACRES	18	2.4310	9	9
		PM	7.5	ACRES	25	3.3700	13	12
	COMMERCIAL CENTER	AM	30	1000 GSF	23	0.7770	16	7
		PM	30	1000 GSF	100	3.3300	49	51
LOWER BEACH	SINGLE FAMILY (210)	AM	178	UNIT	56	0.3120	38	18
		PM	178	UNIT	70	0.3930	29	41
	MULTI-FAMILY	AM	271	UNIT	85	0.3120	57	28
		PM	271	UNIT	107	0.3930	44	63
	HOTEL (330) Resort Hotel	AM	350	ROOMS	83	0.236	13	70
		PM	350	ROOMS	176	0.503	118	58
	GOLF COURSE (430)	AM	203	ACRES	54	0.2660	43	11
		PM	203	ACRES	78	0.3860	6	72
PARK (411) City Park	AM	15.1	ACRES	37	2.4310	19	18	
	PM	15.1	ACRES	51	3.3700	26	25	
TOTAL BEACH DEVELOPMENT						TOTAL AM	352	240
						PM	412	501

Trip Distribution

Trip distribution is the determination of trip origins and trip destinations. The project generated trips were distributed in two directions: north towards Kawaihae and south towards Kailua-Kona. Trip distribution rates were based on the location of population and employment centers as well as on the existing traffic distribution patterns observed on Queen Kaahumanu Highway.

Primary users of the golf course, tennis center, park and commercial facilities will be residents of the Regent Kona Coast Beach development. Most of the traffic attracted by these uses will, therefore, be internal to the overall development.

Table 2
Distribution of Project Generated Trips
(vehicle per hour)

<u>Beach Development</u>	<u>Queen Kaahumanu Hwy</u>		<u>Beach Development (Internal Traffic)</u>	
	<u>North</u>	<u>South</u>	<u>Upper</u>	<u>Lower</u>
Residential Dwellings	33%	67%	-	-
Golf Course	17%	23%	40%	20%
Resort Shops	17%	23%	30%	30%
Park-1 and Park-2	18.5%	36.5%	20%	25%

Trip Assignment

Project generated traffic was assigned onto the existing circulation system using the distribution factors presented in Table 2. The assignment of project generated traffic onto the surrounding roadway system are shown in Figure 5 - Figure 7. Figure 7 identifies the project generated traffic in the future year 2010.

Project Impacts

At full build-out in the future year 2010, access to Queen Kaahumanu Highway from the Regent Kona Coast Beach development is assumed to be provided through grade separated interchanges located north of and south of the project site.

The proposed Beach development is projected to generate 649 additional trips during the a.m. peak hour and 935 additional trips during the p.m. peak hour. Of the total trips generated, 579 trips are projected to travel on Queen Kaahumanu Highway during the a.m. peak hour and 793 trips are projected to travel on Queen Kaahumanu Highway during the p.m. peak hour.

