

COUNTY OF
HAWAII

PLANNING DEPARTMENT

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Deputy Director

June 3, 1986

Office of Environmental Quality Commission
465 South King Street
Kekuanaoa Building, Room 115
Honolulu, HI 96813

Gentlemen:

Final EIS - Kukio Beach Resort
Determination of Acceptability

We have reviewed the final EIS for the proposed Kukio Beach Resort and find that it is acceptable for the following reasons:

- 1) Procedures pursuant to Chapter 343, HRS, were initiated in August, 1985, as a result of the applicant's filing of a General Plan Amendment petition. Since then, procedures for assessment, consultation, review and revisions required for the EIS have been complied with.
- 2) The content requirements for a final EIS have been satisfied.
- 3) Numerous comments from reviewing agencies were submitted for the draft EIS. The applicant has responded adequately to these comments and revisions have been made in the final document. For example, based on comments received, the applicant has eliminated an earlier proposal to utilize the lava tubes and drainage and surface water collectors. Additional details have been provided with respect to volcanic hazards and the hydrology of the area.

While the issue of the seaward boundary of the property has not been resolved, we nevertheless find the document acceptable since the applicant has furnished further documentation for their claim, and since, as an informational disclosure document and process, the EIS is not the appropriate mechanism for legally resolving the boundary issue.


Office of Environmental Quality Commission

Page 2

June 3, 1986

As the proposed project is in the process of obtaining the first of many land use approvals, it is still at a broad, conceptual stage of planning. As such, detailed and site specific plans have yet to be prepared. Thus, a supplemental EIS may be required with other permits, should site specific and detailed plans indicate a need for additional information, particularly with respect to impacts to the anchialine ponds and their management.

Sincerely,


for ALBERT LONO LYMAN
Planning Director

VKG/IP:lv

cc: Tom Witten, Phillips Brandt Reddick & Assoc.
Carl Carlson, Huehue Ranch
Raymond Suefuji

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F I N A L
KUKIO BEACH RESORT
ENVIRONMENTAL IMPACT STATEMENT

PREPARED FOR: HUEHUE RANCH
PREPARED BY: PHILLIPS BRANDT REDDICK & ASSOC. (HAWAII), INC.
FOR SUBMITTAL TO: PLANNING DEPARTMENT, COUNTY OF HAWAII

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FINAL
ENVIRONMENTAL IMPACT STATEMENT

KUKIO BEACH RESORT
Kukio, North Kona, Hawaii
Tax Map Key: 7-2-04: 05 and 16
Third Division

This Environmental Document is Submitted
Pursuant to Chapter 343, HRS

Prepared for:
Huehue Ranch
North Kona, Hawaii

Carl A. Carlson, Jr.
Carl A. Carlson, Jr., Manager
Huehue Ranch

May 16, 1986
Date

Prepared by:
Phillips, Brandt, Reddick, and Assoc. (Hawaii), Inc.

FORWARD

This Environmental Impact Statement has been prepared for Huehue Ranch to disclose information on its proposed Kukio Beach Resort situated on that certain property at Kukio I, North Kona on the Island of Hawaii.

The preparation and submittal of this document is pursuant to Hawaii Revised Statutes, Chapter 343, Environmental Impact Statements, Chapter 200 of Title 11, Environmental Impact Statement Rules, and Chapter 201 of Title 11, Environmental Council Rules of Practice and Procedure.

The County of Hawaii Planning Department reviewed the environmental assessment "Kukio Beach Resort: General Planning and Environmental Considerations (June 1985)", which was prepared by Phillips, Brandt, Reddick and Assoc. (Hawaii), Inc. as part of a General Plan Amendment Application, and determined that an Environmental Impact Statement (EIS) is required. The Environmental Impact Statement Preparation Notice appeared in the OEQC Bulletins dated August 23, 1985 and September 8, 1985. The deadline for requests to be a consulted party was September 23, 1985.

The Draft EIS was officially submitted to the Office of Environmental Quality Control on March 5, 1986 and published in the March 8, 1986 OEQC Bulletin. The deadline for comments and the end of the 30-day public review period was April 7, 1986. On April 11, 1986, a 30-day extension to the sixty-day public review period was made to the Hawaii County Planning Department by the applicant. On April 17, 1986 the extension request was granted with the response period (submission of Final EIS) extended to May 16, 1986 and the Final EIS review and determination of acceptability extended to June 3, 1986.

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1.0
SUMMARY

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1.0
SUMMARY

1.0 SUMMARY

1.1 PROJECT PROFILE

Project Title: Kukio Beach Resort

Action: Applicant action. Petition for General Plan Amendment to allow Intermediate Resort and change the Land Use pattern Allocation Guide Map (LUPAG) designation for area from Conservation to Intermediate Resort, Medium Density, and Low Density. During the processing of the General Plan Amendment or upon receiving a General Plan Amendment, the applicant will petition the State Land Use Commission for a Boundary Amendment from the Conservation District to the Urban District for the subject property.

Applicant: Huehue Ranch
Carl A. Carlson, Jr., Manager
72-3667 Hawaii Belt Road
Kailua-Kona, Hawaii 96740

Contact for Environmental Concerns: Phillips, Brandt, Reddick & Assoc. (Hawaii), Inc.
Thomas S. Witten, Principal
130 Merchant Street, Suite 1111
Honolulu, Hawaii 96813
Telephone: (808) 521-5631

Approving Agency: Planning Department, County of Hawaii

Proposed Project: Applicant proposes to develop a resort hotel complex, multi-family and single family residential units, 18 hole golf course and other recreational facilities, and a village commercial use within the approximate 675 acres of Kukio I (TMK: 7-2-04: 05 and 16) in the North Kona District, Island of Hawaii. The site is bisected by Queen Kaahumanu Highway and is located six miles north of Keahole Airport and one mile south of Kona Village.

1.2 INTENDED USES OF THIS EIS

The Environmental Impact Statement (EIS) is prepared in compliance with the requirements of Chapter 343, Hawaii Revised Statutes and the regulations adopted pursuant thereto.

The proposed action is an amendment to The General Plan, County of Hawaii to allow an Intermediate Resort designation and change the Land Use Pattern Allocation Guide (LUPAG) Map from the Conservation to Intermediate Resort, Medium Density, and Low Density (Figure 6-1).

The County of Hawaii defines an "intermediate resort" area as "a self-contained resort destination area which provides basic and support facilities for the needs of the entire development on a smaller scale than a major resort area. Such facilities shall include sewer, water, roads, employee housing and recreational facilities, etc.:"

Maximum visitor units: 1,500 rooms.

Resort acreage: 45 acres.

Active and passive recreation area: 25 acres.

Accessory uses within hotel or resort zoned area shall be based on 50 square feet of floor area per hotel room.

A maximum of 320 acres for residential use when other zoned lands are not available in close proximity for support use.

Employee housing shall be provided at a maximum ratio of one employee unit to every two hotel units built. The required ratio shall be determined by an analysis of housing needs of each district or relative area."

While the document is specifically prepared to satisfy the requirements for a General Plan Amendment for the subject property, it is also intended to serve as the EIS for future planning applications and permits required to implement the overall development program. In this light, this EIS would be reviewed by the various approving agencies (i.e. State Land Use Commission) at each subsequent step of the regulatory process. If additional data requirements are identified, Supplemental Statements to this EIS would be provided.

1.3 SUMMARY OF PROBABLE IMPACTS AND MITIGATION MEASURES

The potential for significant environmental effects is summarized in this section. Mitigation measures proposed to reduce project effects to insignificant levels are summarized below and discussed in Section 3.0.

- o **Land Use.** In addition to the proposed action, the project would require a State Land Use Petition for Boundary Amendment, Change in County Zoning, Special Management Area (SMA) Permit and several other County, State or Federal permits. Refer to Section 1.7 for the list of necessary permits and approvals.

Mitigation Measures: Resort planning for Kukio would be coordinated with planning for the adjacent Kaupulehu lands of the Bishop Estate. Development of Kukio and Kaupulehu lands would consolidate resort development in North Kona.

Coordinated planning with adjacent property owners will contribute to sound utilization and protection of the natural resources in the North Kona region.

- o **Anchialine Ponds.** Approximately three dozen small anchialine ponds clustered within an approximately three acre area inland of the coastal fringe will be incorporated within the project design, with no fill or alteration to the pond complex. Refer to Section 3.6, Appendix C, and Appendix G.

Mitigation Measures: An anchialine pond management plan will be developed with the objectives of preserving existing pond features and providing interpretive and educational opportunities for the public. Refer to Appendix C and Appendix G.

The effects of withdrawal of groundwaters and/or injection or surface disposal of treated wastewaters or stormwater runoff would be compatible with anchialine pond water quality inasmuch as this habitat is characterized by natural subterranean brackish water discharges. Flora and fauna associated with this habitat are euryhaline and would not be adversely affected by short-term alterations in water quality or salinity.

Diurnal tidal flushing and natural mixing of groundwaters and ocean waters would prevent any significant degradation of anchialine pond water quality.

- o **Archaeological/Historical Resources.** A total of 69 sites (178+ component features) were identified within the overall project area, including several localities and recorded foot trails, with potentially high research, interpretive or cultural values. Refer to Section 3.8 and Appendix B.

Mitigation Measures: Most of the archaeological remains present within the project area could be handled adequately by carrying out the appropriate level of further archaeological work needed to recover the significant data present, such as intensive survey--thereby preserving the valuable archaeological information, rather than the physical remains themselves. At the same time, many of the identified archaeological

remains, while having only limited significance in terms of potential research, interpretive, or cultural value, could be considered for preservation and inclusion into the landscaping of the development project area.

A cultural resources management program for significant sites will be formulated with the assistance of the Department of Land and Natural Resources' Historic Preservation Program and the Hawaii County Planning Department. The program will include specific recommendations for site preservation, data recovery or test level investigations as necessary.

- o **Public Services and Facilities.** The proposed project will result in additional demands for selected public services and utilities, including police and fire protection, school facilities, electrical and telephone services. Privately owned and operated systems for drainage, water supply, wastewater treatment and disposal, and solid waste disposal will be utilized. Refer to Sections 3.12, 3.13, 3.14, 3.15, 3.16, 3.17, 3.18 and 3.19.

Mitigation Measures: The requirements and associated costs to provide additional public services to this project will be more than offset by additional revenues generated to the county and state governments that would be responsible for providing these services.

- o **Fiscal.** The project-generated recurring revenues to the State and County via property taxes, sales and other tax sources, will significantly exceed recurring costs. Refer to Section 3.22.
- o **Population and Employment.** The project will contribute to direct and indirect population and employment increases which are cumulatively significant within the context of North Kona district and Island of Hawaii development plans. Refer to Section 3.22.
- o **Shoreline Resources.** The project will provide mauka-makai access from the highway to the shoreline and lateral shoreline access within the context of a coordinated Shoreline Management Plan with the County and adjacent land owners. Refer to Section 3.5.
- o **Natural Resources.** The project may result in impacts to flora and fauna, coastal water quality, geology, ambient noise levels, air quality, and surrounding land uses which are considered neither directly or cumulatively significant. Refer to the related section of Section 3.0.

Mitigation Measures: All applicable procedures, regulations and laws will be complied with that provide for the protection and proper management of these natural resources.

- o **Transportation/Circulation.** The project will ultimately generate approximately 23,000 total vehicle trips per day (ADT), which in combination with traffic generated by other existing and planned resort and residential developments may have a significant cumulative effect on Queen Kaahumanu Highway. The project will place additional air traffic demands upon Keahole Airport. Refer to Section 3.9.

Mitigation Measures: Pursuant to detailed development plans, a traffic study will be prepared addressing project related traffic generation, traffic assignment and distribution, turning movements, intersection requirements and phasing and financial responsibility of road improvements. All interior roads will be built to County standards.

1.4 SUMMARY OF ALTERNATIVES CONSIDERED

Alternatives to the proposed resort development have been considered and are described in Section 8.0.

As summarized below, all alternatives to the proposed resort development fail to meet the objective of establishing a high quality, low to medium density resort community that is economically viable.

1. Major Resort

Based on the "major resort" standards of The General Plan, County of Hawaii, this alternative would be a self-contained resort destination area with basic and support facilities for the needs of the entire development. The resort would include approximately 90 acres of resort use with a maximum of 3,000 rooms and active and passive recreation areas of 50 acres. A maximum of 640 acres of residential use would be provided in close proximity for support use.

The Kukio lands could not accommodate a resort development of a scale approaching the maximum standards for a "major resort". Development at this intensity could compromise the ability to incorporate significant environmental features into the project design, and would require substantial reductions in open space and recreational use opportunities. Site size limitations would place Kukio at a competitive disadvantage with respect to other major resorts along the Kona and Kohala coasts and the project objectives could not be realized under this alternative.

2. Retreat Resort

This alternative plan would provide a unique resort experience as a retreat from the urban scale and intensity of other resort developments. As characterized by the standards set forth in The General Plan, County of Hawaii, a "retreat resort" at Kukio would provide the user with rest, quiet, and

isolation for an environmental experience. The resort would include a maximum of 100 rooms and provide active and passive recreation areas.

Secluded from intrusions of the highway and urban uses, the resort would provide an isolated bungalow or village-type setting with detached units that would be associated with the beachfront and recreational amenities of the coastline. For recreational amenities, a golf course could also be included, along with a tennis center for those who would like to complement their retreat stay with some recreational activities. With association to the beachclub and coastal amenities, the mauka portion of the site could be developed with estate lots and include an equestrian center.

This alternative would provide opportunities to optimize the land use activities, while minimizing impacts on existing archaeological/ historical resources and environmental resources. Due to proposed land use plans on the adjacent Kaupulehu lands and the high cost of providing the necessary infrastructure to serve a low density resort of this character, both the physical setting and high capital cost and projected low return provide the basic reasons why this alternative is rejected. Additionally, this alternative does not meet the project objectives.

3. Luxury Condominiums Resort

This plan would utilize the coastal area for the development of luxury condominiums at a medium density with a high level of amenities and open space. In conjunction with the oceanfront luxury condominiums, estate lots fronting the 18 hole golf course would also benefit from the coastal amenities of the beachclub and private shoreline park. The total project would be secured with entry features and controlled access. Besides the golf course, another associated recreational feature could be expanded equestrian facilities related to Huehue Ranch's mauka operations.

Due to the private residential character of this alternative, there would be limited access to the coastal resources for public enjoyment. Additionally, the access to significant archaeological and historic resources at Kukio would be severely limited, with little or no opportunity for interpretive material and programs to be provided for the public. The high off-site infrastructure costs would make this alternative either prohibitively expensive or infeasible depending on market demands and would not meet the project objectives.

4. Residential Estate Lots

This alternative would provide for subdivision of the Kukio lands into large residential estate lots with controlled

access from Queen Kaahumanu Highway. Owned and developed by various owners, each lot would be developed independently.

While total infrastructure costs could be reduced, the minimal improvements would require these lots to be extremely expensive to make the project feasible and thus limiting the marketability of this type of project. The coastal resources would have limited access through a development of this nature, although the general open space character of the land may be maintained. The regional economic benefits of this alternative would be minimal due to the lack of employment generators such as resort and commercial uses and would not meet the project objectives.

5. No Build (or "Do Nothing")

This alternative would be consistent with the State land use designation. It would not, however, contribute to County and State goals and policies aimed at promoting employment and economic growth, nor would it respond to projected demand for increased resort opportunities along the West Hawaii coast. Overall environmental impact would be minimized, though the natural attributes and amenities of the site would remain underutilized. The ability to implement programs to manage and preserve the anchialine ponds and historical sites, previously subject to some disturbances and modifications, as well as provision for improved access, is removed with this alternative. This alternative does not meet the project objectives.

1.5 SUMMARY OF UNRESOLVED ISSUES

The General Plan Amendment request is the first of many approvals which must be obtained before Kukio Beach Resort development plans could be implemented. Other necessary approvals are listed in Section 2.6. Clearly, consideration of the appropriateness of the proposed land use designations within the context of long range General Plan policies is the basic issue to be resolved at this juncture.

With implementation of the mitigation measures (identified in Section 3.0) at appropriate stages of project planning and review, most, if not all, of the significant issues associated with the proposed resort will be resolved. A listing of issues requiring further study at appropriate stages of project planning and review is provided below.

1. Anchialine Ponds. Specifics of a pond management plan to preserve and manage anchialine pond resources will be resolved within the context of further detailed site planning and under the provisions for receiving a Special Management Area permit. A Draft-Tentative Anchialine Pond Management Plan is provided as Appendix G.

2. Archaeological/Historical Sites. The ultimate disposition of individual sites through further site investigation and development of a cultural resources management program will be accomplished prior to initiating site development.
3. Transportation Improvements. Timing of potential widening of Queen Kaahumanu Highway and intersection improvements in response to cumulative traffic volumes will need to be assessed by the State Department of Transportation when regional traffic conditions warrant improvements.
4. Air Quality and Noise Standards. Compliance with Federal and State Standards will be achieved.
5. Housing. Availability of adequate housing opportunities on-site or in surrounding communities to meet project-generated needs will be determined prior to starting construction of the first hotel.
6. Public Access/Shoreline Management. Provisions for public access to and along the shoreline will be provided for in detailed site planning of the resort sites and resolved to the satisfaction of the County with the issuance of a Special Management Area permit.

1.6 COMPATIBILITY WITH LAND USE PLANS AND POLICIES

The General Plan Amendment Application and Petition were submitted to the Hawaii County Planning Department on August 7, 1985. Upon acceptance of the Environmental Impact Statement, the General Plan Amendment will be processed by Hawaii County. The remaining approvals will be applied for sequentially or concurrently as allowed by law.

The proposed project will be consistent with: The Hawaii State Plan; the State Functional Plans; the Hawaii County General Plan; the Kona Regional Plan; and the Special Management Area (SMA) Rules and Regulations of the County of Hawaii. The proposed project's relationship to these and other land use plans and controls is described in Section 6.0.

As there are some inherent conflicts in goals and objectives of land use plans, policies, and controls, the proposed action's relationship to these various policies must be reconciled against those plan elements, and policies that most appropriately apply. The proposed project is consistent with the applicable Hawaii County General Plan goals, policies and standards except those for which this action is requesting to amend.

One of the most significant ways in which the proposed action fulfills governmental policies, and therefore, is thought to offset any adverse effects, is through the satisfaction of the Hawaii State Plan policy which states that "Planning for the

State's economy in general shall be directed toward achievement of the following objectives: (1) Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawaii's people...To achieve the general economic objectives, it shall be the policy of this State to:...Encourage labor-intensive activities that are economically satisfying...Promote economic activities, especially those which benefit areas with substantial unemployment problems...Encourage businesses that have favorable financial multiplier effects within Hawaii's economy."

No significant adverse effects are expected to result from the proposed Kukio Beach Resort development. There are some minor impacts, but these are more than offset by the benefits the project will offer. State and County plans have encouraged quality resort development along this coast. The infrastructure ultimately required to serve the project will be largely provided by the project developer. The General Plan Amendment, including Land Use Pattern Allocation Guide Map (LUPAG) change and Intermediate Resort Designation, are initial steps in a process of project review necessary to assure a quality destination resort.

The government policies calling for increased access to the shoreline and increased recreational opportunities will also be met in the proposed Kukio Beach Resort. The archaeological preserves, shoreline access, and golf course are recreational benefits that further offset any environmental costs associated with the requested General Plan Amendment and subsequent resort development approvals.

Generally, the plan is consistent with relevant government plans and policies. It would fulfill the goals of the Hawaii County General Plan which call for economic growth that maintains a desired physical environment and that meets the needs of Hawaii's people.

1.7 LIST OF PERMITS OR APPROVALS

The existing land use authorities, designations, and related permits or approvals required are listed in the following table.

TABLE 1-1
Permits or Approvals Required

<u>Authority/Land Use Designation</u>	<u>Approval Required</u>
COUNTY OF HAWAII	
General Plan	None
o Open (LUPAG)	General Plan Amendment with EIS
o Conservation (LUPAG)	

TABLE 1-1 (continued)

<u>Authority/Land Use Designation</u>	<u>Approval Required</u>
Zoning	
o Open	Change of Zone
Special Management Area (SMA)	SMA Permit
Tsunami/Flood Zone	None
Subdivision Approval	Subdivision (Preliminary & Final)
Grubbing, Grading Excavation and Stockpiling Permit	Grading Permit
Well Permit	Well Permit
Sign Permit	Sign Permit
STATE OF HAWAII	
State Land Use	
o Conservation District	SLUC Boundary Amendment w/EIS
Department of Land And Natural Resources	
o Conservation: Resource Subzone	Conservation District Use Application/Permit
o Conservation: General Subzone	(Not required once SLUC Boundary Amendment Approved)
o Historic Sites (Chapter 6E Review)	Review/Approval
Department of Health	
o Private Wastewater Treatment	Certification/Permit
o Underground Injection Control	UIC Permit
Department of Planning and Economic Development	
o CZM Consistency Review	If Modified, COE Permit Required
FEDERAL GOVERNMENT	
Army Corps Of Engineers (COE)	If Modified, COE Permit Required
U. S. Fish and Wildlife Services	Section 7 Consultation (Endangered Species)

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2.0
PROJECT DESCRIPTION

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2.0
PROJECT DESCRIPTION

2.0 PROJECT DESCRIPTION

2.1 REGIONAL LOCATION

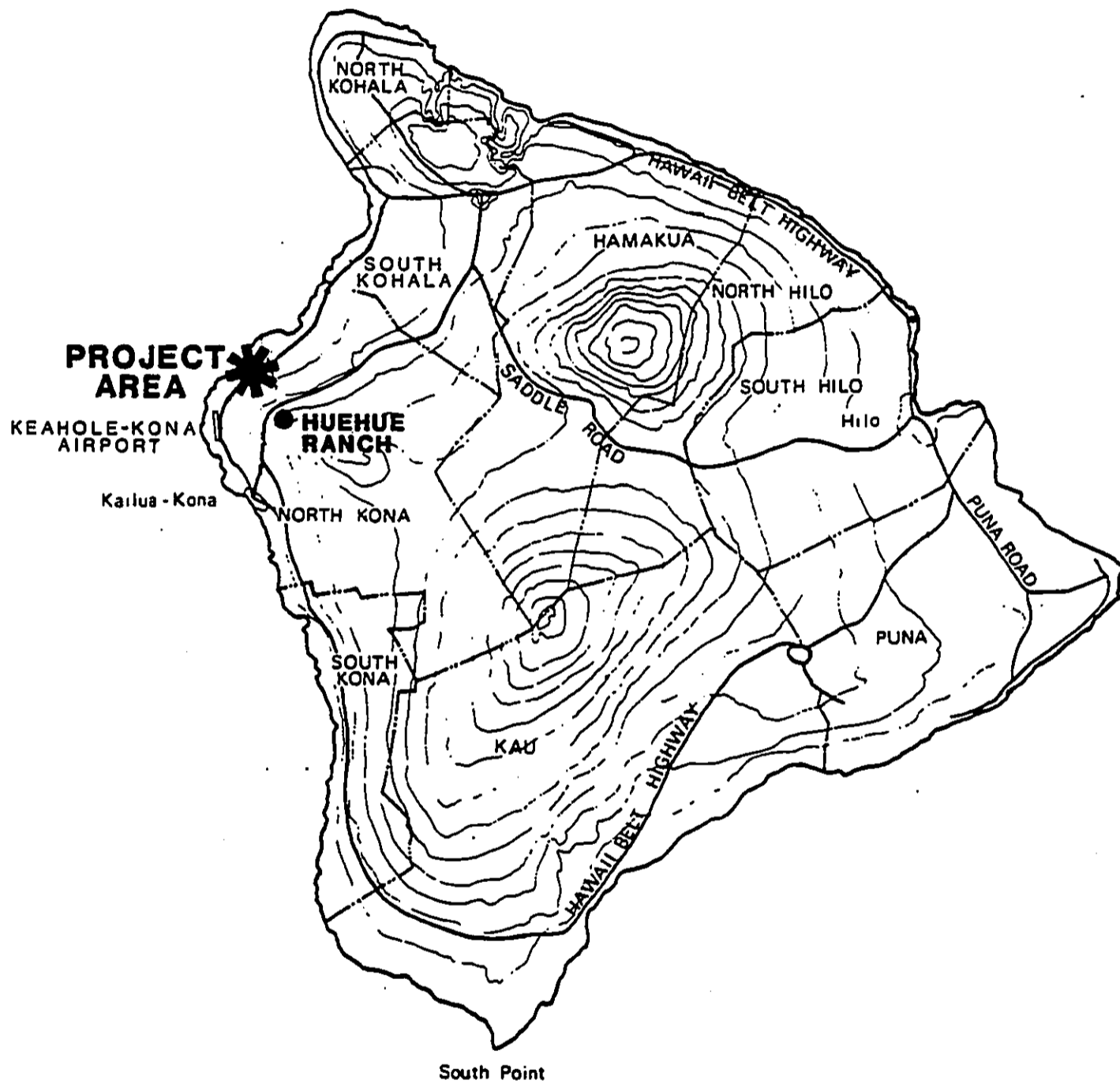
The lands of Kukio are located on the west coast of the island of Hawaii in the district of North Kona, approximately six (6) miles north of Keahole airport and one (1) mile south of the Kona Village Resort (Figures 2-1 and 2-2). The property includes Tax Map Key: 7-2-04: 05 (317.668 acres) and 16 (358.003 acres), Third Division and comprises approximately 675 acres (Figure 2-3). 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 Industries, Inc. and Cambridge Pacific, Inc. 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.

2.2 HISTORICAL PERSPECTIVE

Kukio is located within the ancient North Kona land section of Kekaha. The Kekaha land section is traditionally described as barren and desolate, but also noted for its excellent inshore and offshore marine resources. Included are statements from native historian S. M. Kamakau describing the destruction in Kekaha undertaken by Kekaulike of Maui while fleeing Alapainui of Hawaii, and the setting apart of Kekaha lands for the priestly class, specifically the Kauahi and Nahulu lines of priesthood.

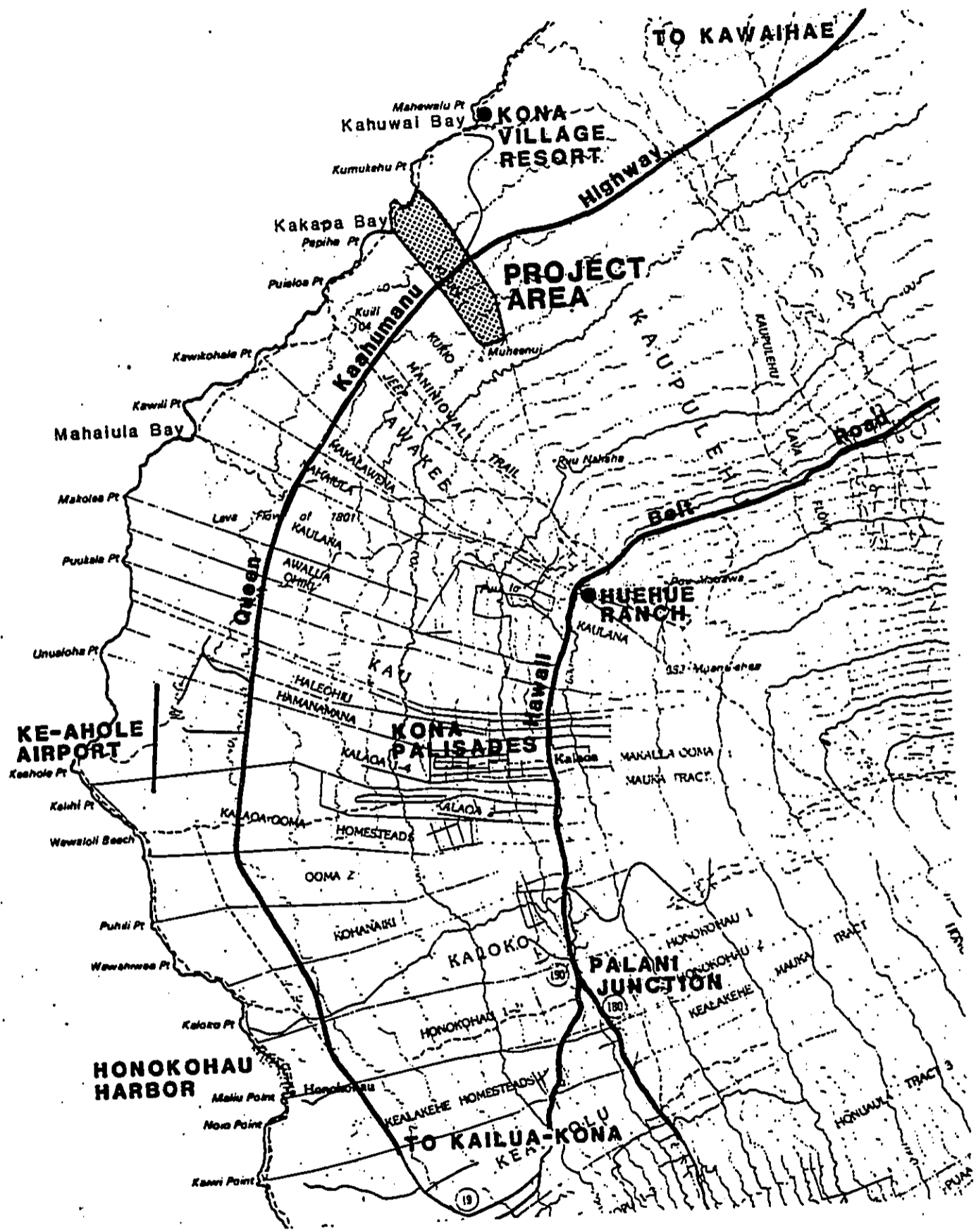
Kukio land history, based on available documentation, can be traced from an individual, Kinolau, who resided there in c. 1790, having obtained the land from Hilikoa. Later, the ownership of released lands, which included Kukio, alternated between Kuakini and Kamehameha III, but upon Kuakini's death in 1844 and the eventual Great Mahele, Kukio 1st and 2nd became government lands. No LCA awards or claims by native Hawaiians were recorded within the project area in either ahupua'a. A seaward portion of the land of Kukio 1st was then purchased in 1855 and Grant 2121 was awarded the next year to Pupule. Interior Department reports indicate payment for this land continued until 1864, and that the land was utilized for pasturage of horses and goats until c. 1875. Eventually, Luka Maguire (great grand-daughter of Kinolau) acquired Grant 2121, and upon her death in 1898 left Kukio, among other lands, to her husband, John A. Maguire. The Land of Kukio 1st was retained by the heirs of J. A. Maguire until 1966, when it was sold.



ISLAND LOCATION MAP
KUKIO BEACH RESORT
HUEHUE RANCH



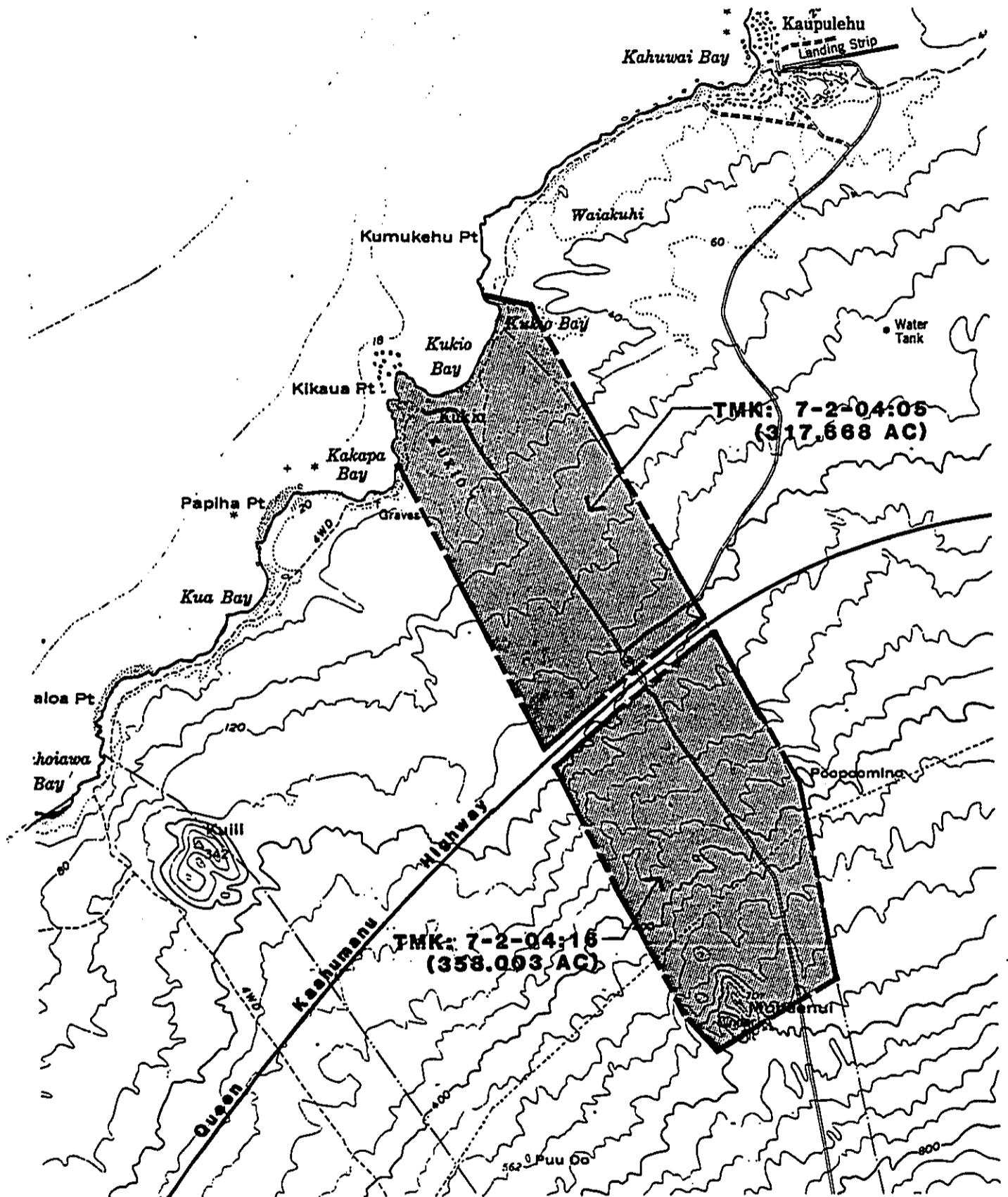
FIGURE 2-1



REGIONAL LOCATION MAP
KUKIO BEACH RESORT
HUEHUE RANCH



FIGURE 2-2



PROJECT SITE
KUKIO BEACH RESORT
HUEHUE RANCH.



FIGURE 2-3

2.3 STATEMENT OF OBJECTIVES

As developer of this project, the owners of Huehue Ranch have the financial capabilities to plan, develop, and market the planned Kukio Beach Resort. The objective is to develop a high quality, low to medium density resort community that is economically viable. Although capable, the land owners will seek experienced resort developers and hotel operators with proven track records to support the execution of this project. Through their understanding of the site and sensitivity to the valued natural and historic resources along this coastline, the owners are committed to contributing to the continued growth of the visitor industry in West Hawaii and at Kukio in particular. As a quality master-planned resort community, Kukio Beach Resort would contribute significantly to the North Kona region and become an integral part of the community.

2.4 STATEMENT OF PURPOSE AND NEED FOR ACTION

A General Plan Amendment is needed so the proposed development of the Kukio Beach Resort will be in complete conformance with the county land use and regulatory controls. As required by Chapter 343, HRS, as amended, and the County Planning Department, an Environmental Impact Statement is required to address the potential impacts this project may have on the environment.

During the processing of the General Plan Amendment or upon receiving county approval, the applicant will petition the State Land Use Commission for a Boundary Amendment to the Urban District that would allow the proposed development.

2.5 SITE CHARACTERISTICS

The bulk of Kukio consists of rough lava land and supports a minimum of dry land vegetation that is concentrated on the mauka portion of the property. The coastal area is characterized by several stretches of white sand beach backed by a low lying sand dune and a dense thicket of kiawe. Kukio has one of the few sandy beaches in North Kona and is a significant natural resource for the region as a whole.

Located in the central area of the Kukio coastline are a series of inland anchialine ponds with a dense 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.

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. 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 Kukio Bay is unrestricted.

Existing facilities at the beach include a small wooden cottage, out-house with cesspool, bar-b-que areas and picnic benches. Solar panels provide the power for a low-voltage electrical system and water heating system.

Current use characteristics of the beach by Huehue Ranch employees and the public (who gain access to the beach from adjacent lands) include swimming, surfing, snorkling, spearfishing, surf fishing, sunbathing, and picnicking. An existing small brackish water well and storage tank provide limited irrigation and rinse water for the beach cottage. No potable water is currently available on the site.

Lands mauka of the Queen Kaahumanu Highway are accessible by an improved ranch road that connects the mauka lands of Huehue Ranch to the coastal property at Kukio. This road is also used by an active cinder quarry operation at the Muheenui cinder cone located at the mauka corner of the project area.

2.6 DEVELOPMENT PLAN

The proposed 675 acre destination resort is divided by the Queen Kaahumanu Highway with 317 and 358 acres on the makai and mauka sides, respectively. It will combine visitor and residential lodging with recreational and commercial facilities and activities in a master-planned development. The coastal parcel is envisioned as the major focal element for resort activity with inland properties utilized for a mixture of multi-family and single-family residences, recreational land uses and a small commercial complex (Figure 2-4). The beach at Kukio Bay represents a significant amenity for resort development. The beach, along with an 18 hole golf course, a health club, beach club, tennis complex and equestrian center, will provide the primary recreational amenities along with the potential for horseback riding and upcountry site-seeing at Huehue Ranch on the nearby slopes of Hualalai.

One or two hotel sites, depending on their size, are envisioned along the coastal strand that will provide from 900 to 1,350 accommodation units with direct ocean frontage and access. As a master-planned recreational and residential community with a first-class market orientation, the initial five years of development could offer a 350 to 450 room first-class hotel and prestigious vacation and primary residences in a resort environment.

The anchialine ponds and adjacent historic sites of significance present an opportunity to provide visitors with an understanding of Hawaiian culture and pond ecology, while preserving and integrating them into the development plan. Permanent structures will be set back from the beach area to increase the recreational opportunities in the coastal area. A beach club facility will provide the necessary beach support services.

Multi-family condominium sites will be located along the open space corridors of the golf course fairways. With a golf course orientation, the low to medium density condominium developments will be linked by a pathway system to the major resort amenities. Approximately 800 to 2,000 multi-family units are planned at varied densities with a mix of compatible product types.

The units will be designed and landscaped to minimize their visual impact from the State Highway and retain sufficient open space to obtain a desirable landscape character. An overall density range of 6 to 15 units per acre is defined for the multi-family areas to provide project flexibility to meet changing market needs.

Single family lots are planned both mauka and makai of the highway. With a golf course or open space orientation, the lot sizes will range from 10,000 to 25,000 square feet with approximately 150 lots planned for the makai portion of the resort and 450 to 650 lots planned mauka of the highway.

An 18 hole golf course is proposed within the resort, with 10 holes and clubhouse and driving range located in the makai area of Kukio and the remaining 8 holes located mauka of the highway. The course would be connected by a golf cart under-pass to be constructed under the highway. Other amenities such as a health club, tennis complex, equestrian center and private recreation areas are envisioned within the multi-family area.

A small village center is planned near the entrance to Kukio Beach Resort at Queen Kaahumanu Highway. The proposed commercial center could serve visitor and residential market segments from the Kona and Kohala area as well as from the resort itself. The village center could house retail establishments such as a small grocery store or pharmacy as well as restaurants, snack and take-out food establishments and clothing or gift boutiques. The center would require approximately six to seven acres and provide approximately 65,000 to 75,000 square feet of leasable area.

To assure a quality development with a unified environmental character, it is the applicant's intent to establish comprehensive design guidelines and covenants to control the overall resort development.

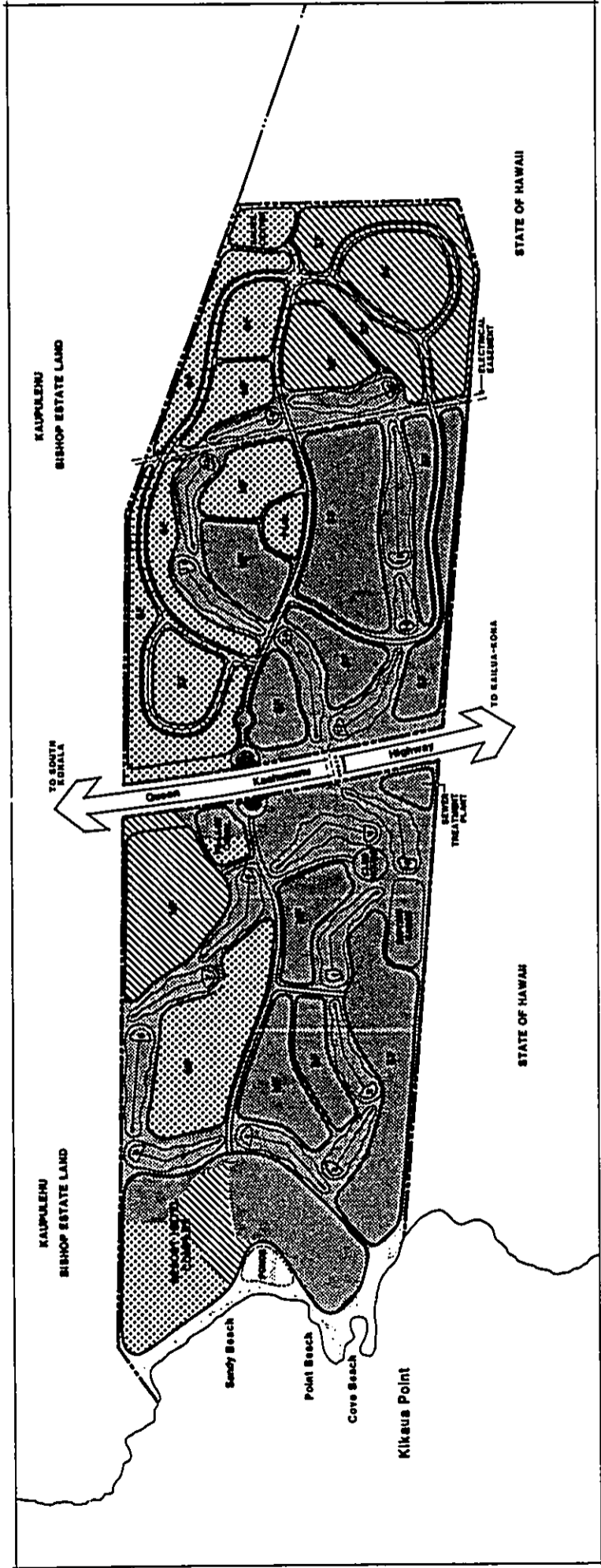
2.7 PHASING AND TIMING OF ACTION

The resort development will be phased to meet market needs and coincide with the necessary infrastructure improvements including site access and roadways, installation of the water and electrical power system, and the incremental phasing of the sewage treatment plant. Figure 2-5 shows the approximate phasing of development for the resort dependent upon receiving the necessary governmental approvals.

TABLE 2-1

General Land Use And Density Allocation
For Kukio Beach Resort

<u>Land Use</u>	<u>Approximate Acres</u>			<u>Approximate Density (Units/Acre)</u>	<u>Planning Range No. of Units</u>
	<u>Makai</u>	<u>Mauka</u>	<u>Total</u>		
<u>Resort Hotel</u>					
Hotel	45	-	45	20-30	900-1350
Beach Club	5	-	5	-	-
Tennis Center	5	-	5	-	-
Open Space (Including Ponds)	10	-	10	-	-
<u>Residential</u>					
Multi-Family	85.5	45	130.5	6-15	783-1958
Single Family	48	210	258	2-3	516- 774
<u>Commercial</u>					
Village Center	6	-	6	-	-
Club House	2	-	2	-	-
<u>Recreation</u>					
18-Hole Golf Course	90	70	160	-	-
	(10 Holes)	(8 Holes)			
Driving Range	5	-	5	-	-
Equestrian Center	-	5	5	-	-
Community Park	-	5	5	-	-
<u>Others</u>					
Roads	7	8	15	-	-
Sewer Treatment Plant	2.5	-	2.5	-	-
Open Space	6	11.5	17.5	-	-
Electrical Easement	-	3.5	3.5	-	-
TOTALS:	317	358	675		2199-4082



PRELIMINARY PHASING
PROPOSED DEVELOPMENT PLAN
KUKIO BEACH RESORT



NORTH KONA, HAWAII
 TRACTS 7-3-04.015 and 16
 1000 800 400 200 0

10 ACRES	2.5	1.5
0	2.5	1.5

JAN. 1988
pbr
 PREPARED FOR: HILIMUS RANCH
FIGURE 2-5

LEGEND

SF	SINGLE FAMILY RESIDENTIAL
MF	MULTI FAMILY RESIDENTIAL
	RESORT HOTEL COMPLEX
	OPEN SPACE

PHASING SUMMARY

[Pattern]	PHASE I
[Pattern]	PHASE II
[Pattern]	PHASE III

Phase I designation generally indicates a 1989 start of construction date with Phase II and Phase III commencement following as required to meet the market needs.

On-site and off-site infrastructure improvements are estimated at approximately fifty million dollars (1985 dollars), not including individual site development costs. At build-out, the total development costs are estimated at over 450 million dollars (1985 dollars).

Table 2-2 summarizes the projected order of magnitude development cost for completing the entire resort.

TABLE 2-2

Summary of Order of Magnitude Development Costs (1985 Dollars)
For Kukio Beach Resort

<u>Improvements</u>	<u>Total</u>
Off-site Infrastructure	\$ 19,885,000
On-site Infrastructure	22,600,800
Project Development-Makai	270,791,000
Project Development-Mauka	77,520,000
Subtotal:	390,796,800
20% Contingency:	78,159,360
Total:	\$468,956,160 =====

The resort hotel complex, or first increment thereof, will be included in the first phase along with the 18 hole golf course and multifamily and single family residential uses. As projected, the initial phase of development will include approximately 425 acres (over 60% of the site), extending mauka and makai of the highway.

2.8 NECESSARY PERMITS AND APPROVALS

In order to implement the proposed development program, several regulatory approvals and permits will be required. Although other approvals may be required for specific project construction within the resort, the following are both necessary and/or probable approvals that have been identified.

TABLE 2-3
Land Use Description/Approvals

<u>Authority/Land Use Designation</u>	<u>Area Affected</u>	<u>Approval Required</u>	<u>Status*</u>
COUNTY OF HAWAII			
General Plan o Open (LUPAG)	40' Coastal Setback	None	AF
o Conservation (LUPAG)	Inland Area	General Plan Amend. w/Environmental Impact Statement (EIS)	
Zoning o Open	Entire Site	Change of Zone	ATBF
Special Management Area (SMA)	Makai of Queen Kaahumanu Hwy.	SMA Permit	ATBF
Tsunami/Flood Zone	Coastal Fringe	None	N/A
Subdivision Approval	Entire Site	Subdivision (Preliminary & Final)	ATBF
Grubbing, Grading Excavation and Stockpiling Permit	Entire Site	Grading Permit	ATBF
Well Permit	Source Location	Well Permit	ATBF
Sign Permit	Entry Area	Sign Permit	ATBF
STATE OF HAWAII			
State Land Use o Conservation District	Entire Site	SLUC Boundary Amendment W/EIS	ATBF
Department of Land And Natural Resources o Conservation: Resource Subzone	Coastal Fringe	Conservation District Use Application/Permit	ATBF
o Conservation: General Subzone	Inland Area	(Not required once SLUC Boundary Amendment Approved)	N/A
o Historic Sites (Chapter 6E Review)	As Identified	Review/Approval	AF

Table 2-3 (continued)

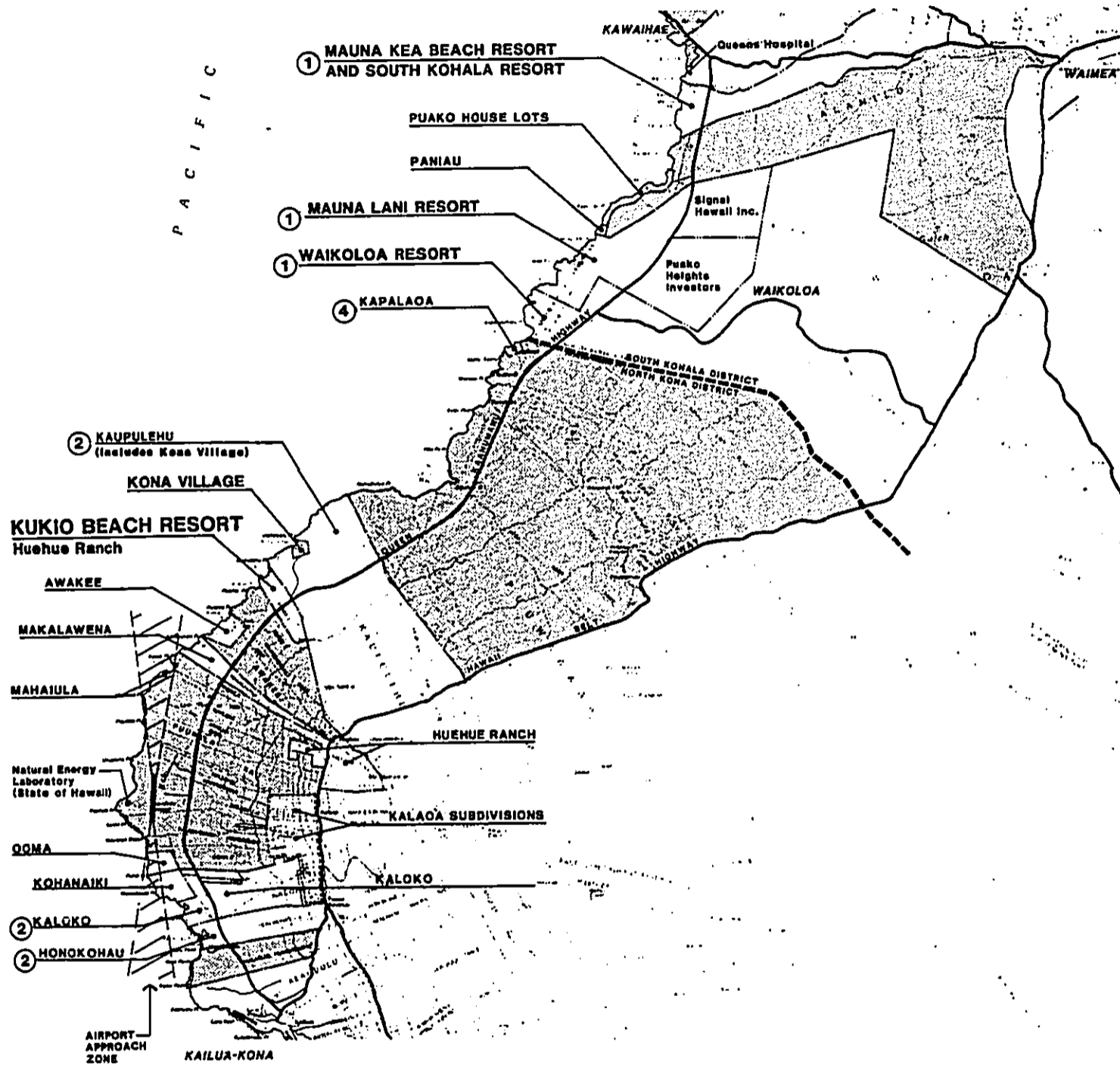
<u>Authority/Land Use Designation</u>	<u>Area Affected</u>	<u>Approval Required</u>	<u>Status*</u>
Department of Transportation o Navigable Water	Near-shore Water	If Modified, Review/ Approval Required	N/A
Department of Health o Private Wastewater Treatment	Treatment Plant	Certification/Permit	ATBF
o Underground Injection Control	Within Site	UIC Permit	ATBF
Department of Planning and Economic Development o CZM Federal Consistency Review	Anchialine Ponds or Shoreline	If Modified, Review Required	N/A
FEDERAL GOVERNMENT			
Army Corps Of Engineers (COE)	Anchialine Ponds or Shoreline	If Modified, COE Permit Required	N/A
U.S. Fish & Wildlife Service	Entire Site	Section 7 Consultation (Endangered Species)	ATBF

*Status

AF = Application Filed.
 ATBF = Application To Be Filed.
 N/A = Not Applicable.

2.9 NEED FOR THE PROJECT

The lands of Kukio lie along the scenic west coast of the island of Hawaii, six miles north of Keahole Airport in the North Kona District. Over the past 20 years, the coastline from Keauhou to Kawaihae, including North Kona and South Kohala, has become the focus of international efforts to develop a world-class destination resort area. These efforts have generated three major resort areas in South Kohala, each with its own identity (Figure 2-6). The population base of West Hawaii has increased in support of coastal development and the future of the region reflects continued economic growth.



LEGEND

GENERAL PLAN DESIGNATION

- ① Major Resort
- ② Intermediate Resort
- ③ Resort Retreat
- ④ Medium Density Residential

 State Land

WEST HAWAII COASTAL DEVELOPMENT

**KUKIO BEACH RESORT
HUEHUE RANCH**



FIGURE 2-6

In a region where sand beaches are the exception rather than the rule, the 3,400 lineal feet of sand covered crescent bay shoreline at Kukio is a significant resource and amenity.

Additionally, strong tradewinds that buffet the coast of South Kohala are less frequent at Kukio and climate conditions are excellent for resort development. The site's proximity to the international airport at Keahole Point and the existing resident population base at Kona provide an efficient access for visitors with an existing base of goods and services nearby.

A market assessment (Appendix E) has been prepared to determine the opportunities for developing a successful resort destination area at Kukio Beach. This assessment presents a basis for a project feasibility analysis that is appropriate at this stage of planning.

In the context of the Hawaii General Plan, a long-range planning document with a 30 year time frame, the allocation of land uses needs to consider a variety of planning elements that are not strictly quantifiable. Broad social goals and objectives are key components of the General Plan. These goals and objectives need to be evaluated with respect to trends and attitudes toward economic development, so that the General Plan reflects the dynamic balance of economic and social conditions on the island.

The visitor industry is the second largest source of income and employment for the state of Hawaii. Visitor arrivals to the state totaled about 4.8 million in 1984. The growth in visitors to the state has historically been strong with an average annual increase of 19.4% between 1960 and 1970, 8.5% between 1970 and 1980 and 5.2% from 1980 to 1984. Over the past ten years westbound visitors have made up about 79% of state visitor arrivals.

Since 1970 the neighbor islands have experienced a relatively faster rate of growth in westbound visitor arrivals than has Oahu. The island of Maui experienced the highest growth rate over the period in the state, at 10.7% per annum, while the island of Hawaii had the lowest, at 3.9% per annum.

Visitor expenditures in the state totaled over \$4.8 billion in 1984 and since 1970 have shown double-digit annual percent increases except in 1983. On a per capita basis, expenditures have increased at a slower rate than have total visitor expenditures.

The Hawaii Department of Planning and Economic Development (DPED) projects a continued increase in visitor arrivals, resulting in more than 8 million visitors to the state by the year 2005. Because of the island of Hawaii's expected emergence as one of the state's major destination resort areas, visitors to the island are expected to represent about 30% of westbound visitors and 9% of eastbound visitors to the state within the next 20

years. This would lead to a total of nearly 2 million visitor arrivals to the island by the year 2005.

Hotel Market Assessment

As of June 1985 the island of Hawaii had 7,511 visitor units including hotel and condominium units. Hotel rooms represented about 70% and condominiums the remaining 30% of this inventory. About 53% of the island's hotel units were in the Kona area.

The island of Hawaii, and the South Kohala to North Kona region in particular, is expected to undergo major and unprecedented development in its resort infrastructure over the next several years. More than 6,000 hotel units are proposed for development on the island over the next 15 years, the majority to be in the Kohala or Kona areas. However, some of these developments are contingent upon governmental approvals or improved market or financial conditions. At this time, the two most definite planned developments on the island include the 1,260-room Hyatt Regency Waikoloa Hotel at Waikoloa Beach Resort and the 350-room hotel planned for the South Kohala Resort. Together, these two hotels would add 1,610 units to the island's hotel inventory.

The average daily demand for hotel and condominium units on the island is projected to increase from about 3,400 units in 1985 to nearly 13,000 units by 2005, representing a 7% average annual increase in demand over the 20 years, with growth concentrated in the earlier periods. The major assumptions underlying this assessment are discussed in Appendix E.

The projected number of hotel units required on the island is based on the demand for commercial facilities, the share of overnight visitors using hotels and an assumed 70% to 80% average annual occupancy level for hotel establishments. Thus, the island is expected to require between 7,500 and 8,600 hotel units by 1995 and 11,300 and 12,900 units by 2005.

Based on the number of existing hotels and those currently in the planning and development process, the supply of units on the island is expected to exceed demand through 1990. However, market support for about 4,500 to 6,100 additional hotel units could be expected between 1991 and 2005.

Hotel development at the Kukio Beach Resort is recommended to offer first-class facilities and services. This market orientation is considered appropriate for Kukio Beach Resort because of the following factors:

- o The planned development of an 18-hole golf course and other recreational facilities.

- o The proximity of the property to shopping, dining and other affordably priced recreational opportunities in Kailua Town.
- o The prestigious and far-reaching market exposure contributed by the luxury resorts of South Kohala which would also attract travelers with lower budgets to the area.
- o The division of the property by the Queen Kaahumanu Highway, making the mauka portion less than ideal for a luxury class resort development.
- o The anticipated competition within the luxury market on the island over the next several years.

The target markets for first-class hotel development at the Resort would include FITs, GITs, meeting and convention groups and within-state travelers as identified and defined in Appendix D. The FIT market could be expected to be the most affluent and discriminating segment of this visitor mix.

Considering the locational and physical advantages of the Kukio site, the first-class level of facilities, amenities and service expected to be offered and the expected level of competition from other visitor accommodations on the island, Kukio Beach Resort could be expected to capture about 15% of the market for additional hotel units on the island initially. This share might increase significantly over time because of the resort's superior beach frontage in comparison to Keauhou Resort and Kailua Town.

Village Commercial Center Market Assessment

Because of its advantageous location on the Queen Kaahumanu Highway, the proposed commercial center could serve visitor and resident market segments from the Kona and Kohala areas as well as from the resort itself. The proposed commercial development could attract the majority of its market support from regional visitors, but up to 40% from regional residents, given the resort developments planned throughout the region, the development concept for the resort as a whole and the anticipated levels of population growth for the region. Thus, the center could house retail establishments such as a small grocery store or pharmacy as well as restaurants, snack and take-out food establishments and clothing or gift boutiques.

Based on the other land uses proposed at the resort and examination of commercial developments at comparable other resorts in the state, the resort could devote between six and seven acres to the commercial center. At a standard one to four relationship of gross leasable area to total acreage, this would represent about 65,000 to 75,000 square feet of leasable area.

Resort Condominium Market Assessment

Resort condominiums are a special type of multifamily development because of their relatively high quality, their location in resort areas and their orientation to second homeowners and other vacation users. Condominium units counted by the Hawaii Visitors Bureau (HVB) as part of a visitor rental pool in the south Kohala and North Kona areas represented 98% of the island of Hawaii's total inventory of visitor condominium units in 1984. Condominium units as a percent of all visitor units have increased significantly from about 19% in 1980 to 27% in 1984.

Presently about 363 and nearly 3,500 condominium units exist in the south Kohala and North Kona resort districts, respectively. The current inventory in North Kona generally exceeds demand and several major projects continue to offer inventory for sale. However, recent construction and sales data and the perspectives of real estate brokers active in both North Kona and South Kohala indicate that a market exists for higher quality development north of Kailua Town.

About 1,300 units are proposed (but not necessarily planned) for construction in south Kohala and about 1,500 for Kona by 1990. However, proposed development plans tend to be optimistic and a significant number of these units are not likely to be realized or completed as proposed.

Oriented to the first-class market, the condominium units at the resort would be set back from the ocean on sites with golf course frontage. Some may also be located on the mauka side Queen Kaahumanu Highway, with a golf course or open space orientation.

The marketing of condominium units is recommended to begin in 1991, or close to the opening of the first hotel at the resort. The condominium units proposed at the resort would be most appropriately targeted at a first-class market.

Initially, the condominium buyers could be expected to be attracted primarily from visitors to Waikoloa Beach Resort and Keauhou Resort and from condominium property "upgraders" from the Kailua-Kona and Keauhou areas. The prospective market support for condominium development would be principally buyers seeking (1) a vacation or second residence and/or (2) an investment to be kept in a visitor rental pool and resold for a profit after a few or several years.

In addition, the buyers are expected to include a component of persons seeking a primary residence. These buyers could be expected to be relatively more evident at the more affordably priced projects located on the mauka side of the highway.

The rate of new condominium unit sales are expected to increase over historical levels due to the projected increase in visitor arrivals to the island and the expected attraction of more and more affluent visitors. Assuming average annual sales will increase from about 400 to 500 over the period, the island could be expected to absorb about 7,000 new units between 1991 and 2005.

Resort Residential Lot Market Assessment

Except for Waikoloa Village and Princeville Resorts, resort areas in Hawaii have primarily focused on the development of hotels, resort condominiums and commercial facilities rather than on residential lots. Residential lot developments were reviewed at five first-class resorts. The resorts were selected based on the historical development of lots at each and the locations, views and amenities offered.

Currently about 2,087 resort residential lots are located in the five selected resorts. The majority of these are at Waikoloa Village and Princeville which contain 968 and 673 lots, respectively.

Over the next two decades, about 6,100 resort lots are proposed at six resorts on the island. However, of this number, only about 5% are definitely planned to be developed in the near term. The greatest potential development is at Waikoloa Village Resort where about 4,830 additional lots could be developed.

Since 1971 an average of about 64 resort residential lots in the state were sold annually. In 1982 and 1983 lot sales were relatively weak, ranging from 6 to 46 annual sales. This decline is primarily due to the decrease in purchases by investors. More recently sales have increased again and resort real estate values have stabilized.

Resort lots currently being offered for sale range from \$55,000 for interior lots at Princeville to \$350,000 for ocean view fairway lots at the Wailea Golf Estates. The prices of resort lots are primarily related to three factors, lot type and view, lot size and the quality of the resort in which the lots are located.

Historically, the majority of purchasers have been motivated to buy resort residential lots for future improvement as a vacation or retirement home, investment or speculative building. In addition, Hawaii is just beginning to follow the California trend in the emergence of an upscale primary home market for resort residential markets.

Because of the current lack of resort residential lots that are situated close to the ocean and the desirability of such property on the island, the resort could provide about 150 lots on the makai side of Queen Kaahumanu Highway. If lot sales could be

underway by 1991, all of the makai lots would be expected to be sold by 1994 or 1995.

Annual sales of lots on the mauka side of the property are projected to range between 20 and 30 lots between 1991 and 1995 and to increase to 25 to 35 lots by 2001.

2.10 USE OF PUBLIC FUNDS OR LANDS

The proposed project does not anticipate the direct use of any public funds or lands. Through the development of a resort community, public funds will be expended indirectly to support the additional public services to be required of this use such as additional police and fire protection.

Summary

The State's projection provides a point of departure for defining the overall conditions for visitor industry growth. It is, however, only a small piece of the equation to determine the market feasibility of individual projects. Many things enter into that equation including the quality of the individual development, product types, price, amenities, site location, and marketing strategy. The key issue is the anticipated share of the total available market that an individual development can hope to acquire based on its development program. Accordingly, it is important that the County General Plan provide the visitor industry with a variety of suitable resort designated properties to supply a diverse and competitive market setting. West Hawaii is becoming a major international resort destination and to limit the further study of potential resort development areas within this region would eliminate the opportunities for competitive creativity that will continue to promote sound visitor industry growth.

The Kukio site is ideally located, lying approximately six miles north of the Keahole Airport and nine miles from the residential areas of Kailua-Kona, which are among the fastest growing in the State. The area is not subject to significant development constraints, such as major flooding and inundation hazards, and is not within the approach and take-off zone of the Keahole Airport.

The makai lands at Kukio have not been utilized due to their low agricultural utility. In conjunction with Huehue Ranch's effort to optimize its mauka agricultural operations and manage its land resources responsibly, the development of these makai lands at Kukio has been accelerated in response to the increasing demand for additional resort sites.

A review of land ownership in the North Kona district indicates a vast amount of State owned property along the shoreline and relatively few privately owned parcels of a size suitable for a

master planned resort development. Given this lack of developable shoreline, the projected need for an expanded visitor plant, and the attributes of the site, Kukio should be considered a primary location for a new resort. Such a development can be seen as a major contribution to the district's economy and an asset to the County as a whole.

RECEIVED AS FOLLOWS

3.0
DESCRIPTION OF THE ENVIRONMENTAL SETTING AND
PROBABLE ENVIRONMENTAL IMPACTS

3.0 DESCRIPTION OF THE ENVIRONMENTAL SETTING AND PROBABLE ENVIRONMENTAL IMPACTS

3.1 PHYSICAL GEOGRAPHY

3.1.1 Existing Conditions

Climate: Environmental conditions at Kukio are similar to those along the rest of the North Kona and South Kohala coast. Coastal temperatures vary between 75 and 85 degrees Fahrenheit with a mean annual temperature of about 78 degrees F. Cooler temperatures are experienced inland at higher elevations. Kukio is located south of the strong wind line in South Kohala and is not subject to the intense winds that regularly buffet Waikoloa and the coastal areas around Kawaihae. Winds at Kukio are usually light and variable, often blowing offshore in the morning and onshore later in the afternoon. Located within the area between Honokohau and Anaehoomalu called Kekaha, meaning dry, sunbaked land, the rainfall at the coast averages only 7 to 8 inches annually. Below the 1,000-foot elevation there is very little rainfall and only increasing to approximately 25 to 30 inches a year at the 2,000-foot elevation.

Topography: Kukio is situated on the lower slope of Hualalai Volcano and is comprised almost entirely of exposed rockland formed from lava flows.

Excepting a few areas, the terrain exhibits slopes of 10 to 20 percent or less. The site is relatively flat from sea level to the highway, which is approximately 200 feet above sea level. Gentle sloping occurs mauka of the highway to a maximum elevation of 680 feet at the Muheenui cinder cone, which rises approximately 100 feet above the surrounding terrain.

3.1.2 Impact

No significant effects on the area's microclimate are anticipated.

The project site is relatively flat makai of the highway and gently sloping mauka of the highway. Substantial land form alteration will not be required. The prominent Muheenui cinder cone is being actively quarried, and would be altered or removed over the long run, notwithstanding the proposed project. Though earthwork quantities are not available, the existence of the cinder cone on-site suggests that cut and fill could be balanced on-site.

3.1.3 Mitigation Measures

Grading plans of the site required to develop the site for the proposed resort, indicating the extent of earthwork, cut and fill areas and any borrow requirements, if any, will be designed to

conform closely with the existing site features. Cut and fill activities would be balanced on-site. All applicable County grading requirements would be met.

3.2 GEOLOGY AND SOILS

3.2.1 Existing Conditions

Kukio is located on the northwest flank of Hualalai, one of five volcanoes which comprise the Island of Hawaii. The oldest volcano, Kohala, is extinct. Mauna Kea has erupted in the past 10,000 years, but not in historic times. Hualalai last erupted in 1800-1801, and Mauna Loa and Kilauea are currently active. Present activity is centered in the southeastern part of the Island.

The prominent westward extension of the coast in the Keahole Point-Kukio region has been formed in the past 3,000 years by lavas flowing from the northwest rift zone of Hualalai (Moore et al., in press). Historic and older lavas from Hualalai underlie the Kukio site.

Both pahoehoe and aa forms of basalt are represented at the site (Figure 3-1). Relative ages of separate lava flows can generally be distinguished by variations in color and vegetation, with younger flows appearing darker and less vegetated.

Pahoehoe is the more fluid form of lava because of its higher gas content. It flows rapidly and forms a relatively smooth surface characterized by low domes and ridges; a "ropy" surface texture is common. The domes may be badly cracked and may conceal open cavities or blisters which are common in pahoehoe. Lava tubes also are common in pahoehoe and are the empty conduits through which the lava once flowed. The rock is characterized by numerous spherical cavities (vesicles) a fraction of an inch in diameter, and thus it is of relatively low density. Individual flows tend to be only a few feet thick, but several flows from the same eruption may rest above each other to form a relatively thick flow unit.

Aa basalt is more viscous because it has lost the higher gas content of pahoehoe. The molten mass moves so slowly that a rough, jagged clinker layer forms on its surface. This layer is carried forward and cascades down the front of the flow so that a clinker pavement typically is formed over which the molten interior flows. Thus, in cross-section aa basalt has a dense interior sandwiched between layers of volcanic clinker. The amounts of these two types of material in an aa flow can vary greatly, however, so that it is impossible to anticipate exact subsurface conditions at a specific location. Cavities are uncommon in aa flows, although clinker pockets can consist of loose gravel-to-cobble sized fragments. The interior rock has fewer vesicles than pahoehoe and thus is denser; the vesicles usually are

stretched as a result of the highly viscous nature of the lava before it solidified. Aa flows tend to be significantly thicker than pahoehoe flows, sometimes several tens of feet thick.

On the southeastern corner of Kukio, the Muheenui cinder cone rises approximately 100 feet above the surrounding terrain to an elevation of 680 feet. It is made up of red and black cinders and is actively quarried under an State permit for use in the construction industry.

Northwest of the cinder cone is a pit crater, which is a collapsed feature formed when shallow molten rock suddenly drains away during an eruption. The steep sides of this formation may be unstable.

Soil on the basalt rock is nonexistent to very thin because of the relatively young age of the lava flows and the arid climate. Some thin volcanic ash soil occurs northwest of the Muheenui cinder cone.

Along the coastline several feet of coral sand has accumulated in a narrow dune less than 10 feet high and about 100 to 150 feet wide, narrowing to the south. Behind the dune a thicket of dense kiawe has developed and the process of soil formation from decaying vegetation is in a very early stage.

In the center of the Kukio coastline a series of brackish water pools represent a geologic feature found frequently along this coastline. These near-shore ponds, termed anchialine, result from a natural depression below sea level which intercepts the water table as it permeates the fractured basaltic rock. Refer to Section 3.5 for detailed discussion of anchialine ponds.

3.2.2 Impact

Rough grading for the golf course, building pads, roadways and landscaped areas will be more difficult on pahoehoe lava flows than on aa. In some locations, the pahoehoe may resist blading or ripping. Lava tubes and other shallow cavities in this basalt form could collapse under weight of construction equipment. In contrast, while the aa surface is jagged, it is more readily shaped by conventional bulldozers to the clinker layer.

Most fill will consist of broken excavated rock or cinder from the Muheenui cinder cone. With proper care, shallow foundations of this material will be appropriate for all structures. Remaining cinder is suitable borrow material and will be used for fine grading of the golf course and backfill purposes. Provided that maximum rock fragment size and gradation of the material is appropriate for the purpose of the borrow, rock excavated at the site will provide acceptable borrow material.

As soil cover and agricultural potential on-site are very limited, no significant soil effects are foreseen. The cinder cone may provide sufficient base material to reduce importation requirements for the golf course, although sufficient quantities of imported screened soil will be required for the golf course and other landscaped areas. The sources of screened soil will be located on island and provide the project with a natural, fertile and friable soil.

3.2.3 Impacts Which Cannot Be Avoided

Lava particulates or fill materials may be exposed to erosion by wind and water during the short-term grading and construction period.

The Muheenui cinder cone will be removed under a current State permit to quarry the site for construction purposes. The loss of this natural and scenic resource may be accelerated with site development. The importation of screened soil will require the removal of this material from another location off-site.

3.2.4 Mitigation Measures

To the extent possible, natural landforms which complement the proposed project plan will be preserved.

An exploratory program to identify potential lava cavities and collapse features will be required prior to project development. Any natural lava tubes or subsurface cavities may offer potential for use as collectors of storm water runoff and thereby reduce disturbance to local topography and landforms.

A site engineering study and geotechnical assessment will be conducted in conjunction with more detailed site plans.

The pit crater northwest of Muheenui cinder cone may be unstable and any construction activity in the vicinity must be preceded by an engineering study to verify suitability for development and possible corrective measures or removal of the crater during quarrying operations.

Appropriate measures of controlling dust resulting from heavy equipment operations will be implemented.

3.3 NATURAL HAZARDS

3.3.1 Existing Conditions

Volcanic Eruptions and Flows: Hualalai last erupted in 1800-1801. These two eruptions were from vents that opened on the northwest rift zone with lava flows reaching the ocean on both sides of the site.

Available evidence (summarized by Moore, 1970) indicates that the two youngest Hualalai flows erupted in 1800-1801. The first, known as the Kaupulehu flow, poured from a rift at 1676-1829 meters (5500-6000 feet) on the northwest flank of Hualalai (Stearns and Macdonald, 1946), and flowed seaward, burying Hawaiian fishponds and villages along the shore (Powers, 1920) approximately 4-5 miles north of Kukio. A smaller flow, the Huehue flow, erupted shortly after the Kaupulehu flow and flowed to the sea at Kukio. This flow, the most recent from Hualalai, underlies the Kukio site. Older flows, 1000-3000 years old occur further south (Moore et al., in press).

The Huehue flow erupted from a line of spatter cones on the northwest rift zone of Hualalai about 6.4-8.0 km. (4-5 miles) from the coast (Moore, 1970). Most of the flow consists of pahoehoe, though some aa occurs in the lower parts of the flow (Stearns and Macdonald, 1946). The submarine Huehue lavas were described by Moore (1970) and Clague (1982).

Most of the Hualalai eruptions have been small, similar to small or average Kilauea eruptions. The 1800-1801 eruption was a comparatively small one. The eruptions tend to be more explosive than those of Kilauea, because of the chemical composition of Hualalai lavas (alkaline olivine basalt with a high proportion of volatiles). Deposits of three explosive eruptions of the past 3000-4000 years have been found at Hualalai (Moore, et al., in press).

Current investigations indicate that the recurrence interval of eruptions on Hualalai averages approximately 50 years (Moore et al., in press). There have been 200 eruptions in the past 10,000 years. Therefore, a new eruption in the near future is a possibility that must be considered. Moore and others suggest that an eruption is probable within the next 200 years and could occur in the next few decades.

Volcanic hazards at Kukio would come from lava flows or pyroclastic material, the products of explosive eruptions (Moore, et al., in press). Lava flows pose the greater hazard and because of the steepness of the west and northwest sides of Hualalai, lavas might flow down the volcano quite rapidly. On the basis of present data it is not possible to predict where the next eruption will occur. However, seismic monitoring instruments located on Hualalai and maintained by the Hawaii Volcano Observatory would permit advance warning of significant seismic activity which could indicate impending volcanic activity. However, some evidence suggests that it might occur on the northwest rift zone.

Future Hualalai eruptions are likely to be of small to moderate size, though possibly explosive, if the pattern of past eruptions continues. There may be some warning time before an eruption, although precursors could be somewhat different from those that

signal eruptions at Kilauea. Since Hualalai has been inactive since the 1800-1801 eruptions, there is probably no molten rock at shallow depths beneath the volcano. Therefore, rising magma could be expected to cause sharper and perhaps somewhat stronger earthquakes than the precursor earthquakes at Kilauea. It is likely that there also would be less ground deformation than occurs at Kilauea which is underlain by a shallow magma chamber. Warning time might be short, perhaps as little as a week or a few weeks. The signals of an impending eruption should be clear and provide time to safeguard lives at Kukio and elsewhere on the Kona Coast.

In evaluating relative risks from volcanic hazards at Hualalai, Mullineaux and Peterson (1974) estimated the risk from lava-flow burial, falling rock fragments and volcanic gases to be moderate. Indirect risk from subsidence and surface rupture was judged to be low. In terms of overall relative volcanic hazards, the Kukio-Keahole Point region is in an area of moderate to high risk. On a scale from A (lowest risk) to F (greatest risk), the Kukio-Keahole region ranks "DE". Most of the southern half of the island of Hawaii is ranked in zones "E" and "F"; most of the northern half (except for the westernmost area within a 10-mile perimeter of Keahole Point) is ranked "A" and "B".

Earthquakes: The island of Hawaii is seismically active and is in Seismic Zone III of the Uniform Building Code. Although the most recent large earthquakes have taken place under the southern part of the island, a large earthquake offshore from Kealahou Bay, roughly 20 miles south of the site, occurred on August 21, 1951. Its magnitude was between 6.75 and 7.0, and its Modified Mercalli intensity at the site was estimated to be IV. This intensity level corresponds to nondestructive ground motion felt by many people indoors. By comparison the magnitude 6.6 "Kaoiki" earthquake that occurred November 16, 1983 under the southeast flank of Mauna Loa was assigned an intensity of IV-V at the site. Intensity V corresponds to ground motion felt by nearly all, with some fragile objects broken.

The closest large earthquake to the site probably was the magnitude 6.5 event on October 6, 1929, centered under Hualalai Volcano. Assuming a distance between 10 and 15 miles from the 1929 earthquake, Modified Mercalli intensities at the site of VII to VIII would have resulted. This corresponds to ground motion causing damage ranging between negligible to slight in well-built structures and slight to considerable damage in ordinary substantial buildings.

Much of Hawaii's seismicity is not associated with surface faulting. The 1951 Kona earthquake is considered to be related to the Kealahou fault, however, and is the closest mapped fault to the site considered active.

Tsunami and Flooding: The Hawaiian island coasts are exposed to seismic sea waves, or tsunamis, from both distant earthquakes and local ones. Tsunami runups for the islands have been documented, but the site is on an essentially uninhabited section of coastline for which no historical tsunami data is available. As identified on the Flood Insurance Rate Maps prepared by the U.S. Army Corps of Engineers, the coastal areas of the property are designated Zone V15 or Coastal High Hazard Areas. The base flood elevation is approximately nine feet above mean sea level with areas of potential 100-year flooding ranging from 75 to 400 feet inland of the shoreline. Other than the area adjacent to the shoreline, the property has been designated Zone C, area of minimal flooding.

3.3.2 Impact

In the occurrence of a volcanic eruption, earthquake, tsunami, or flooding, risk to life and property would exist within the resort development.

3.3.3 Mitigation Measures

On the basis of present data, it is not possible to accurately predict where the next eruption will occur. Seismic monitoring instruments located on Hualalai would permit warning of significant seismic activity which could indicate impending volcanic activity. Additionally, lava originating from an eruption of Hualalai, if similar to other eruptions on the island, would move slow enough to allow for adequate evacuation time in the occurrence of a volcanic eruption. The existing Civil Defense warning systems could be utilized to evacuate people from the area in the occurrence of an eruption. Notwithstanding future man-made barriers designed to divert lava flows, there would be no mitigation measures for the potential damage to property due to volcanic eruption.

The project will conform with standards for Earthquake Zone III in the Uniform Building Code to minimize risks from earthquake activity. Further geotechnical surveys will be conducted to determine the presence of lava tubes and subsurface cavities that could pose a hazard to construction workers and future resort visitors and residents.

Conformance to the County regulations regarding construction within tsunami and flood zones will minimize any potential risk to life due to these natural occurrences.

3.4 HYDROLOGY

3.4.1 Existing Conditions

Drainage: Due to low rainfall and highly porous ground conditions, natural runoff from seasonal rainfall is very limited

and flood hazards remote. What little surface runoff that occurs during storm events is predominantly carried as sheet flow before percolating to the groundwater table.

Several minor gullies traverse upper reaches of the site north of the cinder cone, but generally lose their definition before reaching the highway. Three drainage culverts are located at intervals along the highway to allow any flood waters to pass under the roadway. A minor drainage course enters the site from adjacent state lands at the extreme northwest corner before reaching Kakapa Bay.

Groundwater: Hydrological studies conducted within the same hydrologic basin as Kukio indicate that the extrusive basalts of the Hualalai volcanic series are extremely permeable and, like most flank flows of the major volcanoes of Hawaii Island, constitute aquifers of exceptional hydraulic characteristics. A thin Ghyben-Herzberg lens underlies the coastal region of western Hawaii from Keahole northward to beyond Kawaihae and southward to beyond Keauhou. In the vicinity of Keahole and Kukio, the lens is brackish, probably less than 125 feet thick and discharges freely along the coast. Hualalai flows showed regional hydraulic conductivity of 3,369 feet per day as computed by tidal analysis and of 9,092 feet per day as computed from the flow equation in which the discharge was obtained by hydrologic budgeting. A probable outflow rate, from the lens, of 6.38 mgd per mile was calculated by the budget approach (Dames and Moore, 1985 in HTDC, 1985).

The hydraulics of groundwater flow can therefore be described in terms of a highly permeable basaltic aquifer carrying a continuous thin basal lens of brackish water underlain by salt water. The brackish water of the lens flows toward the coast along a regional gradient of about 1 foot per mile.

All of the lens system in the Keahole-Kukio region experiences appreciable ocean tidal influence. At distances of up to 336 feet inland, tidal efficiencies ranges from 69 percent to 100 percent. Further inland, at 600 feet, the efficiencies decreased to 43 to 68 percent. There is no simple accurate method for separating the tidal component from the head measurement to reveal the true groundwater head associated with the unidirectional ambient seaward flux. Also, it is not possible to measure the actual basal lens thickness without a drilled hole of sufficient depth. However, as previously indicated, the approximate thickness of the lens is less than 125 feet in the area of concern.

The basalt rock at the site is highly permeable because of the many cracks, openings and loose clinker zones. Surface water will tend to percolate directly downward to the water table except when deflected temporarily from this course by layers of dense rock, buried soil or volcanic ash layers. Brackish water

saturates the lavas at or near sea level. As a result of lesser densities, this layer occurs over salt water in underlying rock. Groundwater under land lower than the 1000 foot elevation in the vicinity of the site may be expected to contain chlorides greater than 200 milligrams per liter and thus exceed the limits for potable water. Wells drilled at about 500 feet elevation at the nearby Kona Village Resort have chloride contents approaching 400 milligrams/liter. Salinity in the near-shore ponds at the site have been reported to range between 2 and 5 parts per thousand. Groundwater gradients are approximately 1 foot per mile in the area, and the groundwater level is estimated not to exceed about 2 feet above sea level at the southeastern end of the site.

Groundwater resources at the site are not suitable for domestic consumption because of salinity, but might be acceptable for some irrigation purposes or desalination to meet potable standards. Potable water for the project will be provided from either a well recently drilled at elevation 1,575 at Huehue Ranch, from a comparable well source in the area, or from a desalination plant utilizing a well at a lower elevation.

In the vicinity of the anchialine ponds, fresh groundwater mixes with seawater to generate brackish conditions (4000-5000 ppm) which appear to be fairly consistent throughout the pond complex. (see section 3.5).

3.4.2 Impacts

Runoff: Paving and other impermeable surfaces within the resort, residential areas and roadways will alter drainage patterns and increase surface runoff. Increased surface runoff may adversely affect the baseline water quality in the coastal anchialine ponds by producing short-term reductions in salinity and increases in ambient water temperatures and nutrient levels. However, studies have suggested that the Kukio pond complex is well flushed through groundwater percolation and tidal exchanges (see Appendix C). Additionally, anchialine pond biota are euryhaline over a range of 2-36 parts per thousand (ppt) and temperature tolerant over a range of 19-35 degrees Centigrade. (Brock, 1985). At the Kukio pond complex water temperatures ranged from 24.0-28.1 degrees Centigrade; salinities from 4.0-4.1 ppt. Any short-term perturbations in water quality are, therefore, not expected to result in any adverse impacts to pond biota.

Groundwater: Withdrawals of potable water at higher elevations off-site for resort use are not expected to alter groundwater salinity in the brackish nearshore lens. If lower elevation wells are utilized, short-term changes in the groundwater elevations may occur. Existing data lend strong support to the extreme unlikelihood that groundwater withdrawals in lowland coastal settings could significantly change the water quality within the anchialine pond complex, given the massive seaward flux and hydraulic head of brackish groundwaters in contrast to

the exceedingly small quantities of brackish water that would be required for potable or irrigation purposes..

3.4.3 Effects Which Cannot Be Avoided

Sedimentation potential will increase during the short-term grading and construction phases.

3.4.4 Mitigation Measures

A storm drainage system will be developed with the objective of minimizing stormwater runoff to the shoreline and maintaining nearshore water quality. Sufficient percolation capacity may be retained on-site with the proposed golf course and other open space to substantially preclude runoff reaching the shoreline. Options include directing flows to the golf course, possibly including a water feature with some retention capacity, and/or the use of dry well sumps to collect runoff for percolation. The use of an integrated storm water collection system would minimize perturbations to nearshore water quality during periods of heavy stormwater runoff by allowing for natural percolation and filtration of such waters. Care would be exercised to insure that any subsurface drainage system would not degrade anchialine pond water quality.

The effects of withdrawal of groundwaters and/or injection or surface disposal of treated wastewaters or rainwater runoff would be compatible with anchialine pond and nearshore water quality inasmuch as both habitats are characterized by natural subterranean brackish water discharges. Flora and fauna associated with both habitats are euryhaline and would not be adversely affected by short-term alterations in water salinity. Existing data suggest that, given the extremely euryhaline nature of anchialine pond flora and fauna, changes in the biotic composition resulting from groundwater withdrawal is extremely unlikely. However, insufficient data exists on anchialine pond biota to be able to conclusively state that biotic changes will not occur.

Water currents and diurnal tidal flushing will prevent any significant deterioration of nearshore water quality resulting from the use of treated wastewaters for irrigation purposes.

Diurnal tidal flushing and natural mixing of groundwaters and ocean waters would prevent any significant degradation of anchialine pond water quality.

A water study to identify the most feasible potable water system (well or desalination) will be prepared in conjunction with detailed water supply, irrigation and wastewater disposal planning. All applicable State Department of Health and County standards will be met.

Irrigation of landscaping using potable water would have a potential to reduce underlying groundwater salinity and salinity levels down gradient toward the coastal ponds (see Section 3.5). Conversely, pumping of potential wells in the vicinity of the ponds for brackish irrigation purposes could reduce flows to the ponds and increase their salinity. Any such increases in pond salinity would be offset by increased surface runoff and the high degree of mixing that characterizes the pond complex. Anchialine pond biota are euryhaline (salinity tolerant) and would not be adversely affected by a change in salinity.

In comparison with other disposal methods (i.e. ocean discharge, disposal wells, leaching fields, sewage ponds), proposed landscape irrigation with treated effluent wastewater probably minimizes risk of adverse effects on the groundwater of the region. Nutrient levels in natural, unmodified anchialine ponds are high in comparison to ocean waters. Although nutrient input into groundwaters by golf course irrigation with treated wastewater effluent has been found to increase concentrations of nitrates, phosphates, and ammonium in nearby anchialine ponds, there was no apparent change demonstrated in phytoplankton activity or water turbidity over baseline levels. Rapid flushing is believed to prevent a buildup of phytoplankton populations that would otherwise reduce water clarity (Oceanic Institute, 1984). Negative impacts have not been demonstrated in anchialine ponds makai of the Mauna Lani Resort golf course and condominium development (Brock, 1985).

3.5 COASTAL AND MARINE ENVIRONMENTS

3.5.1 Existing Conditions

The marine environment at Kukio extends along 3400 lineal feet of shoreline and encompasses a large bay with a long, white sand beach and a rocky point which includes a small cove and white sand beach. The near shore waters are similar in clarity, chemistry, and marine life to other areas along the South Kohala-North Kona coast. The waters support a moderately high number of fish species and relatively lower number of corals and algae (see Appendix C - Coastal Baseline Survey). The abundance of large specimens of several species of reef fish suggests that Kukio Bay is not subject to heavy fishing pressure.

Based on a series of transects along the coast within a depth of 15 feet, it appears that marine life is predominantly located along the northern and southern boundary of the property. Offshore waters in the center of the property have a predominantly sandy bottom with few areas of living reef. Transects taken in November 1984 identified sixty-two species of fish, none of which were considered particularly unusual or unique to the coastline. Visibility is good underwater but only a moderate amount of topographic and species diversity exists. Within the first 20 to 30 feet offshore and along a portion of the shoreline

there is a calcified limestone shelf that rises near the surface at low tide. This shelf is rugged and irregular and may serve as an impediment to future shoreline and nearshore recreational activities.

The coastline at the site is composed of rocky points where young lava flows project offshore and small bays occur between these points. Along the coast, beaches of coralline sand have formed at Kukio and Kakapa Bays. The beach dune at Kukio is less than 10 feet high and about 100 to 150 feet wide, narrowing toward the south. Sand movement is expected to be mainly onshore-offshore, because Kikaua and Kumukehu Points serve as probable barriers to longshore sand movement.

An approximately three-acre anchialine pond complex occurs in a coastal depression immediately mauka of the Kukio Bay sand dune. An extensive stand of palms, kiawe trees and grassy vegetation have developed between the ponds and the dune crest, contributing to the stabilization of the dune. Some small advance of the dune inland is evident, possibly as a result of onshore winds, infrequent high storm waves, and/or periodic overtopping of the dune by storm waves.

3.5.2 Impacts

Possible impacts to the marine environment from resort development include the following:

1. Shoreline modifications and shoreline use;
2. Increased sedimentation;
3. Changes to the chemical profile;
4. Changed surface runoff patterns.

Though shoreline modifications cannot be entirely predicted at this stage, none of these potential effects are anticipated to be significant, based on preliminary plans.

The proposed development will be designed to maximize its exposure to the coastline and to utilize the beach area as a major site amenity. The coastal waters of Kukio offer moderate to good recreational opportunities (i.e. skin-diving, etc.), although the rugged inshore shelf may serve as an impediment to extensive beach use. To facilitate access and beach use, shoreline modifications may include the clearing of loose rocks or beach cobbles and the alteration or removal of the nearshore limestone formation which parallels the beach. This irregular inshore reef, densely populated with burrowing sea urchins, poses a hazard for water recreationists. Some clearing of the coastal dune can be anticipated for public access use and view opportunities. Public use of the shoreline may result in impacts to coastal strand vegetation mauka of the dune crest.

Public access to, and use of, the shoreline for fishing and other recreational uses will be increased through the development of the resort. Increased public usage may impact the marine resources by reducing the amount and variety of reef fish.

A potential exists for sedimentation of coastal waters from wind blown dust or runoff during construction phases. This potential is very limited due to the prevalence of lava and lack of soil cover. No significant windblown dust deposition is expected as a result of earthwork or rock crushing activities.

Changes in storm runoff patterns do not represent a significant adverse effect.

Species of concern along the Kona Coast region include the endangered humpback whale (Megaptera novaeangliae) and the threatened green turtle (Chelonia mydas).

The Hawaiian population of humpback whales is the largest of the three Pacific populations, numbering approximately 1200. The whales usually first appear in Hawaiian waters in November, peak in abundance in mid-February, and are scarce by mid-May. Areas of primary importance are Penguin Bank and the waters between Maui, Molokai, Lanai and Kahoolawe (Shallenberger, 1979). Areas of secondary importance include Kaula, Niihau, the south Kauai coast and the northwest coast of Hawaii. The humpback whale management plan (USCD, 1983) adds the north and east coasts of Oahu and the bank extending off Ka Lae (South Point), Hawaii.

The threatened green turtle is the only turtle species which lives and breeds in Hawaii. The hawksbill and leatherback turtles also occur in Hawaiian waters and are designated endangered. The Pacific ridley turtle is also occasionally sighted in these waters (Balazs, 1980). More than 90 percent of all breeding by Hawaiian green turtles occurs at French Frigate Shoals, and most other nesting sites are in the Northwestern Hawaiian islands. The nearest important resident area of green turtles to the Kukio Bay region is at the northwestern tip of Hawaii. Another important area is found along the southeast coast of Hawaii at Ka'u.

Increased human use of the Kukio Bay area is, therefore, not expected to produce any direct effects on either the humpback whale or the green sea turtle.

3.5.3 Mitigation Measures

Public access to the shoreline will be provided through a specified public right-of-way, to be determined in conjunction with detailed plans for the hotel sites and adjacent land owners.

Conservation measures may need to be implemented within the near-shore reef areas to minimize the impact of increased public use of Kukio Bay.

Shoreline modifications including extensive vegetative removal, coastal dune alterations and structural improvements should be minimized.

Effects of wastewater percolation and possible migration to coastal waters should be addressed pursuant to the formulation of detailed landscape irrigation and wastewater treatment/disposal plans.

Natural lava tubes or subsurface cavities may offer potential as collectors of runoff waters, hence, may represent practical alternatives to manmade storm collection culverts. The use of such structures would minimize perturbations to nearshore water quality during periods of heavy stormwater runoff by allowing for natural filtration of such waters.

The effects of withdrawal of groundwaters and/or injection or surface disposal of treated wastewaters or rainwater runoff would be compatible with nearshore water quality inasmuch as the existing habitats are characterized by natural subterranean brackish water discharges. Flora and fauna associated with these habitats are euryhaline and would not be adversely affected by short-term alterations in water salinity.

Nearshore water currents and diurnal tidal flushing will prevent any significant deterioration of nearshore water quality resulting from the use of treated wastewaters for irrigation purposes.

3.6 ANCHIALINE PONDS

3.6.1 Existing Conditions

Located approximately in the middle of the Kukio coastline is a complex of brackish water sea level ponds encompassing approximately three acres. These ponds are referred to as anchialine, derived from the Greek "anchialos" meaning near the sea. More specifically, anchialine refers to shoreline pools without surface connection to the sea, having a measurable salinity and showing tidal rhythms.

Anchialine ponds are known to occur in highly porous substrates such as lavas and fossil reefs. They have a disjunct world-wide distribution and have been recorded in Egypt, Fiji and Hawaii. In Hawaii, these ponds exist on the islands of Maui, Oahu and Hawaii. In West Hawaii, major groups of anchialine ponds occur at 'Anaeho'omalu/Waiulua Bay (Waikaloa Beach Resort), Makalawena/'Opae'ula Pond, Kaloko Pond/Kohanaiki, and Honokohau/Aimakapa Pond. In addition, many individual ponds or

small pond groups and fissures occur along the coast from the South Kohala District to South Point in the Ka'u District. Several areas in East Hawaii are known to contain anchialine ponds, and the potential for finding more anchialine systems is considered high (Brock, 1985).

The Kukio pond complex encompasses approximately three acres in a roughly circular arrangement. The ponds are irregular in shape and range in size from less than one square meter to approximately 50 square meters. Tidal influences result in many of the mauka ponds "disappearing" during low tide periods. Salinity is consistent throughout at 4000 to 5000 ppm of chloride. Portions of the pond complex appear to have been improved over the years, resulting in several low separating walls or walkways that may have been utilized prehistorically. There are also several areas that appear to have been intentionally deepened by removing rocks from the bottom of a pond and stacking them in random configurations nearby. Some of this pond clearing is known to have taken place in recent years.

Along the seaward edge of the Kukio ponds is a grove of coconut trees and various emergent plants associated with shallow, organically rich, brackish wetlands. Aquatic vegetation flourishes in the seaward ponds while the inland ponds are essentially barren. Due to natural succession, organic material has built up along the seaward edges of the pond complex and supports a number of marsh plants and salt tolerant plant species.

Emergent vegetation and organic bottom sediment mats diminish in abundance moving makai to mauka through the pond complex and eventually disappear altogether, leaving small pockets of exceptionally clear water in the midst of aa lava. The transition from barren ponds to vegetated wetlands is characteristic of the natural aging process of succession displayed at several stages in the Kukio ponds.

Anchialine ponds are relatively temporary features on a geologic time scale, and are rare or absent on old or ancient lava flows. Ponds undergo a natural process of aging that is directly related to variable rates of sedimentation. Plant growth and calcifying algae may be principal agents in pond sedimentation. As organic material and sediment accumulation increase, the interstitial voids in the geologic foundation are filled becoming less porous, thereby retarding water exchange or flushing. Emergent plants take root in the accumulating material, increasing the rate of sedimentation, and resulting in the development of a coastal marsh environment, that may become a dry land environment. Brock (1985) hypothesized that senescence could occur within as short a time as 100 years based on field observations.

Another factor that may increase the rate of pond aging is the degree of flushing (Brock, 1985). Field observations on closely associated anchialine ponds frequently showed one to have a con-

siderable deposit of sedimentary carbonate material while others nearby are devoid of sediment. Brock hypothesized that the degree of flushing could be responsible for the differences in sedimentation rates, i.e., the rapid flushing may lower the rate of sediment accumulation. Vegetation may accelerate aging by trapping sediment and introducing leaf litter.

Animal life in the Kukio ponds consists of several species of crustacea, including a small red shrimp or opaeula (Halocaridina rubra), a larger soft shelled shrimp (Palaemon debilis), several species of small snails, prawns (Macrobrachium grandimanus and Macrobrachium lar), dragonfly nymphs, and a school of introduced mullet. A number of water birds frequent the pond including the 'ulili, golden plover, Hawaiian stilt, Hawaiian duck, and several species of migratory waterfowl.

Brock (1985) grouped anchialine pond organisms into two classes: epigeal (those organisms preferring sunlit ponds) and hypogeal (those organisms preferring the subterranean water table). The epigeal organisms include organisms typically found in Hawaiian estuaries and nearshore waters. Major epigeal anchialine pond organisms include the Schizothrix/Lyngbya algal mat, 'opae huna, and hapawai. One phenomenon of organisms recorded by Maciolek and Brock (1974) was the appearance of ecotypes or morphological variants within species apparently caused by environmental conditions in the ponds.

The hypogeal organisms in Hawaiian anchialine ponds consist principally of shrimp species. Little is known about the life requirements of any hypogeal shrimp due to their habits. These shrimp display tidal linked migration, emerging from the rock interstices in the groundwater table with the incoming tide to feed in the pond, and later returning via the interstices to the subterranean labyrinth with the falling tide.

Because of the high ground porosity which characterizes pahoehoe flows, the anchialine ponds could be viewed as small surface expressions of the basal groundwater table, especially when the area lies within one hydrologic regime. The porosity creates a vast labyrinth that interconnects the ponds. Since the hypogeal organisms can spend considerable amounts of time underground and appear to migrate underground, any high porous area could contain a vast underground habitat of hypogeal organisms.

The U.S. Fish and Wildlife Service recently classified several anchialine pond organisms as Category 2 for purposes of the Endangered Species Act. These include three shrimp (Metabetaeus lohena, Procaris hawaiana and Palaemonella burnsi); a hydroid (Ostromouvia horii), and a snail (Neritilia sp.). Category 2 reflects that the organisms probably should be listed as endangered or threatened, but insufficient data prevents an assessment of their status for listing on the Federal List of Threatened and Endangered Species. Thus, the organisms are still

considered rare, but are not listed on the aforementioned list and are not proposed as candidates for listing. Of the species listed under Category 2, only the red alpheid shrimp Metabetaeus lohena was observed in the Kukio Bay anchialine pond complex (Corps of Engineers, 1985).

Anchialine pond flora and fauna are adapted to a wide range of salinities and temperatures, to withstand long periods of desiccation, and to subsist on limited and restricted food supplies. Some pond organisms can escape high water temperatures and desiccation by retreating into wet, dark crevices and spaces in the ponds or by moving into subterranean passages or ponds which retain water during low tide. Based on field observations, 'opae'ula, (Metabetaeus lohena) have been found in salinities ranging from 2-36 parts per thousand. All anchialine shrimp have been found in water temperatures ranging from 76-89 degrees F. High lava permeability, i.e., voids, clinker, allows the frequent exchange of pond water with tidal fluctuations. During low tide the ponds can become fresh, then highly stratified during high tide. Given, Hawaii's semi-diurnal tidal cycles, anchialine ponds can experience two total changes of tidal volume (and corresponding salinity changes) within a 24-hour period.

Water salinity in West Hawaii anchialine ponds average 7 parts per thousand (ppt); in comparison, ocean water has a salinity of about 35 ppt. None of the West Hawaii pond waters meet the potable water standards of 0.5 ppt, and only a few ponds have salinities below the generally acceptable maximum for irrigation water of about 1.9 ppt (Maciolek and Brock, 1974). Anchialine ponds at Kukio Bay average approximately 4.1 ppt (Appendix C).

Maciolek and Brock (1974) measured water temperatures in West Hawaii ponds ranging from a low of 66 degrees F. to a high of 95 degrees F. Solar heating, shallow pond depth and a low rate of water exchange are believed to account for the relatively high water temperatures recorded in some ponds. Ponds at Kukio ranged between 24.0 and 28.1 degrees Centigrade.

Maciolek and Brock's 1974 Aquatic Survey of the Kona Coast Ponds constitutes a preliminary environmental inventory of nearshore ponds and a rough assessment of their comparative ecological value. This 1974 study did not identify Kukio's pond complex as being particularly significant.

The Kukio Beach anchialine pond complex is evaluated in a December, 1984 Coastal Baseline Survey (included as Appendix C).

Other published studies of anchialine ponds, including Holthuis (1973) and Wong (1975), provide some comparative understanding of similar pond complexes both in Hawaii and elsewhere. These descriptive works and other unpublished consultant reports can serve as a basis for future management efforts of the anchialine ponds at Kukio.

3.6.2 Impacts

The ponds at Kukio represent both an environmental resource and a significant site feature. They are also particularly well located to be integrated into the overall site planning process as an attractive and distinctive natural site feature. While no pond filling or alteration is proposed, initial discussions with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service indicate that an environmentally sound pond consolidation and management program could actually improve the ecological value of the resource.

Potentially significant impacts to the ponds could result from a variety of sources, including the following:

1. Removal of existing man-made rock separations and vegetative strips between ponds, which restrict movement of introduced species;
2. Altered water drainage, mixing and percolation rates, through compaction of immediately surrounding substrata by heavy earthmoving equipment;
3. Increased opportunity for introduction of organic materials (i.e. vegetation, leaf droppings, etc.) from surrounding vegetation, resulting in accelerated succession processes or pond aging;
4. Clearing or grubbing of the coastal strand vegetation resulting in wind blown sand deposition in the pond complex.
5. Introduction of exotic species and species not typically associated with anchialine ponds.
6. Increased threat of pond contamination resulting from leaking sewer lines, fertilization, petrochemical spills, herbicides, pesticides and other urban pollutants.

Effects not considered significant but having the potential to change the baseline character of the ponds include:

1. Water quality disturbances from upland development activities;
2. Possible addition of freshwater to the ponds from upland irrigation and;
3. Deposition of treated wastewater or runoff from fertilized areas.

The addition of nutrients from irrigation or fertilization of the golf course and landscape plantings has the potential to affect nearshore water quality, either from site runoff (if uncontrolled) or via groundwater introductions. This effect is dampened by rapid dilution and water exchange processes. Although nutrient loading of nearshore waters may result in favorable stimulation of the marine food chain, it would not be compatible with recreational uses.

Nutrient levels in natural, unmodified anchialine ponds are high in comparison to the ocean. Nutrient input into the groundwater by golf course irrigation around anchialine ponds was found to increase nutrient concentrations in the ponds (Oceanic Institute, 1977). A comparison of pre- and post-golf course development nutrient levels in certain ponds recorded elevated levels of nitrates (98% increase), phosphates (55% increase) and ammonium (134% increase) over pre-development conditions. The elevated nutrient levels were related to golf course fertilization and irrigation with sewage effluent. Despite the elevated nutrient concentrations, there was no apparent change in phytoplankton activity or increase in water turbidity. Rapid flushing (twice-daily water exchange and groundwater outflow) is believed to prevent a buildup of phytoplankton concentrations that would otherwise reduce pond water clarity (Oceanic Institute, 1984). Negative impacts are not presently observable in anchialine ponds surrounded by the Mauna Lani Resort golf course and condominium development (Brock, 1985).

Studies conducted at Kukio pond complex (Appendix C) as well as additional studies recently completed at the proposed Waikoloa Beach Resort and South Kohala District, suggest that anchialine ponds are regularly flushed by tidal fluctuations and the continuous downslope movement of groundwaters. This flushing results in a residence time that would be insufficient for any significant impact to occur. It has also been noted that anchialine species are euryhaline and are able to thrive within a broad range of ambient salinities.

3.6.3 Mitigation Measures

An anchialine pond management program will be developed with the objectives of preserving existing pond features and providing interpretive opportunities for the public (detailed recommendations included in Appendix C).

Natural lava tubes or subsurface cavities may offer potential as collectors of runoff waters, hence, may represent practical alternatives to manmade storm collection culverts. The use of such structures would minimize perturbations to nearshore water quality during periods of heavy stormwater runoff by allowing for natural filtration of such waters. Care would be exercised to insure that any such natural subsurface discharge channels would not degrade anchialine pond water quality.

The effects of withdrawal of groundwaters and/or injection or surface disposal of treated wastewaters or rainwater runoff would be compatible with anchialine pond water quality inasmuch as this habitat is characterized by natural subterranean brackish water discharges. Flora and fauna associated with this habitat are euryhaline and would not be adversely affected by short-term alterations in water salinity.

Diurnal tidal flushing and natural mixing of groundwaters and ocean waters would prevent any significant degradation of anchialine pond water quality.

3.7 FLORA AND FAUNA

3.7.1 Existing Conditions

A botanical reconnaissance survey of Kukio was carried out in October, 1984 (included as Appendix A). The results indicate that there are no rare or endangered species on-site and that the area is predominantly covered with introduced exotics, such as fountain grass and kiawe. Native vegetation is concentrated around the coastal strand including pohuehue vine, loulu, naupaka, and noni (Figure 3 - 2).

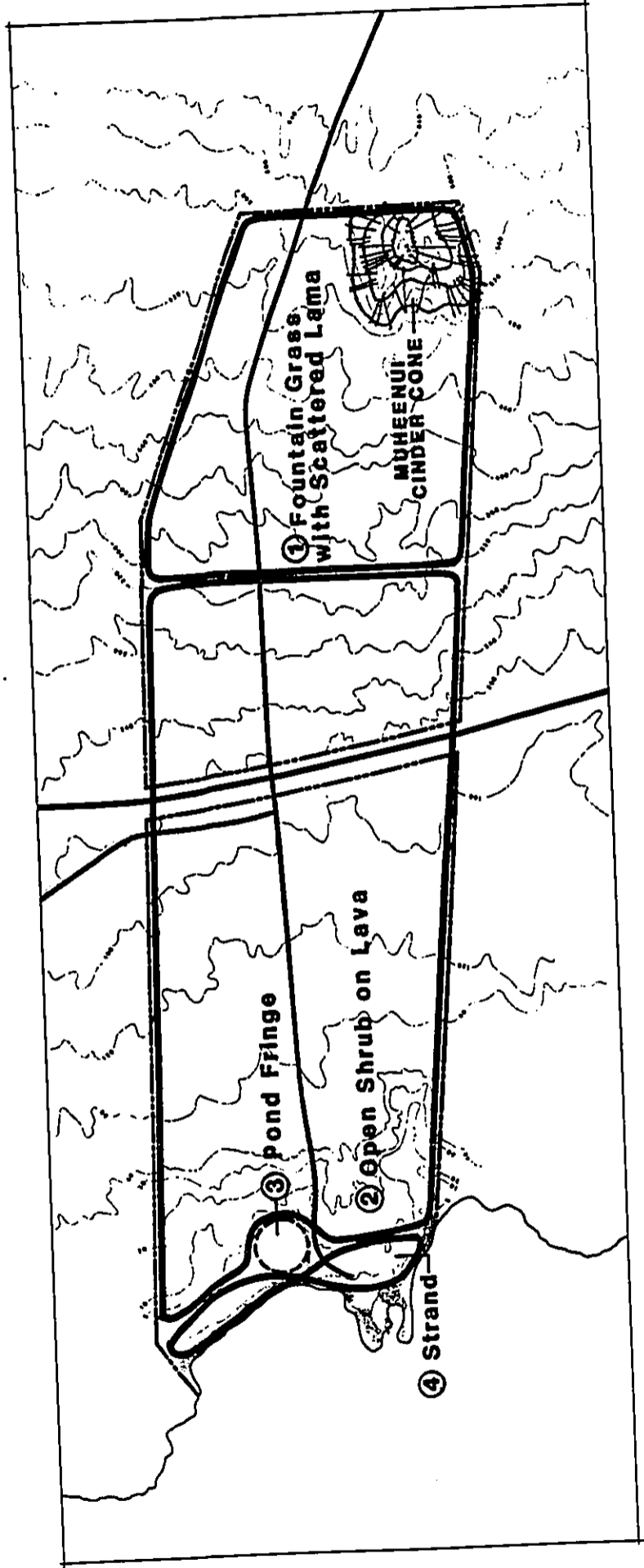
Flora: The project area can be divided into four vegetative zones, each with differing plant composition:

1. Fountain Grass with Scattered Lama

The upland area in the vicinity of Muheenui is about 85 percent covered with fountain grass (Pennisetum setaceum). Native lama trees (Diospyros ferrea ssp) ranging in size from 8 to 12 feet in height are scattered infrequently throughout the area, becoming more frequent mauka of the subject project area. Other dryland species in the area include pua kala (Argemone glauca), a'ali'i (Dodonaea sandwicensis), pili grass (Heteropogon contortus), 'ilima (Sida fallax), haole koa (Leucaena leucocephala), and indigo (Indigofera suffruticosa).

2. Open Scrub on Lava

Below the upland area, vegetation thins out to cover only 5 to 10 percent of the landscape. Vegetation appears in pockets of primarily introduced species such as fountain grass, indigo and natal redtop (Rhynchelytrum repens). Native species such as nehe (Lipochaeta lamarum) and 'ihi (Portulaca cyanosperma) are also present. Vegetation in this zone becomes somewhat denser along the roadside where runoff accumulates and soil moisture is increased.



VEGETATIVE ZONES
KUKIO BEACH RESORT

NORTH KONA, HAWAII
 TMS 7-2-0-038 and 18

19 ACRES	1.0
0.200 ACRES	2.5
0.000 ACRES	1.0



PREPARED FOR: INTERIM BEACH

FIGURE 3-2

3. Pond Fringe

On the seaward fringe of the anchialine ponds near the coast, a variety of plant species can be found. 'Uki or native sawgrass (Cladium leptostachyum), water hysop (Bacopa monniera), hala (Pandanus odoratissimus), milo (Thespesia populnea) and lo'ulu palm (Pritchardia affinis) are all present and a dense cluster of coconut trees lies just makai of the ponds. Plant life is denser in this area than anywhere else on-site due to the presence of brackish groundwater and the initial stages of soil development related to the accumulation of organic material.

4. Strand

The strand or coastal vegetation is subject to salt spray and wind exposure. The predominant plant in this zone is kiawe (Prosopis pullida), 6 to 15 feet tall, which makes a dense 400 feet wide thicket some 100 feet inland from the coastline. Other coastal plants include naupaka (Scaevola taccada), pohuehue vine (Ipomoea brasiliensis), 'akulikuli (Sesuvium portulacastrum) and kauna'oa (Cuscuta sandwichiana).

A complete plant list is included in Appendix A.

Fauna: Animal life at Kukio includes a variety of feral rodents and exotic dryland birds. The avifauna of the Kukio area includes the endangered Hawaiian stilt or ae'o (Himantopus himantopus knudseni) and a single specimen of the Hawaiian duck (Anas wyvilliana). The endemic Hawaiian owl or pueo (Asio flammeus sandwichensis) is known to range throughout most of the Kona area. This diurnal owl is known to range from sea level to at least 8,000 feet elevation and may occasionally feed in the project environs. This species has been classified as endangered by the Department of Land and Natural Resources, but is not presently a federally-designated endangered species (Berger, 1972).

There are a number of indigenous migratory species which frequent the Kona coast any number of which may seasonally be found in the Kukio Bay area. The most common of these wading birds are the golden plover or kolea (Pluvialis dominica fulva), the wandering tattler or 'ulili (Heteroscelus incanus), and the ruddy turnstone or 'akekeke (Arenaria interpres).

Several species of waterfowl frequent the anchialine ponds including the Hawaiian stilt, the Hawaiian duck, and a range of migratory waterfowl. From a regional perspective, Kukio's ponds appear to serve a peripheral role to the larger wetland bird habitats of Opaepa at Makalawena and Aimakapa at Honokahau. As a satellite pond, Kukio's regional ecological role as a waterfowl habitat is less critical than other areas on the West Hawaii coast.

Several species of introduced land birds are also associated with the Kona region. These include the Indian gray francolin, the barred dove, the common mynah, the Japanese white-eye, the house finch, the house sparrow, the cardinal and the Brazilian cardinal (HTDC, 1985). The francolin and the barred dove are very common at the proposed project site.

Several wild donkeys have also been seen near the coastline but their numbers have diminished substantially since the opening of the Queen Kaahumanu Highway.

Other fauna found within the pond complex include a worm (polychaeta worm), fish (mullet), several varieties of crustaceans, including red atyid shrimp, and at least two insect species. Other species characteristic of anchialine ponds may also occur within the pond complex which, as a result of their cryptic (hypogeal) habits, were not observed during the field surveys.

3.7.2 Impact

Flora: Development of areas with fountain grass and open lava fields will have minimal impact on the total island populations of species present. Most of the plants are weedy introduced species, and the few native species present are found throughout the general area. Native plants found around the ponds and along the coastal strand are not threatened or endangered.

Impacts to vegetation of the coastal strand may result from clearing to promote public access and use of the beach.

Fauna: The proposed project will increase the habitat available for introduced species, including the francolin and barred dove, both of which are locally popular game birds. Inasmuch as hunting is not compatible with the proposed resort development, populations of the francolin and barred dove are likely to increase.

Development around the periphery of the ponds, while not directly destroying waterfowl habitat, could increase ambient noise and human activity levels in the surrounding area. This may deter some bird species from frequenting the site.

3.7.3 Effects Which Cannot Be Avoided

Limited habitat and wildlife resources will be removed or displaced from development areas.

3.7.4 Mitigation Measures

Loss of sparse, xeric vegetation would be offset by a major landscaping program utilizing indigenous and introduced species compatible with North Kona's climate and soil. The landscaping program would provide a new and more diverse habitat and niches for a variety of native and introduced birds and mammals.

Whenever possible native plants such as lo'ulu palms, lama trees, and 'ilima and nehe shrubs should be employed in the landscaping. These plants are adapted to the environmental conditions of the study area and would require less maintenance, less water, and less soil than the more commonly used introduced landscape plants.

Water features and open space associated with the golf course and other open areas would provide additional habitats for certain waterfowl and shorebirds. A well conceived anchialine pond maintenance program will protect fauna associated with this system.

3.8 ARCHAEOLOGICAL/HISTORICAL RESOURCES

3.8.1 Existing Conditions

Archaeological Sites: There have been several previous archaeological reconnaissance surveys carried out on the property at Kukio. Two of the more recent surveys (Bishop Museum, Renger, 1971 and Rosendahl, 1985) identify historic sites concentrated in the coastal area within 1,000 feet of the coastline.

The full reconnaissance survey of the Kukio Resort development project area completed by Rosendahl, October 1985 (see Appendix B), confirmed the presence of numerous archaeological sites and features of both prehistoric and historic-period occupation and exploitation. The range of functional feature types identified include both temporary and probably permanent habitation features (walled, cave, and overhand shelters, and raised stone platforms), burial caves, foot trails, aquaculture sites, recreational (petroglyphs) sites, a possible ceremonial (heiau) complex, boundary walls, and sites of undetermined function. The overall physical condition and integrity of the archaeological remains vary from poor to good, with several of the larger structural features being in quite good condition.

Most of the sites and features are concentrated near the shoreline, in the immediate coastal zone, and especially in the southern part of the zone. The inland portions of the project area have a distinct paucity of sites and features, the principal types being coastal inland extending foot trails and associated temporary habitation features. This distribution of sites conforms to the general pattern of aboriginal Hawaiian settlement that has been reconstructed on the basis of archaeological, ethnohistoric, and ethnographic sources for the portion of North Kona to the north of Kailua (Rosendahl 1973:60-61). This local environmental setting is characterized by three major zones: a narrow, arid coastal habitation zone associated principally with the exploitation of various marine resources (immediate coastal area of parcel 15); a sloping, barren middle zone characterized by exposed aa and pahoehoe lava rocklands, and largely devoid of soil or vegetation other than grasses (inland portion of Parcel 5 and parcel 16); and an upland habitation zone associated with

agricultural exploitation. Sites in Parcel 16 may also represent the seaward limits of this upland habitation zone. A forest zone, still further inland, was also exploited but not inhabited. The sites and features identified within the Kukio Resort development project area evidence the occupation of the narrow coastal zone, and the movement of people and produce along the foot trails through the barren intermediate zone that connected the coastal and inland areas of habitation and exploitation.

A coastal trail, only visible north and south of Kukio 1st in the Lands of Kaupulehu and Kukio 2nd respectively, also demonstrates movement of people and produce along the coast. The preliminary historical research (Appendix B) adds further documentation to both coastal and inland oriented movement during the historic period. Furthermore, the preliminary historical research and local informant interviews provided insightful data relevant to specific archaeological sites, land history, cartographic sources, mythological legends, environment, and culture history, lifeways and values. Hydration rind measurements of volcanic glass samples reported by Cordy (1981) indicated a date range of AD 1692-1899 for Sites D21-2 and D21-12. It is reasonable to conclude that other sites in Kukio 1st would yield similar dates.

The significance of archaeological remains can be defined in terms of potential scientific research, interpretive, and/or cultural values as defined in Appendix B.

Based on the findings of the full reconnaissance survey, the archaeological remains found within Kukio appear to be, for the most part, of limited to moderate significance in terms of potential scientific research, interpretive, and cultural values. Specific exceptions to this general evaluation are 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 housesite 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 descendents (pers. comm., H. Springer);
- D21-24 Pond complex--potentially high interpretive value, especially in association with adjacent D21-12 complex; significance of pond internal structural modifications to be determined;

T-124 Burial cave--high cultural value, due to presence in cave shelter of 10 or more human burials and cultural remains; and

Various Foot Trails (D21-7, -23; T-133, -134, -141; 1193, 1197, 1200)--potentially high interpretive value, as well as cultural value.

With the exception of the specific sites and features listed above, most of the sites identified during the full reconnaissance survey appear to be sites for which continued physical preservation would not be considered essential.

The archaeological site location map (Figure 3 of Appendix B) has not been presented within this document so as to protect identified sites from further disturbance. The complete report has been provided to the Hawaii County Planning Department and the Department of Land and Natural Resources' Historic Preservation Program. For general reference, the significant sites have been identified on Figure 3-1.

3.8.2 Impact

Resort development has the potential to disturb or destroy significant archaeological/historical period sites identified in the archaeological reconnaissance survey.

Of particular concern are five site localities (D21-4, D21-18, D21-12, D12-24, and T-124) and several foot trails (D21-7, -23; T-133, -134, -141; 1193, 1197, 1200) with potentially high research, cultural or interpretive values.

Site D21-24 (pond complex) and nearby site D21-12 (possible heiau complex) will be directly incorporated and preserved within the resort design. Opportunities may exist to preserve remaining sites with high significance potential and other sites of lesser significance within landscaped open space areas.

Minor alterations to the anchialine pond complex (Site D21-24) may be required as a component of the pond management plan to be prepared in conjunction with the U.S. Fish and Wildlife Service. The removal of man-made rock separations and vegetation strips between ponds may be required to implement the management plan.

Indirect disturbances to preserved sites could occur from uncontrolled human activity.

3.8.3 Effects Which Cannot Be Avoided

Sites with moderate or low research, interpretative or cultural values may be disrupted or destroyed with site development.

3.8.4 Mitigation Measures

Most of the archaeological remains present within the project area could be handled adequately by carrying out the appropriate level of further archaeological work needed to recover the significant data present, such as intensive survey--thereby preserving the valuable archaeological information, rather than the physical remains themselves. At the same time, many of the identified archaeological remains, while having only limited significance in terms of potential research, interpretive, or cultural value, could be considered for preservation and inclusion into the landscaping of the development project area.

Individual site evaluations and recommendations for appropriate further action (specific field work tasks) have been included in Tables 1, 2, and 3 of Appendix B. Further appropriate archaeological work can be undertaken as specific SMA permit conditions. Based on the findings of the full reconnaissance survey, 19 sites (29 component features)--Sites T-101, -110, -116, -117, -120, -121, -123, -125 thru -127, -131, -135 to -137, -140; D21-8, -19, -20; and 1240--are believed to require no further work. For the remaining 50 identified sites and one unidentified site (Site 1189), further archaeological work in the form of intensive survey (including historical documentary research, vegetation clearing, detailed mapping and recording, and controlled test excavations) is recommended. The following specific field tasks were determined to constitute an adequate scope of work for the intensive survey:

- a. Accurate locational plotting of sites on an appropriate scale topographic map of the project area;
- b. Intensive level survey recording of sites--including detailed plan mapping, written descriptions, and photographs;
- c. Surface collection of portable remains (midden and artifacts) from sites;
- d. Subsurface testing of sites with apparent excavation potential; and
- e. Subsurface testing of beach deposits between the north end of Kukio Bay and the north end of Kakapa Bay to determine the presence or absence of buried cultural deposits.

To aid in detailed development planning, it is recommended that all sites be accurately located and plotted by professional surveyors, with the aid of an archaeologist, on an appropriate scale topographic map of the project area. This will aid development planning by allowing further archaeological work determinations (intensive survey and/or preservation) to be considered on a site-by-site basis.

The trails as noted on Figure 3-1 and identified within the archaeological reconnaissance survey will be impacted by site improvements. Where practical, the remains of the trail segments will be preserved and incorporated within open space or landscaped areas of individual development parcels or the golf course. To accommodate customary patterns of public access where it is determined that there once was access permitted, future roadways and/or path systems will provide pedestrian connections to those path systems that connect to offsite destinations.

A cultural resources management program for significant sites will be formulated with the assistance of the Department of Land and Natural Resources' Historic Preservation Program and the Hawaii County Planning Department. This program will include specific recommendations for site preservation, data recovery or test level investigations as necessary.

3.9 TRANSPORTATION/CIRCULATION

3.9.1 Existing Conditions

Roadways and Access: The principal roadway is the Queen Kaahumanu Highway, which bisects the Kukio site. The road is a two-lane, limited access, high speed state highway with a two-way capacity of approximately 2,000 vehicles per hour. The road is designed with a 24 foot pavement width within a 300 foot right-of-way.

An existing, secured private ranch road runs mauka-makai through the entire site, intersecting the highway at permitted access points, and linking uplands of the Huehue Ranch with the site. Access to the Kona Village Resort to the north is currently provided from makai portions of the ranch road within Kukio.

No designated public access from the highway to the shoreline currently exists through the Kukio lands (see Section 4.8).

Roadway Policies: The Kona Regional Plan (1982) defines General Plan goals, policies and standards for roadways in the region. The plan also provides an overview of traffic conditions, volumes and a roadway plan, focusing primarily on Kailua-Kona and coastal areas to the south. No traffic counts or forecasts along Queen Kaahumanu Highway north of Keahole Airport are provided. The plan forecasts increasing area-wide traffic growth and a need for improvements to the regional highway system. However, no new roadways or improvements to existing roadways are planned north of Keahole Airport.

The plan includes the following roadway policies which may be applicable to the proposed Kukio Beach Resort development:

- o "The further development of the area north of Kailua will require additional roads to serve these developments. The roadways should be laid out to interconnect the respective developments providing access within the area without utilizing the Queen Kaahumanu Highway or Palani Road for internal circulation. The moderate slopes and large land holdings in this area are suitable for a network that runs both mauka-makai and north-south; thus movement within this area can be facilitated. Sections of the major north/south roadway should be installed concurrent with any development in this area, while the mauka-makai roads should be installed with the initial development of the affected properties."
- o "Improve secondary roads as necessitated by localized growth."
- o "Provide improvements for walking, jogging, and bicycling particularly in the densely developed areas."

Additional recent information on highway conditions and future traffic is provided in the Mauna Lani Resort Revised Master Plan EIS (Draft, May 1985). Based on data provided in this document, historic traffic volumes along the highway at points north and south of Kukio are identified in Table 3-1.

TABLE 3-1

Historical 24-Hour Traffic Volumes
on Queen Kaahumanu Highway: 1976 through 1984.

Location	1976		1978		1980		1982		1984	
	Volume	Volume	Percent Change	Volume	Percent Change	Volume	Percent Change	Volume	Percent Change	
South of Waikoloa Road (North of Kukio 1)										
Northbound	607	850	40.0%	645	-24.1%	1,346	108.7%	1,707	26.8%	
Southbound	575	842	46.4%	785	-6.8%	1,489	89.7%	1,893	27.1%	
Total	1,182	1,692	43.1%	1,430	-15.5%	2,835	98.3%	3,600	27.0%	
North of Keahole Airport Road (South of Kukio 1)										
Northbound	858	1,127	31.4%	775	-31.2%	1,478	90.7%	1,966	33.0%	
Southbound	851	1,183	39.0%	643	-45.6%	1,520	136.4%	1,945	28.0%	
Total	1,709	2,310	35.2%	1,418	-38.6%	2,998	111.4%	3,911	30.5%	

Source: Mauna Lani Resort Revised Master Plan EIS (Draft), May 1985; based on State of Hawaii Department of Transportation data.

Airports and Harbors: Three airports serve the Kona and Kohala Coast Resort region. Two of these, Keahole and Waimea-Kekaha (Kamuela), are operated by the State Department of Transportation. The third, the recently opened Waikoloa Airport, is operated by Princeville Airways. The Kamuela and Waikoloa airports are used primarily by commuter airlines and private aircraft, although daily prop-jet service is still provided between Kamuela and other islands by Hawaiian Airlines using its Dash-7 aircraft.

Keahole Airport is located 6 miles south of Kukio and is served by all three of the major interisland air carriers, as well as by several of the commuter airlines and air cargo companies. In 1983, Keahole Airport handled over 1.2 million passengers.

Keahole Airport's 6,500-foot long runway is adequate for the largest interisland aircraft. Wide-bodied jet aircraft, such as the DC-10 and L-1011, now make direct flights into it from the West Coast of the United States.

Kawaihae Harbor is a deep-water harbor used primarily by interisland barges. The primary cargo handled is building materials, consumer goods, large equipment and machinery, as well as the provisions and supplies needed for resorts in South Kohala and Kona.

3.9.2 Impact

Access: The entrance to Kukio Beach Resort will remain at the existing location which is now used as the entrance and security post for the Kona Village Resort. Access to the mauka lands will be immediately across the Queen Kaahumanu Highway and coincide with the existing private ranch road that currently runs between Kukio and the Hawaii Belt Highway in the uplands of Hualalai. Both sites are permitted access points by the State Department of Transportation (DOT) and would be constructed in conformance with the "Hawaii Statewide Design Manual for Streets and Highways." The Kona Village Resort access will probably be relocated off-site in conjunction with that resort's expansion plans, however, an opportunity could exist to retain access through makai portions of the Kukio Beach Resort.

Golf cart traffic to link the mauka and makai portions of the Kukio golf course would be accommodated by an underpass extending beneath the Queen Kaahumanu Highway and built in accordance with DOT requirements. Interior roadways would include underground utilities, appropriate street lighting and pedestrian walkways where functional. All interior roads would be built to County standards.

Public access to the shoreline will be accommodated through a specified public right-of-way.

Traffic: Preliminary estimates of project-related trip generation, presented in Table 3-2, are based on historical traffic counts on entrance roads to various South Kohala resorts.

TABLE 3-2

Project Trip Generation

<u>Kukio Resort Use</u>	<u>Max. Units</u>	<u>Vehicle Trips/Day Per Unit</u>	<u>Vehicle Trips (Approx. ADT)</u>
Hotel(s)	1350	5.5/room	7,425
Multifamily	1950	6.0/unit	11,700
Single Family	750	6.0/unit	4,500
Commercial	+75,000 SF	5.0/1000SF	375
Golf Course	18 holes	100/18 holes	100
Total:			24,100

Notes:

1. Trip generation rates derived from Mauna Lani Resort Revised Master Plan EIS (draft-May 1985).
2. Multifamily (resort condominium) use assumed to have peak month occupancy rates of 70%; single family units assume average occupancy of 45%.
3. Rates represent traffic that leaves the property, and do not account for trips completely internal to the site.

The great majority of usage of commercial space and the golf course is assumed to come from guests of the resort already on-site, thereby generating few off-site trips other than employee traffic. The table approximates the impact of the project on Queen Kaahumanu Highway at build-out. As there are no current plans to provide a public roadway link to the Hawaii Belt Highway directly from Kukio, Queen Kaahumanu Highway will absorb all of the off-site traffic movement. No estimates of future turning movements at the highway intersection are available. The Keahole Airport and Kailua-Kona to the south will be principal origins-destinations for Kukio Beach Resort traffic. However, it is anticipated that northerly origins-destinations, such as the South Kohala resorts, Kawaihae and Waimea will also produce a significant proportion of Kukio related vehicle trips.

Cumulative Effects: Open stretches of Queen Kaahumanu Highway can accommodate as many as 1,800 to 2,000 vehicles per hour (two-way totals). Current traffic volumes are relatively low, and the level of service is "A" (best possible) at all times in the project vicinity. Recent traffic analyses performed for other nearby resorts suggest that the highway will operate at a "C" level of service or better until the year 2000. However, it is anticipated that the capacity of the existing two-lane roadway will be exceeded near the turn of the century as a result of continuing regional growth. At that time additional lanes will be needed between Kailua-Kona and Waimea-Kawaihae Road. In all likelihood, the State Department of Transportation would undertake these improvements as part of its facility.

Airports: The Kukio Beach Resort will generate significant additional air passenger traffic through Keahole Airport. In combination with other planned West Hawaii developments, the project will place significant cumulative demands on airport facilities.

It is clear that substantial expansion of terminal facilities will be required, and lengthening of the runway and other changes to ground facilities will be needed. Keahole Airport improvements have been given a high priority by the State Department of Transportation. Sufficient land area and revenues should be available to support needed improvements.

3.9.3 Effects Which Cannot Be Avoided

The project will contribute to the cumulative long-term need for improvements to Queen Kaahumanu Highway.

3.9.4 Mitigation Measures

Pursuant to detailed development plans, a traffic study will be prepared addressing project related traffic generation, traffic assignment and distribution, turning movements, intersection requirements and phasing and financial responsibility of road improvements. All interior roads will be built to County standards.

3.10 AIR QUALITY

3.10.1 Existing Conditions

The West Hawaii region includes no large stationary sources of air pollutants and relatively low levels of vehicular traffic. While there are no continuous air monitoring stations in West Hawaii, air quality is estimated to be good during most of the year. No specific data representative of regional air quality is available.

In all probability, the state's stringent air quality standards for most, if not all pollutant categories, are being met (Table 3-3). Volcanic activity on the island of Hawaii represents an infrequent source of air pollution episodes.

TABLE 3-3
State and Federal
Ambient Air Quality Standards

POLLUTANT	SAMPLING PERIOD	FEDERAL STANDARDS		STATE STANDARDS
		PRIMARY	SECONDARY	
1. Total Suspended Particulate Matter (TSP) (micrograms per cubic meter)	Annual Geometric Mean	75	60	--
	Annual Arithmetic Mean	--	--	55
	Maximum Average in Any 24 Hours	260	150	100
2. Sulfur Dioxide (SO2) (micrograms per cubic meter)	Annual Arithmetic Mean	80	--	20
	Maximum Average in Any 24 Hours	365	--	80
3. Nitrogen Dioxide (NO2) (micrograms per cubic meter)	Annual Arithmetic Mean		100	70
4. Carbon Monoxide (CO) (milligrams per cubic meter)	Maximum Average in Any 8 Hours		10	5
	Maximum Average in Any 1 Hour		40	10
5. Photochemical Oxidants (as O3) (micrograms per cubic meter)	Maximum Average in Any 1 Hour		240	100
6. Lead (Pb) (micrograms per cubic meter)	Maximum Average in Any Calendar Quarter		1.5	1.5

SOURCES: State of Hawaii, Title 11, Chapter 59, Air Quality Standards Title 40, Code of Federal Regulations, Part 50

There are no stationary emission sources in the project vicinity. Existing mobile source emissions include only low-level vehicular traffic along the Kona Village access road, and through traffic along the Queen Kaahumanu Highway.

The Kukio site is generally sheltered by Hualalai from the strong northeasterly tradewinds prevailing elsewhere along coastal areas to the north. The winds at Kukio are usually light and variable, often blowing offshore in the morning and onshore later in the afternoon.

3.10.2 Impact

Short term: Construction activity involving earthmoving and construction vehicle movement on unpaved roads will result in fugitive dust emissions. EPA studies indicate average emissions of 1.2 tons/acre per month of activity under conditions of medium activity and moderate soil silt content. There is little or no existing soil on the project site and the silt content of any imported soils is unknown.

Long term: The potential exists for state emission standards to be exceeded at receptor locations within the proposed project limits as a result of vehicular activity. In particular, future carbon monoxide levels could eventually be exceeded at receptor locations near the intersection of the proposed Kukio Beach Resort entrance road and Queen Kaahumanu Highway. This condition would most likely occur if the highway is not widened to meet regional traffic volumes, and where intersection improvements (i.e. turning lane and possible signalization) are not provided in a timely manner to meet project-related traffic needs.

Traffic generated by the proposed development will result in a significant net increase in emissions of all major automotive pollutants in the project area.

Emissions resulting from fossil fuel combustion needed to meet electrical demands of the project could be significant. The impact is difficult to predict given the long term phasing of the project, and potential variability in electrical generating technologies, facilities and potential fuel sources.

3.10.3 Effects Which Cannot Be Avoided

Short-term air quality impacts will occur, associated with grading and construction phases (i.e., dust, equipment emissions).

Long-term air quality impacts may occur from mobile and stationary emission sources if the appropriate mitigative measures are not implemented in conjunction with the resort development.

3.10.4 Mitigation Measures

Prevailing winds at Kukio will disperse and dilute emissions from internal combustion engines. Dust control measures will be implemented to reduce airborne particulate dissemination resulting from heavy equipment operations and earthmoving activities.

To avoid exceeding state emission standards on the long term, widen Queen Kaahumanu Highway to meet regional traffic volumes and provide intersection improvements to meet project-related traffic needs.

Should blasting be conducted, all necessary precautions will be implemented to minimize the effects on land/marine communities.

3.11 NOISE

3.11.1 Existing Conditions

Existing noise sources on the Kukio site are limited to:

1. Low volume traffic along Queen Kaahumanu Highway.
2. Infrequent vehicular activity along the Kona Village Resort access or private ranch road.
3. Natural sources (wave action, winds).

The site is well removed from the Keahole Airport departure zone to the west.

A number of different noise measurement scales are used to relate traffic noise levels to land use compatibility, and to assess environmental noise in general. Among these are the Equivalent Noise Level (Leq), the Day-Night Average Sound Level (Ldn), and Community Noise Equivalent Level (CNEL). The Leq and Ldn scales are averages of instantaneous A-weighted sound levels, as indicated on a standard sound level meter.

An exterior noise standard for residential uses of 65 Ldn is generally considered acceptable by federal and state agencies.

Table 3-4 includes traffic noise measurements taken along Queen Kaahumanu Highway at the existing private ranch road intersection (Kona Village Resort entrance) during May 1985. The levels shown are not for peak traffic periods.

3.11.2 Impact

Potentially significant traffic noise effects are related to future volumes along Queen Kaahumanu Highway and a proposed Kukio Beach Resort collector road accessing the highway. Preliminary resort plans identify single family and multi-family residential uses near these roadways.

TABLE 3-4

Typical Highway Noise Levels For Selected Time Periods
Hourly Traffic Volume

Location	Time (Hrs.)	Avg. Speed (MPH)	Auto	Med. Truck	Hvy. Truck	Meas. Leq (dB)	Pred. Leq (dB)
o 50 feet from centerline of Q.K.Hwy. at entrance to Kona Village Resort (Kukio ranch road)	1720 to 1742	50	299	0	8	60.9	62.0
o 100 feet from centerline of Q.K.Hwy at entrance to Kona Village Resort (Kukio ranch road)	1748 to 1832	50	262	0	4	52.5	52.6

Source: Y. Ebisu & Associates, May 1985. (Mauna Lani Resort Revised Master Plan Draft, EIS, (May 1985))

Construction related noise, including grading, potential rock crushing or blasting of lava formations represents additional noise sources. The timing, duration and sequence of construction phases is unknown. However, these activities should not have any significant effect on Kona Village Resort (one mile from the site), and will be planned to minimize effects to on-site uses.

3.11.3 Effects Which Cannot Be Avoided

Noise levels will increase on-site and off-site, most notably as a result of increased traffic volumes.

During grading and construction, short-term noise levels will increase on-site.

3.11.4 Mitigation Measures

Adequate roadway setbacks or other noise attenuation measures (berms, walls) will be integrated into the project design, as necessary, to assure that exterior and interior noise levels meet accepted standards for planned residential uses. Estimates of distances from roadway center lines to noise contours under future peak hour conditions will provide a basis for reducing any significant effects.

All internal combustion engines will be required to have mufflers or other noise suppression devices in proper working order.

3.12 WATER SUPPLY

3.12.1 Existing Conditions

There are no developed potable water supply systems in the project area. The nearest existing water lines are part of the County's North Kona system, with a 12 inch line terminating in the vicinity of the Keahole Airport and the mauka Kalaoa subdivisions (Figure 3-3). The island's Water Master Plan (1980) identifies a proposed future water line extension to Makalawena for the north.

Huehue Ranch has developed a well on their mauka lands at elevation 1,575. Pump tested completed in 1985, at 150 gallons per minute for 24 hours with no measurable draw done, demonstrates the reliability of this source. The water is of potable quality with a chloride count of 90 parts per million.

3.12.2 Impact

Short of an extension of the county system north to Kukio, domestic water for the Kukio Beach Resort will be provided by either a system privately developed by Huehue Ranch with a deep well source located at the upper slope of Hualalai at 1,575 foot elevation, or from a comparable well source in the area, or from a desalination plant utilizing a well at a lower elevation. A well has been completed at Huehue Ranch and pump tests have determined the dependability and water quality of the source. A transmission line and storage system from the selected source to Kukio will be necessary. It is anticipated that the Kukio water system will be maintained as an independent private system and require no public monies for construction or maintenance. In general, groundwater resources at Kukio are not suitable for domestic consumption, unless desalinized, because of salinity. The drilling of brackish wells lower on the slope of Hualalai, possibly within Kukio, could potentially provide a source of potable (if desalinized) and irrigation water for landscaping and the golf course. The Kukio Beach Resort is projected to require a maximum of 1.96 mgd of potable water at potential maximum development (Table 3-5). An additional 1.52 mgd are estimated to be required for irrigation which could be from non-potable sources such as brackish wells.

3.12.3 Mitigating Measures

A state-of-the-art water recycling system which incorporates the use of treated wastewater for irrigation purposes will partially offset the extraction of potable groundwaters.

DRAFT

9/1/99

WB Kuki'o Resort Utility Easements
Environmental Assessment
Kuki'o, North Kona, Hawai'i

August 1999

WB Kuki'o Resort Utility Easements
Environmental Assessment
TMK: 7-2-04: Por. 4
Kuki'o, North Kona, Hawai'i

Prepared for: WB Kuki'o Resorts, LLC.
Prepared by: PBR HAWAII
August 1999

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1.0 DESCRIPTION OF THE PROPOSED ACTION

1.1 PROJECT SUMMARY

Project Name: WB Kuki'o Resort Utility Easements

Applicant: WB Kuki'o Resort, LLC

Landowner: State of Hawai'i

Tax Map Key: (3) 7-2-04: 04 and 17

Existing Use: Disturbed vacant land; used intermittently for grazing

**Proposed Use/
Project Area:** Transmission of water utilities and service access.

Land Use Designations:

- State Land Use: Agricultural and Conservation
(General subzone)
- County General Plan: Extensive Agriculture and
Open
- Zoning: Agriculture and Open

SMA: The subject property is not in the SMA

Action Requested: Conservation District Use Permit

Approving Agency: Board of Land and Natural Resources

1.2 LOCATION AND OWNERSHIP

This Environmental Assessment (EA) has been prepared to support a request to the State Board of Land and Natural Resources (BLNR) for the following 1)a Conservation District Use Application and 2)rights of entry and utility, maintenance and access easements across certain Conservation and Agricultural District, State-owned lands at the ahupua'a of Kuki'o 2nd, Awake'e and Manini'owali, North Kona, Hawai'i.

The affected State lands, which include portions of Tax Map Key (TMK) parcels (3)7-2-04: 04, (3)7-2-06 portions of 17 XXXXXX, are located mauka of Queen Ka'ahumanu Highway and include portions of Mamalahoa Highway, approximately 7 miles north of Keahole Airport and 14 miles north of Kailua-Kona. The island and regional location of the proposed action are shown in Figure 1 and

the project site and alternative corridor connections are shown in Figure 2 and 3.

The adjacent lands to the northeast, which are within the ahupua'a of Ka'ūpūlehu, are owned by Kamehameha Schools Bernice Pauahi Bishop Estate (KSBE) and subject to a long-term lease agreement to Potomac Investment Associates (PIA). To the northwest, within the ahupua'a of Kuki'o 1st, is the Kuki'o Resort property belonging to the applicant, WB Kuki'o Resorts, LLC (WB Kukio). The Muheenui cinder cone is a notable landmark located at the southern corner of the WB Kukio property. The lands to the west of the State parcel, which are within the ahupua'a of Makalawena, are owned by KSBE. To the southeast and mauka of the State lands are the Makalei Hawai'i, Inc. properties, on which four of the five wells owned by the Applicant are located. The Applicant's fifth well and transmission line is located on two privately owned parcels of approximately 48 acres each. The land ownership of the affected lands and surrounding properties is shown in Figure 4.

1.3 EXISTING AND SURROUNDING USES

The affected State lands and the surrounding parcels are mostly vacant with the exception of the West Hawai'i Veterans' Memorial Cemetery which is located on the subject lands south of Muheenui cinder cone and the applicant's property. The subject lands are used intermittently for grazing purposes. Elevations on the property range from approximately 200 feet above mean sea level (msl) at the makai boundary with Queen Ka'ahumanu Highway, to approximately 1,760 feet (msl) at the Makalei Hawai'i property, adjacent to Mamalahoa Highway.

1.4 BACKGROUND

On July 24, 1992, the Board of Land and Natural Resources approved the direct sale of a 25-foot wide and approximately 760-foot long utility and service road easement for a portion of the requested easement to Makalei Hawai'i Corporation (MHC) and Huehue Ranch Associates, L.P.(HRA). The applicant, WB Kuki'o Resorts, LLC., is the successor to the interest of HRA in that agreement. The perpetual, non-exclusive utility and service roadway easement crosses a Government "paper" Homestead Roadway and Lot 84, along the boundary between Lots 84 and 85, of the Puukala-Kaulana Homesteads. These lots are further identified by TMK: 7-2-06: 17 (Por.), as shown previously on the land ownership map, Figure X.

As a condition of the easement sale, the State obtained rights to purchase potable water from the approved MHC/HRA water system to serve the Puukala-Kaulana Homestead Lots 80 to 85 and the County of Hawai'i operated West Hawai'i

Veterans' Cemetery Site at Pu'u O'o. Water to be provided to these lots would be equal to the County of Hawai'i standards for domestic use, which is a maximum of 600 GPD per lot.

The bulk of the site consists of rough lava land and supports a minimum of dry land vegetation that is scattered throughout the property. In the upper elevations, above the 1,000 foot elevation, some scattered trees and heavier shrubs are found and become more common with the increase in elevation and associated precipitation.

1.5 CHAPTER 343, HRS COMPLIANCE

Although the water utility and service road improvements have been implemented in this portion, the initial agreement with the State was processed without meeting the requirements of Chapter 343, HRS. Additionally, the conditions with regard to the provision of potable water to the State lots and County Veterans' Cemetery have yet to be met. The subject easement request, which includes the same approximately 760' portion, is being sought with this Draft Environmental Assessment being filed and processed to meet the requirements of Chapter 343, HRS. Upon execution of a new easement agreement with the State, the applicant anticipates meeting the same conditions in terms of providing water to the Puukala-Kaulana Homestead Lots and the County operated West Hawai'i Veterans Cemetery in an amount equal to the County standard for domestic use, per lot.

The proposed action involves the use of Conservation District and State lands, triggering compliance with Chapter 343 of the Hawai'i Revised Statutes (HRS). This EA has been prepared in accordance with the provisions of Title 11, Department of Health, Chapter 200, Environmental Impact Statement Rules, Sections 11-200-9 through 11-2000-13. A description of the affected environment and the alternatives considered, proposed mitigation measures, preliminary impact determinations based upon the information contained herein, and the reasons supporting these determinations are provided. The information contained in this EA has been developed from site visits and generally available information regarding the environmental characteristics of the project site and surrounding areas.

1.6 PROJECT DESCRIPTION AND OBJECTIVES

1.6.1 Project Development Goals and Objectives

The applicant, WB Kukio Resort, LLC, is requesting an easement across portions of Conservation District and State lands for the purpose of providing a utility corridor connection between the applicant's well system located mauka of the

State lands on the Makalei Hawai'i property, and the applicant's property which is planned for and has received land use approvals for the master-planned Kuki'o Beach Resort. An Environmental Impact Statement (EIS) for the proposed Kuki'o Beach Resort was also prepared and processed according to the requirements of Chapter 343, Hawai'i Revised Statutes, HRS. The Kuki'o Beach Resort Final EIS was published on May 16, 1988.

1.6.2 Alternative Alignments for the Utility Easement

The requested easements, as shown in Figure 5, includes a 25-foot utility and service easement over an approximately 760 foot section of the Puukala-Kaulana Homestead Lots, and a 30-foot utility and service easement generally along an existing ranch road and easements for two tank sites of approximately 1/2 acre in size. A large portion of the utility easement would run along the existing "Old Kona Village Road". This mauka-makai sited cinder access road extends makai from Mamalahoa Highway through State-owned land and is interrupted by Queen Kaahumanu Highway. The road was constructed in 1968 by Huehue Ranch and Signal Landmark to provide access to the Kona Village Resort, and the historical Huehue Ranch lands which are owned by Makalei Hawai'i, Inc.. No formal easements have been recorded for this roadway.

In the mauka portion, near the Makalei property, three alternative alignments for the corridor connection to the well system are requested. (Alternative Corridor Alignment A, B and C). Since the eventual connection of the water system will require easements over other adjacent properties, including portions within the Mamalahoa Highway Right-of-way (ROW) and other State lands, for which agreements have yet to be reached, the alternative corridor alignments are needed to provide some level of routing flexibility, depending on the outcome of the easement negotiations with the adjoining land owners.

Initially, the applicant plans to install a temporary overground irrigation line over the Alternative Corridor Alignment A. This line would extend from the area of the applicant's HR-5 well site and proceed directly makai over the State lands covered by the 1801 lava flow to the Old Kona Village Road, and follow along the Old Kona Village Road to the Kuki'o Beach Resort Project site. Planned permanent improvements would include utility lines and an underground water transmission line, two "breaker" tanks located at approximately the 891 and 1191 foot elevation, and improvements to the existing Old Kona Village Road which would serve as the service road to access the water system lines and tanks.

1.7 PURPOSE AND NEED FOR THE PROPOSED ACTION

The resort and its water source, which consists of five wells, are separated by State owned lands. Subsequently, the requested easements through State lands are needed to provide underground water transmission lines to the proposed Kukio Resort and potentially, for overground power and telecommunication transmission lines, as well.

Therefore, the applicant, WB Kukio Resorts ,LLC, seeks to 1)implement improvements to an existing ranch road (Old Kona Village Road) and 2)provide a utility connection from its water source, which is located just mauka of the State lands at the approximately 1,500 elevation, to the planned Kuki'o Beach Resort development located makai of the State lands, starting at about the 600 foot elevation and extending to the shore.

The "Old Kona Village Road", which extends from the applicants property to the area of the applicant's wells provides a logical alignment for the proposed utility corridor. Improvements to the existing "Old Kona Village Road" would be needed to provide service access to the utility lines.

The requested easements, in addition to providing a means to connect the applicant's water source with the planned Kuki'o Beach Resort development, will also provide a means to provide water to the State Pu'ukala-Kulana Homestead Lots and the County's West Hawai'i Veterans' Cemetery.

1.8 PROJECT TIMETABLE

Following the necessary regulatory approvals from the State and County, including the proposed utility easement, the applicant anticipates the construction of the water transmission, storage and access improvements to start within six (6) months and be completed within one (1) year of the project commencement.

2.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT, IMPACTS AND MITIGATION MEASURES

2.1 PHYSICAL CHARACTERISTICS

2.1.1 Climate

The subject lands are located in the lee of the Hualalai volcano which generally buffers the site from the gusty trade winds. The predominant wind pattern comes from convection processes occurring from the daily heating and cooling of the land. Temperatures in the winter months (October through April) range from 60 to 75 degrees Fahrenheit, and in the summer months (May through September), temperatures range from 70 to 85 degrees Fahrenheit.

Rainfall is closely linked to the land elevation. The area of the Old Kona Village Road, along which the utility corridor is proposed, receives approximately 20 to 25 inches of rainfall annually in the upper elevations and 7 to 8 inches in the lower elevations. While the subject lands are sheltered from the trade winds, rainfall usually occurs in the late afternoons and evenings, caused by sea breezes moving onshore and up slope during the day.

The proposed utility corridor is expected to have little impact on the climate of the area.

2.1.2 Topography

The topography of the land is generally uniform with a gradual slope from makai to mauka. The average slope for the proposed utility easement through the State's lands ranges from five to ten percent. The proposed utility easement and related improvements, which would generally follow the existing Old Kona Village Road alignment, are expected to have little impact on the topography of the subject property.

2.1.3 Soils

The soils underlying the project site consist primarily of cinder lands, and pāhoehoe and 'a'ā lava flows with little or no soil cover. Some thin and rocky soils are found in the upper elevations in the area of the Mākālei Hawai'i property. In the area between the 1,200 and 1,440 foot elevation, the lands are crossed by the 1801 Lava Flow, and therefore consist of almost entirely barren lava. According to the Soil Survey of the Island of Hawai'i, State of Hawai'i, U.S. Department of

Agriculture, Soil Conservation Service, the soils underlying the project site, as shown in Figure X, are described as follows:

Cinder Land (rCL): Cinder lands consist of a combination of volcanic cinders, pumice and ash. Materials range in color from black, red yellow, brown to variegated, characterized by jagged edges and a glassy appearance. These lands support grasses, however, they are not recommended for pasture land due to a loose consistency.

Lava Flows, 'A'ā (rLV): This lava has practically no soil covering and is bare of vegetation with the exception of mosses, lichens, and a few 'ōhi'a trees. The lava is characterized by rough, broken, glassy, sharp fragments piled in heaps.

Lava Flows, Pāhoehoe (rLW): Pāhoehoe lava has no soil covering and is typically bare of vegetation with the exception of mosses and lichens. Predominant characteristics are relatively smooth surface with a billowy, glassy texture broken by rough hummocks and pressure domes.

Punalu'u Extremely Rocky Peat, 6 to 20 percent slopes (rPYD): This soil consists of well drained, thin organic soils over pahoehoe lava bedrock. The soil profile represents a surface layer of black peat 4 inches in depth, underlain by pahoehoe lava bedrock. The soil is of a medium acidity and the peat surface layer is rapidly permeable. The pahoehoe lava is slowly permeable, although water moves rapidly through the cracks. Runoff is slow and erosion hazard is slight.

2.1.4 Groundwater Hydrology

The North Kona district is geologically divided by the northwest rift zone of Hualalai Volcano. The subject property generally experiences light daily rain showers that provide the area's source of water recharge. Groundwater occurs in a basalt lens configuration. The basal lens is a layer of fresh water floating on top of salt water that varies in thickness. Groundwater recharge is relatively dependant on rainfall patterns. The rain is precipitated in light daily showers, as opposed to high volume, short duration storms. These conditions result in a relatively low recharge volume over the subject lands, because the infiltration water is first consumed by existing vegetation before it percolates into the groundwater supply. The primary source of groundwater recharge is from lands considerably mauka of the project site.

The proposed utility corridor is not anticipated to significantly affect existing drainage patterns, surface runoff or groundwater recharge. Withdrawals of potable water from the existing wells at higher elevations are based on sustainable

yields as approved by the State Department of Health through the well permitting process, and are not expected to alter groundwater salinity in the basal lens.

From an agricultural perspective, the above lands are of marginal to poor agricultural quality. The subject lands are intermittently used for grazing purposes, depending on the availability of rainfall.

2.1.5 Flora and Fauna

The vegetation of the lands underlying the proposed easement is typical of the area which is primarily fountain grass (Pennisetum setaceum), which covers nearly 85 percent of the lava flow in the lower elevations, and scattered lama trees (Diospyros ferrea) which are scattered throughout the fountain grass. Other dryland species in the area include pua kala (Argemone glauca), a'ali'i (Dodonaea sandwicensis), pili grass (Heteropogon contortus), 'ilima (Sida fallax), indigo (Indigofera suffruticosa), and 'uhaloa (Walteria indica var. americana). In the upper elevations are found the natural vegetation described below and pasture lands planted with kukuyu green panic (Dennisetum sp.), buffel (Bouteloula Curtipendlila), and guinea grass (Panicum maximum); along with scattered shrubs and trees which increase in density towards the upper elevations. The primary trees found in these areas include kukui (Aleurites moluccana), silk oak (Grenvillea robusta) and Pride-of-India (Melia azedarach). Shrubs include lantana (Lantana sellowiana), haole koa (Leucaena glauca), and Christmas berry (Schinus terebinthifolius). In the elevations from approximately 1,000 feet (msl) to 1,200 feet (msl) the shrub and trees cover approximately 50 percent of the land and increase to between 65 and 80 percent coverage from the 1,200 feet (msl) to the mauka property boundary. Development of a utility corridor on areas, which consist of mostly of previously disturbed lands and open lava fields with fountain grass, will have negligible impact on the total island populations of species present. Most of the plants introduced species, and the few native species present are found throughout the general area.

Typically, animal life in this habitat includes a variety of feral rodents, mongoose, feral goats, donkey, and pigs and exotic dryland birds. These include the Indian gray francolin, the barred dove, the common mynah, the Japanese white-eye, the house finch, the house sparrow, the cardinal and the Brazilian cardinal. The proposed project will have minimal impact on the wildlife which frequents the lands underlying the proposed easement. No unique habitats are known to exist in the path of the proposed easement. The proposed improvements to the existing ranch road and related utility improvements are not anticipated to have any impact to the daily migration of animals in the area or to the existing animal habitats.

2.1.6 Drainage

Due to the low rainfall and highly porous ground conditions, natural runoff from seasonal rainfall is very limited and flood hazards remote. What little surface runoff that occurs during storm events is predominantly carried as sheet flow before percolating to the groundwater table.

There are no natural drainage features in the project area and no floodways are indicated in the area of the project site on the Flood Insurance Rate Maps (FIRM) on file with the Department of Public Works. Some minor gullies are found in the upper elevations and mauka of the project site, however, these features lose definition over a short distance and are not found in the area of the project site.

In that improvements for the proposed utility corridor would be confined primarily to the area of the existing Old Kona Village Road, the project is not expected to have a significant impact on drainage patterns in the area.

2.1.7 Noise and Air Quality

2.1.7.1 Noise

Existing noise sources in the area are limited to low volume traffic along Queen Ka'ahumanu Highway, infrequent vehicular activity along the Old Kona Village Road, and natural sources (wind). The site is well removed from the Keahole Airport departure zone seven miles to the west.

During the installation of the waterline, some construction noise will be generated, however, these activities would occur over a relatively short period of time and during daylight hours. There are no residences in the area of the proposed utility corridor. The nearest residences include four homes located approximately 1.2 miles south and mauka of the project site, near Mamalahoa Highway.

2.1.7.2 Air Quality

Present air quality in the project area is mostly affected by air pollutants from natural and vehicular sources. There are no industrial or agricultural air pollution sources in the area. Natural sources of air pollution that may affect the air quality in the project area include aero-allergens from plants and from wind-blown dust from bare soil areas. Currently, the greatest intermittent natural contributor to air pollution is the eruptive activity at Kilauea volcano, more than 50 miles east of the project site.

Queen Ka'ahumanu Highway, makai of the project site, is a major arterial roadway. Depending upon the prevailing wind direction, emissions from motor vehicles traversing Queen Ka'ahumanu highway may also be carried over the project site.

The Department of Health maintains monitoring stations in Hilo and Honoka'a, about 60 miles east and north east of the project site, but the data collected are specific to those localities and are of little relevance to describing the conditions at the project area. Based on available air quality studies conducted in the general area, it appears that both State and National ambient air quality standards are currently being met despite the persistent vog.

The construction and ongoing maintenance of the utility lines and improvements to the existing road are expected to have minimal impact on the air quality of the area.

2.2 SOCIAL AND ECONOMIC ENVIRONMENT

2.2.1 Land Use

2.2.1.1 State Land Use

The proposed easement lies within lands owned by the State of Hawai'i. As shown in Figure X, the lower portion of the State property is designated by the State Land Use Commission as within the Conservation district (General subzone) and the upper portion is designated within the Agricultural district. These lands have been used intermittently for ranching with the mauka portions having the greater grazing potential due to the relatively higher level of precipitation in these areas.

In that the proposed improvements would be limited to the area of the previous Old Kona Village Road, the potential impacts to the agricultural lands would be beneficial by providing improved access. The utility easement would also provide the potential to extend water transmission lines from existing MHC/HRA water systems at Mamalahoa Highway to the State farm lots located at the upper elevations, and thereby provide greater agricultural utility to these portions. Additionally, the proposed utility easement will provide the potential to extend potable water to the West Hawai'i Veterans' Cemetery.

2.2.1.2 General Plan

The land uses designated on the Hawai'i County General Plan, Land Use Allocation Guide (LUPAG) map for the area of the project site include Extensive Agriculture and Conservation, which are reflective of the area's existing pasture and open space character and the State Land Use designations for the area.

2.2.1.3 Zoning

The current County zoning designations for the project area are Agriculture (A-5a) in the upper portions and Open (O) in the lower portion, which is reflective of the State Land Use and County General Plan designations for these lands. The County General Plan, LUPAG, and zoning designations for the project area are shown in Figure X. The proposed use of the subject lands for utility purposes is consistent with Section 25-4-11 of the County Zoning Code which allows for the transmission of public or private utilities within any district.

2.2.2 Historical and Cultural Resources

A walk through survey along the proposed utility easement was conducted with State Historic Preservation Division staff archaeologist, Mark Smith. No archaeological features were observed in the area of the proposed corridor and tank sites, much of which was previously altered for the construction of the existing Old Kona Village Road.

In the upper elevations, the historic Makalawena Trail extends in a mauka-makai direction, through the Makalei property, between the area of the two easement segments. As such, the trail would not be impacted by improvements proposed within the requested utility and service easements. Any impacts the Makalawena trail in this area would likely to occur as a result of the planned Makalei development rather than the proposed water utility related improvements.

The area of the Alternative Corridor Alignment A was also found to be void of any archaeological features. This area had been previously cleared (chain-dragged) and seeded as part of the land preparation process for pasture use. Any features that may have been present in this area would likely have been disturbed as part of the land preparation process. The area of the Alternative Corridor Alignment B is situated entirely within lands crossed by the 1801 lava flow. No archaeological features were observed in this area, nor would any be expected given the barren character of these lands. The area of the second easement segment (between the segments of the Makalei property) has been improved and no further improvements are anticipated for this portion. Accordingly, the proposed use is anticipated to have no affect on significant historical sites that may be present in the area. Should any significant artifacts, or other indicators of previous on-site activities be uncovered during the construction of the residence, their treatment will be conducted in strict compliance with the requirements of the DLNR, SHPD.

2.3 POTENTIAL IMPACTS AND PROPOSED MITIGATION MEASURES

2.3.1 Potential Impacts

The proposed action includes the request by WB Kukio Resorts, LLC, for certain easements across State lands for a utility corridor which is needed to provide the connection of water and potentially electrical and telecommunication utilities for the proposed Kukio Resort. As noted, the water system would be underground.

In that the proposed easement is to allow for utility connections across State lands, which are absent of any significant features from a historical, cultural or biological perspective and the improvements would be for the most part, underground, with the exception of a service roadway, the proposed action will not have a significant impact on the environment. Further, the proposed use would have no impact on the current use (pasture) of State lands. Additionally, from an economic and social perspective, the proposed improvements are deemed generally beneficial to both the applicant, the State and the County. Therefore, mitigation measures to address potential environmental, social or economic impacts are not warranted.

3.0 ALTERNATIVES CONSIDERED

Several alternatives to the proposed utility corridor have been considered. These include alternative alignments for the proposed corridor across the State parcel, the use of an existing utility corridor on the adjoining KSBE lands, serving the Hualalai Resort, and the "no-build" option.

The no-build option would require that the proposed Kukio Beach Resort development use the available water from on-site wells, which consist of three brackish water wells located at approximately the 620 foot elevation (msl). The no-build option would require that the applicant relinquish the use of its mauka well source and rely solely on its brackish wells in meeting its potable and irrigation needs. Although the existing brackish well source could be used to provide potable water through a desalinization process, the resulting potable water yield would not be sufficient to meet the combined needs of the irrigation and potable water demands of the full development of the property, as approved under the existing land use entitlements. The utility connection between the mauka wells and the applicant property, therefore, is a necessary component to the implementation of the full resort development.

Another alternative that had been examined includes the placement of the utilities within an existing utility corridor on the KSBE property at Ka'ūpūlehu, north of the State lands. This alternative would consist implementing the planned utility improvements within the existing utility corridor which provides a connection between the Hualalai Resort development, makai of Queen Ka'ahumanu Highway, and their potable wells located on KSBE property at the approximately 1,600 foot elevation. Although this alternative would appear to have the advantage of providing a level of redundancy and back-up capacity to both the Hualalai and the Kukio Beach Resorts, such an arrangement would be dependent upon reaching an agreement with the adjoining property owner, whom for competitive reasons, may be reluctant to enter into a cooperative agreement for water and utility transmission. Such an arrangement was sought by the prior owners of the Kukio Beach Resort (Huehue Ranch Associates, LP), though never concluded.

In addition to the proposed alignment, two alternative alignments for the proposed corridor within the State property were evaluated. These included an alignment on the State property along the boundary with the KSBE property at Ka'ūpūlehu, and an alignment that would extend from the southeastern corner of the applicant's property and proceed directly mauka to a point intersecting with the Old Kona Village Road. For both alternatives, the topography and geophysical conditions in the area present significant engineering challenges. The topographic variation in these areas would require a significant amount of grading, would restrict the placement of pressure tanks, and would add significantly to the cost

of the service road construction. Additionally, there is a higher probability of encountering lava tubes as part of the construction activities in the area of the two alternative alignments, especially in the area of the existing pu'u. While the proposed corridor has been previously disturbed, the two alternative alignments, if pursued, would increase the potential impacts to the environment and archaeological features that may be present in these areas. It was for these reasons that the preferred alternative and proposed alignment following the existing Old Kona Village Road was deemed to present the least potential impact to the environment and would best meet the project objectives.

4.0 DETERMINATION WITH SUPPORTING FINDINGS AND REASONS

It is recognized that, because the proposed action involves the use of State Lands, compliance with the Environmental Impact Statement (EIS) process, as defined by HRS Chapter 343 and Chapter 200, Department of Health EIS rules, is requested is one of the primary reasons that this EA has been prepared. Based upon the information available and developed specially for this EA and the type of governmental action requested at present, it has been determined that, because providing the proposed easement across State property would essentially have no social, economic or environmental impacts and will not have a significant impact on the environment, an Environmental Impact Statement (EIS) is not required for the proposed action.

5.0 AGENCIES CONSULTED

The following agencies were consulted in the preparation of this environmental assessment:

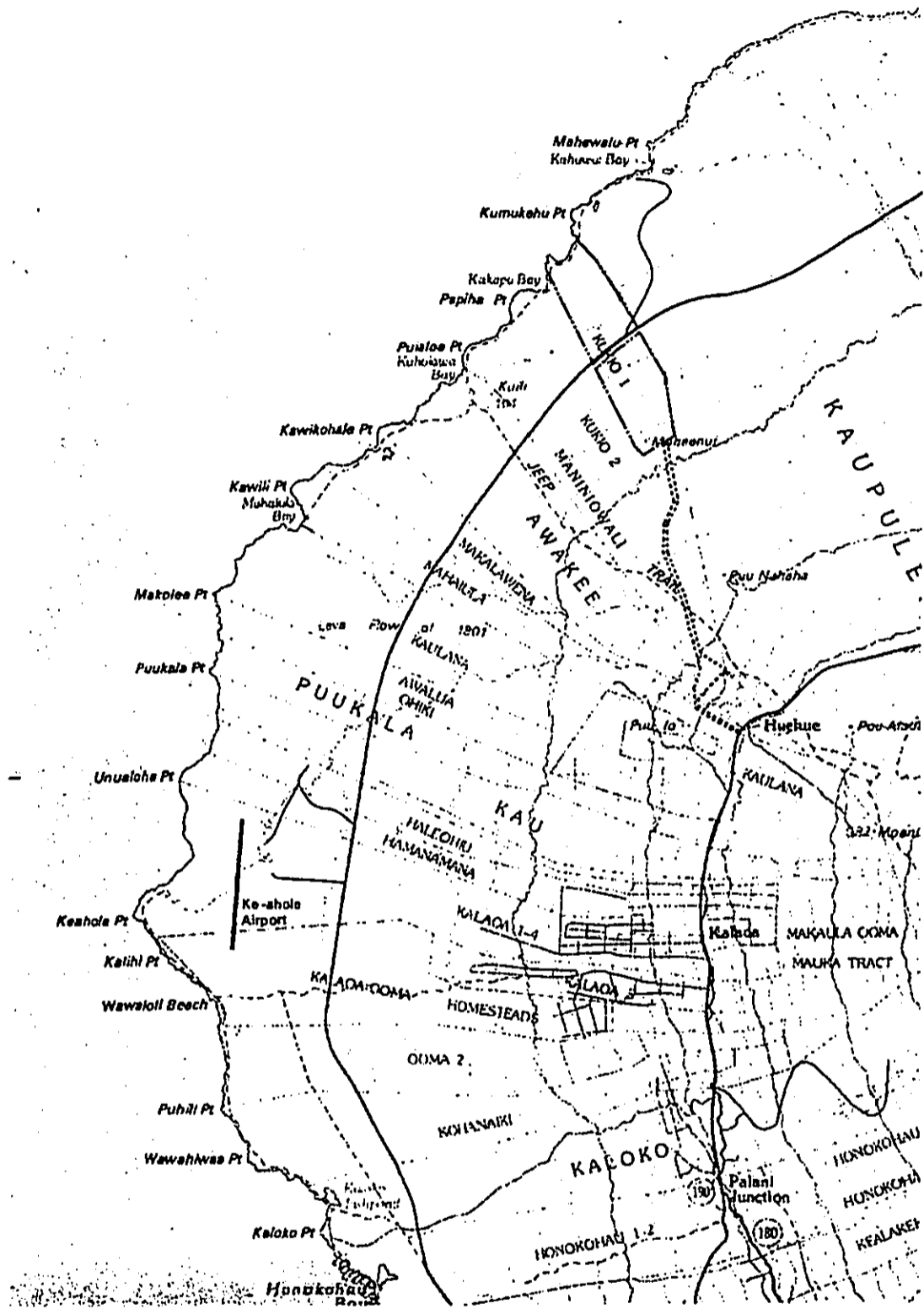
County of Hawai'i

Planning Department
Department of Public Works
Department of Water Supply

State of Hawai'i

Department of Land and Natural Resources, State Historic Preservation Division
Department of Land and Natural Resources, Land Division
Department of Land and Natural Resources, Commission on Water Resource Management
Department of Transportation

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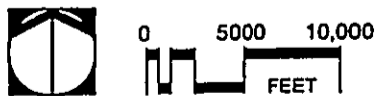
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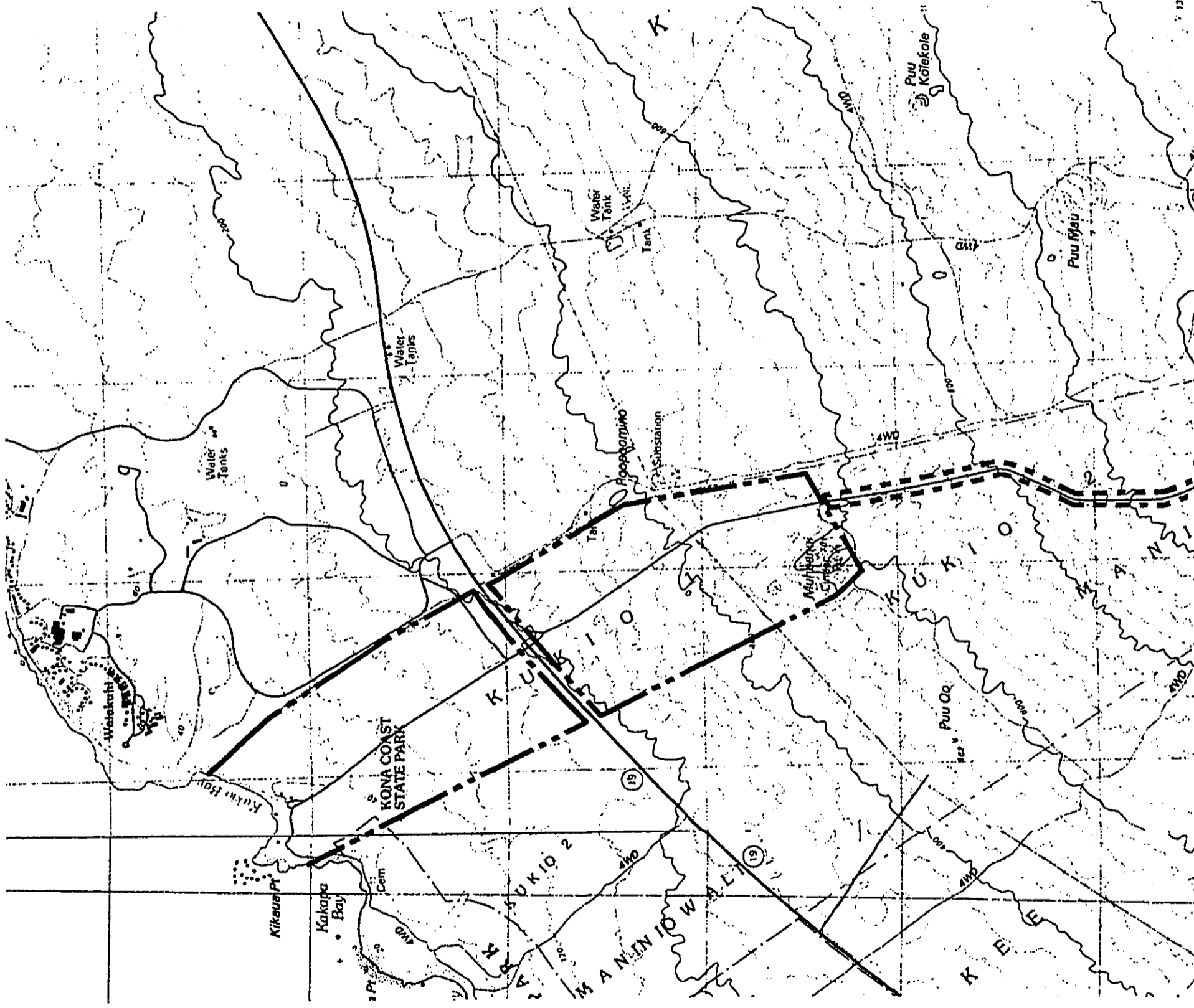
 Study Area

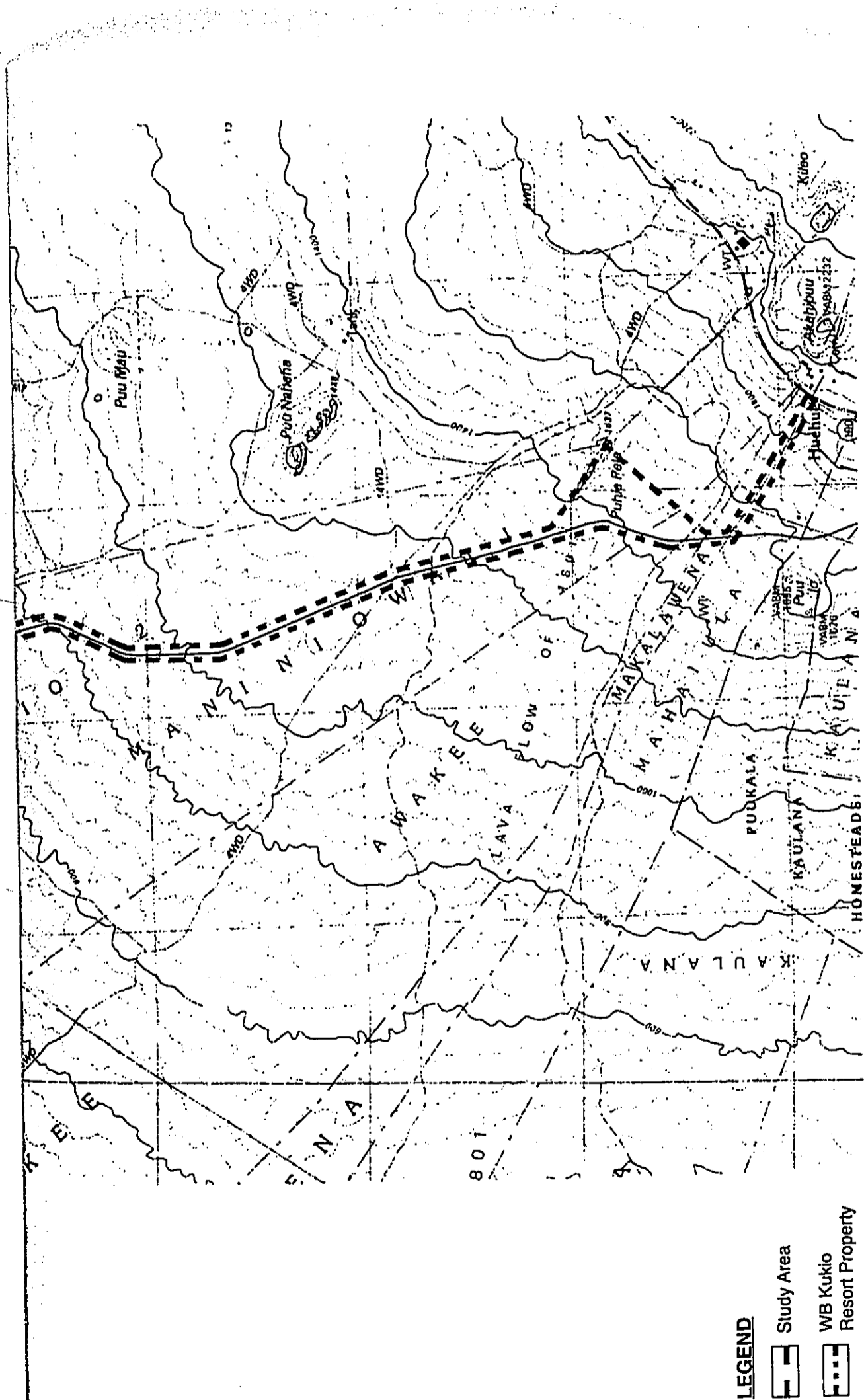


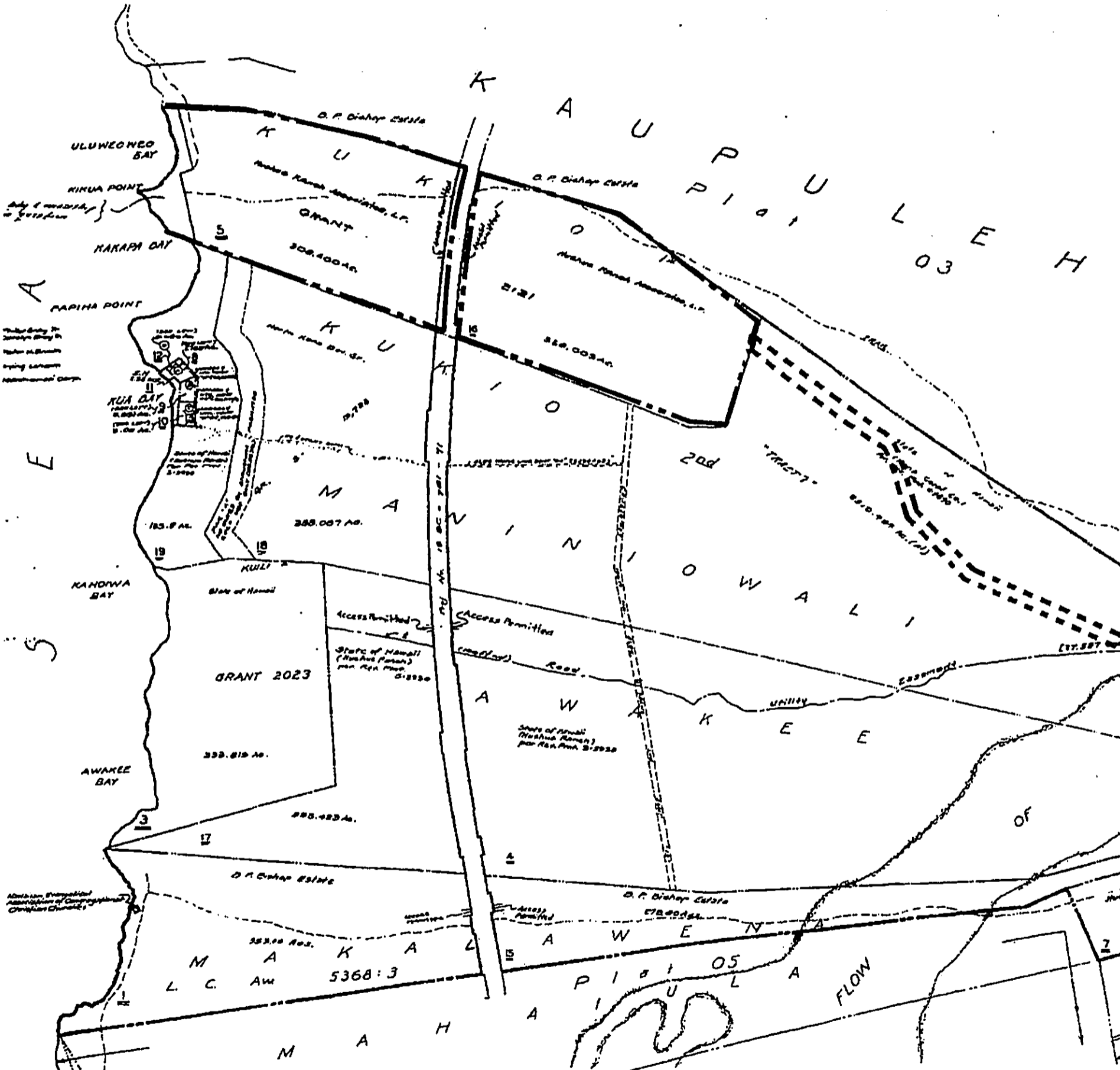
FIGURE 1
REGIONAL LOCATION MAP

WB KUKIO UTILITY EASEMENT









ULUWEHO BAY
KAPAA BAY
PAPAHA POINT

July 4th 1829
July 11th 1830

KU BAY
185.8 AC

KANDOWA BAY

AWAKE BAY

Methodist Episcopal
Abbott of Canterbury
Christian Church

O. F. Bishop Estate

GRANT 1829

O. F. Bishop Estate

308,400 AC

2121

368,003 AC

338,007 AC

GRANT 2023

338,819 AC

338,489 AC

33318 AC

M A K A L E
L C AW 5368:3

M A H

A P I H U L A
A P I H U L A

FLOW

K A U P I U L E H

I O W A L I

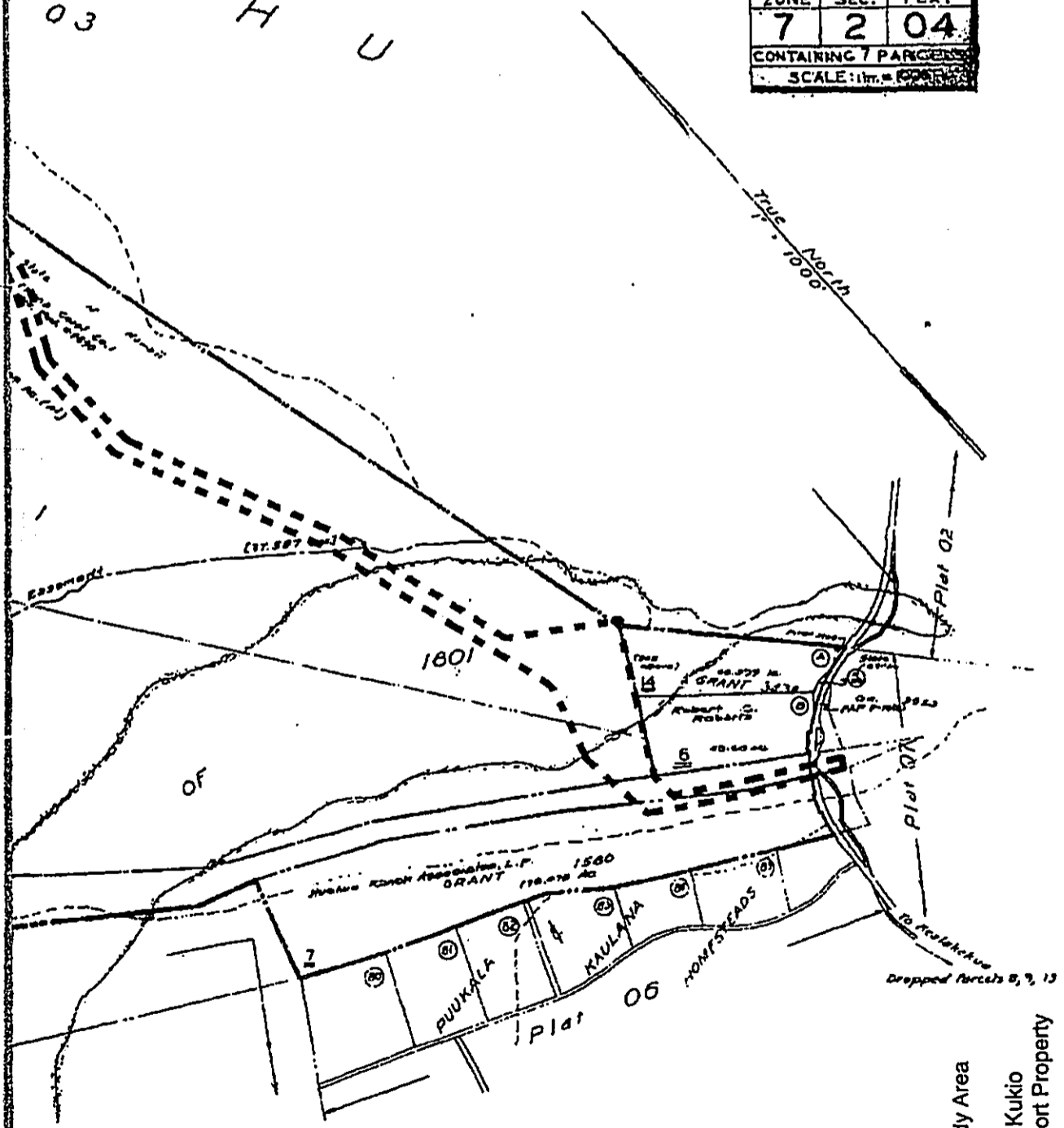
A W A K E E

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L C AW 5368:3
M A H
A P I H U L A
A P I H U L A
FLOW

L
03
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H
U

THIRD		DIVISION	
ZONE	SEC.	PLAT	
7	2	04	

CONTAINING 7 PARCELS
SCALE: 1 in. = 1000 FEET



LEGEND

- Study Area
- WB Kukio Resort Property

FIGURE 3
OWNERSHIP MAP

WB KUKIO UTILITY EASEMENT

0 1000 2000 FEET

August 1999

KAUPULEHU RESERVOIR #3
0.5 M.G. GLASS FUSED STEEL TANK
SPILLWAY ELEV. = 1360'
FIN. FLOOR ELEV. = 1342'

KAUPULEHU PRESSURE
REDUCING STATION #2
ELEVATION = 1060'

KAUPULEHU RESERVOIR #2
0.02 M.G. GLASS FUSED STEEL TANK
SPILLWAY ELEV. = 857'
FIN. FLOOR ELEV. = 843'
WITH RATE-OF-FLOW
CONTROL VALVE STATION

KAUPULEHU PRESSURE
REDUCING STATION #1
ELEVATION = 510'

ELL #2
WELL NO. 4759-02

KI - WELL #3
STATE WELL NO. 4759-03
500 GPM

KI - WELL #1
STATE WELL NO. 4759-01
500 GPM

PROPOSED 620' RESERVOIR
0.5 M.G. GLASS FUSED STEEL TANK
SPILLWAY ELEV. = 620.0'
FIN. FLOOR ELEV. = 587.0'
INLET PRESSURE = 129 PSI

PROPOSED 910' RESERVOIR
0.02 M.G. GLASS FUSED STEEL TANK
SPILLWAY ELEV. = 910.0'
FIN. FLOOR ELEV. = 895.0'
INLET PRESSURE = 130 PSI

PROPOSED 1210' RESERVOIR
0.02 M.G. GLASS FUSED STEEL TANK
SPILLWAY ELEV. = 1210.0'
FIN. FLOOR ELEV. = 1195.0'
INLET PRESSURE = 130 PSI

PROPOSED 1510' R
0.02 M.G. GLASS FUSED
SPILLWAY ELEV. = 1510
FIN. FLOOR ELEV. = 149
INLET PRESSURE = 132

WELL SITE HR-3
STATE WELL NO. 4458-01
STATUS: OPERATING AS STAND
FOR WELL HR-4
RUN BY DIESEL GENER

WELL DATA:
GRD. EL. = 1518'
CASING DIA. = 14"
BOT. CASING EL. = (-)28.1'
BOT. HOLE EL. = (-)78.1'
DRAWDOWN @ 500 GPM = 3'
(ASSUMED)

PUMP DATA:
Q = 500 GPM SUBMERSIBLE P
H = 300 HP MOTOR
TDH = 1710'

150 GPM VERTICAL
250 HP MOTOR
GRD. EL. = 1319.5'
CASING DIA. = 16"
BOT. CASING EL.
WATER LEVEL

WELL
STATE
500 GPM
300 HP

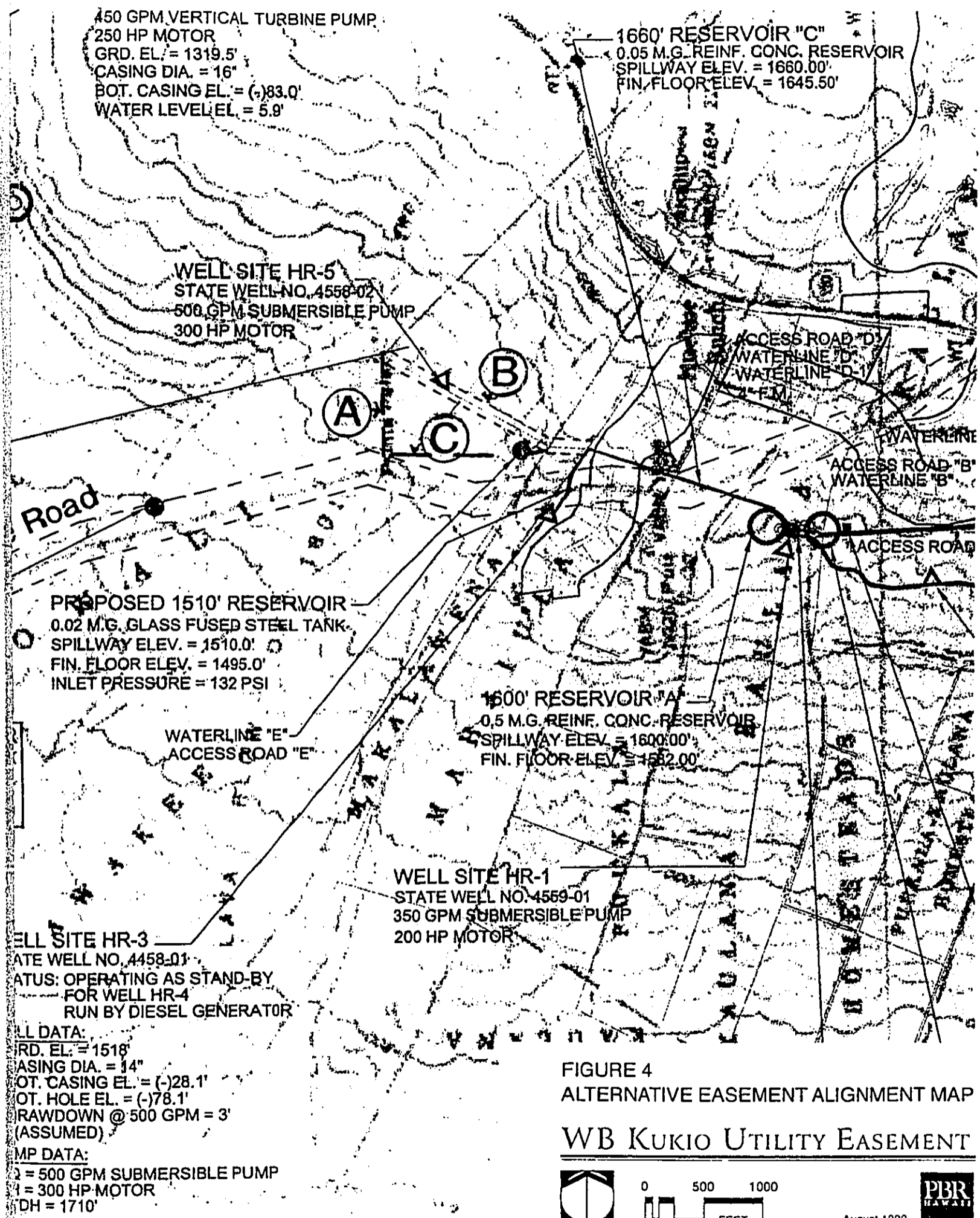
Old Kona Village Road

WATERLI
ACCESS

Puu Maui

Puu Maui

Puu Maui



450 GPM VERTICAL TURBINE PUMP
 250 HP MOTOR
 GRD. EL. = 1319.5'
 CASING DIA. = 16"
 BOT. CASING EL. = (-)83.0'
 WATER LEVEL EL. = 5.9'

1660' RESERVOIR "C"
 0.05 M.G. REINF. CONC. RESERVOIR
 SPILLWAY ELEV. = 1660.00'
 FIN. FLOOR ELEV. = 1645.50'

WELL SITE HR-5
 STATE WELL NO. 4558-02
 500 GPM SUBMERSIBLE PUMP
 300 HP MOTOR

ACCESS ROAD "D"
 WATERLINE "D"
 WATERLINE "D-1"
 7" FM

WATERLINE
 ACCESS ROAD "B"
 WATERLINE "B"

Road

PROPOSED 1510' RESERVOIR
 0.02 M.G. GLASS FUSED STEEL TANK
 SPILLWAY ELEV. = 1510.0'
 FIN. FLOOR ELEV. = 1495.0'
 INLET PRESSURE = 132 PSI

WATERLINE "E"
 ACCESS ROAD "E"

1600' RESERVOIR "A"
 0.5 M.G. REINF. CONC. RESERVOIR
 SPILLWAY ELEV. = 1600.00'
 FIN. FLOOR ELEV. = 1582.00'

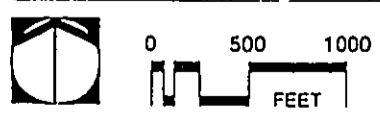
WELL SITE HR-1
 STATE WELL NO. 4559-01
 350 GPM SUBMERSIBLE PUMP
 200 HP MOTOR

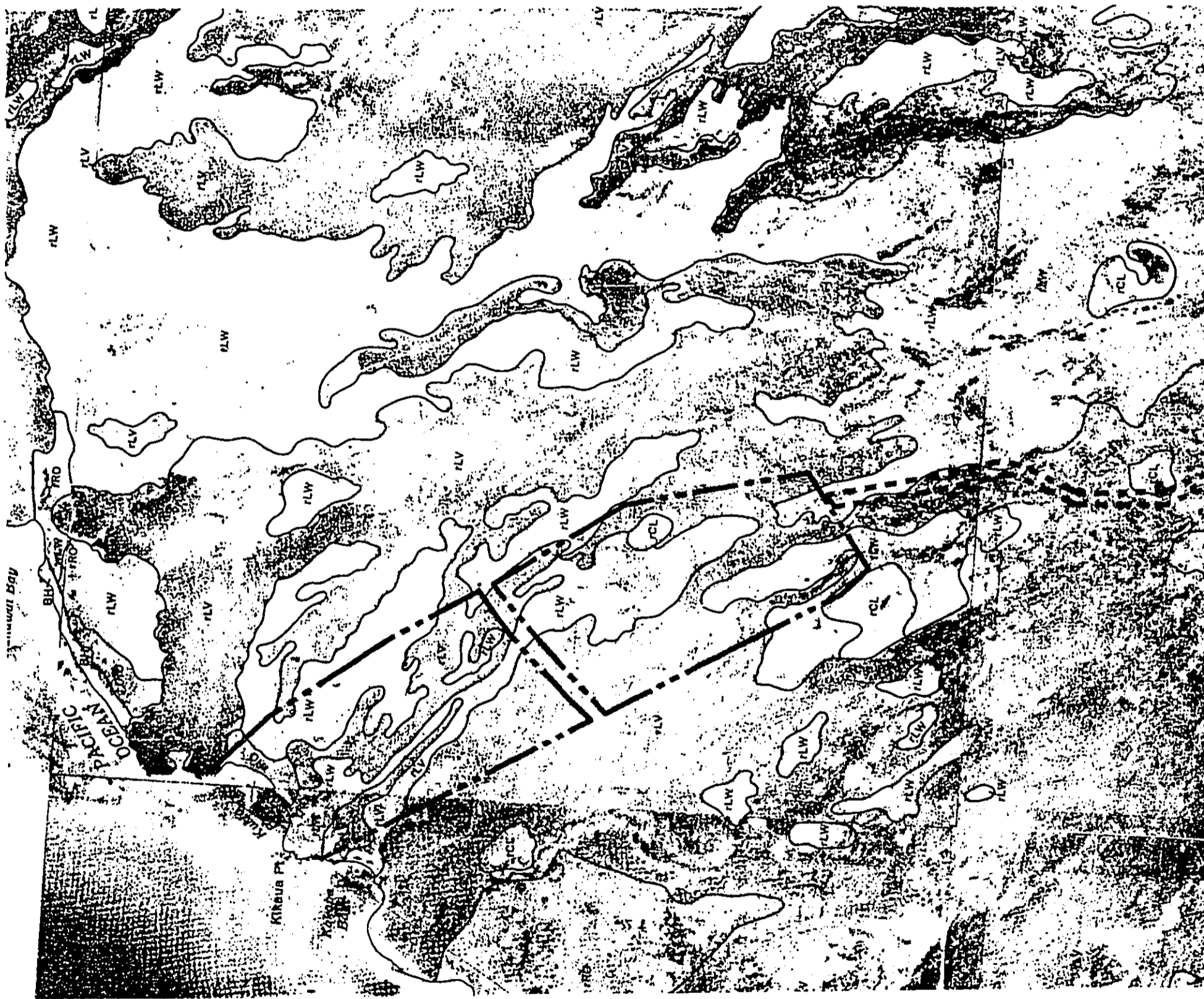
WELL SITE HR-3
 STATE WELL NO. 4458-01
 STATUS: OPERATING AS STAND-BY
 FOR WELL HR-4
 RUN BY DIESEL GENERATOR

WELL DATA:
 GRD. EL. = 1518'
 CASING DIA. = 14"
 BOT. CASING EL. = (-)28.1'
 BOT. HOLE EL. = (-)78.1'
 DRAWDOWN @ 500 GPM = 3'
 (ASSUMED)

PUMP DATA:
 2 = 500 GPM SUBMERSIBLE PUMP
 1 = 300 HP MOTOR
 TDH = 1710'

FIGURE 4
 ALTERNATIVE EASEMENT ALIGNMENT MAP
 WB KUKIO UTILITY EASEMENT





9/1/99



LEGEND











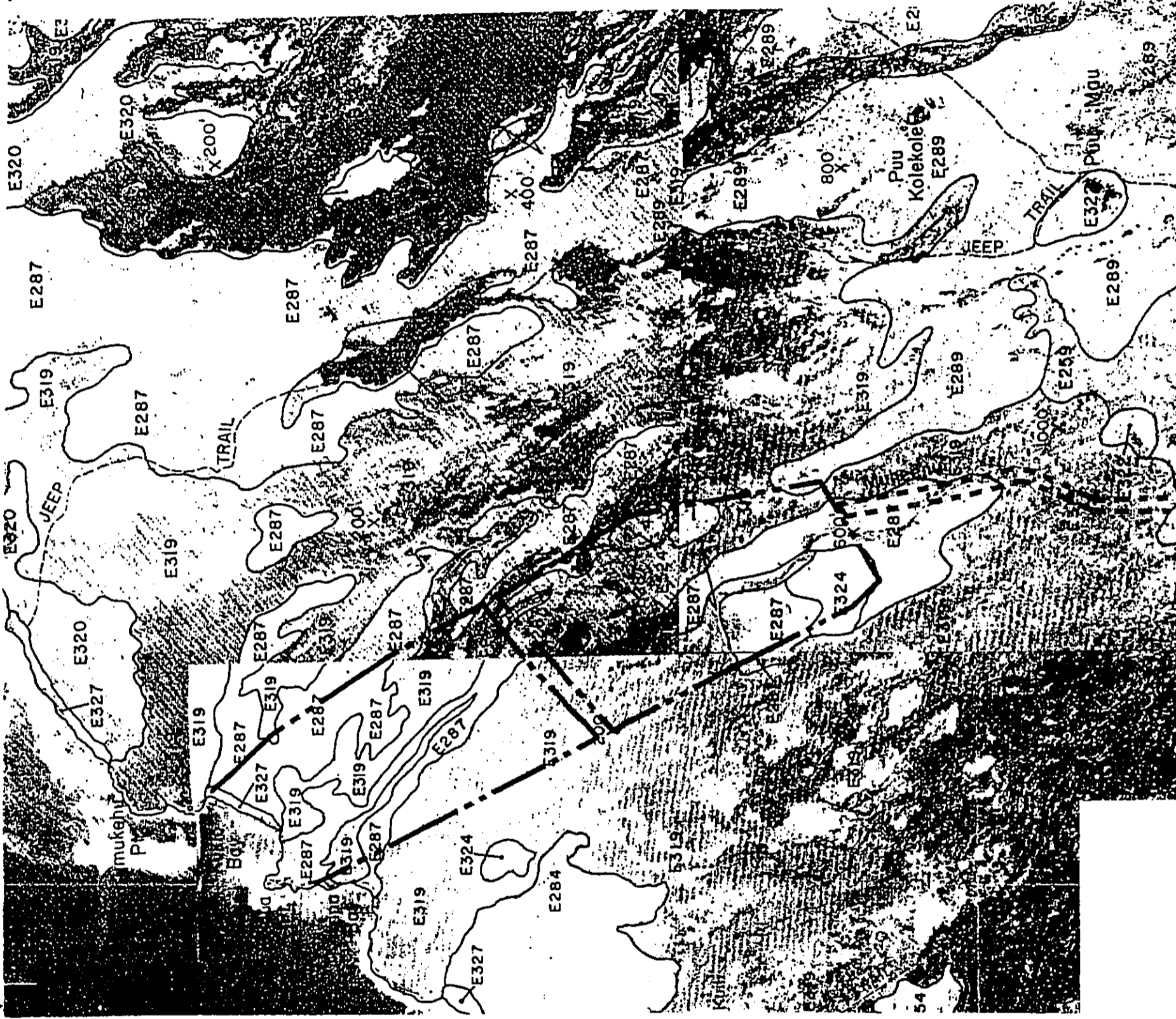
-  Study Area
-  WB Kukio Resort Property
-  Rock outcrop
-  Lava flows, pahoehoe
-  Lava flows, Aa
-  Cinder land
-  Punaluu

FIGURE 5
SCS SOIL SURVEY MAP

WB KUKIO UTILITY EASEMENT

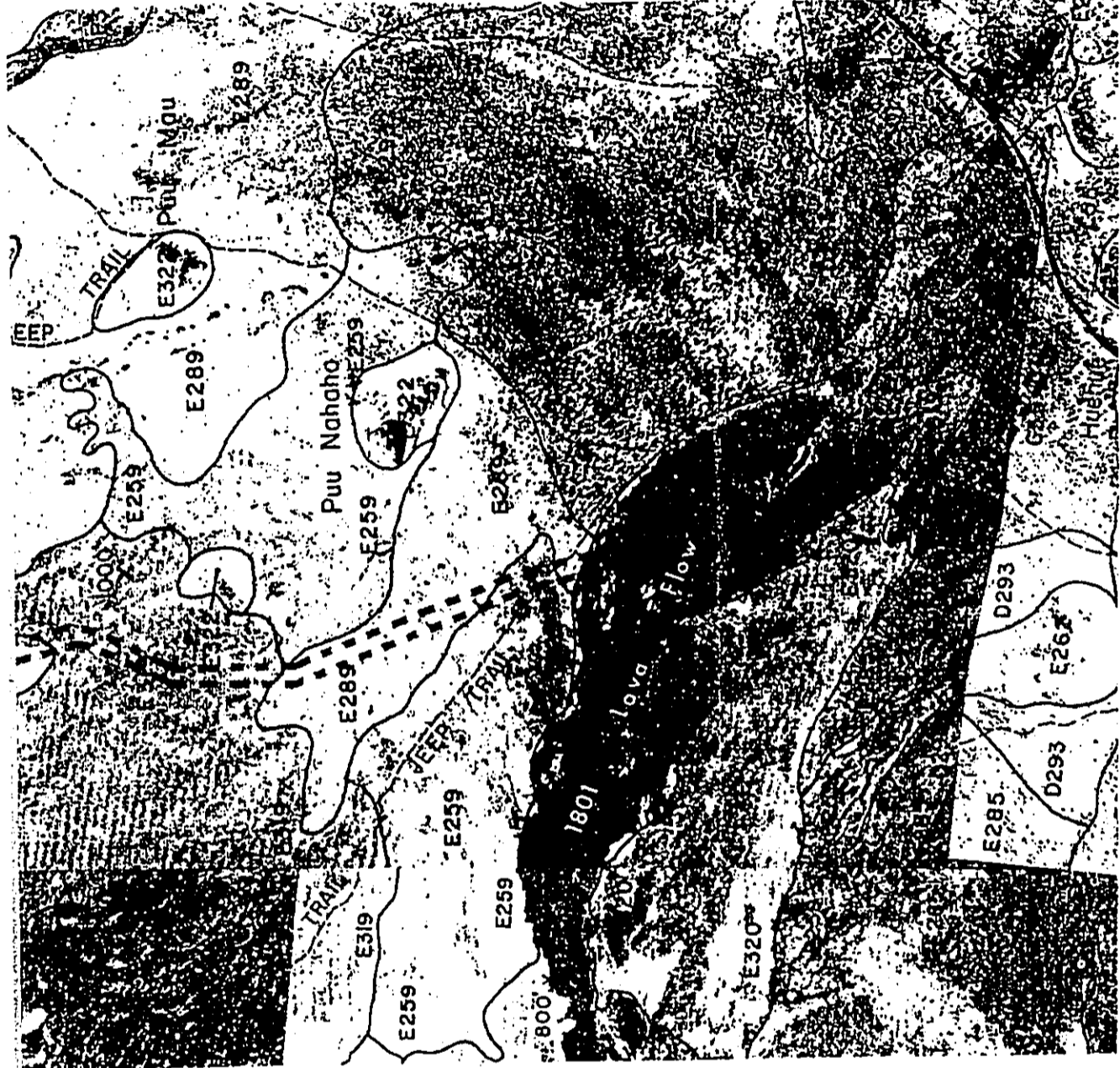




August 1999



LEGEND

Study Area



LEGEND











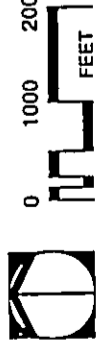

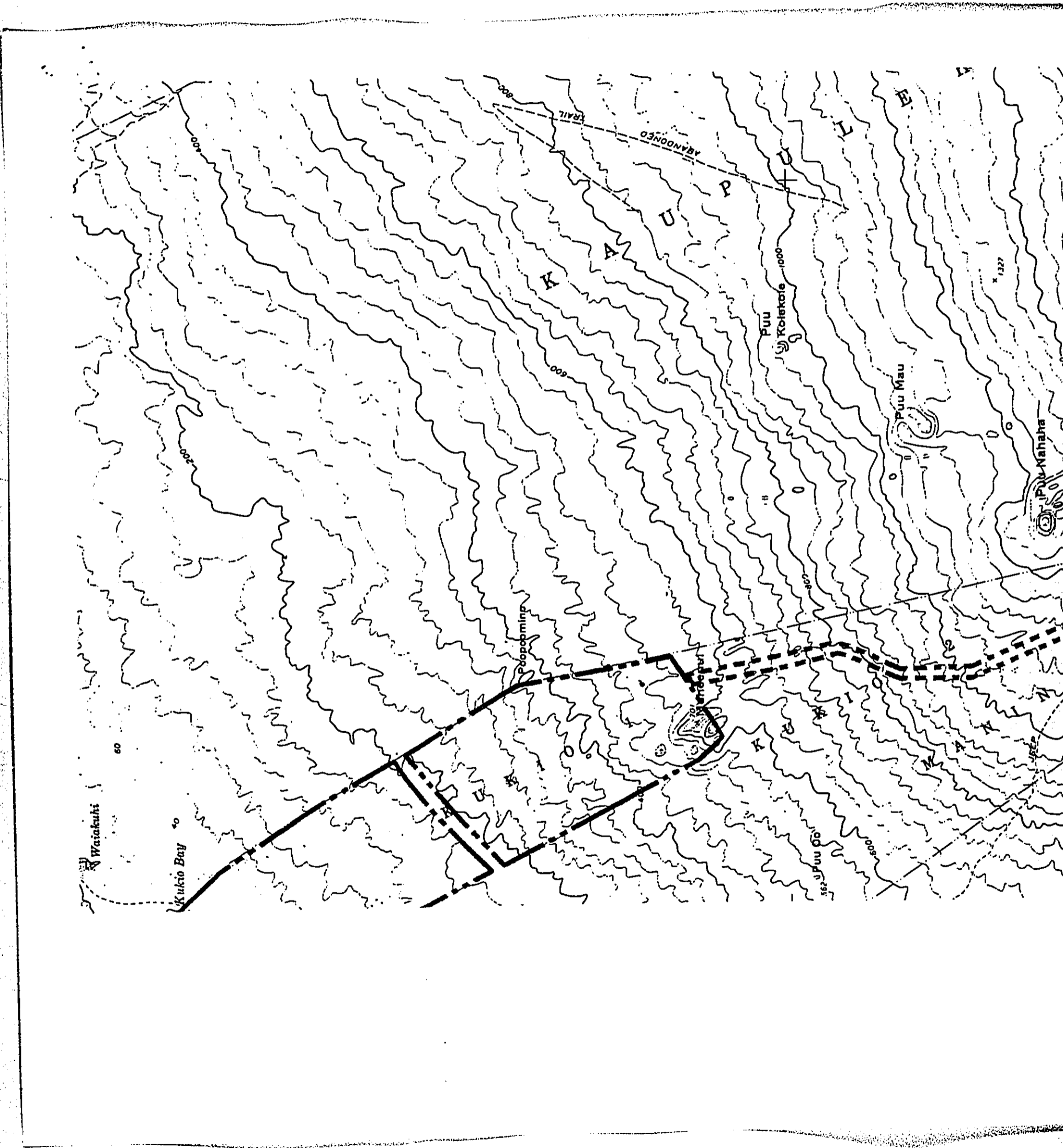
-  Study Area
-  WB Kukio Resort Property
-  C55 Shallow depth, moderately fine Texture, Pehoeoe outcrops, well drained, and 0 - 20% slope
-  E319 No soil material, sharp aa clinkers, excessively drained, and 0 - 12% slope
-  E320 No soil material, well drained, and 0 - 12% slope
-  E259 No soil material, sharp lava clinkers, excessively drained, and 0 - 35% slope
-  E289 No soil materials, well drained, and 0 - 35% slope
-  E287 No soil materials, well drained, and 0 - 10% slope
-  E324 Deep, unweathered cinders, stony, well drained, and 36 - 80% slope
-  E327 Deep, coarse, nonstony to stony, excessively drained, and 0 - 20% slope