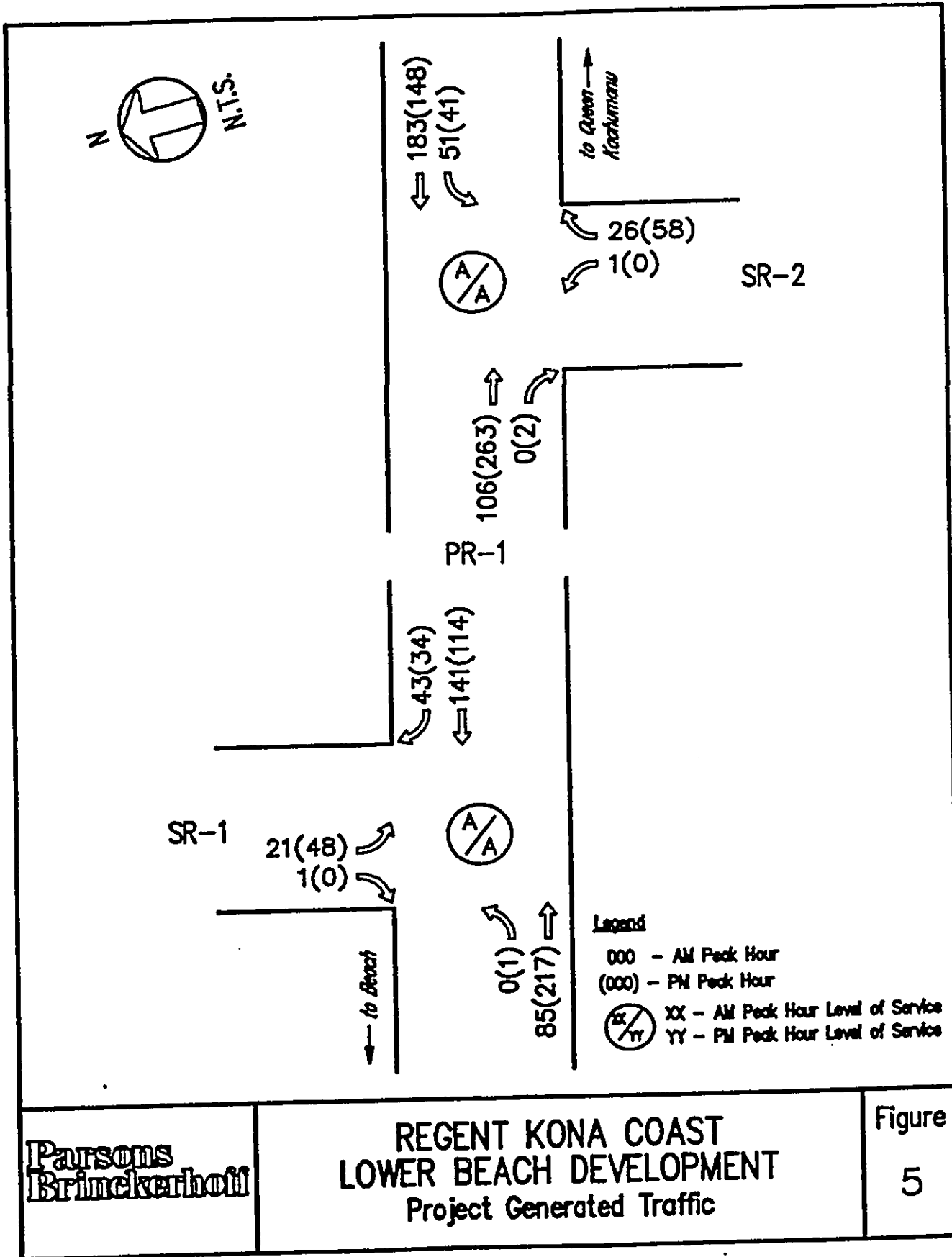
Figure 8 illustrate the traffic assignments for the future year 2010 with project traffic conditions. In Figure 8, through traffic on the frontage road represents vehicles anticipated to travel between the Kaupulehu and Maniniowali developments.