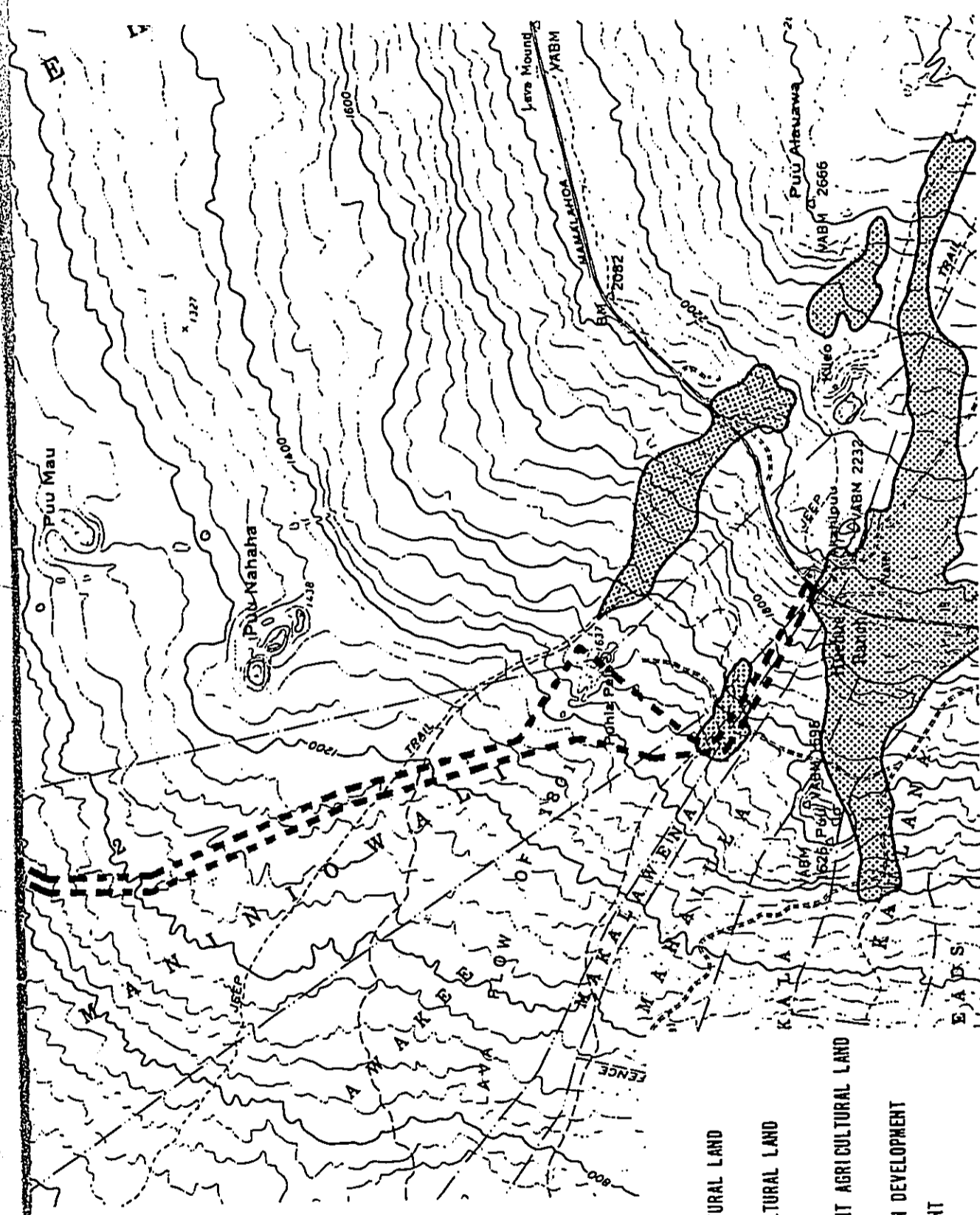
FIGURE 6
LSB DETAILED LAND CLASSIFICATION MAP

WB KUKIO UTILITY EASEMENT









August 1999





LEGEND:

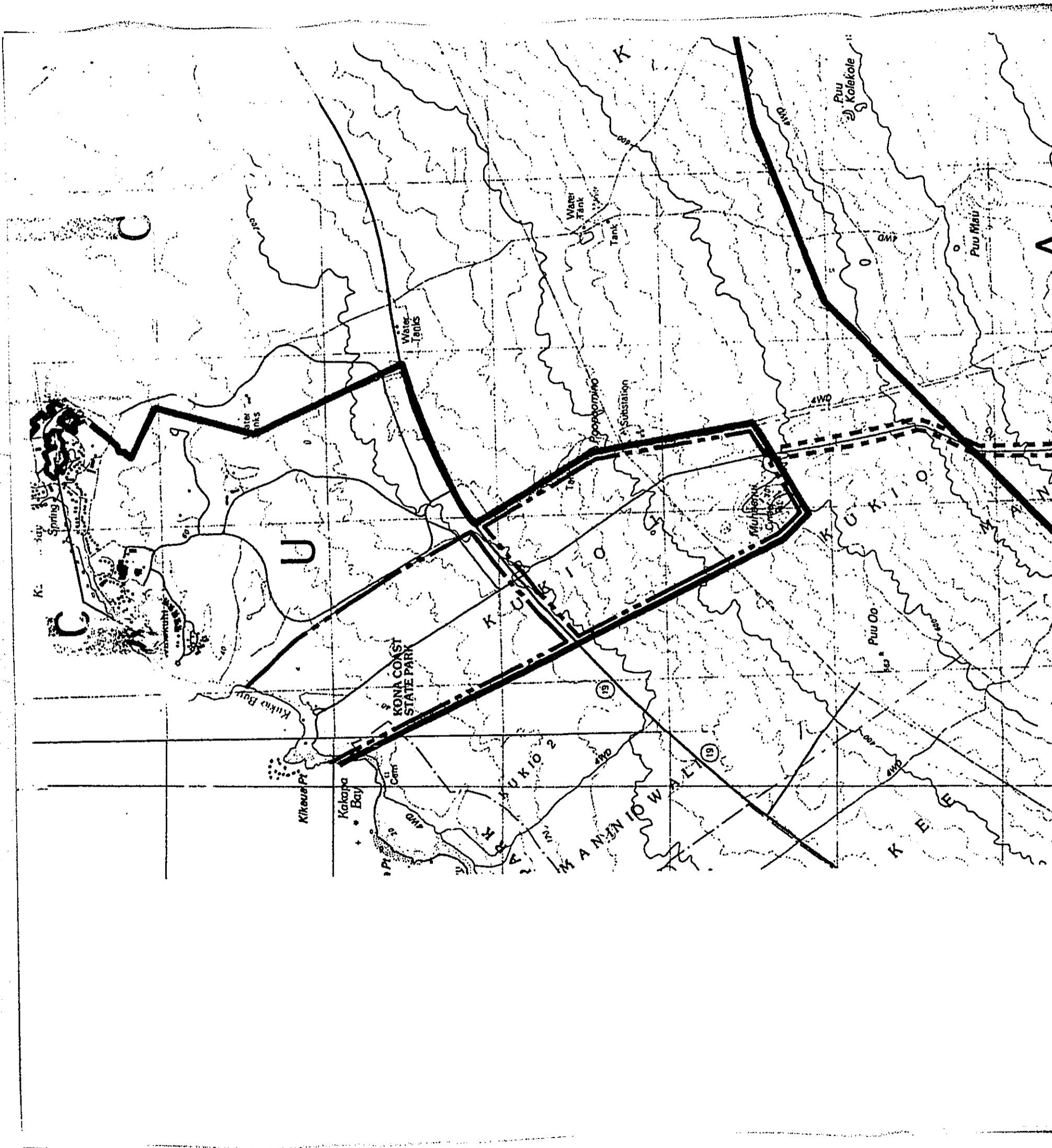
-  PRIME AGRICULTURAL LAND
-  UNIQUE AGRICULTURAL LAND
-  OTHER IMPORTANT AGRICULTURAL LAND
-  EXISTING URBAN DEVELOPMENT
-  U.S. GOVERNMENT

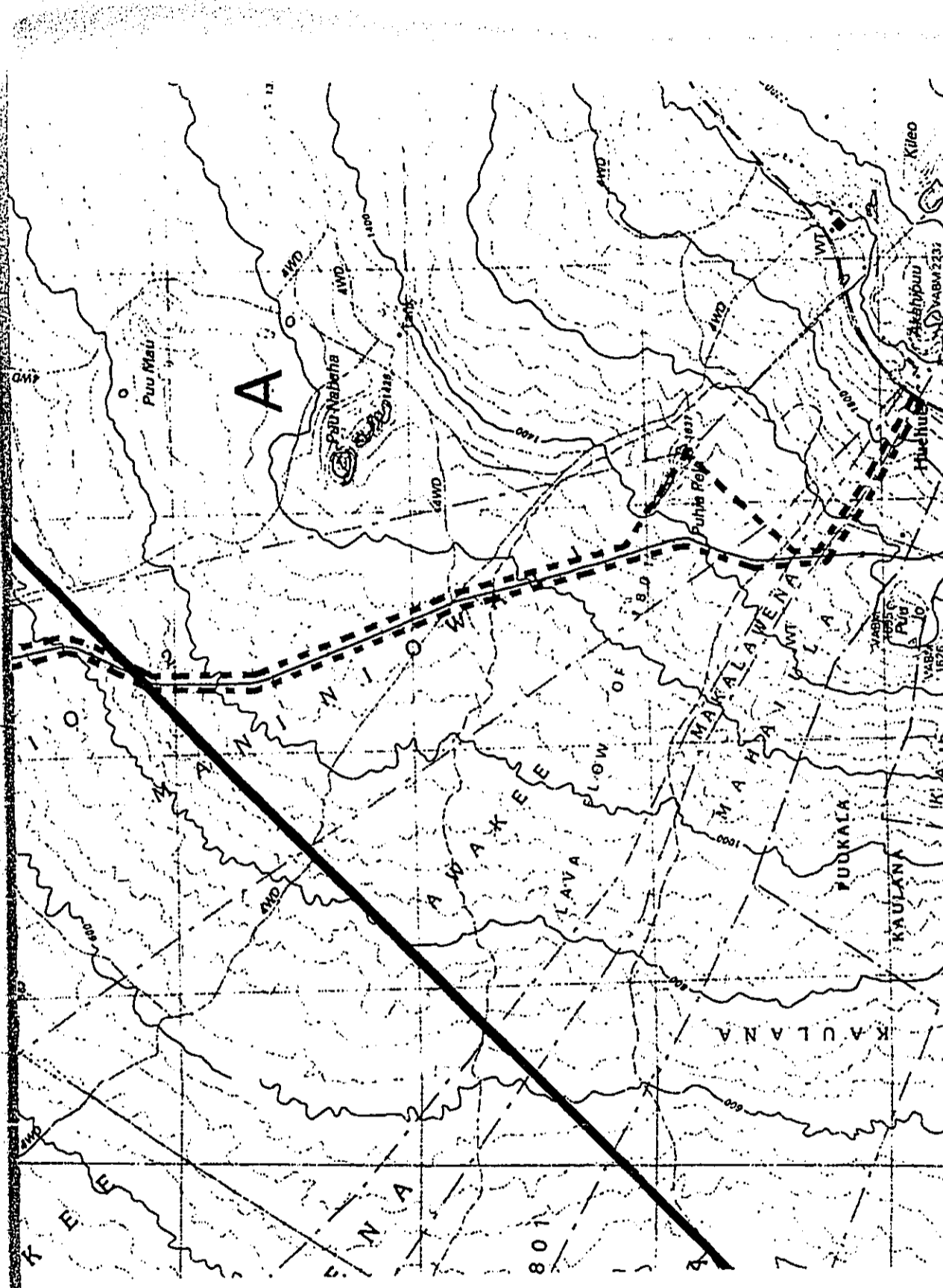
**FIGURE 7
ALISH MAP**

WB KUKIO UTILITY EASEMENT









 August 1999



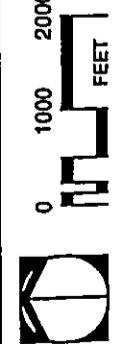



LEGEND

-  Study Area
-  WB Kukio Resort Property
-  Agriculture
-  Urban
-  Conservation

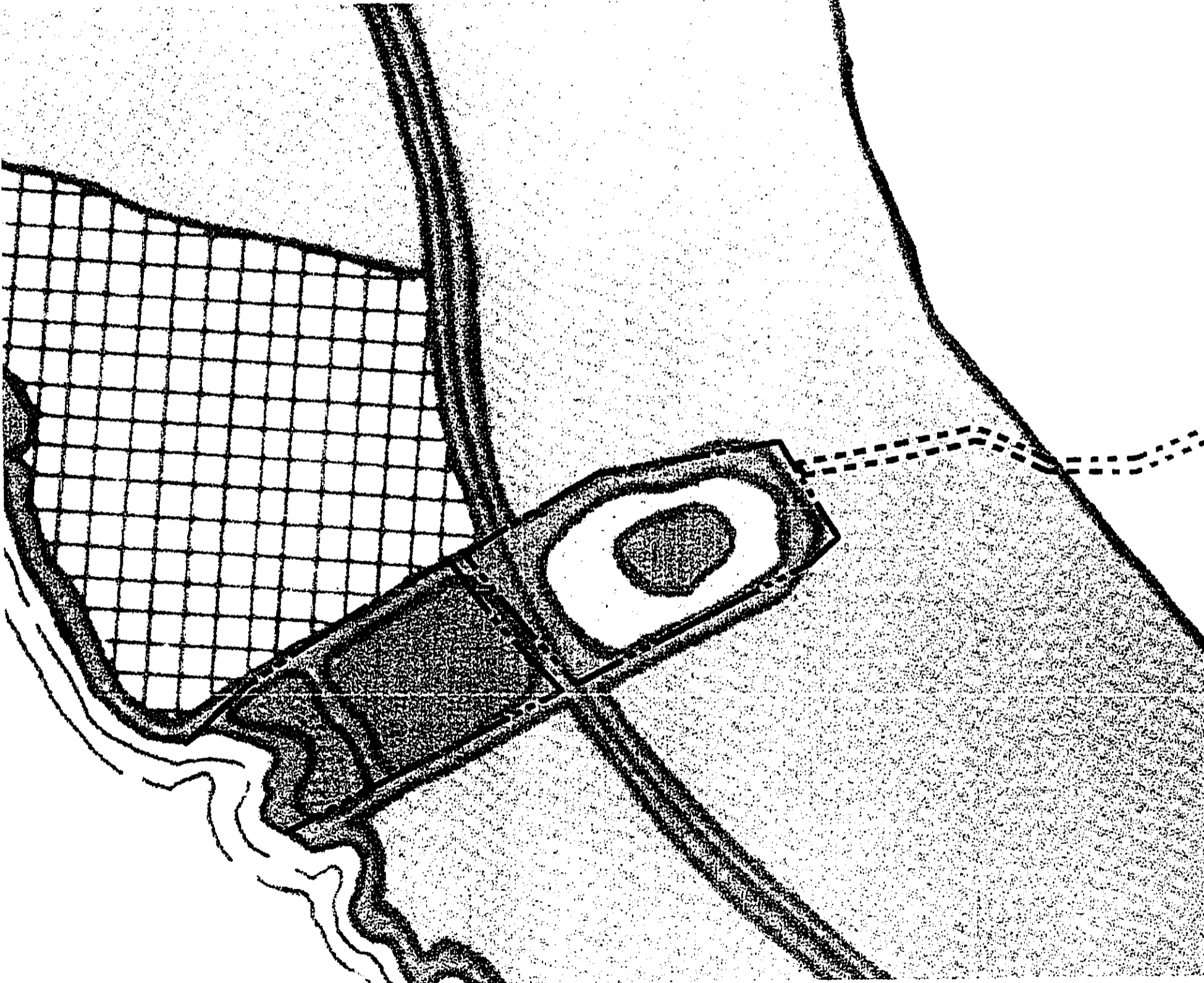
**FIGURE 8
STATE LAND USE DISTRICT MAP**

WB KUKIO UTILITY EASEMENT

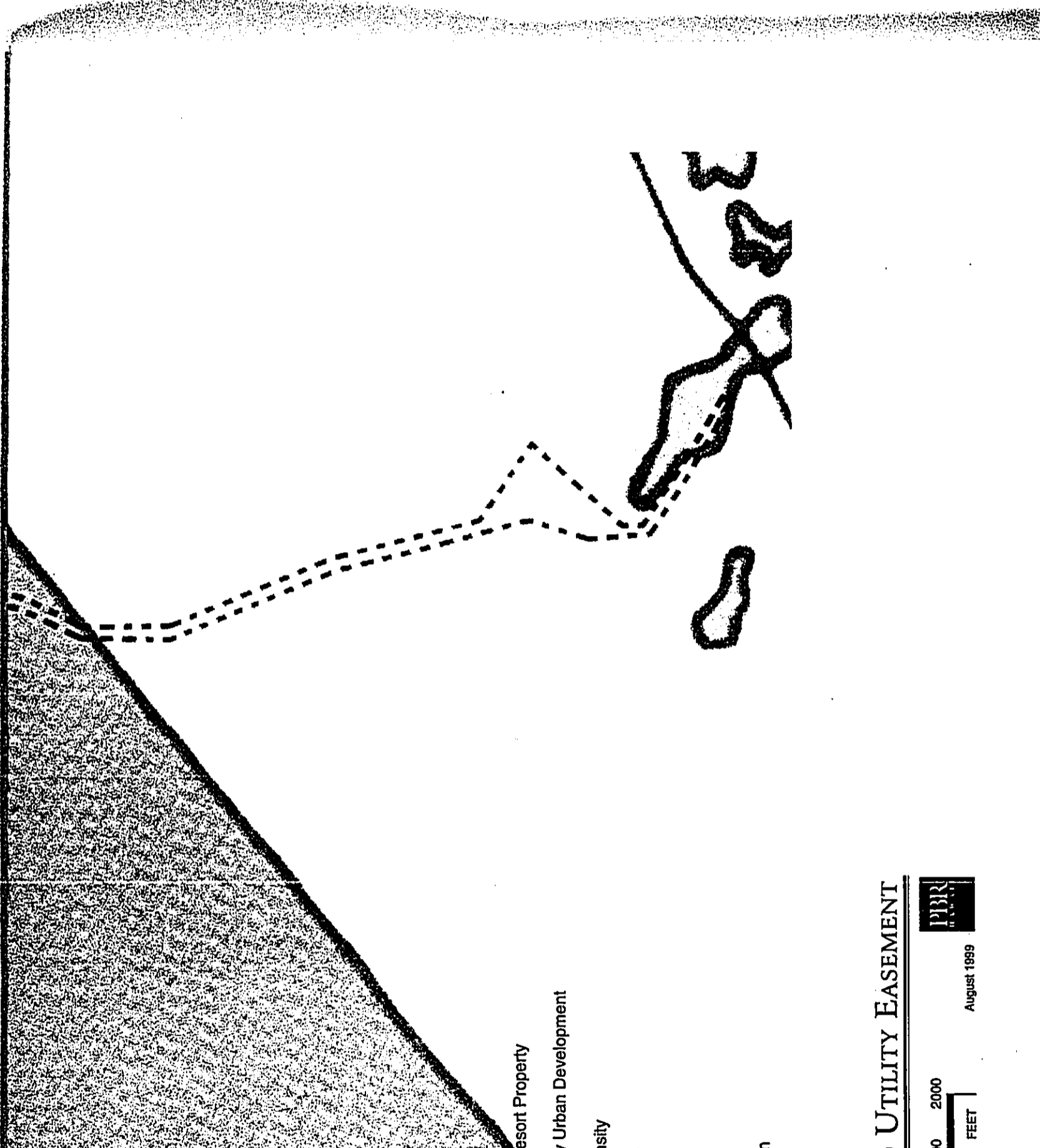



August 1999

RECEIVED AS FOLLOWS



RECEIVED AS FOLLOWS



LEGEND









-  Study Area
-  WB Kukio Resort Property
-  High Density Urban Development
-  Medium Density
-  Low Density
-  Orchards
-  Open Area
-  Conservation

FIGURE 9
LUPAG MAP

WB KUKIO UTILITY EASEMENT

 0 1000 2000 FEET  August 1999

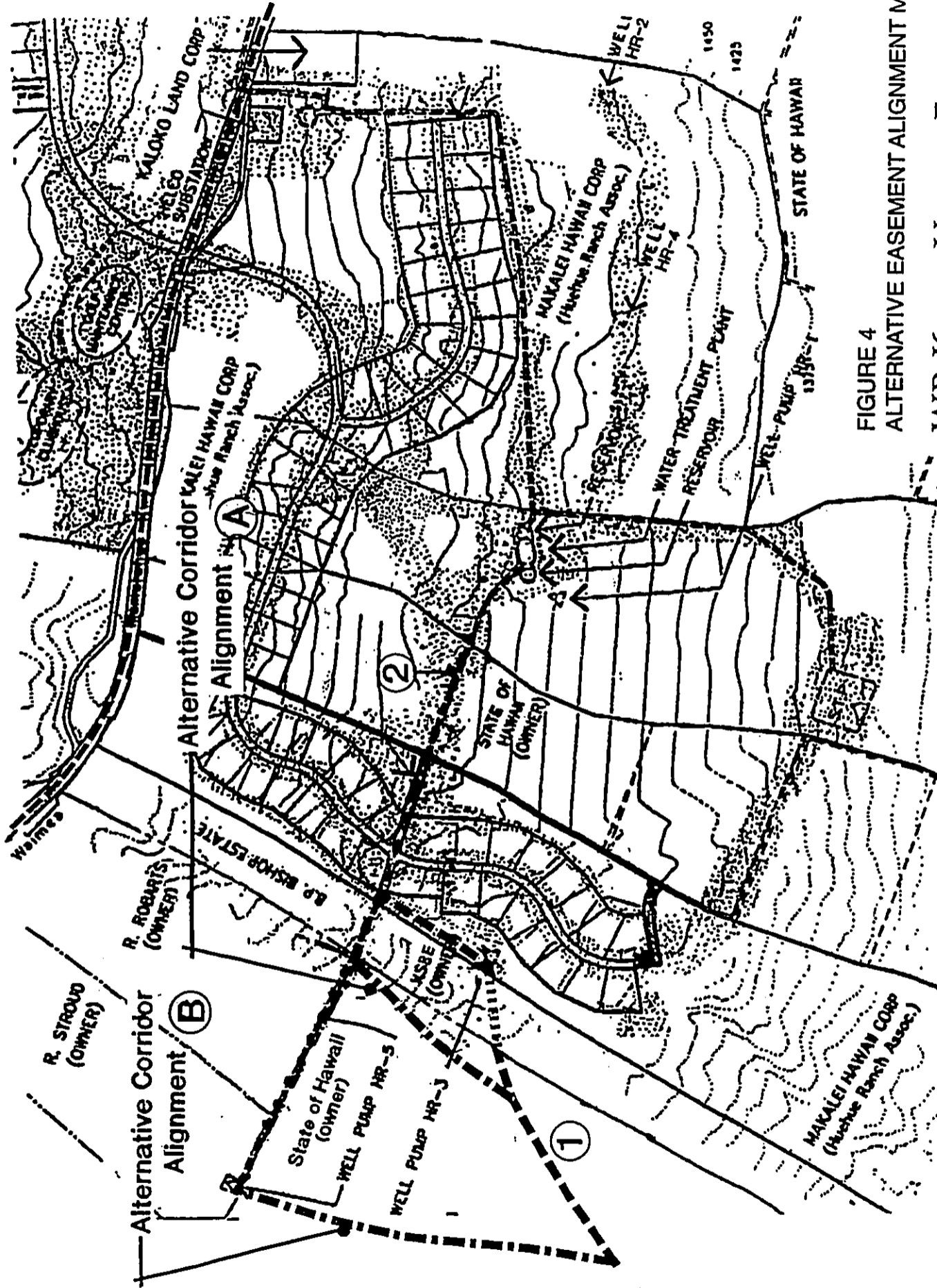


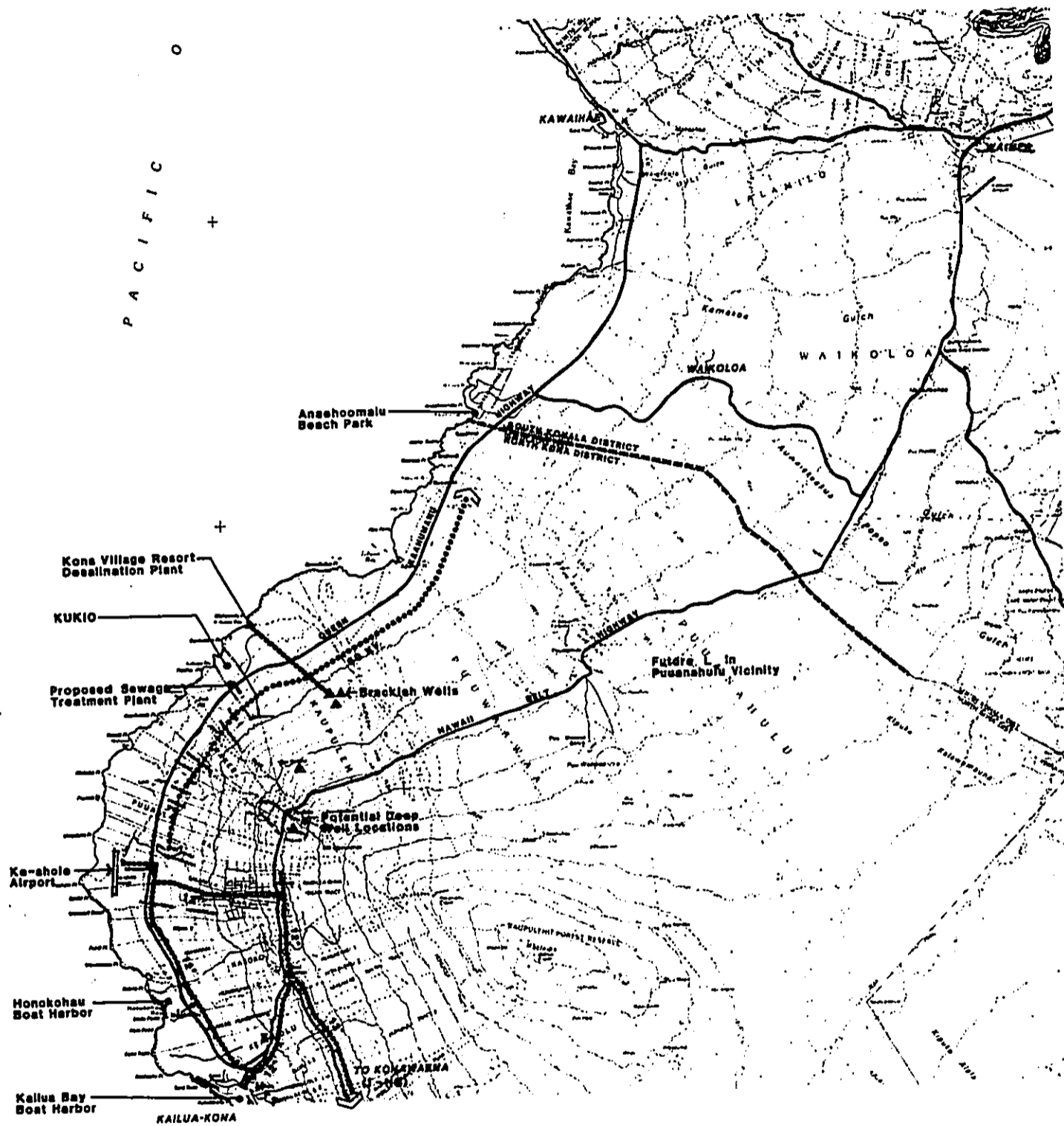
FIGURE 4
 ALTERNATIVE EASEMENT ALIGNMENT MAP
 WB KUKIO UTILITY EASEMENT

0 500 1000 FEET

PBR HAWAII August 1999

Kaui's Beach

1. Intermediate resort - a self contained resort destination area which provides basic and support facilities for the needs of the entire development on a smaller scale than a major resort area. Such facilities shall include sewer, water, roads, employee housing and recreational facilities, etc. (Zoning change from C-1 to intermediate resort, medium density and low density)
2. Need boundary amendment, change in county zoning, special management area permit (SMA), grading permit, well permit, sign permit, CDU, wastewater (DOH permit, Underground Injection Control (UIC) permit, COE (Corp of Engin)
3. Archeologic ~~parts~~ - ^{36 pms} incorporate in project design
4. archeological / historical resources - 69 sites
5. Shoreline accen - shoreline set back
6. natural resources
7. traffic
8. water allocation
9. archeological survey - current ^{burial site, trails, settlement} map showing location of sites and map to show the design of courses to see how it affects the sites
10. Impact total development would have on others (Kona Village, Hopenua)
11. Archeologic find management plan
12. Archeologic management plan (Historical preservation plan)
13. shoreline dispute and surveyed.
14. Trails and public access to shoreline, what public access and how and they incorporated into plan.
15. ~~for~~ sketch for project.



LEGEND

SERVICES		INFRASTRUCTURE		SCHOOLS	
[H]	Hospital	[---]	Electrical Line	[E]	Elementary
[L]	Land Fill	[---]	Water Lines	[I]	Intermediate
[F]	Fire Station	[▲]	Water Wells	[HS]	High School
[P]	Police Station				

**PUBLIC FACILITIES
KUKIO BEACH RESORT
HUEHUE RANCH**



FIGURE 3-3

Detailed infrastructure plans for water supply will be designed and constructed conforming to agency requirements. Private systems are planned for water supply and wastewater treatment to minimize public expenditures.

TABLE 3-5
 Projected Water Consumption at Build-Out
 (In million gallons per day)

<u>Use</u>	<u>Gross Area (Acres)</u>	<u>Max. Units</u>	<u>Water Domestic</u>	<u>Demand Irrigation</u>	<u>Max. Day Total</u>
Hotel	45	1350	^{500 gal/unit} 0.675	0.456	1.018
Multifamily	130	1950	^{470 gal/unit} 0.916	0.596	1.596
Single Family	258	750	" 0.352	0.235	0.525
Clubhouse	2	--	0.004	0.005	0.009
Commercial	6	--	0.013	0.014	0.027
Park	5	--	--	0.011	0.011
Roads	15	--	--	0.204	0.585
Total:			1.960	1.521	3.771

Note:

1. Projections based on County of Hawaii, Dept. of Water Supply, standard rates and actual usage figures at Mauna Lani Resort, 1985.
2. Figures are estimated maximums, excluding only golf course use from potable water demands.

3.13 WASTEWATER

3.13.1 Existing Conditions

Kukio is not within reasonable range of an existing public sewage system and, like other resort systems along the West Hawaii coast, will need to construct an independent treatment and disposal facility.

3.13.2 Impact

A self contained sewage treatment plant will be constructed to meet existing regulatory standards. Once treated, wastewater will be used for irrigation of the golf course and landscaped open spaces. Disposal of properly treated sewage effluent can be accomplished at the site with minimum impact as a result of the high permeability of the underlying rock (Runyan, 1984).

Discharges of treated wastewater may alter the chemical composition of the anchialine ponds to some degree, but is not expected to produce any noticeable change in pond biota because of the high degree of natural flushing. Preliminary estimates of sewage generation are provided in Table 3-6.

TABLE 3-6

Projected Wastewater Generation
(100% Unit Occupancy at Build-out)

<u>Use</u>	<u>Maximum Units</u>	<u>Generation (gpd/unit)</u>	<u>Flow (mgd)</u>
Hotel	1,350	300	0.405
Multifamily	1,950	280	0.546
Single Family	750	280	0.210
Commercial	6 AC.	1,320	0.008
Clubhouse	2 AC.	1,320	0.003
Total:			1.172

3.13.3 Mitigation Measures

Utilization of treated wastewaters for golf course and landscape irrigation represents an environmentally sound and energy-efficient means of wastewater disposal in contrast to the other alternative means of disposal which would likely have greater environmental impacts.

Detailed infrastructure plans for on-site wastewater treatment and disposal will be designed and constructed conforming to agency requirements. Private systems are planned for water supply and wastewater treatment to minimize public expenditures.

3.14 SOLID WASTES

3.14.1 Existing Conditions

The North Kona area is currently served by the Kailua landfill near Kailua-Kona. This facility will continue to serve the district until a planned new landfill, near Pu'uanahula, 10 miles east of Kukio, becomes operational in several years. The collection and delivery system is by transfer stations operated by the County or private collection services that provide on-site pick-up and disposal at the designated County landfill.

3.14.2 Impact

Kukio Beach Resort solid waste generation will have an impact on existing and planned landfill capacities by accelerating the need to provide alternative landfill sites in the future. At completion and full occupancy, the project is projected to generate a maximum of approximately 4.9 to 6.9 tons of solid waste per day based on a projection factor of 3.3 pounds per day per person assuming 100% occupancy.

3.14.3 Mitigation Measures

Alternatives evaluated for the collection and delivery system for removing solid waste from the development included the utilization of transfer stations, private collection and a combination of both. Due to considerations of convenience, cost efficiency and level of service desired for a first class resort community, the solid wastes (including by-products of the sewage treatment facility) will be removed from the site by private refuse collectors and disposed of at approved County locations according to public health and safety standards. These services will be made a requirement of the Codes, Covenant and Restrictions that will be prepared for the resort community.

3.15 ELECTRICAL POWER AND COMMUNICATIONS

3.15.1 Existing Conditions

Electrical power on the island of Hawaii is provided primarily by Hawaii Electric Light Company (HELCO). The County's current generating capacity is 125,900 KW. A powerline corridor with a 69 KV line currently crosses the Kukio property at an elevation of 440 feet, just makai of Muheenui cinder cone. Plans to upgrade the line to 138 KV are currently under discussion.

Telephone service is provided by the Hawaiian Telephone Company. Telephone substations are located within designated service support areas. Telephone signals are received at such facilities via microwave dish. Cable television (CATV) signals are also received by microwave dish and extended to all development sites by underground lines.

3.15.2 Impact

In order to provide power to the proposed development, a substation will need to be constructed within the Kukio service area and a distribution system installed. Provisions for standby electrical power by on-site generators will be provided to all essential services as necessary.

3.15.3 Mitigation Measures

There is sufficient energy available in the existing energy grid to accommodate the project's future power needs.

Detailed infrastructure plans for the electrical power and communications system will be prepared conforming to agency requirements.

3.16 POLICE AND FIRE PROTECTION

3.16.1 Existing Conditions

The nearest police and fire services are based out of Kailua-Kona with an approximate 15 minute response time to service Kukio, some 12 miles to the north. According to the County Police Department, the North Kona district retained 55 uniformed police officers in 1984, representing 22% of the total uniformed officers countywide, and matching the district's proportion of total County resident population. The Kailua-Kona Fire Station is a multiple engine company equipped with a ladder truck. The County Fire Department is currently evaluating possible opportunities for additional station sites in South Kohala to serve area-wide resort needs.

The Kohala Coast Resort Association has offered to fund the full construction of a new 24-hour fire station and fire fighting equipment (except emergency medical service vehicle) within the Mauna Lani Resort in South Kohala. Located approximately 17 miles to the north of Kukio, the County would provide the personnel and administrative and operational costs. Funding would be through the floating of bonds by the County wherein retirement (repayment) of the bond would be by the Association.

3.16.2 Impact

The development of the Kukio Beach Resort community will result in increased demands for police and fire protection services and facilities. Kukio Beach Resort demands on police and fire services may be significant within the context of cumulative resort development plans in North Kona and South Kohala. A coordinated program for provision of police and fire facilities and services will be needed.

3.16.3 Mitigation Measures

Demands on County police services at Kailua-Kona will be partially offset by on-site security personnel and nightwatch services. As the resident population increases in the region, additional uniformed police officers will need to be retained in conjunction with the County Police Department needs assessment. These public service needs should be met by the County based on the revenue generated by the development of Kukio Beach Resort.

Fire protection will be provided from the Kailua-Kona Fire Station until such time that the cost/benefits justify the provision of a new station in close proximity to the proposed development. In conjunction with the proposed resort development at Kaupulehu a new fire station, privately owned and operated or developed and turned-over to the County as proposed by the Kohala Coast Association, could improve the level of service and reduce insurance costs for the resort.

Additionally, all resort facilities will be designed and constructed in accordance with all applicable County fire requirements and building code provisions.

3.17 MEDICAL FACILITIES

3.17.1 Existing Conditions

The full-service health care facility nearest to Kukio is the Kona Hospital, with a total of 79 beds, 53 of which are for acute care and 26 for long-term care. According to the State Department of Health, the hospital has a staff of 36 physicians. An administrator in the State Department of Health described Kona Hospital's resources as inadequate to meet existing regional population needs.

Two additional state-operated hospitals are in Kohala. Existing major long-term care facilities in West Hawaii are operating at or above their desired capacities.

3.17.2 Impact

Kukio Beach Resort development will place additional demands upon Kona Hospital and other West Hawaii medical facilities which are already considered inadequate to meet regional needs. The resort's impact is considered cumulatively significant in combination with projected demands of other resort development in South Kohala - North Kona.

3.17.3 Mitigation Measures

Market demand for additional medical care facilities will dictate future expansion in private and public sector medical services requirements.

3.18 SCHOOLS

3.18.1 Existing Conditions

Students from resort-based families and new employee families are expected to attend classes at schools in North and South Kona, South Kohala, North Kohala and Hamakua. A total of 22 public elementary schools and 5 public high schools are located in these service regions. North and South Kona combined, include 7 ele-

mentary schools and 1 high school. An additional elementary school has been proposed for Waikoloa to the north. Two private schools are located in Waimea and South Kohala; one school serves grades K through 12 and the other serves grades 7 through 12.

3.18.2 Impact

Kukio Beach Resort development will have direct and indirect effects on public schools. New students will be generated from on-site residences and as dependents of hotel employees, both on-site and off-site. Based on student enrollment which may be generated from the project, the State Department of Education estimated that the Kukio Beach Resort could generate 70 to 200 public school students (grades K through 12) at build-out. Additional classroom space and staff are projected to be needed at Kealakehe Elementary-Intermediate (K-8) School and Konawaena High School to accommodate the student enrollment generated by the Kukio Beach Resort development.

3.18.3 Mitigation Measures

Demand for additional educational facilities will influence future expansion needs in private and public sector schools. The Department of Education will be kept informed of the status of the project in order that funds can be requested from the Legislature to provide the necessary classroom facilities on a timely basis.

3.19 RECREATIONAL FACILITIES

3.19.1 Existing Conditions

Recreational facilities in both South Kohala and North Kona are extensive. Those in North Kona include a golf course, beaches, small boat harbors, historic sites, hunting areas and other amenities and attractions. The district has two County beach parks (Pahoehoe and White Sands), the Old Kona Airport State Park, and the Hulihee Palace State Monument. Throughout the district are numerous historic sites, including fishponds, trails, heiaus and buildings. The U.S. Army Corps of Engineers has established wetlands at Honokohau and Kiholo Bay. Several hiking trails are also available in the North Kona District. The Judd Trail provides access to the State Keahou 2 Nene Sanctuary. Bikeways are proposed throughout most of the district.

There is currently one golf course in the North Kona District; the Keauhou-Kona Golf Course located near Keauhou and a proposed golf course at Kaloko to be situated near the Kona Palisade Estates.

Many other recreational amenities similar to those in North Kona are also available in South Kohala and in other neighboring areas of West Hawaii. State and County lands are available for the development of additional public recreational facilities.

3.19.2 Impacts

Kukio Beach Resort development would increase access to the recreational amenities located on the site. New public access ways to the shoreline would be provided to give residents and visitors additional shoreline access. Improved access is likely to lead to increased ocean and other recreational activities.

Access to archaeological sites will have the beneficial effect of exposing visitors and guests to Hawaiian culture. On the other hand, it has the potential adverse effect of increasing the likelihood of vandalism.

Kukio Beach Resort 18-hole golf course, driving range and clubhouse would increase the golfing facilities in North Kona and allow for added public enjoyment of the sport.

Residents and visitors of the proposed resort community are expected to contribute to increased usage of recreational amenities off-site.

3.19.3 Mitigation Measures

Extensive recreational amenities will be provided at Kukio Beach Resort including an 18-hole golf course, driving range, and clubhouse, a shoreline park and beach club, a tennis center, equestrian center and a community park. These recreational facilities comprise approximately 28% of the total site area. These provisions for on-site recreational opportunities for both resort guests and residents would tend to offset the higher usage of off-site amenities. Thus, the burden of public recreational facilities off-site is not expected to be significant.

3.20 LAND USES

3.20.1 Existing Conditions

These lands have not been utilized for ranching or other agricultural uses due to their low agricultural utility. The site is occasionally used for recreation by ranch personnel. Active quarrying at the Muheenui cinder cone is also taking place.

Land to the south of Kukio is owned by the State of Hawaii and is currently not utilized. There are no current or foreseeable plans for improved access over these coastal lands for public and/or private use.

The lands of Kaupulehu to the north are owned by the Bishop Estate and are leased to a private group with future development interests. The Kona Village Resort, also in Kaupulehu, is approximately one mile to the north and is leased to a separate hotel operator which runs the self-contained, 100 room resort facility. The owners of these lands are formulating plans for an

intermediate resort development and have initiated the processing of the necessary land use regulatory approvals.

3.20.2 Impact

On-site: Both private and public recreational opportunities will be greatly expanded with resort development.

If left in its existing undeveloped state, natural resources of the site would be protected but public access would continue to be restricted. Development of the proposed resort complex would facilitate public access to anchialine ponds, historic sites and coastal recreational resources.

Existing quarrying at the cinder cone may continue, contingent upon resort development phasing plans.

Surrounding lands: The Kukio Beach Resort is a master planned resort development, providing a range of uses and requiring no major extensions of infrastructure through adjacent areas.

The project would require no new extensions of infrastructure through state lands to the south. Impacts on adjacent state lands may be limited to occasional public access from the resort.

The project does not result in a significant loss of open space within the North Kona district or West Hawaii.

No adverse impact is expected on the Kona Village Resort to the north due to the physical distance between each site of approximately one mile. In consideration of the proposed resort development within Kaupulehu and immediately adjacent to Kona Village, the proposed resort would have minimal, if any, impact on Kona Village.

In examination of the land ownership of coastal lands of North Kona and South Kohala (Figure 2.6), the majority of the lands are owned by the State of Hawaii. Major private lands that are large enough to accommodate a destination resort along this coastline are all separated by major expanses of State land, thus the major destination resorts of West Hawaii will retain their uniqueness and general isolation from other urban land uses or population centers. With the addition of Kukio Beach Resort being developed along this coastline, there is no significant detrimental effects on the existing resorts of Waikoloa, Mauna Lani and Mauna Kea.

Together with other existing and planned developments, the proposed Kukio Beach Resort contributes to the need for long range management planning of state owned lands in West Hawaii.

3.20.3 Effects Which Cannot Be Avoided

The project will commit existing open space to resort uses.

3.20.4 Mitigation Measures

Resort planning for Kukio would be coordinated with planning for the adjacent Kaupulehu lands of the Bishop Estate. Development of Kukio and Kaupulehu lands would consolidate resort development in North Kona, north of Kailua-Kona on contiguous private landholdings, thereby, facilitating efficient management of extensive state lands to the north and south.

Coordinated planning with adjacent property owners will contribute to sound utilization and protection of the natural resources in the North Kona region.

3.21 VISUAL/AESTHETIC

3.21.1 Existing Conditions

The Kukio site is essentially undifferentiated from surrounding lands in terms of topography, vegetation zones, and visual character (Figure 3-4). The Muheenui cinder cone and a small cinder hill off-site to the north appear as the only visually distinctive features in the immediate vicinity. Coastal views from Queen Kaahumanu Highway are generally uninterrupted along the Kona Coast north of Kailua and Keahole Airport, reflecting the open space character of these predominantly state-owned lands.

For the most part, the overall visual or aesthetic appeal of the site is linked to the open space character of surrounding lands. Exceptions include the distinctive natural amenities of the site, including the 3400 lineal feet of white sandy beach, and the cluster of anchialine ponds just mauka of the coastal strand.

3.21.2 Impact

The proposed project will result in the development of visually prominent man-made features within a predominantly natural setting. While the resort complex, including any multi-story hotel(s), may contrast visually to some degree with surrounding lands, buildings and extensive landscaping will provide visual interest which enhances the aesthetic aspects of the site.

3.21.3 Effects Which Cannot Be Avoided

The resort development will alter the natural vistas of the site and surrounding lava flows.

3.21.4 Mitigation Measures

In order to minimize the visual impact of the buildings from the Queen Kaahumanu Highway, attention will need to be given to the linear development edges along the property boundaries and the highway. The preliminary development plan has included a buffer

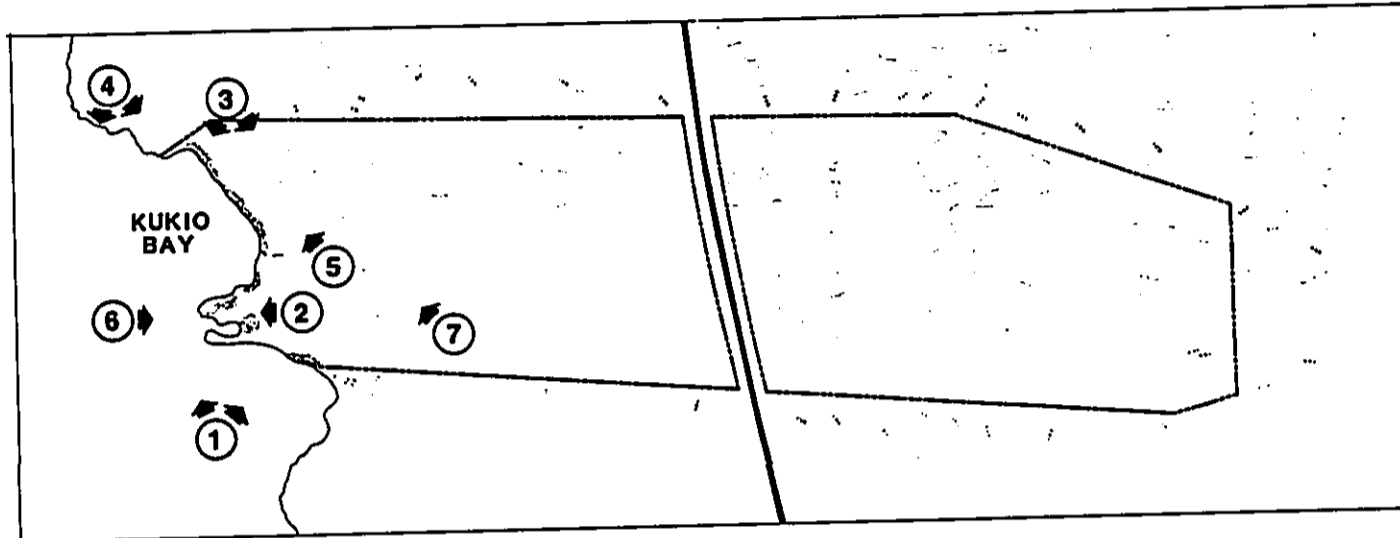


PHOTO INDEX MAP



1 KUKIO BAY. LOOKING NE TOWARD KONA VILLAGE AND SOUTH KOHALA

SITE PHOTOS - VISUAL ANALYSIS
KUKIO BEACH RESORT
HUEHUE RANCH

FIGURE 3-4

2



COVE BEACH

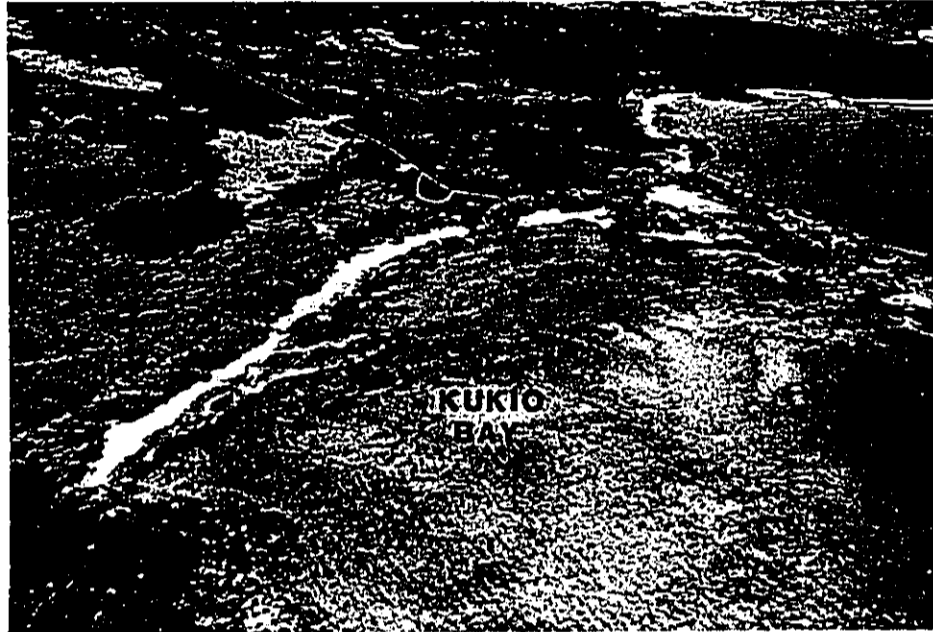
3



KUKIO BAY. LOOKING SOUTH ALONG COASTLINE

SITE PHOTOS - VISUAL ANALYSIS
KUKIO BEACH RESORT
HUEHUE RANCH

4



KUKIO BAY. LOOKING SOUTHEAST

5

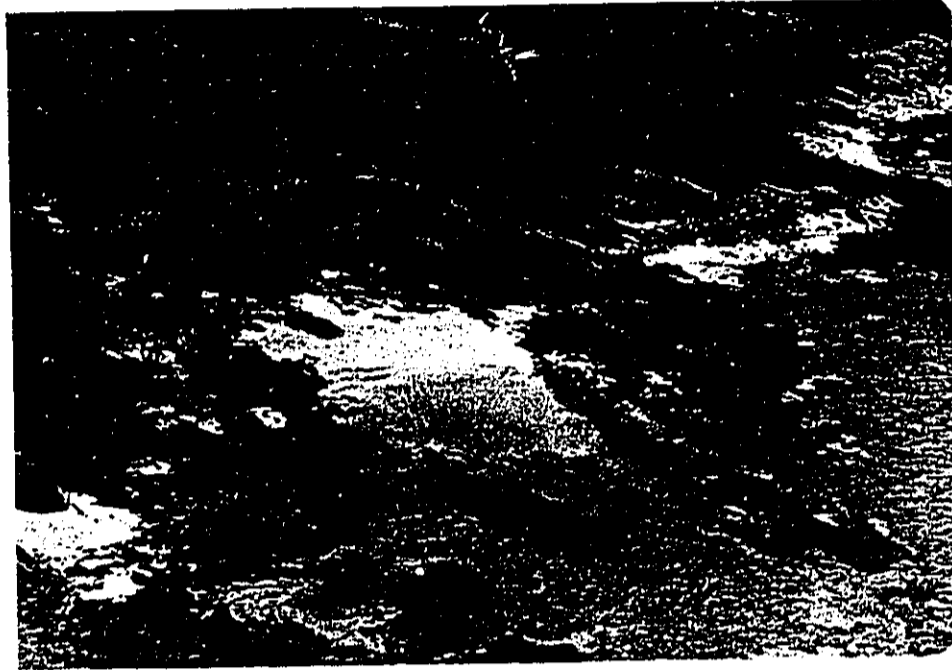


PONDS AND COCONUT GROVE

SITE PHOTOS - VISUAL ANALYSIS
KUKIO BEACH RESORT
HUEHUE RANCH

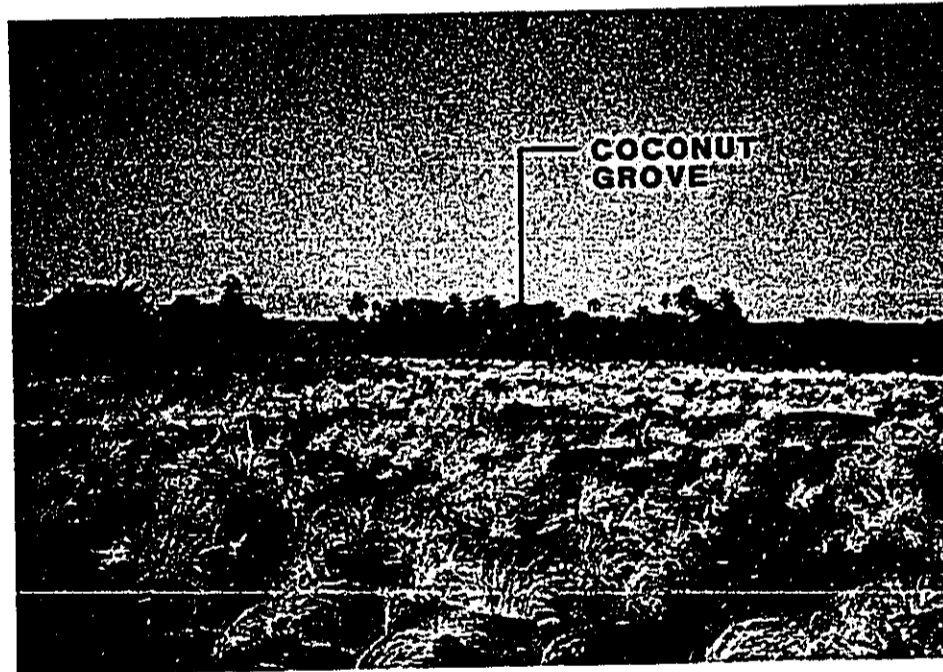
FIGURE 3-4

6



COVE BEACH WITH KIAWE THICKET

7



ENTRY VEGETATION WITHIN PAHOEHOE LAVA

SITE PHOTOS - VISUAL ANALYSIS
KUKIO BEACH RESORT
HUEHUE RANCH

FIGURE 3-4

zone along the highway and, with appropriate design criteria, all structures will be developed to assure no adverse visual or aesthetic impacts. An extensive landscaping program utilizing indigenous species will offset losses of natural, albeit depauperate, lava vegetation.

3.22 SOCIO-ECONOMIC

3.22.1 Existing Conditions

Regional Economic Setting: The entire island of Hawaii is defined for projection purposes as the resort's impact area. However, economic and fiscal impacts will tend to be concentrated in the North and South Kohala and North and South Kona districts. North and South Kohala and North and South Kona may collectively be referred to as West Hawaii. A generation or two ago, the Kohala area was an agrarian community dominated by sugar plantations and pasture lands, while Kona was an area of coastal fishing villages with a handful of independent farmers on the mountain slopes. The economy of this region has changed considerably since Hawaii's statehood.

Coffee production and ranching provided Kona's economic base through much of this century, but it was an unsteady economy due to great fluctuations in the international coffee market. In the years following statehood and the introduction of jet service to the islands, the Kona coastline began to host an increasing number of visitors. In the 1960s and 1970s, North Kona fueled a building boom that spread to South Kohala and resulted in hundreds of new hotel and condominium units and residential dwellings.

Today the region is primarily supported by its real estate and visitor industries. The Kohala and Kona districts have ideal weather conditions, a black lava coastline with scattered sandy beaches and important historical sites. Among the major visitor attractions of the region are the City of Refuge, Captain Cook monument and Kona billfishing. Currently the South Kohala and North Kona districts are the heart of the island's visitor industry. As of October 1984 the 5,690 hotel and visitor condominium units in these two districts represented 82% of the island's total.

The availability of large parcels of land under single ownership and the establishment of horizontal property regime laws have permitted high-quality master-planned development in several resort areas along this coast. Six resort areas currently exist in the South Kohala and North Kona districts. In South Kohala these are:

- o Mauna Kea Resort
- o Mauna Lani Resort
- o Waikoloa Village and Waikoloa Beach Resort

And in North Kona:

- o The Kailua-Kona area
- o Keauhou Resort
- o Kona Village Resort

Population: Nearly one-third of Hawaii Island's population resides in the two Kohala and two Kona districts. The resident population of these four districts was 27,518 in 1980, as shown in Table 3-7. Since 1970 the resident population for the area has increased at a compounded annual rate of growth, of 6.6% per year, or nearly twice the 3.8% rate of growth for the county as a whole. The North Kona district (which includes Kailua-Kona, Kona Village and Keauhou Resorts) experienced the most rapid population growth at 11% per year, followed by the South Kohala district (including the Mauna Lani, Mauna Kea and Waikoloa Resorts) at 7.1% per year. There were 8,960 households in the Kohala and Kona districts in 1980 with an average household size of 3.07 persons each.

Resident population growth on the island since 1980 has been more gradual than during the 1970s and continues to be most rapid in the North Kona and South Kohala districts. Between 1980 and 1984, population grew 6.9% and 6.3% per year in North Kona and South Kohala, respectively, compared to 5.3% for the Kona and Kohala region as a whole and 3.5% for the island, as shown in Table 3-7.

Growth in the island's de facto population, including visitors present but excluding residents absent, has also slowed since the 1970s. De facto population grew about 3.1% per year between 1980 and 1984, or slightly less rapidly than resident population growth during the period.

Social Characteristics: The social characteristics of the West Hawaii population were reviewed in terms of education, ethnicity and age in 1970 and 1980. All four districts of the Kona and Kohala region have changed over the intercensal decade in terms of increasing educational achievement, as shown in Table 3-8. This change was most pronounced in North Kona and South Kohala where development during the 1970s brought new economic opportunities.

All districts of West Hawaii showed increases in the share of population of working force age; South Kona, North Kohala and South Kohala also showed relative growth in the population aged 65 or older.

In 1980 the median age in the region ranged by district from 28.8 to 32 years of age, with the relatively older population residing in areas less impacted by the visitor industry and recent population growth.

TABLE 3-7

Kukio Beach Resort

Resident and De Facto Population of the
Kona and Kohala Districts and County of Hawaii

1970 to 1984

	April 1		July 1, 1984	Average Annual Percent Change	
	1970	1980		1970-1980	1980-1984
Resident population:					
North Kona	4,832	13,748	18,226	11.0%	6.9%
South Kona	4,004	5,914	6,730	4.0	3.1
North Kohala	3,326	3,249	3,403	(.2)	1.1
South Kohala	2,310	4,607	5,972	7.1	6.3
Total region	14,472	27,518	34,331	6.6%	5.3%
	=====	=====	=====	=====	=====
County of Hawaii	63,468	92,053	106,403	3.8	3.5
De facto population, County of Hawaii	65,700	98,700	112,600	4.2	3.1

Sources: State of Hawaii, Department of Planning and Economic Development, Hawaii State Statistical Areas Committee, Estimated Population of Hawaii by Districts, 1984 (Report CTC-64), 1985; and de facto population, by counties: 1970 to 1984, Data Book, 1985; U.S. Bureau of the Census, 1980 Census of Population, Number of Inhabitants, Hawaii (PC 80-1-A13), 1981; and First Hawaiian Bank, Economic Indicators (May/June 1985), 1985.

TABLE 3-8

Kukio Beach Resort

Social Characteristics of the Kona and Kohala
Districts and County of Hawaii

1970 and 1980

	North Kona (census tracts 215 and 216)		South Kona (census tracts 213 and 214)		North Kohala (census tract 218)		South Kohala (census tract 217)		County of Hawaii	
	1970	1980	1970	1980	1970	1980	1970	1980	1970	1980
Total population	4,832	13,748	4,004	5,914	3,326	3,249	2,310	4,607	63,468	92,053
Education (population aged 25+):(1)										
Less than 8 years	28.8%	8.0%	48.0%	23.6%	44.2%	29.0%	24.1%	8.6%	37.2%	20.1%
12 years	66.0	40.9	45.7	33.8	30.0	39.0	34.2	37.0	31.6	35.5
16 or more years	8.8	18.8	6.3	12.4	5.9	8.1	13.1	20.7	7.5	15.2
Ethnicity:(1)										
Hawaiian	19.3	22.1	14.7	23.5	15.3	24.7	26.5	28.5	12.3	18.8
Japanese	23.1	11.8	39.6	27.5	23.8	16.1	24.4	14.6	37.5	26.6
Caucasian	44.0	53.8	17.7	30.0	25.6	27.8	39.2	46.5	28.8	35.0
Chinese	3.7	1.6	.8	.8	4.3	1.0	1.3	1.4	2.9	1.7
Filipino	8.4	7.2	26.3	13.0	29.2	23.9	6.6	5.6	16.5	13.9
Other	1.5	3.5	.9	5.2	1.8	6.5	2.0	3.4	2.0	4.0
Age:										
Under 5 years	9.1	9.1	8.5	9.8	10.0	9.2	9.3	10.2	8.6	9.1
5 to 17 years	27.0	20.3	26.6	17.2	29.4	22.9	28.3	23.6	27.8	21.5
18 to 64 years	55.7	63.9	55.3	62.4	51.1	54.3	56.0	58.6	54.4	59.2
65 or older	8.2	6.7	9.6	10.6	9.5	13.6	6.4	7.6	9.2	10.2

(1) Estimates based on 15% sample.

Sources: U.S. Bureau of the Census, Census of Population and Housing, 1970, Census Tracts (Final Report, PHC(1)88, Honolulu, Hawaii, SMSA), 1972; Census of Population and Housing, 1980, Census Tracts (PHC 80(2)13), 1983; and Summary Tape files 1-A and 3-A, 1980; and State of Hawaii, Department of Planning and Economic Development, Community Profiles for Hawaii, 1973; and The Geographic Distribution of Hawaii's Racial Groups, 1970 and 1980 (SR #152), 1982.

Median family incomes in the North and South Kona districts were higher than the county average of \$19,132 while in the North and South Kohala districts they were notably lower than the county average. In North Kona, the median family income is among the highest in the county estimated at \$21,134 in 1979.

Labor Force Characteristics: Labor force participation rates increased significantly in North and South Kona between 1970 and 1980 but declined in North and South Kohala. Female labor force participation, however, has increased throughout the region, ranging from 18.5% and 10.6% increases over the ten years in North and South Kona, respectively, to 4.3% and 2.7% increases in North and South Kohala, respectively.

Overall declines in labor force participation in the two Kohala districts were due to their more modest increases in female participation and their declining rates in male labor force participation over the period, as shown in Table 3-9. This is attributed primarily to erosion in Kohala's traditionally male-dominated economic base of sugar cultivation and processing, coupled with the rise of resort- and tourism-related centers of employment in North Kona and South Kohala which provided many new work opportunities for women.

Information on labor force characteristics since 1980 is not available by district, but the State of Hawaii, Department of Labor and Industrial Relations (DLIR) prepares labor force estimates for the county as a whole. The DLIR estimates that in the first half of the 1980s, the civilian labor force has increased by 3.8% per year to about 50,600 persons in 1985, as shown in Exhibit D. However, county employment appears to have lagged behind labor force growth, resulting in an estimated 8.5% rate of unemployment in 1985, or about 2.2% more than in 1980.

Employment Patterns: Because of the expanding visitor trade, the hotel, retail, construction, real estate and financial industries of South Kohala and North Kona have experienced significant growth. Altogether, hotel-related industries are estimated to have accounted for 49.8% of civilian employment in South Kohala, 45.6% in North Kohala and 64.2% in North Kona in 1980, as reported by the U.S. Bureau of the Census.

Also in 1980, employment and labor force participation in the Kohala and Kona districts were higher than for the county as a whole. Labor force participation among persons aged 16 years and older was 68.2% in the region, compared to the countywide rate of 61%. Additionally, the Kohala and Kona districts' unemployment rate of 5.9% was lower than the 7% observed in the county as a whole in 1980. Since 1980 unemployment rates in the Kohala and Kona districts and in the county as a whole have increased. The average unemployment rate in 1985 for South Kohala, North Kona and South Kona was 6.8%. The unemployment rate for the county in December 1985 was 8.5%.

TABLE 3-9

Kukio Beach Resort

Labor Force Characteristics of the Kona and Kohala Districts and County of Hawaii

1970 and 1980

	North Kona (census tracts 215 and 216)		South Kona (census tracts 213 and 214)		North Kohala (census tract 218)		South Kohala (census tract 217)		County of Hawaii	
	1970	1980	1970	1980	1970	1980	1970	1980	1970	1980
Potential Labor Force (persons aged 16+)	3,262	10,115	2,629	4,265	2,240	2,286	1,446	3,290	43,075	67,205
Civilian Labor Force	2,022	7,292	1,535	2,823	1,355	1,355	951	2,110	25,889	41,006
Civilian Labor Force Participation Rates:										
Male	78.5	82.0	69.6	76.1	71.6	66.6	84.4	78.3	63.6	70.5
Female	43.5	62.0	44.7	55.3	47.8	52.1	46.3	49.0	36.4	51.3
Average	62.0%	72.1%	58.4%	66.2%	60.5%	59.3%	65.8%	64.1%	60.1%	61.0%

Sources: U.S. Bureau of the Census, Census of Population and Housing, 1970, Census Tracts (Final Report, PHC(1)88, Honolulu, Hawaii, SMSA), 1972; and Summary Tape Files 1-A and 3-A, 1980; and State of Hawaii, Department of Planning and Economic Development, Community Profiles for Hawaii, 1973; and The Geographic Distribution of Hawaii's Racial Groups, 1970 and 1980 (SR #152), 1982.

The occupational distributions shown in Table 3-10 also reflect the emerging visitor industry base of West Hawaii's economy. Employment in the Kohala and Kona districts tends to be in technical, sales, administrative support and service occupations. Together, these sectors account for about 46% of the districts' employment. Managerial and professional occupations account for about 18.9% of the districts' employment, while agricultural-, production- and operations-related employment each represent between 10.5% and 13.1%.

TABLE 3-10

Kukio Beach Resort

Employment Characteristics of the
Kona and Kohala Districts

1980

	North Kona (tracts 215, 216)	South Kona (tracts 213, 214)	North Kohala (tract 218)	South Kohala (tract 217)	Total region	
					Number	%
Labor force participation (persons 16 years & over)	<u>72.2%</u>	<u>66.2%</u>	<u>60.2%</u>	<u>64.1%</u>	N/A	<u>68.2%</u>
Civilian unemployment rate	<u>5.3%</u>	<u>5.7%</u>	<u>9.2%</u>	<u>6.3%</u>	N/A	<u>5.9%</u>
Employed persons by occupation:						
Managerial and Professional	1,462	362	187	407	2,418	18.9%
Technical, sales and administrative support	1,948	661	169	379	3,157	24.7
Service	1,486	460	421	355	2,722	21.3
Farming, forestry & fishing	491	520	175	277	1,463	11.5
Precision production, craft & repair	839	394	119	327	1,679	13.1
Operators, fabricators & laborers	<u>687</u>	<u>265</u>	<u>159</u>	<u>233</u>	<u>1,344</u>	<u>10.5</u>
Total	<u>6,913</u>	<u>2,662</u>	<u>1,230</u>	<u>1,978</u>	<u>12,783</u>	<u>100.0%</u>

N/A Not applicable.

Source: U. S. Bureau of the Census, 1980; (Mauna Lani Resort Revised Master Plan EIS - Draft, May 1985).

County-wide, non-agricultural job losses since 1980 have occurred in the construction and manufacturing industries, while relatively high job increases were noted in the areas of retail trade, services, and finance, insurance and real estate.

Agricultural employment in the county has fallen significantly since 1980. In the sugar industry along, the State of Hawaii, Department of Planning and Economic Development (DPED) estimates that the island lost about 500 jobs between 1980 and 1984..

3.22.2 Economic Impacts

This section describes the expected direct, indirect and induced economic impacts of the Kukio Beach Resort in terms of visitor expenditures, employment, resident income, population and housing. These impacts are assessed for the proposed hotel, condominium, single-family and commercial developments.

Visitor Expenditures

The Kukio Beach Resort will generate direct, indirect and induced visitor expenditures in Hawaii. Visitors to the Kukio Beach Resort will make direct expenditures for food, accommodations, gift items and other goods and services. These expenditures will, in turn, require those establishments serving direct visitor demands to purchase goods and services from other establishments in the state. The latter expenditures are those made by employees and proprietors with income derived from the establishments serving the direct and indirect visitor demands.

In order to estimate these expenditure effects, the analysis begins with a projection of the growth in visitor population expected to be driven by the proposed developments.

Visitor Population: Estimation of the average daily visitor population at the resort is the basis for projecting the visitor expenditure impact of the resort. The projected visitor population is based on the proposed facilities for visitor accommodations and on assumptions regarding unit usage, average occupancy and party size. These assumptions are based on the Hawaii Visitors Bureau's (HVB) 1985 survey of the usage of hotel and resort condominium units in the state (HVB, Profile: The Resort Condominium Market and Profile: The Resort Hotel Market, 1985) and on information gathered from interviews and discussions with resort operators and real estate brokers at selected properties on the islands of Maui and Hawaii. The assumptions used are summaries in Table 3-11.

The projected residential and visitor unit facility development at the resort could amount to 2,250 to 3,125 units at completion. The facility development consists of approximately 37% hotel units, 42% condominium units and 21% single-family lots.

TABLE 3-11

Kukio Beach Resort

Assumptions for On-Resort Population Projections

<u>Facility and Occupational Types</u>	<u>Percentage of Distribution</u>	<u>Occupancy</u>	<u>Aver. Party Size(2)</u>
Hotel units	100%	80%	1.9
Condominium units:			
Full-time residents	15	95	2.5
Part-time residents	20	25	2.5
Visitors	65	50	2.1
Single-family units:			
Full-time units	25	95	2.8
Part-time units	75	25	2.8

(1) Distribution of uses within facility type.
 (2) Occupied units only.

Sources: Based on interviews with resort operators and brokers at similar first-class resort developments and Hawaii Visitors Bureau, Profile: The Resort Condominium Market and Profile: The Resort Hotel Market, 1985.

As discussed above, all of the hotel units and 65% of the condominium units could be assumed to be used for visitor rentals. The projected occupancy rates range from 60% by 1995 to 80% by 2005 for the hotel units and 50% for the condominium units. Party size was estimated at 1.9 and 2.1 for the hotel and condominium units, respectively.

Thus, the projected visitor population could be expected to range from 1,560 to 2,260 persons at completion as shown below.

Kukio Beach Resort
 Projected Visitor Population

<u>Facility type</u>	<u>At Project Completion</u>	
	<u>Low</u>	<u>High</u>
Hotel units	912	1,368
Condominium units	648	887
Total	\$1,560	2,255
	=====	=====

Source: Peat, Marwick, Mitchell & Co.

Direct Visitor Expenditures: Direct visitor expenditures are projected based on average daily 1985 expenditures of \$93 and \$86 for hotel and condominium guests, respectively. These expenditures were estimated based on 1983 Hawaii Visitors Bureau (HVB) expenditure data and consumer price index trends as reported by the U.S. Bureau of Labor Statistics. The direct visitor expenditures, in 1985 dollars, could amount to \$51 million to \$74 million at completion of the resort.

Indirect and Induced Visitor Expenditures: Based on multipliers derived from the most recent information available from the Department of Planning and Economic Development's state Input/Output Model, the projected direct visitor expenditures could be expected to generate indirect and induced expenditures amounting to \$48 million to \$69 million at completion of the resort.

Including direct, indirect and induced effects, expenditures in the state attributable to the Kukio Beach Resort visitors are projected to total \$99 million to \$143 million at completion, in 1985 dollars.

Employment Impact

Planned developments at the Kukio Beach Resort will generate short-term employment during the construction of new facilities and long-term employment in the operation and support of those facilities. Employment effects may also be classified as being direct, indirect or induced. Direct effects are those directly supported by visitor expenditures, such as the employment of hotels and other establishments that serve visitors. Direct employment would generally be located in the county of Hawaii both at and outside of the resort.

Indirect effects occur when directly affected establishments purchase goods or services from other businesses in order to fill new visitor demand. Induced effects are those supported throughout the state's economy when employees or proprietors directly or indirectly dependent on visitor expenditures spend their earnings.

Direct Construction Employment: Direct construction employment is that which would be supported directly by the construction of the various facilities. Such employment would include the on-site laborers, operatives and craftsmen, as well as the professional, managerial, sales and clerical workers whose usual places of employment may be elsewhere on the island or in the state.

Direct demand for construction employees is estimated based on the employment experiences of comparable resort-related facility construction projects in the state. The assumptions used regarding direct construction employment at the hotel, condominium, single-family and commercial products proposed at the Resort are summarized in the table below:

TABLE 3-12

Kukio Beach Resort

Assumptions for Projection of
Direct Construction Labor Requirements

<u>Development type</u>	<u>Person-years per year per unit</u>	<u>Construction period (months)</u>	<u>Full-time equivalent person-years per unit</u>
Hotel	0.50	24	1.00
Condominium	0.70	18	1.05
Single-family lot	0.02	12	0.02
Single-family home	2.00	12	2.00
Commercial space	N/A	N/A	0.60(1)

N/A Not available.

(1) Per 1,000 square feet gross leasable area.

Direct labor requirements for the infrastructural improvements proposed at the Resort were estimated based on order of magnitude construction cost estimates provided by Phillips, Brandt, Reddick & Associates for the estimated labor components of the respective budgets.

Thus, direct construction employment demand may be expected to amount to about 2,800 to 3,600 person-years for the total project as shown in Table 3-13.

Indirect and Induced Construction Employment: The direct employment of construction workers at Resort projects will stimulate additional purchases of goods and services on the island of Hawaii and elsewhere in the state. In its most recent (1982) revisions to a model of the construction industry in Hawaii, the DPED calculated that 2.4 full-time jobs are created in the state for every full-time job in the building construction industry. The multiplier is used to project the indirect and induced employment to be supported by the direct construction employment.

A 1975 study of Kauai's economy suggested a regional capture rate of total indirect and induced employment amounting to about 20% of direct employment. Although the island of Hawaii's future economy may be expected to be more developed than was Kauai's economy in 1975, this figure is assumed to be appropriate due to the number of construction workers who are expected to come from off-island. The actual share of construction employment going to off-island workers will depend on the timing of other major projects planned for the county.

TABLE 3-13

Kukio Beach Resort

Projected Direct Employment for Facility Construction

(Person-years)

<u>Facility type</u>	<u>Total Project</u>	
	<u>Low</u>	<u>High</u>
Hotel units	800	1,200
Condominiums	998	1,365
Single-family lots:		
Lot development	123	150
Home construction	444	535
Commercial	39	45
Infrastructure:		
Recreational amenities	100	100
Other	250	250
Total person-years	2,754	3,645
	-----	-----

- (1) Estimates based on construction cost estimates provided by Phillips, Brandt, Reddick & Associates.
- (2) Includes an 18-hole golf course, clubhouse, beach club, tennis center and equestrian center.
- (3) Includes sewage treatment, roads, water lines, electrical facilities, reservoir and drainage wells.

Through multiplier effects, construction of the resort could generate a total demand for 6,600 to 8,700 person years for the entire project, 3,000 to 4,000 of which could be expected to be located on the island as shown in Table 3-14.

Direct Operational Employment: The majority of direct operational employment at the resort would occur in the two proposed hotels because of their relatively large size and their expected first-class levels of service. First-class resort hotels in Hawaii are found to employ between 0.5 and 1.4 full-time equivalent direct employees per hotel unit. The assumptions regarding direct operational employment at the resort are noted in Table 3-15.

TABLE 3-14

Kukio Beach Resort

Projected Direct, Indirect and Induced Employment
for Facility Construction

(Total person-years)

	<u>Low</u>	<u>High</u>
By Type of Employment:		
Direct	2,754	3,645
Indirect & Induced	<u>3,856</u>	<u>5,103</u>
Total(1)	6,610 =====	8,748 =====
By Location of Employment:		
On-island(2)	3,029	4,010
Elsewhere in State	<u>3,581</u>	<u>4,739</u>
Total	6,610 =====	8,748 =====

(1) Direct employment multiplied by 2.4. State of Hawaii, Department of Planning and Economic Development, Hawaii Construction Model: Further Developments, 1982.

(2) Direct employees represents 90% of direct employment expected to be on-site based on projected 1990 distribution for the statewide construction industry, state of Department of Labor and Industrial Relations, Employment Outlook for Industries and 1980-1990, 1984. Indirect and induced employment in the region estimated as direct employment multiplied by 0.2. Anderson, et al., Kauai Socioeconomic Profile, 1975.

TABLE 3-15

Kukio Beach Resort

Assumptions for Projection of Direct Labor Requirements

<u>Development Type</u>	<u>Full-Time Equivalent Positions</u>
Hotel (unit)	0.9
Condominium (unit)	0.2
Single-family (sold lot)	0.3
Commercial (per 200 square feet gross leasable area)	1.0

In addition, Resort administrative positions were estimated based on employment patterns in resort administration, property development and sales, accounting, golf course maintenance and service, grounds keeping, landscaping and maintenance of other infrastructural facilities, as observed at the Mauna Lani and Waikoloa Resorts.

Thus, the resort could be expected to have generated about 1,500 to 2,100 full-time equivalent direct operational positions at project completion.

Indirect and Induced Operational Employment: The direct operational positions would also generate additional employment elsewhere in the state. Recent studies on the economic impacts of tourism by the DPED indicate that each hotel, resort residential and resort administrative employee creates 0.9 indirect and induced positions. In addition, the factor for resort retail and restaurant positions was determined to be about 0.6 indirect and induced positions for each direct position. Thus, indirect and induced operational employment could be expected to total 1,290 to 1,760 full-time equivalent positions at completion.

Total Operational Employment: In summary, total direct, indirect and induced operational employment is estimated to represent between 2,830 and 3,840 full-time equivalent positions at completion of the resort, as shown in Table 3-16.

Resident Income

The resort could be expected to have a significant impact on personal and household income for residents of the island and state. The resort would generate resident income as employee wages, salaries and fringe benefits and as income to proprietors.

Personal Income: Personal income is defined as the wages and salaries paid to the direct construction and operational employees of the Resort. Personal income is projected on the basis of the expected levels of employment, as projected, and on average industry wages as reported by the DLIR (State of Hawaii, DLIR, Employment and Payrolls in Hawaii: 1984, 1985). The reported wages were updated to 1985 dollars based on changes in average wages in the state as reported by the DLIR Unemployment Insurance Division (in Pacific Business News, January 6, 1986). Assumptions are summarized as follows:

- o Full-time equivalent construction employees are assumed to receive an average annual wage of \$22,541, reflecting 30% of workers from off-island earning the statewide mean annual wage of \$26,786 and 70% from the island of Hawaii at the island mean of \$20,723.

TABLE 3-16

Kukio Beach Resort

Projected Direct, Indirect and Induced Employment
for Resort Operations

<u>Type of Employment</u>	<u>At Project Completion</u>	
	<u>Low</u>	<u>High</u>
Direct	1,540	2,078
Indirect and Induced:		
Hotel and Resort(1)	1,094	1,533
Commercial(2)	<u>195</u>	<u>225</u>
Subtotal	<u>1,289</u>	<u>1,758</u>
Total	<u>2,829</u> =====	<u>3,836</u> =====

(1) Related to direct employment at the hotels, condominium units and in resort administrative positions. Estimated as 0.9 indirect and induced employees per direct employees. Department of Planning and Economic Development, 1983, "The Economic Impact of Tourism in Hawaii: 1970-1980."

(2) Estimated as 0.6 indirect and induced employees per direct employees, Ibid.

o Full-time equivalent hotel, resort residential and resort administration employees are assumed to be paid at the island average of \$11,780 per year for hotel industry employees. This estimate of wages excludes tips, which may amount to a major portion of earnings in many service occupations in the industry.

o Full-time equivalent commercial sector employees are assumed to earn \$10,056 per year, based on the average wages in selected classifications of retail employment on the island.

Thus, personal income earned directly from expenditures of visitors to the resort may be expected to range between \$21.2 million and \$29.3 million at project completion, in 1985 dollars.

Household Income: It is difficult to project the total income benefits of the resort's development because of the dispersion of indirect and induced employment effects among many industries. However, estimation of total household income effects based on visitor expenditure levels permits a perspective on the statewide

income benefits that would result from the resort's further development.

Total household income generated by visitor expenditures at the resort would include the fringe benefits and proprietor's income paid by establishments that sell goods and services directly to visitors as well as the wages and salaries noted above. In addition, household income includes income generated through the multiplier effects of indirect and induced visitor expenditures.

The DPED reports that the multiplier effects of visitor expenditures throughout the community have declined in recent years, but that each \$1.00 spent by visitors in 1983 is estimated to have generated \$0.63 in total income to households in the state. Assuming a similar multiplier effect for the expected expenditures of visitors to the resort, it is projected that the resort could contribute between \$32.3 million and \$46.8 million at completion per year in total household income in the state in 1985 dollars.

3.22.3 Population Impact

The development of facilities will increase population at the resort and elsewhere on the island. On any given day there will be visitors staying at the resort's hotels and in residential units that have been put in visitor rental pools. There will also be persons residing during most or parts of each year at multi- or single-family properties at the resort. In addition, operational and construction employees attracted from off-island will add to the population of the region. This section discusses the on-resort and employee population impacts of the resort's development.

Off-Resort Population Impact: The Kukio Beach Resort will impact the county's population by attracting employees for the resort's construction and operation from off-island. Estimation of population growth generated off-Resort by employees of the Resort assumed that 20% and 33% of service sector and managerial or supervisory operational employees, respectively, could come from off-island for employment at the resort. For comparison, the Mauna Lani Bay Hotel estimates that one year after its opening, about 9% of its work force had recently moved to the island of Hawaii. A higher share of in-migrants is anticipated at Kukio Beach Resort because of the many more resort-related employment opportunities that are expected to exist on the island in the future than at present.

Based on past experience, between 20% and 50% of direct construction employees may be expected to come from off-island with the actual amount related to the amount and scheduling of other major construction projects in the state. For purposes of projection, about 30% of construction workers to be employed at the Resort were projected to come from off-island. However, as noted in

our report, the actual share of off-island workers would depend on labor agreements and the amount, timing and location of other major construction projects throughout the state at any given time. In three surveys taken in 1981 and 1982, during the construction of the first facilities at Mauna Lani Resort, it was found that between 16% and 45% of the workers were from off-island.

Dependents of workers attracted from off-island were estimated at 2.0 per managerial or supervisory operational employee, 1.0 per other operational employee and 0.5 per construction employee. These assumptions are based on discussions with resort operators and construction engineers and are supported as follows:

- o Managerial and supervisory employees are often young heads of households and hence may be accompanied by other household members. An average household size of three persons was assumed, based on the 1980 Hawaii county and North Kona averages of 3.1 and 3.0 persons per household, respectively (U.S. Bureau of the Census, 1980).
- o Nonmanagerial and nonsupervisory resort-related employees are less frequently heads of households and hence are less likely to be accompanied by dependents than are the former groups. In a sample of 4,128 hotel industry workers drawn from the Hawaii State Department of Health's Health Surveillance Survey, only 25% of all workers, including the 11% listed in managerial or supervisory occupational classifications, were heads of households (Bouslog, Employment in the Hotel Industry in Hawaii, 1985).
- o Because of the temporary nature of most construction projects, construction employees working on an island other than their usual place of residence are generally not accompanied by dependents or other household members. However, off-island construction workers were assumed to be accompanied by an average of 0.5 persons per direct worker in order to account for the few supervisory or other construction workers who may have relatively long engagements at the project site and the means to transport their families temporarily.

Based on the above assumptions, total off-resort population impact is projected to range from about 740 to 1,010 at project completion.

On-Resort Population Impact: On-resort population is comprised of visitors staying at the hotels and condominiums, and residents in condominiums and single-family residences. Average daily visitor population was projected to be about 1,560 to 2,260 at project completion. On-resort resident population was projected to be between 720, based on the assumptions shown previously in Table 3-11, to 940 at project completion.

Total Projected Population Impact: In summary, the facility development at the resort is projected to generate population growth at the resort by visitors and residents at the resort's facilities, and in the community by the in-migrant operational employees and their accompanying household members. Total projected population impact is projected to range from about 3,000 to 4,200 persons at project completion.

3.22.4 Housing Impact

This section presents the analysis of the housing needed to support the direct construction and operational employment expected to be generated at the resort.

Construction Employees: Construction employment is temporary and therefore does not generate the long-term housing demands that are associated with operational employment. With the generous housing subsidy allowances typically paid to construction workers, the demand for residential housing by construction employees is expected to be absorbed by units available in the short-term rental market of the Kona region. This approach has been found to be the most satisfactory solution to meeting construction employee housing needs at other major development projects in the Kona and Kohala regions.

If 30% of the construction workers were to come from off-island and require temporary accommodations, the Kona and Kohala region could expect to realize an influx of about 100 to 170 off-island workers at any given time, and a demand for about 40 to 80 rental housing units in a typical year of facility construction. The demand for units would probably be greatest in the early years of construction when major infrastructural developments would coincide with hotel, condominium and single-family construction.

It is anticipated that this additional and temporary construction employee housing demand could be accommodated by the existing and future stock of condominium and single-family homes available for short-term rent in the Kona and Kohala areas. For comparison, the Mauna Lani Resort found that in 1982, up to 112 construction workers were being accommodated in rental and other temporary housing in the area at any given time. Among those from off-island, about 52% were staying in rooms in houses and 45% in rental units. About two-thirds of those renting units were located in the Kona area and an additional 11% and 10% were located in the Waimea and Waikoloa areas, respectively (Mauna Lani Resort, Labor Housing Report, 1981 and 1982). According to the HVB, condominium units in visitor rental pools in the Kona and Kohala areas of the island increased 20% between June 1982 and June 1985, representing 2,114 units available for short-term rentals in 1985.

Operational Employees: The majority of the resort's direct operational employees are expected to come from "available" sources of labor such as unemployed and underemployed persons and labor market entrants.

The demand for additional housing on the island of Hawaii is projected to be less than the number of employees requiring housing because households could include more than one resort employee. About one-fourth of the off-island in-migrants could be expected to be experienced personnel brought to fill managerial or specialty positions. Such persons may be expected to be principally heads of households; thus, each managerial level in-migrant is projected to generate demand for one additional home. On the other hand, experience has shown that many service employees share housing. Thus nonmanagerial and nonspecialty employees in need of new housing are projected to generate a housing unit demand at a ratio of 1.5 employees per additional housing unit.

The cumulative demand for additional housing directly attributable to the resort's expansion is projected to amount to about 290 to 400 units at project completion. Between 19% and 23% of this unit demand would occur among persons in managerial or specialty positions with a relatively greater ability to afford market housing and would possibly choose to reside within the project.

The remainder of the projected additional housing demand, about 240 to 320 units at project completion, would come from the resort's nonmanagerial and nonspecialty employees who would have lower incomes and a lesser ability to afford housing.

Data on the household incomes of hotel employees from the Hawaii State Department of Health's Health Surveillance Survey enables estimation of income distribution of the households projected to demand new housing. The survey suggests that about 40% of resort service-related household incomes fell below \$27,000 per year and about 50% fell below \$30,000 per year, in 1985 dollars. A household earning \$27,000 per year would be able to afford a housing unit costing \$73,000 assuming an 11% interest rate, 30-year amortization period, 10% down payment and mortgage payments equal to 28% of gross monthly income. A household income of \$30,000 per year would enable purchase of a housing unit costing about \$82,000 under the same financing assumptions.

A survey of the pricing structure of a single-family home for sale in the North Kona district taken from the Hawaii Island - Kona Board of Realtors Multiple Listing Service, January 1986, shows a limited availability of single-family homes priced at or below \$80,000. Only about 8% of total single-family listings were priced at \$80,000 or below. Assuming employees with annual household incomes of \$27,000 or less would not be able to find affordable housing and employees with annual household incomes between \$27,000 and \$30,000 would have difficulty in finding

affordable housing, about 120 to 160 affordable housing units would be demanded in the county by project completion as shown in Table 3-17. An undetermined portion of this demand may be provided by other planned affordable housing projects within the region.

TABLE 3-17
Kukio Beach Resort
Projected Affordable Housing Units Needed

	At Project Completion	
	Low	High
Additional housing unit demand by non-managerial and nonspecialty employees	238	321
Share in affordable housing range:		
At 40%	95 ---	128 ---
At 50%	119 ---	161 ---

3.22.5 Fiscal Impacts

The fiscal impacts of the resort's proposed developments may be evaluated by comparing the tax revenues and expenditures that could be expected to be incurred. This section describes the expected fiscal impacts of the proposed developments in terms of additional revenues and expenditures to the county of Hawaii and the state of Hawaii.

Revenues

Development at the Kukio Beach Resort would bring additional tax revenues to the county and state. County revenues would be principally in the form of real property taxes on the new facilities. Revenues to the state would be composed principally of general and specific excise taxes and personal income taxes. The following sections project the additional revenues that could be generated for the county and state governments as a result of the resort's development.

County: Real property in the county is currently taxed at \$10.00 per \$1,000 of assessed value for land and \$8.50 per \$1,000 of assessed value for buildings, for all uses with the exception of improved residential land which is taxed at \$10.00 per \$1,000 assessed value.

Based on expected property values (as provided by Phillips, Brandt, Reddick & Associates, Kukio Beach Resort Cost Estimates,

1986, and John Child & Company, Inc., Hotel, Condominium and Single-Family Market Assessment for the Proposed Kukio Beach Resort, 1986) and current Hawaii County tax rates, the hotel, condominium, single-family, commercial and golf course facilities envisioned at the resort could be expected to generate between \$4.0 million and \$5.5 million at project completion in 1985 dollars. In the long run, the majority of these revenues would be attributable to the property value of the hotels and condominiums units.

State: Additional tax revenues to the state would be generated by the 4% general excise tax on direct, indirect and induced expenditures by the resort's visitors and also on expenditures by the resort's part- and full-time residents. In addition, the resort's full-time residents would pay individual income taxes and other state taxes such as liquor, tobacco, fuel, inheritance, insurance, franchise estate and conveyances taxes. Based on state tax receipts in fiscal 1984, it is estimated that the individual income and other state taxes mentioned above amounted to \$552 per capita.

Thus, total tax revenues to the state are expected to range between \$4.7 million and \$6.6 million per year at completion in 1985 dollars.

Expenditures

The visitors to the resort and the part- and full-time residents that could be expected to live at its condominium and single-family units would also necessitate additional expenditures of public resources. County expenditures on behalf of residents would also increase in proportion to the number of employees coming from off-island to work in the operations of the new resort.

Visitors are seen to necessitate public costs in terms of (1) public safety (such as increased needs for police and fire protection), (2) development and upkeep of highways, recreational facilities and natural resources, (3) health and sanitation measures and, (4) cash capital improvements. Residents necessitate public costs in all the aforementioned areas, and also in education, retirement and pension funds, public welfare and other government functions.

County expenditures were estimated in an analysis of fiscal year 1984 average per capita expenditures for residents of and visitors to the county and state (based on operating government expenditures reported by the Tax Foundation of Hawaii, Government in Hawaii, 1985, and resident and de facto population estimates published by the DPED) and our projections of the population impacts of the Resort.

TABLE 3-18

Kukio Beach Resort

Projected Annual Real Property Tax Revenues
Attributable to Development

(In 1985 dollars; millions)

Source of Property Tax Revenue	At Project Completion	
	Low	High
Hotel units(1)	\$ 1.04	1.57
Multi-family units(2)	1.92	2.63
Single-family units(3)	.57	.68
Single-family lots(4)	.39	.50
Commercial space(5)	.04	.04
Golf course(6)	.01	.01
Total revenues	\$ 3.97 =====	5.43 =====

- (1) Based on estimated value of \$145,000 per room and a combined land and building tax rate of \$9.00 per \$1,000 assessed value.
- (2) Based on estimated value of \$225,000 per unit and a combined land and building tax rate of \$9.00 per \$1,000 assessed value.
- (3) Based on estimated value of \$300,000 per unit and a combined land and building tax rate of \$8.50 per \$1,000 assessed value.
- (4) Based on estimated value of \$165,000 per lot and a tax rate of \$8.50 per \$1,000 assessed value.
- (5) Based on estimated value of \$60.00 per net leasable square foot and a combined land and building tax rate of \$9.00 per \$1,000 assessed value.
- (6) Based on estimated assessed value of \$5,500 per acre and a tax rate of \$10.00 per \$1,000 assessed value, and clubhouse valued at \$500,000 and a tax rate of \$8.50 per \$1,000 assessed valuation.

Sources: Phillips, Brandt, Reddick & Associates, Inc., "Kukio Beach Resort Cost Estimates," January 16, 1986. Tax Foundation of Hawaii, Government in Hawaii, A Handbook of Financial Statistics, 1985. John Child & Company, Inc., "Hotel, Condominium and Single-Family Market Assessment for the Proposed Kukio Beach Resort," January 1986.

TABLE 3-19

Kukio Beach Resort

Projected Annual Revenues to the State
Government Attributable to Development

(In 1985 dollars; millions)

<u>Revenue Source</u>	<u>At Project Completion</u>	
	<u>Low</u>	<u>High</u>
Visitors - general excise tax(1)	\$ 4.0	5.7
On-resort residents:		
General excise tax(2)	.4	.5
Individual income and other taxes(3)	.3	.4
Total	\$ 4.7	6.6
	=====	=====

(1) Based on 4% of direct, indirect and induced visitor expenditures.

(2) Based on 4% of selected household budget items. Household incomes assumed to be \$60,000 for full-time residents and \$150,000 for part-time residents based on a survey of resort developers and real estate brokers at other resorts by Peat, Marwick, Mitchell & Co.

(3) Estimated at \$552 per year per on-resort full-time resident.

Sources: Department of Planning and Economic Development, The State of Hawaii Data Book, 1984, 1985. Tax Foundation of Hawaii, Government in Hawaii; A Handbook of Financial Statistics, 1985.

County: This analysis indicates that county government expenditures in 1984 totaled about \$540 per resident and \$340 per visitor.

Based on these county government outlays, public expenditures by the county on the behalf of the resort's residents or visitors and employee in-migrants to the county could be expected to total about \$1.3 million to \$1.8 million per year at project completion in 1985 dollars.

State: An analogous examination of state government expenditures and the relevant populations for the various services and functions provided by the state indicates that state expenditures in 1984 totaled about \$2,000 per resident and \$210 per visitor.

Based on this analysis, state public expenditures on behalf of residents of or visitors to the resort could be expected to be slightly lower than county expenditures initially. However, the state expenditures would be expected to exceed county expenditures as resort residents become a greater portion of the additional population as the resort matures. State government expenditures are projected to total between \$1.7 million and \$2.4 million per year at project completion.

Revenue/Expenditure Analysis

The net fiscal impacts of the resort's development to the county and state are estimated by comparison of the projected revenues and expenditures.

County: Comparison of projected public revenues and expenditures indicates that the county may expect to net about \$2.7 million to \$3.6 million at project completion, in 1985 dollars. The analysis also indicates that additional county revenues generated by the resort would be 3.0 to 3.1 times the expenditures incurred by the county at project completion as shown in Table 3-20.

TABLE 3-20

Kukio Beach Resort

County Government Annual Revenue
and Expenditure Comparison

(In 1985 dollars; millions)

	At Project Completion	
	Low	High
New revenues	\$ 4.0	5.4
New expenditures	<u>1.3</u>	<u>1.8</u>
Net additional revenues	\$ 2.7	3.6
Revenue/expenditure ratio(1)	=== 3.1 ===	=== 3.0 ===

(1) New revenues divided by new expenditures.

State: Net fiscal benefits to the state are projected to range from \$3.0 million to \$4.2 million at project completion, in 1985 dollars. The analysis also indicates that additional state revenues generated by the resort would be at least 3.5 times the expenditures in the early development of the project. However, the revenue to expenditure ratio could decrease to 2.8 at project completion due to the increasing proportion of residents in the total resort population. The expected revenue/expenditure ratio at project completion is summarized in Table 3-21.

TABLE 3-21

Kukio Beach Resort

State Government Annual Revenue
and Expenditure Comparison

(In 1985 dollars; millions)

	At Project Completion	
	Low	High
New revenues	\$ 4.7	6.6
New expenditures	<u>1.7</u>	<u>2.4</u>
Net additional revenues	\$ 3.0	4.2
Revenue/expenditure ratio(1)	2.8	2.8
	===	===

(1) New revenues divided by new expenditures.

3.22.6 Social Impacts

A comprehensive assessment of qualitative social impacts is provided as Appendix F.

Because of the large number of planned and proposed resort projects in West Hawaii, and in light of uncertainty about how much growth will actually take place, this assessment focused on cumulative impacts of future resort development in general, rather than the Kukio project in particular.

Community Issues and Concerns

The most recent published public opinion surveys are the State's Hawaii State Plan Survey (SMS Research, 1984) and the County's Survey of Big Island Residents on Planning and Housing Concerns (Hawaii Opinion, 1983). Both found that the major public concern involved the need for more jobs and an improved economy. In the statewide survey, Big Island residents were more concerned about

this than residents of other islands. In the County's survey, Kona residents were as concerned as other Big Island residents about economic development, and they were more concerned than others about high housing and general living costs.

Attitudes toward tourism were highly favorable both in these surveys and in another poll commissioned by the Big Island Visitor Appreciation Committee (Ward Research, 1982). However, the surveys do indicate a desire for more economic diversification. The major perceived benefits from resort development have to do with jobs and economic growth, while perceived disadvantages (particularly in West Hawaii) involve impacts on housing cost, destruction of historic sites, infringement on open space, and rapid population growth and immigration of transients.

Cumulative Labor Impacts and Local Labor Supply Sources

The County's draft Kona Regional Plan (Hawaii County Planning Department, 1983) projects Kona's year 2000 population to range from 33,200 to 46,300. The estimated population growth rate in the early 1980's exceeds that of the 1970's (Hawaii State Census Statistical Areas Committee, 1985), suggesting the actual year 2000 population could be even greater. If so, then the Kukio project alone would have little difficulty filling its labor needs from the then-existing West Hawaii population.

However, it is difficult to predict whether the cumulative future resort plant will be able to meet all its labor needs, given the magnitude of all proposed projects. Since new hotels tend to attract employees from existing operations, any labor shortage would be felt by the visitor industry as a whole in West Hawaii.

While no hard data exists, visitor industry representatives believe that a recent labor shortage in West Maui resulted in immigration of both recent foreign immigrants (primarily Filipinos and Southeast Asians) and young Mainland transients willing to live in dormitory-style housing conditions. This might happen in West Hawaii someday, although it should be emphasized that visitor industry leaders expect any labor importation to occur naturally through word of mouth rather than through active recruitment outside Hawaii.

This assessment attempts to identify alternative, more "local" labor supply sources, along with potential barriers to developing these sources. Broadly speaking, alternative labor sources involve either (1) increasing local labor force participation rates by increasing employment among specific groups, or (2) encouraging the immigration of new residents who still have some historical or cultural ties to West Hawaii. More specifically:

- o Females have a labor force participation rate some 20 percentage points less than that for males in West Hawaii (see Table 3-22). Women with young children at home have a particularly low labor force participation rate. While this may in some cases reflect values and preferences, the particularly high participation rate of women with older children suggests that many mothers may wish to work but face child care problems. Resort personnel directors in Hawaii report that lack of child care also is often a barrier to upgrade training.
- o Disadvantaged/Discouraged Residents are those for whom chronic unemployment or lack of job preparation has resulted in withdrawal from the labor force. Exact numerical estimates are not available, but social agency informants suggest these are largely young adults, often of native Hawaiian ancestry. Barriers to developing this labor source would be largely cultural and attitudinal, followed by lack of job training or (particularly for career advancement past entry-level jobs) basic skills. Some would also need transportation assistance.
- o Future High School Graduates will be a particularly important labor source, especially in light of projected increases in class sizes at Konawaena High School. While many will naturally seek visitor industry employment, even more could be attracted through greater exposure to the industry and more vocational classes. An additional obstacle -- which pertains to most other groups as well -- is the perception that hotel jobs are insecure (because of seasonal or other fluctuations in the tourist market) and lack scheduling convenience or predictability (split- or night-shift work, "on-call" status, etc.). Workers with seniority are less affected by these concerns, but young people and others entering the workforce are sometimes discouraged by initial experiences. Periods of low occupancy can result in work conditions more tolerable to transients than permanent residents.
- o East Hawaii Residents Seeking Employment would include the unemployed or others initially entering the labor force. In addition to some of the previously-discussed obstacles, a major potential barrier to their movement across the island could be any continuation of Kona's housing shortage. High rents and residential land values in Kona could make other islands or the Mainland seem more promising.
- o Former West Hawaii Residents may in some cases be interested in returning home if more jobs become available. Again, the stability of those jobs and the availability of affordable housing could be major factors.

TABLE 3-22

Kukio Beach Resort

Civilian Labor Force Participation by Sex and
(for Females) Age of Own Minor Children at Home - 1980

		All Males		All Females		Females With Children Under 6		Females With Children Under 6 - 17	
		in labor force	not in labor force	in labor force	not in labor force	in labor force	not in labor force	in labor force	not in labor force
North Kona	no.:	4194	917	3098	1900	548	450	629	208
	% :	(82%)	(18%)	(62%)	(38%)	(55%)	(45%)	(75%)	(25%)
South Kona	no.:	1699	534	1124	908	198	240	147	108
	% :	(76%)	(24%)	(55%)	(45%)	(45%)	(55%)	(58%)	(42%)
Sub-Total	no.:	5893	1451	4222	2808	746	690	776	316
	% :	(80%)	(20%)	(60%)	(40%)	(52%)	(48%)	(72%)	(28%)
South Kohala	no.:	1329	368	781	812	123	224	185	94
	% :	(78%)	(22%)	(49%)	(51%)	(35%)	(65%)	(66%)	(34%)
Sub-Total	no.:	7222	1819	5003	3620	869	914	961	410
	% :	(80%)	(20%)	(58%)	(42%)	(49%)	(51%)	(70%)	(30%)
North Kohala	no.:	755	357	600	552	133	78	155	66
	% :	(68%)	(32%)	(52%)	(48%)	(63%)	(37%)	(70%)	(30%)
WEST HAWAII SUB-TOTAL	no.:	7977	2176	5603	4172	1002	992	1116	476
	% :	(79%)	(21%)	(57%)	(43%)	(50%)	(50%)	(70%)	(30%)
EAST HAWAII SUB-TOTAL	no.:	16022	7668	11404	11975	2242	2443	2748	1321
	% :	(68%)	(32%)	(49%)	(51%)	(48%)	(52%)	(68%)	(32%)
BIG ISLAND TOTALS	no.:	23999	9844	17007	16147	3244	3435	3864	1797
	% :	(71%)	(29%)	(51%)	(49%)	(49%)	(51%)	(68%)	(32%)

Notes: All figures based on 15% sample; hence, numbers represent estimates. Data are for adults aged 16 or more. Excludes Armed Forces (208 people islandwide).

Source: U.S. Bureau of the Census, 1980 Summary Tape File 3-A.

Social Structure

West Hawaii's social structure has already been largely shaped by the visitor industry, but continued impacts may be felt by the increased presence of three new population groups which resort developments bring into an area:

- o Visitors provide jobs but are sometimes sources of either irritation or improved social life and amenities for residents. After review of published literature on resident-visitor interaction, it was concluded that major determinants of resident attitudes rarely involve economic benefits but instead have more to do with factors such as residents' age, perceived visitor respect for local culture, displaced political resentment, and competition for resources. One of the most important resources in West Hawaii is sandy coastal areas, so that shoreline access agreements to be worked out between the County and the Kukio developer may be a crucial determinant of resident attitudes toward Kukio guests and/or hotel operators - particularly in Kona, where 77% of the people would oppose any development if it interfered with beach access (Hawaii Opinion, 1983).
- o Resort residents may initially have little interaction with the surrounding community, although they ultimately do become involved and intensify prevailing Kona political trends for a more conservative philosophy and increased pressure for more government services. Along with immigrant workers, they can rapidly swell the local population and contribute to so-called "boomtown" social conditions - stresses attributable to overloaded services and facilities, and/or to changes in social norms. In review of "boomtown" social impact literature there is a current disagreement among social scientists as to whether such observed stress is due more to crowding or to the subtle sociological factors.
- o Inmigrating resort workers can generate resentment among local residents if a sense of competition for jobs develops. Another concern is the potential for value conflicts and intercultural adjustments between long time residents and newcomers. Of 31 resort and social agency key informants that were interviewed for this project, virtually all agreed that previous tensions between local residents and young Mainlanders have faded with the end of the "hippie" era. However, some informants raised concerns about a reported recent influx of Asian immigrants who compete for jobs and are not yet integrated into the local social structure.

Indicators of Social Cohesion

Crime: Linkage between tourism and crime have been comprehensively reviewed in other resort social impact assessments (Community Resources, 1984; Community Resources and A. Lono

Lyman, Inc., 1985). Academic statistical analyses produce contradictory conclusions, although there is some consistency in finding a relationship between tourism and increased rates of robbery and rape, as well as juvenile delinquency in places with "street scenes." In Kona, crime rates are high, but they increased less rapidly than in other parts of the island during the 1970's, when tourism growth was greatest.

Interviews with police officers in various parts of rural Hawaii produce a consensus view that on-site crime at destination resorts is minimal. Off-site, the major crime impact is likely to involve increased petty thefts from visitors at beach parks or other tourist attractions. Population increases also typically result in higher rates of reported crime.

Family-Related Impacts: The reported number of child abuse/neglect incidents quadrupled in West Hawaii from 1982 to 1984. However, social agency informants suggest this is due more to problems associated with rapid population growth than to any particular economic activity such as tourism.

Studies of early tourism development in West Hawaii featured reports of both marital discord and neglected children as wives first entered the tourism workforce (Cottingham, 1969; Smith, 1972; Hawaii State Department of Planning and Economic Development, 1972). Resort and social agency informants report that initial adjustment problems such as husbands' jealousy have been overcome, but other concerns have emerged - interference with family time due to night or weekend shift work; male sex role adjustments associated with "service" work and/or initial experiences with multiple female co-workers; etc.

Individual Stress and Mental Health Indicators: Studies conducted by the State Department of Mental Health show the Big Island has high rates of drug and alcohol abuse and of psychiatric symptomatology, but results are not available for the West Hawaii area along. Social agency informants believe there are serious problems in the region, but they also feel the link with tourism, if any, is an indirect one - the strains of rapid population growth rather than the nature of resort employment. Newcomers tend to have less of social support network than longtime residents and are therefore more likely to internalize stress and develop classic psychiatric symptoms.

3.22.7 Effects Which Cannot Be Avoided

The project will contribute to demands for employees and housing in the region.

3.22.8 Mitigation Measures

Employment opportunities and economic development is generally accepted as desirable goal for Hawaii county.

Housing

The project will include provisions for housing opportunities to meet direct project-generated needs that cannot be absorbed by existing or future housing projects. Opportunities for an affordable housing component may be accommodated within the mauka portion of the resort.

Resident-Oriented Job Training

Resident-oriented job training efforts could be targeted at the un- and under-employed components of the existing regional labor market and at potential labor market entrants such as high school or community college graduates and women returning to or entering the labor market. By increasing the employment potential of such "available" sources of labor, job training can mitigate against undesirable levels of in-migration and the subsequent impacts on the regional housing market.

Current providers of hotel and resort-related job training in the state that may be able to service West Hawaii include the following:

- o The State of Hawaii Department of Education (DOE), through the public high schools.
- o Kamehameha Schools, through extension programs.
- o The community colleges, through their regular curricula and through the Employment Training Office (ETO), a nonprofit arm of the community college system which coordinates on-site training programs for individual employers. (The ETO is a major provider of instructional services receiving Federal Job Training Partnership Act (JTPA) funds.)
- o The Hawaii Hotel and Restaurant Industry Employment and Training Trust (HARIETT), an independent training fund overseen by local management and labor groups.
- o Various other programs receiving Federal JTPA funds through the Office of Employment and Training Administration of the State of Hawaii Department of Labor and Industrial Relations. Such programs have included job training programs facilitated by Alu Like, Inc. and the Job Corps.
- o Individual hotel operators.

Some resort developers on other islands have recently been proposing developer-funded, resident-oriented job training for all

operations at a particular resort, with a view to minimizing immigration by maximizing employment of current residents. For example, a current proposal being developed for Oahu's Kuilima area (Kuilima Development Company and North Shore Career Training Corporation, 1986) calls for development of an "Employment Resource Center" which would provide:

- o assistance to residents in obtaining construction jobs;
- o intake, counseling, and placement;
- o job preparation (basic skills and job search courses);
- o vocational training (referrals);
- o in-service upgrade training;
- o community outreach and education;
- o information on resources for entrepreneurial training.

Most of these services are already available in the Kona area, although provided by different agencies which sometimes do not communicate or coordinate with one another. One of the most active roles has been taken by the UH-Hilo and its West Hawaii branch operation, which recently began a Culinary Arts training program in Keauhou and has tentative plans to add courses next year in front-desk operations, groundskeeping, and mid-management skills. On the private-sector side, the Hawaii Hotel Association has taken the lead in organizing input to the college planning.

The major needs for West Hawaii appear to be (1) staff personnel to facilitate coordination of existing efforts, in order to assure a more effective and integrated approach, and (2) improved communication with some service providers, such as public schools and Hawaiian-oriented social agencies. Community college officials currently are intensifying their efforts in such areas as assessing future needs, but it may also be valuable to create private-sector-funded staff who have more flexibility in working on programs outside the University system's mandate - e.g., basic skills, attitudinal counseling, liaison with public schools to assure earlier student exposure to resort work, etc.

The Kuilima model of a resort-specific, developer-funded program may not be applicable for West Hawaii, where (1) the need is regional rather than resort-specific, and (2) the prevailing visitor industry view is that job training is an appropriate concern less for developers than for resort operators, who have already become somewhat involved through Hotel Association efforts. Greater staff support for these existing operator efforts is probably the more effective approach in Kona.

Support Services to Increase Resident Employment

Both child care and transportation assistance have been identified as potential obstacles to maximizing employment among some types of residents. Possible mitigations therefore might include employer- or industry-sponsored child care centers and shuttle bus arrangements such as are in place in Kohala.

However, it is recommended that actions of this sort be preceded by careful study of economics, feasibility, and whether the responsibility rests with government, developer, or operators. As an example, the current Oahu move to require developers to provide land (but no facilities or staff) for child care might be counter-productive in Kona. That is because the need more likely is for a few centralized, 24-hour operations, rather than a larger number of land parcels sited on various developments but without adequate individual resources to begin actual operations.

If private-sector staff materializes to help coordinate regional job training efforts, this staff could also explore development of child care, transportation, or other support services intended to maximize resort employment opportunities for local residents.

Research to Aid Social Impact Management Efforts

Some studies currently underway will be of value in the effort to manage impacts from both tourism and population growth in West Hawaii. Examples are the community college needs assessments and statewide research by Alu Like into obstacles (including cultural and attitudinal ones) faced by Hawaiians seeking careers in the visitor industry.

No known efforts are currently underway to obtain other key data, and a government- or industry-sponsored research effort could be valuable to learn more about such things as (1) the location, characteristics, and willingness to relocate, of current Big Island unemployed residents; (2) changes in the demographic profile of the resort industry, both in West Hawaii and in other areas which have experienced labor shortages; (3) actual survey data to document the true extent and magnitude of family impacts associated with tourism employment or tourism-driven rapid population growth.

In addition to the key data needs identified regarding characteristics of resort employees and unemployed persons on the island, there is also a lack of information on (1) resort employee housing needs and aspirations and (2) supply and demand mechanisms in the housing market in regions of rapid economic growth such as West Hawaii. Such information would be key to the implementation of rational and effective employee housing programs and thus could benefit employers throughout West Hawaii as well as public agencies and departments seeking to serve county housing needs.

New information regarding employee housing needs could support benefits such as the following:

- o Maximize the leverage of the employees' personal and family resources in the housing market through counseling, information and referral services or other support programs.

- o Assess the potential effectiveness of various types of employee housing programs that could be developed.
- o Anticipate the type and geographic location of unit demand that will occur.

The proposed "Tourism Social Impact Management System" approved by the 1986 State Legislature (but not yet signed by the Governor) represents one possible vehicle for obtaining some of this information, since it would involve a research effort focusing on communities with "high tourism impact". However, the pilot report (Coopers & Lybrand, 1986) recommends that population growth impacts be ignored. Since these are crucial to West Hawaii, it is suggested that the County government and visitor industry disagree with this aspect if the proposed system is implemented.

Increasing Regional Capture of Resident Income

Small business advisory services and/or loan programs could encourage entrepreneurship among current residents of West Hawaii. This would contribute to increased regional capture rates of the substantial economic benefits that are expected to be generated through off-resort direct, indirect and induced expenditures by visitors to Kukio Beach Resort.

RECEIVED AS FOLLOWS

4.0
ANY PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH
CANNOT BE AVOIDED AND MITIGATION MEASURES PROPOSED
TO MINIMIZE IMPACTS

RECEIVED AS FOLLOWS

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4.0
ANY PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH
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TO MINIMIZE IMPACTS

4.0 ANY PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED AND MITIGATION MEASURES PROPOSED TO MINIMIZE IMPACTS

The following is a summary of the unavoidable adverse impacts discussed in Section 3.0 which are expected to occur upon implementation of the proposed project.

Potentially significant adverse effects of the proposed project are reduced substantially by basic design features of the proposed land use plan and various commitments by the applicants to minimize impacts.

4.1 Geology and Soils

Lava particulates or fill materials may be exposed to erosion by wind and water during the short-term grading and construction period.

Utilization of the cinder cone quarry for construction purposes will be accelerated with site development.

Mitigation Measures: Grading plans, indicating the extent of earthwork, cut and fill areas, and borrow requirements, if any, will be submitted, as required, at subsequent stages of project review. Additional off-site borrow sites are not anticipated to be required except of the requirement of the golf course and landscaped areas for imported screened soil.

Grading activities will, to the extent possible, be confined to defined corridors, to minimize disturbances to important archaeological features identified for preservation.

An exploratory program to identify potential lava cavities and collapse features will be required prior to project development.

A site engineering study and geotechnical assessment will be conducted in conjunction with detailed site plans.

4.2 Natural Hazards

The project area includes risks from volcanic eruption, earthquakes and tsunami inundation.

Mitigation Measures: Seismic monitoring instruments located on Hualalai would permit warning of significant seismic activity which could indicate impending volcanic activity. Additionally, lava originating from an eruption of Hualalai, if similar to other eruptions on the island, would move slow enough to allow for adequate evacuation time in the occurrence of a volcanic eruption. The existing Civil Defense warning systems could be utilized to evacuate people from the area in the occurrence of an eruption. Notwithstanding future man-made barriers designed to divert lava flows, there would be no mitigation measures for the potential damage to property due to volcanic eruption.

The project will conform with standards for Earthquake Zone III in the Uniform Building Code to minimize risks from earthquake activity. Further geotechnical surveys will be conducted to determine the presence of lava tubes and subsurface cavities that could pose a hazard to construction workers and future resort visitors and residents.

Conformance to the County regulations regarding construction within tsunami and flood zones will minimize any potential risk to life due to these natural occurrences.

4.3 Hydrology

Irrigation of landscaping using potable water would have a potential to reduce underlying groundwater salinity levels down gradient toward the coastal ponds. Conversely, pumping of potential wells in the vicinity of the ponds for brackish irrigation purposes could reduce flows to the anchialine ponds and increase their salinity.

Mitigation Measures: A storm drainage system will be developed with the objective of minimizing storm water runoff to the shoreline.

Anchialine Pond Management Plan will provide for monitoring of water quality in conjunction with detailed water supply, irrigation and wastewater disposal planning.

Landscape irrigation of secondary-treated wastewater is planned to minimize potential effects to groundwater and coastal waters.

4.4 Coastal and Marine Environments

Sedimentation potential will increase during the short-term grading and construction phases. Minor changes in the baseline quality of nearshore water may occur as a result of the utilization of treated wastewater for irrigation purposes. Increased opportunities for public access to the beaches and nearshore waters may be expected to reduce the standing crop of certain marine and intertidal species of high commercial, subsistence or recreational value.

Mitigation Measures: Shoreline modifications including extensive vegetative removal, coastal dune alterations and structural improvements will be minimized.

Effects of wastewater percolation and possible migration to coastal waters will be addressed pursuant to the formulation of detailed landscape irrigation and wastewater treatment/disposal plans.

4.5 Flora and Fauna

Limited habitat and wildlife resources will be removed or displaced from development areas. Minor changes in the chemical and physical properties of anchialine pond waters may be expected.

Mitigation Measures: An anchialine pond management plan will be developed with the assistance of the U.S. Fish and Wildlife Service and the Department of Land and Natural Resources with the objective of preserving existing pond features, water quality, biota, and providing interpretive and educational opportunities for the public.

Whenever possible native plants such as lo'ulu palms, lama trees, and 'ilima and nehe shrubs will be employed in the landscaping; these plants are adapted to the environmental conditions of the study area and would require less maintenance, less water, and less soil than the more commonly used introduced landscape plants.

Potential water features and a pond management plan will not only protect fauna but provide additional habitat.

4.6 Archaeological/Historical Resources

Sites with moderate or low research, interpretive or cultural values may be disrupted or destroyed with site development. Increased opportunities for public access may increase the potential for loss, vandalism, or destruction of historic sites.

Mitigation Measures: A cultural resources management program will be formulated including specific recommendations for site preservation, data recovery and interpretive opportunities.

4.7 Transportation/Circulation

The project will contribute to the cumulative long-term need for improvements to the Queen Kaahumanu Highway.

Mitigation Measures: Pursuant to detailed development plans, a traffic study will be prepared addressing project related traffic generation, traffic assignment and distribution, turning movements, and intersection improvements.

4.8 Air Quality

Short-term air quality impacts will occur, associated with grading and construction phases (i.e., dust, equipment emissions).

Long-term air quality impacts will occur from mobile and stationary emission sources.

Mitigation Measures: Pursuant to detailed development plans, an air quality assessment will be prepared to address pollutant concentrations during peak hour traffic conditions at primary project intersections. The assessment will address any measures required to comply with federal and state air standards.

Measures will be implemented to reduce airborne particulate dissemination resulting from earthmoving activities.

4.9 Noise

Noise levels will increase on-site and off-site, most notably as a result of increased traffic volumes.

During grading and construction, short-term noise levels will increase on-site.

Mitigation Measures: The project will comply with adopted exterior noise standards for residential uses through the use of roadway setbacks, berms, walls or other measures, as required.

4.10 Public Services and Utilities

The project will contribute to cumulative area-wide demands for public services and facilities, including fire and police protection, utilities, schools, and solid waste disposal; consumption of groundwater and energy supplies will increase.

Mitigation Measures: Detailed infrastructure plans for drainage, water supply, on-site wastewater treatment and disposal, electrical power and communications systems will be designed and constructed conforming to agency requirements.

Private systems are planned for water supply and wastewater treatment to minimize public expenditures.

Utilization of treated wastewaters for golf course and landscape irrigation as a means of wastewater disposal will minimize the use of groundwater.

4.11 Land Use

The project will commit existing open space to resort uses.

Mitigation Measures: Kukio Beach Resort planning will be coordinated with planning for adjacent Kaupulehu lands and State lands to maximize open space corridors and systems throughout the development.

4.12 Visual and Aesthetic

The resort development will alter the natural vistas of the site and surrounding lava flows.

Mitigation Measures: Resort plans will incorporate extensive use of landscaping to enhance the visual appearance and a buffer zone will be retained along Queen Kaahumanu Highway.

4.13 Socio-economic

The project will contribute to demands for employees and housing in the region and will generate an increase in population.

Mitigation Measures: The project will provide on-site housing opportunities to meet direct project-generated needs that cannot be absorbed by existing or future housing projects.

Resident-orient job training efforts could mitigate against undesirable levels of in-migration and the subsequent impacts on the regional housing market.

Employer-or industry-sponsored child care centers and shuttle bus systems could possibly maximize employment among some types of residents.

Small business advisory services and/or loan programs could encourage entrepreneurship among residents of West Hawaii to increase regional capture rates of the substantial economic benefits that are expected to be generated by visitors to the Kukio Beach Resort.

Additional research to aid social impact management efforts could provide a basis to implement a rational and effective employee housing program, training programs and other programs to mitigate social impacts generated from the tourism industry.

RECEIVED AS FOLLOWS

5.0
ANY IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF
RESOURCES

RECEIVED AS FOLLOWS

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5.0
ANY IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF
RESOURCES

5.0 ANY IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The construction and operation of the proposed project will involve the irretrievable commitment of certain natural and fiscal resources. Major resource commitments include the land upon which structures are actually constructed (does not include open space areas, such as the golf course, anchialine ponds, and equestrian area), money, construction materials, manpower and energy. The impacts of using these resources should, however, be weighed against the economic benefits to the residents of the region, County and State, and the consequences resulting from taking no action.

Large areas of the project site will be devoted to open space. Approximately fourteen (14) acres of beach area and ponds, one-hundred sixty-five (165) acres of golf course, and approximately thirty (30) acres (including the community park, equestrian center, open space buffer along highway and the electrical easement), will be retained in open space for a total of 209 acres. Additionally, within each buildable parcel it is estimated an additional 280 acres will be dedicated to open space and landscaping. In total, approximately 490 acres or 72% of the site area will remain in open space, therefore, only approximately 185 acres will represent a permanent, irreversible or irretrievable commitment of land.

The commitment of resources required to accomplish the project includes labor and materials, which are mostly unrenowable and irretrievable. The operation of the project will also include the consumption of potable water and petroleum-generated electricity which also represents the irretrievable commitment of resources. However, it should be noted that most of the potable water used will be reused for the irrigation of the golf course and landscaped areas within the project.

RECEIVED AS FOLLOWS

6.0
**RELATIONSHIP OF THE PROPOSED ACTION TO LAND USE
PLANS, POLICIES, AND CONTROLS FOR THE AFFECTED AREA**

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6.0
RELATIONSHIP OF THE PROPOSED ACTION TO LAND USE
PLANS, POLICIES, AND CONTROLS FOR THE AFFECTED AREA

6.0 RELATIONSHIP OF THE PROPOSED ACTION TO LAND USE PLANS, POLICIES, AND CONTROLS FOR THE AFFECTED AREA

The General Plan Amendment Application and Petition were submitted to the Hawaii County Planning Department on August 7, 1985. Upon acceptance of the Environmental Impact Statement, the General Plan Amendment will be processed by Hawaii County. The remaining approvals will be applied for sequentially or concurrently as allowed by law.

The proposed project will be consistent with: the Hawaii State Plan; the State Functional Plans; the Hawaii County General Plan; the Kona Regional Plan; and the Special Management Area (SMA) Rules and Regulations of the County of Hawaii.

The proposed project's relationship to these and other land use plans and controls is described in sections which follow.

6.1 HAWAII STATE PLAN

The Hawaii State Plan, (Hawaii, State of, Department of Planning and Economic Development, 1978) establishes a set of goals, objectives and policies which are to serve as long-range guidelines for the growth and development of the State. Among its stated objectives is a clear statement of intent to support the visitor industry as a major element of steady growth in Hawaii's economy.

Policies related to the development of the visitor industry emphasize the need for cooperation between the public and private sectors to assure a viable industry that is responsive to the economic, social, environmental and aesthetic values of the community as a whole. The proposed development at Kukio would be consistent with the economic and social policies of the State Plan.

The proposed project is in conformance with the State Plan since the plan generally supports the expansion of the visitor industry (sec. 226-8(a), -103(b)(3), (10), HRS), especially on the neighbor islands (sec. 226-5(b)(2), HRS). Additionally, the project would improve opportunities for public use of coastal resources and would be planned and designed in such a way as to be compatible with the environmental and cultural resources of the site.

In general, the proposed Kukio Beach resort expansion is consistent with the overall intent of the State Plan. Specific objectives, policies and priority actions contained in the State Plan most relevant to the proposed project are discussed below.

Objective and policies for population include:

"(1)(a) Guide population growth to be consistent with the achievement of physical, economic, and social objectives of the State Plan."

"(2)(b) Encourage an increase in economic activities and employment opportunities on the neighbor islands consistent with community needs and desires."

"(3)(b) Ensure that adequate support services and facilities are provided to accommodate the desired distribution of future growth throughout the state."

"(4)(b) Promote increased opportunities for Hawaii's people to pursue their socio-economic aspirations throughout the islands."

Discussion: At a time when employment opportunities are decreasing in the agricultural sector of Hawaii's economy, opportunities are increasing in the visitor industry. Permanent operational employment at Kukio Beach Resort will be significant and indirectly, employment throughout the State will also be stimulated by this development.

Adequate services and facilities will be ensured by the resort developers. State and County tax revenues generated by the resort (property taxes, income taxes, etc.) will contribute toward the cost of providing services to visitors and new residents.

Objectives and policies for the economy in general, Section 6(a) states:

"(1) Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawaii's people."

"(6)(b) Strive to achieve a sustained level of construction activity responsive to, and consistent with, State growth objectives."

Other applicable policies for the economy, Section 6(b), include:

"(9) Encourage labor-intensive activities that are economically satisfying."

"(11) Promote economic activities, especially those which benefit areas with substantial unemployment problems."

"(14) Encourage business that have favorable financial multiplier effects within Hawaii's economy."

Discussion: When fully developed, the labor-intensive resort development will provide employment and new business opportunities (to service the resort development) for the Kona and Kohala districts. Refer to Section 3.22.

Relevant Hawaii State Plan policies for the economy - visitor industry, Section 8(b) are as follows:

"(a) A visitor industry that constitute a major component of steady growth for Hawaii's economy."

"(3)(b) Improve the quality of existing visitor destination areas."

"(4)(b) Encourage greater cooperation between the public and private sectors in developing and maintaining well-designed and adequately serviced visitor industry and related developments."

"(5) Ensure that visitor facilities and destination areas are carefully planned and sensitive to existing neighboring communities and activities."

"(6)(b) Develop the industry in a manner that will provide the greatest number of primary jobs and steady employment for Hawaii's people."

"(7) Provide opportunities for Hawaii's people to obtain job training and education that will allow for upward mobility within the visitor industry."

"(9)(b) Foster an understanding by visitors of the aloha spirit and of the unique and sensitive character of Hawaii's cultures and values."

Discussion: State and County tax revenues generated by the development will contribute toward the cost of providing services to new residents and visitors. Kaupulehu Resort will be carefully planned and located in a coastal area planned for intermediate resort development. Kukio Beach Resort intends to maintain the high standards set by other resorts in the South Kohala and North Kona area.

The proposed project will further the policy of providing opportunities for Hawaii's people to obtain job training and will allow for upward mobility within the visitor industry. The proposed development will offer short-term and long-term employment to residents of the State and County of Hawaii and will contribute to sustaining the level of construction activity in the State. Operational employment will provide workers with higher than average total compensation based on wages and gratuities.

As noted in Section 2.7, Need for the Project, the projected market support for development at Kukio would support 800-1,200 hotel rooms, 950-1,300 condominium units and 500-625 residential lots. To be carefully planned and developed to meet market demands, the resort will provide a diverse range of employment opportunities within the region.

Relevant Hawaii State Plan objectives and policies for the physical environment - land-based, shoreline, and marine resources, Section 11(b) include:

"(1)(a) Prudent use of Hawaii's land-based, shoreline, and marine resources."

"(2)(a) Effective protection of Hawaii's unique and fragile environmental resources."

"(2)(b) Ensure compatibility between land-based and water based activities and natural resources and ecological systems."

"(3) Take into account the physical attributes of areas when planning and designing activities and facilities."

"(8)(b) Pursue compatible relationships among activities, facilities, and natural resources, especially within shoreline areas."

"(9) Promote greater accessibility and prudent use of the shoreline for public recreational, educational, and scientific resources."

Discussion: The major physical features within the project have been identified as the anchialine ponds, Kukio Bay, beach, and significant historic sites. These important physical attributes of the site will be preserved and/or integrated into the resort plans.

The applicant is proposing to provide opportunities for public recreational, educational and scientific use of the shoreline fronting the project site.

Relevant Hawaii State Plan policies for socio-cultural advancement - education, Section 21(b) include:

"(4) Provide job preparation training for groups experiencing critical unemployment conditions."

"(6) Assist individuals, especially those who are disadvantaged in meeting job qualifications, through manpower and other related training opportunities."

Discussion: Refer to the previous discussion of the Hawaii State Plan policies for the economy - visitor industry: Section 8(b), (7).

Relevant Hawaii State Plan objective and policy for socio-cultural advancement - culture, Section 23 include:

The enhancement of cultural identities, traditions, values, customs, and arts of Hawaii's people.

"(1)(b) Foster increased knowledge and understanding of Hawaii's ethnic and cultural heritage and the history of Hawaii."

Discussion: The sites of cultural interest at Kukio Beach Resort are predominately of Hawaiian origin. Significant sites will be preserved and interpreted for the public and resort guests.

Relevant Hawaii State Plan policies for socio-cultural advancement - leisure, Section 23 include:

"(4) Promote the recreational and educational potential of natural resources having scenic, open space, cultural, historical, geological, or biological values."

"(5) Ensure opportunities for everyone to use and enjoy Hawaii's recreational resources."

Discussion: The planned resort will provide lateral and mauka-makai access to the recreational resources of the shoreline. The historic and archaeological resources of significance will be preserved and/or restored and integrated into the design of the resort.

Relevant Hawaii State Plan objective and policies for the physical environment - scenic, natural beauty, and historic resources, Section 12 include:

"(1)(a) Enhancement of Hawaii's scenic assets, natural beauty, and multi-cultural/historical resources."

"(1)(b) Promote the preservation and restoration of significant natural and historic resources."

"(4)(b) Protect those special areas, structures, and elements that are an integral and functional part of Hawaii's ethnic and cultural heritage."

"(5)(b) Encourage the design of developments and activities that complement the natural beauty of the islands."

Discussion: The North Kona and South Kohala region, including the lands of Kukio, is rich in natural and cultural resources.

Kukio Beach Resort proposes to preserve significant individual archaeological sites. As mentioned previously, the shoreline area, including the ponds, is not planned to be altered. The low density, landscaped character of the resort will provide a means for the development to accommodate and be complemented by the surrounding environment:

Relevant Hawaii State Plan objective and policy for the physical environment - land, air and water quality, Section 13 include:

"(2)(a) Greater public awareness and appreciation of Hawaii's environmental resources."

"(1)(b) Foster educational activities that promote a better understanding of Hawaii's limited environmental resources."

Discussion: Increased access to the Kukio lands and the shoreline will be made available to the general public via the Kukio Beach resort. Access to archaeological site would support activities that promote a better understanding of Hawaii's heritage. Preserving the anchialine ponds contained in the shoreline area will serve to further both visitors' and residents' understanding of Hawaii's unique natural heritage.

Relevant Hawaii State Plan objective and policies for facility systems - solid and liquid wastes, Section 15 include:

Maintain basic public health and sanitation standards relating to treatment and disposal of solid wastes.

"(1)(b) Encourage the adequate development of sewer systems that complement planned growth."

"(2)(b) Encourage reuse and recycling to reduce solid and liquid wastes and develop a conservation ethic."

Discussion: Kukio Beach Resort intends to construct a sewage treatment facility which treats sewage to the secondary level. This will create an effluent which will be safe to use for golf course irrigation while serving to conserve and recycle water.

Relevant Hawaii State Plan objective and policies for facility systems - water, Section 16 include:

Provide adequate water to accommodate domestic, agricultural, commercial, industrial, recreational, and other needs within resource capacities.

"(1)(b) Relate growth activities to existing and potential water supply."

"(3)(b) Reclaim and encourage the productive use of runoff water and wastewater discharges."

Discussion: Water for Kukio Beach Resort will be supplied from either high elevation wells at Huehue Ranch, mid-elevation brackish water wells that would be desalted for potable use or joint use of other developed water sources in the area. A wastewater treatment plant will be designed so that wastewater can be recycled; effluent mixed with brackish water can be used to irrigate the resort golf course.

Priority Directions

The Economic Implementing Actions of the Hawaii State Plan include the following relevant priority actions:

"(1)(a) Stimulate the economy to provide needed jobs for Hawaii's people without stimulating unnecessary in-migration."

"(3)(b) Maintain or enhance the quality of existing and future hotels and resort destination areas which conform with regional carrying capacities and state policies providing for adequate shoreline setbacks and beach access."

"(5)(b) Preserve and enhance Hawaii's significant natural environment and scenic, historic, and cultural sites."

"(6)(b) Develop and maintain career opportunities in the visitor industry for Hawaii's people, with emphasis on managerial positions."

"(13)(d) Encourage the expansion of the statewide agricultural base through the promotion of products for export and local consumption."

"(1)(f) Promote a consistent and stable level of construction activity."

Discussion: The resort development will provide a steady level of construction employment over a period of several years, lead to the establishment of permanent full-time and part-time operational jobs, and stimulate employment growth in other sectors of Hawaii's economy. It is estimated that many employees will be Hawaii Island residents, and that most of the remaining employees will be from other islands.

Development at Kukio Beach Resort will conform with relevant State and County land use regulations, as well as other regulations pertinent to the proposed development.

Local agricultural products, including fish, meat, vegetables, and fruits, will be purchased for consumption at the resort, contributing to the maintenance and expansion of the agricultural base.

Population Growth and Distribution

The Population Growth and Distribution Implementing Actions of the Hawaii State Plan include the following relevant priority actions:

"(2)(a) Encourage hiring of Hawaii's people by firms doing business in the state."

"(2)(b) Plan the development and availability of land and water resources in a coordinated manner so as to provide for the desired levels of growth in each geographical area."

Discussion: The proposed project will be constructed according to a phased schedule as demand warrants and resources allow and employ locally available labor for long-term employment at the resort.

Land Resources

The Hawaii's Land Resources section of the Hawaii State Plan include the following priority action that is relevant for Kukio Beach Resort:

"(a) Preserve and improve shoreline open spaces and scenic resources."

Discussion: The master plan includes the provision of public access to the shoreline from Queen Kaahumanu Highway and lateral access along the shoreline. An open space area between the shoreline and resort facilities will provide a buffer.

Other Various State Plan Sections

The project also conforms to other factors contained in the State Plan as follows:

- 1) Provides adequate shoreline setbacks and beach access (sec. 226-11(b)(9), -103(b)(3), HRS).

Discussion: No structures will be located in the county's setback area. Public access to the shoreline will be provided.

- 2) Preserves and enhances significant scenic, historic, and cultural sites (sec. 226-12(b)(1)- (5), -103(b)(5), HRS).

Discussion: Along shore views will be preserved. Additional archaeological studies will be conducted and significant archaeological sites will be preserved.

- 3) Protects rare or endangered plant and animal species (sec. 226-11(b)(6), HRS).

Discussion: There are no rare or endangered plant species. The anchialine ponds, which are habitats for several endangered waterbirds and a potentially endangered shrimp, will be preserved.

- 4) Designed with sensitivity to existing neighboring communities and activities (sec. 226-8(b)(5), HRS).

Discussion: The project design will be sensitive to existing communities in the region by giving employment preference, as much as possible, to residents in the area; providing public shoreline access; and ensuring an aesthetic development.

- 5) Fosters an understanding by visitors of the unique and sensitive character of Hawaii's cultures and values (sec. 226-8(b)(9), HRS).

Discussion: Management and interpretive programs will be developed for the anchialine ponds and for significant archaeological sites to foster an understanding of Hawaii's culture and ecology.

- 6) Provides adequate support services (sec. 226-5(b)(3), Hawaii Rev. Stat.) without unreasonable public expenditures (sec. 226-104(c)(2) HRS).

Discussion: The water and wastewater systems will be privately constructed and operated, thus avoiding public expenditures. Certain public services, such as police and fire protection, will eventually have to be expanded to meet the growing regional demand. The revenues generated by the project will more than offset the project's share of the cost to provide these additional services.

- 7) Protects surface, ground, and coastal water quality (sec. 226-13(b)(3), HRS).

Discussion: Potable groundwater sources will be protected from potential wastewater disposal and irrigation practices by complying with the Department of Health Underground Injection Control Permit and the Safe Drinking Water Permit. Compliance with these permit requirements should also protect the coastal water quality since groundwater seepage is the primary pathway for pollutants in the area. Surface water quality is not a concern since there are no streams in the area.

- 8) Maintains or enhances aural and air quality (sec. 226-13(b)(4), HRS).

Discussion: Prevailing tradewinds will disperse the increased vehicle emissions in the area. Without the necessary widening of Queen Kaahumanu Highway, the ambient standards for carbon monoxide may be exceeded. Adequate setbacks from the roadways

will mitigate noise impacts to the proposed residential units located along the roadways.

- 9) Reduces threat to life from erosion, flooding, tsunamis, earthquakes, and other natural or man-induced hazards and disasters (sec. 226-13(b)(5), HRS).

Discussion: The threat from erosion, flooding, lava flow and subsidence hazards is minimal. Tsunami hazards will be mitigated through adequate shoreline setbacks and flood-proofing measures. Earthquake hazards will be mitigated through proper structural design.

- 10) Provides wastewater reclamation as a means to conserve water (sec. 226-16(b)(3), HRS).

Discussion: Treated wastewater effluent will be used to irrigate the golf course and landscaped areas, thereby reducing the overall water demand.

Although the State Plan prefers growth in existing urban areas (sec. 226-104(c), HRS), a resort project that complies with the above factors would be consistent with the State Plan since impacts to critical areas would be mitigated (sec. 226-104(c)(4), (5), HRS), unreasonable public expenditures to provide support facilities would be avoided (sec. 226-104(c)(3), HRS), and the character of the surrounding community would not be affected (sec. 226-104(c)(8), HRS).

6.2 STATE FUNCTIONAL PLANS

The Hawaii State Plan mandated the creation of twelve functional plans to provide detailed guidelines to implement its broad range of planning objectives. Ten of these plans were adopted by the 1984 legislature, with the remaining two adopted in 1985. Development at Kukio will consider the guidelines of the functional plans and integrate the relevant goals and objectives of each.

The relevant State functional plans were examined to determine the relationship of the proposed Kukio Beach Resort. All of the plans had been adopted by 1985; they function as guidelines only and are not to be interpreted as law or statutory mandate.

State Historic Preservation Functional Plan - Historic Properties

"B. Objective: Compilation of an inventory that adequately locates and describes a significant portion of Hawaii's historic properties."

Discussion: A "Full Archaeological Reconnaissance Survey" (Paul H. Rosendahl, 1985) was completed for the project area to locate, describe and determine the significance of historic sites and features within the project area. The findings and recommendations of this survey are summarized in Section 3.8 and Appendix B.

State Housing Functional Plan

"B. Objective: Assist the orderly development of residential areas sensitive to community needs and other land uses."

Discussion: If the necessary governmental approvals are received as requested, and a need is determined, the applicant will assist in providing low to moderate-income housing.

State Recreation Functional Plan - Access

"D. Objective: Assure the provision of adequate public access to lands and waters with public recreation value."

Discussion: The project will conform to the objective of assuring adequate public access to waters with recreational value, by providing unobstructed pedestrian access along the shoreline, and providing mauka-makai access to the shoreline and providing parking facilities for public use.

State Tourism Functional Plan - Physical Development

"B. Objective: Development and maintenance of a well-designed and adequately serviced visitor industry and related developments in keeping with the needs and aspirations of Hawaii's people."

Discussion: The applicant has initiated physical planning for the proposed resort in order to develop a visitor facility of high quality. Implementation of a master planned resort will eliminate the need for government funds for capital improvements. Planning for the proposed resort has taken into consideration land and water resources. The master plan for the resort reflects consideration for environmental, scenic and cultural resources.

Located adjacent to Kaupulehu, a visitor designation area designated for tourism growth based on the existing County General Plan, and identified in the Technical Reference Document of the State Tourism Plan, the proposed site provides the necessary coastal resources (white sand beaches) to satisfy the market need for additional resort development and will contribute to the appropriate expansion of the resort resources of West Hawaii.

State Tourism Functional Plan - Employment and Career Development

"C. Objective: Enhancement of career and employment opportunities in the visitor industry."

Discussion: The Kukio Beach Resort will provide significant employment, construction related and operational, that will enhance career opportunities in the visitor industry. The direct and indirect employment generated from the resort is significant. Refer to Section 3.22.

State Tourism Functional Plan - Community Relations

"D. Objective: Development of better relations and mutual awareness and sensitivity between the visitor industry and the community."

Discussion: The development at Kukio Beach Resort will be sensitive to the community concerns of the North Kona and South Kohala region. Far removed from any existing communities, the proposed resort will become a destination resort community.

6.3 STATE LAND USE

All 675 acres of the proposed Kukio development lie within the State Conservation District. A petition to amend the land use boundary designation from Conservation to Urban will be required in order for the project to proceed.

In 1961, when the State Land Use Commission was established and initial land use designations determined, the bulk of the undeveloped coastal land in North Kona and South Kohala was designated as a Conservation District. Since that time, several major coastal resort developments including Mauna Kea, Waikoloa, Mauna Lani and Kona Village have amended the Conservation District to allow for urban uses similar to those being proposed for Kukio.

Section 205-2, Hawaii Revised Statutes

Pursuant to Chapter 205, HRS (Section 205-17) as amended, the Hawaii State Plan and Functional Plans, the State Land Use Commission shall specifically consider the following decision making criteria on its review of any petition for reclassification of district boundaries.

- (1) "The extent to which the proposed reclassification conforms to the applicable goals, objectives, and policies of the Hawaii state plan and relates to the applicable priority guidelines of the Hawaii state plan and the adopted functional plans;"

Discussion: As summarized in Section 6.1 and 6.2, the proposed resort and associated urban land uses conform to the applicable goals, objectives, and policies of the Hawaii State Plan and guidelines of the Functional Plans.

- (2) "The extent to which the proposed reclassification conforms to the applicable district standards;"

Discussion: The applicable district standards for an Urban District are given in Section 2-2 of the Land Use District Boundary Regulations and discussed below to demonstrate the conformance with these district standards and inapplicability of the conservation district standards with the proposed resort. The required amendments to the State Land Use District boundaries are not violative of the basic standards for determining boundaries that are set forth in Section 205-2, HRS.

"(a) It shall include lands characterized by "city-like" concentrations of people, structures, streets, urban level of services and other related land uses."

Response: Not applicable. Although, the proposed resort when completed will be characterized by "city-like" structures with an extensive open space system including a golf course. The necessary infrastructure will be provided to serve the hotel multifamily and single family residential, and commercial uses meeting all applicable County and State standards.

"(b) It shall take into consideration the following specific factors:

1. Proximity to centers of trading and employment facilities except where the development would generate new centers of trading and employment.
2. Substantiation of economic feasibility by the petitioner.
3. Proximity to basic services such as sewers, water, sanitation, schools, parks, and police and fire protection.
4. Sufficient reserve areas for urban growth in appropriate locations based on a ten (10) year projection."

Response: The resort will generate a new center for employment opportunities. The project's feasibility has been demonstrated in part by the market assessment that determined a need for the project. Basic infrastructure will be provided by the applicant including roads, and water and sewer

systems. Public services such as schools, parks, police, and fire protection are available within the region. Refer to Section 3.0.

The applicants financial capabilities to execute a project of this magnitude will be fully disclosed to satisfy the requirements of the State Land Use Commission.

"(c) Lands included shall be those with satisfactory topography and drainage and reasonably free from the danger of floods, tsunami and unstable soil conditions and other adverse environmental effects."

Response: The lands at Kukio are suitable for the proposed resort development. They are reasonably free from natural hazards such as flooding, tsunami and unstable soil conditions.

"(d) In determining urban growth for the next ten years, or in amending the boundary, lands contiguous with existing urban areas shall be given more consideration than non-contiguous lands, and particularly when indicated for future urban use on State or County General Plans."

Response: The Kukio lands are contiguous to the proposed expansion of the urban district at Kaupulehu for intermediate resort and golf course uses.

"(e) It shall include lands in appropriate locations for new urban concentrations and shall give consideration to areas of urban growth as shown on the State and County General Plans."

Response: Kukio is an appropriate location for a resort development due to the natural attributes of the site and the region's desirable climate. A request to amend the Hawaii County General Plan is the initial action the applicant is addressing in this EIS.

"(f) Lands which do not conform to the above standards may be included within this District:

1. When surrounded by or adjacent to existing urban development; and
2. Only when such lands represent a minor portion of this district."

Response: Standard not applicable.

"(g) It shall not include lands, the urbanization of which will contribute towards scattered spot urban development, necessitating unreasonable investment in public supportive services."

Response: The urbanization of these lands, will not necessitate unreasonable investment in public supportive services. Based on the fiscal impact analysis, this project would have a cumulative positive fiscal impact on the county and the state. Refer to Section 3.11-3.19.

"(h) It may include lands with a general slope of 20 percent or more which do not provide open space amenities and/or scenic values if the Commission finds that such lands are desirable and suitable for urban purposes and that official design and construction controls are adequate to protect the public health, welfare and safety, and the public's interests in the aesthetic quality of the landscape."

Response: The petition area does not contain slopes which exceed 20 percent, except for Muheenui cinder cone which is currently being quarried and will be reduced to slopes of less than 20 percent prior to development. Refer to Section 3.1.

(3) "The impact of the proposed reclassification on the following areas of state concern:

(a) Preservation or maintenance of important natural systems or habitats;"

Response: The anchialine ponds, which are habitats for endangered water birds and potentially endangered shrimp, will be preserved. Refer to Section 3.6.

"(b) Maintenance of valued cultural, historical, or natural resources;"

Response: Significant archaeological resources will be preserved. Refer to Section 3.8.

"(c) Maintenance of other natural resources relevant to Hawaii's economy, including, but not limited to, agricultural resources;"

Response: The petition area does not have agricultural value. Refer to Section 3.2.

"(d) Commitment of state funds and resources;"

Response: The project will not require any state funds or resources. Refer to Section 2.10.

"(e) Provision for employment opportunities and economic development;"

Response: The project will provide substantial employment opportunities and stimulate regional economic development. Refer to Section 3.22.

"(f) Provision for housing opportunities for all income groups, particularly the low, low-moderate, and gap groups."

Response: The project will provide affordable housing opportunities to mitigate demands that the resort may place on the existing housing supply. Refer to Section 3.22.

Conservation Districts. In determining the boundaries for the Conservation District, the following standards shall apply:

"(a) Lands necessary for protecting watersheds, water sources and water supplies shall be included in this District except as otherwise provided for in other sections of these regulations."

Response: These lands are not necessary for protecting watershed, water resources and water supplies of the region. Rainfall is less than 20 inches annually and hydrologic studies in the region indicate sufficient water resources can be developed to support the proposed resort. (Bowles, 1981).

"(b) Lands susceptible to floods, and soil erosion, lands undergoing major erosion damage and requiring corrective attention by the State or Federal government, and lands necessary for the protection of the health and welfare of the public by reason of the lands' susceptibility to inundation by tsunami and flooding, to volcanic activity and landslides may be included in this District."

Response: These lands are not unreasonably susceptible or exposed to undue danger from natural hazards.

"(c) Lands used for national or state parks may be included in this district."

Response: Not applicable.

"(d) Lands necessary for the conservation, preservation and enhancement of scenic, historic or archaeological sites and sites of unique physiographic or ecologic signifi-

cance shall be included in this District except as otherwise provided for in other sections of these regulations."

Response: The project area contains some significant historic and archaeological features and areas of ecological significance (anchialine ponds). These features within the site can be adequately protected and enhanced within the proposed development. An archaeological and pond management program will be developed to insure adequate conservation measures are provided for with the resort.

"(e) Lands necessary for providing and preserving parklands, wilderness and beach reserves, and for conserving natural ecosystems of endemic plants, fish and wildlife, for forestry, and other related activities to these uses shall be included in this District except as otherwise provided for in other sections of these regulations."

Response: The preservation and conservation of the shoreline resources within the site will be provided for within the project. The natural ecosystem of the anchialine ponds will be preserved with a management plan implemented to monitor the pond system so that any indirect or unanticipated impacts may be mitigated.

"(f) Lands having an elevation below the maximum inland line of the zone of wave action, and marine waters, fish ponds and tide pools of the State shall be included in this District unless otherwise designated on the district maps. All offshore and outlying islands of the State of Hawaii are classified Conservation unless otherwise indicated."

Response: The lands below the maximum inland line of the zone of wave action as recently identified on the shoreline survey of Grant 2121 to Pupule at Kukio 1st will remain within the Conservation District.

"(g) Lands with topography, soils, climate or other related environmental factors that may not be normally adaptable or presently needed for urban, rural or agricultural use, shall be included in this District, except where such lands constitute areas not contiguous to the Conservation District."

Response: These lands have no topographic, soils, climate or other related environmental factors that would make it unadaptable for urban use. The market assessment (Section 2.7 and Appendix D) has determined the need for these lands for resort use.

"(h) Lands with a general slope of 20% or more which provide for open space amenities and/or scenic values shall be included in this District except as otherwise provided for in other sections of these regulations."

Response: The general slope of the lands at Kukio are less than 20% except for the Muheenui cinder cone located at the mauka corner of the project area. Currently being mined under a state permit, the cinder cone will provide valuable road and golf course construction materials that, when completed, will reduce the cinder cone to slopes less than 20% that are suitable for residential development.

"(i) Lands suitable for farming, flower gardening, operation of nurseries or orchards, growing of commercial timber, grazing, hunting, and recreational uses including facilities accessory to such uses when said facilities are compatible with the natural physical environment, may be included in this District."

Response: The lands at Kukio are of very low agricultural value due to an almost non-existence of soil.

(3) The impact of the proposed reclassification on the following areas of state concern:

"(A) Preservation or maintenance of important natural systems or habitats;"

Response: The anchialine ponds located within the site are recognized as an important natural system and habitat that should be preserved. The plan includes the establishment of a reserve around the pond complex and formulation of a pond management plan to insure any indirect impacts of developing the surrounding lands will be monitored and, if necessary, mitigated to minimize impacts.

"(B) Maintenance of valued cultural, historical, or natural resources;"

Response: The "Full Archaeological Reconnaissance Survey" has identified the significant cultural and historic resources of the site that should be documented and/or preserved. As recommended, the plan will maintain those sites that are of significant value, where they do not unreasonably encumber the proposed improvements. All necessary scientific documentation will be completed prior to disturbing any sites.

"(C) Maintenance of other natural resources relevant to Hawaii's economy, including, but not limited to, agricultural resources;

Response: The loss of the agricultural resources of this site will not impact Hawaii's economy.

"(D) Commitment of state funds and resources;"

Response: There are no direct requirements for the commitment of state funds and resources due to this project. The fiscal impact assessment summarized in Section 3.22 projects a positive impact to County and State revenues through taxes generated.

"(E) Provision for employment opportunities and economic development;"

Response: The resort will provide significant employment opportunities to support its development and operation. The direct and indirect economic impact to the region is discussed in Section 3.22 and Appendix E.

"(F) Provision for housing opportunities for all income groups, particularly the low, low-moderate, and gap groups."

Response: A provision for providing housing opportunities for the low-moderate and gap groups will be provided as the need is determined due to increased employment associated with development of the resort community.

Interim Statewide Land Use Guidance Policy

The interim statewide land use guidance policy was repealed by Act 230 of the State Legislature in its 1985 session. However, SLUC district regulations have not yet been amended accordingly, and the specific interim policies contained in those regulations may still need to be addressed. Following is a discussion of the proposed action's consistency with the relevant policies.

- (1) Land use amendments shall be approved only as reasonably necessary to accommodate growth and development, provided there are no significant adverse effects upon agriculture, natural, environmental, recreational, scenic, historic, or other resources of the area.

Discussion: As discussed previously, the necessary land use amendment is reasonably necessary to accommodate the quality growth and proposed development. This environmental impact statement disclosed the impacts that might result from the development of the proposed Kukio Beach Resort and details the mitigation measures that would be taken to avoid or minimize these effects. With the mitigation measures proposed there would be no significant adverse effects.

- (2) Lands to be reclassified as an Urban District shall have adequate public services and facilities or as can be so provided at reasonable cost to the petitioner.

Discussion: The projected demand from the project for additional public services and facilities as a result of development has been taken into account. Since the developers will provide the project's infrastructure (much of which is considered a public service/facility, such as a wastewater treatment plant, water system, etc.), it is not expected to foster extensive public expenditures.

- (3) Maximum use shall be made of existing services and facilities, and scattered urban development shall be avoided.
- (4) Urban districts shall be contiguous to an existing urban district or shall constitute all or a part of a self-contained urban center.

Discussion: Huehue Ranch proposes an Urban designation of land for Kukio which is contiguous to the proposed Urban District of the adjacent Kaupulehu development. As a master planned resort, the project has been designed as a self-contained destination resort.

- (5) Preference will be given to amendment petitions which will provide permanent employment, or needed housing accessible to existing or proposed employment centers, or assist in providing a balanced housing supply for all economic and social groups.

Discussion: The Kukio Beach Resort development will add to the economic stability of the area and allow for high quality development and permanent employment opportunities. Housing requirements attributed to the development will be resolved with the appropriate County and State agencies.

- (6) In establishing the boundaries of the districts in each county, the Commission shall give consideration to the general plan of the County.

Discussion: The relationship of the proposed Kukio Beach Resort plan to the Hawaii County General Plan is addressed in this section. A General Plan Amendment is currently pending before the County of Hawaii Planning Department.

- (7) Insofar as practicable conservation lands shall not be reclassified as urban lands.

Discussion: There is no compelling reason for retaining in Conservation the Kukio lands that are to be requested for Urban redesignation.

- (8) The Commission is encouraged to reclassify urban lands which are incompatible with the interim statewide land use guidance policy or are not developed in a timely manner.

Discussion: The Huehue Ranch plan for the land it will be requesting be redesignated Urban is compatible with the interim statewide land use guidance policy and will be developed in a timely manner.

6.4 HAWAII COUNTY GENERAL PLAN










The 1971 Hawaii County General Plan expresses the broad goals and policies for long-range development of the island of Hawaii. It also provides a legal basis for more detailed levels of County Land Use controls and the expenditure of public improvement funds. An administrative effort to update the General Plan is currently underway. This update will evaluate areas of strength and weakness in the initial plan and reevaluate the thirty year horizon of the plan in relationship to current and anticipated economic and social conditions.

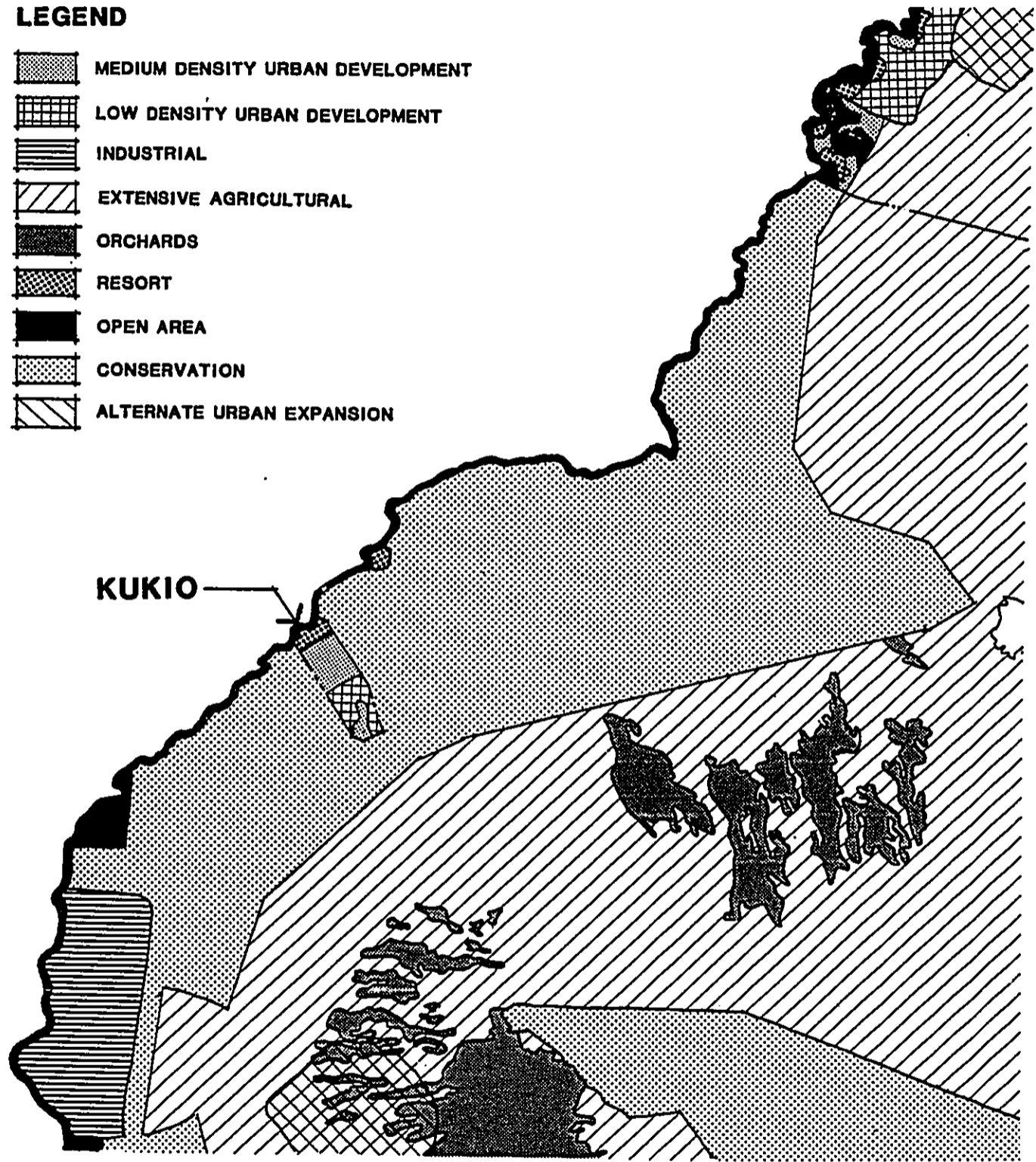
In the 1971 Plan, resort development areas in North Kona were designated at five locations, Holualoa Makai (Minor), Kailua (Major), Keauhou-Kahaluu (Major), Honokohau-Kaloko (Intermediate) and Kaupulehu (Retreat). Since that time the visitor industry has grown significantly and Kaupulehu was designated as an Intermediate Resort. Industry growth has taken place in each of the designated areas, except for Honokohau-Kaloko. Due to historic and environmental considerations, these lands have been identified by the federal government for public park purposes. Based on the significant growth in the visitor industry in the North Kona district and projected continued market demand, consideration of additional resort area designations in conjunction with the General Plan Update is necessary.

The Land Use Pattern Allocation Guide (LUPAG) maps in the 1971 General Plan designate the 40 foot wide coastal strip of the Kukio property for Open Space. The remainder of the site is designated Conservation. In order for the proposed development to proceed at Kukio, the General Plan would need to be modified to allow an "intermediate resort" and the LUPAG map would need to be amended to reflect a mix of land uses including resort, medium density, low density and open space as shown on Figure 6-1.

The current proposed action for the Kukio lands (i.e. General Plan Amendment application) will facilitate the timely review of the General Plan policies and land use designations, and provide necessary information to support the requested changes to designate Kukio as an intermediate resort.

LEGEND

-  MEDIUM DENSITY URBAN DEVELOPMENT
-  LOW DENSITY URBAN DEVELOPMENT
-  INDUSTRIAL
-  EXTENSIVE AGRICULTURAL
-  ORCHARDS
-  RESORT
-  OPEN AREA
-  CONSERVATION
-  ALTERNATE URBAN EXPANSION



**PROPOSED LUPAG MAP
KUKIO BEACH RESORT
HUEHUE RANCH**



FIGURE 6-1

The applicable goals, policies, standards, and courses of action are provided below along with the applicants position related to the proposed action.

1. Economic Element

Goals:

- o The economic system of the County should provide its residents with opportunities to improve their quality of life.
- o Economic development and improvement should be accomplished in an orderly manner which is in balance with the physical and social environments of the Island of Hawaii.
- o The County of Hawaii should strive for stability in its economic system.

Policies:

- o Strive for an economic climate which provides its residents an opportunity for choice of occupation.
- o Encourage the development of visitor industry which is consistent with the social, physical, and economic goals of the residents of the county.
- o Require a study of the total social and physical impact of large developments prior to approval.
- o Encourage the expansion of higher and continuing educational services and institutions.
- o Study the feasibility of establishing a business development loan program
- o Consider the land, water, air, sea, and people as an essential economic resource for present and future generations and to protect and enhance the use of economic incentives.
- o Strive for full employment.
- o Reevaluate all economic goals and policies, particularly in the area of tourism.

Courses of Action:

- o Resort development in the area shall be in balance with the social and physical goals as well as economic desires of the residents of the district. Necessary pollution controls should be available prior to development. Other necessary support facilities such as transportation and nursery facilities shall also be provided.

Position: The utilization of this land resource will result in an increased quantity and variety of job opportunities for local residents resulting in higher employment and better wages which in turn increases the opportunities to improve their quality of life. Utilizing sensible planning principles, and developing facilities in an orderly manner, minimizing the adverse effects on the physical and social environment of the area and expanding the variety and quality of services available to the community. The proposed improvements will create a successful resort development which in turn will be a stable economic force within the island's economy. The resort development therefore will not only result in minimal adverse social and physical impact, but will also create more employment and therefore, will provide for more economic stability in the region.

2. Environmental Quality

Goals:

- o Reduce air pollution.
- o Improve water quality.
- o Eliminate soil pollution.
- o Establish acceptable solid waste disposal systems.
- o Minimize noise pollution.

Policies:

- o Take positive action to further maintain the quality of the environment for residents both in the present and in the future.
- o Reinforce and strengthen minimum controls established by the federal and state governments pertaining to the control of pollutants that effect the environment.
- o Encourage the concept of recycling wastes.

Position: The resort developers will endeavor to maintain environmental quality and will act in a manner which is consistent with minimizing the adverse impacts. The plan has no inherent adverse impacts on environmental quality.

3. Flood Control and Drainage

Goals:

- o Conserve scenic and natural resources.
- o Protect human life.
- o Prevent damage to man-made improvements.
- o Control pollution.
- o Prevent damage from inundation.
- o Reduce surface water and sediment runoff through the employment of soil conservation measures.

Policies:

- o Maintain standards which minimize the danger to life and property in areas of recurrent flooding.
- o Minimize the threat of tsunami inundation.
- o Restrict land use and building structures in areas of severe wave action impact.
- o Maintain drainage systems as well as to assist in developing comprehensive flood damage prevention programs, and in the construction of flood control features.

Position: The resort development will respect, preserve, and improve the scenic beauty and natural resources found within the project area. The plan avoids areas with flood potential or takes protective measures. Infrastructure improvements and mitigating measures during construction will minimize potentially adverse environmental impacts associated with development of the resort.

4. Historic Sites

Goals:

- o Protect and enhance the sites, buildings, and objects of historical and cultural importance to Hawaii.

o Agencies, either public or private, pursuing knowledge about the historic sites should keep the public apprised of projects.

o Access to significant historic sites, buildings, and objects of public interest should be made available.

Policies:

o Evaluate and protect important historic sites, buildings, and objects in appropriate ordinances.

o Require developers of land to provide a historical survey prior to clearing or development of land where there is an indication of historical significance.

o Acquire public access to significant historic sites and objects.

o Give preference to complexes with a preponderance of original materials rather than single isolated sites unless they are of great significance.

o Encourage the restoration of significant sites on private lands.

o Collect and distribute historic site information for public interest and to keep a current inventory of sites. Aid in the development of a program of public education concerning historic sites.

o Encourage the installation of sites explaining historic sites, buildings, and objects that are in character with the surrounding area and cultural aspects of the feature.

o Evaluate the significance of historic sites.

Position: The resort development will preserve and incorporate important historical sites into a pedestrian network which will be accompanied by educational and cultural interpretative information. Historic sites have been identified, and their protection, restoration, and access are part of the plan for the resort and are considered an important resource. Presence of the resort will stimulate interest in the historic sites and their preservation and restoration.

5. Housing

Goals:

o Encourage safe, sanitary, and livable housing.

o Attain diversity of socio-economic housing mix throughout the different parts of the County.

o Maintain a housing supply which allows a variety of choice.

Policies:

o Assure that safe, sanitary, and livable housing is available to persons of all ages, income, and ethnic groups, and to provide a choice as to location and types.

o Promote the volume of construction and rehabilitation of housing to meet growth needs.

o Encourage construction of specially designed facilities for active, elderly persons.

o Encourage the use of new housing design and construction and to increase the volume of production through further use of technological innovations.

o Encourage private programs intended to increase the supply of housing to create a variety for choice.

o Promote and support the use of turn-key developments and encourage the use of cluster and planned-unit developments.

o Protect residential property values from depreciating influences.

Standards:

Housing Standards shall consist of and comply with:

o Housing code.

o Building code.

o Electric code.

o Plumbing code.

o Zoning ordinance.

o Subdivision ordinance.

o Uniformity of housing information system.

o Standards listed for single family and multiple residential land use elements.

Position: Housing within the resort will be available as primary housing. As may be indicated through more specific housing studies, employee housing will be provided for.

6. Natural Beauty

Goals:

- o Protect and enhance the integrity of areas endowed with natural beauty.
- o Protect scenic vistas from becoming obstructed.
- o Maximize opportunities for present and future generations to experience natural beauty.

Policies:

- o Establish viewplane regulations to preserve views of scenic or prominent landscapes from specific locations..
- o Identify and develop view-sites.
- o Review criteria for safeguards of natural beauty in the design of developments so that manmade elements will blend with the natural setting.

Position: The integrity and natural beauty of the shoreline areas will be maintained. The plan contemplates a number of view planes and view corridors using golf or other recreational amenities for this purpose. Since beautiful views are integral to economic values, the development has identified significant views worthy of preservation.

7. Natural Resources and Shorelines

Goals:

- o Protect and conserve the natural resources of the County of Hawaii from undue exploitation, encroachment, and damage.
- o Provide opportunities for the public to fulfill recreational and educational needs without despoiling or endangering natural resources.

Policies:

- o Require users of natural resources to conduct their activities in a manner that avoids or minimizes the adverse effects on the environment.

- o Encourage a program of collection and dissemination of basic data concerning natural resources.
- o Maintain the shoreline for recreational, educational, and/or scientific manner that is protective of resources and is of the maximum value to the general public.
- o Protect from the encroachment of manmade improvements and structures.
- o Coordinate programs to protect natural resources with other government agencies.
- o Investigate methods of beach replenishment and sand erosion control.

Position: Scientific surveys and studies of the environment have been made and plans developed which will not adversely impact the environmental conditions. The integrity of the shoreline and the related recreational resource of the area will be enhanced by the resort development. Public access and utilization will not be impaired. Presence of the resort will stimulate interest and funding to keep public shoreline areas clean. By providing certain services in the resort, the adjacent public uses of the shoreline are enhanced. The anchialine pond complex will be preserved and maintained as an integral part of the resort complex.

8. Public Facilities

Goals:

- o Provide public facilities that effectively service community needs and continue to seek ways of improving public service through better and more functional facilities which are in keeping with the environmental and aesthetic concerns of the community.

Policies:

- o Continue to seek ways of improving public service through the coordination of service and by maximizing the use of personnel and facilities.

Position: The proposed resort development, through increased revenues to the State and County, will support the goal of expanded protection services and health and sanitation installations throughout the district. The resort will provide public dining, entertaining and recreational facilities that service the community needs.

9. Public Utilities

Goals:

- o Ensure that adequate, efficient, and dependable public utility services will be available to users.
- o Maximize efficiency and economy in the provision of public utility services.
- o Improve the physical appearance of public utility facilities and/or to conceal them from public view.

Policies:

- o Provide utilities and service facilities which minimize total cost to public and effectively service the needs of the community.
- o Design utility facilities to minimize conflict with natural environment and natural resources.

Position: The necessary infrastructure systems will be constructed to implement the proposed development plans, including roadways, sewer and water systems, drainage and electric systems. Use of underground utilities will improve the physical appearance while increasing safety and reliability. The sewer treatment plant will be located in such a way as to be screened from view. The facilities will conform to modern standards as to efficiency and quality.

10. Recreation

Goals:

- o Provide a wide variety of recreational opportunities for the residents of the County.
- o Maintain the natural beauty of recreational areas.
- o Provide a diversity of environments for active and passive pursuits.

Policies:

- o Improve existing facilities for optimum use. Features shall be incorporated for use by all age groups, including the handicapped and the elderly.
- o Construct facilities which reflect the natural, historic, and cultural character of the area, and encourage recreational land uses which are compatible with the adjoining areas.

- o Provide compatible, multiple use recreational facilities.
- o Coordinate recreational programs and facilities with both governmental and private agencies which will offer a wider range of recreational opportunities.
- o Identify, designate, and acquire areas of recreational importance, such as sandy beaches and other prime shoreline areas.
- o Provide public access in accordance with adopted programs.
- o Establish a system of trails to places of scenic, historic, natural, or recreational interest.
- o Identify and evaluate marine and terrestrial natural areas for preservation of unique Hawaiian wildlife, especially rare and endangered species.
- o Conduct an ongoing educational program to obtain the cooperation of all people in maintaining the quality of recreation areas.
- o Disseminate recreational information for the public use.
- o Require subdivisions to provide land area for park and recreational use.

Courses of Action: Establish public access to, and the development of, shoreline regions along the North Kona coast so as to provide recreational opportunities in areas such as Keawaiki, Kiholo Bay, Kaupulehu, Kukio and Kapapa Bays, Kua Bay, Kahoiaawa, Makalawena, Mahaiula, and Honokohau.

Position: The resort development will enhance the natural beauty of the area. Facilities will be constructed in keeping with the natural, historic and cultural character of the area. Public access to the shoreline will be provided. Golf and tennis will be two intensive recreational amenities available at the resort. The resort improvements will increase the recreational resources available to the community.

11. Transportation

Goals:

- o Provide an efficient, safe, comfortable, and economical transportation system.

Policies:

- o Promote and encourage improvement of existing transportation systems and allowing for future demands.

Position: The presence of the resort will have a minimum impact on transportation. The internal road system is efficient in its service of the resort. The resort itself is of a scale and plan as to be primarily pedestrian in nature. A number of operational schemes will be considered to facilitate efficient transportation between the resort and the airport.

12. Land Use

The following goals relate specifically to resort development.

Goals:

- o Guide the orderly development of the visitor industry.
- o Provide for resort development that maximizes conveniences to its users.
- o Ensure that resort developments maintain the social, economic, and physical environments of Hawaii and its people.

Policies:

- o Impose incremental and conditional zoning based on performance requirements to ensure the orderly use of resort zoned areas and to curb speculation and resale of undeveloped lots in order to assure a certain percentage of buildings will be constructed.
- o Promote and encourage utilization of resort areas which are presently served by basic facilities and utilities.
- o Grant zoning in resort areas when the proposed development is consistent with and incorporates the stated goals, policies, and standards of the County of Hawaii General Plan.
- o Encourage the visitor industry to provide resort facilities which provide an educational experience of Hawaii, as well as recreational activities.
- o Reevaluate existing undeveloped resort zoned areas and reallocate zoned land in appropriate locations.

Position: There is a need for a tourism based employment facility in the North Kona district in order to provide a variety of employment opportunities.

The orderly development of a master planned resort community will provide the visitor industry with the necessary facilities to adequately serve the projected increase in visitor travel.

6.5 KONA REGIONAL PLAN

The draft Kona Regional Plan, adopted by the Hawaii County Planning Commission in April 1984, but yet to be acted upon by the County Council, is intended to provide a more detailed policy framework for the implementation of the County General Plan. It provides specific regional projections for economic and population growth and serves as a guide for future land use action.

The economic element of the Kona Regional Plan includes a set of scenarios depicting potential growth trends in the Kona region to the year 2000. Population is projected to increase from 20,000 in 1980 to between 33,200 and 46,300 by the Year 2000, depending on the degree to which the inventory of current land uses for hotel and resort condominiums is developed and to which new development areas are designated and developed.

The Plan includes resort development within a low priority land use category in terms of its ability to respond to identified community needs, such as affordable housing. This priority is identified despite resort development's comparative market strength. Policies encouraging private participation in capital improvements for infrastructure and infrastructural extensions (i.e. roads) north of Kailua in phase with development are also included.

The Kona Regional Plan land use concept map prepared under the current General Plan, identifies the proposed development area at Kukio in the Open designation.

Kukio Beach Resort plans include significant private participation in infrastructure development for the resort (i.e. sewage treatment plant, water supply, and on-site roads). While providing significant housing opportunities, the proposed project is not anticipated to contribute significantly to the County's supply of affordable housing.

6.6 COUNTY ZONING

The current County zoning maps designate the entire project area as Open (O). The Open Zone was established to protect scenic and environmental resources and is applied to lands south of Kukio along the coastline except for the Keahole Airport. Although

designated on the County zoning map as Open, the entire site is within the State Conservation district and thus the County has no authority to regulate these lands under the County Zoning ordinance.

In order to proceed with the physical development of the Kukio Beach Resort, the Conservation district must first be changed to the Urban district and then the County could apply its zoning ordinance to allow a mix of resort, residential and commercial uses.

6.7 COASTAL ZONE MANAGEMENT/SPECIAL MANAGEMENT AREA (SMA)

Regulations regarding the use of coastal lands and resources were established through the State Coastal Zone Management Act (Chapter 205A, HRS) and are administered by the County Planning Department. The intent of Coastal Zone Management and SMA regulations is to assure that adequate attention is paid to coastal resources and that development impacts are mitigated before damage occurs. Special controls on developments within an area along the shoreline are necessary to avoid permanent losses of valuable resources and the foreclosure of management options, and to ensure that adequate access, by dedication or other means to public owned or used beaches, recreation areas, and natural resources is provided. It is the State policy to preserve, protect, and where possible, to restore the natural resources of the coastal zone.

The designated SMA boundary includes all land makai of the Queen Kaahumanu Highway or approximately 317 acres of the proposed project area. Accordingly, an SMA permit will be required prior to the development of the Kukio Beach Resort.

The resort as planned will be consistent with the objectives and policies of the coastal zone management program and SMA policies and regulations as summarized below.

1. Recreational Resources

Objective:

- o Provide coastal recreational opportunities accessible to the public.

Policies:

- o Protect unique coastal recreational resources;
- o Replace areas of recreational value as damaged or destroyed by development;

- o Provide adequate public access;
- o Develop new coastal recreational opportunities;
- o Encourage the dedication of coastal areas with recreational value for public use.

Position: At present, access to the shoreline at Kukio from Queen Kaahumanu Highway is controlled at the entry pavillion that service both the Kona Village Resort and the beach area of Kukio. By developing the site for resort use, the public will be provided unrestricted access to the coastal recreational opportunities by way of a designated public right-of-way. Provisions within the development plan will protect the ecologically sensitive areas along the shoreline as well as the adjacent coastal anchialine ponds. Provisions such as parking facilities for the public and other ancillary facilities will be determined in conjunction with detailed site development plans and Special Area Management Permit application.

2. Historic/Archaeological Resources

Objective:

- o Protect, preserve and where desirable, restore significant historic and cultural resources.

Policies:

- o Identify and analyze significant historic resources;
- o Maximize information retention through preservation and salvage.

Position: A Full Archaeological Reconnaissance Survey (Appendix B) has been completed for the project area and several significant archaeological sites have been identified within the resort area. The resort project proposes to protect, preserve, and foster the restoration of significant historic and cultural resources where feasible.

The general mitigation plan calls for preservation/exhibition of 2 sites -- the possible heiau and the anchialine pond complex. The remaining sites will undergo archaeological data recovery or preservation. Also, the burials in the caves are to be reinterred according to the wishes of any living descendants of the deceased. Archaeological data recovery will be in two stages -- (1) detailed mapping, sample surface collection, test excavation, and selected dating and then (2) further excavation and data recovery work as needed to recover adequate and reasonable amounts of information in sites to be destroyed. Analysis of relevant research problems, lab analyses and report write-up will

also be integral parts of the data recovery work. Specific preservation and data recovery plans and execution of the plans will be reviewed and approved by the State Historic Preservation Office and County of Hawaii Planning Department.

3. Scenic and Open Space Resources

Objective:

- o Protect, preserve and where desirable, restore or improve the quality of coastal scenic and open space resources.

Policies:

- o Ensure that new developments are compatible with the visual environment;
- o Preserve and maintain shoreline open space and scenic resources;
- o Encourage developments which are not coastal dependent to locate inland.

Position: The resort development will protect, preserve, and where desirable, restore or improve the quality of coastal, scenic, and open space resources. Building improvements will be set back from the shoreline a minimum of 40 feet so that it retains its pristine character. The resort hotels will include attractive water play facilities to be built inland and thus will reduce pressure on the shoreline resource. A shoreline promenade will be provided along the shoreline to preserve and maintain the open space and scenic resources of Kukio Bay.

4. Coastal Ecosystems

Objective:

- o Protect valuable coastal ecosystems and to minimize adverse impact on all coastal ecosystems.

Policies:

- o Preserve valuable coastal ecosystems of importance;
- o Minimize disruption of coastal ecosystems;
- o Protect water quantity and quality management practices.

Position: The proposed development does not adversely affect the coastal ecosystem or anchialine pond complex. Refer to Section 3.5 for detailed discussion. In the implementation of a Pond Management Plan, a Department of the Army permit and CZM Federal consistency determination by DPED may be required if the ponds are to be altered or the actual coastline modified.

Regarding the project drainage system, storm water runoff and the potential impacts on water quality and nearshore waters, refer to Section 3.4 Hydrology for a detailed discussion.

5. Economic Uses

Objective:

- o Provide public and private facilities and improvements important to the State's economy in suitable locations.

Policies:

- o Concentrate coastal dependent development in appropriate areas;

- o Ensure coastal dependent developments minimize adverse social, visual, and environmental impact;

- o Direct location and expansion of development to existing designated areas.

Position: Kukio has the desired scenic and climatic environment to support a destination resort development. As a coastal dependent development, the proposed resort will minimize adverse social, visual and environmental impacts as discussed in Section 3.

Adjacent to the planned resort expansion at Kaupulehu, including Kona Village, there is projected market demand for increased resort and residential uses within the region. Expanded resort facilities will improve the local economy by providing additional employment opportunities. The Big Island as a whole and the State's economy overall will also benefit from the resort development as summarized in Section 3.21.

6. Coastal Hazards

Objectives:

- o Reduce hazards to life and property from tsunami, storm waves, stream flooding, erosion, and subsidence.

Policies:

- o Control development in areas subject to coastal hazards;
- o Ensure that developments comply with the requirements of the Federal Flood Insurance Program.
- o Prevent coastal flooding from inland projects.

Position: The development plan has addressed the coastal hazards so as to minimize any potential threat to life or property. Adequate setbacks and building designs will be utilized to reduce any potential hazards to the coastal area of the resort.

6.8 FLOOD HAZARD CONTROL

Proposed plan for the resort will be in compliance with the Hawaii County Code - Chapter 22, Flood Hazard Control as follows:

Statement of Purpose:

To promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed:

1. To protect human life and health;
2. To minimize expenditure of public money for costly flood control projects;
3. To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
4. To minimize prolonged business interruptions;
5. To minimize damage to public facilities and utilities located in areas of special flood hazard;
6. To help maintain a stable tax base by minimizing future flood loss;
7. To assist in notifying potential buyers that property is in an area of special flood hazard; and
8. To insure that those who occupy areas of special flood hazard assume responsibility for their actions.

Position: Appropriate measures will be taken in areas that present some risk. Although construction is not expected to have an impact on potential flood hazard, the proper mitigating measures, as required by regulatory agencies and as recommended by consulting engineers, will be implemented in order to minimize adverse environmental effects.

RECEIVED AS FOLLOWS

7.0
OFFSETTING CONSIDERATIONS OF GOVERNMENTAL POLICIES

RECEIVED AS FOLLOWS

RECEIVED AS FOLLOWS

7.0
OFFSETTING CONSIDERATIONS OF GOVERNMENTAL POLICIES

7.0 OFFSETTING CONSIDERATIONS OF GOVERNMENTAL POLICIES

As there are inherent conflicts in goals and objectives of land use plans, policies, and controls, the proposed action's relationship to these various policies must be reconciled against those plan elements, and policies that most appropriately apply. Discussed in Section 8.0, the proposed project is consistent with the applicable Hawaii County General Plan goals, policies and standards except those for which this action is requesting to amend. One of the most significant ways in which the proposed action fulfills governmental policies, and therefore, is thought to offset any adverse effects, is through the satisfaction of the Hawaii State Plan policy which states that "Planning for the State's economy in general shall be directed toward achievement of the following objectives: (1) Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawaii's people...To achieve the general economic objectives, it shall be the policy of this State to:...Encourage labor-intensive activities that are economically satisfying...Promote economic activities, especially those which benefit areas with substantial unemployment problems...Encourage businesses that have favorable financial multiplier effects within Hawaii's economy."

No significant adverse effects are expected to result from the proposed Kukio Beach Resort development. There are some minor impacts, but these are more than offset by the benefits the project will offer. State and County plans have encouraged quality resort development along this coast. The infrastructure ultimately required to serve the project will be largely provided by the project developer. The General Plan Amendment, including Land Use Pattern Allocation Guide Map (LUPAG) change and Intermediate Resort Designation, are initial steps in a process of project review necessary to assure a quality destination resort.

Analysis of the direct, indirect, and induced public revenues versus public expenditures the resort will generate indicates that the cost/benefit ratio will be favorable.

As identified in Section 3.21, the net fiscal impacts of the Kukio Beach Resort development to the county and state are estimated by comparison of the projected revenues and expenditures. The county may expect to net about \$2.7 million to \$3.6 million in additional annual revenues at project completion, in 1985 dollars. The additional county revenues generated by this project would range between 3.0 and 3.1 times the expenditures incurred by the county.

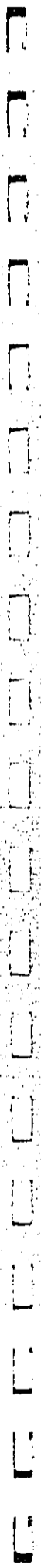
While this analysis did not incorporate the less quantifiable environmental costs, the environmental impacts of the proposed resort are not major. Although the existing lava-dominated

landscape will be transformed into a resort environment, the important resources of this land (including anchialine ponds, quality of the marine environment and shoreline, and significant archaeological sites) are expected to be preserved. The project will fulfill the implementing actions of several of the State functional plans which call for access to, and interpretation of, archaeological resources and unique coastal resources to foster visitors' and residents' understanding of Hawaii's history.

The government policies calling for increased access to the shoreline and increased recreational opportunities will also be met in the proposed Kukio Beach Resort. The archaeological preserves, shoreline access, and golf course are recreational benefits that further offset any environmental costs associated with the requested General Plan Amendment and subsequent resort development approvals.

Generally, as discussed in Section 6.0, the plan is consistent with relevant government plans and policies. It would fulfill the goals of the Hawaii County General Plan which call for economic growth that maintains a desired physical environment and that meets the needs of Hawaii's people.

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8.0
ALTERNATIVES TO THE PROPOSED PROJECT

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ALTERNATIVES TO THE PROPOSED PROJECT

8.0 ALTERNATIVES TO THE PROPOSED PROJECT

Known alternatives which could feasibly attain the objectives of the action--even though more costly--are described in this section. A comparative evaluation of the environmental benefits, cost, and risks of the proposed action and each alternative is provided. All the alternatives to the proposed resort development fail to meet the objective of establishing a high quality, low to medium density resort community that is economically viable.

Including the preferred alternative, the proposed "intermediate resort", five alternatives to the proposed project have been considered and evaluated against the project objective.

8.1 MAJOR RESORT

The General Plan, County of Hawaii characterizes a "major resort" as "a self-contained resort destination area which provides basic and support facilities for the needs of the entire development. Such facilities shall include sewer, water, roads, employee housing and recreational facilities, etc.:

Maximum visitor units: 3,000 rooms.

Resort acreage: 90 acres.

Active and passive recreation areas: 50 acres.

Accessory uses within hotel or resort zoned area shall be based on 50 square feet of floor area per hotel room.

A maximum of 640 acres for residential use when other zoned lands are not available in close proximity for support use.

Employee housing shall be provided at a maximum ratio of one employee unit to every two hotel units built. The required ratio shall be determined by an analysis of housing needs of each district or relative area."

The Kukio lands encompass 675 acres total, and could not accommodate a development of a scale approaching the maximum standards for a major resort. Development at this intensity could compromise the ability to incorporate significant environmental features into the project design, and would require substantial reductions in open space and recreational use opportunities (i.e. golf course). Site size limitations would place Kukio at a competitive disadvantage with respect to other major resorts along the Kona and Kohala coast. For these reasons, the "major resort" designation is rejected as a viable alternative for the Kukio site.

8.2 RETREAT RESORT

Characteristic of Kona Village, the concept of this alternative plan would be to provide a unique resort experience as a retreat from the urban scale and intensity of other resort developments.

As characterized by the standards set forth in The General Plan, County of Hawaii, "a retreat resort area is generally an area which provides the user with rest, quiet, and isolation for an environmental experience. It shall have sewer, water, roads, employee housing, and recreational facilities, etc.:

Maximum visitor units: 100 rooms.

Resort acreage: 15 acres or less.

Provide active and passive recreation area commensurate with scale of development.

Accessory uses within hotel or resort zoned area shall be based on 50 square feet of floor area per hotel room.

Employee housing shall be provided at a maximum ratio of one employee unit to every two hotel units built. The required ratio shall be determined by an analysis of housing needs of each district or relative area."

Secluded from intrusions of the highway and urban uses, the resort would provide an isolated bungalow or village-type setting with detached units that would be associated with the beachfront and recreational amenities of the coastline. For recreational amenities, a golf course would be included, along with a tennis center for those who would like to complement their retreat stay with some recreational activities. With association to the beachclub and coastal amenities, the mauka portion of the site could be developed with estate lots and include an equestrian center that could be associated with, and/or operated by, Huehue Ranch. Due to the low intensity of this resort concept, a commercial or village center would not be included.

This alternative would provide opportunities to optimize the land use activities to minimize impacts on existing archaeological/historical resources and environmental resources. Due to proposed land use plans on the adjacent Kaupulehu lands and the high cost of providing the necessary infrastructure to serve a low density resort of this character, both the physical setting and high capital cost and projected low return provide the basic reasons why this alternative is rejected.

8.3 LUXURY CONDOMINIUMS RESORT

This concept does not include a standard resort-type operation and would utilize the coastal area for the development of luxury

condominiums at a medium density with a high level of amenities and open space. In conjunction with the ocean-front luxury condominiums, estate lots fronting the 18 hole golf course would also benefit from the coastal amenities of the beachclub and private shoreline park. The estate lots would most probably be second-home type estates, with the total project secured with entry features and controlled access. Besides the golf course, another associated recreational feature could be expanded equestrian facilities related to Huehue Ranch's mauka operations.

Due to the private residential character of this alternative, there would be limited access to the coastal resources for public enjoyment. Additionally, the access to significant archaeological and historic resources at Kukio would be severely limited with little or no opportunity for interpretive material and programs to be provided for the public. The high off-site infrastructure costs would make this alternative either prohibitively expensive or infeasible depending on market demands.

8.4 RESIDENTIAL ESTATE LOTS

This alternative would provide for subdivision of the Kukio lands into large residential estate lots with controlled access from Queen Kaahumanu Highway. Owned and developed by various owners, each lot would be developed independently.

While total infrastructure costs could be reduced, the minimal improvements would require these lots to be extremely expensive to make the project feasible and thus limiting the marketability of this type of project. The coastal resources would have limited access through a development of this nature, although the general open space character of the land may be maintained. The regional economic benefits would be minimal due to the lack of employment generators such as resort and commercial uses.

8.5 NO BUILD (or "Do Nothing")

This alternative would be consistent with existing zoning and State land use designations. It would not, however, contribute to County and State goals and policies aimed at promoting employment and economic growth, nor would it respond to projected demand for increased resort opportunities along the West Hawaii coast. Overall environmental impact would be minimized, though the natural attributes and amenities of the site would remain underutilized. The ability to implement programs to manage and preserve the anchialine ponds and historical sites, previously subject to some disturbances and modifications, as well as provisions for improved access, is removed with this alternative.

8.6 COMPARATIVE EVALUATION

In assessing each of the alternatives and the proposed development plan for the Kukio Beach Resort, a general comparative eva-

uation as shown in Table 8-1 demonstrates the different benefits, costs, and risks associated with each action. None of the alternatives meet the objective of establishing an economically viable resort community of a quality competitive with other resorts in the region.

Table 8-1

Comparative Evaluation of
Benefits, Costs, and Risks of
Alternative Actions

	<u>Proposed Development</u>	<u>Major Resort</u>	<u>Retreat Resort</u>	<u>Luxury Condo</u>	<u>Estate Lots</u>	<u>No Build</u>
<u>Benefits</u>						
Employment	+	+	o	-	-	-
Income Generation	+	+	o	-	-	-
Tax Revenues	+	+	o	-	-	-
Recreation Facilities	+	+	+	o	-	-
Public Access	+	+	o	-	-	-
+ = Positive Impact o = Minimal Impact - = Possible Negative Impact						
<u>Costs</u>						
Public Infrastructure Requirements	-	-	-	-	-	-
Community Services	o	+	o	o	o	-
Environmental Resources	o	+	-	o	-	-
Housing	o	+	-	-	-	-
+ = High Cost o = Medium Cost - = Low Cost						
<u>Risks</u>						
Archaeological/ Historical Resources	o	+	o	o	+	o
Coastal Resources	-	+	-	-	-	-
Ground Water Quality	-	o	-	-	o	-
+ = High Risk of Damage o = Medium Risk of Damage - = Low Risk of Damage						
<u>Overall Ranking</u>	1	N/A	3	2	4	5

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9.0
RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE
ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF
LONG-TERM PRODUCTIVITY

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9.0 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The principal long-term benefits of the existing site use and General Plan designations relate to the provision of uninterrupted open space, natural vistas, and preservation of environmental features, such as coastal resources, the anchialine ponds and historical features. Additional possible advantages include avoidance of any public costs associated with extensions of infrastructure and services to the site.

As demonstrated in this document, the proposed Kukio Beach Resort does not appear to pose any long-term risks to health and safety, and includes provisions to maintain, enhance or make available to a broader public the long-term benefits associated with existing site use. Measures to ensure coastal resource integrity, including anchialine pond management and cultural resources management are integral features of the proposed development.

Existing views of the site and surrounding lands, while natural in character and uninterrupted, are dominated by barren lava fields. Over the long-term, these views will be replaced by man-made features and landscaped open space. These open space areas, including the golf course and the shoreline, will be maintained and landscaped so that the visual character of the resort is enhanced.

Other benefits of the proposed development include long-term employment opportunities and other economic benefits which it will bring to the region, county and state. Economic benefits will more than offset aggregate public costs associated with providing services to the resort and other indirect increases in population generated by increased employment opportunities in the region.

Because the area is largely barren lava fields with little or no agricultural value, future options for alternate uses of the land are limited. Thus, viable future options for use of the land and resources are limited, and the range of beneficial uses of the environment will not be significantly narrowed.

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AGENCIES, ORGANIZATIONS AND PERSONS CONSULTED AND
FIRMS AND PERSONS PREPARING THE EIS

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**AGENCIES, ORGANIZATIONS AND PERSONS CONSULTED AND
FIRMS AND PERSONS PREPARING THE EIS**

10.0 AGENCIES, ORGANIZATIONS AND PERSONS CONSULTED AND FIRMS AND PERSONS PREPARING THE EIS

The agencies, organizations, and individuals listed below were consulted in preparing the Environmental Assessment (EA) and/or the Draft EIS.

Federal Agencies

U.S. Department of Agriculture,
Soil Conservation Service

U.S. Department of Interior,
Fish and Wildlife Service

U.S. Army Corps of Engineers

State Agencies

Department of Planning and Economic Development
Department of Health
Department of Transportation
Department of Education
Department of Land and Natural Resources
Office of Environmental Quality Control
Department of Land and Natural Resources

Hawaii County

Mayor's Office
Department of Water Supply
Department of Planning
Department of Public Works
Police Department
Fire Department

Public Utilities

Hawaii Electric Light Company
Hawaiian Telephone Company

Major Landowner, Developer, Resort Operators

Kona Village
Kaupulehu Developments (Barnwell Industries, Inc.)

The Environmental Impact Statement was prepared for Huehue Ranch by Phillips, Brandt, Reddick & Assoc. with input provided by the planning team and subconsultants. The following were involved:

PLANNING TEAM

Huehue Ranch

Carl A. Carlson, Jr., Manager

R. H. Suefuji, Project Coordinator

Raymond H. Suefuji

Phillips, Brandt, Reddick & Associates, Planners.

Wm. Frank Brandt, President

Thomas S. Witten, Principal-In-Charge

Jeffrey Melrose, Associate

Roy Y. Takeyama, A Law Corporation, Attorney

Roy Y. Takeyama

Jan Sullivan

SUBCONSULTANTS

John Child & Company, Inc., Market Consultant

Karen Char, MAI

Peat, Marwick, Mitchell & Co., Economic Consultant

Malcolm Tom, Partner-In-Charge

Ann Bouslog, Senior Consultant

John Frazier, Consultant

Engineers Surveyors Hawaii, Inc., Consulting Engineers

William Hee, Principal

Robert Itagaki, Project Engineer

Jerry S. Nakagawa, Land Surveyor

William A. Brewer & Associates, Marine/Coastal/

Terrestrial Consultant

William A. Brewer, President

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

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

Alan T. Walker, Field Archaeologist

Carol L. Silva, Historical Researcher

Hannah Kihalani Springer, Historical Researcher

Char & Associates, Botanical/Environmental Consultant

Winona Char, Botanist

Damon R. Runyan, Inc., Geotechnical Consultant

Damon R. Runyan

PHILLIPS BRANDT REDDICK

Wm. Frank Brandt
Thomas Witten
Thomas Holm
Matthew Grady
Greta Bergdahl
Edith Masaki
Grace Wang

President
Principal-In-Charge
Project Director
Cartographer/Research Assistant
Graphic Designer/Editor
Graphic Designer
Word Processor

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11.0
AGENCIES, ORGANIZATIONS AND PERSONS WHO WERE SENT A
COPY OF THE NOTICE OF PREPARATION AND
ENVIRONMENTAL ASSESSMENT; WRITTEN COMMENTS AND
RESPONSES DURING CONSULTATION PROCESS

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RESPONSES DURING CONSULTATION PROCESS

11.0 AGENCIES, ORGANIZATIONS AND PERSONS WHO WERE SENT A COPY OF
THE NOTICE OF PREPARATION AND ENVIRONMENTAL ASSESSMENT;
WRITTEN COMMENTS AND RESPONSES DURING CONSULTATION PROCESS

The notice of availability of the EIS Preparation Notice (EISPN) for the Kukio Beach Resort General Plan Amendment was published in the OEQC Bulletin by the Office of Environmental Quality Control on August 23, 1985. Copies of the EIS Preparation Notice (EISPN) with the Environmental Assessment (EA) were sent to those agencies, organizations or individuals that responded to the request as listed below. Copies of the correspondence with them are reproduced in this section.

Response from EIS Preparation Notice

	<u>Response</u>
<u>State Agencies</u>	
Department of Planning and Economic Development Mr. Charles Carol	Letter 9/20/85
Department of Land and Natural Resources	Letter 10/11/85
<u>Federal Agencies</u>	
U. S. Fish and Wildlife Service Mr. Andy Yuen	None



DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT

STATE OF HAWAII
DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT
1555 KALANIANA'OLA DRIVE, SUITE 200, HONOLULU, HAWAII 96813

Ref. No. P-2714

September 20, 1985

GEORGE R. ANDERSON
DIRECTOR
KURT A. KEITH
ASSISTANT DIRECTOR
ALEXANDER E. EDWARDS
ASSISTANT DIRECTOR
LINDA KAKIMAKI ROSSWELL
ASSISTANT DIRECTOR

PLANNING AND ECONOMIC DEVELOPMENT DIVISION

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PLANNING AND ECONOMIC DEVELOPMENT DIVISION

The Honorable Albert Lono Lyman
Planning Director
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Lyman:

SUBJECT: EIS Preparation Notice for Kukio Beach Resort,
North Kona, Hawaii

We have reviewed the subject environmental impact statement preparation notice (EISPN) and have the following comments.

The existing Kona Village Resort is unique because of its isolation, low density, and lack of typical resort amenities. The impact of the proposed Kukio Beach Resort on the existing Kona Village Resort should be addressed.

According to the State Tourism Plan Technical Reference Document dated October 1981, the Kukio area is not within a "Designated Visitor Destination Area." However, Kaupulehu, which is located to the north of Kukio, is within a "Designated Visitor Destination Area" and is also designated as an "Intermediate Resort Area" by the County of Hawaii.

The EIS should address the impact that further development of the Kukio and Kaupulehu environs would have on the "Designated Visitor Destination Areas" of North Kona (Kaliua, Keahou-Kaniala, Nohonou-Kaloko) and South Kohala (Anehoomalu, Kawihaha-Kapuna, Puako-Honokaae Bay). Between North Kona and South Kohala, the proliferation of hotels along the shoreline and associated residential projects makes of Queen Kaanani Highway could have a detrimental effect on the luxury South Kohala resort areas of Waikoloa, Mauna Lani and Mauna Kea. The social, visual, resource and market impacts should be thoroughly addressed in the EIS.

The Honorable Albert Lono Lyman
Page 2
September 20, 1985

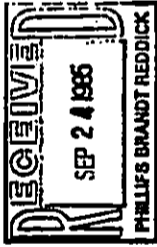
The "Draft EIS for General Plan Amendment" which was submitted with the EISPN should be revised on p. 6-2 regarding the number of adopted State Functional Plans. Also, the State Land Use Commission was established in 1961 and not in 1974 as stated.

Thank you for the opportunity to review and comment on the subject document.

Very truly yours,

Murray E. Towil
Murray E. Towil
Phyllis Brandt Reddick

cc: Office of Environmental Quality Control
Phillips, Brandt, Reddick and Associates, Inc.
Hawaii, Hawaii



Phillips Brandt Reddick

January 31, 1986

Mr. Kent M. Keith, Director
Department of Planning and
Economic Development
State of Hawaii
P. O. Box 2359
Honolulu, Hawaii 96804

SUBJECT: KUKIO BEACH RESORT EIS PREPARATION NOTICE
NORTH KOHA, HAWAII

Dear Mr. Keith:

Thank you for your comments contained in your letter dated September 20, 1985. We have reviewed your comments and offer the following responses:

- 1) The proposed plans for the adjacent Kaupulehu lands, to be developed as an intermediate resort area, will separate Kukio from the existing Kona Village. Near term and long term impacts from Kukio Beach Resort on the current Kona Village Resort will be addressed in the Draft EIS.
- 2) The objectives, policies, and implementing actions of the State Tourism Plan will be addressed in regards to proposed Kukio Beach Resort.
- 3) Related to resort development, the Draft EIS will address the regional impact that development at Kukio and Kaupulehu environs would have on the other resort areas within North Kona and South Kohala.


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Mr. Kent M. Keith
Department of Planning
and Economic Development
January 31, 1986
Page 2

- 4) The errors identified within the "Exhibit for General Plan Amendment" which was submitted with the EISPW have been noted.

Very truly yours,

PHILLIPS BRANDT REDDICK



Ms. Frank Brandt, ASLA
President

cc: Mr. Ai Lyman, Director
County of Hawaii Department of Planning

Mr. Carl Carlson, Manager
Ruehue Ranch

Mr. Raymond Susefuji
Mr. Roy Takeyama
OEQC



GEORGE B. ANTONIO
Commissioner of Land

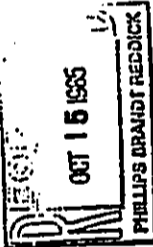


STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 521
HONOLULU, HAWAII 96809

SUSUMU OKO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES
EDGAR A. HALELOU
DEPUTY TO THE CHAIRMAN
DIVISIONS:
AGRICULTURE DEVELOPMENT
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RECREATION
CONSTRUCTION AND
DEVELOPMENT
COUNCIL ON LAND
LAND MANAGEMENT
STATE TREASURY
WATER AND LAND DEVELOPMENT

REP. NO.: CPO-1814-85

OCT 11 1985



Phillips, Brandt, Reddick and Associates, Inc.
130 Merchant Street, Suite 1111
Honolulu, Hawaii 96813

Gentlemen:

SUBJECT: Comments on HIS Preparation Notice
Summary of Proposed Project

Title: PROPOSED KUKIO BEACH RESORT
Project by: Kaloko Land Corporation
Location: Keahole, M. Kona, Hawaii

Brief Description:

We understand that the developer plans a large-scale beach resort on 675 acres: (317 acres makai and 358 acres mauka of the Queen Kaahumanu Highway) between Keahole Airport and Kona Village Resort. The master plan for the entire project includes two hotel layouts (65 acres), 900 to 1200 condominium units and 500 single-family homes (358 acres), shopping center (5 acres), one golf course (175 acres), and other uses (70 acres).

Comments:

The information on THK 7-2-04:05 indicates that shoreline ownership may be disputed. The HIS should clarify limits of property to be developed.

For your information, in Aquatic Survey of the Kona Coast Ponds, Hawaii Island, authors MacIolek and Brock describe seven anchialine ponds with surface areas from less than 10 square meters to more than 100 square meters located on or near the project site. A major concern is the cumulative deterioration of Hawaii's unique anchialine ponds by human activities. The HIS should discuss impacts on the pond habitat and mitigation measures to ensure the survival of the endemic native species inhabiting these ponds.

Phillips, Brandt, Reddick & Assoc.

CPO-1814-85

Also, there are three well-documented trails in this region currently providing public access to the shoreline (West Hawaii Coral Reef Inventory). One trail meanders mauka from Kaupulehu to Huchue Ranch; another trail leads upland from Kukio to Huchue Ranch. Alongshore, a trail leads from Kukio Bay to Kaupulehu. There is also access by a jeep road to Kukio Bay with permission. The coastline can also be reached on foot from Kahawai Bay or Makalawena. The HIS should address the potential impacts of development on these ancient trails as well as any modification to existing and customary patterns of public access to, and uses of, the shoreline for fishing and other recreational uses.

Additionally, the HIS should address the following:

1. Effects on the coastal brackish water lens and associated anchialine ponds of withdrawing ground water for irrigation of the proposed golf course, landscaping and other residential developments;
2. Effects of sewage disposal and wastewater treatment on coastal resources, e.g. from dissolved nutrients and solid residues;
3. Contamination of coastal waters and resources from grading, filling, erosion, pesticides, herbicides, construction materials, petroleum products, etc.

Very truly yours,

SUSUMU OKO, Chairperson
Board of Land and Natural Resources

Phillips Brandt Reddick

January 30, 1986

Mr. Susumu Ono, Chairperson
Board of Land and Natural Resources
State of Hawaii
Department of Land and Natural Resources
P. O. Box 621
Honolulu, Hawaii 96809

**SUBJECT: KUKIO BEACH RESORT EIS
NOTICE OF PREPARATION (NOP)**

Dear Mr. Ono:

Thank you for your letter dated October 11, 1986. We have reviewed your comments and offer the following responses:

- 1) TMK 7-2-04: 08 recently had its shoreline surveyed and certified as the makai boundary of Grant 2121 to Pupule within asened area of 317.668 acres. The Land Surveyor confirmed the Grant description in discussion with Surveyors at the State Survey Office. The EIS will clearly state the limits of the property to be developed.
- 2) There is a complex of anchialine ponds located within the project area. The Draft EIS will discuss the impacts on the pond habitat and mitigation measures to ensure the survival of the endemic native species inhabiting these ponds.
- 3) The historic trails within the project area have been well documented within a full archaeological reconnaissance survey completed for the subject project. The Draft EIS will address the potential impact of development on these trails as well as any modifications to existing patterns of public access to and use of the shorelines for fishing and other recreational uses.
- 4) As suggested, the Draft EIS will address the following:
 - a) Effects on the coastal brackish water lense and associated anchialine ponds.

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Mr. Susumu Ono
Department of Land and
Natural Resources
January 30, 1986
Page 2

- b) Effects of sewage disposal and wastewater treatment on coastal resources.
- c) Contamination of coastal waters and resources.

We appreciate your comments and the information provided and we will incorporate them into the Draft EIS.

Very truly yours,

PHILLIPS BRANDT REDDICK


Mr. Frank Brandt, ASLA
President

cc: Mr. Al Lyman, Director
Department of Planning
County of Hawaii
Mr. Carl Carlson, Manager
Kuehne Ranch
Mr. Raymond Susufuji
Mr. Roy Takayama
ORQC

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12.0
AGENCIES, ORGANIZATIONS AND PERSONS WHO WERE SENT A
COPY OF THE DEIS; WRITTEN COMMENTS AND RESPONSES
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COPY OF THE DEIS; WRITTEN COMMENTS AND RESPONSES
RECEIVED DURING THE PUBLIC REVIEW PERIOD**

12.0 AGENCIES, ORGANIZATIONS AND PERSONS WHO WERE SENT A COPY OF THE DEIS; WRITTEN COMMENTS RECEIVED DURING THE PUBLIC REVIEW PERIOD; AND RESPONSES

The Draft EIS (DEIS) was officially filed with the Hawaii County Planning Department and the Office of Environmental Quality Control (OEQC) on 5 March 1986 and was published in the OEQC Bulletin on 8 March 1986. The following agencies, organizations and persons received a copy(ies) of the DEIS. As of 7 April 1986, a total of 16 letters were received; of this total, 9 provided substantive comments.

A thirty day extension to the sixty day public review period was requested by the applicant on 11 April 1986 in order that sufficient time would be available to respond to comments received late. The request was granted on 17 April 1986 by County of Hawaii Planning Department thus extending the response period to 16 May 1986 and Final EIS review and determination of acceptability to 3 June 1986.

Starred (*) individuals sent letters regarding the DEIS, but did not provide substantive comments. Double starred (**) respondents provided comments on the DEIS. Their letters and our replies are reproduced in this section.

Additionally, five letters were received after the 7 April 1986 deadline for the review period. These respondents are indicated by a triple star (***) and their letters and our replies are also reproduced in this section.

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Wailuku Regional Library, Maui
Lihue Regional Library, Kauai
Kohala Library, Hawaii
Holualoa Library, Hawaii
Kailua-Kona Library, Hawaii

H. COMMUNITY ORGANIZATIONS

*** Sierra Club, Hawaii Chapter (Moku Loa Group)

12-87

GEORGE R. BRANTOME
DIRECTOR



APR 7 1986

PHILLIPS BRANTOME

LETITIA N. UYEHARA
DIRECTOR

TELEPHONE NO.
548-9111

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
465 South King Street, Room 115

HONOLULU, HAWAII 96813

April 4, 1986

Mr. Albert Lono Lyman, Director
County of Hawaii Planning Department
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Lyman:

Subject: Draft Environmental Impact Statement for Kukio
Beach Resort, Kukio, North Kona, Hawaii

We have reviewed the draft environmental impact statement
and offer the following comments for consideration:

1. Anchialine ponds. We suggest that a buffer zone
around anchialine ponds be created to prevent
degradation of the ponds from surface runoff. We
share the U.S. Fish and Wildlife and National Marine
Fisheries Services' concern that fertilizer and other
chemicals utilized in maintaining the proposed golf
course may adversely affect pond habitat. The use of
natural lava tubes as alternatives to manmade storm
collection culverts as proposed on page 3-17 is not
recommended. Unlike storm culverts, lava tubes will
direct surface runoff in unknown directions, and may
directly affect anchialine ponds.
2. Archaeological sites. Several sites in the area have
cultural significance and should be preserved. We
suggest that the Department of Land and Natural
Resources' State Historic Preservation Program be
consulted in the effort to incorporate these sites
into the resort design.

Thank you for providing us the opportunity to review this
draft EIS.

Sincerely,

Letitia N. Uyehara
Director

cc: Huehue Ranch
✓ Phillips, Brandt, Reddick
and Associates (Hawaii) Inc.

Phillips Brandt Reddick

May 7, 1986

Ms. Letitia M. Uyebara, Director
Office of Environmental Quality Control
State of Hawaii
465 S. King Street
Room 115
Honolulu, Hawaii 96813

SUBJECT: DRAFT EIS
FOR KUKIO BEACH RESORT
NORTH KONA, HAWAII

Dear Ms. Uyebara:

Thank you for the copy of your letter of 4 April 1986 to Mr. Albert Lono Lyman, Director, County of Hawaii Planning Department. We have reviewed your comments and offer the following response:

- 1) Regarding anchialine ponds, an adequate buffer zone will be provided in the pond reserve area of the resort. The preparation of a pond management plan has been initiated with the U.S. Fish and Wildlife Service so that the necessary measures will be taken to prevent the degradation of the ponds from surface runoff.

Changes in the baseline quality of the groundwaters in the Kukio area may be expected. However, the euryhaline nature of the pond biota and reported temperature range (22-30 degrees C.) suggest groundwater withdrawals and surface disposal of treated wastewater and rainwater runoff would have little if any detectable effect on pond biota. Monitoring studies conducted at a pond complex abutting the Mauna Lani Resort failed to detect any negative impact directly attributable to construction or subsequent use of the surrounding terrain (including effects of golf course irrigation with treated wastewater). Water quality and benthic algal abundance remained unchanged from a pre-construction survey conducted 13 years earlier (Brock, 1985a). Additionally, based on further study of the drainage alternatives, natural lava tubes will not be utilized as an alternative to storm collection culverts.

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Ms. Letitia M. Uyebara
DRAFT EIS FOR KUKIO BEACH RESORT
May 7, 1986
Page 2

- 2) Regarding archaeological sites, the Full Archaeological Reconnaissance Survey for Kukio Resort Development (Rosendahl 1986) has been reviewed by the Department of Land and Natural Resources, State Historic Preservation Program. Their review identified several problems and questions that have subsequently been clarified and resolved to their satisfaction and Chapter 6E - Historic Preservation clearance has been granted for the subject project.