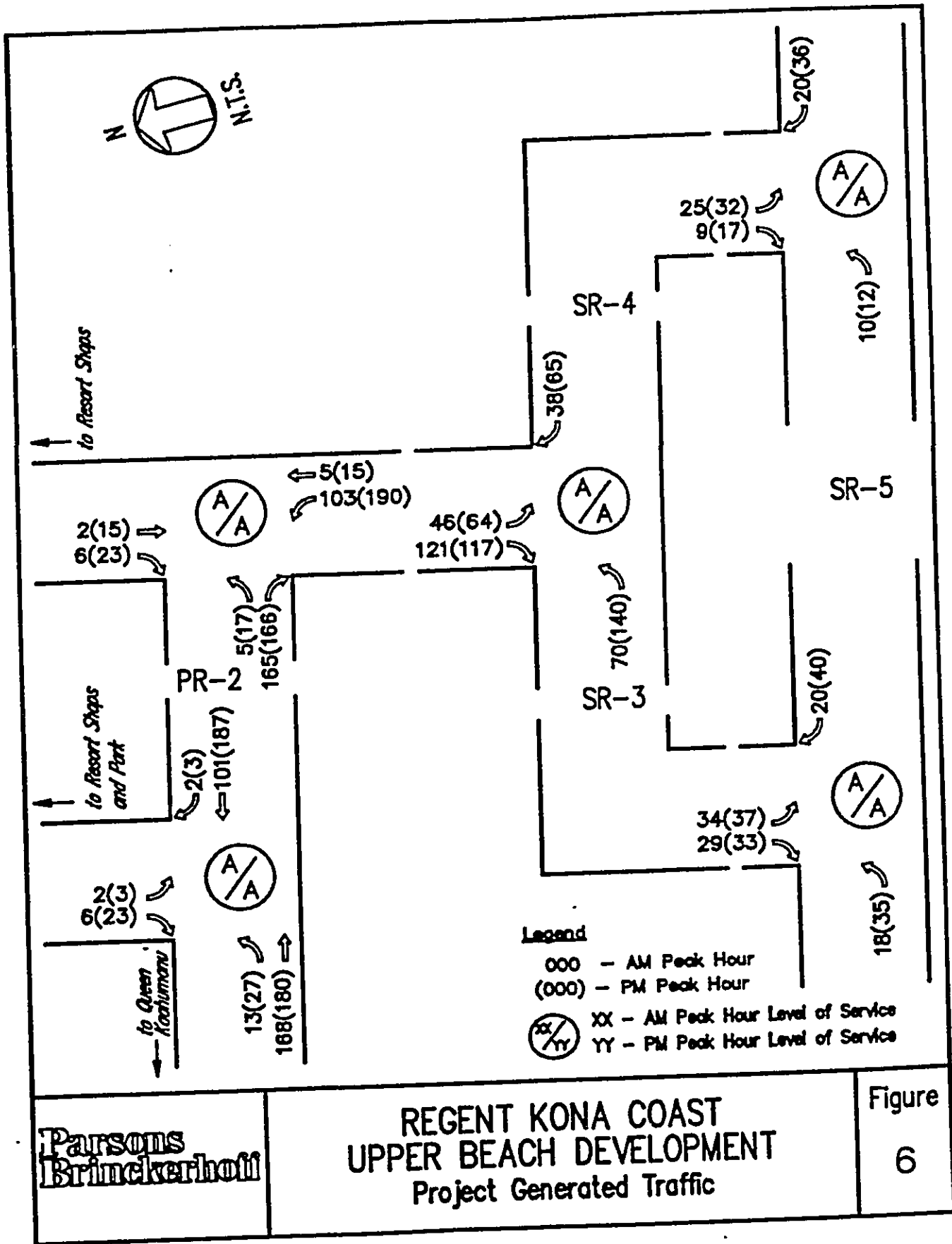
The impacts of these additional trips were assessed by re-evaluating roadway capacities on Queen Kaahumanu Highway and analyzing unsignalized intersection capacities. Peak hour traffic volumes tend to represent the worst case conditions. For this reason, level-of-service (LOS) calculations were conducted for both the a.m. peak and p.m. peak hours along Queen Kaahumanu Highway and at the proposed PR-1/frontage road intersection in the future year 2010.