Thank you for your comments. Your letter and this response will be appended to the Final EIS.
Sincerely,

PHILLIPS BRANDT REDDICK

Phillips Brandt Reddick
Thomas S. Witten, ASLA
Principal

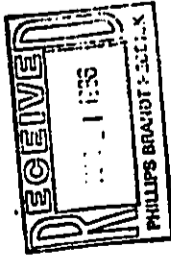
cc: Mr. Albert Lono Lyman, Director
County of Hawaii Planning Department
Mr. Carl Carlson, Manager
Huehue Ranch

GEORGE E. ARIYOSHI
GOVERNOR



JACK K. SUWA
CHAIRMAN, BOARD OF AGRICULTURE

SUZANNE D. PETERSON
DEPUTY TO THE CHAIRMAN



State of Hawaii
DEPARTMENT OF AGRICULTURE
1428 So. King Street
Honolulu, Hawaii 96814

Mailing Address:
P. O. Box 22159
Honolulu, Hawaii 96822

March 18, 1986

MEMORANDUM

To: Mr. A. Iono Lyman, Director
Planning Department, County of Hawaii

Subject: Draft Environmental Impact Statement (EIS) for
Kukio Beach Resort
Huehues Ranch
TKK: 7-2-04: 05 & 16 North Kona, Hawaii
Acres: 675

The Department of Agriculture has reviewed the subject application and has the following comments to offer.

The project site is entirely within the Conservation District but the well sits is within the State Agricultural District. According to the Draft EIS (page 3-33), this well can supply 150 gallons per minute or 216,000 gallons per day. The projected maximum potable water demand is 1.96 million gallons per day. It appears that additional water sources will have to be developed. If such wells are necessary, ground water withdrawal impacts on current or potential agriculture in that region should be addressed.

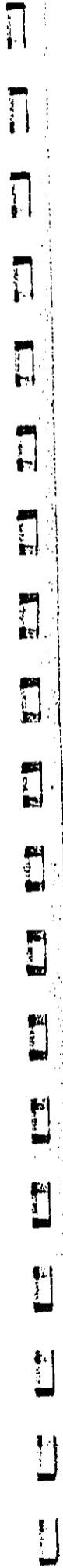
Thank you for the opportunity to comment.

Jack K. Suwa

JACK K. SUWA
Chairman, Board of Agriculture

cc: Mr. Carl A. Carlson, Jr.
Mr. Thomas S. Witten

"Support Hawaii's Agricultural Products"



Phillips Brandt Reddick

May 7, 1986

Mr. Jack K. Suwa
Chairman, Board of Agriculture
Department of Agriculture
State of Hawaii
1428 S. King Street
Honolulu, Hawaii 96814

SUBJECT: DRAFT EIS FOR KUKIO BEACH RESORT
NORTH KONA, HAWAII

Dear Mr. Suwa:

Thank you for the copy of your memorandum of 18 March 1986 to Mr. A. Lono Lyman, Director, Planning Department, County of Hawaii. We have reviewed your comments and offer the following response.

The well developed at elevation 1,575 at Huehue Ranch was pump tested at 150 gallons per minute for 24 hours with no measurable draw down. The actual available water supply that can be obtained from this well has yet to be determined, although it is known that additional water sources will be required to service the proposed development.

The additional water sources will be obtained by either drilling additional wells at Huehue Ranch, joint development of additional wells within the region with other landowners or developers, or desalination of shallow wells within the Kukio project area. About 1.7 MGD of additional potable water must be developed to meet the water needs of Kukio Beach Resort. To address your concerns regarding groundwater withdrawal impacts on current or potential agriculture in the region the following assessment is provided.

The operating cost of potable quality water supplies produced either directly from deep wells or desalting will be very high and probably on the order of \$8.00 per 1,000 gallons. It appears doubtful that any agricultural crop use, could afford such high priced water. Brackish water having a salinity of from 700 to 1,000 mg/l total chlorides can be developed at lower elevations. The quality of this water and the high pumping cost will greatly restrict crop types in the future as it does in present day economics.

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Mr. Jack K. Suwa
DRAFT EIS FOR KUKIO BEACH RESORT
May 7, 1986
Page 2

There is an adequate but limited amount of groundwater available in the area according to a study prepared by Island Resources Limited for Huehue Ranch (1981). The major problem in water availability lies in the cost to develop and operate groundwater sources whether for agricultural or domestic purposes. Potential agricultural activities in this area face the same constraints as domestic users. Only very high valued crops, very low water users, or saline water users can afford to use these groundwater resources. For crops that can meet these criteria, it appears that there will be adequate water resources in this region and groundwater withdrawal would not impact any current or known potential agricultural use.

Thank you for your comments. Your letter and this response will be appended to the Final EIS.

Sincerely,

PHILLIPS BRANDT REDDICK

Phillips Brandt Reddick
Thomas S. Witten, ASLA
Principal

cc: Mr. Albert Lono Lyman, Director
County of Hawaii Planning Department

Mr. Carl Carlson, Manager
Huehue Ranch

ORQC

GEORGE B. ANTONIO
Superintendent



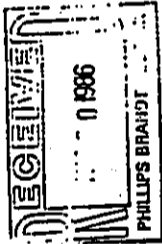
STATE OF HAWAII
DEPARTMENT OF EDUCATION

P. O. BOX 2300
HONOLULU, HAWAII 96810

March 18, 1986

OFFICE OF BUSINESS SERVICES

FRANCIS M. MATAMBA
Superintendent



Mr. Albert Lono Lyman, Director
County of Hawaii Planning Department
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Lyman:

SUBJECT: Kukio Beach Resort EIS

Our review of the proposed resort development with multi-family condominiums and single family lots indicates that the following student enrollment may be generated:

SCHOOL	GRADE	APPROXIMATE ENROLLMENT
Kealahou Elem.-Inter.	K-8	50 - 150
Konawaena High	9-12	20 - 50

The above listed schools are operating at capacity and will require additional classroom facilities to accommodate the student enrollment generated by the Kukio Beach development.

We would appreciate being kept informed of the status of this project in order that funds can be requested from the Legislature to provide the necessary classroom facilities on a timely basis.

Should there be any questions, please contact Mr. Howard Lau at 737-4743.

Sincerely,

Vernon H. Honda
Vernon H. Honda
Assistant Superintendent

VHH:HL:J1

cc F. Hatanaka, Supt.
K. Mizuba, Hawaii Dist.
C. Carlson, Jr., Ruehue Ranch
W. Witten, Phillips, Brandt, Reddick & Assoc.

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

Phillips Brandt Reddick

May 7, 1986

Mr. Vernon H. Honda
Assistant Superintendent
Department of Education
State of Hawaii
P. O. Box 2360
Honolulu, Hawaii 96804

SUBJECT: DRAFT EIS FOR KUKIO BEACH RESORT
NORTH KONA, HAWAII

Dear Mr. Honda:

Thank you for the copy of your letter of 18 March 1986 to Mr. Albert Lono Lyman, Director, County of Hawaii Planning Department. We have reviewed your comments and offer the following response.

Based on your projections for student enrollment to be generated from the proposed project, additional classroom facilities would be required at Kealahou Elementary and Intermediate School and Kona High School. So that these needs can be adequately met through your department, we will keep you informed of the status of the project in order that funds can be requested from the Legislature to provide the necessary classroom facilities on a timely basis.

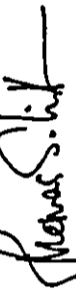
As indicated in the Economic and Fiscal Impact Assessment (Appendix E) for this project, the State will receive sufficient tax revenues from this project to support the additional public services required of the project.

Mr. Vernon H. Honda
DEIS FOR KUKIO BEACH RESORT
May 7, 1986
Page 2

Thank you for the information provided. Your letter and this response will be appended to the Final EIS.

Sincerely,

PHILLIPS BRANDT REDDICK


Thomas S. Witten, ASLA
Principal

cc: Mr. Albert Lono Lyman, Director
County of Hawaii Planning Department

Mr. Carl Carlson, Manager
Huehue Ranch

OEQC

PROJECT OFFICES
HAWAII OFFICE
P O BOX 175
KANALEA HAWAII HI 96741



STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS

P O BOX 1879
HONOLULU HAWAII HI 96813
March 24, 1986

PROJECT OFFICES
MAUI OFFICE
P O BOX 17
KANALEA MAUI HI 96752

HONOLULU OFFICE
P O BOX 186
HONOLULU HAWAII HI 96813

KAUAI OFFICE
P O BOX 132
LILUOEA KAUAI HI 96750

APR 2 1986

PHILLIPS BROS.

Mr. Albert Lono Lyman
Director
County of Hawaii Planning Department
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Lyman:

Recently, the department received a copy of the Kukio Beach Resort Draft Environmental Impact Statement on which to comment.

While the planned resort does not impact on DWHL lands directly, the department is beginning to make awards to native Hawaiian beneficiaries at Kawaihae. The potential for enhanced employment possibilities in North Kona with the construction of the proposed resort make the department's awards at Kawaihae more attractive.

As an agency working in the Hawaiian community, the department does have a few concerns which are not addressed by the draft EIS.

1. The draft identifies a strategy to protect major archaeological sites from destruction. It notes that there will be "surface collection of portable remains (middens and artifacts) from sites" (p. 3-23C). What will be the disposition of this material? The department suggests that it be given to either the Bishop Museum in Honolulu or the Lyman Museum in Hilo.
2. The draft notes that burial caves have been found in the area. There will probably be other such caves found as excavation begins. The EIS does not address the mitigation measures that will be followed for handling such sites. The department suggests that such caves be properly sealed and periodically inspected to ensure that caves remain intact. It would not be appropriate to disturb such sites - unless they are in areas which are exposed and simply cannot be adequately protected.

Mr. Albert Lyman
Page Two

3. The concerns expressed by the informants of Kukio should be given utmost attention. (Appendix B - Full Archaeological Reconnaissance Survey, P. 103, "Informants Concerns and Considerations".) The burial concerns have been noted previously. The other elements identified by the group should be preserved, protected, and developed to enhance the proposed development. These elements include "wai'opaa, the anchialine ponds, shrimp and birds, and the hala and palms associated with them."

If the developer takes adequate care to preserve those things which make Kukio unique and beautiful, the proposed development will be successful.

Thank you for the opportunity to comment.

Sincerely yours,

Mary S. Jones
for GEORGIANA K. PADEREN
Chairman

GRP:RF:HS:st

Phillips Brandt Reddick

May 7, 1986

Ms. Georgiana K. Padeken
Chairman
Department of Hawaiian Home Lands
State of Hawaii
P.O. Box 1879
Honolulu, Hawaii 96805

SUBJECT: DRAFT EIS FOR KUKIO BEACH RESORT
NORTH KONA, HAWAII

Dear Ms. Padeken:

Mr. Albert Lono Lyman forwarded a copy of your letter of 24 March 1986 regarding the Kukio Beach Resort Draft Environmental Impact Statement. After a review of your concerns, I requested the project's archaeological consultant to respond to the first two concerns regarding historic sites (refer to Rosendahl's letter 14 April 1986).

We have reviewed your comment regarding the preservation and treatment of existing natural elements within the site including Wai'opae, the anchialine ponds, shrimp and birds, and the Hala and palms associated with them. In response to this concern, we offer the following response.

The ponds and their associated flora and fauna will be included in a Anchialine Pond Management Plan that is to be developed with support from the U.S. Fish and Wildlife Service with the objectives of preserving existing pond features and providing interpretive opportunities for the public. The owner feels as you do that with adequate care taken in planning and developing the site, those things that make Kukio unique and beautiful can be preserved and contribute to a successful development.

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Ms. Georgiana K. Padeken
DRAFT EIS FOR KUKIO BEACH RESORT
May 7, 1986
Page 2

Thank you for your comments and we hope our responses have answered your concerns. If you have any further questions, please contact us. Your letter and this response will be appended to the final EIS.

Sincerely,

PHILLIPS BRANDT REDDICK

Phillips Brandt Reddick
Thomas S. Witten, ASLA
Principal

cc: Mr. Albert Lono Lyman, Director
County of Hawaii Planning Department
Mr. Carl Carlson, Manager
Rushue Ranch
Dr. Paul H. Rosendahl
OEQC

PAUL H. ROSENDAHL, Ph.D., Inc.
Consulting Archaeologist

April 14, 1986
86-226

Ms. Georgiana K. Padaken, Chairman
Department of Hawaiian Homes Lands
State of Hawaii
P.O. Box 1879
Honolulu, Hawaii 96805

Subject: Hawaiian Home Lands Concerns
Kuiko Beach Resort Draft EIS

Dear Ms. Padaken:

As the consultant responsible for conducting the archaeological study for the Kuiko Beach Resort EIS, we have been asked by Mr. Tom Witten of Phillips, Brandt, Maddick and Associates, Inc. for their client Eshme Ranch, to respond to your letter dated March 24, 1986 to Mr. Albert Lono Lyman, Director, Hawaii County Planning Department. Your letter raised three concerns which are paraphrased here as follows:

1. What will be the disposition of the portable remains (artifacts and midden) recovered during archaeological work associated with the project?
2. What mitigative measures will be followed for burial caves?
3. A request that "wailunas, the anchialine ponds, shrimp and birds, and the hali and palms associated with them" be preserved, in accordance with concerns raised by local informants.

These concerns are addressed below.

Concern 1.

All portable remains are the private property of the landowner, who will determine their ultimate disposition.

Concern 2.

Burial sites will be preserved if possible; however, if they cannot practically be preserved in place, they will be disinterred and reinterred according to State Health Department rules and procedures, and in consultation with any documented direct lineal descendants.

Hawaiian Homes Lands
86-226 April 14, 1986

2

Concern 3.

Item three relates to the proposed development plans, and therefore, can only be answered by the developer.

We hope that our comments have answered your concerns. If you have any further questions, please contact us.

Sincerely yours,

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

Alan K. Haun
Alan K. Haun, Ph.D.
Senior Archaeologist

cc: Mr. Tom Witten
Phillips, Brandt, Maddick & Assoc.

305 Mohonui Street • Hilo, Hawaii 96720 • (808) 969-1763 or 966-8038

12-12

GEORGE R. JARROLD
Director of Health



STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 229
HONOLULU, HAWAII 96822

REC
APR 2 1986
PHILLIPS BLDG.

LESLIE S. MATSUMURA
DIRECTOR OF HEALTH

In Reply, please refer to
EPW-80

March 31, 1986

Mr. Albert Lono Lyman, Director
Planning Department
County of Hawaii
25 Aupuni St.
Hilo, Hawaii 96720

Dear Mr. Lyman:

Subject: Request for Comments on Draft Environmental Impact Statement
(EIS) for Kukio Beach Resort, North Kona, Hawaii

Thank you for allowing us to review and comment on the subject draft EIS. We provide the following comments for your consideration.

Air Pollution

On page 3-29, the EIS mentions that the potential exits for state emission standards to be exceeded at receptor locations within the proposed project limits as a result of vehicular activity. Further the report states that the condition would most likely occur if the highway is not widened to meet regional traffic volumes.

A study should be conducted to determine the increase in emissions from the automotive activity. If the study indicates an impact to the state ambient air quality standards, mitigating actions should be studied, proposed, and implemented.

Wastewater Usage

The EIS indicates that multi-family condominiums will be located along the open space corridors of the golf course fairway that will be irrigated with the treated wastewater. This will create health and safety concerns if spray irrigation is to be used. Some type of buffer area should be addressed including degree of wastewater treatment, wind speed and direction if spray irrigation is to be used and perhaps drip irrigation along the fringe areas of habitation.

General Comments

Municipal drinking water and wastewater treatment systems or their equivalents are recommended as the most appropriate alternatives because of the magnitude of the proposed project.

Mr. Albert Lono Lyman
March 31, 1986
Page 2

We realize that the statements are general in nature due to preliminary plans being the source of discussion. We, therefore, reserve the right to impose future environmental restrictions on the project at the time final plans are submitted to this office for review.

Sincerely,

JAMES K. IKEDA
Deputy Director for
Environmental Health

cc: Mr. Carl A. Carlson, Jr.
Mr. Thomas S. Witten
DHSA, Hawaii

Phillips Brandt Reddick

May 7, 1986

Mr. James K. Ikeda
Deputy Director
Environmental Health
Department of Health
State of Hawaii
P.O. Box 3378
Honolulu, Hawaii 96801

SUBJECT: DRAFT EIS FOR KUKIO BEACH RESORT
NORTH KONA, HAWAII

Dear Mr. Ikeda:

Thank you for the copy of your letter of 31 March 1986 to Mr. Albert Lono Lyman, Director, Planning Department, County of Hawaii. We have reviewed your comments and offer the following response.

Air Pollution

As the result of the projected vehicular activity within the proposed project limits, the potential exists for state emission standards to be exceeded at receptor locations. This condition would most likely occur only if the highway is not widened to meet regional traffic volumes and where intersection improvements are not provided to meet project related traffic needs. It is the intent of the developer to provide the necessary intersection improvements to minimize this potential impact.

Regarding the widening of Queen Kaahumanu Highway to meet regional traffic volumes, it is assumed that the State Department of Transportation will provide the necessary planning and funding to accommodate regional traffic volumes based on advanced planning for these needs. If it is determined that the state emission standards are likely to be exceeded due to the increased emissions from automotive activity and lack of highway improvements, a study will be completed to indicate the impact to the state air quality standards including mitigation measures.

Wastewater Usage

Health and safety concerns have been expressed regarding the utilization of secondary treated wastewater being utilized to irrigate the golf course fairways and landscaped open space areas in

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Mr. James K. Ikeda
DEIS FOR KUKIO BEACH RESORT
May 7, 1986
Page 2

close proximity to multi-family condominiums. Based on the applicant's knowledge, the use of treated wastewater to irrigate golf courses is the current practice in North Kona, South Kohala, and other parts of the state without adverse effect. Additionally, these system designs and means of application will be studied to determine the best application method to minimize any potential impacts of wastewater irrigation and water aerosol on inhabited areas around the golf course. The State Department of Health, and the County Department of Public Works regulate construction, operation of the wastewater treatment facilities, and the facility's design and thus this project will conform to their standards.

General Comments

A municipal drinking water system or equivalent is proposed to service the project. Due to the lack of a future municipal water system servicing the project area, a independent water system is proposed to be developed to service the needs of the proposed development. Additionally, a wastewater treatment system will be provided and will conform to all State and County standards and requirements.

Thank you for your comments. Your letter and this response will be appended to the Final EIS.

Sincerely,

PHILLIPS BRANDT REDDICK

Thomas S. Witten
Principal

cc: Mr. Albert Lono Lyman, Planning Director
County of Hawaii
Mr. Carl A. Carlson, Jr., Manager
Huehue Ranch
Office of Environmental Quality Control

GEORGE R. ARYTOUM
DIRECTOR OF LAND



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

P. O. BOX 821
HONOLULU, HAWAII 96809
APR 09 1988

Honorable Albert Lono Lyman
Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Lyman:

We have reviewed the draft environmental impact statement covering the Kukio Beach resort and have a number of comments to offer.

A. Shoreline Boundary Dispute

During the consultation process, the Department of Land and Natural Resources commented, in part, as follows:

"The information on Tax Map Key 7-2-04:05 indicates that shoreline ownership may be disputed. The EIS should clarify limits of property to be developed."

Department of Land and Natural Resources' letter to Phillip, Brandt, Reddick and Associates, Inc. dated October 11, 1985 is attached.

Response by Mr. Frank Brandt dated January 30, 1986 (copy also attached) is as follows:

"Tax Map Key 7-2-04:05 recently had its shoreline surveyed and certified as the makai boundary of Grant 2121 to Pupule within amended area of 317,668 acres. The Land Surveyor confirmed the grant description in discussion with Surveyors at the State Survey Office. The EIS will clearly state the limits of the property to be developed."

Records in the offices of our Land Management Division and the State Surveyor confirm that the shoreline boundary was certified on October 25, 1985. The shoreline as certified, however, is not the seaward property boundary of Grant 2121. The grant line as shown and described in the grant is further inland. The shoreline certified map of October 25, 1985 shows this makai boundary of Grant 2121 in dotted lines. The tax map plat 7-2-04 also shows the approximate seaward property boundary of Grant 2121 with a notation that boundary and ownership of the area seaward of the grant line to be in question.

SUZUKI OAO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES
EDDIE A. HALLAU
SECRETARY TO THE CHAIRMAN
DEVELOPMENT
ADVANCED TRAFFIC IMPROVEMENT
ADAPTIVE RESEARCH
CONSTRUCTION AND
RESEARCHES ENFORCEMENT
CONTRACTS
LAND MANAGEMENT
ELECT PLANS
WATER AND LAND DEVELOPMENT



APR 10 1988

PHILLIPS BRANDT

Hon. A. L. Lyman
Kukio Beach Resort DEIS
Page 2
APR 09 1988

In light of the above, we recommend that the environmental impact statement address this dispute and revise all map exhibits to show the true makai boundary of Grant 2121. We further recommend that, unless the boundary dispute is resolved, the final environmental impact statement not be accepted and the application for General Plan amendment be denied.

B. Aquatic Environment

The draft environmental impact statement (DEIS) has provided some information on mitigating possible impacts of drainage water, landscaping and agriculture chemicals, waste disposal, and nutrient enrichment. We would like the opportunity to review more detailed provisions of forthcoming plans for irrigation and other wastewater disposal when these are completed.

A major concern is continuing deterioration of the unique anchialine pond life due to introduced exotics and other man-induced factors (DEIS page C-15). The U. S. Fish and Wildlife Service (correspondence dated March 14, 1986) has determined that "the loss of a substantial number of ponds at Waikoloa and the potential development of other coastal sites along West Hawaii make the remaining anchialine ponds and pond complexes more valuable." Further comments on potential adverse impacts to these ponds must be reserved until a management plan has been provided for review.

Precautions should be taken during construction so that eroded soils, petroleum products, fertilizers, pesticides, and other potential contaminants associated with this development do not blow, leach, or flow into the anchialine ponds or coastal waters.

C. Shoreline Recreation

There are three well-documented trails in this region currently providing public access to the shoreline (West Hawaii Coral Reef Atlas). A report of an archaeological survey attached to the DEIS described "a coastal trail . . . also demonstrates movement of people and produce along the coast." Court decisions on the Big Island have held that ancient historical trails establish public right to traditional access to the coastline. The final environmental impact statement should discuss this issue, and also detail specifically any other provisions which would be made for public access to the shore.

D. Water Resources

We support the developer's proposed use of desalinization to supplement the potable water sources, and the use of brackish water and treated waste water effluent for irrigation. Both measures conserve potable groundwater resources.

Well drilling permits from this department will be required for the drilling of any new brackish water or deep wells that may be required to meet project demands. State well drilling permits should also be listed in Table 1-1, pg. 1-9.

We note the interest and concern for maintaining the archialine pond water quality, temperature, and salinity. A pond monitoring program may be useful in ensuring that no adverse effects result from pumping brackish wells or directing store runoff into subsurface lava tubes or cavities.

E. Historic Sites

We believe that the applicant is showing high sensitivity toward compliance with historic preservation concerns. Plans are on the right track with preservation and proper archaeology being vital concerns. However, a number of problems need to be resolved before we can approve the plans. Until the problems are resolved, we believe that the intent of Chapter 6E, Hawaii Revised Statutes, has not been met. We are thus recommending to the Office of Environmental Quality Control that these problems need to be resolved for the final environmental impact statement (EIS) to be acceptable. We are also recommending that any land use change petitions not be submitted, or that they be deferred until the problems are solved.

This review should not be seen as a strongly negative assessment of the applicant's plans or interests. We believe the problems can be rapidly resolved, resulting in a strong historic preservation plan. We have detailed the specific nature of the problems below to help the applicant understand and resolve them. We are also available for consultation to assist the applicant in resolving these problems.

The archaeological reconnaissance report (Walker & Rosendahl 1985), which is an appendix to the DEIS, is a good quality study. It should be lauded for its inclusion of historical studies which help evaluate the significance of historic sites in the project area. The archaeological portions of the report are also good with clear descriptions of the sites found. The information on these sites is also acceptably presented in the DEIS (3-20,-21).

The problems in the DEIS are related to the lack of a full archaeological survey of the parcels involved and problems with the significance assessments and the recommended mitigation actions.

Problem 1. A Full Inventory of Historic Sites is Unlikely

It is important to note that the reconnaissance survey was not a full coverage of parcels 5 and 16. 100% survey coverage only took place in the coastal 80 acres of parcel 5 (Walker & Rosendahl 1985:8-10). There all historic sites were identified, 33 in total. Of the remaining 595 acres, the consulting archaeologists have argued that 314 are "very rough as lava lands" and are unlikely to contain archaeological sites (Walker & Rosendahl 1985:8). We agree with this conclusion based on past archaeological findings in the state. This leaves 281 acres being likely to contain historic sites. The reconnaissance survey covered only 91 of these acres, and 36 sites were found. 190 acres are still unsurveyed.

Significant sites may be present in these 190 acres, but until survey occurs, it cannot be determined how many sites are present (if any). In turn, site significance, impact assessments, and mitigation plans cannot be made, much less by evaluated by the state or county.

We see two alternatives to resolve this problem. The applicant could have an archaeological reconnaissance survey done for the remaining acreage before the final EIS is prepared and before land use boundary changes are submitted, and include findings in the final EIS; or, the applicant could apply for land use boundary changes in two phases. Phase 1 could be for lands which have already been surveyed. Phase 2 could follow when the remaining 190 acres are surveyed. If the latter alternative is followed, the final EIS must spell this out.

Problem 2. Final Significance Assessments of the Sites Have Not Been Clearly Made

It must be emphasized that the applicant and the consulting archaeologist cannot unilaterally make final significance determinations for each historic site, at least in state actions. The written concurrence of our Historic Sites Office is required for state actions, and the written concurrence of the County Planning Department is likely required for the county actions. This is intended as a check to avoid oversights, inadvertent or otherwise. In this DEIS, the initial significance assessments of the consulting archaeologists are presented as if they are the final assessments, and this is incorrect.

5) We are not sure that adequate and reasonable amounts of the significant information have been recorded or recovered in 9 of the 19 sites. If not, these 9 sites would still be significant. Eight of these sites had sparse midden deposits, and we wonder if they might contain datable material (enough shell for radiocarbon dates, or volcanic glass). Dates are highly significant information. These sites are 117, 120, 126, 135, 136, 137, 19, and 20. Also, one site (110) has petroglyphs, and we wonder if these petroglyphs have been drawn or clearly photographed.

Problem 3. The Mitigation Plans Need Minor Improvements

At present, at least 51 significant sites exist in the project borders. Mitigation plans noted in the DEIS (3-23-24) are summarized here:

- 1) 51 sites still have significant information. Appropriate archaeological work will be done at these sites to recover this information or these sites may be preserved by inclusion within the landscaping of the project area.
- 2) 2 of these 51 sites - D21-14 (the anchialine pond complex) and D21-12 (the residential and/or heiau complex) - will be preserved and exhibited.
- 3) The trail segments (evidently 9 of the 51 sites) will be preserved where practical.
- 4) A cultural resources management program for the above data recovery and preservation will be formulated with specifics and with the assistance of our Historic Sites Office and the County Planning Department.

The mitigation plans are definitely close to what is needed, but some minor alterations and clarifications are needed. The historic preservation plan ("cultural resources management plan") in this case, as in most developments, is being prepared in two parts. Part 1 is a general plan acceptable for the final EIS and land use changes; Part 2 is a specific plan which should be completed as a condition of any land use changes and be completed as a condition of any land use changes and be completed before any Special Management Area (SMA) permit application. Both will need to be approved by our Historic Sites Office and the County Planning Department.

It is critical that this problem be corrected and that significance assessments be agreed upon before the final EIS is prepared and before any land use change actions are taken.

Actually, in this case, reaching agreement on significance of the different sites should take little time because we believe the consulting archaeologists' initial assessments are largely correct. Unfortunately, the categories of significance the consulting archaeologists use are not those used by state or federal historic preservation agencies. Although similar, we are unsure if we correctly understand their initial assessments. We have reprased their recommendations here, and we need to know if our understanding of their assessments is correct. Of the 70 total historic sites:

- 1) 51 sites are considered significant for their information content ("research value"). 19 sites, which had their significant information recorded, are no longer considered significant.
- 2) Three of the 52 sites also have special significance to the Hawaiian ethnic group ("cultural value") - the burials (D21-18, T-124) and the possible heiau (D21-12).
- 3) Nine of the 51 sites are significant as unusual examples of a type.
 - a) D21-12 as a residential and/or heiau complex.
 - b) D21-24 as an anchialine pond complex.
 - c) D21-7 (w/1197, 1200, T-141, T-133), D21-3, and T-134 as prehistoric trail complexes.

In sum, it appears that 40 sites are significant solely for their information content, while 11 others are also significant on other criteria.

We also need the applicants or their consulting archaeologists to make two clarifications before we can evaluate the significance of all the sites:


- 4) Is not the burial cave (T-124) significant as an unusual example of a type?

Hon. A. L. Lyman
Kukio Beach Resort DEIS
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APR 09 1988

4. Last, a short statement should be included saying that the preparation of the specific historic preservation plan will be requested to be a condition of the proposed land use changes and that this plan will be prepared and approved before the submittal of any SHA permit applications.

We hope this review will clarify the current problems with the Draft Environmental Impact Statement that need to be resolved.

Sincerely,


SUSAN O'NEIL
Chairperson
and

State Historic Preservation Officer

Enclosures

cc: Mr. Carl Carlson
/Mr. Thomas S. Mitten (w/encs)

Hon. A. L. Lyman
Kukio Beach Resort DEIS
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Part 1, the general plan, is what should be in the final EIS. The DEIS' plan, however, needs to be clearer, and it needs to resolve several questions. We believe the following should be in the general plan in the final EIS:

1. A table which lists what is planned for each site - data recovery, preservation, etc. Preparation of this table needs to resolve the following questions:
 - a. The DEIS says 51 sites will undergo data recovery or preservation; yet, it then says two (021-14, 021-12) will definitely be preserved and exhibited. Is this not 49 sites for data recovery or preservation and 2 sites for preservation/exhibition?
 - b. What of the two burial sites (021-18, T-124) which are considered culturally significant by the consulting archaeologists? We are concerned that plans for these often sensitive sites are clearly given.
 - c. Also, the commitment for the trails needs to be specified in a clearer fashion than "preserved where practical," and the specific trail sites to be preserved need to be noted. We actually believe that only one inland-heading trail need be preserved, and it might be useful for visitor and resident benefits to have a few of the caves or C-shapes along the trail preserved as examples of trail shelters.
2. A short paragraph should discuss archaeological data recovery, saying it will be properly done according to a data recovery plan to be prepared as part of the specific historic plan which will be approved by our Historic Sites Office and the County Planning Department. A few major research problems which will be addressed should be noted. And it should say that data recovery will involve mapping, excavation, laboratory analyses, dating, and a final report. Do not use the words "intensive survey" here, because data recovery quite probably will involve elements of intensive survey and some excavation beyond the scale of intensive survey. If the applicant wishes, the reader can be directed to Tables 1-3 of the consulting archaeologists' report to see tentative kinds of tasks to be done for each site, but this is not necessary.
3. A short paragraph should discuss exhibition, noting conceptually what will be done. This paragraph should also note that exhibition will be done properly according to the specific historic preservation plan which will be approved by the Historic Sites Office and the County Planning Department.

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STATE OF HAWAII
 DEPARTMENT OF LAND AND NATURAL RESOURCES
 P. O. BOX 651
 HONOLULU, HAWAII 96808

OCT 11 1985

Phillips, Brandt, Reddick and Associates, Inc.
 130 Merchant Street, Suite 1111
 Honolulu, Hawaii 96813

Gentlemen:

SUBJECT: Comments on HIS Preparation Notice

Summary of Proposed Project

Title: PROPOSED KUKIO BEACH RESORT
 Project by: Kalohe Land Corporation
 Location: Keshole, N. Kona, Hawaii

Brief Description:

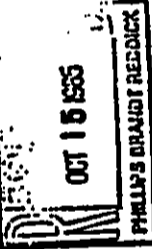
We understand that the developer plans a large-scale beach resort on 675 acres: (317 acres total and 358 acres mauka of the Queen Kaahumanu Highway) between Keshole Airport and Kona Village Resort. The master plan for the entire project includes two hotel layouts (65 acres), 900 to 1200 condominium units and 300 single-family homes (358 acres), shopping center (5 acres), one golf course (175 acres), and other uses (70 acres).

Comments:

The information on THK 7-3-04:05 indicates that shoreline ownership may be disputed. The HIS should clarify limits of property to be developed.

For your information, in Aquatic Survey of the Kona Coast Ponds, Hawaii Island, authors Matlock and Brock describe seven anchialine ponds with surface areas from less than 10 square meters to more than 100 square meters located on or near the project site. A major concern is the cumulative deterioration of Hawaii's unique anchialine ponds by human activities. The HIS should discuss impacts on the pond habitat and mitigation measures to ensure the survival of the endemic native species inhabiting these ponds.

PHILLIPS, BRANDT, REDDICK & ASSOCIATES
 130 MERCHANT STREET, SUITE 1111
 HONOLULU, HAWAII 96813
 TEL: 535-1111
 FAX: 535-1112



REF. NO.: CPO-1814-85

Phillips, Brandt, Reddick & Assoc.

CPO-1814-85

Also, there are three well-documented trails in this region currently providing public access to the shoreline (West Hawaii Coral Reef Inventory). One trail ascends mauka from Ikaupulehu to Hushue Ranch; another trail leads from Kukio Bay to Kaupulehu. There is also access by a jeep road to Kukio Bay with permission. The coastline can also be reached on foot from Kahawai Bay or Makalawana. The HIS should address the potential impacts of development on these ancient trails as well as any modification to existing and customary patterns of public access to, and uses of, the shoreline for fishing and other recreational uses.

Additionally, the HIS should address the following:

1. Effects on the coastal brackish water lens and associated anchialine ponds of withdrawing ground water for irrigation of the proposed golf course, landscaping and other residential developments;
2. Effects of sewage disposal and wastewater treatment on coastal resources, e.g. from dissolved nutrients and solid residues;
3. Contamination of coastal waters and resources from grading, filling, erosion, pesticides, herbicides, construction materials, petroleum products, etc.

Very truly yours,

SUSUMU ONO, Chairperson
 Board of Land and Natural Resources

Phillips Brandt Reddick

January 30, 1988

Mr. Susumu Ono, Chairperson
Board of Land and Natural Resources
State of Hawaii
Department of Land and Natural Resources
P. O. Box 631
Honolulu, Hawaii 96809

SUBJECT: KUKIO BEACH RESORT EIS
NOTICE OF PREPARATION (NOP)

Dear Mr. Ono:

Thank you for your letter dated October 11, 1988. We have reviewed your comments and offer the following responses:

- 1) TMX 7-2-04; 05 recently had its shoreline surveyed and certified as the makai boundary of Grant #11 to Pupale within an amended area of 317.668 acres. The Land Surveyor confirmed the Grant description in discussion with Surveyors at the State Survey Office. The EIS will clearly state the limits of the property to be developed.
- 2) There is a complex of anchialine ponds located within the project area. The Draft EIS will discuss the impacts on the pond habitat and mitigation measures to ensure the survival of the endemic native species inhabiting these ponds.
- 3) The historic trails within the Project area have been well documented within a full archaeological reconnaissance survey completed for the subject project. The Draft EIS will address the potential impacts of development on these trails as well as any modifications to existing patterns of public access to and use of the shorelines for fishing and other recreational uses.
- 4) As suggested, the Draft EIS will address the following:
 - a) Effects on the coastal brackish water lens and associated anchialine ponds.

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Mr. Susumu Ono
Department of Land and
Natural Resources
January 30, 1988
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- b) Effects of sewage disposal and wastewater treatment on coastal resources.
 - c) Contamination of coastal waters and resources.
- We appreciate your comments and the information provided and we will incorporate them into the Draft EIS.

Very truly yours,

PHILLIPS BRANDT REDDICK



Mr. Frank Brandt, ASLA
President

cc: Mr. Al Lyman, Director
Department of Planning
County of Hawaii

Mr. Carl Carlson, Manager
Mushue Ranch

Mr. Raymond Suefaji
Mr. Roy Takayama
OKQC

Mr. Susumo Ono, Chairperson
DEIS FOR KUKIO BEACH RESORT
May 12, 1986
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to lands owned by petitioners with applications pending before the Commission. The Commission has taken the position that such disputes should not preclude the processing of an application if it is shown that the applicant is the recorded owner at the Department of Taxation - in the event that the issue is not resolved amicably among the parties, a court of law should be the final arbiter.

In the instant case, the applicant is the recorded owner, so the application that is pending at the Planning Department should be processed and approved if it meets the General Plan guidelines. In the event that this boundary dispute cannot be settled among the affected parties, and a court of law determines that our position with regards to the shoreline boundary is incorrect, the property boundaries reflected on land use maps and plans would be amended to reflect the appropriate boundaries.

Aquatic Environment

An Anchialine Pond Management Plan is to be prepared in conjunction with the U.S. Fish and Wildlife Service. These efforts have been initiated with a meeting with Mr. John Ford and Mr. Andy Yuan of the USFWS on 24 April 1986.

Related to possible impacts of drainage water, landscaping and agriculture chemicals, waste disposal and nutrient enrichment, the applicant will provide detailed provisions and plans for the treatment of irrigation and other wastewater systems for review and approval by the State Department of Health. Similar concerns of the U.S. Fish and Wildlife Service (correspondence dated 14 March 1986) have been addressed in our letter response dated 5 May 1986 and has been attached for your reference. The management plan for the pond complex will implement mitigation measures so that eroded soils, petroleum products, fertilizers, pesticides, and other potential contaminants associated with on-site development do not significantly impact the anchialine ponds or coastal waters.

Shoreline Recreation

The two of the three foot trails noted in the Heat Hawaii Coral Reef Inventory were identified in the Full Archaeological Reconnaissance Survey completed for the project (Rosendahl, 1985). The shoreline trail leading from Kaupulehu to Kukio Bay is only evi-

Phillips Brandt Reddick
May 12, 1986

Mr. Susumo Ono, Chairperson
State Historic Preservation Officer
Board of Land and Natural Resources
State of Hawaii
Department of Land and Natural Resources
Post Office Box 621
Honolulu, Hawaii 96809

SUBJECT: DRAFT EIS FOR KUKIO BEACH RESORT
NORTH KONA, HAWAII

Dear Mr. Ono:

Thank you for the copy of your letter of 9 April 1986 to Mr. Albert Lono Lyman, Director, Planning Department, County of Hawaii. We have reviewed your comments and offer the following response:

Shoreline Boundary Dispute

Documentation is being provided under separate letter from Mr. Carl Carlson to substantiate and clarify our contention that the makai boundary of Grant 2121 to Pupule extends to the shoreline certified on 25 October 1985. Documented notes by the land surveyor and additional information provided by Mr. Jerry Nakagawa, the land surveyor for the subject property, confirm this position.

We disagree that the acceptance of this environmental impact statement, or the processing of Kukio's General Plan amendment application or any other land use amendment, should be contingent upon the resolution of this boundary dispute. The pendency of this dispute should not foreclose the applicant from proceeding with general land use applications. To take a contrary position would be unreasonable and would be denying the property owner certain constitutional rights.

The State Land Use Commission, for example, has faced disputes of this nature in many instances. Parties have made adverse possession claims or there have been boundary disputes pertaining

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dent to the north of and is not within the project area. The trail to the north leads to the sandy beach where lateral access along the shoreline is provided for.

The coastal-inland oriented foot trails that have been documented in the archaeological survey will be retained where feasible although due to their location within the project area the majority of the trails will not be retained. Complete archaeological and historical documentation will be completed and an interpretive program included within the project. Access will be provided from the mauka regions of the property to the shoreline utilizing existing trail segments where feasible and future roadways.

Water Resources

As noted, State Well Drilling Permits will be listed in Table 1-1, page 1-9 and well drilling permits will be obtained for any new brackish water or deep wells that will be required to meet project demands.

The anchialine pond management plan will include a pond monitoring program to ensure that no adverse effects result from pumping brackish wells or storm run-off that may be directed towards the ponds through subsurface lava tubes or cavities.

Historic Sites

The comments provided are identical to those previously received from Mr. Ralston Nagata, Division of State Parks, (31 March 1986). All issues raised in the review of the archaeological findings and recommendations contained in the Kukio Beach Resort Draft EIS were resolved to the full satisfaction of the Historic Sites Section through a meeting with Dr. Ross Cordy, staff archaeologist and subsequent response by the project consultant archaeologists, Dr. Paul H. Rosendahl and Dr. Alan E. Haun (letter dated 14 April 1986). The above correspondence has been attached for your reference.

Mr. Susumo Ono, Chairperson
DEIS FOR KUKIO BEACH RESORT
May 12, 1986
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Thank you for your comments and should you have any additional questions, please do not hesitate to contact us. Your letter and this response will be appended to the Final EIS.

Sincerely,

PHILLIPS BRANDT REDDICK

Phillips Brandt Reddick

Thomas S. Witten, ASLA
Principal

Attachment: USFWS correspondence, 7 April 1986 and 7 May 1986
Rosendahl letter, 14 April 1986 and DEHR Response
24 April 1986
C. Carlson letter

cc: Mr. Albert Lono Lyman, Director
County of Hawaii Planning Department

Mr. Carl Carlson, Manager
Huehue Ranch

Dr. Paul Rosendahl

Office of Environmental Quality Control

Mr. Susump Ono, Chairperson
Board of Land and Natural
Resources
State of Hawaii
Department of Land and
Natural Resources
P. O. Box 621
Honolulu, Hawaii 96809

Re: Kukio Beach Resort
Draft Environmental Impact Statement

Dear Mr. Ono:

This is in response to your comments to the Draft Environmental Impact Statement covering the Kukio Beach Resort, relating to the makai boundary of the subject property.

We believe that the shoreline, as recently certified, is the makai boundary of Grant 2121. This position is supported by a review of all the survey data in the grant itself, as well as a review of the original survey description and map upon which the grant was based. Our position is set forth at greater length in the memorandum enclosed herewith.

We believe that a reasoned review of the matter will result in the conclusion that the makai boundary is as shown on the maps included in the Environmental Impact Statement. But even if a dispute does exist with respect to the makai boundary of Grant 2121, the existence of such a dispute is not a proper basis for nonacceptance of the Environmental Impact Statement. Nor is the environmental review process the proper forum for determining the boundaries of the property under review. To the extent that the makai boundary must be further clarified as a condition to other approvals required for the development of the property, we are prepared to take the appropriate action to do so at that time.

Very truly yours,

Carl A. Carlson, Jr.
Manager of Huehue Ranch

cc: Mr. Albert L. Lyman, Director
Department of Planning
County of Hawaii

MEMORANDUM RELATING TO
THE MAKAI BOUNDARY OF
KUKIO ISt

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 ISt is the shoreline.

A part of the ahupuaa of Kukio ISt, 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 ISt, 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 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 ISt-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

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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 ist 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 the 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 ist 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 ist 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 seacoast 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 Awakea to the south of Kukio ist done on September 28, 1854, the day after the Kukio ist survey, Fuller used identical survey techniques and similar methods of transcribing his survey data. In surveying Awakea, 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 characteristics 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 Awakea 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 ist, to "N. cor. heap of stones", a point which on the map is shown to be about 1 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 ist, 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 ist - 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 Hiensaloli 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 Hokukano 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 ahupua'a". 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 Kaneva, 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 Ahupua'a 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 ka kahakai
" 17° 30' " 20.75 " i ka kihi Akau ika pou pohaku, holo
- (2) Copy of Grant 2121 in State Land Office reads:
" 63° 30' " 6.26 " ma kapa o ka kahakai
" 17° 30' " 20.75 " i ka kihi
Akau o ka pou 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 ditto (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.

Appendix "A" - Page 1

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 saanbara" would presumably place the boundary terminus somewhere out on the peninsula at the northern corner of the grant.

Appendix "g"

<u>Grant No.</u>	<u>Date</u>	<u>Grantee</u>	<u>Land</u>
1652	Nov. 3, 1854	William Johnson	Kawani 1 & Kuamoo
1731	Sept. 21, 1854	Kahalo	Kauhakui, Kailua, Kona
1732	Oct. 5, 1854	Julia Kamahiki	Kona
1743	Sept. 12, 1854	Kamakahi	Pahoehoe 4, Kona
1744	Sept. 22, 1854	Kahamaula	Kona
1745	Oct. 14, 1854	John Carnah	
1746	Sept. 21, 1854	James Kole	Auhukase 2
1747	Sept. 15, 1854	Kakukalawa	Kapalalasa 2
1748	Sept. 13, 1854	Kapahu	Kamuku in Pahoehoe 2
1749	Sept. 13, 1854	Kipepe	Kaoha in Pahoehoe 3
1751	Sept. 14, 1854	Kahama	Kamui in Pahoehoe 3
1752	Sept. 25, 1854	Kavelo	Hienaloli 6
1756	Sept. 15, 1854	Koaka	Kapalalasa 2
1757	Sept. 11, 1854	Kamea	Lesionui
1759	April 11, 1855	Edward Rootis	Kauiki, Kona
1854	Feb. 22, 1855	Ipunui	Lanihau 2, H. Kona
1855	Feb. 21, 1855	Laleo	Laula, H. Kona
1856	Feb. 21, 1855	Kewihoa	Koai, H. Kona
1857	Nov. 2, 1854	Peahoa	Pahoehoe 1, H. Kona
1858	Feb. 12, 1855	Hanukasa	Kauhako, S. Kona
1859	Feb. 12, 1855	Hahao	Kauhako, S. Kona
1860	Feb. 14, 1855	Kaanama	Kauhako, S. Kona
1861		Kahimoo	Lanihau 2, H. Kona
1862	Oct. 10, 1854	Kapule	Kamaku, Kona
1863	Aug. 17, 1855	Freston Cumings	Kahauloai, Kona

Appendix "C"

DATES OF SURVEY BY JOHN FULLER

Grant No.	Date	Grantee	Land	Date	Name of Land	Grant No.
1864	Feb. 22, 1855	Kialoa	Uaihala, Kailua, Kona	September, 1854	Kahului 1	1868
1865	Feb. 20, 1855	Kameha	Laaloomui, Kona	Wednesday 20	Auhakua 2	1746
1868	Sept. 20, 1854	Kaupena	Kahului 1, Kona	Thursday 21	(Kahaimale)	1744
1869	Sept. 12, 1854	Ekaakahi	Fabooboe 4, Kona	Friday 22		
1870	Oct. 2, 1854	Hawheua	Hakaula, Kona	Saturday 23		
2022	Sept. 29, 1854	Puhiloalo	Avalua & Ohiki, Kona	Sunday 24		
2024	Mar. 8, 1855	Kuimoku	Fabooboe 3, S. Kona	Monday 25	Hienaloli 6	1752
2025	Mar. 21, 1855	Pamalani	Fabooboe 1	Tuesday 26	(Travel)	
2026	Feb. 12, 1855	Kahama	Kauhako, S. Kona	Wednesday 27	Kuhio 1st	2121
2034	Feb. 29, 1855	Kaupaha	Ahala 1 & 2, S. Kona	Thursday 28	Ahake	2023
2036		Hemilana	Avalua	Friday 29	Avalua and Ohiki	2022
2112		Wopulau		Saturday 30		
2119	Feb. 28, 1855	Kalana	Koniens, N. Kona	October, 1854		
				Sunday 1		
				Monday 2	Makaula	1870
				Tuesday 3	?	
				Wednesday 4	?	
				Thursday 5	(Julia Kawahiki)	1732
				Friday 6	?	
				Saturday 7		
				Sunday 8		
				Monday 9	?	
				Tuesday 10	Kanaka	1862

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, Apena 10
L.P. 7463 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 Kauhau, H. 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. HAKALAPENA

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

At the Boundary Commission hearing (August 12, 1873) two kamaaina testified as to the boundaries. Kahalii (k.) testified that the boundary proceeded "thence to Hokupehaku, or Kalui Kohala, a large rock in the surf. Mahalaena is bounded makai by the sea, and the land has eminent 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 Mahalule goes to a point at the seashore; the next call begins to go mauka along Awikee. The fishing rights included extend a mile out to sea.

3. KAULAMA

Grant 4723 dated February 16, 1903, to J. Kaalehale, 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

Mabile Award 13-B to Paulie K. P. 8265 containing survey and signed by John Albert Matthewman, August 20, 1909

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

5. OOWA 2nd

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

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

6. KOSHAIKI

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

The survey of this Grant was dated May 30, 1863, by S. C. Wittes. It began at a large rock at the beach at the corner of Kaloko and Koshaiki 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 chgs
S 34° E 12 chgs
S 74° E 650 chgs
S 50° E 9.30 chgs to the place of beginning. Containing 154. Acres"

The Part of Deed 1, Sec. 15 Dispute situated
 in the District of Iowa State of Iowa, and
 bounded as follows: Begin at a high of stone at the
west corner of the land now owned by John
Anderson, N 20° E 1876 along to the top of the land
of N 20° E 636 along the bank to the land
of N 20° E 297.

- 1 S 63° E 211
 - 2 S 57° W 6 176
 - 3 S 41° W 6 226
 - 4 S 29° E 57
 - 5 S 194° E 45
 - 6 S 57° W 97
 - 7 S 57° W 115
 - 8 N 55° W 1730
 - 9 N 20° W 161
- to east corner & back of lot
 to leg. and meeting of road
 to west corner
 back of lot
 to limit of beginning and
 containing 697 acres

J. E. Fuller
 Surveyor

Done & sworn to Sept 27, 1876.

SURVEY JOHN FULLER, DESCRIPTION AND MAP
 FROM FILES OF LAND MANAGEMENT DIV. PLNR

Document on file in
 Department of
 State Land Office

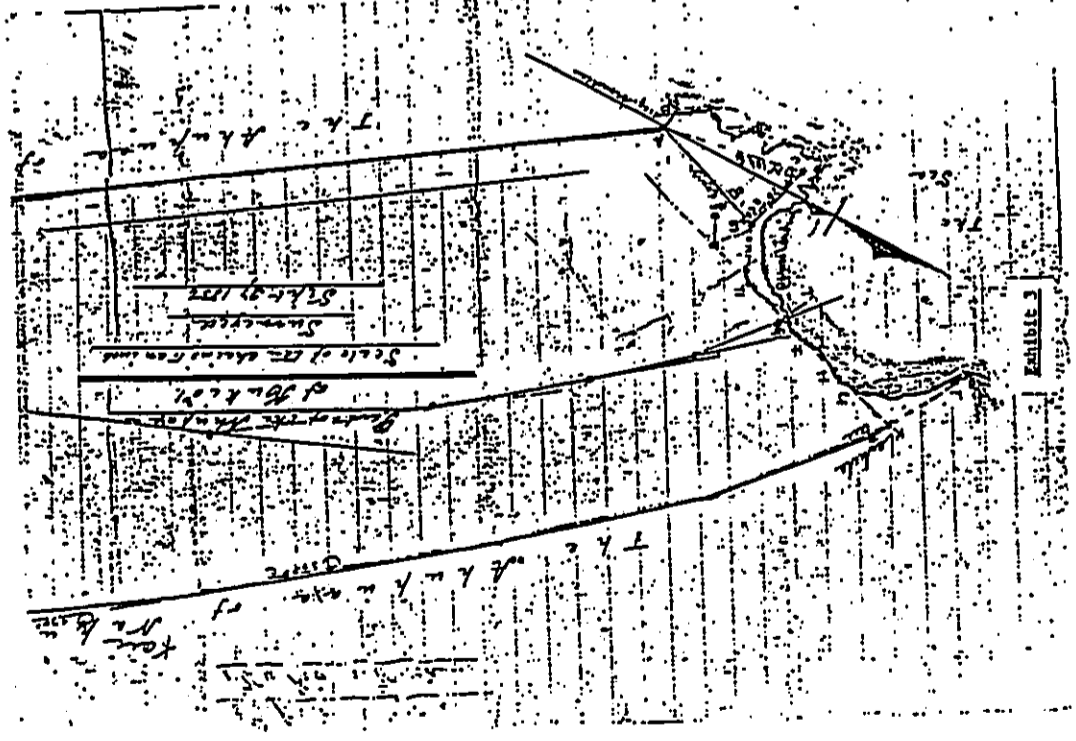
EXHIBIT 2

As part of the ... in the vicinity of ...
 ... and bounded by ...
 ... of the ... at ...
 ... of the ...
 ...

- 1 8 77° 16' 6" 9.15
- 2 2 38' 6" 33.11
- 3 4 40° 45' 6" 36.22
- 4 8 66° 45' 6" 3.00
- 5 8 66° 45' 6" 11.41
- 6 8 53' 6" 35.00
- 7 8 31° 15' 4" 62.10
- 8 1 70° 31' 4" 66.70

Point of beginning and ending 601 ays.
 S. Cheller
 Surveyor

Some ... Sept. 28, 1854.



Survey ...

Part of Siskiwit, Keweenaw, Keweenaw & Keweenaw Island
 Great Lakes, with the Keweenaw, and boundary of
 Bay at high of water on the west, the eastern of the land
 adjoining the surface of the water and some other
 adjoining the surface of the water.

- 1 S 39° 10' E 800 yds along the great wall
- 2 S 16° 15' E 1175
- 3 S 16° E 1410
- 4 S 19° E 912
- 5 S 23° 45' E 1340
- 6 S 74° 15' W 550
- 7 S 63° W 550
- 8 S 66° 15' W 930
- 9 N 80° 15' W 850
- 10 N 26° W 870
- 11 N 9° 30' W 1200
- 12 N 13° 30' E 700
- 13 N 1° 6' E 600
- 14 N 88° W 450
- 15 S 77° W 750
- 16 S 66° W 620
- 17 N 81° W 350
- 18 N 60° E 270

To East Corner of the land a distance of 1000 yds
 to the corner boundary of the land
 to the shore
 to the point of landing at Keweenaw
 to the village of Keweenaw
 to the shore
 to the shore to the corner
 to the boundary of the land
 to the point of beginning and containing 115 acres.

A. B. Miller
 Surveyor

Some Keweenaw, Oct. 14, 1856.

EXHIBIT A

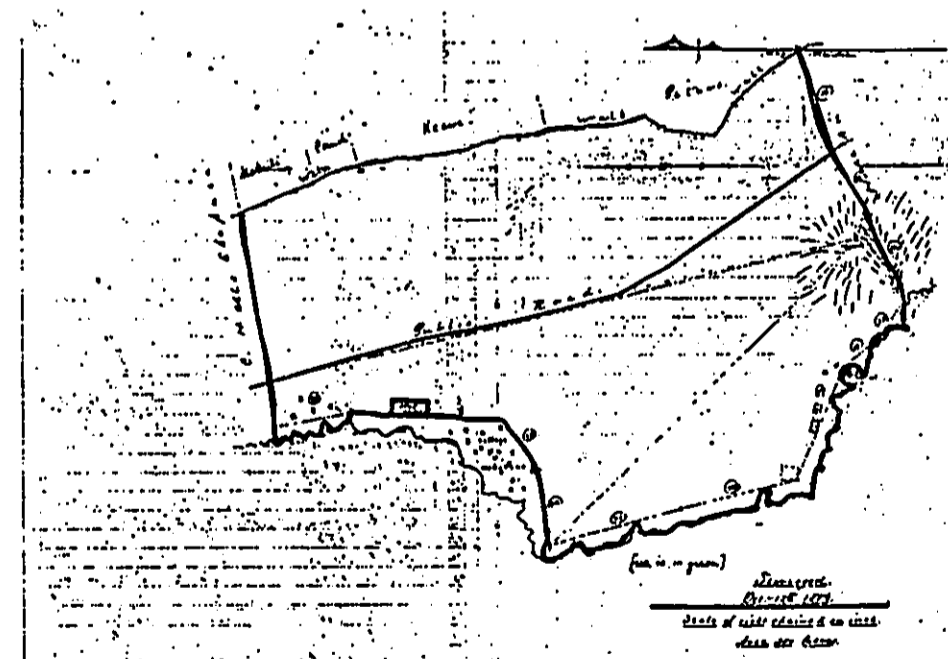


EXHIBIT A



Survey
Oct. 16, 1882
CORA H. GAY
Scale of 1 inch = 100 feet.

Exhibit 3

Part of Section in Town of Hawaii, being all
that part within the great wall. See H. 100, 101,
and 102 as follows. Begin at N.W. corner of the
lot south of former place, a point of iron and run
1 187° 14' 6" 85.9 chain to public road - then
2 114° 08' 6" 7.99 "
3 174° 6" 6.834 "
4 11° 9' 11.886 "
5 11° 58' 6" 1.62 "
6 53° 52' 6" 1.99 "
7 53° 21' 6" 6.60 "
8 53° 19' 6" 5.500 "
9 8° 14' 6" 11.887 "
10 3 58° 31' 5.15 "
11 0 75° 48' 4.61 "
12 0 70° 00' 14.390 "

along the boundary of the lot to
street - then
along the corner boundary of the lot to
street - then
along the corner boundary of the lot to
street - then
along the line to point of beginning and
containing 23 acres.

S. Brewer
Surveyor

Town of Hawaii Act. 27, 1882.

Exhibit 10





Tennessee
 July 29, 1901
 State of Tennessee
 State of Tennessee

EXHIBIT 11

GEORGE H. ARYTOGH
DIRECTOR OF PLANNING



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

RESOURCES DIVISION, CALIFORNIA
DIVISION OF LAND & NATURAL RESOURCES

EDGAR A. MALONEY
DIRECTOR

DIVISION OF
AGRICULTURE
AGRICULTURAL TYPE DEVELOPMENT
PROGRAMS
AGRICULTURAL RESOURCES
AGRICULTURAL RESEARCH
AGRICULTURAL EXTENSION
AGRICULTURAL MARKETING
AGRICULTURAL LAND MANAGEMENT
AGRICULTURAL WATER RESOURCES
AGRICULTURAL POLICY

March 31, 1986

Mr. Albert Lono Lyman, Director
Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

APR 2 1986
PHILLIPS BRAND

Mr. Albert Lono Lyman - 2 - March 31, 1986

the problems can be rapidly resolved, resulting in a strong historic preservation plan. We have detailed the specific nature of the problems below to help the applicant understand the problems and resolve them. We are also available for consultation to assist the applicant in resolving these problems.

Quality of the Reconnaissance Survey Report. The archaeological reconnaissance report (Walker & Rosendahl 1985), which is an appendix to the Draft EIS, is a good quality study. It should be lauded for its inclusion of historical studies which help evaluate the significance of historical sites in the project area. The archaeological portions of the report are also good with clear descriptions of the sites found. The information on these sites is also acceptably presented in the Draft EIS (3-20,-21).

The Problems. The problems in the Draft EIS are related to the lack of a full archaeological survey of the parcels involved and problems with the significance assessments and the recommended mitigation actions.

Problem 1. A Full Inventory of Historic Sites is Unlikely. It is important to note that the reconnaissance survey was not a full coverage of parcels 5 and 16. 100% survey coverage only took place in the coastal 80 acres of parcel 5 (Walker & Rosendahl 1985:8-10). There all historic sites were identified, 33 in total. Of the remaining 595 acres, the consulting archaeologists have argued that 314 are "very rough as lava lands" and are unlikely to contain archaeological sites (Walker & Rosendahl 1985:8). We agree with this conclusion based on past archaeological findings in the state. This leaves 281 acres being likely to contain historic sites. The reconnaissance survey covered only 91 of these acres, and 16 sites were found. 190 acres are still unsurveyed.

Significant sites may be present in these 190 acres, but until survey occurs, it cannot be determined how many sites are present (if any). In turn, site significance, impact assessments and mitigation plans cannot be made, much less be evaluated by the state or county.

We see two alternatives to resolve this problem. The applicant could have an archaeological reconnaissance survey done for the remaining acreage before the Final EIS is prepared and before land use boundary changes are submitted, and include findings in the Final EIS. Or, the applicant could apply for land use

SUBJECT: Chapter 6E Historic Preservation Review, Draft EIS
Kukio Beach Resort
Kukio 1, North Kona, Hawaii
TRK: 7-2-04: 5, 16

This EIS is being prepared as a document which will undoubtedly be used to support two different categories of actions involved in this development -- county level actions (General Plan Amendment and future SMA use applications) and state level actions (Land Use Commission boundary petition, an EIS submitted to the Office of Environmental Quality Control, and future CDURs). The state level actions all must ultimately conform with Chapter 6E, and Chapter 6E requires the involved state agencies (in this case the Office of Environmental Quality Control -- OEQC) to contact the state's historic preservation program (the Historic Sites Section) for evaluation and approval of the historic preservation review. The Historic Sites Section is involved with the county level actions because the County Planning Department has requested our comments.

Basic Recommendation. We believe that the applicant is showing high sensitivity toward compliance with historic preservation concerns. Plans are on the right track with preservation and proper archaeology being vital concerns. However, a number of problems need to be resolved before we can approve the plans. Until the problems are resolved, we believe that the intent of Chapter 6E has not been met. We are thus recommending to the OEQC that these problems need to be resolved for the Final EIS to be acceptable. We are also recommending that any land use change petitions not be submitted or be deferred until the problems are resolved.

This review should not be seen as a strongly negative assessment of the applicant's plans or interests. We believe

boundary changes in two phases. Phase 1 could be for lands which have already been surveyed. Phase 2 could follow when the remaining 190 acres are surveyed. If the latter alternative is followed, the Final EIS must spell this out.

Problem 2. Final Significance Assessments of the Sites Have Not Been Clearly Made. It must be emphasized that the applicant and the consulting archaeologist cannot unilaterally make final significance determinations for each historic site, at least in state actions. The written concurrence of the Historic Sites Section is required for state actions, and the written concurrence of the County Planning Department is likely required for the county actions. This is intended as a check to avoid oversights, inadvertent or otherwise. In this Draft EIS, the initial significance assessments of the consulting archaeologists are presented as if they are the final assessments, and this is incorrect.

It is critical that this problem be corrected and that significance assessments be agreed upon before the Final EIS is prepared and before any land use change actions are taken.

Actually, in this case, reaching agreement on significance of the different sites should take little time because we believe the consulting archaeologists' initial assessments are largely correct. Unfortunately, the categories of significance the consulting archaeologists use are not those used by state or federal historic preservation agencies. Although similar, we are unsure if we correctly understand their initial assessments. We have rephrased their recommendations here, and we need to know if our understanding of their assessments is correct. Of the 70 total historic sites,

1. 51 sites are considered significant for their information content ("research value"). 19 sites, which had their significant information recorded, are no longer considered significant.
2. Three of the 51 sites also have special significance to the Hawaiian ethnic group ("cultural value") -- the burials (D21-18, T-124) and the possible heiau (D21-12).
3. Nine of the 51 sites are significant as unusual examples of a type.
 - a. D21-12 as a residential and/or heiau complex.
 - b. D21-24 as an anchialine pond complex.
 - c. D21-7 (w/1197, 1200, T-141, T-133), D21-3, and T-134 as prehistoric trail complexes.

In sum, it appears that 40 sites are significant solely for their information content, while 11 others are also significant on other criteria.

We also need the applicant or their consulting archaeologists to make two clarifications before we can evaluate the significance of all the sites:

1. Is not the burial cave (T-124) significant as an unusual example of a type?
2. We are not sure that adequate and reasonable amounts of the significant information have been recorded or recovered in 9 of the 19 sites. If not, these 9 sites would still be significant. Eight of these sites had sparse midden deposits, and we wonder if they might contain datable material (enough shell for radiocarbon dates or volcanic glass). Dates are highly significant information. These sites are 117, 120, 126, 135, 136, 137, 19, 20. Also, one site (110) has petroglyphs, and we wonder if these petroglyphs have been drawn or clearly photographed.

Problem 3. The Mitigation Plans Need Minor Improvements. At present, at least 51 significant sites exist in the project borders. Mitigation plans noted in the Draft EIS (3-23-24) are summarized here:

1. 51 sites still have significant information. Appropriate archaeological work will be done at these sites to recover this information or these sites may be preserved by inclusion within the landscaping of the project area.
2. 2 of these 51 sites -- D21-14 (the anchialine pond complex) and D21-12 (the residential and/or heiau complex) -- will be preserved and exhibited.
3. The trail segments (evidently 9 of the 51 sites) will be preserved where practical.
4. A cultural resource management program for the above data recovery and preservation will be formulated with specifics and with the assistance of the Historic Sites Section and the County Planning Department.

We believe that these plans are definitely close to what is needed, but some minor alterations and clarifications are needed. The historic preservation plan ("cultural resources management plan") in this case, as in most developments, is being prepared in two parts. Part 1 is a general plan acceptable for the Final EIS and land use changes; Part 2 is a

March 31, 1986

specific plan which should be completed as a condition of any land use changes and be completed before any SMA application. Both will need to be approved by the Historic Sites Section and the County Planning Department.

Part 1. the general plan. is what should be in the Final EIS. The Draft EIS' plan, however, needs to be a clearer, and it needs to resolve several questions. We believe the following should be the in general plan in the Final EIS:

1. A table which lists what is planned for each site -- data recovery, preservation, etc. Preparation of this table needs to resolve the following questions:

- a. The Draft EIS says 51 sites will undergo data recovery or preservation, yet it then says two (D21-14, D21-12) will definitely be preserved and exhibited. Is this not 49 sites for data recovery or preservation and 2 sites for preservation/exhibition?
- b. What of the two burial sites (D21-18, T-124) which are considered culturally significant by the consulting archaeologists? We are concerned that plans for these often sensitive sites are clearly given.
- c. Also, the commitment for the trails needs to be specified in a clearer fashion than "preserved where practical", and the specific trail sites to be preserved need to be noted. We actually believe that only one inland-heading trail need be preserved, and it might be useful for visitor and resident benefits to have a few of the caves or C-shapes along the trail preserved as examples of trail shelters.
2. A short paragraph should discuss archaeological data recovery, saying it will be properly done according to a data recovery plan to be prepared as part of the specific historic plan which will be approved by the Historic Sites Section and the County Planning Department. A few major research problems which will be addressed should be noted. And it should say that data recovery will involve mapping, excavation, laboratory analyses, dating, and a final report. Do not use the words "intensive survey" here, because data recovery quite probably will involve elements of intensive survey and some excavation beyond the scale of intensive survey. If the applicant wishes, the reader can be directed to tables 1-3 of the consulting archaeologists' report to see tentative kinds of tasks to be done for each site, but this is not necessary.
3. A short paragraph should discuss exhibition, noting conceptually what will be done. This paragraph should also

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note that exhibition will be done properly according to the specific historic preservation plan which will be approved by the Historic Sites Section and the County Planning Department. 4. Last, a short statement should be included saying that the preparation of the specific historic preservation plan will be requested to be a condition of the proposed land use changes and that this plan will be prepared and approved before the submittal of any SMAs.

We hope this review will clarify the current problems with the Draft EIS that need to be resolved.



HAMSTON H. NAGATA

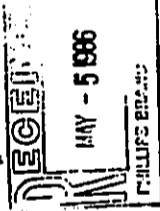


STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF STATE PARKS
P. O. BOX 521
HONOLULU, HAWAII 96809

SUSUMU ODO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES

EDGAR A. HAMAUSA
SECRETARY TO THE CHAIRMAN

DEVELOPMENT:
AGRICULTURE DEVELOPMENT
PROGRAM
ADULTIC RESOURCES
RESEARCH & DEVELOPMENT
CONSERVATION
FORESTRY AND WILDLIFE
RECREATION
STATE LAND DEVELOPMENT



April 24, 1986

Mr. Albert Lono Lyman, Director
Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Lyman:

SUBJECT: Historic Preservation Review, Draft EIS Kukio Beach
Resort
Kukio 1, North Kona, Hawaii
TMK: 7-2-04: 5, 16

Mr. Thomas Witten of Phillips, Brandt, Reddick & Associates and his firm's consulting archaeologists, Dr. Paul Rosendahl and Dr. Alan Haun, met with us on April 8, 1986. They answered all of our questions, and all matters were cleared up. Their written response and clarifications are attached.

We believe their historic preservation review and mitigation plans, with clarifications, now comply with Chapter 6E for state-related actions and will meet historic preservation concerns for county-level actions. We believe final site significance determinations can be established now and that general mitigation plans will suffice for land use actions, with detailed plans and their execution to follow later as a condition of any state Land Use Commission amendment and as a condition of any county land use amendments or SMAs, as is appropriate.

The clarifications make it clear that the entire land area likely to contain sites was completely surveyed, and all sites are likely to have been found. These total 70.

With the clarifications, we now agree that 19 sites have had all their significant information recorded and that these 19 sites are no longer significant. We agree that the other 51 sites are significant for the following reasons:

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April 24, 1986

- a. 40 are significant solely for their information content.
- b. 2 (the burial caves, D21-18 & T-124) are culturally significant to the local Hawaiian ethnic group, as well as being significant for their information content.
- c. 1 (the possible heiau, D21-12) is culturally significant, significant for its information content, and significant as an example of a type (site type).
- d. 8 (the anchialine pond complex & 7 trails) are significant as examples of a type (site type) and significant for their information content.

We believe these can be considered final significance assessments for state-level actions -- reached in agreement with the applicant. For county-level actions, your office will undoubtedly wish to make a determination also. To ensure that state and county actions are coordinated, we will await your comments on our determination before we actually finalize our records.

With the clarifications, we also now endorse the mitigation plan for handling the 51 significant sites. The general plan calls for preservation/exhibition of 2 sites -- the possible heiau and the anchialine pond complex. The remaining sites will undergo archaeological data recovery or preservation. Also, the burials in the caves are to be reinterred according to the wishes of any living descendants of the deceased. Archaeological data recovery will be in two stages -- (1) detailed mapping, sample surface collection, test excavation, and selected dating and then (2) further excavation and data recovery work as needed to recover adequate and reasonable amounts of information in sites to be destroyed. Analysis of relevant research problems, lab analyses and report write-up will also be integral parts of the data recovery work. Specific preservation and data recovery plans and execution of the plans will be reviewed and approved by our office and yours. Again, we anticipate that this review and approval will be a condition of any state Land Use Commission amendment and a condition to be tied to any county land use amendment or SMAs.

In sum, we believe the historic preservation review and mitigation plans are now clear and quite acceptable. We wish to emphasize again that although our original review letter was long, the archaeological reconnaissance report was excellent and the Draft EIS was very close to what we believe was needed for an acceptable historic preservation review and plan of

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Rec'd 4/22 A RL
PAUL H. ROSENDAHL, Ph.D., Inc.
Consulting Archeologist

DIVISION OF
STATE PARKS April 14, 1986
STATE PARKS 86-226
APR 15 5 19 AM '86

TO: _____
FROM: _____
SUBJECT: _____
DATE: _____
TIME: _____
PLACE: _____
BY: _____
FOR: _____

Mr. Malston H. Nagata, Administrator
Division of State Parks
Department of Land and Natural Resources
State of Hawaii
P.O. Box 621
Honolulu, Hawaii 96809

Subject: Chapter 6E Historic Preservation Review
Kukio Beach Resort Draft EIS

Dear Mr. Nagata:

As the consultant responsible for conducting the archaeological study for the Kukio Beach Resort EIS, we have been asked by Mr. Tom Witten of Phillips, Brandt, Reddick and Associates, Inc. for their client Huehue Ranch, to respond to your letter dated March 31, 1986 to Mr. Albert Lono Lyman, Director, Hawaii County Planning Department. The DLMR Chapter 6E Historic Preservation Review of the Draft EIS for Kukio Beach Resort listed three major problem areas:

- Problem 1. A Full Inventory of Historic Sites is Unlikely.
- Problem 2. Final Significance Assessments of the Sites Have Not Been Clearly Made.
- Problem 3. The Mitigation Plans Need Minor Improvements.

On April 8, 1986, we met with Mr. Witten and Dr. Ross Cordy, Staff Archeologist, Historic Sites Section-Division of State Parks to resolve the issues raised in the review of the archaeological findings and recommendations contained in the Kukio Beach Resort Draft EIS. All of these problems were resolved to the full satisfaction of all parties during this meeting. A summary of our discussion of each problem is presented below.

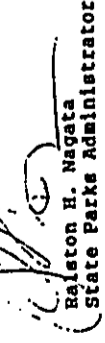
Problem 1.

Resolution of this problem simply required clarifying the nature and intensity of the archaeological survey coverage at Kukio. Problem 1 was based on the fact that 190 acres of the interior portion of the project area were not surveyed on the ground. In fact, the entire 190 acres were surveyed by helicopter. Given the nature of the terrain, vegetation cover, and previous knowledge concerning the distribution of sites in this area, aerial survey is far more efficient for locating sites than ground survey. Subsequent ground survey coverage was conducted only for areas where features were observed from the air. This ground coverage also included a substantial buffer area around all sites. Thus, we believe that a full inventory of historic sites is highly likely, rather than unlikely. Dr. Cordy concurred with our assessment of the adequacy of the survey.

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April 24, 1986

action. We only needed clarifications, and the applicant quite willingly supplied them. In the future, we plan to work toward getting any clarifications resolved before the Draft EIS is printed.

Sincerely yours,


Malston H. Nagata
State Parks Administrator

cc: T. Witten, Phillips, Brandt, Reddick & Associates.
C. Carlson, Huehue Ranch
Office of Environmental Quality Control
P. Rosendahl; P. Rosendahl, Ph.D., Inc.
R. Evans, OCEA, Dept. Land & Natural Resources.

In addition, it should be noted that we recognize "[t]here is always a possibility, however remote, that previously unidentified surface structural remains or subsurface cultural features or deposits...might be encountered in the course of subsequent archaeological investigations or other development activities" (Walker and Rosendahl 1985:64). Our report goes on to recommend that in such a situation, immediate archaeological consultation should be sought.

Problem 2.

Dr. Cordy's rephrasing of our significance assessments in the review (page 3) is correct, and after consultation with Dr. Cordy he concurred with our initial assessments. He further concurred that the burial cave (T-124) is not significant as an unusual example of a type, that the eight sites with sparse midden do not contain datable materials, and that the petroglyphs at Site 110 have been adequately recorded.

Problem 3.

Dr. Cordy requested minor improvements in the mitigation plans outlined in the Draft EIS. These improvements consist of the following additions to a General Historic Preservation Plan: a) a table listing what is planned for each site; b) specification that data recovery or preservation is planned for 49 sites and preservation/exhibition is planned for Sites D21-12 and -24 (incorrectly listed in the review as "D21-14 (the anchiline pond complex)"; page 4, paragraph 3); c) a clearer statement regarding the intended treatment of burial sites D21-18 and T-124; d) specification of which trails will be preserved; e) a paragraph discussing archaeological data recovery; and f) a paragraph discussing exhibition. He also requested that the EIS include a statement that, as a condition of the proposed land use changes, a Specific Historic Preservation Plan will be prepared and approved prior to SMA submittal.

We cannot respond to the final request (f) because the imposition of land use change conditions is the responsibility of the State Land Use Commission. The remaining items are addressed as follows:

- a) The table already is contained in our report (see Tables 1, 2, and 3 in Walker and Rosendahl 1985:67-77);
- b) Sites D21-12 and -24 will be preserved and exhibited. Preservation and/or data recovery is planned for 49 sites (see Tables 1, 2, and 3 in Walker and Rosendahl 1985 for complete listing of sites);
- c) Burial sites will be preserved if possible; however, if they cannot practically be preserved in place, they will be disinterred and reinterred according to State Health Department rules and procedures, and in consultation with any documented direct lineal descendants;

d) Specification of which trails will be preserved is to be determined by the developer;

e) Archaeological data recovery will be conducted according to a phased data recovery plan to be approved by and conducted in coordination with the State of Hawaii-Historic Sites Section and the Hawaii County Planning Department. The phased data recovery plan will consist of two phases: a) detailed mapping and test excavations designed to determine as specifically as possible the necessity for and scope of further mitigation excavations; and b) mitigation excavations, to be conducted in accordance with the Specific Historic Preservation Plan that has been approved by the Historic Sites Section and the County Planning Department. Lab analyses (including dating) and the preparation of appropriate reports will be essential elements of each phase. The phased data recovery plan will address relevant major research topics such as, but not necessarily limited to, the following:

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

f) Interpretive programs will be developed and implemented for all preserved sites. The intent of these programs will be to educate and entertain the public by informing people about the past and the cultural resources that are the physical remains of the past. The results of the phased data recovery program, in conjunction with results of other previous archaeological research carried out in western Hawaii, will provide the basis for the development of interpretive programs. The programs will convey a sense of history and continuity, and provide a means of understanding the cultural background and heritage of the area. The interpretive programs will provide for selection of appropriate interpretive themes, site preparation, specific interpretation foci, and interpretive mechanisms.

If you have any further questions, please contact us.

Sincerely yours,

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

Alan E. Sand
Alan E. Sand, Ph.D.
Senior Archaeologist

cc: Mr. Tom Witten
Phillips, Brandt, Reddick & Assoc.

Phillips Brandt Reddick

May 7, 1986

Mr. Ralston H. Nagata
Division of State Parks
Dept. of Land and Natural Resources
State of Hawaii
P.O. Box 621
Honolulu, Hawaii 96809

SUBJECT: CHAPTER 6E HISTORIC PRESERVATION REVIEW FOR
DRAFT EIS FOR KUKIO BEACH RESORT
NORTH KOHA, HAWAII

Dear Mr. Nagata:

Thank you for the copy of your letter of 31 March 1986 to Mr. Albert Lono Lyman, Director of the Planning Department, County of Hawaii. We have reviewed your comments and have met with Dr. Ross Cordy, Staff Archaeologist, Historic Site Sections, Division of State Parks, and our consultant archaeologist, Dr. Paul H. Rosendahl and Dr. Allan E. Haun on 8 April 1986. All of the problems that were raised in your review were resolved to a full satisfaction of all parties during this meeting as summarized in Dr. Paul H. Rosendahl's letter of 14 April 1986.

One comment that needed further response was in regards to the specification of trails within the site that are to be preserved within the development. The following response is provided.

The foot trails identified during the Full Archaeological Reconnaissance Survey were generally coastal-inland oriented foot trails consisting of a worn pahoehoe and crushed gravel surface. These trails that may have historically provided a means to traverse these barren lands between the shoreline and upland areas have been bisected and connections destroyed by Queen Kaahumanu Highway. None of these trails have been known to be utilized in recent history as foot trails and are known to be utilized as livestock trails (including cattle, horses, goats and donkeys) that are common to this area. Other than by aerial reconnaissance, most of the trail systems are very difficult to discern on the ground.

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Mr. Ralston H. Nagata
CHAPTER 6E HISTORIC PRESERVATION REVIEW
DRAFT EIS FOR KUKIO BEACH RESORT
May 7, 1986
Page 2

In relationship to the proposed development, the trails will be maintained where feasible with the coastal-inland access retained through utilization of the trails and proposed roadways. Due to the foot trails location within the site, a majority of the foot trails will not be preserved. Where appropriate historical documentation of the trails will be completed to identify the historic significance and provide a basis for preparing interpretive information.

Thank you for your comments. Your letter and this response will be appended to the final EIS. If you have any further questions, please contact us.

Sincerely,

PHILLIPS BRANDT REDDICK

Phillips Brandt Reddick
Thomas S. Witten, ASLA
Principal

cc: Mr. Albert Lono Lyman, Director
County of Hawaii Planning Department
Mr. Carl Carlson, Manager
Kuehne Ranch
Dr. Paul H. Rosendahl
Office of Environmental Quality Control



DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT

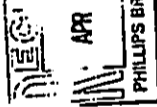
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GEORGE E. JANTZEN
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KENT W. KEITH
DEPUTY DIRECTOR
MURRAY E. DWELL
DEPUTY DIRECTOR
LINDA K. KAPUNIAHI
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GENERAL PLANNING DIVISION
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RESEARCH AND ECONOMIC ANALYSIS DIVISION
ADMINISTRATIVE SERVICES DIVISION
COMMUNICATIONS DIVISION

Ref. No. P-3834

April 4, 1986



The Honorable Albert Lono Lyman
Planning Director
County of Hawaii
25 August Street
Hilo, Hawaii 96720

Dear Mr. Lyman:
Subject: Draft EIS for Kukio Beach Resort, North Kona

We have reviewed the subject document and offer the following comments for your consideration and action.

- 1) As discussed in our letter dated September 20, 1985, to you, DPED remains concerned about the impacts that the further development of the Kukio and Kaupulehu environs would have on the "Designated Visitor Destination Areas" of North Kona (Kailua, Kaunohou-Kanaiua, Nohokohau-Kaloloa) and South Kohala (Anaehoomalu, Kawahae-Jayuna, Puako-Honokaaope Bay).
- 2) The draft EIS states that the proposed Kukio Beach project will seek the Intermediate Resort Designation on the County of Hawaii's General Plan and Land Use Pattern Allocation Guide (LUPAG) Map. However, it also mentions the possibility of combining the Kukio with the adjacent Kaupulehu lands. Kaupulehu is already designated as an Intermediate Resort according to the County General Plan. If both Kukio and Kaupulehu are developed as Intermediate Resorts and successfully integrated, the result would be at the Major Resort scale.
- 3) The draft EIS should discuss the probable impacts resulting from a Major Resort Area at Kukio-Kaupulehu on the existing luxury South Kohala resort area of Maikoloa/Mauna Lanu/Mauna Kea which is also designated as a Major Resort Area. The EIS should also discuss possible detrimental effects resulting from the development of hotels along the shoreline between North Kona and Anaehoomalu with associated resort residential projects mauka of Queen Kaahumanu Highway. The social, visual, natural resource, market and infrastructural impacts should also be thoroughly addressed.

The Honorable Albert Lono Lyman
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April 4, 1986

4. With regard to Hawaii's Coastal Zone Management Program, we have the following comments to offer.

The information provided in the document lacks sufficient detail to determine its adequacy in addressing the resource areas covered under Chapter 205A (HRS). This information may be forthcoming at subsequent stages of the project; however, we believe it is important that these potential impacts be addressed early at the conceptual stage of a project.

Recreation Resources

In the project narrative, Kukio Beach is described as one of the few significant sandy beaches in North Kona; having crystal waters, 3400 linear feet of white sand beach and backed with heavy growth of coconut trees and other vegetation. The beach is presently used for snorkeling, fishing and swimming. Existing mauka-makai access is limited by a control pavilion at the intersection of Queen Kaahumanu Highway and the private road to Kona Village. This existing access, according to the subject document, would be used as the access to the proposed Kukio Beach Resort.

While the draft EIS refers to beach access through the shoreline resort as well as the maintenance of lateral access and mauka-makai access, the details of these provisions are not described. For example, if access from Queen Kaahumanu Highway is controlled or restricted, as is now the practice, both beach access and lateral access would have little meaning in terms of overall public access to the shoreline. In addition to these provisions, it would be helpful to indicate the number and location of parking facilities for the public, as well as the provision of ancillary facilities. Public access and opportunities for public use of recreation resources are a particularly important element of the proposed project in light of recent and ongoing shoreline access issues along the North Kona and South Kohala Coast.

Historic/Archaeologic Resources

Preliminary survey by the project proponents indicates the presence of significant historic and archaeological resources. Sixty-nine sites are tentatively identified. The draft EIS discusses intensive survey of the site, including surface collection and sub-surface testing, recording and mapping of all sites, preservation and display. It is recommended that these activities be approved by and closely coordinated with the State Historic Preservation Office.

The Honorable Albert Lono Lyman
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April 4, 1986

Plan (Chapter 226, HRS). Considering the scope and scale of the proposed project and the extensive list of probable impacts and mitigating measures (p. 1-2 to 1-4), a more in-depth analysis of all relevant objectives, policies and priority guidelines of the Hawaii State Plan is required to determine consistency. For example, the draft EIS does not identify nor address the project's consistency with Section 104(C), particularly priority action (2) "encourage urban growth primarily to existing urban areas where adequate public facilities are already available or can be provided with reasonable public expenditure," or action (4) "Direct future urban developments away from cultural environmental areas or impose mitigating measures so that negative impacts on the environment would be minimal."

In summary, while the proposed project may be consistent with some components of the Hawaii State Plan, we do not necessarily concur that those which are identified in the draft EIS offset the adverse effects which may arise if the project is initiated.

Thank you for the opportunity to provide these comments.

Very truly yours,

Kent M. Keith

Kent M. Keith

cc: Office of Environmental Quality Control
Mr. Carl A. Carlson, Jr., Heahe Ranch
Mr. Thomas S. Witten, Principal,
Phillips, Brandt, Reddick &
Associates

The Honorable Albert Lono Lyman
Page 3
April 4, 1986

Coastal Ecosystems

The draft EIS provides information on 36 anchialine ponds that cover approximately 3 acres adjacent to the shoreline. The document indicates that the ponds will not be filled, but that alteration may be desirable. Alteration may require a Department of the Army permit and CMA Federal consistency determination by this department. Similarly, any alteration of the natural coastline may also require a Department of the Army permit and related Federal consistency review.

An additional and related ecosystem concern is discussed in the draft EIS which relates to the project drainage system, storm water runoff and impact on water quality and nearshore waters. Disposal via injection wells, existing lava tubes and other means are suggested. These should be discussed in the draft EIS in greater detail.

Among the various alternatives offered, a major resort (alternate 1) and a retreat resort (alternate 2) are rejected because the site would not accommodate the density and the high capital cost. A luxury condominium resort (alternate 3) would incur prohibitively expensive off-site infrastructure costs and a residential development (alternate 4) is said to have limited economic benefits. Both alternatives 3 and 4 would limit access to the shoreline and restrict recreational opportunities as well as access to significant archaeological and historic resources.

The preferred alternative, although not specifically described as such, appears to be a combination of all of them. The project would consist of 350 to 450 first-class hotel units and apparently 900 to 1,350 "accommodation units." The project as described would also include 800 to 2,000 multi-family and 500 to 750 single-family units. Again it is not clear that the preferred alternative would have distinct benefits in terms of public access, historic preservation and available recreational opportunities over the other alternatives that are rejected. An evaluation of the alternatives, including the preferred development scheme, cannot be made in the absence of important details.

5. The draft EIS states that the proposed project "will be consistent" with the Hawaii State Plan and State Functional Plans (pages 1-7, 6-1, 7-1). A number of selected and specific objectives and policies of the Hawaii State Plan and pertinent Functional Plans are identified to support this conclusion.

In this regard, we find that the draft EIS document lacks sufficient detail to determine consistency with pertinent objectives, policies and priority guidelines of the Hawaii State

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Mr. Kent M. Keith, Director
DRAFT EIS FOR KUKIO BEACH RESORT
May 9, 1986
Page 2

Phillips Brandt Reddick

May 9, 1986

Mr. Kent M. Keith, Director
Department of Planning and
Economic Development
Post Office Box 2359
Honolulu, Hawaii 96804

SUBJECT: DRAFT EIS FOR KUKIO BEACH RESORT,
NORTH KONA, HAWAII

Dear Mr. Keith:

Thank you for the copy of your letter of 4 April 1986 to Mr. Albert Lono Lyman, Director, Planning Department, County of Hawaii. We have reviewed your comments and offer the following responses that are numbered and ordered to correspond to your comments:

1. The potential impacts that development of Kukio would have on the "Designated Visitors Destination Areas" of North Kona and South Kohala include social, visual, resource, and market impacts. The Draft EIS will be revised and supplemental information provided in the Final EIS to address these concerns.

In general, none of the concerns raised will have a significant impact on the other visitor destination areas due to the relatively isolated location of the proposed development and adjacent land ownership patterns. To the south, Kukio is separated from the designated visitor destination areas of North Kona by approximately 12 miles of shoreline of which approximately 90 percent is owned by the State of Hawaii. To the north, approximately 10 miles of shoreline separate Kukio from the other resort destination areas of South Kohala. Again, the 10 miles are almost entirely owned by the State of Hawaii. Assuming that the State does not embark on a program to develop its coastal lands for resort use, the Kukio resort destination area will not significantly impact the overall visual/aesthetic resources of the region.

It is unlikely that the development at Kukio would impact the occupancy rates of existing resort facilities of North Kona and South Kohala. As identified in the Market Assessment for the Kukio Beach Resort (Appendix D of DEIS), there is projected adequate demand for resort facilities to support development of new resort facilities without reducing the occupancy rates of existing resorts. The resort development at Kukio is to be directed at the first class market which is differentiated from Mauna Lani and Mauna Kea resorts which are luxury classed and those of the other North Kona resorts (Kailua, Keauhou, Kanaiua) that are generally oriented towards the tourist class. The natural site attributes of Kukio are ideal for resort development and will thus differentiate itself from other resort destination areas.

An Assessment of Potential Qualitative Social Impacts (Appendix F of Final EIS) addresses the potential social impact and provides recommendations on mitigative measures. Additionally, the complete Economic and Fiscal Impact Assessment has been included as Appendix E of the Final EIS.

2. Kukio Beach Resort is planned as a independent destination resort and there is no intent to combine or integrate the development with the adjacent resort planned at Kaupulehu. The possibility of combining the Kukio with the adjacent Kaupulehu lands is only mentioned as a theoretical alternative if a "major resort" destination was to be feasible based on County of Hawaii General Plan standards.
3. The only probable impacts resulting from the development of resort facilities of Kukio and Kaupulehu on existing luxury South Kohala resort areas of Waikoloa, Mauna Lani, and Mauna Kea are addressed in the response to the first comment. The social, visual, natural resource, market, and infrastructure impacts have been discussed in the Draft EIS and will be further discussed in the Final EIS regarding any possible detrimental effects resulting from the development of this resort along the shoreline and associated resort residential development mauka of Queen Kaahumanu Highway.
4. With regard to Hawaii's Coastal Zone Management Program (Chapter 205A HRS), Section 6.7 of the Draft EIS will be revised to include sufficient discussion to address the resource areas in the Final EIS. We concur that it is impor-

Alongshore views will be preserved. Additional archaeological studies will be conducted and significant archaeological sites will be preserved.
(Ref. DEIS, Sect. 3.8)

c. Protects rare or endangered plant and animal species (sec. 226-11(b)(6), Hawaii Rev. Stat.).

There are no rare or endangered plant species. The anchialine ponds, which are habitats for several endangered waterbirds and a potentially endangered shrimp, will be preserved.
(Ref. DEIS, Sect. 3.6 and 3.7)

d. Designed with sensitivity to existing neighboring communities and activities (sec. 226-8(b)(5), Hawaii Rev. Stat.). The nearest existing community is the residential area of Kona Palisades located approximately 8 miles to the south. The nearest major employment and residential center of North Kona is Kailua-Kona located 14 miles to the south.

The project design will be sensitive to existing communities in the region by giving employment preference, as much as possible, to residents in the area; providing public shoreline access; and ensuring an aesthetic development.
(Ref. DEIS, Sect. 3.21 and 3.5)

e. Fosters an understanding by visitors of the unique and sensitive character of Hawaii's cultures and values (sec. 226-8(b)(9), Hawaii Rev. Stat.).

Management and interpretive programs will be developed for the anchialine ponds and for significant archaeological sites to foster an understanding of Hawaii's culture and ecology.
(Ref. DEIS, Sect. 3.6 and 3.8)

f. Provides adequate support services (sec. 226-5(b)(3), Hawaii Rev. Stat.).

Regarding the project drainage system, storm water runoff and impact on water quality and nearshore waters, the Draft EIS will be revised to include greater detail. The possible use of existing lava tubes for the disposal of storm water runoff has been eliminated due to potential impacts to the anchialine ponds. A thorough discussion of these concerns has been provided in response to comments received from the U.S. Wildlife Service and a copy of their concerns and our response is attached for your reference.

In response to comments regarding Section 8.0, Alternatives to the Proposed Project, the Final EIS will include revisions to address your concerns. The evaluations of alternatives, including the preferred development scheme, will be assessed based on meeting the project development objectives.

5. The Draft EIS, Section 6.1 and 6.2. Will be amended in the Final EIS to include the following detailed analysis of the Hawaii State Plan siting pertinent objectives, policies, and priority guidelines.

The proposed project is in conformance with the State Plan since the plan generally supports the expansion of the visitor industry (sec. 226-8(a), -103(b)(3), Hawaii Rev. Stat.), especially on the neighbor islands (sec. 226-5(b)(2), Hawaii Rev. Stat.). The project also conforms to other factors contained in the State Plan as follows (references to specified sections in this assessment and in the DEIS are given below each item):

a. Provides adequate shoreline setbacks and beach access (sec. 226-11(b)(9), -103(b)(3), Hawaii Rev. Stat.).

No structures will be located in the county's setback area. Public access to the shoreline will be provided.
(Ref. DEIS, Sect. 3.5)

b. Preserves and enhances significant scenic, historic, and cultural sites (sec. 226(b)(1)-(5), -103(b)(5), Hawaii Rev. Stat.).

Mr. Kent M. Keith, Director
DRAFT EIS FOR KUKIO BEACH RESORT
May 9, 1986
Page 6

The water and wastewater systems will be privately constructed and operated, thus avoiding public expenditures. Certain public services, such as police and fire protection, will eventually have to be expanded to meet the growing regional demand. The revenues generated by the project will more than offset the project's share of the cost to provide these additional services.
(Ref. DEIS, Sect. 3.9 to 3.18)

g. Protects surface, ground, and coastal water quality (sec. 226-12(b)(3), Hawaii Rev. Stat.).

Potable groundwater sources will be protected from potential wastewater disposal and irrigation practices by complying with the Department of Health Underground Injection Control Permit and the Safe Drinking Water Permit. Compliance with these permit requirements should also protect the coastal water quality since groundwater seepage is the primary pathway for pollutants in the area. Surface water quality is not a concern since there are no streams in the area.
(Ref. DEIS, Sect. 3.4 and 3.5)

h. Maintains or enhances rural and air quality (sec. 226-13(b)(4), Hawaii Rev. Stat.).

Prevailing tradewinds will disperse the increased vehicle emissions in the area. Without the necessary widening of Queen Kaahumanu Highway, the ambient standards for carbon monoxide may be exceeded. Adequate setbacks from the roadways will mitigate noise impacts to the proposed residential units located along the roadways.
(Ref. DEIS, Sect. 3.10 and 3.11)

i. Reduces threat to life from erosion, flooding, tsunamis, earthquakes, and other natural or man-induced hazards and disasters (sec. 226-13(b)(5), Hawaii Rev. Stat.).

The threat from erosion, flooding, lava flow and subsidence hazards is minimal. Tsunami hazards will be mitigated through adequate shoreline setbacks and flood-proofing measures. Earthquake hazards will be mitigated through proper structural design.
(ref. DEIS, Sect. 3.3)

Mr. Kent M. Keith, Director
DRAFT EIS FOR KUKIO BEACH RESORT
May 9, 1986
Page 7

j. Provides wastewater reclamation as a means to conserve water (sec. 226-16(b)(3), Hawaii Rev. Stat.).

Treated wastewater effluent will be used to irrigate the golf course and landscaped areas, thereby reducing the overall water demand.
(Ref. DEIS, Sect. 3.13)

Although the State Plan prefers growth in existing urban areas (sec. 226-104(c)(2), Hawaii Rev. Stat.), a resort project that complies with the above factors would be consistent with the State Plan since impacts to critical areas would be mitigated (sec. 226-104(c)(4), (5), Hawaii Rev. Stat.), unreasonable public expenditures to provide support facilities would be avoided (sec. 226-104(c)(3), Hawaii Rev. Stat.), and the character of the surrounding community would not be affected (sec. 226-104(c)(8), Hawaii Rev. Stat.).

Thank you for your comments. Should you have additional questions or concerns, please contact us. Your letter and this response will be appended to the Final EIS.

Sincerely,

PHILLIPS BRANDT REDDICK

Thomas S. Hitten
Thomas S. Hitten, ASLA
Principal

Attachment: Letter from Mr. Ralston Nagata, DLNR, 24 April 1986.
Correspondence with USFWS, Letters 7 April 1986 and 7 May 1986.

cc: Mr. Albert Lono Lyman, Director
Planning Department, County of Hawaii

Mr. Carl A. Carlson Jr.
Huehue Ranch

Office of Environmental Quality Control

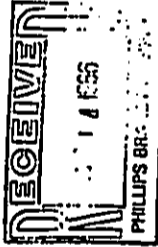
GEORGE R. ARTOSH
GOVERNOR



STATE OF HAWAII
DEPARTMENT OF SOCIAL SERVICES AND HOUSING

March 14, 1986

FRANKLIN Y. K. SUNN
DIRECTOR
RICHARD K. FAGELHAKAN
DEPUTY DIRECTOR
ALFRED K. BUDA
DEPUTY DIRECTOR



Mr. Albert Lono Lyman, Director
County of Hawaii Planning Department
25 Aupuni Street
Hilo, Hawaii 96720

Gentlemen:

Subject: Draft Environmental Impact Statement - Kukio Beach Resort,
Kukio, North Kona, Hawaii

The Hawaii Housing Authority has reviewed subject matter and offer the following comments for consideration into the final EIS.

1. The State Housing Plan encourages the development of rental housing for employees of large businesses outside of urban areas, therefore employee housing should be addressed and this need be provided for by the applicant.
2. Affordable housing for the moderate-gap group families is much needed in the Kohala-Kailua-Kona area and should also be addressed.

Thank you for the opportunity to comment.

Sincerely,

Franklin Y. K. Sunn
Franklin Y. K. Sunn
Director

cc: Huehue Ranch
Phillips, Brandt, Reddick & Associates



Peat, Marwick, Mitchell & Co.
Financial Plaza Of The Pacific
P.O. Box 4190
Honolulu, Hawaii 96813
808-531-7236

Phillips Brandt Reddick

May 9, 1986

Mr. Franklin Y.K. Sunn, Director
Department of Social Services & Housing
State of Hawaii
1390 Miller Street
Honolulu, Hawaii 96813

SUBJECT: DRAFT EIS FOR KUKIO BEACH RESORT
NORTH KONA, HAWAII

Dear Mr. Sunn:

Thank you for the copy of your letter of 14 March 1986 to Mr. Albert Lono Lyman, Director, County of Hawaii Planning Department. We have reviewed your comments and requested that Peat, Marwick, Mitchell & Company, the consultant that prepared the economic and fiscal impact assessment for the Kukio Beach Resort, respond to your comments regarding the resort's employee housing needs. Their letter is attached for your reference.

Thank you for your comments and should you have additional questions or concerns, please contact us. Your letter and this response will be appended to the final EIS.

Sincerely,

PHILLIPS BRANDT REDDICK

Thomas S. Witten
Thomas S. Witten, ASLA
Principal

Attachment: Correspondence from Peat Marwick Mitchell & Company
31 March 1986

cc: Mr. Albert Lono Lyman, Director
Hawaii County Planning Department
Mr. Carl A. Carlson, Jr., Huehue Ranch
Office of Environmental Quality Control

Landscape Architecture • Planning • Environmental Studies Honolulu • Irvine • San Francisco • Denver
Financial Plaza of the Pacific • 130 Merchant Street, Suite 1111 • Honolulu, Hawaii 96813 • Tel. (808) 521-5831

March 31, 1986

Mr. Thomas S. Witten, ASLA
Phillips Brandt Reddick
& Associates
Suite 1111
130 Merchant Street
Honolulu, Hawaii 96813

Subject: Draft EIS for Kukio Beach Resort, North Kona, Hawaii

Dear Mr. Witten:

As requested, we have reviewed the copy of the letter from Mr. Franklin Y. K. Sunn, Department of Social Services and Housing, dated 14 March 1986. In regard to Mr. Sunn's comments regarding the Resort's employee housing needs, the following response is provided.

1. We concur with you that the development of rental housing opportunities for employees of large businesses outside of urban areas is an important public and business concern. Our analysis addressed total employee housing needs with a focus on the "affordable housing" bracket because experience has shown this to be an important concern in the development of resort projects in the state. The demand for rental units is part of the "affordable housing" market since many renters are those who cannot afford to purchase market-priced housing.
2. As noted above, our impact assessment did address the need for "moderate-gap group" or "affordable" housing opportunities for employees of the Resort. We estimate that 60% to 50% of Resort employee households would not be able to afford to purchase market-priced housing in the area, given estimates of household incomes of hotel and resort employees (derived from the State Department of Health's Health Surveillance Survey), recent sales listings, and current loan terms. Thus, as stated in our report, about 100 to 160 additional "gap group" or "affordable" housing units are estimated to be demanded on the island by Resort employees by the time of project completion.

Thank you for the opportunity to respond to these comments. Please let me know if we may provide any further explanation or clarification.

Very truly yours,

PEAT, MARWICK, MITCHELL & CO.

Malcolm J. Tom
Malcolm J. Tom, Partner

MJT:lta



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION

160 KALANIANA'OLA STREET
HONOLULU, HAWAII 96813

April 14, 1986

WAYNE J. YAMASAKI
DIRECTOR

DEPUTY DIRECTOR
JONATHAN K. SORJADA, Ph.D.
WALTER TU HO
CHERYL D. SOON
ADAM D. VINCENT

IN REPLY REFER TO
STP 8.1276

Mr. Albert Lono Lyman
Page 2

STP 8.1276

of our strong interest in reviewing any other development proposed for the approximate area from Awakee to Honokohau since they may be affected negatively by noise from aircraft and/or airport operations.

Thank you for this opportunity to provide comments.

Very truly yours,

Wayne J. Yamasaki
Wayne J. Yamasaki
Director of Transportation

Mr. Albert Lono Lyman, Director
Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Lyman:

Draft EIS for Kukio Beach Resort
Kukio, North Kona, Hawaii

We have reviewed the subject draft EIS and offer the following comments for your consideration.

A fully channelized intersection with acceleration, deceleration, and left turn storage lanes should be constructed by the developer. In addition, all utilities crossing Queen Kaahumanu Highway are to be underground and all work within the State Highway right-of-way will need approval from our Highways Division. The developer should also coordinate the access with the Kaupulehu development.

The document acknowledges that the development will contribute to the cumulative long-term need for improvements to Queen Kaahumanu Highway. We concur with this assessment but whether or not these improvements can be implemented in a timely manner by our department will depend to a large extent on scheduling and the availability of funds. Consequently, since developments along this section of the highway contribute to the overall immediate and downstream traffic impacts, we are presently considering methods of requiring developers' commitment/participation in funding the construction of needed improvements and mitigation measures should public funds not be available at the appropriate time.

While the project will not be adversely impacted by aircraft noise from Keahole Airport, we would like to inform your office

Phillips Brandt Reddick

May 7, 1986

Mr. Wayne J. Yamasaki
Director of Transportation
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

SUBJECT: DRAFT EIS FOR KUKIO BEACH RESORT
NORTH KONA, HAWAII

Dear Mr. Yamasaki:

Thank you for the copy of your letter of 14 April 1986 to Mr. Albert Lono Lyman, Director, Planning Department, County of Hawaii. We have reviewed your comments and offer the following response.

A fully channeled intersection with acceleration, deceleration and left turn storage lanes is planned to be provided by the developer of this project. In addition, all utilities crossing Queen Kaahumanu Highway are to be underground and all work within the State Highway Right-of-Way will receive approval from the Highways Division, State Department of Transportation prior to implementing. Regarding access to the Kaupulehu development, discussions have been initiated regarding the potential of a joint access solution. If this is determined to be feasible, the design will be coordinated with your department.

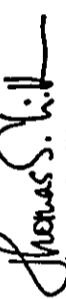
In reference to your present consideration of methods of requiring developer's commitment/participation in funding needed highway improvements and other mitigation measures should public funds not be available at the appropriate time to make such improvements, we would appreciate being notified of these methods if it is determined by your department that this is a reasonable and equitable solution to highway improvements.

Mr. Wayne J. Yamasaki
DEIS FOR KUKIO BEACH RESORT
May 6, 1986
Page 2

Thank you for your comments and if you have any further questions, please contact us. Your letter and this response will be appended to the Final EIS.

Sincerely,

PHILLIPS BRANDT REDDICK


Thomas S. Witten, ASLA
Principal

cc: Mr. Albert Lono Lyman, Director
County of Hawaii Planning Department

Mr. Carl Carlson, Manager
Euehue Ranch

OEQC



United States Department of the Interior

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PHILLIPS BRADLET

Mr. Albert Lono Lyman, Director
County of Hawaii Planning Department
25 Aupuni Street
Hilo, Hawaii 96720

Re: Draft Environmental Impact Statement, Kukio Beach Resort,
Kukio, North Kona, Hawaii

Dear Mr. Lyman:

We have reviewed the subject Environmental Impact Statement (EIS) and offer the following comments for your consideration.

General Comments

Our primary concerns with the proposed resort development are the following:

a. Short and long-term adverse impacts to anchialine pond habitats in the project area from direct and indirect modifications of ponds, alterations in the quality and quantity of groundwater, introduction of alien species into the ponds, and human activities, such as swimming and collecting, in the ponds.

b. Reduction in the biological value of the anchialine ponds for anchialine organisms and endangered and migratory waterbirds from the above impacts.

Specific Comments

a. Page 3-6, 3.4. Hydrology. It appears that site-specific studies of the groundwater hydrology at the Kukio Bay site have not been conducted. Since future site development may involve the discharge of treated wastewater and untreated stormwater runoff, we recommend that detailed investigations of groundwater hydrology be conducted to determine whether these practices may affect the water quality and biological integrity of the anchialine pond complex. These studies should establish the flushing rate, discharge volume, and salinity gradients of basal groundwaters within the project area south of the highway.

b. Page 3-7, 3.4.2. Impacts. If lower elevation wells are used on a long-term basis, the changes in groundwater concentrations may be long-term, and not short-term as described.



Save Energy and You Serve America

c. Page 3-7, 3.4.4. Mitigation Measures. We do not concur with the statement that "the effects of withdrawal of groundwaters and/or injection or surface disposal of treated wastewaters or rawwater runoff would be compatible with anchialine pond and nearshore water quality..." This statement does not consider the impacts of toxic substances (petroleum products, biocides, sediment) contained in urban stormwater runoff and wastewater. It is for this reason, that we have recommended that detailed hydrological investigations be conducted here.

d. Page 3-8, 3.4.4. Mitigation Measures. The statement that "diurnal tidal flushing and natural mixing of groundwaters and ocean waters would prevent any significant degradation of anchialine pond water quality" should be substantiated with hydrological studies of the area and of the affected ponds.

e. Page 3-15, 3.6.2. Impacts. The statement that "...an environmentally sound pond consolidation and management program could actually improve the ecological value of the resource" is misleading. It is unclear what is meant by "consolidation" or how this would improve the ecological value of the resource. This statement should not be construed as direct or implied approval by the Service of any pond filling. We do agree that management and surveillance of the anchialine ponds on the site are important because it will limit potential adverse human impacts to the ponds. Our office is willing to provide technical support to develop an anchialine pond management program.

f. Page 3-15, Fauna. A more thorough description of the use of the Kukio area by the Federally endangered Hawaiian noddie (*Himatione immutabilis*) and the Hawaiian duck (*Anas wyvilliana*) and the role of these ponds in maintaining populations of these species should be included in the EIS. While the waterbird habitats at Opae Ula and Aieakapa are larger, the ponds at Kukio may still play an important role in supporting populations of these endangered species. The effect of increased human presence in the Kukio area on these endangered species should be discussed.

g. Appendix C. The biological consultant spent a relatively short period of time (1.5 hours) surveying the ponds. In addition, only a fraction of the ponds at the site were surveyed. We recommend that additional biological surveys of the anchialine ponds be performed during both night and day, and include a majority of the ponds on the site.

Summary Comments

Anchialine ponds and pond complexes in the United States are limited to portions of Maui and Hawaii. Anchialine ponds are

under serious threat of destruction and degradation by the recent increase in resort development proposals along West Hawaii. The loss of a substantial number of anchialine ponds at the Waikoloa site make the remaining anchialine ponds and pond complexes more valuable and worthy of complete protection. In light of this, the Service recommends that no pond filling or modification be proposed at the Kukio site.

We appreciate this opportunity to comment.

Sincerely yours,
William R. Kramer

for Ernest Kosaka
Project Leader
Office of Environmental Services

cc: NMFS - WPPD
EPA, San Francisco
DLNR
CE, Operations Branch
Mr. Carl A. Carlson, Jr., Manager (Huehue Ranch)
✓ Mr. Thomas S. Mitten, Principal
(Phillips, Strandt, Reddick & Asso.)

Phillips Brandt Reddick

May 7, 1986

Mr. Ernest Kosaka, Project Leader
Office of Environmental Services
United States Department of the Interior
Fish and Wildlife Service
300 Ala Moana Blvd.
P. O. Box 50167
Honolulu, Hawaii 96850

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT
FOR KUKIO BEACH RESORT
NORTH KOHA, HAWAII

Dear Mr. Kosaka:

Thank you for the copy of your letter of 7 April 1986 to Mr. Albert Lono Lyman, Director, County of Hawaii Planning Department. We have reviewed your comments and offer the following response to your specific comments:

A) Page 3-6. 3.4 Hydrology. Although site specific studies of the groundwater hydrology at Kukio have not been completed, hydrological studies conducted within the same hydrological basin as Kukio indicate that the extrusive basalts of the Hualalai volcanic series are extremely permeable and like most flank flows of the major volcanoes of Hawaii Island, constitute aquifers of exceptional hydraulic characteristics. A thin Chyden-Herzberg lens underlies the coastal region of western Hawaii, from Keahole northward to beyond Kawaihae and southward to beyond Keauhou. In the vicinity of Keahole and Kukio, the lens is brackish, probably less than 125 feet thick, and discharges freely along the coast. Hualalai flows showed regional hydraulic conductivity of 3,369 feet per day as computed by tidal analysis of 9,092 feet per day as computed from the flow equation in which the discharge was obtained by hydrologic budgeting. A probable outflow rate from the lens of 6.38 mgd per mile was calculated by the budget approach (Dames and Moore, 1985). Based on this data, it is unlikely that the use of any brackish water from low elevation wells would constitute any threat to anchialine pond flora and fauna.

Mr. Ernest Kosaka
DEIS FOR KUKIO BEACH RESORT
May 7, 1986
Page 2

The hydraulics of groundwater flow can therefore be described in terms of a highly permeable basaltic aquifer carrying a continuous thin basal lens of brackish water underlain by salt water. The brackish water of the lens flows towards the coast along the regional gradient about 1 foot per mile.

All of the lens system in the Keahole-Kukio region experiences appreciable ocean tidal influence at distances of up to 336 feet inland. Tidal efficiencies range from 69 percent to 100 percent. Further inland, at 600 feet, the efficiencies decrease to 43 to 66 percent. There is no simple accurate method for separating the tidal component from the head measure to reveal the true groundwater head associated with the unidirectional ambient seaward flux. Also, it is not possible to measure the actual basal lens thickness without a drilled hole of sufficient depth. However, as previously indicated, the approximate thickness of the lens is less than 125 feet in the area of concern.

These data lend strong support to the extreme unlikelihood that groundwater withdrawals or potential seepage of treated wastewater or storm water in low land coastal settings could significantly change the water quality within the anchialine pond complex given the massive seaward flux and hydraulic head of brackish groundwaters in contrast to the exceedingly small quantities of brackish water that would be required for potable or irrigation purposes.

These data further suggest that given the extreme euryhaline nature of anchialine pond flora and fauna, changes in the biotic composition resulting from groundwater withdrawal is extremely unlikely. However, insufficient data exist on anchialine pond biota to be able to conclusively state that biotic changes will not occur.

B) Page 3-7. 3.4.2 Impacts. If lower elevation wells are utilized, short-term changes in groundwater elevation may occur due to withdrawals. Although based on the characteristics of this aquifer as noted above, it is unlikely that changes in the groundwater observation would be long-term in that the recovery period at these lower elevations would be quick due to the thickness of the brackish water lens and its discharge rates along the coastline. As

Mr. Ernest Kosaka
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Page 3

noted, a probable outfall rate from the lens of 6.38 mgd per mile has been calculated (Dases and Moore, 1985 in HTDC, 1985).

C) Page 3-7, 3.4.4 Mitigation Measures. This statement is based upon the surveys and studies by Maciolek and Brock (1974), OI Consultants (1985), and Brock (1985a), and summarized by Brock (1985b). On the basis of field surveys, Brock (1985b) concluded that "in most instances, environmental degradation of anchialine resources directly due to development of the surrounding terrain is minimal...". Conversely, he suggests that "...other human activities associated with development such as increased access to and increased recreational uses in and around these coastal resources may result in a large impact on the anchialine biotope". Unlike other large development projects on the Kona Coast the proposed Kukio Bay project would not result in any loss of ponds (through filling) or other direct perturbations.

Brock (1985b) suggests three possible causes of anchialine pond degradation:

- 1) development that either results in pond obliteration or excessive nutrient loading,
- 2) recreation in or near ponds (resulting in their use for fishing, bathing, or refuse receptacles), and
- 3) the utilization of ponds for the cultivation of fishes.

The proposed Kukio Beach Resort project would not result in pond obliteration, recreation in or near ponds except passive interpretive trails, or allow for the cultivation of fishes within the pond complex.

Changes in the baseline quality of groundwaters in the Kukio area may be expected. However, the curvilinear nature of pond biota 2-38 ppt. and reported temperature range (22 to 30 degrees C.) suggest groundwater withdrawals and surface disposal of treated wastewater and rainwater runoff would have little if any detectable effect on pond biota. Monitoring studies conducted at a pond complex abutting the Mauna Lani Resort failed to detect any negative impact

Mr. Ernest Kosaka
DEIS FOR KUKIO BEACH RESORT
May 7, 1986
Page 4

directly attributable to construction or subsequent use of the surrounding terrain (including effects golf course irrigation with treated wastewater). Water quality and benthic algal abundance remained unchanged from a pre-construction survey conducted 13 years earlier (Brock, 1985a).

Although we appreciate your concerns on the impacts of "toxic substances, petroleum products, biocides, sediment in urban stormwater runoff and wastewater" on anchialine ponds and nearshore water quality, extensive literature searches and consultations with staff of the Aquatic Resources Division, Department of Land and Natural Resources, did not produce a single instance where ground-water discharges of any kind have been attributed to identifiable adverse impacts on nearshore marine organisms. The natural beach berm at Kukio would prevent surface water discharges from contributing silt and sediment to nearshore waters. Should future detailed engineering studies suggest that direct discharge is required, the applicant will consult with and obtain the consent of the Service prior to initiating final engineering drawings.

Regarding anchialine ponds, Brock (1985b) cites a toilet facility immediately adjacent to a "green water" pond surveyed in 1972, which upon re-survey (helicopter overflight in 1983) appeared to be full of macroalgae. Whether this was the result of natural pond successional processes or increased nutrient loading is not clear. In a second instance, the disappearance of opaeula from a pond adjacent to Honokohau Harbor was attributed to the dumping of used oil, grease and oil filters (Brock, 1985b). The latter use is, of course, not compatible with any pond or coastal setting. Although it is unlikely that oil/grease dumping would occur as part of normal resort operations, some degree of risk would likely be associated with heavy equipment operations associated with construction. To minimize risks from heavy equipment, we suggest that construction bid documents specify no on-site fuel storage or equipment maintenance with verification of compliance provided by the Service.

Mr. Ernest Kosaka
DEIS FOR KUKIO BEACH RESORT
May 7, 1986
Page 5

D) Page 3-8, Section 3.4.4 Mitigation Measures. Based on available hydrological studies within this region, the diurnal tidal flushing and natural mixing of groundwaters and ocean waters would prevent any significant degradation of anchialine pond water quality. (Refer to response A) p.1 of this letter:

E) The word "consolidation" is a typographic error and should read "conservation". Based on a project scoping meeting with John Ford, USFWS, and John Naughton, MMS, on 4 December 1984, an informal agreement was reached that a management plan could in fact maintain or improve the ecological and scientific value of the Kukio pond complex. The statement is based on natural pond successional processes underway which appear to be rapidly "aging" portions of the Kukio pond complex (particularly sakai ponds). Maintaining ponds in their present, undisturbed, state suggests that portions of the pond complex may lose its anchialine character within a few years. Conversely, certain enhancement procedures (strand vegetation removal, avoidance of exotic species introductions, and sediment controls) could be effective in retaining their true anchialine character. Recently constructed man-made barriers within some ponds may be removed to provide a more pristine appearance and natural setting. Similarly, properly constructed interpretative trails within the pond complex could enhance public as well as the visitor experience to the proposed development.

F) We welcome the support of the Service in developing a management program which would benefit the Kukio anchialine pond complex and have met with Mr. John Ford and Mr. Andy Yuen, USFWS, on 24 April 1986 to begin these efforts.

G) Repeated visits by the applicant, consultants and consultant teams over a 2-year period have failed to detect any additional endangered birds on site, other than the two stilts previously reported. Stilts are conspicuous and distinct and to those knowledgeable about native Hawaiian wildlife (albeit not ornithologists), easy to identify. These repeated observations indicate that the Kukio pond complex is not an important habitat for populations of this

Mr. Ernest Kosaka
DEIS FOR KUKIO BEACH RESORT
May 7, 1986
Page 6

species, but is an apparent permanent habitat for the specimens observed. As indicated in your letter, the Opae Ula and Alahapa ponds are larger and apparently provide more important habitat for endangered species. Additionally, surveys conducted by the Division of Forestry and Wildlife, Department of Land and Natural Resources, and the U.S. Fish and Wildlife Service at Amorlett Aquafarms International at Kahuku, and at the Kealia Baitfish facility, Maui, suggest that the Hawaiian stilt is not threatened by human presence (Walker, 1986; personal communication, DOPAM, DLMR).

G) As indicated in Appendix C, Page 3, Paragraph 1 (but apparently misinterpreted), the biological consultant spent 1.5 hours conducting a preliminary site reconnaissance survey of the entire pond basin before establishing a sampling protocol and initiating detailed qualitative and quantitative surveys (and chemical/physical analysis). Quantitative data are presented in Appendix C, Page C-13, Paragraph 1 and 3; Page C-12, Paragraph 4; and Page C-13, Paragraph 2. Total time on-site was in excess of 13 hours and included early morning (0400-0430 hours) water quality analysis and biological observations within 3 of 5 sampling stations. Although important water quality data was obtained during these early morning surveys, no additional biota was observed.


Inasmuch as hydrological data provided evidence that the Kukio anchialine pond complex is situated within a single, contiguous, interconnected basin with the majority of the ponds occupying surface areas of less than 3 square meters (many visible only during high tide periods) the consultant stands behind his sampling/survey protocol as representing the most accurate, descriptive, and scientifically valid means to assess pond biological features. The consultant has indicated his willingness to review and discuss his survey procedures with the Service, either in Honolulu or on-site at Kukio Bay.

Mr. Ernest Kosaka
DEIS FOR KUKIO BEACH RESORT
May 7, 1986
Page 7

Thank you for your comments, and should you have further concerns please do not hesitate to call. Your letter and this response will be appended to the final EIS.

Sincerely,

PHILLIPS BRANDT REDDICK


Thomas S. Witten, ASLA
Principal

Attachment: References Cited

cc: Mr. Albert Lono Lyman, Director
County of Hawaii Planning Department

Mr. Carl Carlson, Manager
Huehue Ranch

OEQC

"Attachment"
Mr. Ernest Kosaka
DEIS FOR KUKIO BEACH RESORT
May 7, 1986

REFERENCES CITED:

Brock, R.E., 1985a. An Assessment of the Conditions and Future of the Anchialine Pond Resources of the Hawaiian Islands in Waikoloa Beach Resort - Final Environmental Impact Statement, U.S. Army Corps of Engineers, Honolulu District.

Brock, R.E., 1985b. Aquatic Survey of the Anchialine Pond System at Lahaiapua, Kona, Hawaii. Prepared for Mauna Lani Resort, Kawaihae, Hawaii. 29 pp.

Dames & Moore, 1985. Development Plan for the Hawaii Ocean Science and Technology Park and Expansion of the Natural Energy Laboratory of Hawaii. High Technology Development Corporation, Honolulu, Hawaii. Appendix C.

OI Consultants, Inc., 1985. Anchialine Pond Survey of the Northwest Coast of Hawaii Island. Prepared for Transcontinental Development Co. 63 pp.

MacIsleik, J.A. & R.E. Brock, 1974. Aquatic Survey of the Kono Coast Ponds, Hawaii Island. University of Hawaii Sea Grant Rep. AR-74-04. 73 pp.



PLANNING DEPARTMENT

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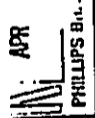
DANTE L. CARPENTER
Mayor

ALBERT LOHO LIMAN
Director

HIMA A. PRANSIA
Deputy Director



APR 9 1986



April 4, 1986

Mr. Thomas S. Witten
April 4, 1986
Page 2

Hualalai. Since Hualalai is still classified as an active volcano, there may ultimately be no mitigation measures for damage to property, particularly if the eruption originates in the northwest flank. Also, there is no way to predict rate of movement of lava flows from Hualalai. While there may be some mitigation measures to minimize loss of life, it would most likely result from the slow movement of lava and from a build up of seismic activity in the Hualalai area. Thus, the discussion should include information on the seismic monitoring program and equipment stationed on Hualalai by the Hawaii Volcano Observatory. The section should also include a discussion on how well it might be possible to predict a pending eruption and what kind of warning system should be or is already established.

Page 3-4: The use of Mueheui cinder cone is an irrevocable loss of a natural and scenic resource and should so be clearly stated.

Pages 3-6 and 3-33: The discussion on water supply notes the possibility of desalinization and use of non-potable water from wells at lower elevations. Are these wells likely to be at elevations similar to the brackish wells at Kona Village (Kaupulehu) or are they likely to be lower and closer to the coastline. What then are the likely impacts to the anchialine ponds from the use of lower elevation wells and is there a critical elevation point where impacts may be anticipated?

Page 3-7: The draft EIS suggests the use of natural lava tubes as collectors and drainage pits for surface run-off. While this is a possibility, impacts to other resources should be considered and discussed. Some of these lava tubes may be used as burial grounds. Thus an exploration of these tubes should be done prior to use as drainage collectors. There may also be some effects to downslope areas, such as the anchialine ponds, which should be considered and discussed.

Pages 3-8 through 10: The draft EIS mentions public access in terms of being a potential impact on the existing coastal and marine environments. The draft goes on to state in the mitigation section that public access to the shoreline will be provided through a specified public right-of-way to be determined in conjunction with detailed plans for the hotel sites and adjacent land owners. In order to access what the draft acknowledges to be a potential impact, it is necessary to have more information concerning public access to the shoreline. The provision of conceptual alternatives delineating alternative locations for public access, would be sufficient. It should also be noted that public access is generally discussed before the State Land Use Commission on a conceptual basis.

Thomas S. Witten
Phillips, Brandt, Reddick,
and Associates, Inc.
130 Merchant Street, Suite 1111
Honolulu, HI 96813

Dear Mr. Witten:

Comments on the draft EIS - Kukio Beach Resort

We have reviewed the subject draft EIS and submit the following comments which are ordered by section and page for your easy reference. We have also included comments from the Department of Public Works.

SECTION #I. SUMMARY

Pages 1-4-5: Need to define "intermediate resort" designation. Also, the definitions of "major" and "retreat" resorts should include the standards set forth in pages 94-95 of the County's General Plan.

SECTION #II. PROJECT DESCRIPTION

Page 2-6: Kaupulehu, including Kona Village, makai of the highway has an intermediate resort designation.

Page 2-7: Should work be proposed, as is suggested in other sections of the EIS, within shorewaters and the shoreline setback area, permits will also be required from the State Department of Health and the Department of Transportation. These should be included in the listing of permits required.

SECTION #III. DESCRIPTION OF THE ENVIRONMENTAL SETTING

Page 3-2: The discussions which begin with this section and are in other sections of the draft EIS on volcanic hazards should more clearly define the nature of the hazard. The area is within a volcanic natural hazard area designated "DH" by the U.S. Geological Survey and is vulnerable to volcanic activity originating from

Thomas S. Witten
April 4, 1986
Page 4

Page 3-36: On the discussions relating to solid waste, the draft EIS indicates that solid waste will be removed by private refuse collectors. However, because of the mixed uses and ownership of various aspects of the development and because of the distance from existing and planned landfills, the EIS should discuss alternatives such as transfer stations on site or means of requiring private collection. The EIS should also include an analysis of the potential impact that the resort's population would have on a solid waste landfill operations.

Page 3-37: A statement is made in relation to public service requirements that "Resort facility design will comply with all applicable County fire requirements and building code provisions." This is not an adequate mitigation measure to the question of probable need for additional fire fighting services.

Page 3-38: On the discussion relating to schools, perhaps there is an error in listing Hilo, as it is too far away to service North Kona families. Perhaps Hamakua was meant to be included instead.

Page 3-39: Kona Village and Kaupulehu are designated as part of a single intermediate resort area rather than a major resort as is noted. We suggest that all references including the illustrations be checked for the correct designation.

Page 3-41: Socio-economic, Regional Economic Setting. Additional information should be included based on the 1970 and 1980 census of population for the County, the West Hawaii Region, and the South Kohala-North Kona Districts. Such information should include demographic data related to the population's age, ethnicity, educational background, labor force participation rate in general and for males and females, and other appropriate background data. The census information should be supplemented with data from other sources, such as existing hotels and the State Department of Labor.

Page 3-45: The discussion regarding the proposed resort's visitor population indicates that the resort would have between 1,576 to 3,024 visitor units. This exceeds the number of visitor units permitted in the intermediate resort designation (1,500) as well as the major resort designation (3,000). If the developer proposes to have 3,000 visitor units, then the proposed resort's designation should be changed to that of a major resort and the number of visitor units accordingly reduced. If the developer proposes to continue with its application for a change of the site's general plan designation to that of an intermediate resort, then the proposed resort's visitor unit count should be reduced.

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Page 3-15: Among the potential impacts to the anchialine ponds, the draft EIS lists "Removal of existing natural and man-made rock separations and vegetation strips between ponds, which restrict movement of introduced species." If the developer intends to do this, the draft EIS should also discuss it in the section on historic/archaeological resources.

Page 3-17: The statement that care will be exercised to insure that natural sub-surface discharge channels do not degrade the anchialine ponds needs to be substantiated with possible methods of control.

Page 3-19: The statement is made that Kukio's anchialine ponds are less critical (emphasis ours) as a habitat for waterfowl than other areas of the West Hawaii coastline. Is it critical and have there been any avifaunal surveys of these ponds?

Page 3-28: The draft EIS proposes as a mitigation measure for impacts to traffic flow and movement on Queen Kaahumanu highway, that a traffic study be prepared addressing the project related traffic generation, traffic assignment and distribution etc. At what point in the planning and/or permit process does the developer intend to complete this study?

Page 3-31: The draft EIS notes as a mitigation measure for impacts to air quality that "prevailing tradewinds will rapidly disperse and dilute emissions from internal combustion engines." The area is usually sheltered from the trades (as is noted on page 3-29); thus the trades are not likely to be a consistent mitigation measure.

Page 3-33: The existing water well developed at Huehue Ranch produces 216,000 gallons per day. Additional information should be presented to substantiate that there are additional water resources that may feasibly be developed to satisfy the water requirements of the proposed development. Gross order of magnitude cost estimates should be provided for the cost of developing the water resource storage and transmission facilities in order to assess the reasonableness of developing the water system.

Page 3-35: The draft notes that "discharge of treated wastewater may alter the chemical composition of the anchialine ponds to some degree, but is not expected to produce any noticeable change in pond biota because of the high degree of natural flushing." This statement needs to be supported with substantive data and factual information.

APPENDIX D: MARKET ASSESSMENT

Table II-G. The reference to "Hawaii" is unclear. Does the table depict data for the State or the County?

Exhibit II-J. A detailed explanation is needed to justify the expectation that Hawaii County's share of the State's west- and eastbound visitors would increase. There is insufficient information and data presented to evaluate the validity of the expected increase in market share.

Exhibit III-I and accompanying narrative. A detailed explanation is needed to justify the expectation that Hawaii County's average nights of stay would increase as it did in Maui County. Other than it having happened in Maui County, there is no basis presented for assuming that it will happen in Hawaii County. There is also nothing presented to evaluate the validity of the expectation that state residents seeking hotel accommodations on the island will increase as they are projected to in Exhibit III-I.

Present and Projected Market Support. Market support should be presented in terms of the historical and projected occupancy rates in the region. This analysis may be presented on an aggregate basis, but it should separate hotel units from condominium units. Additional detail should also be presented concerning the estimated visitor accommodations market share for the County in 1985, particularly as it relates to the market share for hotel versus condominium accommodations. Presently, the discussion of market support does not indicate what the distribution of market support would be for the existing resort areas which should also include Kaupulehu and SeaMountain. Given that the existing resorts have development capacity that has not yet been translated into project proposals, the EIS should be revised to give consideration to the impact of the full development of these resorts relative to the overall regional market support for commercial visitor development. The EIS should be revised to indicate what the market support would be at the existing resorts assuming that the proposed Kukio resort is developed and assuming it is not developed.

Table IV-H. It is unclear if the sales data represents the "original" sale, or "resales." The latter is preferred since it represents the total market activity.

Pages 3-46-47: The employment impact analysis and its assumptions need to be substantiated with a more detailed presentation of the analysis and the underlying assumptions and conclusions, including the factual basis for the assumptions and conclusions.

Pages 3-47-48: The resident income analysis and its assumptions need to be substantiated with a more detailed presentation of the analysis and the underlying assumptions, including the factual basis for the assumptions and conclusions.

Pages 3-48-49: The population impact analysis and its assumptions need to be substantiated with a more detailed presentation of the analysis and the underlying assumptions, including the factual basis for the assumptions and conclusions.

Pages 3-49-50: The housing impact analysis is inadequate since it does not even disclose the projected total housing needs for either construction or operational employees. Without this estimate, it is not possible to evaluate the potential impact. The housing impact section should estimate the total housing impact and provide an objective and substantiated basis for evaluating the impact. The presentation should include details of the analysis and the underlying assumptions, including the factual basis for the assumptions and conclusions.

Pages 3-51-53: The fiscal impact analysis does not provide a basis for evaluating the conclusion that County real property tax revenues would be between \$4.0 to \$5.5 million. Similarly, the statement regarding County expenditures are unsubstantiated. A more detailed presentation is required of both the analysis and the underlying assumptions, including the factual basis for the assumptions and conclusions.

Pages 3-53-54: The social impact presentation does not provide an objective and substantiated basis for evaluating the impact. The presentation should include details of the analysis and the underlying assumptions, including the factual basis for the assumptions and conclusions. Additionally, an assessment should be made of the projected relationship between crime rates and visitor development.

Pages 3-54: Socio-economic, Mitigation Measures. This section is grossly inadequate. We would suggest that the consultant responsible for preparation of the draft refer to the EIS prepared for the Kailua Resort's State Land Use Reclassification.

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Table V-D. The table does not include sales data for any of the residential lot projects located within Hawaii County's resorts. Further, it is unclear if the sales data represents the "original" sale, or "resales." The latter is preferred since it represents the total market activity.

Should you wish to discuss any of these comments, please do not hesitate to contact us.

Sincerely,



ALBERT LOHO LYMAN
Planning Director

ALL/VKG:aeb

12-63

Phillips Brandt Reddick

May 7, 1986

Mr. Albert Lono Lyman, Director
Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 98720

SUBJECT: DRAFT EIS FOR KUKIO BEACH RESORT
NORTH KONA, HAWAII

Dear Mr. Lyman:

We have reviewed the comments contained in your letter of 4 April 1986 and provide the following responses. The responses correspond to the order of your comments and are referenced by section and page.

Section 1.0 Summary

Pages 1-4-8: The "intermediate resort" designation will be defined under Section 1.2. Under Section 1.4, definitions of "major" and "retreat" resorts will be supplemented to reflect the standards set forth in the County's General Plan.

Section 2.0 Project Description

Figure 2-6 will be revised so as to properly indicate that Kaupulehu, including Kona Village, is designated as an "intermediate resort" designation on the General Plan, County of Hawaii.

Page 2-7: Table 2-3: Land Use Descriptions/Approvals will be revised as suggested to indicate permits required from the State Department of Health and the Department of Transportation. Should improvements be implemented within near-shore waters or the shoreline setback area, the Department of Transportation's review of any actions in the near-shore waters would be included under the Conservation District Use Application review process administered by the Department of Land and Natural Resources.

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Section 3.0 Description of the Environmental Setting

Page 3-2: Section 3.2 Geology and Soils and Section 3.3 Natural Hazards has been revised for the Final EIS to include additional information on the volcanic hazards. It will be noted that the area is within a volcanic natural hazard area designated "DE" by the U.S. Geological Survey and is vulnerable to the volcanic activity originating from Hualalai. Information has been provided on the monitoring program and equipment station on Hualalai by the Hawaii Volcano Observatory. Also, a discussion on how well it might be possible to predict a pending eruption and what kind of warning system should be or is already established is included.

Page 3-4: It will be noted in the Final EIS under Section 3.2.3 that the Mueheui cinder cone will be removed under a current state permit to quarry the site. The loss of this natural and scenic resource is not a direct impact of the proposed development but may cause the acceleration of the removal due to need for cinders and aggregate in construction.

Page 3-6 and 3-33: As noted in the discussion on water supply, the possibility of desalination and use of non-potable water from wells at lower elevations is being considered for this project. Based on hydrological studies by Island Resources Limited these wells would likely be sited at elevations similar to the brackish wells at Kona Village (Kaupulehu).

In regards to likely impacts to the anchialine ponds from the use of lower elevation wells, it is unlikely that use of any brackish water low elevation wells would constitute any threat to anchialine pond flora and fauna. Hydrological studies conducted within the same hydrological basin as Kukio indicate that the extrusive basalts of the Hualalai volcanic series are extremely permeable and, like most flank flows of the major volcanoes of Hawaii Island, constitute aquifers of exceptional hydraulic characteristics. A thin Ghyben-Herzberg lens underlies the coastal region of western Hawaii from Keahole northward to beyond Kawaihae and southward to beyond Keauhou.

In the vicinity of Keahole and Kukio, the lens is brackish, probably less than 125 feet thick and discharges freely along the coast. Hualalai flows showed regional hydraulic conductivity of 3.369 feet per day as computed by tidal analysis and of 9.092

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feet per day as computed from the flow equation in which the discharge was obtained by hydrologic budgeting. A probable outflow rate, from the lens, of 6.38 mgd per mile was calculated by the budget process (Dames and Moore, 1985 and HDEC, 1985).

The hydraulics of groundwater flow can therefore be described in terms of a highly permeable basaltic aquifer carrying a continuous thin basal lens of brackish water underlain by salt water. The brackish water of the lens flows toward the coast along a regional gradient of about 1 foot per mile.

All of the lens system in the Keahole-Kukio region experiences appreciable ocean tidal influence at distances of up to 338 feet inland, tidal efficiencies range from 89 percent to 100 percent. Further inland, at 600 feet, the efficiencies decreased to 43 percent to 68 percent. There is no simple accurate method for separating the tidal component from the head measurement to reveal the true groundwater head associated with the unidirectional ambient seaward flux. Also, it is not possible to measure the actual basal lens thickness without a drilled hole of sufficient depth. However, as previously indicated, the approximate thickness of the lens is less than 125 feet in the area of concern.

These data lend strong support to the extreme unlikelihood that groundwater withdrawals in low land coastal settings could significantly change the water quality within the anchialine pond complex or coastal waters. Given the massive seaward flux and hydraulic head of brackish groundwaters in contrast to the exceedingly small quantities of brackish water that would be required for potable or irrigation purposes. These data further suggest that given the extremely euryhaline nature of anchialine pond flora and fauna, changes in the biotic composition resulting from groundwater withdrawal is extremely unlikely. However, insufficient data exist on anchialine pond biota to be able to conclusively state that biotic changes will not occur.

Page 3-7: After further consideration of the potential impacts the use of natural lava tubes as collectors and drainage pits for subsurface storm drainage, this means of drainage is not being considered. If retention ponds and settling basins are utilized within the project, precautions will be taken to assess the subsurface conditions including the occurrence of natural lava tubes so as to minimize the effects on down slope areas such as the anchialine ponds.

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Page 3-8 through 10: In the development of this coastal site, the providing of convenient public access to the coastal and marine environments will have an impact on the coastal resources. Public access to the shoreline will be provided through a specified public right-of-way to be determined in conjunction with detailed plans for the hotel sites and adjacent landowners. Conceptually, the location of alternative locations for public access would include one of the following locations:

1. public right-of-way located along the northern boundary of the site;
2. public right-of-way located in the central portion of the site between the two hotel sites; or
3. a public right-of-way located along the southern boundary of the property adjacent to the state land.

Identified conceptually for the purpose of the General Plan Amendment and State Land Use Commission Boundary Amendment, the specifics of the shoreline management and public access plan will be determined during the Special Management Area permitting process and will conform to County and State laws.

The potential impacts to the existing coastal marine environments are associated with the provision for public access to the shoreline. At the present there is no public right-of-way to the Kukio shoreline other than limited use by Huehue Ranch personnel and friends and groups with permission from Huehue Ranch management. The increased use of the shoreline area would include:

1. impacts to the vegetative groundcover within the coastal strand area due to increase in pedestrian traffic;
2. reduction in shoreline fish populations due to increased fishing activities; and
3. increased introduction of non-biodegradable materials discarded on site by users (bottles, cans, and miscellaneous trash).

Page 3-15: The removal of the existing man-made rock separations and vegetation strips between ponds, which restricts movement of introduced species may be removed as a component of the

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Page 3-31: Section 3.10. Air Quality. Will be revised in the final EIS to reflect your comment and those received from the Department of Health.

Page 3-33: The existing water well developed at Huehue Ranch was pump tested at 216,000 gallons per day with actual capacity greater than this amount, but yet undetermined. In 1981, Mr. Steven P. Bowles of Island Resources, Limited, prepared a study for the Domestic Water Supply for the Proposed Subdivision at Huehue Ranch, North Kona, Hawaii. The study analyzed the general behavior of the hydrologic cycle within the North Kona-South Kohala region that includes the Kukio project area. Because the area is geologically divided by the northwest rift zone of the Hualalai volcano, special attention was given to the rainfall patterns north and south of the rift zone axis. Although the areas contained within the isohyets (annual rainfall contours) tend to indicate distribution continuity, the weather patterns to the north and south of the axis line are quite different and thus recharge to the groundwater differs significantly.

Quality in water level data provided from wells located within or next to the study area indicated that recharge to the groundwater is the predominant hydrologic control of fresh groundwater flow, whereas on Oahu, Kauai, and Maui, most of the groundwater flow is controlled by geologic features and structures. Along the West Hawaii coast from Upolu to Kealahou, fresh groundwater occurs in the basal lens only where seasonal recharge volumes are high. Detailed analysis of the north and south recharge zones of the study area revealed that the time distribution of rainfall has decidedly reduced the amount of effective recharge in the southern zone. The result is that the groundwater flow from a given unit of aquifer (water bearing formation) is slightly less for a given rainfall volume. The development of soils and heavy vegetation within the south further reduces the recharge. In other words, the rainfall to the north occurs primarily as high volume short duration storms, whereas the rainfall in the south occurs primarily as lighter daily showers, thus creating soils and supporting lush growth which consumes such of the annual rainfall total. This behavior gives a slight decrease in recharge volume for a given annual total rainfall. This apparent contrast in recharge volume appears to significantly influence the quality of groundwater in the basal lens where the total rainfall is less than 75 inches annually. Such behavior is clearly evident when comparing the performance of the Kiholo Well (north zone) with the Kalaoa Well 12-11 (south zone).

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anchialine pond management plan to be prepared in conjunction with the U.S. Fish and Wildlife Service. This element of the management plan will be discussed in the section on historic/archaeological resources of the Final EIS. A Draft - Tentative Anchialine Pond Management Plan will be provided as an Appendix to the Final EIS.

Page 3-17: Care would be exercised to ensure that natural subsurface discharge channels do not degrade the anchialine ponds. As part of the site specific geotechnical surveys required for detailed design and engineering studies, necessary borings and acoustical methods would be utilized to ascertain the presence of holes, voids, channels and lava tubes which may occur within the project's proposed developed areas. Such studies are generally a part of the engineering studies associated with any construction project to determine bearing loads and structural requirements for buildings, roads, and other improvements. Such studies would detect the presence of any sub-terranean channels or lava tubes. Appropriate revisions would be made to development plans to ensure that the presence of any such tubes, channels, or bores would not affect, directly or indirectly, anchialine ponds or near-shore water quality.

Page 3-19: Repeated visits by the applicant, the consultant and subconsultant team over the past three years substantiate the statement that the Kukio ponds are not a major habitat for endangered water birds. The ponds (and the adjacent protected embayment at Kukio Point) provide habitat for two Hawaiian stilts and several mallard ducks from the nearby Kona Village Resort which have been repeatedly observed over a period of several years. Although not reported in the baseline environmental survey, the presence of the two stilts and several ducks was confirmed in this study. Both species are distinctive and readily identifiable even by untrained eyes. These observations suggest that while the ponds and the small protected embayment at Kukio Point represent habitat for these species, the area does not appear to be a major or critical habitat for either species.

Page 3-26: A traffic study would be prepared in conjunction with zoning and special management area permit applications. Sufficient traffic impact assessment has been completed for this project to determine that traffic engineering solutions can mitigate the anticipated impact the traffic flow and movement onto and off of Queen Kaahumanu Highway.

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Based on the anticipated water demand for Huehue Ranch sub-division and the Kukio Beach Resort development and the above water resource assessment, a series of well developmental alternatives were evaluated. Three candidate areas were identified for well development to supply the proposed development, although recommended that the pumping rate for a given well should not be planned to exceed a rate of 500 gpd.

In summary, well development prospects in the selected areas were characterized as very promising. The primary constraint to successful well development in either of the three areas will be over-pumping, improper construction and operational high cost. It is recognized that fresh groundwater within the north and south Kona coast is quite limited in quantity, particularly the sources which are located away from high rainfall belt.

In analysis of the total project feasibility, it has been determined that the water resources of the region, including wells at Huehue Ranch, could feasibly supply the water demand requirements of the Kukio Beach Resort and include a transmission line and reservoirs that would connect the system to the proposed development. The gross order of magnitude cost estimates to develop the water resource storage and transmission facilities are as follows based on 1986 dollars:

Well Construction (2 additional wells)	\$ 1,000,000
Water Transmission Main (16" and 12")	\$ 1,950,000
Reservoirs	\$ 2,500,000
Total:	\$ 5,450,000

The operating cost of potable water supplies produced either directly from deep wells or desalting would be high and probably on the order of \$5 per thousand gallons.

Page 3-35: The statement that "discharges of treated wastewater may alter the chemical composition of the anchialine ponds to some degree is not expected to produce any noticeable change in pond biota because of the high degree of natural flushing" is supported by long term monitoring studies that have been conducted at the Mauna Lani Resort located in a geologically/hydrologically identical area. These studies have detected

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significant increases in anchialine pond nutrient levels but no eutrophication or changes in represented flora and fauna were observed. The high degree of flushing and diurnal tidal exchange was identified as the factors responsible for maintenance of represented species groups, despite the increased nutrient levels (Strock, 1985; in Corps. of Engineers, 1985). The additional references cited have been noted in Section 13.0 References of the Final EIS.

Page 3-36: Section 3.14 - Solid Wastes will be revised for the Final EIS to reflect your comments and further discussion with Mr. Galen Kuba, Department of Public Works, County of Hawaii.

Page 3-37: Section 3.16 - Police and Fire Protection will be revised for the Final EIS to address your comments regarding the probable need for additional fire fighting services.

Page 3-38: Section 3.18 - Schools will be revised for the Final EIS to include the corrections as noted in your comments.

Page 3-39: Section 3.19 - Land Uses will be revised for the Final EIS to reflect your comment regarding Kona Village and Kaupulehu designated as a single "intermediate" resort area rather than a "major" resort as was noted. Related references and illustrations will be checked and the correct designation noted.

Page 3-41: Comments regarding the Socio-Economic and Regional Economic Setting of the DEIS have been transmitted to Peat, Marwick, Mitchell & Co., the consultant that prepared the Economic and Fiscal Impact Assessment for the subject project. Responses to your comments are included in the attached letter from Peat Marwick dated 22 April 1986.

Page 3-45: As summarized in Section 2.0, Project Description and included in Table 2-1, General Land Use Intensity Allocation for Kukio Beach Resort, 900 to 1,350 hotel rooms are planned and thus the maximum visitor units of 1,500 rooms, the standard established by the County General Plan as a guide to the development of resort areas, will not be exceeded. It is the intent of the developer to proceed with the "intermediate resort" designation based on the land use allocations as depicted in Table 2-1.

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Your comment implies that the residential condominium units proposed to be developed, which may potentially be utilized as visitor rentals and are beyond the control of the developer, are being considered as hotel rooms. Only for purposes of determining visitor expenditures, 65 percent of the residential condominium units could be assumed to be used for visitor rentals. This percentage is based on existing patterns within similar resorts and it is not to imply that the intention of the developer is to develop those residential condominium units as hotel rooms or visitor rentals. The ultimate use of the proposed residential condominium units as residential or visitor units would depend on the individual unit purchasers and is beyond the control of the developer.

Pages 3-46 to 53: Regarding the employment, resident income, population, housing, and fiscal impact analysis, Peat, Marwick, Mitchell, & Co., the consultant who completed the study of these areas for the project has responded to your comments. The letter dated 22 April 1986 is attached.

Pages 3-53 to 54: Section 3.21 - Socio-economic will be revised in the final EIS to address your comments. In addition, an Assessment of Potential Qualitative Social Impacts will be appended to the Final EIS.

Appendix D: Market Assessment. John Child and Co., Inc., the consultant responsible for preparing the market assessment, has responded to your comments regarding the market assessment. Their letter dated 25 April 1986 is attached.

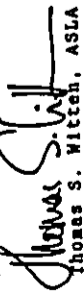
Where indicated in the above responses to your comments, the appropriate sections will be revised for the Final EIS.

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Thank you for your comments, and should you have any further concerns please contact us. Your letter and this response will be appended to the Final EIS.

Sincerely,

PHILLIPS BRANDT REDDICK


Thomas S. Witten, ASLA
Principal

Attachments: Peat Marwick letter dated 22 April 1988
John Child letter dated 25 April 1988

cc: Mr. Carl Carlson, Manager
Huehue Ranch

Ms. Ann Bouslog
Peat Marwick

Ms. Karen Char
John Child and Co.

Dr. Paul H. Rosendahl

OEQC



Peat, Marwick, Mitchell & Co.
Financial Plaza Of The Pacific
P.O. Box 4150
Honolulu, Hawaii 96813
808-531-7286

April 22, 1986

Mr. Thomas S. Witten, ASLA
Phillips Brandt Reddick & Associates
130 Merchant Street, Suite 1111
Honolulu, Hawaii 96813

Dear Mr. Witten:

Subject: Draft EIS for Kukio Beach Resort (DEIS)
North Kona, Hawaii

As requested, we have reviewed the comments received from Mr. Albert Lono Lyman (letter dated April 4, 1986) on the DEIS for the proposed Kukio Beach Resort (Resort). Since the economic and fiscal impact portion of the DEIS was based on Peat, Marwick, Mitchell & Co.'s (Peat Marwick) report entitled "Economic and Fiscal Impact Assessment for the Proposed Kukio Beach Resort", February 1986, which was prepared for Huehue Ranch, this letter responds to the comments and questions directed to pages 3-41 through 3-53 of the DEIS. Reference is also made to the Peat Marwick report noted above, a copy of which has been transmitted to Mr. Albert Lono Lyman at the Hawaii County Planning Department.

REGIONAL SETTING

Background information on the Kona and Kohala region is presented in Chapter II of our report. The sections below supplement that information with material on social characteristics, population growth since 1980 and labor force characteristics of the region.

Social Characteristics

Exhibit A shows the social characteristics of the regional population in terms of education, ethnicity and age in 1970 and 1980. All four districts of the Kona and Kohala region have changed over the intercensal decade in terms of increasing educational achievement, as shown in the exhibit. This change was most pronounced in North Kona and South Kohala where development during the 1970s brought new economic opportunities. All districts also showed increases in the share of population of working force age; South Kona, North Kohala and South Kohala also showed relative growth in the population aged 65 or older.

Comparison of 1970 and 1980 U. S. Census data on ethnicity, unfortunately, is not productive because of the significant differences in the means employed in classifying ethnicity at the two enumerations.



Mr. Thomas S. Witten
April 22, 1986

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Population Growth Since 1980

Resident population growth on the island since 1980 has been more gradual than during the 1970s and continues to be most rapid in the North Kona and South Kohala districts. Between 1980 and 1984, population grew 6.9% and 6.3% per year in North Kona and South Kohala, respectively, compared to 5.3% for the Kona and Kohala region as a whole and 3.5% for the island, as shown in Exhibit B.

Growth in the island's de facto population, including visitors present but excluding residents absent, has also slowed since the 1970s. De facto population grew about 3.1% per year between 1980 and 1984, or slightly less rapidly than resident population growth during the period, as also shown in Exhibit B.

Labor Force Characteristics

Labor force participation rates increased significantly in the North and South Kona districts between 1970 and 1980 but declined in the North and South Kohala districts, as shown in Exhibit C. Female labor force participation, however, has increased throughout the region, ranging from 18.5% and 10.6% increases over the ten years in North and South Kona, respectively, to 4.3% and 2.7% increases in North and South Kohala, respectively.

Overall declines in labor force participation in the two Kohala districts were due to their more modest increases in female participation and their declining rates in male labor force participation over the period, as also shown in Exhibit C. This is attributed primarily to erosion in Kohala's traditionally male-dominated economic base of sugar cultivation and processing, coupled with the rise of resort- and tourism-related centers of employment in North Kona and South Kohala which provided many new work opportunities for women.

Information on labor force characteristics since 1980 is not available by district, but the State of Hawaii, Department of Labor and Industrial Relations (DLIR) prepares labor force estimates for the county as a whole. The DLIR estimates that in the first half of the 1980s, the civilian labor force has increased by 3.8% per year to about 50,600 persons in 1985, as shown in Exhibit D. However, county employment appears to have lagged behind labor force growth, resulting in an estimated 8.5% rate of unemployment in 1985, or about 2.2% more than in 1980.

Job losses since 1980 have occurred in the construction and manufacturing industries, while relatively high job increases were noted in the areas of retail trade, services, and finance, insurance and real estate, as also shown in Exhibit D.

County data on agricultural employment is not yet available for 1985. However, in the sugar industry alone, the State of Hawaii, Department of Planning and Economic Development (DPED) estimates that the island lost about 500 jobs between 1980 and 1984.



Mr. Thomas S. Witten
April 22, 1986
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NUMBER OF VISITOR UNITS

Huehue Ranch has expressed the desire to develop 900 to 1,350 hotel units and 783 to 1,958 residential condominium units at its proposed Kukio Beach Resort. The ultimate use of the proposed condominium units as residential or visitor units would depend on the individual unit purchasers.

EMPLOYMENT IMPACT

This section explains the key assumptions made in our projections of construction and operational employment at the Resort.

Direct Construction Employment

Construction employment for the Resort is estimated based on estimates of construction labor requirements at other resort developments in the state. The method used to estimate the direct labor requirements of the various developments proposed is shown in Exhibit III-E of our report. The assumptions regarding direct construction employment at the hotel, condominium, single-family and commercial products proposed at the Resort are summarized in the table below:

Assumptions for Projection of Direct Construction Labor Requirements at the Kukio Beach Resort

Development type	Person-years per unit	Construction period (months)	Full-time equivalent person-years	
			per unit	per unit
Hotel	0.50	24	1.00	
Condominium	0.70	18	1.05	
Single-family lot	0.02	12	0.02	
Single-family home	2.00	12	2.00	
Commercial space	N/A	N/A	0.60(1)	

N/A Not available.

(1) Per 1,000 square feet gross leasable area.

The above assumptions are based on projections of direct construction labor requirements at comparable planned hotel developments such as at Turtle Bay Resort, SeaMountain at Punaluu and Kaanapali Beach Resort. Consideration was also given to the direct labor requirements estimated for the Princeville Resort Phase II, as provided by Princeville's engineers, which were as shown in the table on the following page:



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Estimated Direct Construction Labor Requirements for Princeville Resort, Phase II

Development type	Full-time equivalent person-years
Hotel (unit)	0.80
Condominium (unit)	1.10
Single-family unit (house and lot)	1.60
Commercial space (per 1,000 square feet gross leasable area)	1.04

Direct labor requirements for the infrastructural improvements proposed at the Resort were estimated based on order of magnitude construction cost estimates provided by Phillips Brandt Reddick & Associates for the estimated labor components of the respective budgets.

Indirect and Induced Construction Employment

The indirect and induced demands for labor supported by direct construction employment are estimated based on the DPED's interactive model of the economic impacts of the construction industry in Hawaii (State of Hawaii, DPED, Hawaii Construction Model: Further Developments, 1982), as explained on page III-2 and in Exhibit III-F of our report. This model estimates that a total of about 2.4 jobs are created in the state for every direct job created in the building construction industry in the state. Indirect and induced employment is estimated as a residual of total employment less direct employment, amounting to a total of 3,860 to 5,100 person-years over the development of the project, as shown in Exhibit III-F of our report.

Based on the results of a study of economic multiplier effects on the island of Kauai (Anderson et al, Kauai Socioeconomic Profile, 1975), about 20% of this indirect and induced employment could be expected to be located on the island of Hawaii. Together with the approximately 90% of direct construction employment that could be expected to be on-site, total on-island construction employment over the development of the Resort could be expected to be as follows:

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• Condominiums - Employment at the Kanaloa at Keauhou, the Mauna Kea Villas and the Mauna Lani Terrace is estimated to represent 0.2 full-time equivalent positions per unit. A study prepared for the DPED found that resort condominium employment throughout the state averaged about 0.1 jobs per unit, most of which were full-time positions (Daly & Associates, Inc., Resort Condominium Issue Paper, 1980).

• Single-family units - Single-family developments in planned resort communities are a relatively new product in Hawaii, so less information is available for comparison than is available for resort condominiums. However, the Fairways at Mauna Kea are reported to employ an average of 0.5 persons per sold lot.

• Commercial space - Commercial spaces in the Mauna Lani Bay Hotel and the Sheraton Royal Waikoloa are estimated to employ an average of one full-time equivalent person per 200 square feet gross leasable area. Employment at the 80,000-square foot Whaler's Village Shopping Center in Kaanapali, Maui, is estimated to represent about one full-time equivalent employee per 170 square feet of gross leasable area.

In addition, Resort administrative positions were estimated to amount to about 75 to 85 full-time equivalent positions at project completion. This estimate is based on employment patterns in resort administration, property development and sales, accounting, golf course maintenance and service, grounds keeping, landscaping and maintenance of other infrastructural facilities, as observed at the Mauna Lani, Waikoloa and Princeville Resorts.

Indirect and Induced Operational Employment

Indirect and induced operational employment is estimated based on the direct employment requirements projected in our study and the DPED's assessment of the economic impacts of tourism in the state, as explained on page III-3 and in Exhibit III-H of our report. In 1983 the DPED estimated that visitor spending supports 0.9 and 0.6 indirect and induced positions in the state for every direct position in the hotel and retail industries, respectively (State of Hawaii, DPED, The Economic Impacts of Tourism in Hawaii: 1970-1980, 1983). In February 1986 Dr. Tu Duc Pham of the DPED confirmed that these multipliers are still valid given results of the most recent updates of the DPED's economic modeling.

Current and anticipated future levels of economic development on the island of Hawaii will permit the island to service essentially all of the direct operational needs of its resort areas and increasing shares of the indirect and induced requirements for goods and services generated by the resorts. Thus, all of the direct employment projected to be generated by the operation of the Resort could be expected to be located on the island. When completely developed, the Resort could be expected to support about 1,900 to 2,600 full-time equivalent permanent positions, as shown in the following table:

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Projected Total Employment on the Island of Hawaii Supported by Construction of Proposed Facilities at Kukio Beach Resort

(Total person-years)

	Total project	
	Low	High
Direct effects(1)	2,480	3,280
Indirect and induced effects(2)	550	730
Total	3,030	4,010

(1) Estimated as 90% of direct construction employment shown in Exhibit III-E of report.

(2) As shown in Exhibit III-F of report.

Direct Operational Employment

Direct operational employment at the various developments proposed at the Resort was estimated based on the following assumptions:

Assumptions for Projection of Direct Labor Requirements at the Kukio Beach Resort

Development type	Full-time equivalent positions
Hotel (unit)	0.9
Condominium (unit)	0.2
Single-family (sold lot)	0.3
Commercial (per 200 square feet gross leasable area)	1.0

The aforementioned assumptions are based on our surveys of employment at existing resort establishments and other research, summarized as follows:

• Hotels - Estimated full-time equivalent employment at the Sheraton Royal Waikoloa, King Kamehameha Hotel, Kona Surf Hotel, Kona Hilton Hotel, Mauna Lani Bay Hotel and the Hyatt Kaanapali range from 0.5 per unit at the King Kamehameha to 1.4 per unit at the Hyatt Kaanapali and the Mauna Lani Bay Hotel. In addition, expenditures made by visitors to these hotels support other direct jobs in the community.

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Projected Total Employment on the Island of Hawaii
Supported by Operations of Proposed Facilities
at Kukio Beach Resort

	At project completion	
	Low	High
Direct effects(1)	1,540	2,080
Indirect and induced effects(2)	390	530
Total	1,930	2,610

- (1) As shown in Exhibit III-G of report.
(2) Estimated as 30% of indirect and induced employment shown in Exhibit III-H of report.

RESIDENT INCOME

The effects of the proposed Resort on personal and household income in the state are estimated based on the expected levels of employment, as projected, and on average industry wages as reported by the DLIR (State of Hawaii, DLIR, Employment and Payrolls in Hawaii: 1989, 1985). The reported wages were updated to 1983 dollars based on changes in average wages in the state as reported by the DLIR Unemployment Insurance Division (in Pacific Business News, January 6, 1986). Our analysis is explained in Exhibit III-1 of our report and is summarized as follows:

- Full-time equivalent construction employees are assumed to receive an average annual wage of \$22,541, reflecting 30% of workers from off-island earning the statewide mean annual wage of \$26,786 and 70% from the island of Hawaii at the island mean of \$20,723. This would represent \$3.6 million to \$3.4 million (in 1985 dollars) per year in personal income paid to direct construction employees, the majority of whom are expected to be island residents.
- Full-time equivalent hotel, resort residential and resort administration employees are assumed to be paid at the island average of \$11,780 per year for hotel industry employees. This estimate of wages excludes tips, which may amount to a major portion of earnings in many service occupations in the industry. The most recent study on this issue (Touche, Ross, Bailey & Smart, 1969, Report on the Compensation Structure for Hourly Employees of the Hawaii Hotel Industry for the Year 1968) indicated that wages represent only about two-thirds of the average hotel employee's total compensation. The remaining



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one-third was split fairly evenly between tips and fringe benefits. Considering wages alone, direct operational employment at the Resort could be expected to generate about \$14.3 million to \$20.0 million (in 1985 dollars) in annual salaries, nearly all of which would be captured on the island.

- Full-time equivalent commercial sector employees are assumed to earn \$10,036 per year, based on the average wages in selected classifications of retail employment on the island. This would represent \$3.3 million to \$3.8 million (in 1985 dollars) in annual salaries paid to direct employees, nearly all of whom would be employed on the island.

Household income is estimated based on direct visitor expenditures, as projected in our study, and the results of the DPED's study of the flow of visitor dollars through the state economy (in State of Hawaii, DPED, Data Book, 1984). The DPED study indicated that each dollar spent by a visitor in the state generates about \$0.63 in household income through direct, indirect and induced effects.

POPULATION IMPACT

The on- and off-Resort population impacts of the proposed Resort were discussed on pages III-1 and III-4 through III-5 of our report. This section summarizes the bases of our analysis, as noted in the report.

On-Resort Population

Exhibit E, attached, is copied from Exhibit III-B of our report which shows the assumptions made in projecting on-Resort population. As noted in the exhibit, these assumptions are based on the Hawaii Visitors Bureau's (HVB) 1983 survey of the usage of hotel and resort condominium units in the state (HVB, Profiles: The Resort Condominium Market and Profiles: The Resort Hotel Market, 1985) and on information gathered from interviews and discussions with resort operators and real estate brokers at selected properties on the islands of Maui and Hawaii.

Off-Resort Population

Estimation of population growth generated off-Resort by employees of the Resort assumed that 20% and 33% of service sector and managerial or supervisory operational employees, respectively, could come from off-island for employment at the Resort. For comparison, the Mauna Lani Bay Hotel estimates that one year after its opening, about 9% of its work force had recently moved to the island of Hawaii. A higher share of in-migrants is anticipated at Kukio Beach Resort because of the many more resort-related employment opportunities that are expected to exist on the island in the future than at present.

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For purposes of projection, 30% of the construction workers to be employed at the Resort were projected to come from off-island. However, as noted in our report, the actual share of off-island workers would depend on labor agreements and the amount, timing and location of other major construction projects throughout the state at any given time. In three surveys taken in 1981 and 1982 during the construction of the first facilities at Mauna Lani Resort, it was found that between 16% and 43% of the workers were from off-island, as shown in the table below:

Composition of On-Site Construction Workforce
at Mauna Lani Resort

1981 to 1982

	Total work- force	Workers from off-island	
		Number	Percent of total
August 1981	151	25	16.5%
March 1982	301	85	28.0
October 1982	250	112	44.8
Average	234	74	31.6%

Source: Mauna Lani Resort, Inc., Labor Housing Reports, August 1981, March 1982, October 1982 (prepared for the County of Hawaii).

Dependents of workers attracted from off-island were estimated at 2.0 per managerial or supervisory operational employee, 1.0 per other operational employee and 0.5 per construction employee. These assumptions are based on discussions with resort operators and construction engineers and are supported as follows:

- Managerial and supervisory employees are often young heads of households and hence may be accompanied by other household members. An average household size of three persons was assumed, based on the 1980 Hawaii county and North Kona averages of 3.1 and 3.0 persons per household, respectively (U. S. Bureau of the Census, 1980).
- Nonmanagerial and nonsupervisory resort-related employees are less frequently heads of households and hence are less likely to be accompanied by dependents than are the former groups. In a sample of 4,128 hotel industry workers drawn from the Hawaii State Department of Health's Health Surveillance Survey, only 25% of all workers, including the 11% listed in managerial or supervisory occupational classifications, were heads of households. In comparison, 42% of



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the 77,278 workers sampled from the state population at large were household heads and this was significantly different from the hotel industry figure at a 0.1% level of confidence (Bouslog, Employment in the Hotel Industry in Hawaii, 1983).

- Because of the temporary nature of most construction projects, construction employees working on an island other than their usual place of residence are generally not accompanied by dependents or other household members. However, off-island construction workers were assumed to be accompanied by an average of 0.5 persons per direct worker in order to account for the few supervisory or other construction workers who may have relatively long engagements at the project site and the means to transport their families temporarily.

HOUSING IMPACT

The housing requirements of operational and construction workers supported by the Resort are discussed in the following subsections.

Operational Employees

The housing requirements of operational employees at the Resort were addressed on pages III-5 through III-6 and in Exhibits III-K through III-O of our report. The analysis indicated that at project completion, direct operational employees could be expected to generate demand for about 290 to 400 additional housing units on the island, as also indicated in the DEIS. Of this number, an estimated 93 to 160 households are estimated to have difficulty in purchasing a unit, assuming current market conditions.

Construction Employees

The housing requirements of construction employees were not addressed in our report because of the difficulty in predicting the amount of construction labor to come from off-island, as discussed previously, and because such workers generally receive generous housing subsidies and are accommodated in local rental markets. Housing subsidies for off-island construction workers are generally established by union contracts. They vary slightly by trade, but most current agreements require that the employer pay \$31 to \$32 per day, or \$930 to \$960 per month. Thus, by doubling up, construction workers from off-island could afford to rent units priced at up to \$1,920 per month.

In its Labor Housing Reports, Mauna Lani Resort reported that 43% to 75% of its off-island construction work force in the 1981 to 1982 period rented units, while the others rented rooms in houses, stayed with relatives or friends or found other temporary accommodations. If 30% of the construction workers were to come from off-island and require temporary accommodations, the Kona and Kohala region could expect to realize an influx of about 50 to 100 off-island workers at any given time, and a demand for 20 to 80 rental housing units in a typical year of facility construction. If 30% were to come

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The estimated assessed values used in our study were as follows:
Estimated Assessed Property Values
at Kukio Beach Resort
(In 1985 dollars)

	Unit	Building	Land	Total
Hotel	Unit	N/A	N/A	\$ 143,000
Multifamily	Unit	N/A	N/A	225,000
Single-family	House and lot	\$ 135,000	\$ 165,000	300,000
Single-family	Lot	-	165,000	165,000
Commercial space	Square foot	N/A	N/A	60
Golf course	Acre	-	5,500	5,500
Golf clubhouse	Clubhouse	500,000	-	500,000

Sources:
Phillips Brandt Reddick & Associates, Inc., "Kukio Beach Resort Cost Estimates, January 16, 1986. John Child & Company, Inc., "Hotel, Condominium and Single-Family Market Assessment for the Proposed Kukio Beach Resort", January 1986.

State government revenues were estimated based on anticipated general excise, individual income, liquor, fuel, tobacco, insurance, franchise, inheritance, estate and conveyance taxes to be paid by visitors to and residents of the Resort, as explained in Exhibit IV-B of our report.

County and state expenditures were estimated in an analysis of fiscal year 1984 average per capita expenditures for residents of and visitors to the county and state based on operating government expenditures reported by the Tax Foundation of Hawaii, Government in Hawaii, 1983, and resident and de facto population estimates published by the DPED) and our projections of the population impacts of the Resort.

The 1984 county government expenditures of \$64.9 million shown in Exhibit IV-C of our report include expenditures made from special county revenue sources such as those dedicated to sewer or highway development and/or upkeep. Thus, it reflects county operating expenses and may be greater than figures representing expenditures or budgets based on the county general fund only.

In recent years, total county government operating expenses have been as follows:

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from off-island, there might be 80 to 170 workers temporarily housed on the island at any given time, and these workers could be expected to demand up to 130 rental housing units. The demand for units would probably be greatest in the early years of construction when major infrastructural developments would coincide with hotel, condominium and single-family construction.

It is anticipated that this additional and temporary construction employee housing demand could be accommodated by the existing and future stock of condominium and single-family homes available for short-term rent in the Kona and Kohala areas. For comparison, the Mauna Lani Resort found that in 1982, up to 112 construction workers were being accommodated in rental and other temporary housing in the area at any given time. According to the HVB, condominium units in visitor rental pools in the Kona and Kohala areas of the island increased 11% between June 1982 and February 1986, representing 1,883 units available for short-term rentals in 1986. In peak tourism months these units, on the average, are estimated to have experienced at least 30% vacancies in recent years. Thus, even without any further condominium development or rental pool conversions, there are estimated to be at least 360 vacant condominium units in visitor rental pools in the Kona and Kohala areas at the present time.

About two-thirds of Mauna Lani Resort's off-island construction workers between 1981 and 1982 who rented units were located in the Kona area and an additional 11% and 10% were located in the Waimea and Waikoloa areas, respectively (Mauna Lani Resort, Labor Housing Report, 1981 and 1982).

Housing needs will be assessed in greater detail when new county zoning designations are sought for particular developments.

FISCAL IMPACTS

The analysis of the fiscal costs and benefits of the proposed Resort was presented in detail in Chapter IV of our report. The bases for key assumptions to our projections are noted below:

- County government revenues were estimated based on expected property values (as provided by Phillips, Brandt, Reddick & Associates, "Kukio Beach Resort Cost Estimates, 1986, and John Child & Company, Inc., "Hotel, Condominium and Single-Family Market Assessment for the Proposed Kukio Beach Resort", 1986) and current Hawaii County tax rates as reported by the Tax Foundation of Hawaii, Government in Hawaii: A Handbook of Financial Statistics, 1983 and by Hawaii County real property tax assessors. The analysis is summarized in Exhibit IV-A of our report.

KUKIO BEACH RESORT
Social Characteristics of the Kona and Kohala
Districts and County of Hawaii
1970 and 1980

	North Kona (census tracts 213 and 216)		South Kona (census tracts 213 and 214)		North Kohala (census tract 218)		South Kohala (census tract 217)		County of Hawaii	
	1970	1980	1970	1980	1970	1980	1970	1980	1970	1980
Total population	4,832	13,748	4,004	5,914	3,326	3,249	2,310	4,607	63,468	92,053
Education (population aged 25+):(1)										
Less than 8 years	28.8%	8.0%	48.0%	23.6%	44.2%	29.0%	24.1%	8.6%	37.2%	20.1%
12 years	66.0	40.9	45.7	33.8	30.0	39.0	34.2	37.0	31.6	35.5
16 or more years	8.8	18.8	6.3	12.4	5.9	8.1	13.1	20.7	7.5	15.2
Ethnicity:(1)										
Hawaiian	19.3	22.1	14.7	23.5	15.3	24.7	26.5	28.5	12.3	18.8
Japanese	23.1	11.8	39.6	27.5	23.8	16.1	24.4	14.6	37.5	26.6
Caucasian	44.0	53.8	17.7	30.0	25.6	27.8	39.2	46.5	28.8	35.0
Chinese	3.7	1.6	.8	.8	4.3	1.0	1.3	1.4	2.9	1.7
Filipino	8.4	7.2	26.3	13.0	29.2	23.9	6.6	5.6	16.5	13.9
Other	1.5	3.5	.9	5.2	1.8	6.5	2.0	3.4	2.0	4.0
Ages:										
Under 5 years	9.1	9.1	8.5	9.8	10.0	9.2	9.3	10.2	8.6	9.1
5 to 17 years	27.0	20.3	26.6	17.2	29.4	22.9	28.3	23.6	27.8	21.5
18 to 64 years	55.7	63.9	55.3	62.4	51.1	54.3	56.0	58.6	54.4	59.2
65 or older	8.2	6.7	9.6	10.6	9.5	13.6	6.4	7.6	9.2	10.2

(1) Estimates based on 15% sample.

Sources: U. S. Bureau of the Census, Census of Population and Housing, 1970, Census Tracts (Final Report, PHC(1)88, Honolulu, Hawaii, SMSA), 1972; Census of Population and Housing, 1980, Census Tracts (PHC 80(2)13), 1983; and Summary Tape Files 1-A and 3-A, 1980; and State of Hawaii, Department of Planning and Economic Development, Community Profiles for Hawaii, 1973; and The Geographic Distribution of Hawaii's Racial Groups, 1970 and 1980 (SR #152), 1982.

Exhibit A

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Hawaii County Government Operating Expenses

Fiscal years 1981 to 1984

(\$ in millions)

1984	\$ 64.9	9.0%
1983	59.0	
1982	54.0	
1981	50.1	

Average annual percent change -
 1981 to 1984

Source: Tax Foundation of Hawaii, Government in Hawaii, 1984 and 1985.

Thank you for this opportunity to respond to these comments and questions. I hope that, together with this letter, our report answers the questions and concerns that Mr. Lyman has raised. Please contact Ms. Ann Bouslog or myself if we can provide any further information.

Very truly yours,

PEAT, MARWICK, MITCHELL & CO.

Malcolm J. Tom
 Malcolm J. Tom, Partner

MJT:ID
 Enc.

Exhibit B

KUKIO BEACH RESORT
 Resident and De Facto Population of the
 Kona and Kohala Districts and County of Hawaii
 1970 to 1984

	April 1		July 1, 1984	Average annual percent change	
	1970	1980		1970-1980	1980-1984
Resident population:					
North Kona	4,832	13,748	18,226	11.0%	6.9%
South Kona	4,004	5,914	6,730	4.0	3.1
North Kohala	3,326	3,249	3,403	(.2)	1.1
South Kohala	2,210	4,607	5,972	7.1	6.3
Total region	14,872	27,518	34,331	6.6%	5.3%
County of Hawaii	63,468	92,053	106,403	3.8	3.5
De facto population, County of Hawaii	65,700	98,700	112,600	4.2	3.1

Sources: State of Hawaii, Department of Planning and Economic Development, Hawaii State Statistical Areas Committee, Estimated Population of Hawaii by Districts, 1984 (Report CTC-64), 1985; and de facto population, by counties: 1970 to 1984, Data Book, 1985; U. S. Bureau of the Census, 1980 Census of Population, Number of Inhabitants, Hawaii (PC 80-1-A13), 1981; and First Hawaiian Bank, Economic Indicators (May/June 1985), 1985.

KUKIO BEACH RESORT

Labor Force Characteristics of the Kona
 and Kohala Districts and County of Hawaii

1970 and 1980

	North Kona (census tracts 215 and 216)		South Kona (census tracts 213 and 214)		North Kohala (census tract 218)		South Kohala (census tract 217)		County of Hawaii	
	1970	1980	1970	1980	1970	1980	1970	1980	1970	1980
Potential labor force (persons aged 16+)	3,262	10,115	2,629	4,265	2,240	2,286	1,446	3,290	43,073	67,205
Civilian labor force	2,022	7,292	1,335	2,823	1,355	1,355	951	2,110	25,889	41,006
Percentage distribution:										
Armed services	-	.1%	-	.%	1.1%	1.0%	-	.%	.4%	.3%
Civilian labor force	62.0	72.1	58.4	66.2	60.5	59.3	65.8	64.1	60.1	61.0
Not in labor force	38.0	27.8	41.6	33.8	38.4	39.7	34.2	35.9	39.5	38.7
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Civilian labor force participation rates:										
Male	78.5	82.0	69.6	76.1	71.6	66.6	84.4	78.3	63.6	70.5
Female	43.5	62.0	44.7	55.3	47.8	52.1	46.3	49.0	36.4	51.3
Average	62.0%	72.1%	58.4%	66.2%	60.5%	59.3%	65.8%	64.1%	60.1%	61.0%

Sources: U. S. Bureau of the Census, Census of Population and Housing, 1970, Census Tracts (Final Report, PHC(1)88, Honolulu, Hawaii, SMSA), 1972; and Summary Tape Files 1-A and 3-A, 1980; and State of Hawaii, Department of Planning and Economic Development, Community Profiles for Hawaii, 1973; and The Geographic Distribution of Hawaii's Racial Groups, 1970 and 1980 (SR #132), 1982.

Exhibit C

Exhibit E

KUKIO BEACH RESORT
Assumptions for On-Resort Population Projections

Facility and occupational types	Percentage of distribution(1)	Occupancy	Average party size(2)
Hotel units	100%	80%	1.9
Condominium units:			
Full-time residents	15	95	2.5
Part-time residents	20	25	2.5
Visitors	65	50	2.1
Single-family units:			
Full-time units	25	95	2.8
Part-time units	75	25	2.8

(1) Distribution of uses within facility type.
(2) Occupied units only.

Sources: Based on interviews with resort operators and brokers at similar first-class resort developments and Hawaii Visitors Bureau, Profiles: The Resort Condominium Market and Profiles: The Resort Hotel Market, 1985.

Exhibit D

KUKIO BEACH RESORT
Average Annual Labor Force Estimates
of the County of Hawaii
1980 and 1985

	1980	1985	Average annual percent change 1980-1985
Civilian labor force	41,930	50,600	3.8 %
Percent unemployed	6.3%	8.5%	.4
Nonagricultural wage and salary jobs by industry:			
Construction	2,000	1,300	(8.3)
Manufacturing	2,900	2,800	(.7)
Transportation, communications and utilities	1,900	2,000	1.0
Trade:	7,000	9,100	5.4
Wholesale (1980 and 1985, 1,400)			
Retail (1980, 5,700; 1985, 7,600; 5.9%)			
Finance, insurance and real estate	1,200	1,500	4.6
Services and miscellaneous:	7,000	8,400	3.7
Hotels (1980, 3,100; 1985, 3,600; 3.0%)			
Government	6,600	6,900	.9
Total	28,500	32,000	2.3 %

Sources: State of Hawaii, Department of Labor and Industrial Relations, Labor Force Data Book, annually updated, and Labor Area News (February), 1986.



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Mr. Albert Lono Lyman
April 25, 1986
Page 2

Increasing variety of visitor destinations

West Hawaii will ultimately include a variety of resort destinations. This diversity will attract and better serve a broad range of visitors seeking new vacation experiences.

Until recently, the major visitor destination areas in West Hawaii were Mauna Kea, Kona Village, and Keaunohu Beach resorts. Each appealed to a specific visitor market segment. As a result, some segments were not being serviced.

Development at the Waikoloa Beach and Mauna Lani resorts have further stratified the visitor market, offering slightly different orientations targeted at a younger, upwardly mobile, more active segment of the visitor market which had not previously been fully serviced.

Evolving island image

Visitors to the State do not have a strong image of the island of Hawaii. As a result, the island is frequently the last choice for many visitors.

The image of Hawaii County has been improved by recent large-scale resort development. West Hawaii, particularly South Kohala and North Kona, is perceived to offer the newest, most attractive resort facilities in the most dramatic settings.

Vacation travel to Hawaii County would increase as resort facilities on the island of Hawaii mature.

Increasing advertising and publicity

Advertising and publicity by individual hotels, resorts, and combined efforts by the Kona Visitors Association, Kohala Coast Resort Association, Hawaii County Research and Development Office, Hawaii Visitors Bureau, United Airlines, and others is anticipated to increase the visibility of Hawaii County as facilities are developed.

April 25, 1986

Mr. Thomas S. Witten, ASLD
Phillips, Brandt, Reddick,
and Associates
130 Merchant Street, Suite #1111
Honolulu, Hawaii 96813

Subject: Draft EIS for Kukio Beach Resort
North Kona, Hawaii

Dear Mr. Witten:

At your request, this letter responds to the Hawaii County Planning Department (Planning Department) comments covering the Hotel, Condominium and Single-Family Market Assessment in Appendix D of the Kukio Beach Resort Environmental Impact Statement. Our response is outlined under six specific areas of concern of the market assessment.

1 - Table II-C

The table compares historical data on the seasonality of visitors to the State of Hawaii.

2 - Exhibit II-J

Westbound arrivals to Hawaii County are projected to increase from 20% of total State arrivals in 1985 to 30% of total State arrivals by 2000. Over the same period, eastbound arrivals to the County are projected to increase from 5% to 9% of total State arrivals.

The increasing share of State arrivals to Hawaii County is based on the following considerations:

Robert J. Witten, LMA CPE
Thomas S. Witten, BREA ASA
Phillips, Brandt, Reddick,
and Associates
Craig T. Smith, ASA
Paul D. Graham, ASA
Paul D. Coe

Direct flights from the Mainland

In 1984, United Airlines began direct flights from San Francisco to Kona. Although no statistics have been compiled, these direct flights are considered to have a favorable impact on visitor arrivals to the island.

The number of direct mainland flights to the island is projected to increase as the island visitor market grows.

Growing number of repeat visitors

First-time visitors to the State typically spend the majority of their time on Oahu and tend to take short day trips to the neighbor islands.

Having visited Oahu, repeat visitors tend to spend a greater amount of time on selected neighbor islands. Maui has been a popular island for repeat visitors.

Each time they return, these repeat visitors are challenged to find new vacation experiences. Ultimately, these repeat visitors will visit the island of Hawaii.

In addition, continued resort development on Hawaii would provide the facilities to encourage repeat visitors.

Deregulation of Japanese overseas air service

Recent deregulation of Japanese overseas air service is expected to increase competition among Japanese air carriers for air service between Japan and the United States. All Nippon Airways and Toa Domestic Airlines, Japan's largest and third largest domestic air carriers are seeking rights to air routes to the State of Hawaii. The increase in competition between air carriers is anticipated to result in lower airfares and increased air travel.

Deregulation will also increase competition for packaged tours, as strong affiliation with the major air carrier will no longer be as important as it once was.

The State of Hawaii and Hawaii County will benefit from the deregulation because air travel and vacation packages from Japan will become more competitive and make vacation travel to Hawaii more affordable.

These considerations support the position that the share of State visitors traveling to Hawaii County will increase during the next 15 to 20 years.

3 - Table III-I and Accompanying Narrative

Hawaii County has not yet established itself as a major destination alternative. Until recently, additions to the visitor plant have occurred on isolated sites, lacked integrated master plans, and have not provided the necessary amenities and facilities to promote longer visitor stays. As a result, average length of stay on the island has increased by only 1.4% per year since 1970.

The established resorts in West Maui and the available resort sites in West Hawaii share similar locational and physical attributes, such as prime ocean frontage, sunny weather, dry climate, and unique surroundings, which are conducive to successful resort development. West Hawaii will also offer golf, tennis, a variety of dining and shopping opportunities and extensive water sports and equestrian attractions, all of which would encourage longer lengths of stay.

Between 1970 and 1984, the number of visitor rooms on Maui increased at a compound rate of 11% per year, from 2,720 rooms to 13,336 rooms. Most of these facilities were in or near to destination resorts. During the same period, the average length of stay increased at a compound rate of about 5% per year, from 2.97 days to 6.47 days. The increased length of stay is attributed to the development of a variety of resort facilities.

As its facilities develop, Hawaii County is also anticipated to emerge as a major destination area capable of attracting an increasing number of visitors for increasing lengths of stay. A growing number of visitors would be expected to spend a larger portion of their vacation on the island.

Hawaii County's average nights of stay is projected to increase from 3.0 in 1985 to 5.0 by 2005. In comparison, this represents

an increase of about 2.6% per year compounded annually, substantially less than the rate of increase experienced on Maui.

Interisland travel by State residents is affected by many of the same factors that influence neighbor island travel by visitors to the State. Just as Maui is now a popular destination for State and particularly Oahu residents, facility and amenity development on the island of Hawaii is anticipated to result in increasing visits by State residents. Thus, State residents seeking hotel accommodations on the island are anticipated to increase at a slightly higher rate than the rate of resident population growth projected for the State by the Department of Planning and Economic Development.

4 - Present and Projected Market Support

Comments relating to present and projected market support are discussed under the following subheadings.

Condominium and hotel room demand

To project the demand for hotel units on the island of Hawaii, a distinction was made between the demand for hotel rooms and condominium units.

The HWB counted 5,232 hotel and 2,279 condominium units on the island of Hawaii as of June 1985, as shown in Exhibit III-B. Occupancy rates for hotel units on the island are estimated to have averaged between 60% and 65% during the year, and between 35% and 40% for condominium units in visitor rental pools, based on the information shown in Exhibits III-E and III-F and discussions with representatives of resort condominium rental agencies. Thus, the hotel and condominium shares of the market for overnight accommodations was estimated as follows:

Type of unit	Number of units	Percent occupancy	Estimated occupied units	Percent distribution
Hotel	5,232	60% to 65%	3,300	79%
Condominium	2,279	35% to 40%	900	21%
Total	7,511	55% to 60% 1/	4,200	100%

As the island's visitor industry matures and more repeat visitors begin to seek less costly and more spacious condominium accommodations, hotels are expected to account for a smaller share of total demand. Hotel accommodations are projected to capture only 70% of commercial room demand by 2005, as shown in Exhibit III-J.

Visitor accommodation market share

Separation of market share for visitor accommodations by hotel and condominium use on a resort or regional basis is not currently available. Therefore, resort or regional demand for hotel and condominium units was assumed to be proportionate to island-wide demand. About 80% of the island-wide demand for visitor accommodations was estimated to be served by hotel rooms, the remaining 20% by condominium units.

1/ Actual 1984 average for island was 56%, first six months of 1985 were 60% based on monthly reports prepared by the Hawaii Visitors Bureau.

Mr. Albert Lono Lyman
April 25, 1986
Page 7

Market shares for Kaupulehu and SeaMounttain

The Kaupulehu site has received a general plan reclassification to resort but has not yet received the necessary State Land Use reclassification. Based on projected visitor arrivals, demand for visitor accommodations and market orientation, hotel development at Kaupulehu is not considered to significantly impact the projected market share for hotel development at Kukio Beach Resort.

The market share for Hilo/Ka'u/Volcano area, estimated at 20% in 1985, includes the existing resort development at SeaMounttain.

Impact of full development at existing resorts

Mauna Kea, Mauna Lanai and Waikoloa resorts are expected to increase their market share as additional facilities are developed and repeat clientele established for each. Due to their luxury market orientation, the hotel facilities at these resorts are not anticipated to compete directly with the first-class hotel development on the island.

5 - Table IV-H

Table IV-H presents total condominium sales by selected resorts for both new and resale activity on the islands of Hawaii and Maui.

6 - Table V-D

Table V-D illustrates the original sales rate for single-family subdivisions in selected Hawaii resorts.

Subdivisions included in Table V-D were selected on the basis of their similarities to the proposed subdivision development at Kukio Beach Resort in terms of location, physical characteristics, and market orientation.

Keauhou Subdivision and Keauhou Estates were considered the only two comparable subdivisions on the island. Waikoloa Village and the Fairways at Mauna Kea were considered dissimilar in terms of

Mr. Albert Lono Lyman
April 25, 1986
Page 8


physical characteristics and market orientation and were excluded from the tabulation.

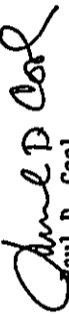
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We appreciate the opportunity to address these concerns relating to the market assessment for development at the proposed Kukio Beach Resort. Please call us if we can be of further assistance.

Very truly yours,

JOHN CHILD & COMPANY, INC.


Karen Char, MAI
Executive Vice President


Paul D. Cool
Appraiser

cc: Mr. Carl Carlson

12-82

12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32

Phillips Brandt Reddick

May 7, 1986

Ms. Patricia Engelhard, Director
Department of Parks and Recreation
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

SUBJECT: DRAFT EIS FOR KUKIO BEACH RESORT
NORTH KONA, HAWAII

Dear Ms. Engelhard:


Thank you for the copy of your letter of 2 April 1986 to Mr. A. Lono Lyman, Director of the Planning Department, County of Hawaii. We have reviewed your letter and offer the following response.

With regard to proposed public access to the shoreline, the Kukio Beach Resort plans provide for the enhancement of the shoreline area and related recreational resources. Public access to the shoreline will be provided through a specified public right-of-way to be determined in conjunction with detailed plans for hotel sites and adjacent land owners and the Special Management Area permits process. As the planning advances for the subject project, we will review detailed plans for shoreline access with your department.

Thank you for your comment. Your letter and this response will be appended to the Final EIS.

Sincerely,

PHILLIPS BRANDT REDDICK


Thomas S. Witten, ASLA
Principal

cc: Mr. Albert Lono Lyman, Director
County of Hawaii Planning Department

Mr. Carl Carlson, Manager
Kuehne Ranch

OEQC

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Financial Plaza of the Pacific • 130 Merchant Street, Suite 1111 • Honolulu, Hawaii 96813 • Tel. (808) 531-5631

Phillips Brandt Reddick

May 7, 1986

Mr. Nelson Ho
Moku Loa Conservation Committee
Moku Loa Group - Hawaii Chapter, Sierra Club
P. O. Box 1137
Hilo, Hawaii 96720

SUBJECT: DRAFT EIS FOR KUKIO BEACH RESORT
NORTH KONA, HAWAII

Dear Mr. Ho:

Mr. Albert Iono Lyman, Planning Director, County of Hawaii, transmitted a copy of your letter regarding the subject Draft EIS for our response.

Copies of the Draft EIS (DEIS) were distributed for agency and public review by the Office of Environmental Quality Control on March 8 with several extra copies on file at the County Planning Department for public review in addition to five libraries on Hawaii including two in the Hilo area. It was unfortunate that you were unable to review a copy of the Draft EIS prior to submitting comments since the majority of your comments are addressed in the DEIS.

Where specific responses were necessary to address your concerns, we have so provided as follows:

1. Anchialine Ponds: A pond management plan will be prepared in conjunction with the U.S. Fish and Wildlife Service to address the management concerns of potential impacts on the ponds from surrounding uses and activities. Maintenance of pond health will require sensitive management of developed areas which affect the groundwater flow into the ponds.
2. Water Quality Certification: No discharges are planned for the coastal waters and thus the Clean Water Act, Section 401 of water quality certification process would not be required.

Mr. Nelson Ho
DEIS FOR KUKIO BEACH RESORT
May 7, 1986
Page 2


3. Archaeological/Historical Concerns: Refer to Section 3.8 of the Draft EIS and Appendix B - Full Archaeological Reconnaissance Survey for complete discussion.
4. Mauka-Hakai Access: Some significant archaeological/historical sites or endemic trees on the property will be impacted by the road access and other site development activities. The necessary mitigative measures as identified in Section 3.8 of the DEIS will be carried out to minimize these impacts.
5. Traffic Impacts: Estimates of project related trip generation were based on historical traffic counts on entrance roads to various South Kohala resorts and summarized in Table 3-2 of the DEIS. The projected impacts on Queen Kaahumanu Highway and potential air quality degradation are addressed in Section 3.0 of the DEIS.
6. Hydrologic Impacts: Section 3.4 of the DEIS identifies the water requirements for the project, the alternative sources of water, and assesses the potential groundwater impacts.
7. Soil for Golf Course: It is estimated that 65,000 cubic yards of soil will be needed for the construction of the golf course. The soil would come from various locations on the island of Hawaii at existing or future borrow pits. The potential for siltation and dust drift will be minimal with construction practices to be in compliance with County of Hawaii grading standards and State Department of Health regulations.
8. Habitat for Hawaiian Stilt: Two Hawaiian stilts have been periodically seen at the project site. The birds' primary habitat is in and around that of the anchialine ponds and associated vegetation. The pond management plan will include provisions to minimize the impact to the birds' habitat through the provision of buffer areas and additional landscaping.
9. Public Access Concerns: A public right-of-way will be provided within the project area at a yet to be specified location in conjunction with more detailed planning with adjacent land owners. Specific details of the point of access and public right-of-way will be determined in conjunction with a Special Management Area Permit Application.

Mr. Nelson Ho
DEIS FOR KUKIO BEACH RESORT
May 7, 1986
Page 3

Thank you for your comments. Your letter and this response will
be appended to the Final EIS.

Sincerely,

PHILIPS BRANDT REDDICK


Thomas S. Hitten, ASLA
Principal

cc: Mr. Albert Iono Lyman, Director
Planning Department

Mr. Carl Carlson, Manager
Huehue Ranch
OEQC

Daniel K. Carpenter
Mayor

Eugene N. Tivnanak
Managing Director



DEPARTMENT OF PARKS & RECREATION
COUNTY OF HAWAII

Patricia G. Engelhard
Director

Ronald Okamura
Deputy Director

APR 4 1986

PLPS DR.

April 2, 1986

Mr. A. Lono Lyman, Director
Planning Department
County of Hawaii
Hilo, HI 96720

Subject: Kukio Beach Resort, North Kona

We have reviewed the project's EIS and have no adverse comments to offer.

With regard to proposed public access to the shoreline, we would appreciate the opportunity to review this proposal when detailed plans are developed.

Thank you for the opportunity to review the report.

Patricia Engelhard
Patricia Engelhard
Director

PE:CH:al

cc: Mr. Carl Carlson
Mr. Thomas Witten

• 25 ALUPUN STREET • HILLO, HAWAII 96720 • TELEPHONE 961-8311

Phillips Brandt Reddick

May 7, 1986

Ms. Patricia Engelhard, Director
Department of Parks and Recreation
County of Hawaii
25 Alupuni Street
Hilo, Hawaii 96720

SUBJECT: DRAFT EIS FOR KUKIO BEACH RESORT
NORTH KONA, HAWAII

Dear Ms. Engelhard:

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Thank you for your comment. Your letter and this response will be appended to the Final EIS.

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PHILLIPS BRANDT REDDICK

Phillips Brandt Reddick
Thomas S. Witten, ASLA
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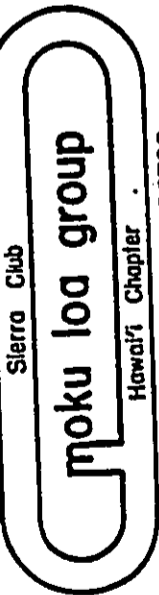
cc: Mr. Albert Lono Lyman, Director
County of Hawaii Planning Department

Mr. Carl Carlson, Manager
Huehue Ranch

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Honolulu • Irvine • San Francisco • Denver

12-86



P.O. Box 1137, Hilo, HI 96720
APRIL 9, 1986

COMMENTS ON DRAFT EIS FOR THE KUKIO BEACH RESORT, NORTH KONA, HI
HUEHUDE RANCH/COUNTY OF HAWAII, PLANNING DEPT.

As of 4/4/86 there was no Draft EIS at the County of Hawaii Bldg. to review. As a result our comments have been drafted with only general knowledge of the project and are a few days late.

Anchialine Pond Concerns
There should be a buffer zone around the pond complex with no activity permitted within it. Around the pond complex, attempts should be made to incorporate endemic plant species. How is it planned to keep the ponds clean?

Water Quality Certification Process
Mentioned in the OEQC Bulletin are impacts to the coastal water quality, will this invoke the Clean Water Act, Section 401, the Water Quality Certification process?

Archeological/Historical concerns
Please detail if any of the 69 archeological/historical sites are planned to be destroyed and discuss what efforts will be made to study and document them.

Mauka-Makai Access
Sierra Club's concern is that the road access not destroy any significant archeological/historic sites, and not impact any important stands of endemic trees on the property.

Traffic impacts
How was it determined that the project would generate 23,000 total vehicle trips per day? What is the anticipated total vehicle impact on the Queen Kaahumanu Hwy given the existing and planned resort and residential developments? Please give details of each project's anticipated contribution to the traffic load. What air quality degradation will there be as a result of the added traffic?

Hydrologic impacts
What is the anticipated number of gallons of water that will be used by the development? What potential groundwater impacts will there be? What is the source of water for this project?

Soil for Golf Course
How many cubic yards of material will be needed for the construction of the course? Where is the soil for the courses to come from? What is the potential for siltation and dust drift during the construction and operational phases? How many other golf courses exist or are planned for the Kona Coast?

Habitat of Hawaiian Stilt
Sightings of this protected endemic bird have occurred at this location. What mitigation measures will be taken to alleviate the impact of this project on the bird's habitat?

Public Access Concerns
Please detail the access policy and plans. How many parking spaces will be made available for public use?

Thank you for the opportunity to comment on this land use change. We look forward to review the Draft EIS and comment further.

Nelson Ho *NHO*
For Moku Loa Conservation Comm.
Hawaii Chapter, Sierra Club

Mr. Nelson Ho
DEIS FOR KUKIO BEACH RESORT
May 7, 1986
Page 2

Phillips Brandt Reddick

May 7, 1986

Mr. Nelson Ho
Moku Loa Conservation Committee
Moku Loa Group - Hawaii Chapter, Sierra Club
P. O. Box 1137
Hilo, Hawaii 96720

SUBJECT: DRAFT EIS FOR KUKIO BEACH RESORT
NORTH KONA, HAWAII

Dear Mr. Ho:

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areas which affect the groundwater flow into the ponds.
2. Water Quality Certification: No discharges are planned for
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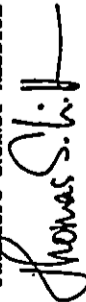
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Mr. Nelson Ho
DEIS FOR KUKIO BEACH RESORT
May 7, 1986
Page 3

Thank you for your comments. Your letter and this response will
be appended to the Final EIS.

Sincerely,

PHILIPS BRANDT REDDICK


Thomas S. Witten, ASLA
Principal

cc: Mr. Albert Lono Lyman, Director
Planning Department

Mr. Carl Carlson, Manager
Huehue Ranch

OEQC

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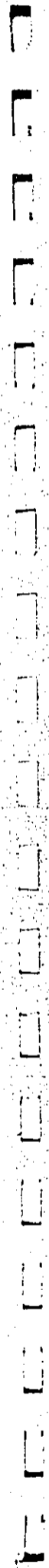
"Personal Communications" with:

Schools/Education: State of Hawaii, Dept. of Education,
548-2472 Demographics Dept., Ed Matsushigi
737-4743 Facilities Dept., Howard Lau

Transportation: State of Hawaii, Dept. of Transportation,
548-3194 Planning Dept. Caroline Kuwahara

Solid Waste Disposal: County Sewer & Sanitation Bureau
961-8338 Harold Sugiyama
Galen Kuba

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APPENDICES

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APPENDICES

APPENDIX A: ASSESSMENT OF FLORA

ASSESSMENT OF FLORA
KUKI'O I, NORTH KONA, HAWAI'I

Prepared for: Phillips, Brandt, Reddick
& Assoc. (Hawaii), Inc.
Prepared by: Char & Associates, Honolulu
November 1984

INTRODUCTION

The study site is located in North Kona on the island of Hawai'i. Kuli'o I covers a total of 666.4 acres; 358.0 acres lie above the Queen Ka'ahumanu Highway (mauka portion). 308.4 acres lie below the highway (makai portion). Elevation runs from sea-level to 600 ft.---upper limits of mauka boundary just above Muhe'enui cinder cone. The land is currently designated Conservation by the State Land Use Commission and the owner, Huehue Ranch, is proposing to amend the County General Plan to allow resort development.

A general assessment of the flora on the study site was made on October 24, 1984. The survey employed two botanists; a total of 2-man days was expended. A walk-through survey method was used. Notes were made on the vegetation types present and plants which could not be positively identified in the field were collected for later determination in the herbarium and laboratory.

The primary objectives of the assessment were to describe the major vegetation types present, to search for rare, threatened or endangered native species within the study site, and to compile a checklist of the species present.

The species found during the course of this survey are indicative of the season and conditions under which this survey was taken. Other surveys taken at different times will no doubt yield slight variations in the species present.

RESULTS

Most of the study site consists of 'a'a lava with very sparse plant cover. On the Muhe'enui cinder cone the plant cover is very dense but consists almost entirely of fountain grass, an introduced species. An almost impenetrable thicket of kiawe can be found along the coast. Behind this thicket and the 'a'a lava fields are several slightly brackish ponds which harbor a number of wetland species.

Four vegetation types are recognized within the study site and are discussed below.

1. Fountain Grass with Scattered Lama Trees

This vegetation type is found in the mauka portion of the study site. It begins just above the powerline and extends upslope past Muhe'enui cinder cone. Fountain grass (Pennisetum setaceum) covers roughly 85 percent of the lava flows. Native lama trees (Diospyros ferrea ssp. sandwicensis), 3 to 5 m tall, are scattered throughout the fountain grass. The trees are gnarled and appear to be quite old. Other natives found in this vegetation type include pua-kala (Argemone glauca), 'a'ali'i (Dodonaea sandwicensis), pill grass (Heteropogon contortus), and 'ilima (Sida fallax). Areas with rocky outcroppings support a number of shrubby species such as indigo (Indigofera suffruticosa), 'uhaloa

(Walteria indica var. americana) and some of the native species mentioned above.

Because Muke'enui cinder cone is composed almost entirely of cinder it supports almost a 100 per cent cover of fountain grass; bare areas are rare. Koa-haole (Leucaena leucocephala) is only found on or around the cinder cone. Shrubs of indigo are also more abundant on the cinder cone.

2. Open Scrub on Lava

This vegetation type is found in the area below the powerline and extends downslope towards the ocean. The lava is primarily 'a with a few pahoehoe flows. Vegetation is very sparse; cover may vary from 5 to 10 percent. Most of the vegetation appears as scattered pockets of plants over the rough terrain. Although introduced species such as fountain grass, indigo, and natal redtop (Rhynchelytrum repens) are the most frequently found species on these lava fields, closer examination of these lava fields reveals a few plants of the native nehe (Lipochaeta lavarum) and quite an abundance of 'ihi (Portulaca cyanosperma).

Along the margins of the paved road, which runs the length of the study site, the vegetation is denser. Desmodium intortum and fountain grass are abundant. The road actually increases soil moisture by channeling runoff to its sides.

3. Pond Fringe

Elliott and Hall (1977) did not examine the ponds on the study site although they did survey the nearby Makalawena and Kiholo ponds.

The pond fringe area within the study site surrounds several ponds of varying sizes. Water varies from fresh to slightly brackish. Piles of rocks appear in or along the sides of some ponds and may be the result of earlier pond clearing efforts. The ponds have a thin layer of brownish-orange organic muck and sand. This type of pond supports two aquatic species. Chara, a green algae, is thread-like with whorls of branches arising at intervals along its stem. Growing among the Chara is a grass-like herb with slender whitish stems. This is the sea tassel or widgeon grass (Ruppia maritima var. pacifica). Both of these plants are widely distributed throughout the wetlands of the world (Stemmermann 1981) probably due to migratory waterfowl which feed on them.

On the makai margins of the ponds a thick growth of 'uki or the native sawgrass (Cladium leptostachyum) makes botanizing difficult. Behind the 'uki is dense shrub and tree growth composed largely of coconut (Cocos nucifera), plucheas (Pluchea odorata), and milo (Thespesia populnea). A few plants of hala (Pandanus odoratissimus) and the native lo'ulu palm (Pritchardia affinis) are found here. This lo'ulu species is endemic to the island of Hawai'i and scattered individuals or colonies are found throughout the Kona Coast from sea-level to 2,000 ft. elevation (Hodel 1980). The lo'ulu palms existing today are perhaps the remnant populations of plants cultivated by the Hawaiians. Many of these plants are found growing around brackish water pools.

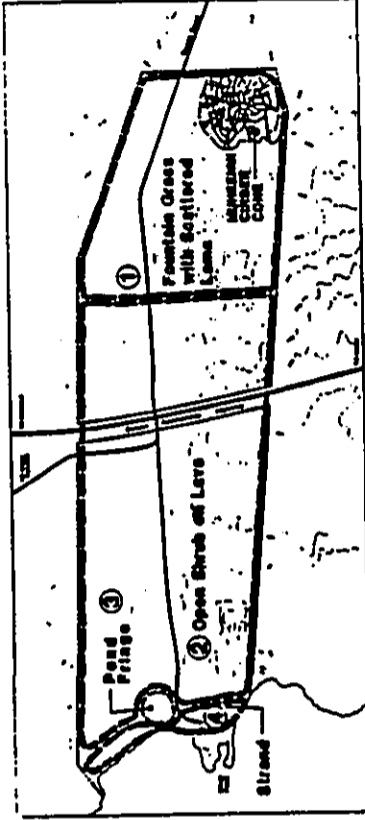
4. Strand

The strand or coastal vegetation is subject to salt spray and wind exposure. As a result it is usually low growing, forming mats or, if further inland, forming low, windswept thickets.

On the rocky portions of the strand near Kikaua Point, vegetation consists of mats of 'akulikuli (Sesuvium portulacastrum) and 'ohelo-kai (Lycium sandwicense). On the sandy areas of the strand along Kuki'o Bay large areas are covered by the pohuehue vine (Ipomoea brasiliensis). A few

orange patches of the kauna'oa vine (Cuscuta sandwichiana) as well as several shrubs such as plucheas and naupaka (Scaevola taccada) can also be found here.

Bordering the sandy and rocky areas is a dense thicket of kiawe (Prosopis pallida), 2 to 5 m tall. Ground cover under the thicket is usually sparse, although in low-lying areas where there is water seepage water hyssop (Bacopa monnieri) may form rather large patches. A few sprawling naupaka and plucheas shrubs as well as and coconut trees are also occasionally seen in the kiawe thicket.



VEGETATIVE ZONES

SUMMARY AND RECOMMENDATIONS

None of the plant species encountered are considered threatened or endangered. Development of the areas with fountain grass and the open lava fields should have a minimal impact on the total

island populations of the species present. Most of the plants are weedy introduced species; the few native species present are found throughout the general area.

The native plants found around the ponds and along the coast are not threatened or endangered species. However, a minimal amount of physical alteration should be considered for these areas especially the wetlands. Areas with wetland vegetation have been rapidly diminishing in the Hawaiian Islands. Physical alteration would also require an SMA permit for the coastal area and Corps of Engineers approval for the wetlands.

Whenever possible native plants such as lo'ulu palms, lama trees, and 'i'iima and nehe shrubs should be employed in the landscaping. These plants are adapted to the environmental conditions of the study area and would require less maintenance, less water, and less soil than the more commonly used introduced landscape plants; they would be cheaper to maintain in the long run.

SPECIES CHECKLIST

Three groups of plants are recognized---Algae (fresh water algae), Monocotyledonae (flowering plants), and Dicotyledonae (flowering plants). Families of plants are listed alphabetically within these three groups. Genera and species are also alphabetically arranged. Names of flowering plants follow St. John (1973), except where more commonly accepted names are used. Hawaiian names used in the checklist follow St. John (1973) or Porter (1972).

For each species the following information is provided:

1. Scientific name with author citation.
2. Common or Hawaiian name, when known.
3. Biogeographic status of each species:
E = endemic = native to the Hawaiian Islands only, not occurring naturally elsewhere.
I = indigenous = native to the Hawaiian Islands and also to one or more geographic areas.
P = Polynesian introduction = plants brought by the Polynesians prior to Cook's discovery of the islands.
X = exotic or introduced = not native to the Hawaiian Islands; brought here by man, intentionally or unintentionally.

4. Vegetation types

FL = fountain grass with scattered lama trees
os = open scrub on lava
W = wetlands
S = strand

Taxa	Common Name	Status	Vegetation type(s)	var. zoharyi Deg. & Deg. Matapilo, pua-piilo Gynandropsis gynandra (L.) Briq.	African spider flower, honohina	E	os
DICOTYLEDONAE							
AIZOACEAE							
Sesuvium portulacastrum L.	'Akuliku'i	I	S, W		X		S
CARYOPHYLLACEAE							
Sagina sp.		X	os, S				S
AMARANTHACEAE							
Amaranthus spinosus L.	Sprny amaranth, pakat-kuku	X	os		X		S
ANACARDIACEAE							
Schinus terebinthifolius Raddi	Christmas berry, wilelalki	X	S				FL, os
BORAGINACEAE							
Helfotropium curassavicum L.	Mena, kipukai	I	S				FL
Messerschmidia argentea (L.f.) Johnston	Tree helfotrope	X	S				FL
CACTACEAE							
Opuntia megacantha Salzm-Dyck	Prickly pear, panfni	X	FL				os
CAPPARIDACEAE							
Capparis sandwichtiana							E

Taxa	Common Name	Status	Vegetation type(s)						
<i>Pluchea odorata</i> (L.) Cass.	Pluchea	X	os, S, W						FL, os
<i>Tridax procumbens</i> L.	Coat buttons	X	FL						FL
CONVOLVULACEAE									
<i>Cuscuta sandwicensis</i>									
Choisy	Kauna'oa	E	S						
<i>Ipomoea brasiliensis</i> (L.) Sweet	Pohuehue	I	S						
<i>Ipomoea congesta</i> R. Br.	Koali-'avahia	I	FL						
<i>Stictocardia tiliifolia</i> (Desr.) Hallier f.	Stictocardia, pii-i-kai	X	W						
CUCURBITACEAE									
<i>Cucumis dipsaceus</i> Ehrenb. ex Spach	Wild cucumber	X	S						
<i>Momordica charantia</i> var. pavel Crantz	Balsam apple	X	FL						
EBENACEAE									
<i>Diospyros ferrea</i> ssp. sandwicensis (A. DC.) Fosb.	Lama	E	FL						
EUPHORBIACEAE									
<i>Euphorbia glomerifera</i> (Millsp.) L.C. Wheeler		X	os						
<i>Euphorbia hirta</i> L.	Garden spurge.								
<i>Ricinus communis</i> L.									
	koko-hahiki	X							FL, os
	Castor bean, kofi	X							FL
GOODENIACEAE									
<i>Scaevola taccada</i> (Gaertn.) Roxb.	Maupaka-kahakai	I	S						
LABIATAE									
<i>Hyptis pectinata</i> (L.) Poit.	Comb hyptis	X	FL						
LEGUMINOSAE									
<i>Cassia teschenaultiana</i> DC.	Partridge pea, lauki	X	os						
<i>Crotalaria pallida</i> Aiton	Rattlebox	X	os						
<i>Desmodium intortum</i> (Mill.) Urban		X	FL, os						
<i>Indigofera suffruticosa</i> Mill.	Indigo, 'iniko	X	FL, os						
<i>Leucaena leucocephala</i> (Lam.) de Wit	Koa-huole, ekoa	X	FL						
<i>Prosopis pallida</i> (Humb. & Bonpl. ex Willd.) HBK	Algaroba, kiawe	X	FL, os, S						

Taxa Common Name Status Vegetation type(s)

MALVACEAE
Malvastrum coromandelianum
(L.) Garcke False mallow, hauuof X FL
Sida fallax Walp. 'Iiima I FL, os
Thespesia populnea (L.)
Soland. ex Correa Hilo P W

NYCTAGINACEAE
Boerhavia coccinea MILL. X S

PAPAVERACEAE
Argemone glauca Pope Pua-kala E FL

PASSIFLORACEAE
Passiflora foetida L. Scarlet-fruited
passion flower,
pohapoaha X FL

PORTULACACEAE
Portulaca cyanosperma
Egler 'Ihi E os, S

PROTEACEAE
Grevillea robusta
A. Cunn. Silk oak, 'oke-kiiika X FL, os

RUBIACEAE
Hedyotis corymbosa

(L.) Lam.
Morinda citrifolia L. Honi X os
SAPINDACEAE
Dodonaea sandwicensis
Sherff A'ai'i'i E os

SCROPHULARIACEAE
Bacopa monnifera (L.)
Wettst. Water hyssop I W

SOLANACEAE
Lycium sandwicense Gray 'Ohele-kai, 'ae'ae I S
Lycopersicon
pimpinellifolium Mill. Current tomato,
'ohi'a-ma'kanahale X S

STERCULIACEAE
Waltheria indica var.
americana (L.) R. Br.
ex Hosaka Hi'aloa, 'utaloa I FL, os, S

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APPENDIX B: FULL ARCHAEOLOGICAL RECONNAISSANCE SURVEY

PAUL H. ROSENDAHL, Ph.D., Inc.
Consulting Archaeologist

Report 167-090385

**FULL ARCHAEOLOGICAL RECONNAISSANCE SURVEY
KUKIO RESORT DEVELOPMENT PROJECT AREA**

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

October 1985

305 Mohouli Street • Hilo, Hawaii 96720 • (808) 969-1763 or 966-8038

PAUL H. ROSENDAHL, Ph.D., Inc.
Consulting Archaeologist

Report 167-090385

167-090385

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**FULL ARCHAEOLOGICAL RECONNAISSANCE SURVEY
KUKIO ENSOY DEVELOPMENT PROJECT AREA**

Land of Kukio Inc.
North Kona, Island of Hawaii
(TKK:3-7-2-04:5,16)

by
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Field Archaeologist
and
Paul H. Rosendahl, Ph.D.
Principal Archaeologist

Prepared for
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Financial Plaza of the Pacific
130 Marchant Street, Suite 1111
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and
Euehue Ranch
North Kona, Hawaii

October 1985

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INTRODUCTION

BACKGROUND

This report presents the results of the full reconnaissance survey of the Kukio Resort development project area in the Land of Kukio lat., North Kona, Island of Hawaii. The full reconnaissance survey was carried out by Paul H. Rosendahl, Ph.D., Inc. (PHRI) at the request of Phillips, Brandt, Reddick & Associates for their client, Huehue Ranch. This survey was conducted to determine the nature and extent of archaeological remains on the property for the purpose of development planning.