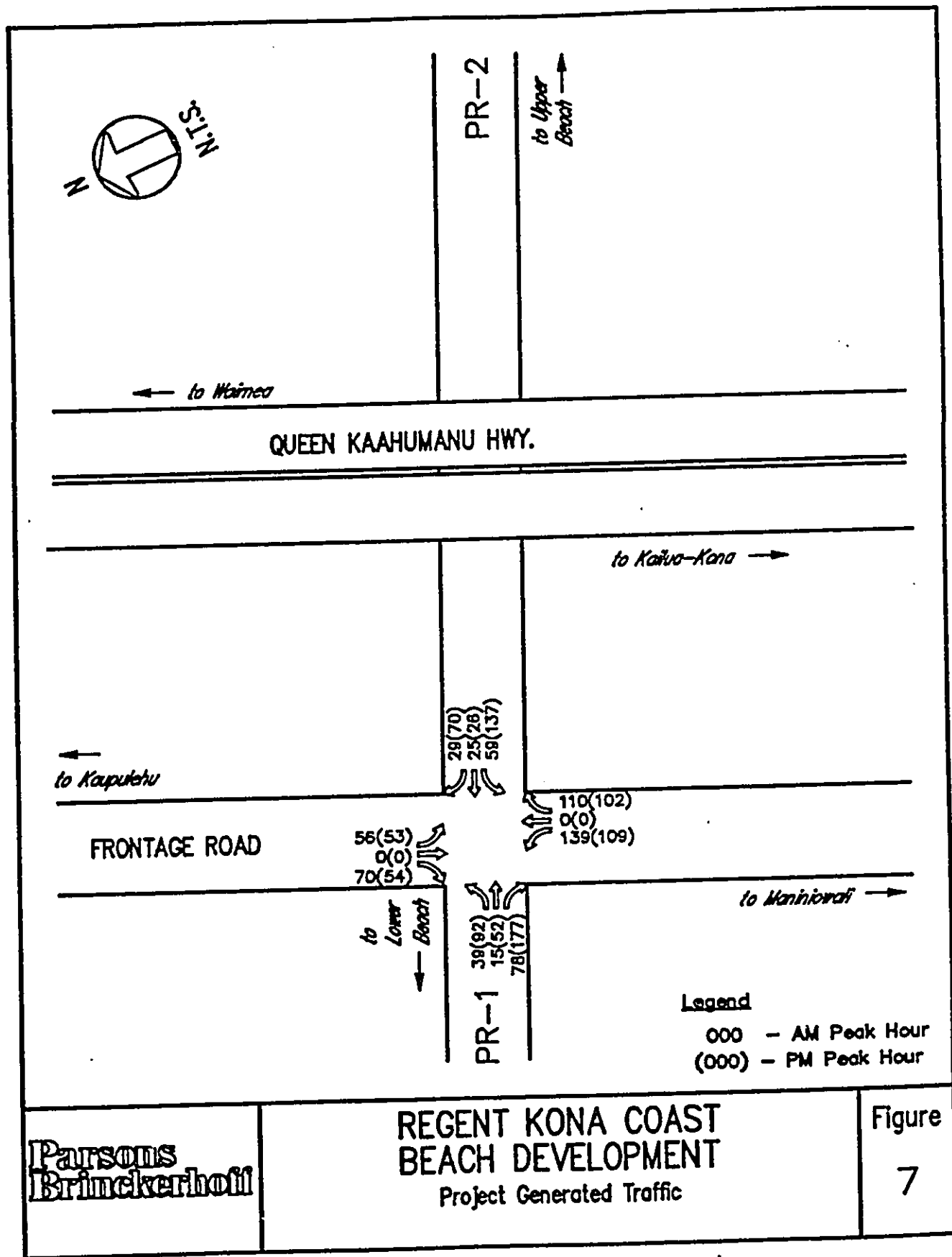
Unsignalized intersection capacity analyses, conducted at the proposed PR-1/frontage road intersection for the future year 2010 with project conditions, revealed that the shared westbound left-turn and through movement would operate at LOS B during the a.m. peak hour and LOS D during the p.m. peak hour. The shared eastbound left-turn and through movement would operate at LOS A during the a.m. peak hour and LOS B during the p.m. peak hour. All other movements at this intersection would operate at a LOS A during both the a.m. and p.m. peak hours.

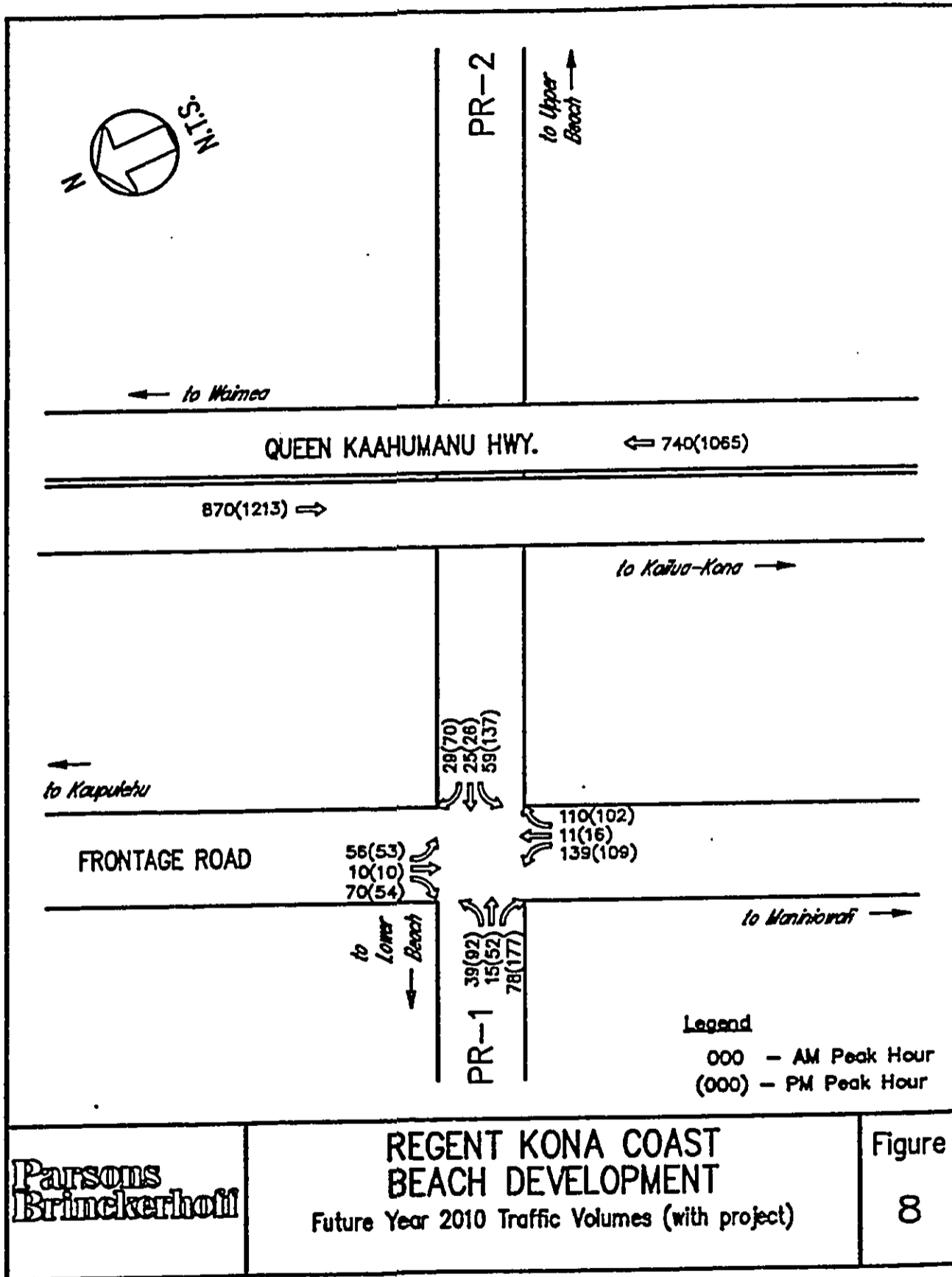
Roadway capacity analysis conducted on Queen Kaahumanu Highway for future year 2010 with project conditions revealed that this section of roadway would operate at LOS B or better during both the a.m. and the p.m. peak hours. Unsignalized intersection capacity analyses conducted at the intersections located in the Upper Beach and Lower Beach revealed that all movements operate at LOS A during both the a.m. and p.m. peak hours. Intersection levels-of-service are summarized in Figures 5 and 6.

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**Parsons
Brinckerhoff**

**REGENT KONA COAST
BEACH DEVELOPMENT**
 Future Year 2010 Traffic Volumes (with project)

Figure
8

PROPOSED INTERSECTION CONNECTION

Until Queen Kaahumanu Highway is widened to a four-lane freeway with grade separated interchanges and frontage roads, an interim connections to Queen Kaahumanu Highway is needed to provide access to the project site. Construction of an interim connection to Queen Kaahumanu Highway as well as a grade separated crossing of Queen Kaahumanu Highway are, therefore, proposed within the Regent Kona Coast Beach development. The proposed interim intersection connection is shown in Figure 9.

The construction of two at-grade T-intersections to Queen Kaahumanu Highway would provide direct access to the project site. Turn movements at these two T-intersections could be restricted to right-turns only since the grade separated Queen Kaahumanu Highway crossing would accommodate directional travel demands. A southbound ramp connection that intersects Queen Kaahumanu Highway and PR-1 forming T-intersections would be provided on the western (makaï) side of Queen Kaahumanu Highway. A northbound ramp connection that intersects Queen Kaahumanu Highway and PR-2 forming T-intersections would be provided on the eastern (mauka) side of Queen Kaahumanu Highway.

Analyses indicate that a two-lane Queen Kaahumanu Highway would experience near capacity conditions by the future year 2000 without or with the proposed Regent Kona Coast Beach project. Roadway capacity analysis performed on a two-lane Queen Kaahumanu Highway revealed that this section of roadway will operate at LOS D during the a.m. peak hour and LOS E during the p.m. peak hour. Widening Queen Kaahumanu Highway to a four-lane freeway with grade separated interchanges and frontage roads would improve operations to LOS A during both the a.m. and p.m. peak hours.