Reconnaissance survey field work was carried out on August 14 and 19-23, 1985, by a four-man field team under the overall direction of Principal Investigator Dr. Paul H. Rosendahl and the on-site supervision of Field Archaeologist Alan T. Walker. Personnel included PHRI Field Archaeologists Rodney T. Fujii, Richard A.K. Gilman, and Roy Pua-Kaipo. Field inspections by Dr. Rosendahl were made on August 14 and 23, 1985. He was accompanied on August 23, 1985 by PHRI Senior Archaeologist Dr. Alan E. Haun. Approximately 168 man-hours of labor were expended in conducting the full reconnaissance survey field work.

Upon completion of field work, Dr. Rosendahl and Mr. Walker met with Ms. Virginia Goldstein--staff planner and historic sites specialist in the Hawaii County Planning Department, to discuss field findings and preliminary conclusions, including tentative evaluations and recommendations. A preliminary report summarizing this information was submitted to Mr. Tom Witten of Phillips, Brandt, Reddick & Associates and to Huehue Ranch in September (Walker and Rosendahl 1985). The present report comprises the final report for the full reconnaissance survey project, and includes recommendations for appropriate further intensive archaeological survey work to be undertaken as part of the Kukio Resort development project.

SCOPE OF WORK

The basic purpose of an archaeological reconnaissance survey is to identify--to discover and locate on available maps--sites or features of possible archaeological significance. A reconnaissance survey is simply a pedestrian, or walk-through, survey--extensive rather than intensive in scope--conducted to determine the presence or absence of archaeological resources within a specified project area. Reconnaissance survey indicates both the general nature and variety of archaeological remains present, and the general distribution and density of such remains. A reconnaissance survey permits a preliminary evaluation of the archaeological resources, and facilitates formulation of realistic recommendations and estimates for such further archaeological work as might be necessary or appropriate. Such further work could include intensive survey--detailed

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recording of sites and features, and selected test excavations; and possibly subsequent mitigation--salvage research excavations. Interpretive planning and development, and/or preservation of sites and features with significant scientific research, interpretive, and/or cultural values.

The basic objective of the full reconnaissance survey was to identify and evaluate sites and features of potential archaeological significance present within the Kukio Resort development project area. Based on the findings of the earlier November 1984 preliminary reconnaissance survey (Goswami 1985) and subsequent discussion of those findings with Mr. Goldstein, the following specific tasks were determined to constitute an adequate scope of work for the full reconnaissance survey:

1. Conduct a 100% coverage aerial reconnaissance (helicopter) of the entire 675 acre project area, with special emphasis upon (a) following out foot trails and plotting them onto available maps and/or aerial photographs, (b) identifying sites adjacent to such trails and any other sites seen, and (c) identifying areas which were devoid of sites;
2. Conduct 100% coverage ground reconnaissance of the immediate coastal zone--an area of c. 80 acres, extending to approximately 1000 ft inland;
3. Conduct sample coverage ground reconnaissance of the remainder of the project area, principally utilizing 150 foot-wide transects along identified foot trails;
4. Conduct limited historical documentary research, with an emphasis on local informant sources; and
5. Analyze field and historical data, and prepare appropriate written reports.

Furthermore, Ms. Goldstein indicated the full reconnaissance survey be carried out in accordance with the standards for reconnaissance survey recommended by the Society for Hawaiian Archaeology (SHA).

In conjunction with the full reconnaissance survey work, preliminary historical documentary research was carried out by a qualified historical researcher (C. Silva, Appendix A). Local informant interviews were conducted by a local resident and undergraduate Anthropology student at the University of Hawaii-Hilo (M. Springer, Appendix B).

PROJECT AREA DESCRIPTION

The project area consists of two parcels totaling approximately 675 acres which includes Land Grant 2121 in the Land of Kukio Ist, North Kona District, Island of Hawaii (TKM:3-7-2-04:5,16) (Figure 1). The two par-

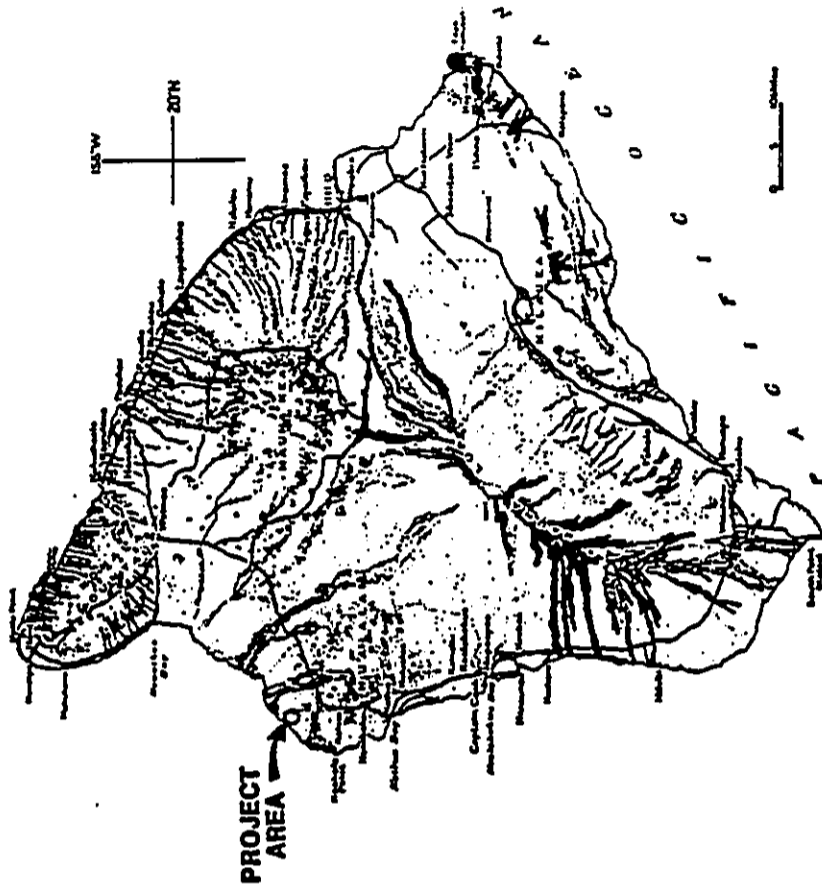


Figure 1. PROJECT LOCATION MAP.

Full Archaeological Reconnaissance Survey
Kukio Resort Development Project Area
Land of Kukio Ist, North Kona
Island of Hawaii (TKM:3-7-2-04:5,16)

PHNI Project 85-167 August 1985

(Map taken from Macdonald and Abbott 1970:288.)

cells are separated by the Queen Kaahumanu Highway, which cuts across the Land of Kukio 1st roughly along the 200-ft elevation contour, and divides the project area into a seaward parcel of c. 317 acres (Parcel 5) and a slightly larger inland parcel of c. 358 acres (Parcel 16). The project area overall extends about two miles (3.2 km) inland from the shore of Kukio Bay (Uluwevu Bay) to the prominent cinder cone of Mubenui, and varies in width from c. 0.4 miles (0.67 km) to 0.6 miles (0.98 km). Annual rainfall is estimated to range from about 10 in at the coast, to about 25 in at the inland limit (Armstrong 1973:57).

Situated on the lower slope of Hualalai Volcano, and rising from sea level to a maximum of c. 700 ft at the top of Mubenui, the project area is characterized by its generally barren and rugged, open terrain. With the exception of Mubenui, classified as cinderland (Sato et al. 1973), the land is almost entirely exposed rockland formed by the recent (post-Pleistocene) basaltic pahoehoe and 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.

The dominant vegetation covering most of the project area are introduced grasses, with scattered specimens of *kiawe* (*PROSOPIS JULIFLORA* [Rubb. and Bonpl. ex Willd.] HBK.) and *AGR-HUOLA* (*ACACIA NEUROSPHORA* [Lam.] de Wit) trees—both introduced species, the native tree *lama* (*DIOSPIROSA* [L.] var. *sandwicensis* [A. DC.] Forb.), and the native shrub, *ilima* (*Sida fallax* Walp.). The immediate coastal zone of the project area behind Kukio Bay has a dense stand of *kiawe* and *milo* (*IMPERATA TOPIALANA* L.) just inland of the beach, which supports a cover of *maunaka-kahakai* (*SCYRUS SERICEA* Vahl) and *bohobohu* (*INOCYBE PTEROCARPA* [L.] above the high water-line. The beach also has a grove of scattered coconut palms (*COSCOBESYLA FARA* L.). The central portion of the immediate coastal zone has a group of shallow anchialine ponds bordered by *hala* (*PANDANUS EDORATILANUS* L.f.), *kiawe* and *milo* trees, and various grasses and sedges.

PREVIOUS ARCHAEOLOGICAL WORK

Previous archaeological work conducted most recently within the present project area includes a preliminary archaeological reconnaissance survey of the Kukio Resort development project area conducted in November 1984 by PHAI for Phillips, Brandt, Reddick & Associates and Maunua Ranch (Rosenbuhl 1985). The primary objective of the preliminary reconnaissance survey was to provide a general assessment concerning (a) the presence or absence of sites or features of potential archaeological significance within the limits of the Kukio Resort development project area, and (b) the possible need for subsequent archaeological work that might be appropriate and/or required in order to obtain desired State and County development approvals.

Approximately 60 acres of the immediate coastal zone were inspected, in addition to approximately 25 acres in the more inland portion of Parcel 5, and approximately 20 acres in Parcel 16. Thirteen previously unidentified sites were recorded, in addition to 17 thirteen previously unidentified sites. The range of formal feature types 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 brackish ponds with internal structural modifications.

Based on the findings of the preliminary reconnaissance survey, it was determined that a full reconnaissance survey of the project area would be required by the Hawaii County Planning Department. Furthermore, it was indicated that any full reconnaissance survey should be carried out in accordance with the standards for reconnaissance level survey recommended by the Society for Hawaiian Archaeology. These standards are currently being used by the Hawaii County Planning Department as guidelines for the review and evaluation of archaeological reconnaissance survey reports submitted in conjunction with various development permit applications.

Archaeological field work within the Land of Kukio 1st prior to the November 1984 preliminary reconnaissance survey includes four survey projects conducted between 1930 and 1975. In 1930, John E. Reinecke recorded several sites along the shoreline of Kukio 1st while carrying out his survey of sites along the western coast of Hawaii Island for B.P. Bishop Museum (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 are sufficiently 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 (Zemry 1970). That inventory was based entirely on existing records in the Department of Anthropology, and did not involve any field work.

In July and August of 1970, Robert C. Menger 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 Malohe and Kukio for Maunua Ranch (Menger 1970). Concurrent historical background research for the project was done by Marion Kelly (1971). Menger's archaeological survey at Kukio covered the coastal portion of Parcel 5, from the shoreline to 4000 ft (1220 m) inland at most. Menger identified 24 sites and feature complexes within his survey area (Sites D21-1 through 24).

During the June-October 1970 surface survey of the Kailua-Kawaihae road corridor, done by the Parks Division of the State Department of Land

*B.P. Bishop Museum site designation system: all site numbers prefixed by 50-Ha-D21- (50-8 State of Hawaii, Ha-Island of Hawaii, D-North Kona District, 21-Land of Kukio)

and Natural Resources for the State Department of Transportation (Ching 1971), fourteen sites were identified in the inland portion of the 3000 ft-wide road corridor, in the area comprising the north corner of Parcel 16 (Ching 1971:77 [Map 16, Enlargement III]). The Queen Kamehameha Highway was subsequently constructed in the more seaward part of the road corridor, thus avoiding these sites, which were mainly foot trails and associated temporary habitation shelters.

Prior to the November 1984 FHRI survey (Kostendahl 1985), the most recent prior archaeological work within the project area was done late in 1975 by Ross H. Cordy during coastal survey and testing conducted as part of his dissertation research (Cordy 1978, 1981). He apparently recorded a single additional site at Kukio Bay, which he designated as Site D21-25. Cordy collected volcanic glass samples from the surfaces of previously identified Sites D21-2 and D21-12 for hydration ring dating (nine samples, reported range A.D. 1692-1899), and a few indigenous and historic artifacts from the surface of Site D21-12 (Cordy 1981:244,250).

Archaeological work conducted previously in the general vicinity of the project area includes recent reconnaissance surveys of shoreline areas in Ka'upulehu (Carter 1985, Komori 1981), and an earlier survey in Ka'upulehu and Makalavena by Soehren (1963).

SUMMARY OF PRELIMINARY HISTORICAL DOCUMENTARY RESEARCH

Preliminary historical documentary research (Appendix A) and preparation of regional notes from Kekaha; Kuli'o (Appendix B) were carried out by historical researchers Ms. Carol L. Silve and Ms. Hannah K. Springer respectively. Both reports are summarized here.

Included within both reports are historical background excerpts from Kelly (1971) relevant to Kekaha, an ancient North Kona land section, and the Land of Kukio situated within Kekaha. In general, Kelly (1971) contained very little information specific to Kukio.

A cursory study of Kekaha is presented in Silve's report to define properly the setting and basic historical background for the immediate vicinity of the project area. The Kekaha land section is traditionally described as barren and desolate, but also noted for its excellent inshore and offshore marine resources. Included are statements from active historian G. M. Kamahu describing the destruction in Kekaha undertaken by Kekaulike of Maui while fleeing Aiepaiaui of Hawaii, and the setting apart of Kekaha lands for the priestly class, specifically the Kaunahi and Nabalua lines of priesthood.

Specific material regarding the Kukio area of Kekaha includes mythological legends, land history, and cartographic sources. Two specific legends are "Maniowali", a story of love and courtship pertaining to specific geologic features, and "The Waters of Kama", describing the outcome of a local drought.

Kukio land history, based on available documentation, can be traced from an individual, Kinolau, who resided there in c. 1790, having obtained the land from Hikutos. Later, the ownership of released lands, which included Kukio, alternated between Kukini and Kamehameha III, but upon Kukini's death in 1844 and the eventual Great Māhela, Kukio lot and 2nd became government lands. No LCA awards or claims by native Hawaiians were recorded within the project area in either ahupua'a. A seaward portion of the land of Kukio lot was then purchased in 1855 and Grant 2121 was awarded the next year to Pupule. Interior Department reports indicate payment for this land continued until 1864, and that the land was utilized for pastures of horses and goats until c. 1875. Eventually, Luks Maguire (great grand-daughter of Kinolau) acquired Grant 2121, and upon her death in 1898 left Kukio, among other lands, to her husband, John A. Maguire. The Land of Kukio lot was retained by the heirs of J.A. Maguire until 1966, when it was sold.

Principal cartographic sources for Kukio are two State Survey Division maps, Reg. Map 1278 and 2035. Reg. Map 2035 is apparently comprised of Reg. Maps 1446, 1447 and 1448. Map 1278 shows two coastal-inland oriented trails leading from Olueveve/Olueveve Bay (Kukio Bay) past Puu Poopoomano. These two foot trails appear to correspond with Trails D21-7 and D21-23. Furthermore, both maps indicate a shoreline residence of Paepa (reported as Paaba in Kelly (1971)), in the area of Site Complex D21-12. Ceramic shards, portable shell remains, and a small terrace area on Site Complex D21-12 (Feature 3) are probably remnants of this house-site. Silve concluded that few readily accessible resources remained that could help present a fuller view of Kukio.

Regional notes from Kekaha; Kukio were prepared by Ms. Hannah K. Springer (Appendix B), a kumu'āina of Kona. Contained within her report are general background information pertaining to environment and subsistence strategies. Environmental background has notes on geology, climate, water resources, vegetation, and bird life. Subsistence background has notes on planting and fishing strategies.

Specific material regarding the Kukio area of Kekaha includes population reconstructions, land tenure, and local informant interview pertaining to access, use, concerns and considerations. Population reconstructions include those suggested by Cordy (1978) and taxpayer counts from 1837, 1839 and 1860 provided by Kelly (1971). The land tenure and history presented by Ms. Springer includes additional notes from files of the Kona Historical Society, and basically corresponds with the findings of Ms. Silve (Appendix A).

The local informant interviews provided informational insight regarding cultural history, lifeways, and values from c. 1900 to present. Included are detailed descriptions of coastal-inland movement along established foot trails (specifically D21-7, T-133, -136, and -141). The local informant interviews also specifically referred to the anchoring pond modifications (Site D21-24) and PALE WAI (breakwater, Site T-105) as pre-existing. Furthermore, the informant interviews referred to a burial cave(s) behind the beach (Sites D21-18, T-124), and suggested Site D21-8 functioned as a drift fence utilized in herding goats or donkeys.

Two major concerns were expressed in the local informant interviews concerning the burials and anchialine ponds. The possible need to disturb the burials is understood, but it was stressed the remains should stay in Kukuio and suggested that they be reinterred at the graveyard behind Kakaepa Bay in the Land of Kukuio 2nd. Regarding the anchialine ponds, concern was expressed for the continuity of the floral and faunal inhabitants. The leaves from the hala are utilized in weaving, and it was suggested that an appropriate community organization be contacted to tend and keep up the grove. Ms. Springer made a further recommendation that further ethnographic and archival work be conducted to determine a more complete history of land tenure and various genealogical associations.

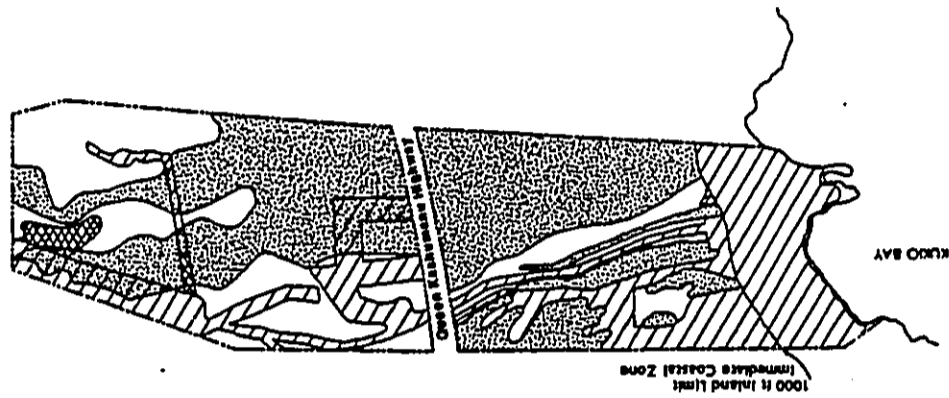
FIELD METHODS

On August 14, 1985, Dr. Rosenzweig and Mr. Walker, accompanied by Mr. Witten of Phillips, Brandt, Reddick & Associates, carried out 100% coverage aerial reconnaissance of the project area by means of a helicopter piloted by Mr. Jim Cardin of Kona Helicopters. After initially flying the boundaries of the project for orientation purposes, the entire project area was examined from the air utilizing a series of southeast to southwest sweeps (average altitude c. 50 ft above ground surface) in order to locate any archaeological features. In addition to the project area boundaries, previously identified foot trails were followed out to identify sites associated with such features. With the exception of the immediate coastal area, the aerial helicopter reconnaissance provided excellent 100% visibility of the open, virtually treeless lava terrain, and aided in identifying archaeological features. Utilizing this reconnaissance technique, no major surface structural features were overlooked. The aerial reconnaissance determined that c. 162 acres (45%) of c. 358 acres within Parcel 16 and c. 132 acres (64%) of the c. 237 acres within the inland portion of Parcel 5 were composed of very rough as lava lands, which were assessed as having a very low probability for containing any archaeological sites (Figure 2). The aerial reconnaissance also identified areas of high probability for containing archaeological sites (predominantly pahoehoe lava lands and sinkhole areas), thereby formulating ground reconnaissance tasks and priorities for sampling the project area.

The 100% ground reconnaissance survey field work in the immediate coastal area (shoreline to c. 1000 ft inland, estimated area c. 80 acres) was covered by a series of pedestrian sweeps. Distance between crew members varied from 10 m to 20 m, according to vegetation and terrain.

Field work in the more inland portion of Parcel 5 (both preliminary and full reconnaissance) minimally covered an estimated 212 (49 acres) of the c. 237 acres, or an estimated 59% of the c. 85 acres identified as areas of high probability for containing archaeological sites. The ground reconnaissance was accomplished by a series of pedestrian sweeps across a sample of the parcel. Distances between crew members in this area varied

Figure 2
PEDESTRIAN INSPECTED AREA
FULL ARCHAEOLOGICAL RECONNAISSANCE
LAND OF KUKUIO 1st, NORTH KONA,
ISLAND OF HAWAII
PHRI 85-107
August 1985



Refer to Preliminary Survey Report
(see Rosenzweig 1985)

from 30 m to 50 m, due to the open, visible terrain and the relative absence of vegetation. Sample ground reconnaissance sweeps included transects along identified Trails D21-7, D21-23, T-133, and T-134.

Field work in Parcel 16 (both preliminary and full reconnaissance) minimally covered an estimated 19% (68 acres) of the 358 acres and consisted of an estimated 22% (42 acres) of the c. 192 acres identified as areas of high probability for containing archaeological sites and an estimated 16% (26 acres) of the c. 162 acres identified as an lava land, areas of low probability for containing archaeological sites. The ground reconnaissance in this area was accomplished by a series of pedestrian sweeps with distances between crew members varying from 30 m to 50 m, due to the open, visible terrain and the relative absence of vegetation. Sample ground reconnaissance sweeps included transects along identified Trails D21-7, 1193, 1197, 1200, and T-141.

The approximate locations of all identified sites were plotted on a blue-line map (scale 1"=400', variable contour intervals) made from an aerial photograph of the project area and prepared by Phillips, Brandt, Reddick & Associates for Bushue Ranch. The approximate limits of all ground survey coverage were also plotted on the map, which formed the basis for Figure 2.

Each site was described on standard FHI site survey record forms, and all sites were sketch mapped and/or photographed in 35 mm black-and-white (FHI Rolls No. 372-375, 377, 379). Each site, or the primary feature within a site complex, was marked with red and blue flagging tape, and with an aluminum tag bearing the site number, date, the letters "FHI" and FHI project number (85-167). Flagging tape with the site number was also wrapped around a rock and placed on the structure as an aid to future site reidentification. Selected sites, marked during the preliminary survey (Korenshl 1985) were not tagged if the initial tags were adequate; therefore, these retained the FHI preliminary survey project number (85-148). While previously recorded sites were labeled with the appropriate site number, all newly identified sites were assigned three digit temporary field numbers prefixed with "T-", continuing the numerical sequence begun during the preliminary reconnaissance survey (Korenshl 1985).

FIELD WORK FINDINGS

A total of 69 sites (178+ component features) were identified within the overall project area. Of these, 34 sites (and 74 features) had been previously recorded and 35 sites (and 104 features) were newly identified. The range of formal feature types encountered included walled shelters and enclosures, cave shelters, overhang shelters, walls, trails, raised stone platforms, cairns, petroglyphs, surface midden concentrations, cleared areas, stone alignments, a brickish wall, and archaic ponds with internal structural modifications. Site locations are indicated on Figure 3 (at end).

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

- a. Thirty-three sites (97+ component features) located within the immediate coastal area of Parcel 5, extending to approximately 1000 ft inland, an area of c. 80 acres (FHI Sites T-101 to -107, -117 to -122, -125, -130 to -132, -138, and S.P. Bishop Museum Sites D21-1 to -12, -15, -24, -25). Tentative functional site types included habitation features, recreation features, foot trails (both coastal and inland oriented), possible aquacultural pond system, boundary walls, and a possible burial and/or shrines;
- b. Sixteen sites (38+ component features) located within the inland portion of Parcel 5 (FHI Sites T-108, -116, -123, -126, -127, -133 to -135, and S.P. Bishop Museum Sites D21-17 to -23). Tentative functional site types included habitation features, burial caves, and foot trails; and
- c. Twenty sites (43+ component features) located within Parcel 16 (FHI Sites T-110, -114, -115, -136, -137, -139 to -141, Ching (1971) Sites -1196, -1197, -1200 to -1207, -1210, -1211). Tentative functional site types included habitation features and foot trails.

Site D21-7, a foot trail, was also identified within the inland portions of the project area, but only included within the immediate coastal area site count.

Tables 1, 2 and 3 (at end) summarize the identified sites and their component features with respect to formal type, tentative functional interpretation, and preliminary evaluation of site significance and recommended field tanks. Table 1 summarizes newly identified sites recorded during both the prior preliminary (Korenshl 1985) and the present full reconnaissance surveys. Table 2 summarizes sites previously identified by Renger

(1970) and Cordy (n.d.). Table 3 summarizes sites previously identified by Ching (1971). Additional component features were recorded and appended when encountered, continuing the existing feature designation sequence. Of the 39 previously recorded sites, 34 were definitively relocated. Site 1189 (Ching 1971:71, 135) was not relocated; Sites D21-13, D21-14 and D21-16 (Menger 1970:38) were only possibly relocated (Sites T-107 [Feature B], T-107 [Feature A], and -106 respectively, identifications uncertain); and the major east-west (coastal-inland) trail had been assigned two site numbers, D21-7 (Menger 1970:36-37) and 1193 (Ching 1971:202-203), of which 1193 is not included within the relocated site total. Relocation of Menger's sites was hampered by the lack of an adequate site location map (approx. scale 1"=900', no contours or topographic features indicated) (Menger 1970:Figure 23). Furthermore, site identifications were sometimes difficult due to a lack of sufficient detail in the existing site descriptions (Menger 1970:37-39, Ching 1971:Appendix 1), and the absence of any site plan maps or site identification tags.

SITE DESCRIPTIONS

T-101 Valled Shelter

This shelter consists of a raised, poorly stacked wall of angular as boulders constructed along a bedrock outcrop. The wall measures c. 0.9-1.7 m high by 0.8 m wide and consists of three discontinuous segments totaling c. 10.1 m in length. The wall and bedrock outcrop create a protected shelter area which appears to have been intentionally leveled and measures c. 1.3 by 1.0 m in area. With the exception of a few coral cobbles, no cultural deposit or portable remains are visible on the rocky basalt cobbles surface.

T-102 Complex

This complex consists of seven features. Feature A, an overhang cave shelter, measures c. 5.0 by 2.0 m in area and has a ceiling height of up to 1.1 m. The shelter contains several basalt slabs placed across the overhang to restrict the entrance and create a larger interior cavity. The interior surface of the shelter contains a moderate amount of portable remains, and a greyish deposit of sandy gravel which appears partially disturbed by looters.

Feature B, a box C-shape walled shelter, is open to the southwest and measures c. 3.4 by 2.7 m in area. The walls measure c. 0.5 m wide by c. 0.5-0.85 m high and are faced, but collapsing in places, constructed of stacked basalt boulders. It is located c. 24.5 m southeast of Feature A on level pahoehoe bedrock. The shelter is in fair condition, and contains a sparse surface scatter of shell midden and angular basalt cobbles.

Feature C, a box C-shape walled shelter, is open to the southwest and measures c. 2.6 m by 2.4 m in area. The walls measure c. 0.5 m wide by

Figure 4
SITE T-102

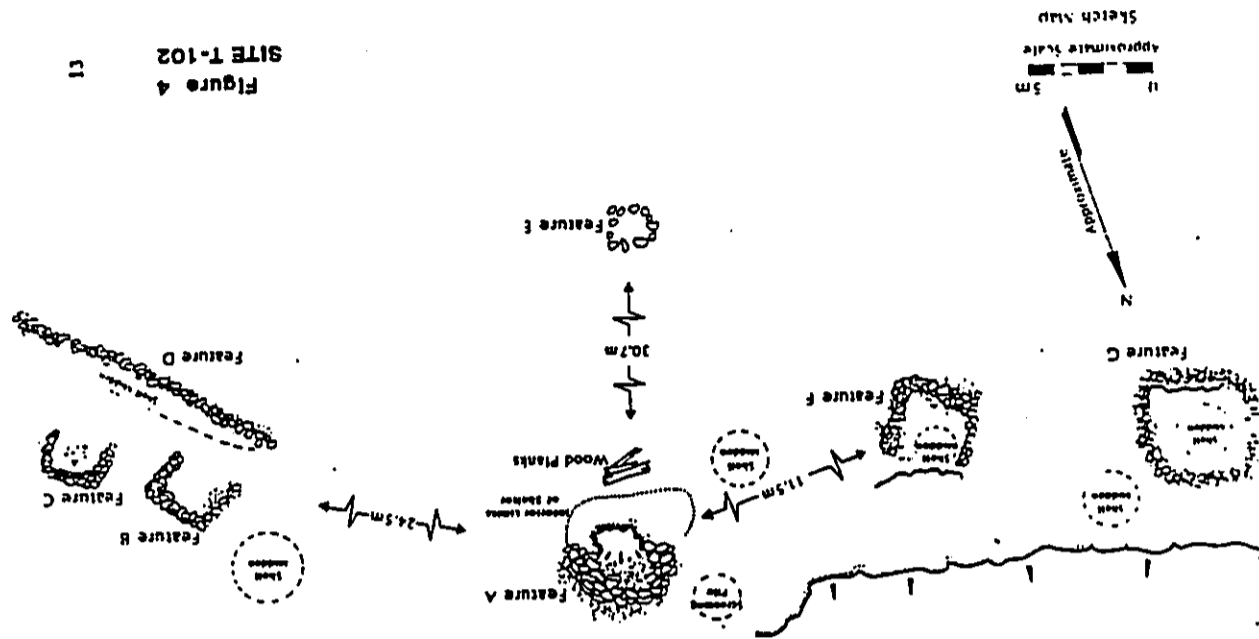


Figure 4

167-090385

Both features are situated near Trail D21-7, within a 30.0 m area northeast of Site D21-9. A sparse scatter of surface shell midden is also present in the area.

Figure 5

T-104 Complex

This complex consists of four features. Feature A consists of a T-shaped wall, part of which is well faced, in good condition, and constructed of stacked basalt boulders. This portion consists of one section extending north c. 10.9 m in length by 0.7 m wide and 0.85 m high, with an additional section extending east c. 7.7 m in length by 0.7 m wide and 0.85 m high. A poorly constructed, collapsed wall extends south from the main north-south wall, and measures c. 4.5 m in length by 2.2 m wide and 0.6 m high.

Feature B, a well constructed wall, is located c. 6.0 m west of Feature A and measures c. 9.7 m in length by 0.85 m wide by 1.0 m high. This wall is well faced, in good condition, and constructed of stacked basalt boulders.

Feature C, a terrace, is located c. 7.5 m south of Feature B and measures c. 5.1 by 4.0 m and up to 0.85 m high on the north side. The terrace is roughly rectangular shaped, collapsed in places, constructed with crudely stacked basalt boulders and contains a roughly level boulder surface.

Feature D, a collapsed platform, is located c. 2.0 m south of Feature C and measures c. 6.8 by 6.8 m and up to 1.35 m high. The platform is generally square shaped, with a rounded or sloping profile, contains no faced edges, and is constructed of piled basalt boulders. Two possibly upright boulders are incorporated into the structure, one each at the southwest and southeast corners. Both Features C and D contain a moderate surface scatter of coral cobbles.

Figure 6

T-102 Wall

This wall measures c. 40.7 m in length by 0.6 m wide and 0.5-0.7 m high. An additional wall section extends c. 23.0 m to the northeast, but is discontinuous or broken in length. The wall is in fair condition, faced on the east side and constructed of stacked basalt boulders. It is located on the inland (east) side of the beach and partially covered by sand.

T-106 Complex

This complex consists of six features, one of which may possibly be Site D21-16 (Menger 1970:38). Feature A, a partially walled sink, measures c. 2.1 m in diameter by 0.7 m deep. A concentration of basalt boulders are crudely piled around the northeast edge of the sink, and a scatter of shell midden is visible west of the sink on the level pahoehoe bedrock.

167-090385

c. 0.55-0.6 m high and are faced but collapsing in places, constructed of stacked basalt boulders. It is located c. 5.0 m southeast of Feature B on level pahoehoe bedrock. The shelter is similar to Feature C, in fair condition, and contains a very sparse surface scatter of shell midden and angular basalt cobbles.

Feature D, a linear rock alignment, is located c. 3.0 m south of Features B and C measures c. 17.8 by 0.4 m and up to 0.35 m high. The alignment is in poor condition, constructed of low piled basalt boulders, rounded or sloping in profile and contains no faced sides. A moderate to high amount of shell midden is concentrated upslope (northeast) of the alignment on level pahoehoe bedrock.

Feature E, a circular rock alignment, is located c. 30.7 m southwest of Feature A, and measures c. 2.15 by 2.0 m and up to 0.4 m high. The alignment is constructed with a single course of basalt boulders one rock high and wide on pahoehoe bedrock. With the exception of a single fragment of shell, no portable remains are visible on or near the structure.

Feature F, a C-shape walled shelter, is located c. 11.5 m west of Feature A, and measures c. 3.9 by 3.8 m in area. The walls measure c. 0.85 m wide by c. 0.5-0.55 m high and are partly faced, but generally collapsed in appearance. The structure is open to the northeast, and constructed of piled basalt boulders. It is generally in poor condition and contains a scatter of shell midden on the interior bedrock surface.

Feature G, an enclosure, is located c. 7.0 m west of Feature F and measures c. 5.0 by 4.5 m in area. The walls measure c. 0.7 m wide by 0.5-0.7 m high and are collapsed in appearance, but may have been faced at one time. The structure is generally in poor condition, constructed of piled basalt boulders on pahoehoe bedrock. Several concentrations of shell midden are present on the interior and exterior surface of the structure.

Portable remains recorded within Site Complex T-102 include *EXHUSA* spp., *Melita bicca*, *Melita pallida*, *Thalididae*, *Echinoidae*, *Gallina* spp., *Incudina* sp., *Leptocyonidae*, *Erchidontia strabistrilata*, *Exhalina reticulata*, *Trochidae*, *Strombidae*, *Conidae*, fish bone, coral, waterworn rock, volcanic glass, wooden planks, a coral abrader, and a basalt flake.

T-101 Complex

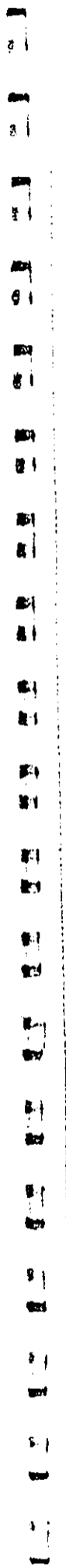
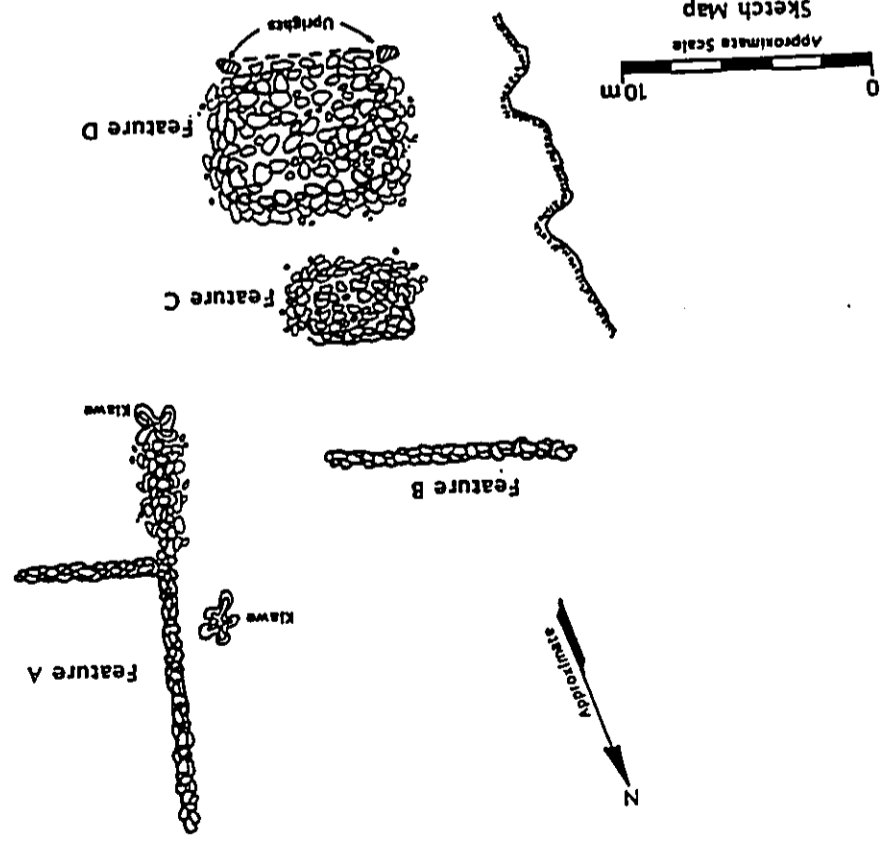
This complex consists of two features. Feature A represents a concentration of three *PAPAM*, of which one is faintly visible. The *PAPAM* consist of approximately seven or eight rows of small holes pecked into flat pahoehoe bedrock.

Feature B represents a concentration of three petroglyphs resembling human figures. Like the *PAPAM*, the petroglyphs are formed by pecking forms into flat pahoehoe bedrock.



Figure 6. SITE T-105. View to north. (PHRI Neg. 374-10)

Figure 5
SITE T-104



Feature B, a rubble mound, is located adjacent to and south of Feature A. The mound measures c. 2.7 m in diameter by c. 1.0 m high and is constructed of piled basalt boulders on bedrock. The mound does not contain any faced sides, and is generally rounded or sloping in profile.

Feature C, a box C-shape walled shelter, is located c. 4.2 m southwest of Feature A and measures c. 3.0 by 1.8 m in area. The shelter walls measure c. 0.6 m wide by 0.6 m high, is open to the west, and consists of crudely piled basalt boulders. Very sparse shell midden is visible in the area.

Feature D, a rubble mound, is located c. 4.2 m northwest of Feature A and measures c. 2.2 by 1.3 m and up to 0.6 m high. The mound does not contain any faced sides. A concentration of shell midden is visible adjacent to and west of the mound.

Feature E, an overhang walled shelter, is located c. 14.7 m northwest of Feature A and measures c. 4.0 by 3.0 m in area. The shelter walls measure c. 1.0 m wide by c. 1.15 m high, are raised, and consist of crudely stacked basalt boulders. The shelter is open to the northwest, and utilizes a small overhang area c. 1.0 m high to the east.

Feature F, a C-shape walled shelter, is located c. 30.0 m north of Feature A, on the east edge of the kiwax grove. The shelter measures c. 4.5 by 3.3 m in area and utilizes a large natural upright boulder as part of the east wall. The shelter wall measures c. 0.4 m wide by 0.3 m high, constructed of piled basalt boulders on pahoehoe bedrock and is open to the west. Portable remains present include a few marine shells, coral, and a waterworn boulder which has a pecked or battered surface.

Portable remains recorded within Site Complex T-106 include sparse to moderate amounts of *CYPRINA* spp., *M. RIGIDA*, *GALLINA* spp., coral, and a volcanic glass flake.

T-107 Complex

This complex consists of two features which may have been previously identified by Renger as Site D21-14 (Feature A), and D21-13 (Feature B) (1970:38). Feature A, a C-shape walled shelter, measures c. 4.0 by 3.2 m in area. The partially faced shelter wall measures c. 0.7 m wide by 0.7 m high, is open west, and constructed of crudely stacked basalt boulders and slabs on pahoehoe bedrock.

Feature B, a C-shape shelter, is located c. 7.5 m south of Feature A and measures c. 3.0 by 2.6 m in area. The partially faced shelter wall measures c. 0.4 m wide by 0.3 m high, is open west, and constructed of piled basalt boulders on pahoehoe bedrock.

Portable remains recorded within Site Complex T-107 include sparse amounts of *CYPRINA* spp., *M. RIGIDA*, *GALLINA* spp., coral, and a waterworn pebble.

T-108 Complex

This complex consists of two features. Feature A, a box C-shape shelter, measures c. 3.6 by 2.0 m in area. The partially faced shelter wall measures c. 0.85 m wide by c. 0.45 m high, is open southwest, and constructed of piled basalt boulders and upright slabs on pahoehoe bedrock.

Feature B, a partially walled sink, is located west of, and adjacent to, Feature A. The north edge of the sink is partially walled with a L-shaped wall measuring c. 4.2 m (northeast-southwest) by 1.3 m in length and c. 0.75 m wide by 0.95 m high. The wall is constructed of piled basalt boulders and generally in poor condition.

Portable remains recorded within Site Complex T-108 include sparse amounts of *CYPRINA* spp., *Conidae*, *Thalididae*, *Trochidae*, and coral.

T-109 Trail

Inland portion (Parcel 16) of previously designated Site D21-7, a foot trail recorded by Renger (1970:37). See Site D21-7.

T-110 Complex

This complex consists of four features, of which Features A and B are part of a collapsed lava tube. Feature A, a cave shelter measures c. 15.04 by 2.5 m and 2.0-3.0 m high. The cave contained a crude partially walled entrance end, with the exception of two coconut shells, a waterworn boulder and one piece each *CYPRINA* spp., and *Thalididae*, contained no cultural deposit.

Feature B, a cave, is located c. 10.0 m east of Feature A and measures c. 3.0 by 1.5 m and 1.0 m high. The cave did not contain any modifications or portable remains, but due to its close proximity to Feature A was probably also utilized as a cave shelter.

Feature C, a cairn, is located adjacent to Trail D21-7 on the north side of the collapsed lava tube, and measures 3.1 by 2.5 m and up to 1.05 m high. The cairn is constructed of piled basalt boulders on pahoehoe bedrock, and probably functions as a marker for Trail D21-7.

Feature D, a group of two human figure petroglyphs (figure 7), is located c. 10.0 m downslope (north) of Feature A. The petroglyphs consist of one complete and one incomplete human figure. The incomplete figure measures c. 0.23 m wide by 0.3 m high and appears to be missing an arm, while in contrast the complete figure measures c. 0.18 m wide by 0.23 m high.

T-111 Trail

Inland portion (Parcel 5) of previously designated Site D21-23, a foot trail recorded by Renger (1970:39). See Site D21-23.

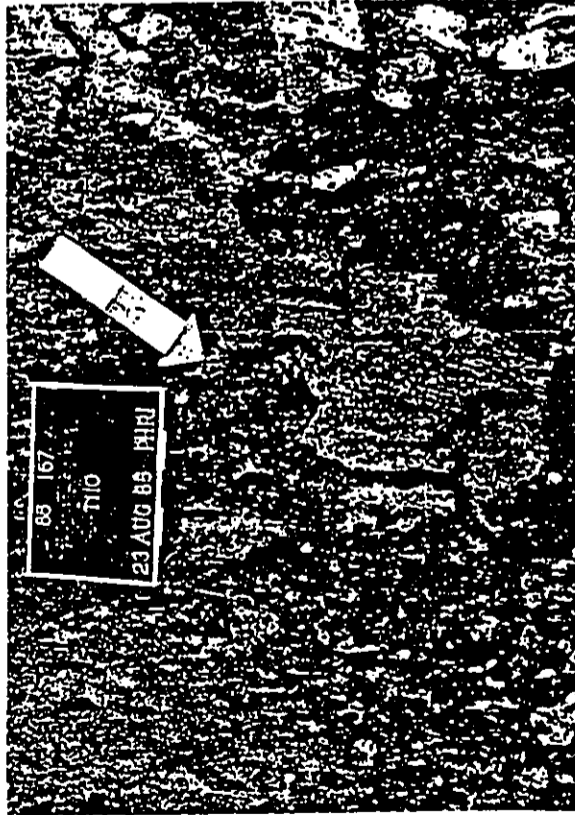


Figure 7. SITE T-110 (Feature D). View to southeast.
(PHRI Neg. 375-18)

I-112 Inail

Inland portion (Parcel 5) of previously designated Site D21-7, a foot trail recorded by Renger (1970:37). See Site D21-7.

I-113 Cave Shelter

Temporary site designation (I-113) assigned Site D21-21, a cave shelter initially recorded by Renger (1970:39). See Site D21-21.

I-114 Box C-shape

Figure 8

This box C-shape walled structure measures c. 5.0 by 3.5-4.0 m in area. The wall-faced and crude biface wall measures c. 0.8-1.0 m wide by 0.3-1.1 m high, is open northwest, and constructed of stacked rough pahoehoe slabs (several upright) and boulders. Although a few fragments of weathered marine shell are visible on the exterior of the structure, no portable remains are visible on the interior soil surface. This structure is located on the west slope of Muehenui cinder cone and has an excellent view of the coast.

I-115 Enclosure

Figure 9

This walled enclosure measures c. 7.0 by 5.0 m in area. The wall-faced and crude biface wall measures c. 0.8 m wide by 0.4-1.0 m high, contains an entrance thru the west wall, and is constructed of stacked pahoehoe slabs (several upright) and boulders. No portable remains are visible on the interior or exterior soil surface of the structure. This site is located on a low knoll situated west of Muehenui cinder cone and has an excellent view of the coast.

I-116 C-shape Shelter

This C-shape walled shelter measures c. 2.4 by 1.1 m in area. The shelter wall measures c. 0.45 m wide by 0.6 m high, is open southwest, and constructed of crudely stacked basalt slabs and boulders on pahoehoe bedrock. This structure is located near the intersection of Trails D21-7 and T-134. No portable remains are visible on or near the structure surface. The structure is in fair condition, and probably functioned as a temporary shelter.

I-117 Overhang Shelter

Figure 10

This overhang shelter measures c. 3.5 by 3.4 m with a ceiling height of 1.3 m, and contains a crude wall partially enclosing the c. 3.4 by 1.5 m overhang area. The wall measures c. 0.7 m wide by 0.9 m high, constructed of piled on boulders, and contains an opening or entrance. This structure is in fair condition, and probably functioned as a temporary shelter.

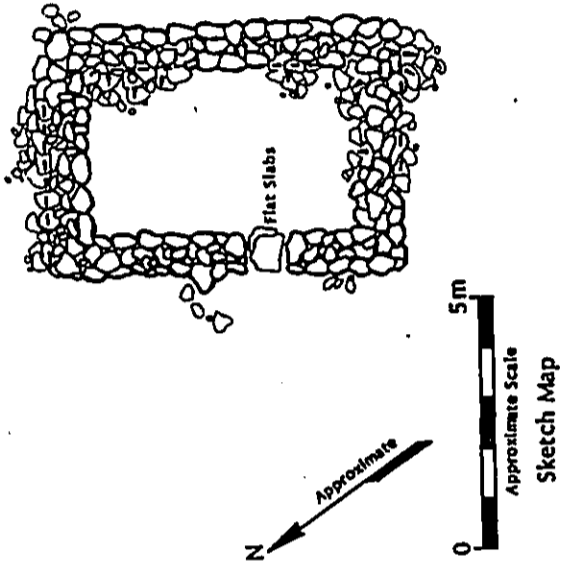


Figure 9
SITE T-115

Portable remains recorded within Site T-117 include very sparse amounts of Thaididae, Echinoidea, Crustacea, and coral on a rocky or cobble surface.

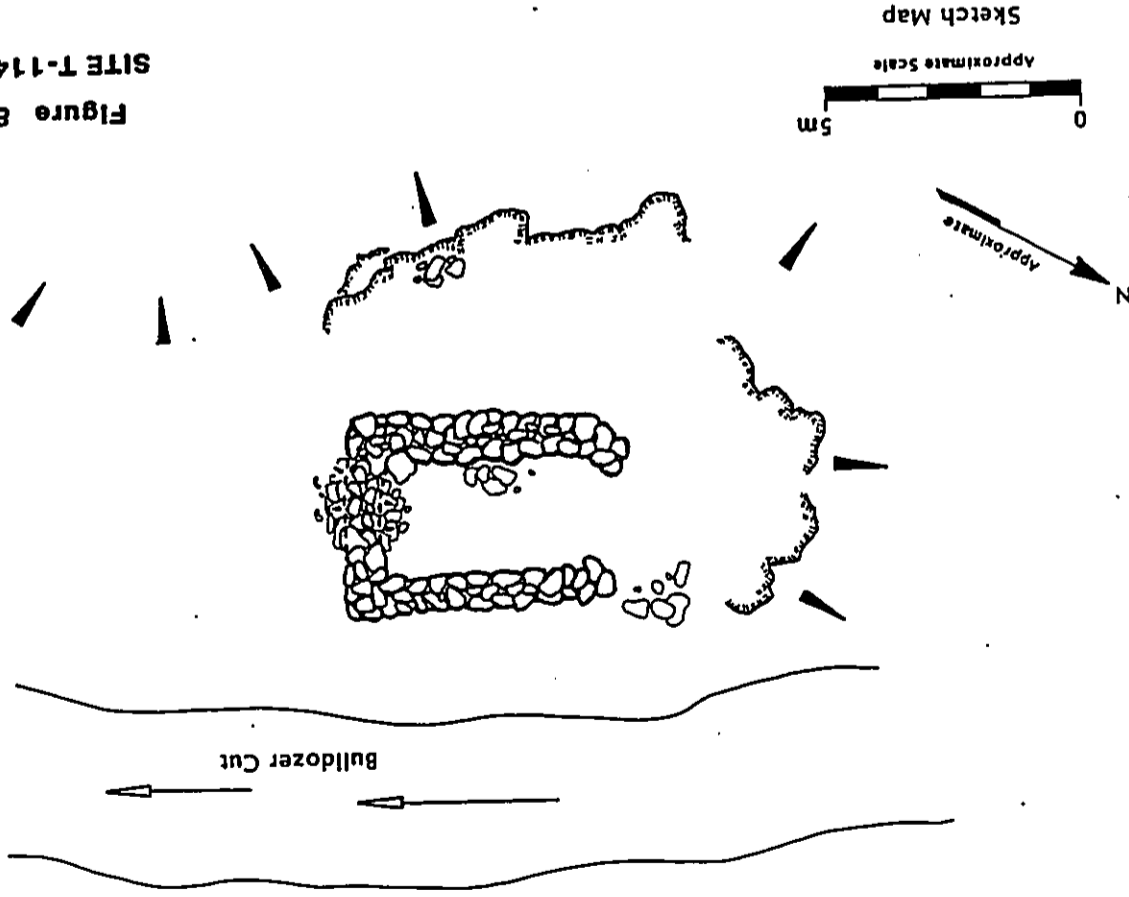
T-118 Complex

This complex consists of two features. Feature A, a box C-shape walled shelter, measures c. 4.0 by 3.5 m in area. The partially faced shelter wall measures c. 1.0 m wide by 0.65-0.8 m high, is open west, and constructed of stacked basalt boulders on pahoehoe bedrock.

Feature B, a terrace, is located c. 14.7 m east of Feature A and measures c. 2.4 by 7.3 m and up to 0.3 m high. The terrace contains a raised and faced west side constructed of stacked basalt boulders, and a level surface crudely paved with pebbles and cobbles. The south and east sides of the terrace blend into pahoehoe bedrock. The north side consists of a partially faced rubble wall measuring c. 8.3 by 0.7 m and up to 0.6 m high, constructed of crudely stacked basalt boulders extending west toward Feature A.

Portable remains recorded within Site Complex T-118 include sparse to moderate amounts of *Cypraea* spp., *N. plicata*, *Merita solita*, Echinoidea, *Gallina* spp., *P. reticulata*, Conidae, Trochidae, and coral.

Figure 8
SITE T-114



167-090385

T-119 Complex

This complex consists of two features. Feature A, a roughly rectangular enclosure, measures c. 11.0 m by 6.7 m in area. The enclosure wall measures c. 0.5-0.6 m wide by 0.4 m high, and is constructed of piled basalt cobbles and boulders one to two courses high on pahoehoe bedrock.

Feature B, an overhang shelter, is located on the north edge of a lava flow c. 6.0 m south of Feature A and it measures c. 4.35 by 2.5 m in area and contains a low wall partially enclosing the entrance. The crude wall measures c. 0.55 m wide by 0.65 m high, and is constructed of piled as boulders.

Portable remains recorded within Site Complex T-119 include sparse amounts of *Expiraea* spp., *Thauidae*, and coral pebbles.

This complex is situated within 50.0 m of the antihaline ponds and may possibly be associated with Site Complex D21-24.

T-120 Box-C-shape

This box C-shape shelter measures c. 3.1 by 2.8 m in area. The shelter wall measures c. 0.6 m wide by 0.55 m high, is open north, and constructed of piled basalt boulders two to three courses high on pahoehoe bedrock. A small sink area measuring c. 0.8 by 0.85 m and 0.75 m deep is located near the southeast corner of the structure. The structure is in fair condition, and probably functioned as a temporary shelter. Portable remains recorded in the general area of the site include very sparse amounts of *Thauidae*, *Echinoides*, coral, and waterworn basalt pebbles.

T-121 Walled Shelter

This walled shelter measures c. 3.0 by 2.0 m in area and utilizes a large natural upright boulder (1.5 m high) as part of the south wall. The shelter wall measures c. 0.8 m wide by 0.6 m high, is constructed of piled as boulders, and contains an entrance or opening. The structure is in poor condition, and probably functioned as a temporary shelter. No portable remains are visible on or near the as cobble surface of this shelter.

T-122 Complex

This complex consists of five cairns. Features A to E. Feature A measures c. 0.9 by 0.7 m by 1.0 m high. Feature B measures c. 1.2 by 0.7 m and 0.85 m high. Feature C measures c. 1.7 by 1.5 m and 1.05 m high. Feature D measures 0.6 by 0.5 m and 0.5 m high. Feature E measures c. 0.6 by 0.5 m and 0.6 m high. They are constructed of stacked as boulders and form an irregular north-south alignment. Although no visible physical remains are present, the cairns may mark the course of a foot trail.

167-090385



Figure 10. SITE T-117. View to southeast. (PHRI Neg. 373-14)

I-123 Circular Rock Alignment

This circular rock alignment measures c. 2.0 m in diameter. The alignment measures c. 0.4 m wide by 0.6 m high, and is constructed of crudely piled basalt boulders encircling a shallow, excavated sink. The structure is in poor condition and its function is undetermined. Portable remains recorded include coral and waterworn basalt pebbles on pahoehoe bedrock.

I-124 Cave

Figure 11

This cave measures c. 10.0 by 3.0 m in area and contains several side tubes. It initially was utilized as a prehistoric habitation/shelter cave, as evidenced by the grey, ashy deposit containing moderate amounts of portable remains including *Cyrtina* spp., *M. bicra*, *Echinoidea*, *Callina* spp., *Isopodomidae*, and a coral abrader.

At present, the cave contains the remains of an estimated 10 historic and possibly several prehistoric and/or protohistoric period burials. Portable remains associated with the historic burials include wooden planks, clothing (including blue stripe pants), woven material, a wooden smoking pipe, red and green glass beads, a safety pin, and part of a canoe hull. The cave entrance, a natural crack c. 0.65 m wide, was previously sealed with basalt slabs and boulders (Figure 11).

I-125 Wall

Situated on the north end of Kukio Bay, near the boundary between the Land of Kukio Iai and Kaupulehu, this wall measures c. 16.0 by 0.6 m and up to 0.65 m high. It is constructed of piled ss boulders on the south edge of an ss flow. The wall is in fair condition and probably functioned as a boundary wall. A grey sandy cultural deposit and two cairns are visible on the ss flow in the adjacent property (Kaupulehu).

I-126 Walled Shelter

Figure 12

This walled shelter measures c. 3.65 by 3.5 m in area, constructed on pahoehoe bedrock against the south edge of an ss flow. The wall measures c. 0.55 m wide by 0.55 m high, and is constructed of piled ss boulders and upright slabs. The shelter contains an opening or entrance in the north wall, and the upright slabs are utilized primarily on the walls interior side. The structure is in fair condition and probably functioned as a temporary shelter. Portable remains recorded include very sparse amounts of *Cyrtina* spp., *M. bicra*, *Echinoidea*, *Thalassia* and coral.

I-127 Walled Shelter

This walled shelter measures c. 5.4 by 2.4 m in area and utilizes a very large, natural boulder (3.3 m high) as a protective wind break. The

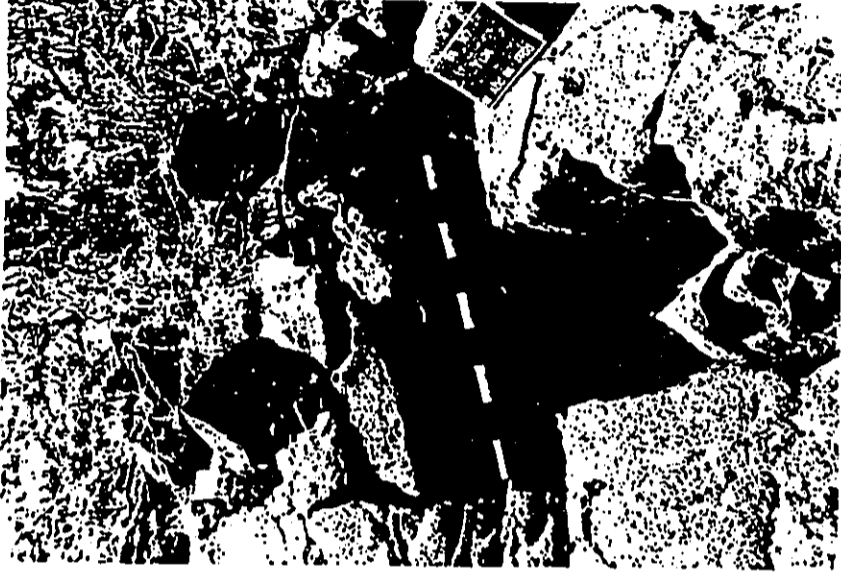


Figure 11. SITE I-124 ENTRANCE. View to northeast.
(PHR Neg.374-19)



Figure 12. SITE T-126. View to northeast. (PHRI Neg. 374-23)

shelter wall measures c. 0.7 m wide by 0.45 m high, is constructed of piled ss boulders, and partly encloses an area west of the large boulder. The shelter contains an interior surface of several flat basalt slabs. The structure is in fair condition and probably functioned as a temporary shelter. Portable remains recorded include one piece each of *M. bicca* and *Conidae*.

T-128 Complex

Temporary site designation (T-128) assigned Site D21-22, a complex of cave and wall shelters recorded by Renger (1970:39). See Site D21-22.

T-129 Complex

Temporary site designation (T-129) assigned Site D21-20, a complex of two cave shelters recorded by Renger (1970:38). See Site D21-20.

T-130 Complex

This complex consists of three features situated near the boundary between the Land of Kukio 1st and 2nd. Feature A, a roughly oval shape walled shelter, measures c. 5.6 by 5.1 m in area, and is situated on the top of a bedrock outcrop/rise. The shelter wall measures c. 0.45 m wide by 0.8 m high, and is constructed of piled basalt boulders which incorporate the bedrock outcrop as part of the east wall. The interior surface of the shelter contains a gravelly ss deposit and portable remains including sparse to moderate amounts of *Cypraea* spp., *M. bicca*, *Echinoides*, *Conidae*, coral, waterworn basalt cobbles and charcoal.

Features B and C, both cairns, measure c. 1.0 m in diameter by 0.8 m high and are constructed of stacked basalt boulders. Approximately three other cairns are visible in this area, but appear situated on the adjacent property.

T-131 C-shape Shelter

This C-shape shelter measures c. 3.15 by 1.25 m in area and is located adjacent to Site T-134, a foot trail. The crudely faced shelter wall measures c. 0.55 m wide by 0.75 m high, is open south, and is constructed of piled basalt boulders and cobbles on pahoehoe bedrock.

With the exception of a waterworn boulder concentration located c. 5.0 m southwest of the shelter, no portable remains are visible on or near the shelter. This structure is in fair condition and probably functioned as a temporary shelter.

167-090385

Very sparse portable remains recorded within Site Complex T-136, include *SPIRAX* spp., and coral on pahoehoe bedrock.

T-137 Complex

This complex consists of three features which probably functioned as temporary shelters. Feature A, a cave shelter, measures c. 7.9 by 2.5 m in area with a ceiling c. 0.9 m high. The cave entrance has been partially modified by basalt boulder capstones sealing a wide crack, thus creating a larger shelter area.

Feature B, a cave shelter, is located c. 5.1 m north of Feature A, and measures c. 12.0 by 10.0 m in area with a ceiling c. 1.0 m high. Although Feature B did not contain any structural modifications, it may also have been utilized as a cave shelter due to its proximity to Feature A.

Feature C, a cave shelter, is located c. 7.0 m west of Feature A and measures c. 6.0 by 4.7 m with a ceiling c. 0.7 m high. It also contains no structural modifications, but a surface scatter of shell midden is present.

Portable remains recorded within Site Complex T-137 include sparse amounts of *Echinoides*, *M. plicata*, *SPIRAX* spp., *Kallana* spp., and coral on bedrock.

T-138 C-shape Shelter

This C-shape shelter is located c. 2.0 m south of Site D21-24 and measures c. 2.15 by 2.1 m. The shelter wall measures c. 0.5 m wide by 0.6 m high, is open west, and is constructed of piled as boulders and upright slabs. The upright slabs are utilized primarily on the interior face of the wall. No portable remains are visible on the level as pebble and cobble surface of the shelter. Due to its proximity, Site T-138 could be considered a feature of Site Complex D21-24.

T-139 Complex

This complex consists of four features. Feature A, a cave shelter, is formed by two large sink areas connected by a lava tube. The tube measures c. 14.0 m in length, by c. 2.0-2.5 m wide and c. 0.55-2.0 m high. A crude boulder terrace measuring c. 7.8 by 1.3 m and 0.6 m high is built in the west sink area against the south wall. The terrace, which is constructed of stacked basalt boulders, has an uneven boulder surface and a crudely faced north side.

Feature B, a cave shelter, is located c. 5.0 m south of Feature A and measures c. 10.0 by 4.3 m with a ceiling 1.1 m high. It has no structural modifications, but a surface scatter of shell midden is present.

167-090385

T-132 Cave Shelter

This cave shelter measures c. 3.25 by 1.5 m in area with a ceiling 0.8-1.0 m high, and is located c. 5.0 m south of Site D21-7, a foot trail. The shelter does not contain any structural modifications, but a very thin deposit of grey, ashy soil and shell midden is present. Portable remains recorded within Site T-132 include *SPIRAX* spp., *M. plicata*, *Echinoides*, *Thalassia*, coconut husk and shell.

T-133 Trail

This site appears to be a coastal-inland oriented foot trail consisting of a worn pahoehoe and crushed gravel surface. The trail is c. 0.7 m wide, and branches c. 0.6-0.8 m wide, and branches north toward Site D21-24 from trail D21-7 at approximately the 40 ft elevation. The trail is partially destroyed by the present beach access road and is not visible north of this road.

T-134 Trail

This site is a coastal-inland oriented foot trail consisting of a worn pahoehoe and crushed gravel surface. The trail is c. 0.7 m wide, and branches south toward Site T-131 and Kakapa Bay from Trail D21-7 at approximately the 50 ft elevation. Several crude cairns are visible along the trail.

T-135 Cave Shelter

This cave shelter measures c. 7.2 by 2.8 m in area with a ceiling 0.5-1.0 m high, and is located c. 6.0 m north of trail D21-7. The cave shelter does not contain any structural modifications, but a sparse scatter of shell midden is present on the bedrock surface. The cave probably functioned as a temporary shelter. Portable remains recorded within Site T-135 include *SPIRAX* spp., *M. plicata*, *Echinoides*, *Thalassia*, and a waterworn basalt pebble.

T-136 Complex

This complex consists of two features. Feature A, an overhang shelter, is located c. 7.0 m north of trail D21-7. The shelter measures c. 5.0 by 3.6 m in area with a ceiling c. 0.9 m high, and a wall enclosing the c. 2.0 by 1.5 m overhang area. The shelter wall measures c. 0.75 m wide by 0.5 m high, is built of piled as boulders, and contains an opening or entrance.

Feature B, a crude overhang shelter, is located c. 5.0 m east of Feature A, and measures c. 2.5 by 1.7 m in area with a ceiling c. 0.75 m high. A crude wall measuring c. 1.25 by 0.4 m and 0.6 m high encloses the overhang area. Features A and B are in poor to fair condition, and probably functioned as temporary shelters.

167-090385

167-090385 32
Feature C, a square mound, is located c. 15.0 m northeast of Feature A, and measures c. 1.1 by 1.1 m and 0.6 m high. It is constructed with a perimeter of large basalt boulders and a fill of pahoehoe slabs piled on bedrock.

Feature D, a mound, is located c. 10.0 m east of the west sink area and above the Feature A tube. The mound measures c. 1.5 m in diameter by c. 0.6 m high, and is constructed of piled basalt boulders and cobbles.

Portable remains recorded within Site Complex Y-139 (predominantly Features A and B) include sparse amounts of *Schizoides*, *Erpasa* spp., *Exallana* spp., *kukui* (*Aleurites moluccana*), burnt wood, charcoal flecks, and waterworn cobbles and boulders.

Y-140 Complex

This complex consists of three cairn features. Feature A measures c. 2.15 by 0.55 m and 0.9 m high, and is crudely faced and constructed of stacked as boulders. Feature B, located c. 30.0 m southwest of Feature A, measures c. 0.3 m in diameter by 0.45 m high, and is constructed of stacked as slabs. Feature C, located c. 50.0 m west of Feature A, measures c. 0.6 m in diameter by 0.7 m high, and is constructed of piled as boulders. The cairns are all in fair condition.

This complex is probably recent, due to its location adjacent to and east of Queen Kaahumanu Highway.

Y-151 Complex

This complex consists of three features. Feature A, a coastal-inland oriented foot trail, measures c. 0.7 m wide. It consists of a worn pahoehoe and crushed gravel surface branching north toward Keupiahu from Trail D21-7 at approximately the 340 ft contour, southwest of Zoopoomiao.

Feature B, a cairn, is located at the intersection of Feature A and Trail D21-7, and measures c. 0.65 m in diameter by 0.65 m high. The cairn is built of stacked as slabs and marks the trail intersection.

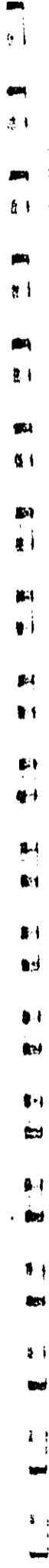
Feature C, a rectangular mound, is located c. 25.0 m southwest of the intersection of Feature A and trail D21-7 measures c. 3.15 by 1.4 m and 0.35 m high. It is crudely faced and constructed of stacked as slabs on a bedrock arch.

D21-1 Complex

This complex consists of four features. Feature 1, an overhang shelter (Figure 13), measures c. 4.2 by 4.0 m in overall area and includes a wall partially enclosing the overhang area. The area under the overhang measures c. 3.0 by 1.5 m with a ceiling c. 1.1 m high. The crudely faced



Figure 13. SITE D21-1 (Feature 1). View to South.
(PHRI Neg.373-16)



wall measures c. 0.8 m wide by c. 0.9-1.35 m high, contains an opening or entrance, and is constructed of stacked sa boulders. The overhang shelter contains a level interior surface of sa pebbles and cobbles.

Feature 2, a rectangular cairn, is located c. 2.9 m east of Feature 1 and measures c. 1.5 by 1.2 m and 0.85 m high. It is crudely faced, constructed of stacked sa boulders on a bedrock outcrop.

Feature 3, a walled shelter, is located c. 15.0 m south of Feature 1, measures c. 3.5 by 2.0 m in area, and utilizes a large natural boulder (2.5 m high) as part of the south wall. The shelter wall measures c. 0.5 m wide by 0.5 m high, is constructed of piled sa boulders, and partially encloses the area north of the large boulder. An entrance or opening is present on the north side of the shelter. This feature is in poor condition and generally collapsed in appearance.

Feature 4, a walled shelter, is located c. 15.0 m southwest of Feature 1 and measures c. 4.0 by 2.0 m in area. It utilizes two large natural boulders (0.7 m and 1.5 m high) as the north and south walls. The west wall of the shelter is constructed of piled basalt boulders and measures c. 4.0 by 0.4 m and 0.5 m high. The two large boulders and constructed wall form a crude C-shape shelter open to the east. This feature is in poor condition and generally collapsed in appearance.

Portable remains recorded within Site Complex D21-1 (predominantly Feature 1) include sparse amounts of *EXPIAZA* spp., *Echinoidea*, *Sallina* spp., *M. pisca*, *M. pallia*, *Conidae*, *Trochidae*, unidentified bivalve shell, and waterworn rock.

D21-2 Complex

Figure 14

This complex consists of five features. Feature 1, an enclosure, measures c. 7.1 by 5.7 m in area, and contains an opening or entrance (c. 2.25 m wide) in the west wall. The enclosure wall measures c. 1.0 m wide by c. 0.55-1.05 m high, is well constructed and faced, but collapsing in places. The northeast corner of the enclosure appears modified with a level, cobble paved terrace measuring c. 2.6 by 1.6 m and 0.4 m high. The enclosure has a level grey sandy soil interior, which has a slab lined fire pit near the west wall.

Feature 2, an L-shape wall, is located on a sand and coral cobble surface c. 9.7 m northwest of Feature 1. The wall measures c. 7.7 m (north-south) by c. 3.75 m (east-west) and c. 0.7 m wide by c. 0.6-0.85 m high. The walls are crudely faced and constructed of stacked basalt boulders.

Feature 3, a terrace, is located c. 7.0 m southwest of Feature 1 and measures c. 15.0 by 6.2 m and c. 0.4-0.95 m high. It is roughly rectangular shaped, built with a perimeter of crudely-stacked basalt boulders, and is raised and faced on the north, south, and east sides. The east terrace face contains an upright boulder and a centrally located opening or entrance. The terrace has a level, sand and rock surface similar to

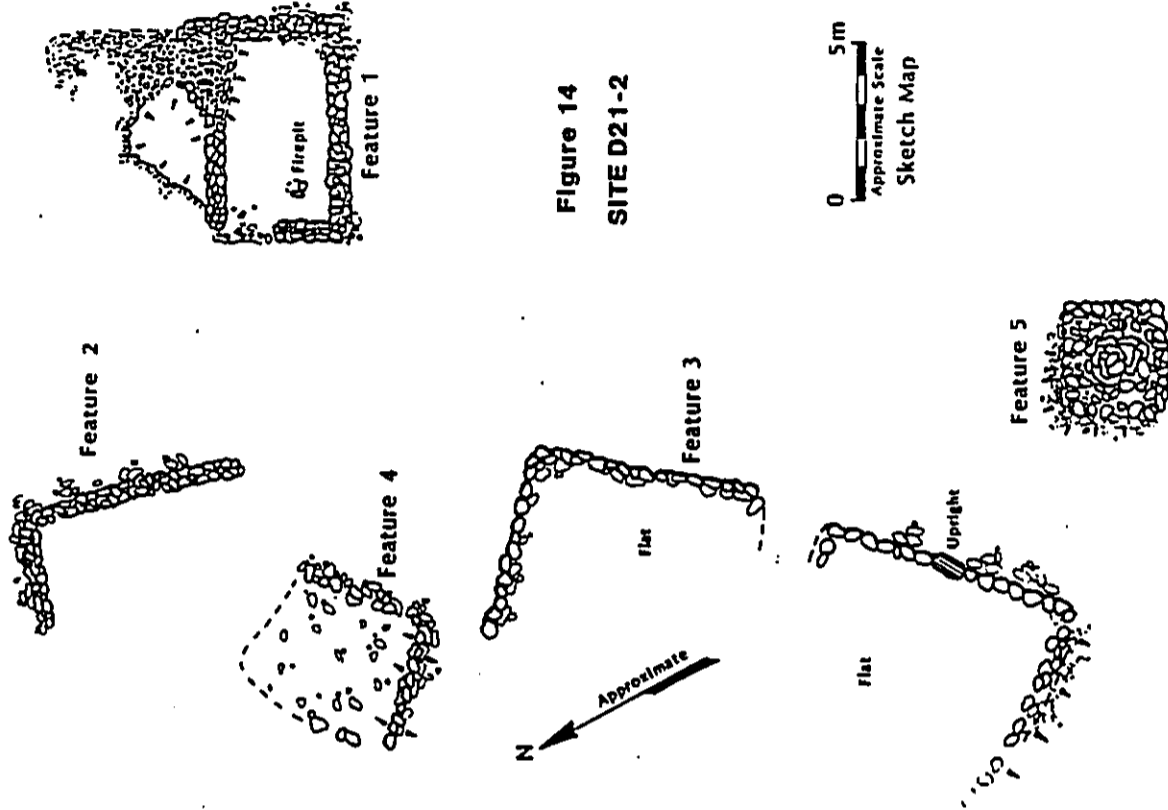


Figure 14
SITE D21-2

0 5m
Approximate Scale
Sketch Map

the surrounding beach dune. The western extent of the terrace is unclear and may possibly be buried beneath this beach dune.

Feature 4, a terrace, is located between Features 2 and 3. It measures c. 4.4 by 4.4 m and c. 0.45 m high, constructed of piled basalt boulders collapsing in places. The south and east sides are slightly raised and identified by indistinct boulder alignments, but the extent of the north and west sides are unclear, possibly buried beneath the beach dune. The structure is vague in form and generally in poor condition.

Feature 5, a platform, is located c. 5.0 m southeast of Feature 3 and measures c. 3.5 by 3.0 m and 0.7-1.0 m high. It is constructed of stacked basalt boulders with a scatter of coral cobbles. The structure is roughly square shaped, faced on the south and east sides, but collapsing on the north and west sides.

Portable remains recorded within Site Complex D21-2 (predominantly Feature 1) include moderate amounts of *CYPRINA* spp., *Echinoides*, *M. NICKA*, *Callinix* spp., *Tequomonidae*, fish bone, *Thalasside*, *Conidae*, unidentified bivalve, mammal bone, charcoal, coral, waterworn rock, and a volcanic glass flake.

D21-3 Complex

This complex consists of three features located west of a *Mikya* grove, near the beach. Feature 1, a cave shelter, measures c. 2.5 by 2.0 m in area with a ceiling 0.7-0.9 m high. The shelter does not contain any structural modifications, and is currently used by fishermen evidenced by plastic jugs and a kerosene can. A thin grayish sand deposit is visible on the interior surface of the shelter. Portable remains recorded within Feature 1 include *CYPRINA* spp., *M. NICKA*, *Echinoides*, *Thalasside*, *Cyathididae*, coconut shell (possibly modified), waterworn rock, and coral.

Feature 2, a cairn, is located c. 10.0 m northwest of Feature 1. The cairn measures c. 1.5 m in diameter by 0.8 m high, is roughly oval shaped and open in the middle. Recent charcoal and coconut bark is present within the opening.

Feature 3, a cleared area, is located c. 7.0 m northwest of Feature 1 and measures c. 1.5 m in diameter. The feature consists of an artificially leveled basalt cobble surface. No portable remains are visible on this feature.

D21-4 Complex

Figure 15

This complex consists of four features. Feature 1, a platform measures c. 8.1 by 2.2 m and 0.8-1.05 m high. The platform is roughly rectangular shaped and the sides are well faced, utilizing numerous upright basalt slabs. The structure is constructed of stacked basalt boulders and has an uneven boulder surface. A possible steppingstone trail is located west of Feature 1.

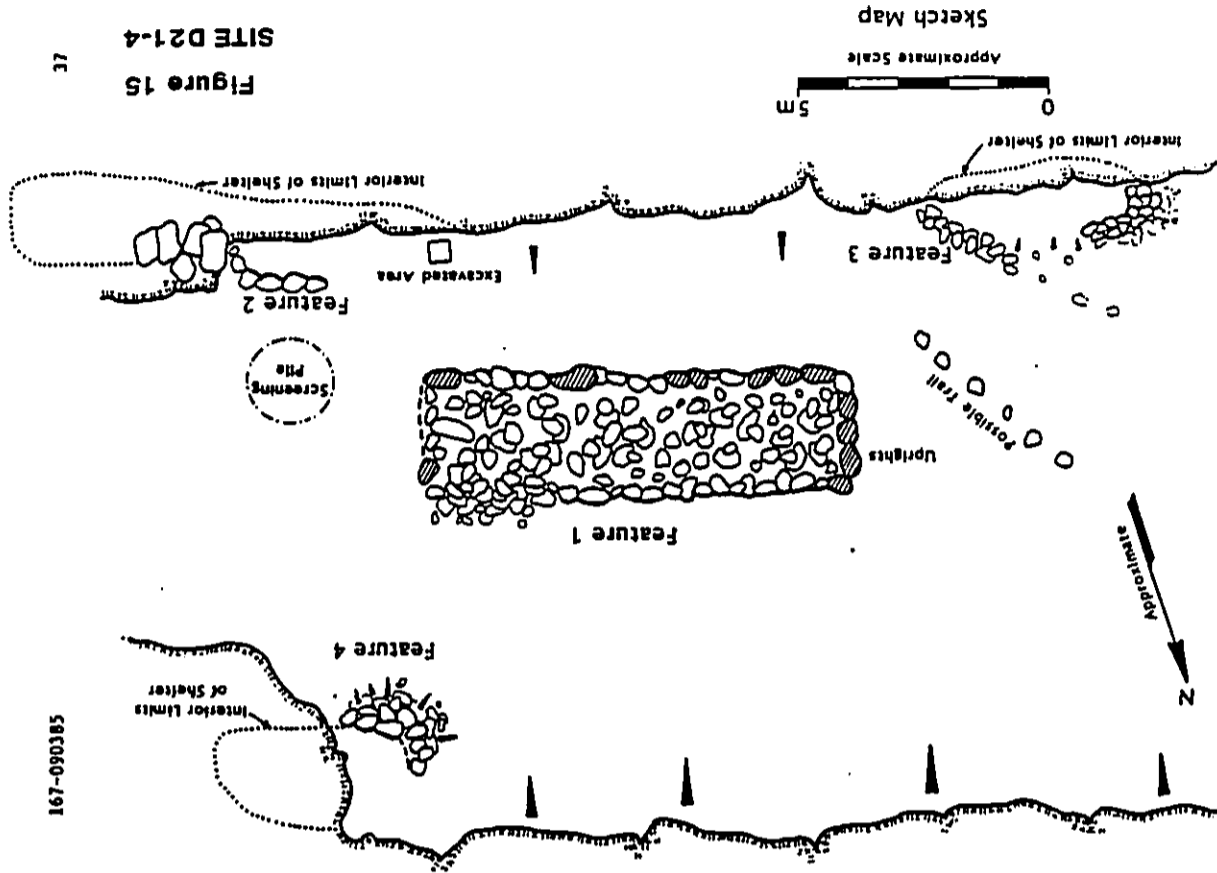


Figure 15
SITE D21-4

Feature 2, a cave shelter, is located c. 2.0 m southeast of Feature 1. The cave interior measures c. 4.0 by 2.15 m in area with a ceiling 0.85 m high. The cave entrance is modified with a retaining wall faced on the interior side and capstone slabs which create a larger protected shelter area. The interior surface of the cave shelter contains a greyish, rocky soil deposit, containing moderate to high amounts of shell midden, which appears to be partially damaged by looters as evidenced by several excavated areas. A large screening pile is visible on the exterior of the shelter. Although partially damaged, a substantial cultural deposit remains undisturbed.

Feature 3, an overhang shelter, is located c. 6.25 m southwest of Feature 1. The shelter measures c. 7.7 by 1.25-2.0 m in area with a ceiling c. 1.6 m high and is partially enclosed by a crudely built wall. The wall is constructed of stacked basalt boulders and is wall faced on part of the interior side. The interior surface of the shelter contains moderate amounts of shell midden on a leveled, rocky surface.

Feature 4, a cave shelter, is located c. 9.0 m northeast of Feature 1. The cave shelter measures c. 2.6 by 1.8 m in area with a ceiling c. 1.1 m high. The entrance is partially enclosed and modified with a crudely built basalt boulder wall, which is raised and crudely faced on the interior side. The interior surface of the shelter contains sparse amounts of shell midden on a leveled, rocky surface.

Portable remains recorded within Site Complex D21-4 (predominantly Features 2, 3, and 4) include sparse to abundant amounts of *CYPRAEA* spp., *GALLINA* spp., *M. PICCA*, *M. POLITA*, *Echinoidea* (including *Heterocentrotus*, *Semililium*), *Conidae*, *E. stricklandianus*, *E. raticulata*, *Isopodomorpha*, fish bone, *Thalididae*, *Meothala harpa*, charcoal, kukui, coral, volcanic glass flakes, and echinoid spine abraders.

D21-5 Double Box C-shape Shelter

This site consists of a box C-shape walled shelter with a central wall dividing the structure into two "rooms", forming a double box C-shape structure. The double box C-shape measures c. 6.0 by 4.0 m in area, with walls c. 0.7-0.9 m wide by 0.55-0.7 m high, and is wall faced but collapsing in places. The shelter is open to the west, with walls constructed of stacked basalt boulders utilizing numerous upright basalt slabs.

Portable remains recorded within Site D21-5 include moderate amounts of *CYPRAEA* spp., *Echinoidea*, *M. PICCA*, *M. POLITA*, *GALLINA* spp., coral, a basalt flake, and coral and echinoid spine abraders on *Psobos* bedrock. This structure is probably a habitation feature.

D21-6 Complex

This complex consists of four features. Feature 1, an overhang shelter, measures c. 3.3 by 1.5 m in area with a ceiling c. 1.2 m high. With

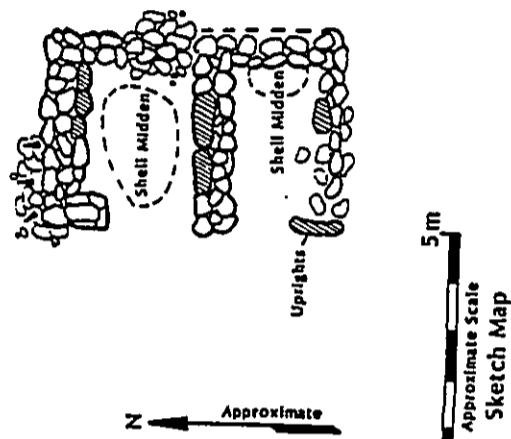


Figure 16
SITE D21-5

the exception of a crude wall measuring c. 1.4 by 0.55 m and 0.4 m high at the entrance, the shelter does not contain any structural modifications.

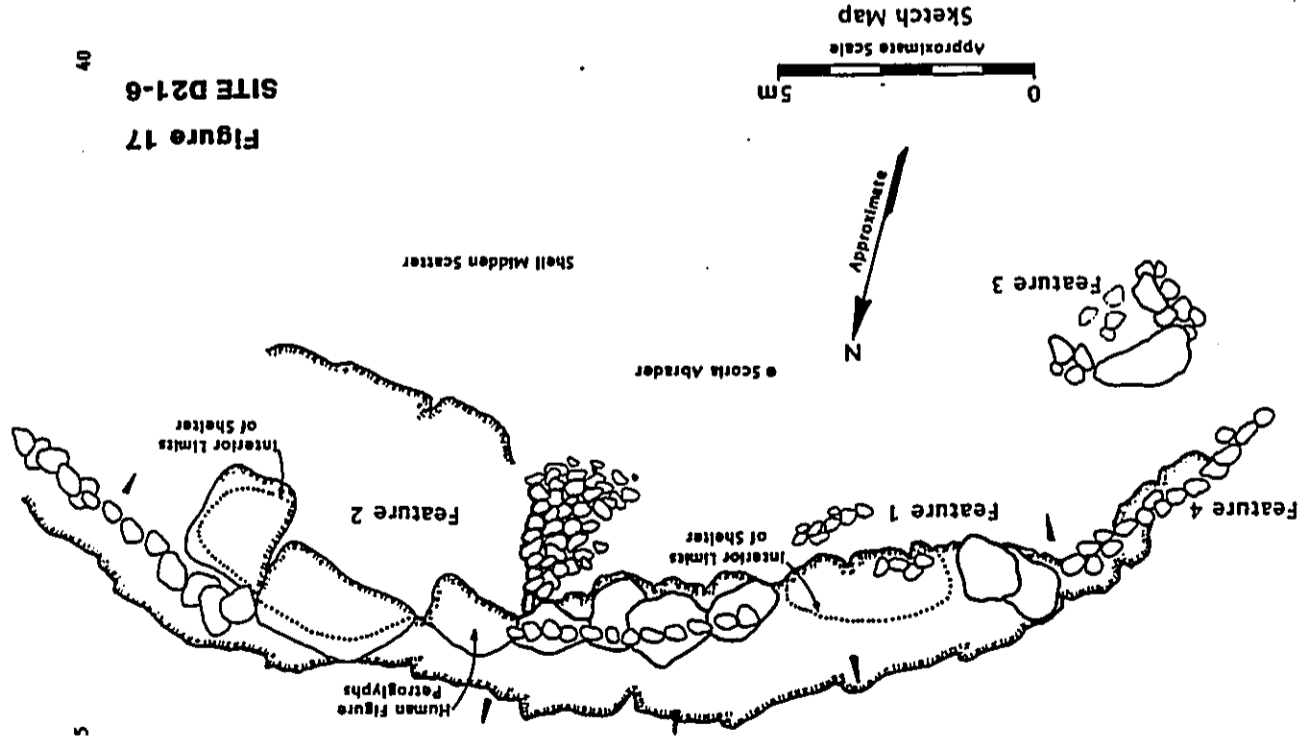
Feature 2, an overhang shelter, is located c. 5.0 m northeast of Feature 1 and measures c. 5.6 by 2.1 m in area with a ceiling c. 1.5 m high. A terrace measuring c. 2.8 by 2.25 m and 2.25 m high is situated southwest of and adjacent to the shelter entrance. The terrace is faced on the northeast side and constructed of stacked basalt boulders. A group of three human figure petroglyphs is visible between the shelter entrance and terrace.

Feature 3, a box C-shape shelter open to the southeast, is located c. 7.6 m south of Feature 1 and measures c. 3.15 by 1.35 m in area. The walls measure c. 0.6 m wide by 0.6 m high, are built with several upright basalt slabs, and utilize a large boulder as the northwest wall.

Feature 4, a wall, is constructed along the north edge of the site complex, near Features 1 and 2. The wall consists of approximately three discontinuous sections totaling c. 15.0 m in length by 0.5 m wide and 0.6 m high. It is crudely built, constructed with stacked basalt boulders one to two courses wide and two to three courses high.

Portable remains recorded within Site Complex D21-6 include moderate to abundant amounts of *CYPRAEA* spp., *M. PICCA*, *M. POLITA*, *Conidae*, *E. raticulata*, *GALLINA* spp., *Echinoidea*, *Thalididae*, mammal bone, coconut husk,

Figure 17
SITE D21-6



coral, waterworn cobbles, fish bone, scoria abraders, a basalt hammerstone, volcanic glass flakes, and a perforated shell (*Conus* sp.). This site is probably a habitation complex.

D21-7 Complex

This complex consists of three features. Feature 1, a coastal-inland oriented foot trail, consists of a worn pahoehoe and crushed gravel surface measuring c. 0.7 m wide. This trail appears to be a major coastal-inland oriented foot trail, evidenced by its well worn surface and less worn associated trails.

Feature 2, a rock alignment, is located south of Feature 1 and c. 14.8 m southwest of Site D21-6. This feature consists of a northwest-southeast alignment of basalt boulders and measures c. 15.8 by 0.4 m and 0.25 m high.

Feature 3, a rock alignment, is located north of Feature 1 and c. 4.8 m northwest of Site D21-6. This feature consists of a north-south alignment of basalt boulders and measures c. 10.6 by 0.5 m and 0.4 m high.

D21-8 Wall

This wall is located north of and adjacent to Site D21-7. It is oriented northeast-southwest and discontinuous in length, consisting of sections c. 7.0 and 7.6 m long separated by c. 5.4 m. The wall measures c. 0.7-0.85 m wide by c. 1.1-1.2 m high, is constructed of stacked basalt boulders, and contains well faced sides. This structure is in good condition and possibly functioned as a drift wall for herding goats or donkeys.

D21-9 Complex

This complex consists of eight features. Feature 1, an enclosed overhang and cave, measures c. 7.6 by 4.0 m in area. The wall measures c. 0.8-1.0 m wide by c. 1.2-1.4 m high, and does not have an opening or entrance. It is constructed of stacked basalt boulders and is faced on both the interior and exterior sides.

The wall is semi-circular shaped, built against a bedrock outcrop, and encloses the overhang area and cave. The overhang area measures c. 4.7 by 3.0 m with a ceiling c. 1.0 m high. The cave is located immediately east of the overhang and measures c. 3.0+ by 2.9 m with a ceiling c. 1.0 m high. Both shelters contain a grey, gravelly cultural deposit, shell midden, and artifacts. Portable remains recorded within Feature 1 include moderate amounts of *Cypraea* spp., *Gallina* spp., *M. pisca*, *Echinoidea*, *Thalassideae*, mammal bone, kukui, coral, modified coconut shell, abraders (coral and echinoid spine), and a shell scraper (*Gallina* sp.).

Features 2-9 are concentrated within a 40.0 m area south and west of Feature 1. Feature 2, an overhang shelter, is located c. 7.8 m southwest of Feature 1. The shelter measures c. 2.65 by 2.5 m with a ceiling height of 0.65 m and contains a crude wall partially enclosing the c. 2.0 by 1.4 m overhang area. The wall measures c. 0.25 m wide by 0.35-0.7 m high, is constructed of crudely stacked basalt boulders, and does not contain an entrance or opening.

Feature 3, a walled shelter, is located c. 14.6 m southwest of Feature 1. The shelter measures c. 4.85 by 3.1 m and consists of two adjacent lava depressions modified with crude shelter walls. The walls measure c. 0.7 m wide by 0.35-0.7 m high, is constructed of piled basalt boulders, and does not contain an entrance or opening.

Feature 4, a walled shelter, is located c. 9.3 m south of Feature 1. The shelter measures c. 2.8 by 2.2 m and consists of a lava depression modified on the north and east sides with a boulder alignment. The boulder alignment measures c. 0.3 m wide by 0.3 m high, and is constructed of crudely piled basalt boulders.

Feature 5, a cairn, is located c. 12.7 m south of Feature 1 and c. 2.0 m west of Feature 4. The cairn measures c. 2.0 by 1.7 m and 0.55 m high, and is generally rounded or sloping in profile. It is constructed of piled basalt boulders on bedrock.

Feature 6, a cairn, is located c. 10.8 m west of Feature 1. The cairn measures c. 1.2 by 1.15 m and 0.9 m high, and is generally rounded or sloping in profile. It is constructed of piled basalt boulders on bedrock.

Feature 7, a cairn, is located c. 9.7 m west of Feature 1. The cairn measures c. 1.6 m in diameter by c. 0.55 m high, and is generally rounded or sloping in profile. It is constructed of piled basalt boulders on bedrock.

Feature 8, a cairn, is located c. 32.9 m southwest of Feature 1. The cairn measures c. 1.2 by 1.1 m and 0.8 m high, and is generally rounded or sloping in profile. It is constructed of piled basalt boulders on bedrock.

Feature 9, a cairn, is located c. 38.0 m southwest of Feature 1. The cairn measures c. 1.75 m in diameter by c. 0.7 m high, and is generally rounded or sloping in profile. It is constructed of piled basalt boulders on bedrock.

Portable remains recorded within Features 2-9 include sparse to moderate amounts of *Cypraea* spp., *Sellana* spp., *M. bicca*, *M. kollita*, *Echinoidea*, *Thauidae*, *Conidae*, *E. reticulata*, *E. sibiriatritata*, mammal bone, kukui, coral, and waterworn basalt.

D21-10 Complex

This complex consists of two features. Feature 1, a platform remnant initially recorded by Menger (1970:38), was subsequently designated Site

D21-12, Feature 4 by Cordy (Cordy n.d.). This feature has been partially destroyed by construction of a ranch road and watertank. The remnant measures c. 6.5 by 6.5 m and 0.3 m high, and is constructed with a level basalt and coral cobble surface.

Portable remains recorded on the surface of Feature 1 include sparse amounts of *Cypraea* spp., *Sellana* spp., *M. bicca*, *Cyathidae*, *Conidae*, coral, and waterworn basalt.

Feature 2, a platform, is located c. 10.0 m southwest of Feature 1. It measures c. 7.0 by 5.15 m and 0.4 m high, and is constructed of basalt boulders. The platform is indistinct, but appears rectangular shaped with slightly raised sides. No portable remains are visible on or near the surface of Feature 2.

D21-11 Complex

This complex consists of four features. Feature 1, a platform, measures c. 6.3 by 5.5 m and 0.45 m high on the east side. The platform is constructed of crudely stacked basalt boulders and contains a roughly level surface. No portable remains are visible on or near the surface of this structure.

Feature 2, a level basalt cobble area, is located east of Feature 1 and measures c. 5.0 by 3.5 m in area. It contains an alignment of three rectangular concrete foundations, which probably formed the base of an old watertank or historic structure. No portable remains are visible on or near the surface of this structure.

Feature 3, a terrace, is located c. 8.0 m northeast of Feature 2 and measures c. 4.8 by 3.4 m and 0.55 m high on the northeast edge. The terrace is constructed of stacked basalt boulders, contains a roughly level surface, and is faced on the northeast side. Portable remains recorded on this feature include very sparse amounts of *Cypraea* spp., coral, and several ceramic sherds.

Feature 4, a terrace, is located north of Feature 1, and measures c. 3.3 by 2.8 m and 0.65 m high. It contains a concrete foundation with a square (c. 1.9 by 1.3 m), centrally located opening filled with boulders. The concrete foundation probably formed the base of an old outhouse. No portable remains are visible on or near the surface of this structure.

D21-12 Complex

Figure 16

This complex consists of three features. Feature 1, a platform, measures c. 11.0 by 9.0 m and 1.0 m high. It is built of stacked basalt boulders and is partly faced but collapsing in places. Furthermore, the south end of the structure appears altered by the present ranch road. The platform contains a roughly level boulder surface upon which is built a raised terrace and wall segment. The terrace measures c. 6.0 by 6.0 m and

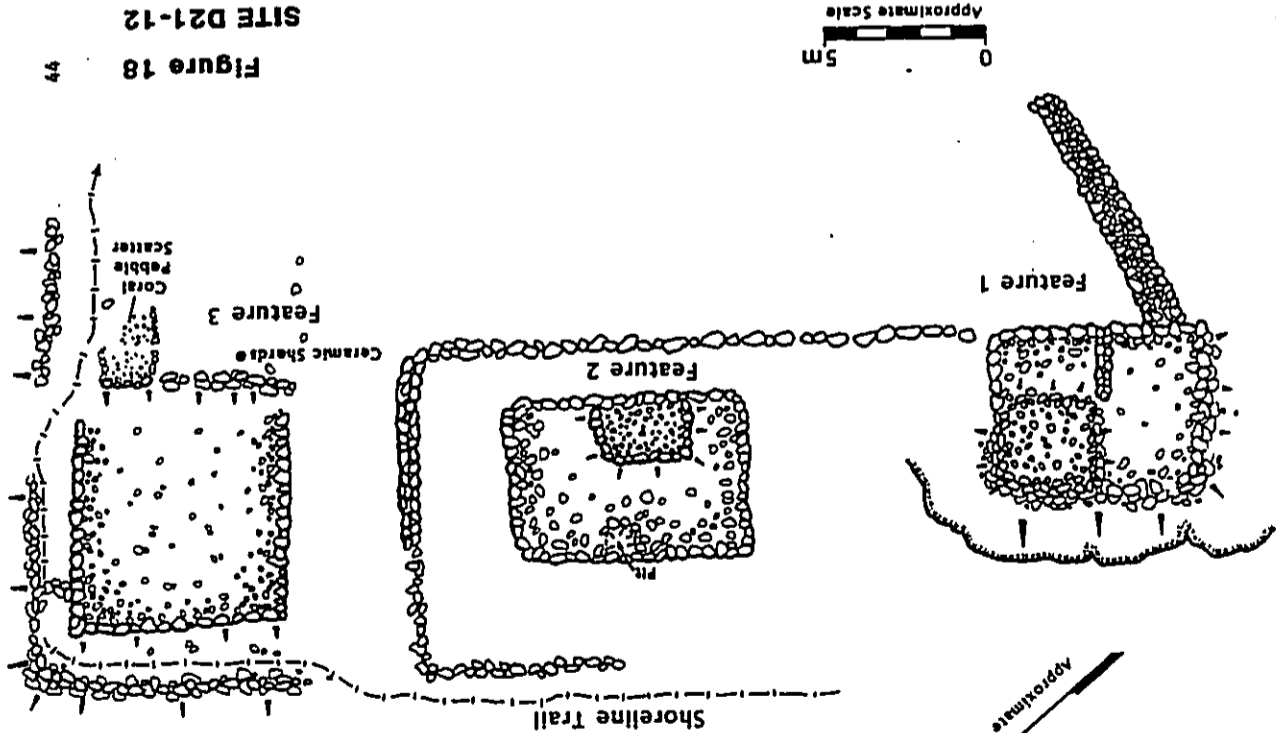


Figure 18
SITE D21-12

is built in the northwest corner of the structure. It contains a level boulder surface and is slightly raised on the south and east sides. The wall extends southeast from the southeast corner of the terrace and measures c. 5.0 by 0.5 m and 0.8 m high. It is faced and constructed of well stacked basalt boulders.

A ramp, measuring c. 14.0 by 1.5 m and 0.7-1.4 m high, extends east from the southeast corner of the platform. It is faced, constructed of stacked basalt boulders. A boulder alignment, which appears to be the remnants of a wall, extends northeast toward Feature 2.

Feature 2, a platform, is located c. 10.0 m north of Feature 1 and measures c. 15.1 by 0.7 m and 1.1 m high. It is constructed of stacked basalt boulders, including several large upright slabs and is faced, but collapsing in places. The platform contains a roughly level boulder surface upon which is constructed a raised terrace and pit. The terrace is constructed against the east edge of the platform and measures c. 3.5 by 3.4 m and 0.5 m high. It contains a level boulder surface and is slightly raised on the north, south and west sides. The pit is constructed against the west edge of the platform, and measures c. 2.6 by 0.8 m and 1.6 m deep. The platform is partially enclosed on the east, west and north sides by a wall of varying dimensions. The wall is faced, constructed of stacked basalt boulders, and measures (maximum) c. 1.6 m wide by 2.0 m high.

Feature 3, a large terrace, is located north of Feature 2 and measures c. 20.9 by 13.0 m and 0.75 m high. It is faced on the northwest, northeast and southwest sides, is constructed of stacked basalt boulders, and contains a level cobble paved surface.

Immediately east of and overlooking the large terrace area are two smaller terraces and a wall. The terraces contain a level, basalt cobble surface with a moderate amount of coral pebbles and shell midden. A worn foot trail defined by crude boulder alignments extends east from the terraces ending at the present ranch road. Several ceramic sherds are visible to the southwest of the terraces.

Portable remains recorded within Site Complex D21-12 (predominantly Feature 3) include sparse to moderate amounts of *Coralliophila* spp., *H. picea*, *H. polika*, coral, and waterworn rock. The small terraces and ceramic sherds appear to be the remnants of a historic house site.

D21-13 Platform

This platform was initially recorded by Renger (1970:38) and only tentatively identified during present survey. It may possibly have been recorded as Site T-107 (Feature B).

D21-14 Enclosure

This enclosure was initially recorded by Renger (1970:38) and only tentatively identified during present survey. It may possibly have been recorded as Site T-107 (Feature A).



Approximate Scale
5m
Sketch Map

Figure 19
SITE D21-15

D21-15 Box C-shape shelter

This box C-shape shelter measures c. 4.5 by 4.1 m in area with walls c. 0.6-1.3 m wide by c. 0.75 m high. The partially faced shelter wall is open to the northwest and constructed of stacked basalt boulders. The shelter contains a low internal terrace c. 0.2 m high, built against the southeast wall. Furthermore, shell midden is visible in an uprooted *Fig* tree adjacent to the structure. Portable remains recorded within Site D21-15 include spores to moderate amounts of *CYPRINUS* spp., *Thalididae*, *M. plicata*, *Echinoidea*, *Isognomonidae*, and charcoal fragments.

D21-16 C-shape shelter

This C-shape shelter was initially recorded by Reeger (1970:38) and only tentatively identified during present survey. It may possibly have been recorded as a feature of Site Y-106.

D21-17 Complex

This complex consists of nine features situated on pahoehoe and the west edge of an aa flow. Feature 1, a box C-shape shelter, is built on pahoehoe, but against the aa flow, and measures c. 3.4 by 2.5 m in area. The partially faced shelter walls are open to the west, measure c. 0.85 m wide by c. 0.6 m high, and are constructed of stacked as boulders utilizing upright basalt slabs on the interior side.

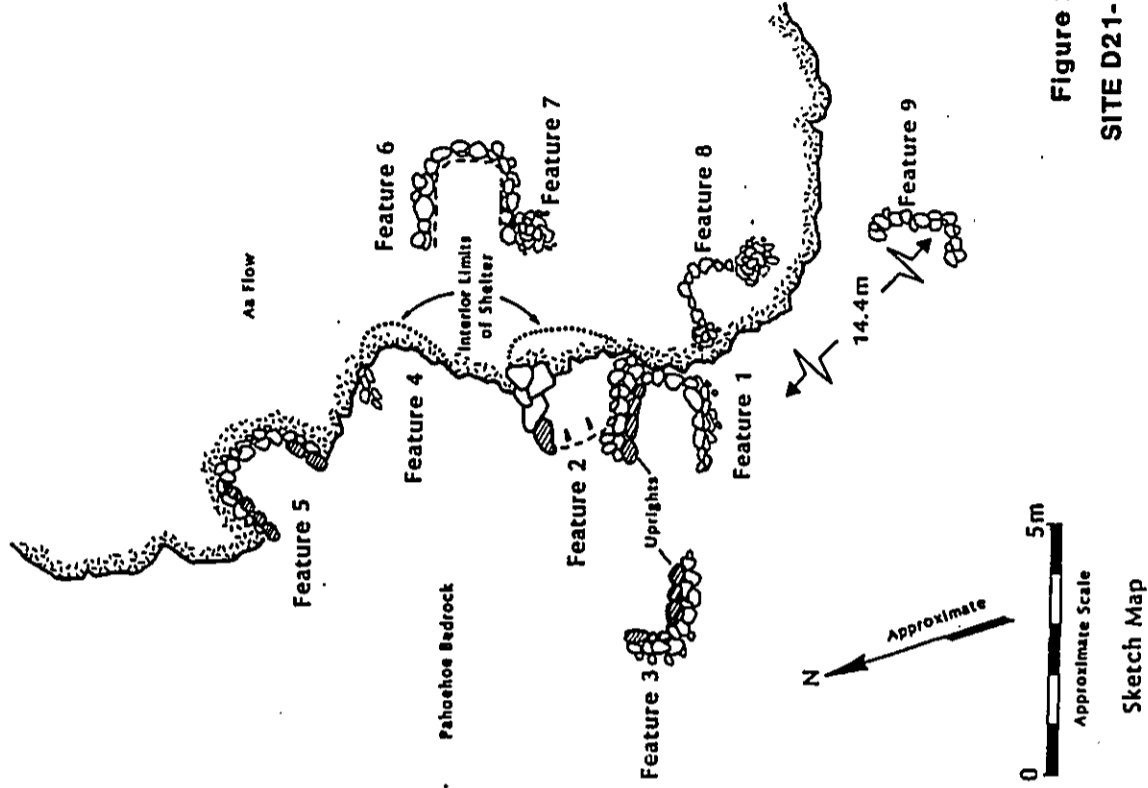


Figure 20
SITE D21-17

Approximate Scale
5m
Sketch Map

Feature 2, a walled overhang shelter, located adjacent to and north of Feature 1 is open to the west and measures c. 2.0 by 1.4 m in area. The overhang area measures c. 1.4 by 0.8 m with a ceiling 1.1 m high. It utilizes the north wall of Feature 1, in addition to an upright and capstone slabs which create a larger shelter area.