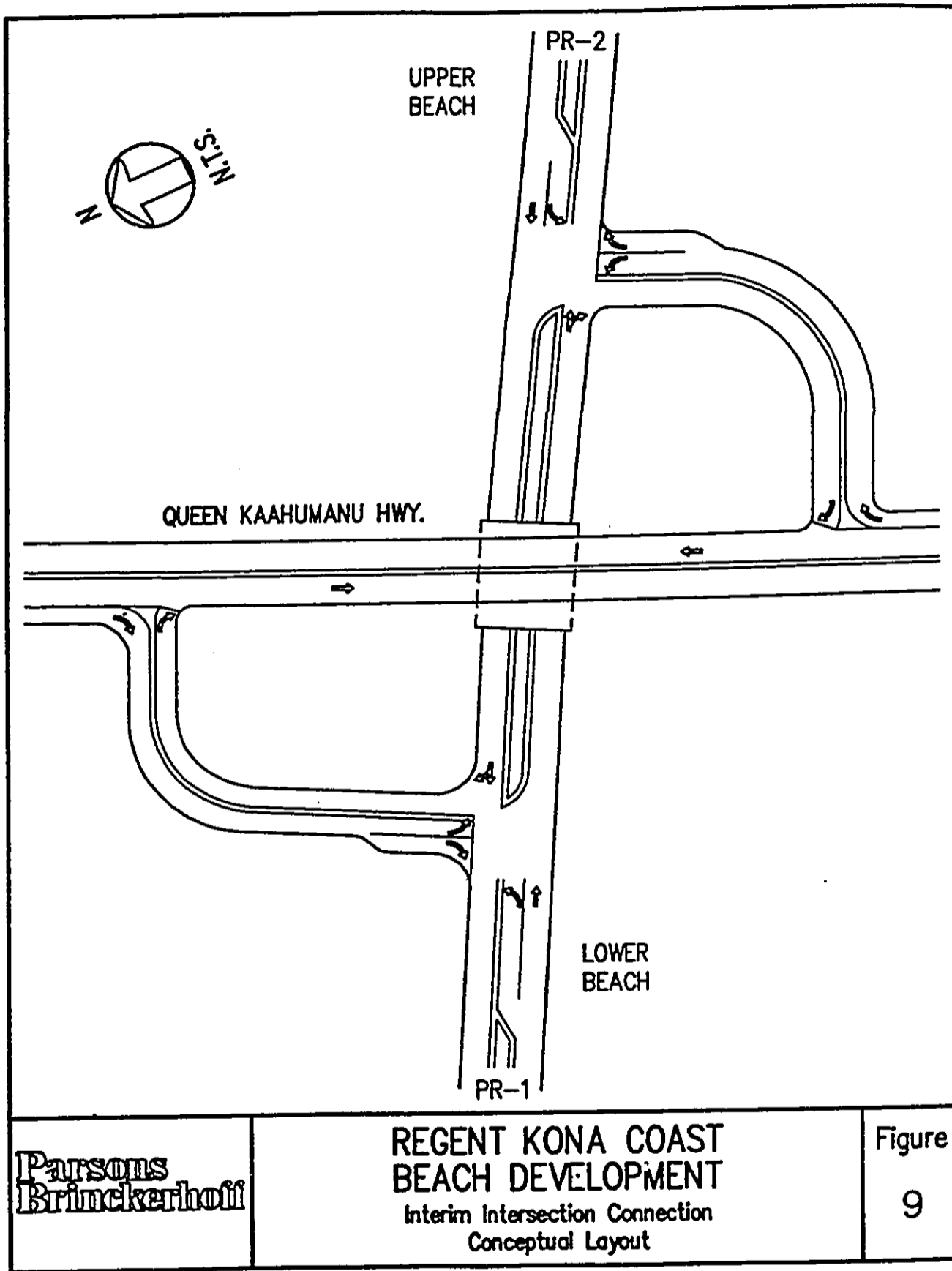
For the interim connection, unsignalized intersection capacity analyses reveal that all movements at the proposed southbound on-ramp/off-ramp/PR-1 and the northbound on-ramp/off-ramp/PR-2 intersections would experience LOS B or better during both the a.m. and the p.m. peak hours through the year 2010. This interim connection, therefore, has sufficient reserve capacity to adequately accommodate projected traffic demands at acceptable levels-of-service. The results of these analyses are summarized in Table 3.

It was further assumed that separate interim connections would be provided within the adjoining Kaupulehu and Maniniowali developments until Queen Kaahumanu Highway

was improved to a four-lane freeway with grade separated interchanges and frontage roads. Because of this, traffic demand on the frontage roads are anticipated to be very low. Construction of these frontage roads is, therefore, not recommended until Queen Kaahumanu Highway is improved to a four-lane freeway with grade separated interchanges and frontage roads or until traffic demand warrants their construction.

It is recommended that dedicated left-turn pockets be provided on PR-1 at its intersection with the southbound ramp connection and on PR-2 at its intersection with the northbound ramp connection to minimize delay to westbound and eastbound through vehicles. Dedicated left-turn pockets will significantly aid in reducing the potential for rear-end type accidents and improve the flow of traffic.

A recommended 150-foot long left-turn pocket for eastbound vehicles on PR-1 and a 75-foot long left-turn pocket for westbound vehicles on PR-2 will provide sufficient storage capacity to accommodate anticipated traffic demand. Recommended 96-foot tapers and 125-foot transition lengths are based on a posted speed limit of 35 miles per hour on PR-1 and 12-foot wide left-turn lane. These dimensions conform to guidelines published in the Hawaii Statewide Uniform Design Manual for Streets and Highways⁵.



**Parsons
Brinckerhoff**

**REGENT KONA COAST
BEACH DEVELOPMENT**
Interim Intersection Connection
Conceptual Layout

Figure
9

**Table 3
LEVEL OF SERVICE SUMMARY**

UNSIGNALIZED INTERSECTION CAPACITY ANALYSIS

<u>Approach</u>	<u>Interim Intersection Connection</u>		<u>2010 W/</u>	
	<u>AM</u>	<u>PM</u>	<u>AM</u>	<u>PM</u>
Northbound on-ramp/off-ramp @ PR-2				
NBLT	A	A	--	--
NBRT	A	A	--	--
WBLT	A	A	--	--
Southbound on-ramp/off-ramp @ PR-1				
SBLT	A	B	--	--
SBRT	A	A	--	--
EBLT	A	A	--	--
PR-1 @ Frontage Road				
WBLT+TH	--	--	B	D
WBRT	--	--	A	A
EBLT+TH	--	--	A	B
EBRT	--	--	A	A
NBLT	--	--	A	A
SBLT	--	--	A	A

ROADWAY CAPACITY ANALYSIS

<u>Roadway</u>	<u>Existing</u>		<u>TWO-LANE HIGHWAY</u>				<u>FOUR-LANE FREEWAY</u>			
	<u>AM</u>	<u>PM</u>	<u>2000 W/O</u>		<u>2000 W/</u>		<u>2010 W/O</u>		<u>2010 W/</u>	
			<u>AM</u>	<u>PM</u>	<u>AM</u>	<u>PM</u>	<u>AM</u>	<u>PM</u>	<u>AM</u>	<u>PM</u>
Queen Kaahumanu Highway										
North of project site	C	C	D	E	D	E	A	A	A	A
South of project site	C	C	D	E	D	E	A	A	A	B

RAMP ANALYSIS

	<u>AM</u>		<u>PM</u>	
	<u>Northbound</u>	<u>Southbound</u>	<u>Northbound</u>	<u>Southbound</u>
On-Ramps	A	B	B	B
Off-Ramps	B	A	B	B

CONCLUSIONS AND RECOMMENDATIONS

The proposed Regent Kona Coast Beach development will increase traffic volumes on Queen Kaahumanu Highway by less than 22 percent during the a.m. peak hour and 18 percent during the p.m. peak hour.

A preliminary review of traffic signal warrants as outlined in the Manual on Uniform Traffic Control Devices for the proposed interim intersection connection reveals that the southbound ramp connection/PR-1 and the northbound ramp connection/PR-2 intersections do not justify signalization.

It is recommended that dedicated left-turn pockets be provided on PR-1 at its intersection with the southbound ramp connection and on PR-2 at its intersection with the northbound ramp connection to minimize delay to westbound and eastbound through vehicles. Dedicated left-turn pockets will significantly aid in reducing the potential for rear-end type accidents and improve the flow of traffic.

The interim connection to Queen Kaahumanu Highway, proposed for construction with the Regent Kona Coast Beach development, will provide sufficient capacity to accommodate traffic generated by the Beach development.

Without or with the project, however, Queen Kaahumanu Highway must be widened from two-lanes to four-lanes to provide sufficient capacity to accommodate projected future traffic demands. Roadway capacity analysis conducted in the project area revealed that this roadway would operate near capacity without or with project conditions in the future year 2000.

REFERENCES

1. Transportation Research Board, National Research Council, Highway Capacity Manual, Special Report 209, Washington, D.C., 1985.
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3. State of Hawaii, Department of Transportation, Highways Division; Island of Hawaii Long-Range Highway Plan, Draft Report; September 1990.
4. Institute of Transportation Engineers, Trip Generation, Fourth Edition, Washington, D.C., 1987.
5. State of Hawaii, Department of Transportation, Highways Division; Statewide Uniform Design Manual for Streets and Highways; October 1980.

APPENDIX A

The Highway Capacity Manual defines six Levels of Service, labelled A through F, from best to worst conditions. Levels of Service for signalized and unsignalized intersections are defined in terms of average user delays. Delay is a measure of driver discomfort, frustration, fuel consumption, and lost travel time.

Unsignalized Intersections

For unsignalized intersections, the Highway Capacity Manual evaluates gaps in the major street traffic flow and calculates available gaps for left turns across oncoming traffic and for the left and right turns onto the major roadway from the minor street.

LEVEL OF SERVICE A:	Little or no delay.
LEVEL OF SERVICE B:	Short traffic delays.
LEVEL OF SERVICE C:	Average traffic delays.
LEVEL OF SERVICE D:	Long traffic delays.
LEVEL OF SERVICE E:	Very long traffic delays.
LEVEL OF SERVICE F:	Demand volume exceeds capacity, resulting in extreme delays with queuing that may cause severe congestion and affect other movements at the intersection.

Ramps

<u>LEVEL OF SERVICE</u>	<u>MERGE FLOW RATE (pcph)</u>	<u>DIVERGE FLOW RATE (pcph)</u>
A	0 - 600	0 - 650
B	601 - 1,000	651 - 1,050
C	1,001 - 1,450	1,051 - 1,500
D	1,451 - 1,750	1,501 - 1,800
E	1,751 - 2,000	1,801 - 2,000
F	> 2,000	>2,000

LEVEL OF SERVICE A: Merge or diverge movements have little effect on freeway flows as drivers operate under unrestricted conditions. Merge movements fill gaps smoothly with only minor speed adjustments; diverge movements experience no or very little turbulence.

LEVEL OF SERVICE B: Freeway flows are generally smooth and stable, and vehicles not directly involved in merge or diverge movements remain unaffected. Merging vehicles must adjust speed to fill gaps; diverging vehicles operate without significant turbulence.

LEVEL OF SERVICE C: Overall speed and density of freeway flow remain stable; but the lane adjacent to the lanes directly involved in merging and diverging movements may be affected by these movements. Both lanes approaching a merge must adjust speed to provide smooth merging, and minor ramp queuing may occur with large on-ramp volumes. Vehicles may also decrease speeds in diverge areas.

LEVEL OF SERVICE D: Several freeway lanes are affected by turbulence from merge and diverge movements. Disruptive queues may form at ramps with large demand volumes. Vehicles in merge lanes must adjust speeds to avoid conflicts as smooth merging becomes difficult to attain. Vehicles in diverge areas also encounter distinct decreases in speed.

LEVEL OF SERVICE E: This service level represents capacity conditions. Vehicles are significantly affected by turbulence, but do not create noticeable freeway queuing. Vehicles not directly involved in ramp movements attempt to avoid the turbulence by moving toward the median lanes. On-ramp queues may be significant and queues may also form in diverge areas. Diverging movements experience a significant decrease in speeds.

LEVEL OF SERVICE F: Considerable turbulence is created by ramp movements and vehicles attempting to change lanes to avoid ramp areas. Long delays are encountered in the vicinity of ramp terminals and may possibly extend for some distance upstream on the freeway. Merging lanes experience extensive breakdowns as merge movements occur on a stop-and-go basis. Traffic conditions change constantly and vary widely, resulting in unstable conditions with waves of alternatively good and forced flows.