Feature 3, a walled shelter, is located on pahoehoe bedrock west of Feature 1. The wall is L-shaped measuring c. 2.75 m (east-west) by 2.75 m (north-south) in length and c. 0.55 m wide by 0.65 m high. It is built of piled basalt boulders, utilizing upright basalt slabs on the north and east sides.

Feature 4, an overhang shelter, is located c. 2.0 m north of Feature 2. The overhang area measures c. 2.3 by 0.6 m and up to 0.8 m high. With the exception of a possible rubble wall which is vague and indistinct, the shelter does not contain any structural modifications.

Feature 5, a box C-shape shelter, is located c. 6.5 m north of Feature 2 against the west edge of the aa flow, and measures c. 2.7 by 2.0 m in area. The partially faced walls are open to the southwest, measure c. 0.65 m wide by 0.8 m high, and are constructed of stacked boulders utilizing upright basalt slabs on the interior side.

Feature 6, a C-shape shelter, is located on the aa flow c. 6.3 m north-west of Feature 1. It measures c. 2.1 m in area with walls c. 0.65 m high. The walls are raised but not faced, open to the west, and constructed of piled boulders. The interior floor of the shelter consists of a level aa cobbles surface.

Feature 7, a cairn, is located south of and adjacent to Feature 6. It measures c. 1.0 by 0.8 m and 1.05 m high. The cairn is constructed of crudely stacked boulders. Its function is undetermined.

Feature 8, a C-shape shelter, is located on the aa flow southeast of Feature 1. It measures c. 3.0 by 2.0 m in area with walls c. 0.6 m high. The walls are raised but not faced, open to the southwest, and are constructed of piled boulders. The interior floor of the shelter consists of a level aa cobbles surface. On each end of the C-shape wall is a cairn. The cairns are incorporated into the structure and they measure c. 0.8 m in diameter by c. 0.9 m high, being constructed of crudely stacked boulders.

Feature 9, a walled shelter, is located on pahoehoe bedrock c. 14.4 m south of Feature 1. The wall is L-shaped measuring c. 2.6 m (north-south) by 1.4 m (east-west) in length and c. 0.6 m wide by 0.4 m high. It is constructed of piled basalt boulders and is raised but not formally faced.

Portable remains within the complex include sparse to moderate amounts of *Cypraea* spp., *Callina* spp., *N. picea*, unidentified shell, and waterworn rock.

D21-18 Complex

Figure 21

This complex consists of six features, including a collapsed lava tube containing several cave shelters. Feature 1, a cave shelter, measures c. 4.1 by 3.6 m in area with a ceiling c. 1.25 m high. Structural modifications include a terrace and a sealed opening. The terrace is c. 0.45 m high, constructed of crudely stacked basalt boulders, and located on the exterior and northwest of the cave entrance. The sealed opening is located on the southeast end of the cave shelter. Shell midden is visible on the interior and exterior surfaces of the shelter.

Feature 2, a cave shelter, is located c. 9.0 m northwest of Feature 1, and measures c. 8.0 by 2.5 m with a ceiling c. 1.0 m high. The shelter contains no structural modifications, but a scatter of shell midden is visible on the interior surface.

Feature 3, a sealed cave shelter, is located c. 15.6 m northwest of Feature 2. It was initially utilized as a habitation/shelter cave, as evidenced by moderate amounts of shell midden. At present, the entrance is sealed with basalt slabs, and the cave contains a minimum of five burials with associated wooden poles and planks. No interior cave dimensions were recorded, because the entrance was recessed and the cave was not explored further.

Feature 4, a wall shelter, is located on pahoehoe bedrock north of Features 1 and 2. The shelter is constructed of piled basalt boulders and resembles a collapsed rock pile. It measures c. 2.0 m in diameter by c. 0.7 m high, and a scatter of shell midden is visible north of the structure.

Feature 5, a concentration of petroglyphs, is located north of and adjacent to Features 1 and 2. The petroglyphs are vague and indistinct, but appear to represent human figures.

Feature 6, a cave shelter, is located c. 31.0 m southeast of Feature 1. It measures c. 15.0 by 3.5 m in area with a ceiling 1.3 m high. The shelter contains no structural modifications, but an extensive scatter of shell midden is visible on the interior surface.

Portable remains recorded within Site Complex D21-18 include moderate to high amounts of *Cypraea* spp., *N. picea*, *Echinoidea*, *Thauidae*, *Callina* spp., *E. strabularioides*, *Strombidae*, *Isogonomidae*, unidentified pearl shell, charcoal fragments, coral, volcanic glass flakes, and abraders (echinoid spine and coral).

D21-19 Cave Shelter

This cave shelter is located adjacent to Trail D21-23, and measures c. 10.0 by 8.0 m in area with a ceiling c. 0.8 m high. The cave entrance may possibly be modified by a crude, piled boulder alignment, and the



Figure 21. SITE D21-16. View to west. (PHRI Neg. 372-22A)

interior bedrock surface contains a very sparse scatter of shell midden. The cave probably functioned as a temporary shelter. Portable remains recorded within Site D21-19 include *EXYZIA* spp., *N. RICES*, *N. ROLLIS*, *Thalididae*, *Echinoidae*, and coral.

D21-20 Complex

This complex consists of two features which probably functioned as temporary shelters. Feature 1, a cave shelter, measures c. 8.0 by 5.0 m in area with a ceiling c. 0.65 m high. The entrance appears modified with a crudely constructed L-shaped wall. The wall measures c. 2.1 m (north-south) by 1.7 m, and c. 0.45 m wide by 0.5 m high, and is constructed of crudely piled basalt boulders.

Feature 2, a cave shelter, is located c. 8.0 m southwest of Feature 1 and measures c. 4.0 by 3.5 m in area with a ceiling c. 0.9 m high. The shelter contains no structural modifications, but a very sparse scatter of shell midden is visible on the interior surface.

Portable remains recorded within Site Complex D21-20 includes very sparse amounts of *EXYZIA* spp., *N. RICES*, *N. ROLLIS*, and *Echinoidae*.

D21-21 Cave Shelter

This cave shelter is located south of and near Trail D21-23. The cave measures c. 8.0 by 5.0 m in area with a ceiling c. 1.5 m high. The cave contains a thin, greyish cultural deposit, and shell midden on the interior bedrock surface.

Portable remains recorded within Site D21-21 includes moderate amounts of *EXYZIA* spp., *Echinoidae*, *N. RICES*, and *Thalididae*.

D21-22 Complex

Figure 22

This complex consists of eight features. Feature 1, a cave shelter, measures c. 6.0 by 1.6 m in area with a ceiling c. 1.0 m high. With the exception of an exterior terrace (Feature 7), constructed near the entrance and extending toward Feature 2, the cave shelter contains no structural modifications.

Feature 2, a cave shelter, is located c. 4.5 m southeast of Feature 1 and measures c. 8.0 by 1.8 m in area with a ceiling c. 1.0 m high. With the exception of a small terrace c. 1.0 m high constructed of stacked basalt boulders located on the exterior and south of the cave entrance, the shelter contains no structural modifications. A small crawlway extends northwest, connecting Feature 2 to Feature 1.

Feature 3, a cave shelter, is located c. 5.0 m northwest of Feature 1. It measures c. 10.0 by 1.95 m in area with a ceiling c. 0.8 m high. The shelter did not appear to contain any structural modifications.

Feature 4, a C-shape shelter, is located east of and above Feature 1 entrance. The shelter is open west and measures c. 2.2 by 2.0 m in area with walls c. 0.95 m high on the interior side. The walls are faced on the interior side, constructed with stacked basalt boulders, and are even with the surrounding terrain on the exterior edge. The shelter contains a level interior surface of sand cobbles.

Feature 5, a box C-shape shelter, is located c. 3.4 m south of Feature 2 entrance, and measures c. 2.6 by 2.4 m in area with walls c. 0.65 m wide by 0.65 m high. The walls are crudely faced on the interior side and constructed of stacked basalt boulders. The structure is open west and contains a level, interior sand cobble surface.

Feature 6, a wall shelter, is located c. 7.0 m northwest of Feature 4, and measures c. 3.0 m in length by 0.6 m wide and 0.6 m high. The wall curves slightly west, and is constructed of piled basalt boulders on a pahoehoe bedrock surface.

Feature 7, a terrace, is located immediately west of Feature 1 entrance, and extends southeast toward Feature 2 entrance. The terrace measures c. 4.7 by 0.9 m and up to 0.65 m high. It is faced on the west side, constructed of stacked basalt boulders, and contains a roughly level boulder and cobble surface. A large upright boulder is utilized in the faced west side.

Feature 8, a walled shelter, is located on pahoehoe bedrock c. 33.0 m southeast of Features 1-7, and measures c. 4.5 by 4.5 m in area with walls c. 0.35 m wide by 0.55 m high. The shelter is roughly rectangular in shape, utilizing the edge of an ash flow as the south wall. The walls are constructed of piled basalt boulders, and an opening or entrance is visible in the north wall. A complete *Syrnasa* sp. shell octopus lure was recorded within this structure, but not collected.

Portable remains recorded within Site Complex D21-22 include sparse amounts of *CYPHERA* spp., Echinoides, and unidentified marine mollusc shell. Furthermore, a thin, greyish deposit (possibly ash) was visible on the interior surface of the cave shelters.

D21-22 Trail

This site is a coastal-inland oriented foot trail consisting of a worn pahoehoe and crushed gravel surface. Trail D21-23 is distinct near Sites D21-19, D21-21, and inland from approximately the 150 ft elevation, but is not visible in most other areas. The trail is c. 0.5-0.7 m wide, oriented toward Sites D21-19 and D21-21, but is not as well worn as Trail D21-7. A short, indistinct trail segment connects D21-23 and D21-7 at approximately the 160 ft elevation. Trail D21-23 probably intersected further inland with Trail D21-7, but this area has been destroyed by Queen Kapihau Highway.



Figure 22. SITE D21-22. View to northeast. (PURI Neg. J74-25)



D21-24 Complex

Figure 23

This site complex consists of an anchialine pond concentration which contains at least eight component features. The features include numerous low pond walls, cairns, and platforms. These internal structural modifications appear to create separate, distinct ponds which form an aquascul-ture complex.

A worn foot trail defined by crude boulder alignments extends south from the ponds, ending at the present ranch road. This trail is probably of recent construction.

D21-25 Complex

This complex consists of three features. Feature 1, a box C-shape, measures c. 9.4 by 9.0 m in area with well faced walls c. 1.0 m wide by 0.3-0.9 m high. The structure is open to the west and constructed of well stacked basalt boulders on a sand beach overlooking Kukio Bay. A rectangular barbecue pit and wooden picnic tables are also present.

Feature 2, a box C-shape, is located immediately south of Feature 1, and measures c. 8.0 by 5.4 m in area with well faced walls c. 1.1-2.5 m wide and 0.6 m high. The structure is open to the west and constructed of well stacked basalt boulders on a sand beach. Feature 2 is similar in construction and appearance to Feature 1.

Feature 3, a wall, is located southeast of Feature 2, and measures c. 12.0 by 1.0 m and 0.8-1.0 m high. It is faced, constructed of stacked basalt boulders, and partially encloses a brackish water spring. A small portable water pump and pipe lead to the water tank near Site D21-10 (Feature 1).

Site Complex D21-25 probably represents recent recreational structures associated with ranch activities, but it may possibly be built on a pre-existing site.

1189 Cairn

This cairn was initially recorded by Ching (1971:Map 16, Enlargement 11), but due to the lack of any site description, it could not be identified during present survey.

1193 Trail

This trail is an inland portion (within Parcel 16) of previously designated Site D21-7, a foot trail initially recorded by Renger (1970:37) and subsequently assigned Site 1193 by Ching (1971:202-203). See Site D21-7.



Figure 23. SITE D21-24. View to northwest. (PHRI Neg. 372-27A)

167-090385

1196 Complex

This complex consists of three features. Feature A consists of a group of four distinct, and several indistinct, petroglyphs. The petroglyphs appear to represent human figures, including both stick and triangular body forms.

Feature B, a wall, is located northeast of Feature A, and measures c. 4.1 by 1.4 m and 0.5 m high. The wall is indistinct, in very poor condition, and constructed of piled basalt boulders.

Feature C, a wall, is located northeast of Feature A, and measures c. 1.9 by 1.1 m and 0.4 m high. The wall is indistinct, in very poor condition, and constructed of piled basalt boulders.

1197 Trail

This foot trail consists of a worn pahoehoe and crushed gravel surface measuring c. 0.6-0.7 m wide. The trail is intermittently visible, and appears to branch from Trail D21-7 toward Trail 1200.

1200 Trail

This foot trail consists of a worn pahoehoe and crushed gravel surface measuring c. 0.6-0.7 m wide. The trail is intermittently visible, and appears to branch from Trail D21-7 toward Sites 1202-1207.

1201 Complex

This complex consists of two features. Feature A, a cave shelter, measures c. 10.1 by 4.0 m in area with a ceiling c. 0.8 m high. The shelter consists of a small sink with overhang or small cave shelters on the east, west, and south sides. The cave shelter contains a natural skylight on the east side measuring c. 0.3 by 0.7 m in area, but no structural modifications.

Feature B, a cave shelter, is located c. 25.0 m east of Feature A, and measures c. 6.5 by 3.0 m in area with a ceiling c. 0.85 m high. The cave shelter contains no structural modifications.

Portable remains recorded within Site Complex 1201 includes sparse to moderate amounts of *Cyrtusa* spp., Echinoidea, Thaididae, *Gallina* spp., and coral.

1202 Complex

This complex consists of three features, all part of a collapsed tube. Feature A, a cave shelter, is located on the east side of the collapsed tube, and measures c. 6.0 by 4.0 m in area with a ceiling c. 1.0 m high.

167-090385

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With the exception of a second boulder sealed entrance to the east, the cave shelter does not contain any structural modifications. A thin, greyish soil deposit and shell midden are visible on the interior surface of the shelter.

Feature B, a cave shelter, is located c. 4.0 m from Feature A on the west side of the collapsed tube, and measures c. 4.5 by 3.0 m in area with a ceiling c. 0.75 m high. The entrance to Feature B is modified, with large basalt slabs (several upright) creating a smaller opening. The shelter contains a second entrance or opening measuring c. 1.3 by 0.8 m in size on the north side. A very thin, greyish soil deposit and shell midden are visible on the interior surface of the shelter.

Feature C, a terrace, is built within and across the collapsed tube between Features A and B. The terrace measures c. 3.0 by 1.5 m in area and 0.6 m high. It is raised, but not well faced, contains a roughly level surface, and is constructed of stacked basalt boulders.

Portable remains recorded within Site Complex 1202 include sparse to moderate amounts of *Cyrtusa* spp., *R. picea*, Echinoidea, *Gallina* spp., Thaididae, mammal tooth, kukui, waterworn cobbles, charcoal fragments, and a *Cyrtusa* sp. shell octopus lure.

1203 Cave Shelter

Figure 24

This cave shelter is located c. 13.0 m west of Site Complex 1202, and measures c. 10.0 by 4.2 m in area with a ceiling c. 1.15 m high. The cave entrance is modified, with basalt boulders and slabs creating a smaller opening. A small skylight is located c. 5.2 m west of the entrance, and the interior cave surface contains a greyish soil deposit with shell midden.

Portable remains recorded within Site 1203 include moderate amounts of *Cyrtusa* spp., *R. picea*, Echinoidea, Thaididae, Isogononidae, *Gallina* spp., a pandanus key, bird bone, charcoal fragments, a waterworn cobble, kukui, a *Cyrtusa* sp. shell octopus lure, an echinoid spine abrader, and a perforated *Gallina* sp. shell. A second *Cyrtusa* sp. shell octopus lure was recorded, flagged, and located c. 20.0 m west of Site 1203.

1204 Complex

This complex consists of two features. Feature A, a cave shelter, measures c. 4.0 by 2.0 m in area with a ceiling c. 0.55 m high. With the exception of a single *Cyrtusa* sp. shell fragment, no portable remains are visible within the cave shelter.

Feature B, a wall, is located right at the entrance and it continues over the shelter. The wall measures c. 3.0 by 0.5 m and 0.35 m high. The wall is constructed of piled basalt boulders, is in poor condition, and generally collapsed in appearance. This structure probably functioned as a temporary shelter.



Figure 24. SITE 1203. View to west. (PHMI Neg. 375-12)

1205 Cave Shelter

This cave shelter is located c. 17.0 m northeast of Site Complex 1202, and measures c. 5.5 by 4.0 m in area with a ceiling c. 1.2 m high. The shelter entrance is modified with basalt boulders, creating a smaller opening.

Portable remains recorded within Site 1205 include sparse to moderate amounts of *Cypraea* spp., *Echinoides*, *N. pisca*, *Gellana* spp., *Thalididae*, *Conidae*, *Strombidae*, mammal bone, kuku, and coral.

1206 Complex

This complex consists of three features, all part of a collapsed tube. Feature A, a cave shelter, is located on the northwest side of the collapsed tube and measures c. 8.0 by 3.15 m in area with a ceiling c. 0.75 m high. The cave shelter does not contain any structural modifications but shell midden is visible on the interior surface.

Feature B, a cave shelter, is located c. 3.5 m from Feature A on the southeast side of the collapsed tube and measures c. 4.0 by 3.6 m in area with a ceiling c. 0.75 m high. The cave shelter does not contain any structural modifications, but shell midden is visible on the interior surface.

Feature C, a terrace, is built within and against the southwest side of the collapsed tube between Features A and B. The terrace measures c. 1.8 by 1.4 m in area and 0.2 m high. It is raised but not well faced, contains a roughly level surface, and is constructed of stacked basalt boulders.

Portable remains recorded within Site Complex 1206 include sparse to moderate amounts of *Cypraea* spp., *N. pisca*, *Echinoides*, *Gellana* spp., *B. crebristriatus*, and a waterworn cobble.

1207 Cave Shelter

This cave shelter is located c. 20.0 m east of Site Complex 1206, and measures c. 5.0 by 2.7 m in area with a ceiling 1.05 m high. The cave does not contain any structural modifications, but shell midden is present on the interior surface. Portable remains recorded within Site 1207 include sparse amounts of *Cypraea* spp., *N. pisca*, *Gellana* spp., and *B. crebristriatus*.

1210 Complex

This complex consists of two features. Feature A, a cave shelter, measures c. 6.0 by 4.25 m in area with a ceiling 1.1 m high. The cave shelter contains a thin grey soil deposit and shell midden, but no internal structural modifications.



Figure 25. SITE 1210. Note slab paved surface. View to west.
(PHRI Neg.375-23)

Feature B, a boulder slab paving, is visible east of the entrance on the exterior surface of the shelter. The slabs measure c. 0.3-0.7 m in diameter by c. 0.06-0.2 m thick, and form a roughly level, paved surface.

Portable remains recorded within Site Complex 1210 include moderate amounts of *EXYZEA* spp., *Callina* spp., *Conidae*, *M. Picea*, *Littorinidae*, *Thaididae*, a waterworn basalt cobble, and coral.

1211 Complex

This complex consists of two features. Feature A, a cave shelter, is located c. 7.1 m southeast of Site Complex 1210, and measures c. 8.0 by 5.0 m in area with a ceiling 1.0-1.85 m high. The cave shelter contains a thin, gray soil deposit and a second large entrance on the southeast side, but no internal structural modifications.

Feature B, an alignment of steppingstone basalt slabs, is visible on the exterior of the north entrance. The steppingstone basalt slabs are similar in size to those of Site Complex 1210 (Feature B), and are an extension of that slab paved feature.

Portable remains recorded within Site Complex 1211 include moderate amounts of *EXYZEA* spp., *M. Picea*, *Callina* spp., *Thaididae*, *Conidae*, mammal bone, and a waterworn basalt boulder.

CONCLUSION

DISCUSSION

The full reconnaissance survey of the Kukio Resort development project area confirmed the presence of numerous archaeological sites and features of both prehistoric and historic-period occupation and exploitation. The range of functional feature types identified include both temporary and probably permanent habitation features (walled, cave, and overhang shelters, and raised stone platforms) comprising 71.0% of the total sites, burial caves (2.9%), foot trails (10.1%), aquaculture sites (2.9%), recreational (petroglyphs) sites (2.9%), a possible ceremonial (heiau) complex (1.4%), boundary walls (2.9%), and sites of undetermined function (5.7%). The overall physical condition and integrity of the archaeological remains vary from poor to good, with several of the larger structural features being in quite good condition.

Most of the sites and features (47.8%) are concentrated near the shoreline, in the immediate coastal zone, and especially in the south part of the zone. The inland portions of the project area have a distinct paucity of sites and features (inland portion of Parcel 5 = 23.1%, Parcel 16 = 28.9%), the principal types being coastal inland extending foot trails and associated temporary habitation features. This distribution of sites conforms to the general pattern of aboriginal Hawaiian settlement that has

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Based on the findings of the full reconnaissance survey, the archaeological remains found within the Kukio Resort development area appear to be, for the most part, of limited to moderate significance in terms of potential scientific research, interpretive, and cultural values. Specific exceptions to this general evaluation are 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 main complex comprised of three large platforms, later historic-period boushite 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., M. Springer);
- D21-24 Pond complex--potentially high interpretive value, especially in association with adjacent D21-12 complex; significance of pond internal structural modifications to be determined;
- T-124 Burial cave--high cultural value, due to presence in cave shelter of 10 or more human burials and cultural remains; and
- Various foot trails (D21-7, -23; T-133, -134, -141; 1193, 1197, 1200)--potentially high interpretive value, as well as cultural value.

With the exception of the specific sites and features listed above, most of the sites identified during the full reconnaissance survey appear to be sites for which continued physical preservation would not be considered essential. This finding suggests that most of the archaeological remains present within the project area could be handled adequately by carrying out the appropriate level of further archaeological work needed to recover the significant data present, such as intensive survey--thereby preserving the valuable archaeological information, rather than the physical remains themselves. At the same time, many of the identified archaeological remains, while having only limited significance in terms of potential research, interpretive, or cultural value, could be considered for preservation and inclusion into the landscaping of the development project area.

Upon completion of field work, survey findings and preliminary conclusions--including tentative evaluations and recommendations, were discussed (August 30, 1985) with Ms. Virginia Goldstein, Staff Planner and Historic Sites Specialist in the Hawaii County Planning Department. Ms. Goldstein concurred with the conclusions and the recommendations presented here regarding further archaeological work to be done within the Kukio Resort development project area.

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been reconstructed on the basis of archaeological, ethnographic, and ethnographic sources for the portion of North Kona to the north of Kailua (Kosendahl 1973:60-61). This local environmental setting is characterized by three major zones: a narrow, arid coastal habitation zone associated principally with the exploitation of various marine resources (immediate coastal area of Parcel 5); a sloping, barren middle zone characterized by exposed and pahoehoe lava rocklands, and largely devoid of soil or vegetation other than grasses (inland portion of Parcel 5 and Parcel 16); and an upland habitation zone associated with agricultural exploitation. Sites in Parcel 16 may also represent the seaward limits of this upland habitation zone. A forest zone, still further inland, was also exploited but not inhabited. The sites and features identified within the Kukio Resort development project area evidence the occupation of the narrow coastal zone, and the movement of people and produce along the foot trails through the barren intermediate zone that connected the coastal and inland areas of habitation and exploitation.

A coastal trail, only visible north and south of Kukio lot in the Lands of Kaupulehu and Kukio 2nd respectively, also demonstrates movement of people and produce along the coast. The preliminary historical research (Appendices A and B) adds further documentation to both coastal and inland oriented movement during the historic period. Furthermore, the preliminary historical research and local informant interviews provided insightful data relevant to specific archaeological sites, land history, cartographic sources, mythological legends, environment, and culture history, lifeways and values. Hydration risid measurements of volcanic glass samples reported by Cordy (1981) indicated a date range of AD 1692-1899 for Sites D21-2 and D21-12. It is reasonable to conclude that other sites in Kukio lot would yield similar dates.

EVALUATIONS AND RECOMMENDATIONS

The significance of archaeological remains can be defined in terms of potential scientific research, interpretive, and/or cultural values. Research value refers to the potential of archaeological resources for producing information useful in the understanding of culture history, past lifeways, and cultural processes at the local, regional, and interregional levels of organization. Interpretive value refers to the potential of archaeological resources for public education and recreation. Cultural value, within the framework for significance evaluation used here, refers to the potential of archaeological resources for the preservation and promotion of cultural and ethnic identity and values.

To attempt definitive evaluation of the significance of archaeological resources on the basis of a preliminary assessment such as a reconnaissance survey is generally premature. Occasionally it is possible at even a preliminary level of study, such as that of a reconnaissance survey, to evaluate the significance of specific sites or features when their scientific research, interpretive, and/or cultural values are obvious; however, in most instances it is necessary first to conduct intensive survey, often including test excavations, to determine and substantiate the significance of specific archaeological remains.

Individual site evaluations and recommendations for appropriate further action (specific field work tasks) have been included in Tables 1, 2, and 3 (at end). Further appropriate archaeological work can be undertaken as specific SMA permit conditions. Based on the findings of the full reconnaissance survey, 19 sites (29 component features)--sites 1-101, -110, -116, -117, -120, -121, -123, -125 thru -127, -131, -135 to -137, -140; D21-8, -19, -20; and 120A--are believed to require no further work. For the remaining 50 identified sites and one unidentified site (Site 1189), further archaeological work in the form of intensive survey (including historical documentary research, vegetation clearing, detailed mapping and recording, and controlled test excavations) is recommended. The following specific field tasks were determined to constitute an adequate scope of work for the intensive survey:

- a. Accurate locational plotting of sites on an appropriate scale topographic map of the project area;
- b. Intensive level survey recording of sites--including detailed plan mapping, written descriptions, and photographs;
- c. Surface collection of portable remains (middens and artifacts) from sites;
- d. Subsurface testing of sites with apparent excavation potential; and
- e. Subsurface testing of bench deposits between the north and of Kukio Bay and the north end of Kekapa Bay to determine the presence or absence of buried cultural deposits.

As an important initial step, it is recommended that all sites be accurately located and plotted by professional surveyors, with the aid of an archaeologist, on an appropriate scale topographic map of the project area. This would greatly aid development planning by allowing further archaeological work determinations (intensive survey and/or preservation) to be considered on a site-by-site basis.

It should be noted that the evaluations and recommendations given here have been made on the basis of the surface reconnaissance survey. There is always the possibility, however remote, that previously unidentified surface structural remains or subsurface cultural features or deposits of high significance might be encountered in the course of subsequent archaeological investigations or other development activities. In such a situation, archaeological consultation should be sought immediately.

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Table 1.

SUMMARY OF NEWLY IDENTIFIED SITES AND FEATURES
KUKIO RESORT DEVELOPMENT PROJECT AREA

Site & Feature Number	Formal Site/Feature Type	Tentative Interpretation	Significance Evaluation				Field Work Tasks	Comments
			R	I	C	DR, SC, EX		
T-101	Walled shelter	Habitation	L	L	L	None	Four excavation potential	
T-102	Complex (7) ⁺	Habitation	M	L	L	x x x	Surface midden and excavation potential	
A	Cave shelter							
B	Box C-shape shelter							
C	Box C-shape shelter							
D	Linear rock alignment							
E	Circular rock alignment							
F	C-shape shelter							
G	Enclosure							
T-103	Complex (2)	Recreational	M	M	M	x x -	Surface midden present; PAPUHU (3), human figure petroglyphs (3)	
A	Papuhu							
B	Petroglyphs							
T-104	Complex (4)	Habitation	M	L	L	x - x	Walls appear recent; Fes. C and D unclear	
A	Wall							
B	Wall							
C	Terrace							
D	Platform (collapsed)							
T-105	Wall	Aquaculture	M	M	M	x - x	Possible buried seaward wall of pond complex (Site D21-24)	
T-106	Complex (6)	Habitation	M	L	L	x x x	Surface midden and volcanic glass (1) present; poss. Site D21-16	
A	Partially walled sink hole							
B	Rubble mound							
C	Box C-shape shelter							
D	Rubble mound							
E	Overhang walled shelter							
F	C-shape shelter							

*Significance Evaluation—Nature: N = scientific research, I = interpretive, Degree: H = high, M = moderate, L = low

†Field Work Tasks: DR = detailed recording (scaled drawings, photographs, and written descriptions), SC = surface collections, EX = test excavations

‡Number of component features within complex.

Table 1. (Cont.)

Site & Feature Number	Formal Site/Feature Type	Tentative Functional Interpretation	Significance Evaluation	Field Work	Comments
			R I C	DR SC EX	
T-117	Overhang shelter	Habitation	L L L	None	Portable remains include one piece each of coral, Thaididae, Echinoidea, and Crustacea
T-118	Complex (2) Box C-shape shelter	Habitation	M L L	x x x	Midden present
T-119	Complex (2) Enclosure	Habitation	L L L	x x -	Midden present
T-120	Box C-shape shelter	Habitation	L L L	None	Sparse midden includes Cypraea spp., Thaididae, and Echinoidea
T-121	Walled shelter	Habitation	L L L	None	No portable remains
T-122	Complex (5) Cairn	Undetermined	L L L	x - -	Recommend accurate locational plotting by professional surveyors; poss. marks indistinct trail
T-123	Circular rock alignment	Undetermined	L L L	None	Portable remains include sparse coral and water-worn pebbles
T-124	Cave	Habitation/Burial	H L H	x x x	Historic and prehistoric burials (10+); moderate prehistoric deposit present
T-125	Wall	Boundary	L L L	None	On boundary between Kukio 1st and Kaupulehu
T-126	Walled shelter	Habitation	L L L	None	Sparse midden present

Table 1. (Cont.)

Site & Feature Number	Formal Site/Feature Type	Tentative Functional Interpretation	Significance Evaluation	Field Work	Comments
			R I C	DR SC EX	
T-107	Complex (2) C-shape shelter	Habitation	M L L	x x x	Surface midden present; poss. Site D21-14 (See A) and D21-13 (See B)
T-108	Complex (2) Box C-shape shelter	Habitation	L L L	x x -	Sparse surface midden present; upright slabs utilized in box C-shape shelter
T-109	(See Site D21-7)				Inland portion of Site D21-7 (above Queen Kaahumanu Highway)
T-110	Complex (4) Cave shelter	Habitation	L L L	None	Midden included two coconut shells, one waterworn boulder, one Thaididae and one CYPRAEA sp. frag.
T-111	(See Site D21-23)				Identified as Site D21-23
T-112	(See Site D21-7)				Inland portion of Site D21-7 (between immediate coastal area and Queen Kaahumanu Highway)
T-113	(See Site D21-21)				Identified as Site D21-21
T-114	Box C-shape shelter	Habitation	M L L	x - x	
T-115	Enclosure	Undetermined	M L L	x - x	
T-116	C-shape shelter	Habitation	L L L	None	Associated with T-134 trail; no portable remains

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Table 1. (Cont.)

Site & Feature Number	Formal Site/Feature Type	Tentative Functional Interpretation	Significance Evaluation			Field Work	Comments
			R	I	C		
T-127	Walled shelter	Habitat	L	L	L	None	Midden includes one piece each Harika mica and Conus sp. on bedrock
T-128	(See Site D21-22)						Identified as Site D21-22
T-129	(See Site D21-20)						Identified as Site D21-20
T-130	Complex (3) A Walled shelter B Cairn C Cairn	Habitat	M	L	L	x - x	Recommend accurate locational plotting by professional surveyors; situated on Kukio 1st and Kukio 2nd boundary
T-131	C-shape shelter	Habitat	L	L	L	None	Portable remains include waterworn boulders
T-132	Cave shelter	Habitat	M	L	L	x x -	Midden and eco-factual material (coconut husk) present
T-133	Trail	Foot trail	M	H	M	x - -	Recommend accurate locational plotting by professional surveyors; branches from main trail (Site D21-7)
T-134	Trail	Foot trail	M	H	M	x - -	Recommend accurate locational plotting by professional surveyors; branches from main trail (Site D21-7)
T-135	Cave shelter	Habitat	L	L	L	None	Sparse midden on bedrock

Table 1. (Cont.)

Site & Feature Number	Formal Site/Feature Type	Tentative Functional Interpretation	Significance Evaluation			Field Work	Comments
			R	I	C		
T-136	Complex (2) A Overhang shelter B Overhang shelter	Habitat	L	L	L	None	Sparse midden on bedrock; shelters situated adjacent to trail (Site D21-7)
T-137	Complex (3) A Cave shelter B Cave shelter C Cave shelter	Habitat	L	L	L	None	Sparse midden on bedrock
T-138	C-shape shelter	Habitat	L	L	M	x - -	Situated within 2.0 m of anchialine ponds (Site D21-74)
T-139	Complex (4) A Cave shelter B Cave shelter C Square mound D Mound	Habitat	L	L	L	x x -	Midden and eco-factual material (KRYL) present
T-140	Complex (3) A Cairn B Cairn C Cairn	Undetermined	L	L	L	None	Features B and C appear recent; complex situated near Queen Kahunanu Highway
T-141	Complex (3) A Trail B Cairn C Rectangular mound	Foot trail	M	H	M	x - -	Recommend accurate locational plotting by professional surveyors; branches from main trail (Site D21-7)

Table 2.
SUMMARY OF PREVIOUSLY IDENTIFIED SITES AND FEATURES
PARCEL 5 - KUKIO RESORT DEVELOPMENT PROJECT AREA

Site & Feature Number	Formal Site/Feature Type	Tentative Functional Interpretation	Significance Evaluation			Field Work Tasks	Comments
			R	I	C		
D21-1	Complex (4) ⁺	Habitat	M	L	L	x x x	Midden present on as cobble surface
-1	Overhang shelter						
-2	Rectangular cairn						
-3	Walled shelter						
-4	Walled shelter						
D21-2	Complex (5)	Habitat	M	M	M	x x x	Substantial midden and grey cultural deposit present
-1	Enclosure						
-2	L-shape wall						
-3	Terrace						
-4	Terrace						
-5	Platform						
D21-3	Complex (3)	Habitat	M	L	L	x x	Midden and thin grey cultural deposit present
-1	Cave shelter						
-2	Cairn						
-3	Cleared area						
D21-4	Complex (4)	Habitat	H	L	L	x x x	Site damaged by looters; substantial undisturbed cultural deposit and midden present
-1	Platform						
-2	Cave shelter						
-3	Overhang shelter						
-4	Cave shelter						
D21-5	Double box C-shape shelter	Habitat	M	L	L	x x x	Central wall divides structure into two "rooms"; midden present
D21-6	Complex (4)	Habitat	M	L	L	x x x	Midden and artifacts present; petroglyph (human figure) noted near entrance to Feature 2
-1	Overhang shelter						
-2	Overhang shelter						
-3	Box C-shape shelter						
-4	Wall						

*Significance Evaluation--Mature: R = scientific research, I = interpretive, C = cultural;
Degree: H = high, M = moderate, L = low

⁺Field Work Tasks: DR = detailed recording (scaled drawings, photographs, and written descriptions), SC = surface collections, EX = test excavations

⁺Number of component features within complex.

Table 2. (Cont.)

Site & Feature Number	Formal Site/Feature Type	Tentative Functional Interpretation	Significance Evaluation			Field Work Tasks	Comments
			R	I	C		
D21-7	Complex (3)	Foot trail	M	M	M	x x	Recommend accurate locational plotting by professional surveyors
-1	Trail						
-2	Rock alignment						
-3	Rock alignment						
D21-8	Wall	Drift wall	L	L	L	None	Situated adjacent to and perpendicular to trail (Site D21-7)
D21-9	Complex (9)	Habitat	M	L	L	x x x	Moderate amounts of midden and artifacts present in Fea. 1
-1	Enclosed overhang/cave						
-2	Overhang shelter						
-3	Walled shelter						
-4	Walled shelter						
-5	Cairn						
-6	Cairn						
-7	Cairn						
-8	Cairn						
-9	Cairn						
D21-10	Complex (2)	Habitat	M	L	L	x x x	Fea. 1 partially destroyed by construction of ranch road and water tank
-1	Platform remnant						
-2	Platform						
D21-11	Complex (4)	Habitat	M	L	L	x x x	Fea. 2 and 4 have concrete foundations; historic ceramic sherds and sparse midden present
-1	Platform						
-2	Level area						
-3	Terrace						
-4	Terrace						
D21-12	Complex (3)	Habitat	H	H	H	x x x	Complex consists of three large structures containing numerous internal structural features; preservation recommended
-1	Platform						
-2	Platform						
-3	Terrace						
D21-13	Platform	Habitat	L	L	L	x x x	Unidentified during present survey; Poss. Site T-107 (Feature B)

Table 2. (Cont.)

Site # Feature Site/Feature Number	Formal Type	Tentative Functional Interpretation	Significance Evaluation			Field Work Tasks DR SC XX	Comments
			R	I	C		
D21-14	Enclosure	Habitat	M	L	L	x x x	Unidentified during present survey; poss. Site T-107 (Feature A)
D21-15	Box C-shape shelter	Habitat	M	L	L	x x x	Contains internal terrace against east wall
D21-16	C-shape shelter	Habitat	M	L	L	x x x	Unidentified during present survey; poss. Site T-106
D21-17	Complex (9)	Habitat	M	L	L	x x x	Midden present on bedrock; upright slabs utilized in construction
-1	Box C-shape shelter						
-2	Walled overhang shelter						
-3	Walled shelter						
-4	Overhang shelter						
-5	Box C-shape shelter						
-6	C-shape shelter						
-7	Cairn						
-8	C-shape shelter						
-9	Wall shelter						
D21-18	Complex (6)	Habitat/burial	M	L	M	x x x	Historic burials (5) in Fea. 3; moderate amounts of midden and artifacts present; excavation potential
-1	Cave shelter						
-2	Cave shelter						
-3	Sealed cave shelter						
-4	Wall shelter						
-5	Petroglyphs						
-6	Cave shelter						
D21-19	Cave shelter	Habitat	L	L	L	None	Sparse midden present on bedrock
D21-20	Complex (2)	Habitat	L	L	L	None	Sparse midden present on bedrock
-1	Cave shelter						
-2	Cave shelter						
D21-21	Cave shelter	Habitat	M	L	L	x x x	Midden and thin cultural deposit present on bedrock

Table 2. (Cont.)

Site # Feature Site/Feature Number	Formal Type	Tentative Functional Interpretation	Significance Evaluation			Field Work Tasks DR SC XX	Comments
			R	I	C		
D21-22	Complex (8)	Habitat	M	L	L	x x x	Sparse midden present; octopus lure present at Fea. 8; cave shelters part of single tube complex
-1	Cave shelter						
-2	Cave shelter						
-3	Cave shelter						
-4	C-shape shelter						
-5	Box C-shape shelter						
-6	Wall shelter						
-7	Terrace						
-8	Wall shelter						
D21-23	Trail	Foot trail	M	M	M	x - -	Recommend accurate locational plotting by professional surveyors
D21-24	Complex (8+)	Aquaculture	M	M	M	x - x	Component features include numerous low pond walls, cairns and platforms; preservation recommended
D21-25	Complex (3)	Habitat	L	L	L	x - x	Prob. recent structures; possibly constructed on pre-existing site
-1	Box C-shape						
-2	Box C-shape						
-3	Wall						

Table 3.

SUMMARY OF PREVIOUSLY IDENTIFIED SITES AND FEATURES
PARCEL 16 - KUNIO RESORT DEVELOPMENT PROJECT AREA

Site & Feature Number	Formal Site/Feature Type	Tentative Functional Interpretation	Significance Evaluation			Field Work Tasks	Comments
			R	I	C		
1189	Cave	Undetermined	L	L	L	x	Identified during present survey
1193	Trail	Foot trail	M	M	M	x	Inland portion of trail D21-7 (east of Queen Kathmann Highway)
1196	Complex (3) ⁺ Petroglyphs Well Well	Recreational	M	L	L	x	Petroglyphs (4+) include human figure; walls are crude and collapsed
1197	Trail	Foot trail	M	M	M	x	Trail intermittently visible; appears to branch from trail Site D21-7
1200	Trail	Foot trail	M	M	M	x	Trail intermittently visible; appears to branch from trail Site D21-7
1201	Complex (2) Cave shelter Cave shelter	Habitat	L	L	L	x	Midden present on bedrock surface

*Significance Evaluation--Nature: R = scientific research, I = interpretive, C = cultural
Degree: H = high, M = moderate, L = low

Field Work Tasks: DR = detailed recording (scaled drawings, photographs, and written descriptions), SC = surface collections, EI = test excavations

⁺Number of component features within complex.

Table 3. (Cont.)

Site & Feature Number	Formal Site/Feature Type	Tentative Functional Interpretation	Significance Evaluation			Field Work Tasks	Comments
			R	I	C		
1202	Complex (3) Cave shelter Cave shelter Terrace	Habitat	M	L	L	x	Moderate amounts of midden and a single octopus lure present; terrace constructed between cave shelters across tube
1203	Cave shelter	Habitat	M	L	L	x	Moderate amounts of midden and artifacts (octopus lure, echinoid spine shader, perforated shell) present; excavation potential
1204	Complex (2) Cave shelter Wall	Habitat	L	L	L	None	One piece midden (CYPRIS sp.) present on bedrock; crude wall constructed over cave
1205	Cave shelter	Habitat	M	L	L	x	Moderate amounts of midden present; entrance partially walled
1206	Complex (3) Cave shelter Cave shelter Terrace	Habitat	M	L	L	x	Midden present; terrace constructed between cave shelters partly across tube
1207	Cave shelter	Habitat	L	L	L	x	Midden present on bedrock surface
1210	Complex (2) Cave shelter Slab paving	Habitat	M	L	L	x	Moderate amounts of midden present; thin (5 cm) cultural deposit
1211	Complex (2) Cave shelter Steppingstone entrance	Habitat	M	L	L	x	Moderate amounts of midden present; thin (5 cm) cultural deposit

APPENDIX A:

PRELIMINARY HISTORICAL DOCUMENTARY RESEARCH

Kukio Resort Development Project Area
Land of Kukio Ist., North Kona
Island of Hawaii (TK:3-7-4-04:3,16)

by

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Historical Researcher

INTRODUCTION

It is the intent of this preliminary research effort to identify and examine immediately available sources for information relative to the project site. A sampling of specific mythological, cultural, and historical information has been assembled from the writings of native historians, descriptive accounts, land records, and cartographic sources.

Before proceeding with details relative to TK:3-7-4-04:3,16 in Kukio, North Kona, a cursory study will be presented of the larger land division in which Kukio is situated. It is intended, by this approach, to properly define the setting which back-drops the project site so as to provide a historically faithful context from which Kukio can be viewed.

Kekaha - A Traditional Perspective

A distinct set of traditions exists for that broad North Kona land section anciently known as Kekaha. In describing its expanses and boundaries, a Kamehameha wrote:

Kekaha (barren, desolate) was the name given to that section of North Kona from Honohahu, North of Kailua, to Napuu (The Hills), meaning Puuwassawa and Puunahulu, and along the coast to Anechoomalu, the boundary of South Kohala.

It is often spoken of as Kekaha-Wai-Ole (the desolate land without water). Pele, the Volcano, has literally eaten the heart out of this section.

One readily sees the great lava stretches of country, as one travels along the road. It is no wonder that the simple

fisherfolks living along the sea-coast personified the Volcano as a dreadful being with supernatural powers whose wrath bore down on them so much destruction, laying waste their gardens, and filling their fishponds with rocks, leaving them on a narrow strip of beach, the ocean on one side, and the lava fields on the other (Maguire 1926:5).

The district's waterless condition is memorialized by generations of native residents in the familiar saying quoted in part above:

Kekaha Wai'Ole o Na Kona.
Waterless Kekaha of the Kona district.

Kekaha in Kona, Hawaii, is known for its scarcity of water but is dearly loved by its inhabitants (Pukui 1983:185).

Another saying fixed in oral tradition comments on the life-sustaining qualities of the sea off Kekaha:

Ole aku la ka aina kaha, ua pua ka lehua i kai.
Life has come to the kaha lands for the lehua blooms are seen at sea.

"Kaha lands" refers to Kekaha, Kona, Hawaii. When the season for deep-sea fishing arrived, the canoes of the expert fishermen were seen going and coming (Pukui 1983:271).

Kekaha was also known among those who dwelt at Kailua as the land from which the gusty Koolua wind blew. John Papa Ii noted:

A little more frequent was a cold wind from Kekaha, the Koolua. Because of the calm of that land, people often slept outside of [on] the tapa drying sites at night. It is said to be a land that grows cold with a dew-laden breeze, but perhaps not so cold as in Hilo when the Alabonua blows (Ii 1973:122).

Thus the natives of that land characterize Kekaha in elemental and physical terms. Despite those short-comings acknowledged above, a fairly unique history sprang from this district.

Kekaha - A Historical Brief

The native historian S.M. Kamakau recorded that in the war between Kekaulike of Maui and Alapa'inui of Hawaii, Kekaulike, in fleeing from Alapa'inui's forces, pillaged Kona and Kohala and "abused the country people of Kekaha" (Kamakau 1961:66-9). Kekaulike ruthlessly laid waste to the coconut groves of both districts and slaughtered the common folk.

Kamakau also stated that Kekaha lands had been set apart from the whole of Hawaii Island for the priestly class:

From infancy, the girl Maniowali was betrothed to Uluweu of Kukio. As the wedding day approached, Uluweu suddenly is taken very ill. Kikau, a kahuna, is sent for and he diagnoses that the prospective groom is suffering from love-sickness. He also reveals that Uluweu has secretly been courting the beautiful princess Kahawaliwali. When Maniowali learns of this sad news, she in turn becomes love-sick much to the consternation of her parents. Both sets of parents in desperate frustration once again consult with the kahuna and they decide to turn all three young people into stone (Maguire 1926:31-5).

The second tale, "The Waters of Kane", unfolds as a result of a drought which affected the neighboring districts of Kaupulehu, Kukio and Maniowali. The chiefess under whose jurisdiction these lands are placed, consults a kahuna as to her immediate options. He instructs her, she complies and is consequently visited by her demi-god brother, Kane. He instructs her men to prepare an imu in which he, in his plant form, is roasted. He exits unscathed and a spring issues forth from that very spot. Kane then demands that the imu be uncovered. The people upon following his orders find all sorts of staple foods which they eagerly consume and are thus spared from starvation (Maguire 1926:36-9).

A single, somewhat humble explanation behind Kukio's naming was encountered:

The place name Kukio (Ku-ki'o), as it refers to a fish-pond on the Island of Oahu near Kahuku, was translated to mean "settled pond" (Pukui-Kibert, 1966:15). It seems also to be appropriate for describing the present condition of the marsh just back of the shoreline at Kukio in Kekaha, Hawaii. However, the story that is told in Kona today centers around a rock in the water just off the coast at Kukio Bay. The rock stands in a position suggestive of a man evacuating. Thus, ku, "to stand," or "to be in a state of" and ki'o, "to excrete." This explanation is always accompanied by laughter and great amusement (Kelly 1971:18).

(As the kahuna's name derived such amusement from relating the latter, one is compelled to wonder whether the story is given in good-faith, or merely good-naturedly.)

As a matter of course, manuscript materials contained in the Henry P. Kekaha Collection in the State Archives were culled for data. No specific traditions were found to have been recorded relative to Kukio.

KUKIO - LAND HISTORY

Data relating to Kukio land history has been gathered from available documentation and ordered here into a chronicle of events.

Waiwae was given to the Paao kahuna class in perpetuity and was held by them up to the time of Kamehameha III when titles had to be obtained. But there was one land title held by the kahuna class for many years and that was Puuapa in Kohala. In the same way the land of Kekaha was held by the kahuna class of Ka-uahi and Mahulu (Kamakau 1961:231).

These Ka-uahi and Mahulu lines of priesthood assumed active and influential roles well into the historic period. They served as counsel to kings, and later even dared to strongly voice their disapproval over Liholiho's "free-eating" and his disregard of traditional precepts. Their Kekaha lands were thus guaranteed by chiefs such as Kalanopuu and passed quietly to their progeny. Individuals descending from one of these priestly lines, the Mahulu, included the twin chiefs Kameiameoku and Kamanawa.

Of particular note in relation to Kekaha, is Kameiameoku's son, Uluweu, who was well-trained in all of the arts of this esteemed lineage. Kamakau recalled:

He [Hospili] belonged to the priesthood of Mahulu and was an expert in priestly knowledge. He had been taught astronomy and all the ancient lore (Kamakau 1961:354).

Kamakau further enumerated upon some of the skills at which Hospili excelled: debate, knowledge of the history and rule of the chiefly lines, ancient protocol, royal genealogies, and proficiency and literacy in the English language as well. He was entrusted with many key political positions and governed justly and well. So faithful and dependable was he that upon the demise of Kamehameha I, Hospili was given the guardianship of the "Conqueror's" sacred remains which (it is believed) he carefully hid at Kekaha in Kaloko (Kamakau 1961:355,215).

With facility we are able to see that in spite of an unassuming appearance, Kekaha distinguished itself in its rather unique history and religious and cultural significance. Now that a sketch of the broad land area of Kekaha has been established, we are better able to center specifically on Kukio.

Kukio - The Mythological Past

Two legends were located which have particular attachment to the Kukio area within Kekaha, North Kona. The first, entitled "Maniowali", pertains to a certain rock of that name situated on the shore just south of Kukio. The major characters in this tale assume the names of local land features. This device of naming characters such as is based in an ancient time. The geographical features included the following: Uluweu, the bay outside of Kukio I; Maniowali, the aforementioned rock, and also the name of the *shurua* immediately south of Kukio 2; Kikau, a point of land in Kukio I; and Poopooiwa, a hill on the northern boundary of Kukio I.

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5/28/1855

J. Fuller reported the following to the Minister of the Interior:

I have the honor to report the following sales of land in Kona Hawaii in addition to former reports -

Purchaser	Name of Land	No of Acres	Price per Acre	Amount	Observations
...
Popule	Kohio 1	690	0.124	86.25	vary poor land good pasture

I would observe that none of these lands are fully paid for, but after the sales are confirmed I shall proceed to collect the balance as soon as possible - Yet it is necessary to give the purchasers considerable time, as they are mostly poor and have but little which they can turn into cash - To encourage them, I have agreed to take goat skins, Pulo, wood & c. and pay the cash for them-

Your Excellency will perceive that I have sold this poor land in large tracts for goat runs and pastures, as in small lots it would be perfectly worthless - Hoping these transactions will meet your approbation... (Int. Dept.).

11/17/1856

Grand 2121 is awarded to Popule. The great deed lists the metes and bounds, which are given here as translated [C.S.] from the Hawaiian:

- Begin at the rock mound at the Kona corner of this land, close at the sea and adjacent to Kukio 2 and run:
 - N. 20° E. 13.76 chains to the corner of that side where canoes are beached
 - N. 63°30' E. 626 chains to the edge of the beach
 - N. 17°30' W. 20.75 " to the north corner marked by a rock mound, then
 - S. 62° E. 2.15 " to the ancient boundary of Neputehu
 - " 50°45' W. 17.60 " "
 - " 41°30' W. 22.60 " above the
 - " 39° " 80.00 " hill
 - " 19°45' W. 48.00 " the east corner marked by a rock mound, then
 - S. 50° W. 20.65 chains to the large stone upland of the rounded hill
 - " 50°15' W. 11.50 " to the southernmost corner
 - N. 55°30' W. 10.20 " to the pile of rocks there
 - N. 33°30' W. 141.50 " to run until the point of commencement is reached.

690 Acres excepting the rights of the tenants for \$86.25 (Grant Award Book).

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1790s to early 1800s

The earliest documentary reference to the occupation of Kukio dates back to the late 18th century.

One informant stated that Kukio was once owned by his great-grandfather, Kinolau, who obtained it from Huihiko. Presumably, Kinolau would have had Kukio in the late 1790s, long before written records were kept. It was his daughter who was married at the time Pele filled Kamehameha's Fishpond with lava in 1801. Kinolau and his wife, Ha'ilouwahine, lived in Kukio and were buried there... (Kelly 1971:10).

...Kinolau and Ha'ilou...raised their family at Kukio's, and all their children except Ka'ahu'ula were buried there. She was buried at Makalewena because, it was explained, by the time she died, there was no one left to take her remains back to the family burial grounds at Kukio. The husband of Ka'ahu'ula was Kaus-i-Muunu, a man who was born on Hauli but raised in Kohala by his foster parents. When the lava flowed at Kiholo (1801-1802) many Kohala people came to Kona to visit and to watch the eruption; some stayed as long as six months. Kaus-i-Muunu was one of these, and it was then that he met and married Ka'ahu'ula... (Kelly 1971:42).

1820s to 1844

Under Kookini's governorship, ownership of released lands on Hawaii alternated between Kookini and Kamehameha III. In 1842-3, Kamehameha III released his rights to Kukio, and this land along with others passed into the domain of Kookini (Int. Dept. 5/28/1855).

1844 - Great Mahalo (1849)

Upon Kookini's death in 1844, Leleiohoku inherits his estate and decides to commute Kukio to Kamehameha III during the reportioning of lands. Land records of this period also indicate that the chiefs Kekauonohi had some kind of interest in Kukio land; no specifics were found to clarify the nature of her interest (Int. Dept. Dec. 391).

Kamehameha III sets apart Kukio 1 & 2 as Government lands (Board of Commissioners 1929:33). No KULIGUNA was claimed by natives in either ahupua'a.

Although difficult to place in exact time, one of Kelly's informants related the following, which is believed to date to this period:

My grandmother lived up at Kukio, beyond Mahaiula. My grandmother had a couple of acres of cotton fields. When she had to mend the olden-day quilts, she went to pick cotton (Kelly 1971:39).

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3/25/1861

Pupule paid \$20.00 toward the purchase of Kukio 1 land (Int. Dept.).

3/23/1864

Pupule's son, Kahaunaele paid \$9.00 toward the purchase of Kukio 1 land (Int. Dept.).

9/5/1862

S.C. Wilkes submitted the following report of Government lands, describing Kukio 1 and 2 thus:

These lands extend from the sea to the lower edge of the forest, distance 3/4 mile, and contain not far from 1000 acres, most of this is rocks, and of little value.

The mauka part of Kukio 1st containing about 100 Ac. sold by Sheldon to Kahaunaele and Pupule but not patented (Int. Dept.).

2/11/1870

A report of this date described the general use of Kukio and its neighboring lands as "pasturage of horses and goats" (Int. Dept.).

4/17/1872

In a letter requesting the lease of certain North Kona lands, Jno. Broad commented in Hawaiian on Pupule and Kahaunaele:

...[r]egarding one of the Kukios, a certain seaward section of it being obtained by a person named Kahaunaele who purchased it together with his father, Pupule... (Int. Dept.).

1898

Without completing an abstract of title, it could not be readily ascertained how and when Luke Maguire acquired Grant 2121. However, in an inventory of her estate, she leaves Kukio, among other lands, to her husband, John A. Maguire (Kelly 1971:44-5; 3 Probate 388 and Will 448).

Thus, in the century prior to Kukio's acquisition by John A. Maguire, the above chronicle exhibits a small range of land uses--residential and occupational as it related to fishing, burial ground, and limited agriculture (possibly cotton cultivation) and pasturage.

CARTOGRAPHY

The State Survey Division had on file two maps on which Kukio appeared. One map (Reg. Map 2035) simply delineated Kukio alupua, Grant 2121, and marked the aboriginal residence of Pupu. A small grove of coconut are sketched along the shore of Ulouwevu/Ulewevu Bay. The second map (Reg. Map 1278) provided much of the same information, and additionally described the land as "as-grassy." This map, which was drawn by Emerson, also plots two trails leading from opposite ends of Ulouwevu Bay, upland past Pooopooia, indicating that the area may have been fairly well-travelled.

CONCLUSION

Little in the way of readily accessible resources remains to be examined in creating a fuller view of Kukio than that which has been presented here. It is hoped that this report shall contribute historical insight, and serve to complement archaeological work in the area.



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APPENDIX B:

REGIONAL NOTES FROM KEKAHA: KUKI'O

by

Hannah Kihalani Springer

The shupua'a of Kuki'o 1, Kuki'o 2, and Manini'ovali are part of the region of Kekaha, North Kona, which includes those lands from Honohohu through Pu'unanahu (Figure 26).

ENVIRONMENT

Geology

The principal rift zone of Hualalai trends approximately N 50° W, is well-defined by cinder and spatter cones, and runs through Kekaha. A secondary rift zone with a general north-south trend includes the pumice cone of Pu'uwa'awa'a and the trachyte flow issued from it, Pu'unanahu. Younger than Kohala and Mauna Kea and older than Mauna Loa and Kilauea, available evidence indicates six major volcanic events occurred on Hualalai between 1500 and 1800. There are several relatively recent, though specifically undated, flows in Kekaha.

There have been two documented volcanic eruptions of Hualalai in the post-Euro-american-contact period, both of which occurred in Kekaha. The main vent of the Ka'upulehu flow of 1800 is between c. 1,675 and 1,810 m above sea level. The flow moved down the northwest flank of Hualalai to the coast where it entered the water in separate fingers. Fishponds at Ka'upulehu and Kiholo were consumed by these fingers (Kamakau 1961:184). The vent of the Puhiupele flow of 1801 is at c. 490 m above sea level. This flow moved down the western flank of Hualalai, and entered the sea over a front approximately 6.5 km wide, destroying the fishpond of Pa'ies in the area of Kalakehole (Maguire 1926:14) and the breadfruit grove of Kawaha'ikana in "the uplands of Hu'e'hu'e" (Kamakau 1961:185).

Kekaha has been impacted by the volcanism of Mauna Loa as well. In the post-Euro-american-contact period this occurred in 1859, when a Mauna Loa flow moved through the shupua'a of Pu'unanahu and Pu'uwa'awa'a. Beginning on January 23, 1859, this north flank eruption broke out at c. 2,760 m above sea level, lasted 300 days, and sent approximately 440,000,000 cubic meters downslope towards the sea (Macdonald, Abbott, and Peterson 1983:64). The Mauna Loa flow of 1859 came into the "Kamehameha Pond" at Kiholo which, prior to inundation, was reputed to be c. 600 acres in size, and destroyed the coastal village of Wainnali'i as well.

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Bird Life

From the coastal sandy-beach mat and marshland communities up to the summit area of Hualalai, Kekaha has played host to a wide variety of native birds, and still plays host to a large mixed avian population. The endangered Hawaiian stilt (Himantopus mexicanus knudseni), the Hawaiian coot (Fulica americana alai), and the seasonally present Pacific golden plover (Larus dominica fulva) are found at Kepo'iki Marsh in Makalavene, along with black-crowned night heron (Nycticorax nycticorax hawaiiensis). Presently, four kukulua'o frequent the anchialine ponds behind the beach at Kuki'o. Koles, when in season, and muku'y also visit Kuki'o.

Native upland birds include the Hawaiian goose (nene, Branta sandvicensis), the Hawaiian crow (alala, Corvus hawaiiensis), the Hawaiian hawk (Io, Buteo solitarius), and the Hawaiian owl (moo, Asio flammeus sandvicensis). Exotic upland birds include the barn owl (tyto alba), chukar (Alektoris chukar), California quail (Lophortyx californicus), and various pheasants and francollins. Chukar and francollins range from the uplands to the KAAWE thickets near the ocean.

Native forest birds include 'ama'ihi (Loxops virens), 'akepa (Loxops scintilla), 'apapane (Himatione sanguinea), 'i'iwi (Vestiaria coccinea), and formerly palila (Psaltriparus pallidus) and the Kona finch (Geopelia striata kona). The mynah (Acridotheres tristis), barred dove (Geopelia striata striata), spotted dove (Streptopelia chinensis chinensis), house finch (Carduelis mexicanus frontalis), cardinal (Cardinalis cardinalis), and other introductions are now included in the avian population of Kekaha.

FOOD SOURCES

PLANTING

William Ellis, on his tour of Hava'i'i in 1823, described Kailua, North Kona as follows:

The houses, which are neat, are generally erected on the sea-shore, shaded with cocoa-nut and kou trees, which greatly enliven the scene. The environs were cultivated to a considerable extent; small gardens were seen among the barren rocks on which the houses are built, where ever soil could be found sufficient to nourish the sweet potato, the water melon, or even a few plants of tobacco, and in many places these seemed to be growing literally in the fragments of lava collected in small heaps around their roots.

The next morning, Messrs. Thurston, Goodrich and Harwood visited the high and cultivated part of the district. After traveling over the lava for about a mile, the hollows in the rocks began to be filled with a light brown soil; and about

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the surface thus filled. There are basal springs at many of the beaches, both of submarine and surface expression, but the surface spring at Lae-kikau in Kuki'o "...is probably the most potable water on the coast of Hualalai" (Stearns and McDonald 1946:270). This spring is tapped to meet some of the domestic needs of the Hu'ehu'e Ranch beach cottage at present.

Vegetation

The leeward geographic and climatic conditions and the harsh volcanic terrain of Kekaha are reflected in the vegetation of the region. The botanical zones of Kekaha may be considered as follows: the coastal zone, including a sandy-beach-mat and thicket community, and a marsh ecosystem, found in conjunction with naturally occurring or man-made community found in conjunction with naturally occurring or man-made depressions where fresh water emerges; the leeward savannah and grassland, which extends up to about 760 m above sea level; the dryland forest, which extends up to an approximate elevation of 2,130 m; and the sub-alpine region, which extends up to the summit area of Hualalai at an elevation of 2,521 m. The coastal areas were the first areas to be impacted by the Polynesian settlers. As the population grew, systematic growing of specific crops was pursued, where land and climate permitted, up to an elevation of about 535 m.

From the native coastal community, the loulu palm (Pritchardia) yielded fronds suitable for weaving and thatching. The savannah/grasslands and the dryland forest were exploited by traditional residents of Kekaha for a variety of resources, including grass for thatching (Panicum heteropogon schimperii), wood for building houses (Calappa, Dodonaea stricta, and laea, Dipterocarp spp.), wood for fashioning implements (Kauihala, Colubrina oppositifolia), wood for building canoes (koa, Acacia koa), foliage for lei (maile, Alivina silvasformis), and foliage for dressing certain alters (maile, Freziera arborea).

Polynesians were limited in the botanical stock that they could introduce to Hava'i'i, and the nature of their transportation further limited them to hardy, practical, agricultural species and associated weedy "hitchhikers". The agricultural introductions include coconut (niu, Cocos nucifera), pandanus (niu hala, Pandanus odoratissimus), breadfruit (ulu, Artocarpus communis), ti (ti, Cordyline terminalis), and sweet potato (ula, Ipomoea batatas).

In the post-Euro-american-contact period, a wide variety of plants have been introduced: experimentally, to form wind breaks (silver oak, Grevillea robusta); with good intent, as versatile food and shade plants for livestock (kava, Propolis pallida); unsuspectingly, as ornamentals (fountain grass, Ficus setacea); as food plants, gone out of control (mohi, Passifloraceae); and so on. These alien plants are generally more aggressive and competitive than native plants or Polynesian introductions, and have greatly modified the plantscape of Kekaha.

half a mile further, the surface was entirely covered with a rich mould, formed by the decayed vegetation and decomposed lava. Here they enjoyed the agreeable shade of breadfruit and ohia trees... The path now lay through a beautiful part of the country, quite a garden compared with that though which they had passed, on first leaving town. It was generally divided into small fields, about fifteen rods square, fenced with low stone walls, made of fragments of lava which had been gathered from sweet potatoes, mountain taro, tapa trees, melons and sugar cane, flourishing in every direction (Ellis 1969:60-61).

Handy describes areas of planting in Kekaha as follows:

Wherever a little soil could be heaped together along the dry lava coast of North Kona, a few sweet potatoes were planted by fishermen at such places as Honokohau, Mahi'ola, Makalei, vena, Kaupulehu, Kiholo, Keawaiki and Kapalaos. Doubtless potatoes were planted on the upland of North Kona, on the lower slopes of Hualalai toward Pu'u Wa'awa's, up to a considerable altitude in rainy seasons. In recent times the flatlands of Pu'u Anahulu, having an elevation of 2,300 feet, have supported a number of patches planted by Hawaiian cowboys (Handy, Handy, and Pukui 1972:527-528).

In those upland areas where homesteads were established in 1895, and at Hu'ehu'e prior to the Fuhiapele eruption, Ellis' description of upland cultivation can probably be applied. Up until the early decades of this century, residents of Kahawai Bay in Ka'upulehu tended sweet potatoes as well as *niu*, *niu* haka, and *lowlu*. The leaves and fronds of the latter two species were woven into mats, hats, and bags which were taken upslope by foot/horse trail access, to be sold at either of the two stores then operating in Kalaos.

FISHING

The Hawaiians exploited both in-shore and off-shore ocean resources extensively. Management of these resources corresponded to observed natural cycles and, where conditions permitted, included man-modified environments. Kekaha was famous for its off-shore fishing grounds. Kamakau notes the High Chief 'Umi-a-Liloa fishing for *AKU* (*KALUPURUHA* *palamita*) off of Makalei (Kamakau 1961:20). When Kanikesouli declared the *Mahala* in 1848, Hialeohi'u in Kekaha was one of the *ahupua'a* which he reserved for himself. Much of the *ahupua'a* was rendered barren by the Fuhiapele flow; it is perhaps that Kanikesouli desired the *ahupua'a* not for its on-shore resources, but for its off-shore *aku* grounds. People living in upland Kekaha today recall "the old folks" who lived at Makalei Beach and Ka'upulehu Beach, and caught and dried *'opelu* (*Decapterus pinnulatus*) for home use, exchange with family upslope, and sale at the stores in upland Kalaos.

To supplement their protein needs beyond deep-sea fishing and mammal and fowl sources, the Hawaiians also innovated systematic breeding and nurturing networks, or ponds, for certain fish. Fish frequently propagated were *'ama* (*Mugil cephalus*), *'o'lo* (*Albula vulpes*), and *'ava* (*Chanos chanos*), as well as *'opua* (shrimp). At high tides, open-water fish such as *'ua* (Carangidae), *kumu* (*Pomacentrus porphyreus*), *weke* (*Halodichthys* spp.), *manini* (*Acanthurus sandvicensis*), *palani* (*Acanthurus dussimieri*), and *kupipi* (*Abudefduf sordidus*) might enter ponds built open to the sea.

Kekaha was also noted for its fishponds. The lava flows in 1800 and 1801 filled ponds at various places along the coast. "The people believed that this earth-consuming flame came because of Pele's desire for *'ava* fish from the ponds of Kiholo and Ka'upulehu" (Kamakau 1961:184). The pond of Pa'alea (Maguire 1926:14) was also destroyed in "Pele's desire for *aku* fish from Ka'eiehoiho" (Kamakau 1961:184). In 1859, the great Hauna *Lo* flow inundated the large pond at Kiholo. The pond was built in 1810 under the direction of Kawahama, and was thus described by Ellis:

A small bay, perhaps half a mile across, runs inland a considerable distance. From one side to the other of this bay, Kawahama built a strong stone wall, six feet high in some places and twenty feet wide, by which he had an excellent fish-pond not less than two miles in circumference.

There were several arches in the wall, which were guarded by strong stakes driven into the ground so far apart as to admit the water of the sea; yet sufficiently close to prevent the fish from escaping. It was well stocked with fish, and water fowl were seen swimming on its surface (Ellis 1963: 294-296).

Until the middle part of this century, the *kuapa* ponds at Kaloko and Honokohau were exploited for *'ama* and *'ava*, and the *'ua* *'opua* of Makalei (*'opua*), and Ka'upulehu were exploited for *'opua* *'ua* (*Halocardinus* *'ua*), a formerly popular bait for *'opelu*.

KUKI'O

Population and Land Tenure

Based on archaeological survey and testing conducted in 1975, Cordy (1978:244,245) has suggested household counts and population reconstructions for Kuki'o 1 and Kuki'o 2 for the late prehistoric period (AD 1500-1780). His counts and reconstructions are summarized here in Table 4.

With the Mahele and the related Acts of the late 1840s and early 1850s, tenure was formalized, and maps of the period include important demographic information such as population density and distribution. According to "H. Kona Hawaii Reg. Map 2035 6-70", the lower portions of Kuki'o 2 and Mani'ouali comprised holding 34 A, and the upper portions

in 1888 George Clark made a conditional agreement with John A. Maguire for transfer of the Ka'upulehu lease to Maguire. This lease was retained by the heirs of J.A. Maguire as a part of Hu'ehu'e Ranch until 1960. According to other Kona Historical Society notes, J.A. Maguire purchased 127 acres in Kuki'o for \$381 on 6 June 1896 (Hawaiian Investigation, Part 3).

When Loka Maguire died in 1898, her Kuki'o lands went to her husband, John A. Maguire.

Her will listed lands valued at \$12,855, which went to her husband, John A. Maguire. Six of these land parcels were in Kona. Among these were lands once owned by Pupule (Gr. 926 and Gr. 2121) in Puna and Kuki'o respectively. Maihū Pupule was contracted to be a "retainer of Kuki'o" from July 1, 1898 to June 1, 1899 for the sum of \$96.00 and on June 7, 1899, received \$25 from John A. Maguire (Probate Estate 388, 3rd Circuit Court, Archives of Hawaii) (Kelly 1971:45).

The lands in Kuki'o were retained in turn, by the heirs of J.A. Maguire until 1966, when Hu'ehu'e was sold.

ACCESS AND USE

Reminiscences of Kekahi Kama'aina

The last child born at Ka'upulehu was born about 1919. He recalls that siblings and cousins lived with their mothers and the elders, "Kahiko" (f) and Mahiko (m), at Kabovai Bay, while their fathers worked for Fu'uvu'ava's Ranch. The men would go upland from the beach as late as Sunday or early Monday as available light would allow, work the week at the ranch, staying at ranch housing or on family homesteads in Pu'unahulu, and return to the coast after work on Friday, again traveling as available light allowed.

At the beach the women tended various types of hala and loulu, and wove hats, bags, and mats from the leaves. The men fished for opelu, using the opelu-bait from the anchialine ponds, and cinder from Mahaha for bait. The woven products and the dried opelu were taken to one of two stores in Kaloa, Aloi's or Akona's, to be sold.

The trails linking Ka'upulehu Beach with the uplands of Fu'uvu'ava's and Kaloa are very old and, where vegetation permits, are prominent features of the lava-lands. The trail to Kaloa from Ka'upulehu intersects with the trail from Kuki'o uplope, at Po'opo'omino. It then follows a course up and over Pu'uokai, across the southwestern flank of Mahaha, across the eastern flank of Puhialele, and from there on to Kaloa through Hu'ehu'e and the Homesteads, at Kaulana, Pu'ukala, Haleohi'u, Hamanama, and Kaloa.

The trail to Kuki'o Beach from Po'opo'omino divides about 350 m from the shore. One spur goes south to Kakapa in Kuki'o 2, and the other spur

Table 4.
Kuki'o: Household Counts and Population Reconstructions
by Fifty-Year Time Units

	1500-1550	1550-1600	1600-1650	1650-1700	1700-1750	1750-1780
Ahupua'a						
Kuki'o 1						
Households	-	-	-	1	1	2
Population	-	-	-	18	18	24
Kuki'o 2						
Households	1	2	2	2	3	4
Population	12	24	24	24	42	48

of Kuki'o 1 and 2 and Manini'ovali comprise holding 34 B. Both holdings 34 A and 34 B are designated as Lot's (Kamehameha V). Pupule is noted on that map as the holder of Grant 2121, which is the lower portion of Kuki'o 1, and "pasapu's b. [house]" is a site noted south of the coconut grove at "Uleueueu Bay".

Kelly (1971:11) has provided some numbers for tax payers in Kuki'o: four in 1857, five in 1859, and five in 1860. She has further offered genealogical associations of "the 'Ohana of Kinoleu and Ha'ilau and Haleheva and Kahua" to certain places in Kekaha. The names Pupule and Pa'apu do not appear in the genealogical accounts. It may be that the people noted in her accounts were more closely associated with Kuki'o 2; Cordy has suggested consistently larger populations for that subdivision.

As indicated by Kelly (1971:43,46), Kinoleu (m) and Ha'ilau (f), who lived at Kuki'o around 1790, had a daughter named Haiba who married Kohoupa'au. A son of Haiba and Kohoupa'au, named Kealoha, married Kamale Ha'ilauwahine, and their daughter, Luka, was the first wife of John A. Maguire. Hopula'au is noted on "Reg. Map 2035", as the holder of Grant 2112 in Kaulana. This is probably Kealoha, the father of Luka.

Notes from the Kona Historical Society file on Kuki'o indicate correspondence from H.N. Greenwell to the Minister of the Interior on 23 February 1875, indicating that he had leased the unrold portions of land lying between Pu'ukala and Kuki'o to John Broad for \$34 per year. In 1876, those lands were again up for "auction". There is note of further correspondence on 22 March, 1879, from H.N. Greenwell to Mr. Wilder regarding the lease of the Government Lands of Kuki'o, which would be Kuki'o 2, and the adjoining ponds, in Kuki'o 1, to H. Cooper for \$35 per year.

The Kona Historical Society file on Ka'upulehu indicates that in 1884 those lands were used for grazing sheep and mules. There is a note that

goes west to Kalaekikaua. The latter spur in turn divides about 150 m from the shore, and goes north to the anchialine ponds in Kuki'o I.

An elder cousin, now 82, who grew up in the Hamaunama-Kalaos area, recalls her youth when she would go to Ka'upulehu Beach:

My folks would put me on our horse. Just me. Tie me to the saddle, send me *haka'i*. I would fall asleep. Ah, soon I would be leaving Kuki'o and on to Ka'upulehu. But I cannot remember how it was *mauka*. I would be asleep. I would take the old folks *kalo*. I would help with the evening chores. The old lady Ino liked that, her children were all gone and no *mo'opuna*. The old man would bundle fish for me to take home. Before sunrise the next day, going *mauka*. When that horse died, I never went back.

When queried if she ever visited Kuki'o Beach, she solemnly shook her head, "Not really, maybe once. I don't like the ocean...the things in it scare me."

Not so another elder cousin, born in 1910, recalled going to the coast whenever school holidays permitted, from the Kaulana-Fu'ukala area:

Oh, there were so many trails. Sometimes we'd go down over the hills Ka'upulehu side. Sometimes we'd go down to Mahai'ula or right down to Makalavenua from Hu'e'bu'e, then across once we're at the beach.

People went up and down the coast. People lived at Makalavenua, you had the old folks, Annie (Funihaole) and Una (her bus-band). There were lots of people there. There was a church too. At Ka'upulehu you had Mahiko folks. There was almost always someone at Mahai'ula and Kuki'o too. Everyone was family, friends.

When you came you chose your spot to sleep. I never slept inside at Kuki'o, it was too nice, no rain...so peaceful...if you needed shelter, there were the caves. I like how the *opelu* come in close there. Right inside the bay, you can watch them ripple the water.

There was a tall, like two story house at Kuki'o. Annie folks would use it. Kanaka Funihaole told me it was Aileen's *hale* (Aileen R.K. Maguire Stillman, the grand-daughter of Luka and J.A. Maguire).

The *hale* and the coconuts were already there by the ponds when I was small. There must have been people there because of the ponds. Like the *alii*, they have keepers for the ponds. Anywhere you have ponds you have people to care for them, but that was before my time at Kuki'o.

You have some ponds for *opaa*, others to drink from, others to wash in. I was allergic to the brackish water, so I drank coconut water or catchment when I stayed at Ka'upulehu.

Oh I love it down there. Even after my first child was born, I'd go down. That was when I was 22, 23. By then, the (Stillman) family had put up two other houses there at Kuki'o.

The informant from Ka'upulehu recalls meeting "Aunt Annie and Una" at Kuki'o, or going with them as they passed through Ka'upulehu on their way to Kalaekikaua for salt or to fish. "Aunt Annie and Una lived at Makalavenua, but would stay at the tall, green and white house at Kuki'o also" (Figure 27).

He further recalls that Annie used to gather *lau hala* from Kuki'o, and that during his time, she was perhaps the only one to do so. He noted that a *gapa'i* was maybe all that was left of this Pa'upu's *hale*, and that "the *pale vai* was there to keep the sand and stuff from the plants and the ocean...you know how leaves and *limu* will float in with the tide?...out of the *vai opaa*." When he was about 12 years of age, the informant moved away from the beach at Ka'upulehu, to the upland homesteads at Fu'uanabulu.

Around 1932, the Stillman family and friends began spending summers at Kuki'o. The family would ride down from Hu'e'bu'e on the old trail "by the hills" to Kuki'o. In the manner of the time, the children did not investigate the caves and other features of the area, giving their full attention to the delights of the sea. Initial provisions were brought to the beach on horse or mule back, and in the weeks that followed, subsequent provisions were brought in from Kailua on Mr. Finlayson's charter fishing boat.

The family kept a *koa* canoe at the beach until it and the buildings were destroyed by the 1946 tidal wave (Figure 28). During the 1950s, Arthur J.K. Stillman and his friends would fish for *opelu* from the canoe, using *opaa-ula* gathered from the anchialine ponds behind the beach for bait (Figure 29).

In addition to the *pale vai*, the *shu* and walls in the pond area were already in place. It is suggested that the *shu* were not built to serve as markers, a function *shu* often serve, but were built with stones removed from the ponds during pond deepening efforts. Even today, the forms of the ponds which are used recreationally are changing, as one party will deepen their favorite spot while another party might widen their favorite spot. It should be noted that in decades past, people were less likely to tamper with the features "from the old days".

Abolohole, if caught in surplus, were sometimes "held" in the ponds which "did not have any shrimp in them", and were thus kept fresh until another meal. Turtles were sometimes put into the pond "with the Green *limu*" to "clean" the pond, and for the children's enjoyment.

During this time, Arthur Stillman and Haru Haratomo planted more coconut trees at Kalaekikaua around the "tall green and white house". A coconut thatched sleeping house and a wooden frame cooking house were also

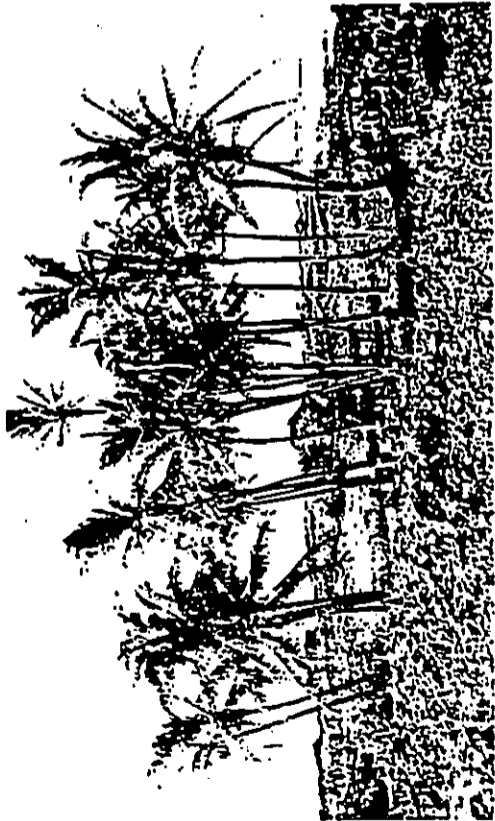


Figure 27. OVERLOOKING KIKAUA POINT AT KURIO ABOUT 1915. View to southwest. Photo by Eliza Davis Low McGuire.

(Photo courtesy of the Kukui'ohiwi Collection.)



Figure 28. LAUNCHING THE STILLMAN'S KOA CANOE. Launching the canoe on the north side of Kikaua Point about 1932. The woman in the photo is Annie Uss, family friend and resident of Makalavena. View to east. Photo by Thelma K. Stillman.

(Photo courtesy of the Kukui'ohiwi Collection.)

built during this time. The cooking house was built on the water's edge on the north side of Kalsekikaus, and it was the only structure to survive the tidal wave of 1946, though in a damaged condition (Figure 30).

The family used the well at Kalsekikaus for water to cook with and from which to water their animals. Small corrals were built in shaded areas for the animals. Though it was not observed in use, two informants suggested that the small section of wall crossing the trail upslope from Kikaus might have been used as a drift fence when herding goats or donkeys.

Auntie Annie is fondly remembered by one of Aileen Stillman's daughters as always coming from Makalavens to join the family at Kuki'o. In the evenings, it was Annie's routine to "tend" the family cave(s) up behind the beach. She went alone, and it was implied, if not discussed, that members of her family were buried in the cave(s) that she visited.

During the 1940s, adult, contemporary responsibilities, the War, and the destruction associated with the tidal wave of 1946 all contributed to a decline in visitation to the coast by "the young folks". As the old folks died or moved away, the hamlets became empty. After the tidal wave of 1946, only Annie returned to Makalavens, where she lived out her life with her companion, Porto. In the late 1950s, she was still offering dried *Opelu* and *ha's* (octopus) to visitors to their home by the sea at Makalavens.

In response to changing access patterns and land uses, and increased vandalism and poaching, land owners increasingly installed locked gates. *Kulama* lands were in some cases absorbed by larger landholders through adverse possession, and old "roads" were abandoned. It was a time of profound change. Many of the young people who moved away during those years did not return.

The wife of an employee of Hu'ehu'e Ranch, who now enjoys Kuki'o Beach on a weekly basis (the most regular user among the informants), recalls that as a child growing up in the 'O'ama-Kohansiki area, her family did not frequent the beaches to the north of the Puhiapele flow, but rather went to 'O'ama, Kahanaiki, and other spots directly below their home. Her father who also worked for Hu'ehu'e Ranch would periodically take supplies to Kuki'o for Annie and Una as part of his job. It was not until 1955 that this informant first rode to the beach at Kuki'o with her husband.

The 1960s boom in recreational boating, and increased capability to put in vehicular access, saw a renewed usage in the coastline--the privately owned parcels in particular. Kahuwai Bay in Ka'upulehu has been developed as the Kona Village Resort, and Hu'ehu'e Ranch has had a paved access into Kuki'o for over a decade. The Ranch policy on access favors the family and friends of the ranch owners, employees, and affiliates. Members of various churches, community groups, schools, and businesses have had increased access to Kuki'o in recent years by making advance arrangements for use for specific events.



Figure 29. CLEANING FISH ON THE NORTH SIDE OF KIKAHA POINT. Looking toward coconut grove at Dluvevevu Bay, about 1932. Site D21-12 in the background. View to northeast. Photo by Thelma K. Stillman.

(Photo courtesy of the Kukui'ohiwi Collection.)



Figure 30. COMPLEX OF HOUSES ON KIKAUA POINT ABOUT 1932. The frame house to the left is older and was used for storage. The house to the right was thatched with palm fronds. It was built around 1930, and provided a cool place in which to sleep. View to west. Photo by Thelma K. Stillman.

(Photo courtesy of the Kukui'ohiwi Collection.)

INFORMANT CONCERNS AND CONSIDERATIONS

All of the informants expressed concern for appropriate treatment of the burials on the property. They understood the possible need to disturb the burials for research and/or development, but stressed that the bodies should remain at Kuki'o. One suggestion was that they be reinterred at "the regular" graveyard at Kuki'o 2, behind of Kakapa Bay.

All of the informants expressed concern for the wai 'opae, the anchiline ponds, and the shrimp and the birds and the hala and the palms associated with them. It was noted that the palms and the hala need to be tended so that they can have light and grow healthy. In particular, the old leaves must be removed from the hala so that new ones can grow long. The majority of the hala were observed to be female, the gender preferred for weaving. As there is an increased interest in traditional Hawaiian skills and arts, and a decrease in availability of appropriate resources, a tentative suggestion made was to contract an appropriate community organization to tend the grove, utilizing the desired materials while keeping the area safe and presentable to guests.

Everyone is resigned to change in Kekaha, and hopeful that any development at Kuki'o will be of a quality that *Kama'aina* can look to or seek employment at with pride. The consensus was that Hu'ehu'e Ranch is the preferred developer, even by those who do not approve of the proposed zoning change and development.

RECOMMENDATIONS

Further ethnographic and archival work is needed to determine a more complete history of land tenure and various genealogical associations, particularly from the Euro-American contact period up to 1898, but also including the times and changes up to World War II and the tidal wave of 1946. Newly determined geological dates and scenarios might reveal interesting correlations to regional demographics, and would be worth further study. Eliza D. Maguire translated and compiled *Kona Legends* from pieces contributed to "Ka Hoku O. Hawaii" by Isaac W.H. Kihe. Further investigation of folklore in the Hawaiian language newspapers would no doubt yield insights into place names and related topics.

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GLOSSARY OF HAWAIIAN WORDS IN TEXT

<u>ahu</u>	heap, pile, altar, shrine, cairn
<u>ahupuna'a</u>	land division, usually extending from the uplands to the sea and including the water for a certain distance out to sea
<u>alpha</u>	affection, love
<u>hale</u>	house
<u>ka'ao</u>	fontiful tale
<u>kalo</u>	taro
<u>kama'aina</u>	child of the land, native born; often region specific
<u>kakahi</u>	some
<u>kuaa</u>	fishpond wall, fishpond made by building a wall upon a reef is a loko (pond) <u>KUAA</u>
<u>lau hala</u>	pandanus leaf
<u>limu</u>	water plants generally, fresh or salt water
<u>mahale</u>	portion, division, as of land; land division Act of 1848
<u>maka</u>	toward the sea, at the sea
<u>mana'o</u>	thought, idea, meaning
<u>mauka</u>	toward the uplands, at the uplands
<u>mo'olelo</u>	historic account
<u>mo'opuna</u>	grandchild
<u>pale wai</u>	breakwater, protective wall
<u>papa'i</u>	temporary hut or shelter, open air
<u>wai'opae</u>	literally "shrimp water"; as used in the text, subaline ponds

APPENDIX C: COASTAL BASELINE SURVEY



William A. Brewer & Associates
Marine / Coastal / Terrestrial Consultants
for
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**COASTAL BASELINE SURVEY, KUKIO RESORT, NORTH KONA
ISLAND OF HAWAII**

prepared for

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December 17, 1984

COASTAL BASELINE SURVEY, KUKIIO RESORT, NORTH KONA
ISLAND OF HAWAII

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1. INTRODUCTION

By letter dated November 14, 1984 from Phillips Brandt Reddick, the following scope of services were identified for the subject project:

COASTAL BASELINE SURVEY, KUKIO RESORT, NORTH KOHA

1. **Nearshore resources:** A qualitative assessment of the existing coastal resources and a general characterization of these resources in relationship to nearshore waters elsewhere along the North Kona-South Kohala coasts.
2. **Anchialine ponds:** A more detailed assessment of existing environmental conditions in the ponds, their flora and fauna, and their comparative environmental value in relationship to other ponds along the coast (based on existing data).
Our purpose is to determine possible effects to the environmental conditions within the ponds that may result from development on surrounding properties.

The following sections address this scope of work.

C - 1

2. METHODS

A. PHYSICAL MEASUREMENTS

Salinity and temperature readings were made with a Yellow Springs Instrument Company (YSI) S-C-T meter equipped with a YSI 3300 Series nickel-platinum conductivity/temperature probe. Dissolved oxygen values were obtained on a YSI Model 51R dissolved oxygen meter equipped with a membrane-covered polarographic sensors. The dissolved oxygen meter was calibrated according to factory guidelines in a water vapor-saturated chamber. All sampling was conducted by *in situ* measurements.

B. BIOLOGICAL SURVEYS

1. Marine Environment

Preliminary reconnaissance surveys were conducted to ascertain the general physiography and and benthic community structure occurring within the area. On the basis of these surveys, transects were identified reflecting the 5, 10 and 15 foot contours within Kukio Bay and the 5 and 10 foot contours on both sides of Kikaua Point area (Figure 1). Wave action curtailed any survey of the west side of Kikaua Point. The defined transects served only as a general guide for the diver who followed a compass bearing along representative inshore zones. A total of four dives of approximately 30 minutes duration each were conducted in the vicinity of Kikaua Point and Kukio Bay. A 20-minute survey of the small, sandy, protected embayment at Kikaua Point was also conducted.

Corals, algae, fishes and invertebrates noted on the surveys were identified and ranked according to their relative abundance in an area. Notes were taken to indicate general habitat features and the most conspicuous species characterizing a given zone or habitat. Where appropriate, actual counts or estimates of invertebrate population densities were made with the assistance of a meter-stick which was used to lay out crude one-meter square quadrats.

Underwater data were recorded on Naigene Poly Paper sheets. A Nikonos II underwater camera was utilized to document subtidal physiographic features and representative marine flora and fauna.

C - 2

2. Anchialine Ponds

Approximately 1.5 hours were spent on foot reconnoitering the Kukio anchialine pond complex which covers an area of approximately 3 acres. The preliminary survey provided an overview of the major physiographic features characterizing this coastal lowland basin and permitted selection of individual ponds, ponds or pond systems for more detailed surveys. The great number of both large and small ponds and pools in the area necessitated the selection of five pond/pool complexes which appeared to offer a representative cross-section of the various pond environments occurring in the Kukio area (Figure 2).

Surveys within the selected ponds/pool systems were conducted by visual reconnaissance from shore and, except for the mauka pools, by underwater qualitative surveys. A Nikonos II camera was used to document underwater physical and biological features. Both black and white and color negative films were used to provide an accurate, detailed and permanent record.

Collection of free-swimming fauna was conducted utilizing a 6" diameter nylon dip net with a 2 millimeter square mesh. Sedimentary deposits and algal crusts were removed with a spatula. Specimens collected in the field were stored in a 1% glycerin and formaldehyde solution and returned to Honolulu for taxonomic identification.

Dr. Maxwell Doty and staff of the Botany Department of the University of Hawaii provided assistance in the identification of algal materials.

3. RESULTS

A. MARINE BIOLOGICAL SURVEYS

1. Water Quality.

With the exception of the small sandy embayment at Kikaua Point (Figure 1 and Table 1, Station 2), temperature and dissolved oxygen values were very uniform. Temperatures ranged from 28.2-28.6 degrees Centigrade (C.) with a slight vertical stratification evident at Stations 3, 4 and 5. With the exception of Station 3, dissolved oxygen values were at or exceeded saturation with respect to the prevailing temperature and salinity. Station 3 had a value in excess of 95% saturation, a difference which is probably not significant.

Station 2, an inshore sample from the protected embayment, demonstrated the lowest temperature and salinity of all stations, as well as the highest dissolved oxygen value. The salinity data indicate that fresh or brackish groundwater discharges into this small bay. This factor probably resulted in the lower water temperature. Cooler, lower saline waters hold correspondingly more dissolved oxygen than ambient seawater and probably contributed to the somewhat elevated dissolved oxygen levels which were recorded.

The temperature, salinity and dissolved oxygen values recorded in the study area are representative of nearshore waters along the Kona coastline.

2. Kikaua Point

Kikaua Point is a rugged lava headland intersected with small channels and large lava boulders. This rocky point appears to have resulted from a lava flow which filled in portions of the lower third of what was formerly a single large embayment. With the exception of the immediate vicinity of Kikaua Point, the nearshore marine environment largely reflected its once contiguous character in the gross similarities evident in represented species populations on either side of the point. The following description of Kikaua Point is based on a description of the wave-exposed intertidal zone and the wave-protected small sandy embayment which occupies a significant portion of Kikaua Point.

Except for the rather low abundance of fleshy algae (Table 6), the intertidal zone was characterized by two species of grass crabs and, high in the intertidal zone, the neritic *Heriades pices* and the littorinids *Littorina pinnata* and

L. scabra. Several very small *coihi* were also noted in wave-exposed areas. The shingle urchin, *Colobocentrotus atratus* was conspicuous on wave-swept rocks.

Inshore areas of the embayment consist of biologically depauperate unconsolidated sands colonized by an unidentified mound-building tube worm. Juvenile mullet (*Mugil cephalus*) and the goatfishes *Mulloides vanicolensis* and *Parupeneus multifasciatus* were the representative fishes of sandy inshore areas within the bay. Rocks and boulders become increasingly abundant approximately 15-20 meters from shore and provide habitat for small scattered colonies of coral, including *Porites lutea*, *Pocillopora scandrina* and *Pocillopora damicornis*. Most of the *Porites* colonies are small and irregular in shape and demonstrate several growth forms, suggesting wave deposition from sources outside the rocky headland. The presence of small outcroppings of *Pocillopora* is an indicator that this area is frequently exposed to significant wave action, since these two species are generally regarded as a pioneer species in reef environments. Small yellowish-white patches of the encrusting zooanthid coral *Porolithothamnion tuberculosa* occur on larger, wave-swept boulders.

Echinoderms dominated the invertebrate population near the rocky entrance to the protected beach and are the dominant species of the rocky, irregular bottom across all of Kikaua Point. The boring urchins *Echinozetra aesthesi* and *E. oblonga* were the dominant species, occasionally reaching densities of over sixty (60) per square meter. Other common urchins included the slate-pencil urchin, *Heterocentrotus sessilifolius*, the short-spined or collector urchin, *Trispineustes gratiosa*, and the black, venomous urchin, *Echinophrax diadema* and *E. calassaris*. Starfish were also common with *Linckia sulciflora*, *L. guilfordingi*, and *Culcita novaeguineae* recorded in unusually high numbers. Holothurians (sea cucumbers) were represented by *Kelothuria atra*, *H. perrinax* and, in more wave-exposed locations, *Actinopyga securitiana*. Table 5 is a complete checklist of the major macroinvertebrates.

Twenty-two species of fish were identified despite rather limited (perhaps 4-5 meters) underwater visibility caused by larger than average waves. Extremely large schools of sholehole (*Kuhlia sandvicensis*) were encountered several times in areas of moderate water currents, but were not seen elsewhere in the Kikaua area. In terms of total numbers or biomass, this population well outnumbered all other species. Acanthurids (surgeonfishes) were moderately abundant with *Acanthurus trifasciatus* (manini), *A. ciliaceus* (na'ena'e), and *A.*

nigroris (maiko) noticeably well represented. Eight different wrasses were recorded in protected areas around Kikaua Point. The most common wrasses included *Stethojulis beltata*, *Coris flaviventata*, *Halichoeres ornatus* and *Thalassoa duperrae*. Pomacentrids (damselfishes) were common in every habitat type and were represented, in decreasing order of abundance, by *Chromis ovalis*, *Abudefduf abdominalis*, *Plectroglyphidodon imparipennis*, *P. johnstonianus*, *P. sindonis* and *Segastias fasciatus*. Butterflyfishes were represented by various species of *Chaetodon*. *Rhinocentrus sculeatus* was the only ballistid (triggerfish) recorded in the area. Fish records based on only single sightings included an unidentified pipefish (family Syngnathidae) and a one-meter long trumpetfish (*Aulostomus chinensis*).

3. Kikaua Bay and Environs

Kukio Bay and the smaller embayment immediately south of Kikaua Point show several physiographic similarities and except for the smaller expanse of the embayment south of the Point, could be described as mirror images of one another. The gross physical similarities may well be the result of the contemporary rise in sea level associated with the Hawaiian Islands and relatively recent volcanic activity. With the exception of the subtidal environment approximately 200 meters north and south of Kikaua Point, the benthic environment is characterized by a broad, undulating and gently-sloping limestone and/or cemented sand beachrock platform which extends seaward several hundred meters from shore. This broad platform appears interrupted only by the massive lava flow which created Kikaua Point. Approximately 200 meters north and south of the Point the principal physiographic features are basalt boulders, rocks and rubble which have been deposited by wave action and erosion from sources on Kikaua Point proper. Thus, north and south from Kikaua Point is a pattern of decreasing abundance and size in basaltic rocks, boulders, and rubble and an increase in the abundance of reef platform rock.

In general, the diversity and density of the benthic epi-faunal community and associated fish populations is directly proportional to topographic relief: species diversity and density of macrobenthic invertebrates and fish were highest in areas of high topographic relief and lowest in areas of relatively little vertical relief. Thus moving north or south from Kikaua Point there is a pattern of decreasing biological diversity in the represented species populations. This pattern is also reflected in the represented coral species. Immediately,

adjacent to Kikaua Point *Pocillopora sandrina* and *Pocillopora damicornis*, corals indicative of wave-stressed or unstable environments, predominate. These corals experience a fugitive existence, in that they are the first to occupy new surfaces and are most common in areas normally too harsh for other species. They are also replaced in normal successional processes by *Porites* corals which constitute the stable "climax community" in west Hawaii reefs. The abundance of *Porites lobata* and *Porites lutea*, and the absence of *Pocillopora* in the middle to the extreme northern side of Kukio Bay (and in the embayment south of Kikaua Point) suggests that this area is a far more stable environment and less subject to major physical environmental perturbations.

Seven species of scleractinian corals (hard corals) and one zoanthid coral (soft coral) dominated the coral biota of Kukio Bay and environs. *Porites lutea* and *Porites lobata* were the dominant shallow water corals on the north side of Kukio Bay. *Porites compressa* became increasingly prominent in deeper waters. Inshore subtidal waters in Kukio Bay and nearshore waters adjacent to Kikaua Point were dominated by *Pocillopora sandrina* and, occasionally *P. damicornis*. *Pocillopora eydouxi* was an uncommon resident. The acroporid coral *Montipora verrucosa* was occasionally abundant in waters between 2-4 meters deep.

The seaweed flora of Kukio Bay and environs is sparse and is monopolized by relatively few species. Coralline algae are the most abundant species. *Porolithon onkodes* is the dominant algae, forming dense pink crusts on most exposed basalt and limestone surfaces. Other common corallines included *Porolithon gardineri*, *Hydroclithon breviclavus*, *H. reinboldii* and *Jania* sp. Foliose species were largely limited to the more disturbed areas and were represented by *Ulva fasciata*, *Boodlea composita* and *Chaetozorpha*. Small patches of *Ralfsia* sp. were common in rocky areas at about the 8-foot contour.

Macrobenthic invertebrates were well represented throughout Kukio Bay though less so in the smaller embayment south of Kikaua Point (Table 5). Echinoderms were represented by three sea stars, seven echinoids, at least two species of brittle stars, and three species of holothurians. Three species of cowries, including *Cypraea caputserpentis*, *C. saurijana* and *C. maculifera* were recorded, all of which were exceptionally large and unusually abundant (two of the six specimens of *C. saurijana* recorded exceeded 9 cm. in length).

Fifty-eight species of fish encompassing 37 genera and

eighteen families were recorded in Kukio Bay (Table 4). Highest diversity was associated with the rough, irregular topography in close proximity to Kikaua Point. The number of fish species and individual recorded was high and, interestingly, the size of many of the represented fish was unusually large. Goatfish, squirrelfish, parrotfish, and muttoni were exceptionally large throughout the bay, which may indicate that this area receives relatively little fishing pressure as contrasted with other nearshore environments on the Kona Coast.

B. ANCHIALINE POND COMPLEX

1. Introduction

The Kukio anchialine pond system is composed of several dozen small (<1 square meter) to large (>100 square meters) ponds within a single a'a lava depression of approximately 3 acres.

Three physically and biologically distinct pond types were defined within the study area: (1) Intermittent and permanent biologically depauperate mauka pools; (2) Rocky intermedial ponds with biogenic crusts; and (3) Sedimented mauka ponds with non-mineralized benthic algal mats. The above definitions highlight the major characteristics of represented large and small ponds and pools, although gradations in physical and biological characteristics, often within the same pond system, do not permit a strict definition to apply. This classification does, however, assist for clarity and discussion purposes and permits attention to be focused on the major features of this coastal pond complex.

2. Water Quality

The uniformity in temperature, salinity and dissolved oxygen values suggest that all ponds and pools within the study area are extremely well mixed (Table 2). The pond complex appears to consist of an extension of the ocean water table diluted by fresh groundwater runoff and subject to tidal influence. A tidal range of approximately 20 cm. was evident during the survey period.

Salinity values ranged from 4.0-4.2 parts per thousand (ppt) with most sampling stations indicating a value of 4.1 ppt, regardless of the tidal period.

Temperature values were more variable and ranged from 24.0-26.7 degrees C. in shallow mauka pools and between 23.5-28.1 degrees C. in larger mauka ponds.

Dissolved oxygen values were similar during daylight hours with a range of 5.2-6.8 parts per million (ppm) recorded from five sampling stations. Mauka ponds demonstrated slightly higher dissolved oxygen values than mauka ponds, though most showed values between 64-86% of saturation. Dissolved oxygen does not appear to be a limiting factor during daylight hours. Measurements were during early morning hours of 11/18/84 to determine dissolved oxygen values during non-photosynthetic periods when plant respiration (oxygen consumption) would be high. These data indicated a significant reduction in dissolved

oxygen values over daytime readings, though none would appear to be limiting to the extant species populations. Stations 5, 2 and 1 (Table 2) indicate a pattern of decreasing dissolved oxygen concentrations moving mauka to makai. With values of approximately 60%, 47%, and 43% of saturation, respectively, recorded.

3. Intermittent and permanent biologically depauperate mauka pools

Numerous small intermittent and permanent ponds and pools occur within the mauka portions of the study area. The term "intermittent" is utilized only to denote shallower pools whose surface waters are scant or disappear during low tide periods.

Surface dimensions of these rocky, irregularly-shaped pools ranged from shallow (1 cm.), rocky, circular depressions of less than 1 square meter, to long, sinuous, deep (1.5 meters) pools up to an estimated 50 square meters. Virtually transparent waters, an absence of benthic silt, sediment and macroscopic plant life, and the ubiquitous occurrence of the brilliant red atyid shrimp *Halocaridina rubra* characterized this type of pool system. Another important characteristic of such pools is the absence of any riparian or terrestrial plants in proximity to such pool or pond complexes. The development of more diverse pond systems, that is, the senescence or ecological succession pattern evident in the Kukio anchialine pond complex, appears to be in part the result of the accumulation of organic materials originating from adjacent terrestrial and riparian plants and organic material deposited by wind action. Larger pools sometimes harbored the predatory red alpheid shrimp *Metabetaeus lohena*, though this species was not observed in all ponds surveyed.

A moderately-sized representative mauka pool comprising approximately 14 square meters in surface area and located approximately one-half way between the existing access road and the elevated pahoehoe flow on the north side of the parcel was selected for more detailed analysis. Water depths based on six measurements averaged 11.4 cm., though two areas within the pond demonstrated depths of nearly 0.5 meters. Water quality data indicated that this pool remained slightly cooler (25.5 degrees C.) than four adjacent pond sampling stations during the morning hours of 11/17/84, though temperatures recorded during the morning hours of 11/18/84 were comparable with other ponds. Salinity was a uniform 4.1 parts per thousand (ppt) during all sampling periods.

4. Rocky intermediate ponds with biogenic crusts

This pond type represents an intermediate stage between the "young" mauka ponds and the biologically senescent "makai" pond systems. This pond type is distinguished by extensive biogenic (algal) crusts, rocky a'a substrate with silt and organic sediments in deeper depressions, reduced water permeability, extensive growth of riparian and terrestrial vegetation around pond perimeters, and the ubiquitous presence of *Halocaridina*. *Metabetaeus* occurs in this pond type as does the native prawn *Macrobrachium grandimanus* and the snails *Melania* and *Assisinea*.

The "white crust" community is dominated by the cyanophyte *Shizothrix calcicola*, pennate diatoms and at least one species of *Oscillatoria*. According to Mong (1975) these species secrete a mucilage-like material which traps and binds sediments, forming a solid calcareous crust. Orange and orange-brown crusts were dominated by *Lyngbya* and/or *Schizothrix* in association with various diatoms. Mong (1975) described similar orange crusts occurring in anchialine ponds on Maui (of considerably higher salinity) as composed of blue-green algae, periphytic diatoms, *Lyngbya*, *Pleurocapsa*, and several species of *Oscillatoria*. Green crusts or mats at Kukio were dominated by either *Entophysalis deusta* or *Rhizoclonium* with *Lyngbya* and *Chroococcus* of secondary importance.

Unlike the smaller, low diversity mauka ponds, this intermediate pond type is best distinguished by the partial to near complete border of low-lying riparian and terrestrial vegetation. Plants contribute organic matter which appears to provide sedimentary material and a nutrient base for pond biota. Decomposition products of such materials result in the development of benthic mats and crusts which reduce pond permeability while at the same time providing a foothold for vascular aquatic plants. *Chara salina* and *Ruppia sarifina* occasionally form dense growths in several of the intermediate ponds but were generally smaller than in the more heavily sedimented makai ponds.

A nine-meter long transect across a representative intermediate pond (pond #2) provided the following data:

76%	-	barren a'a rock and rubble
16%	-	orange and white algal crusts
5%	-	<i>Chara salina</i>
3%	-	green algal mats

The northwest side of this pond had a water depth of 1.4

Densities of the atyid shrimp *Halocaridina rubra* on exposed horizontal rock surfaces ranged from approximately 9/0.25 sq. meters to 22/0.25 sq. meters based on eight counting stations within the pool. The absolute glass like surface and polarized glasses permitted relatively undisturbed counts of the shrimp on horizontal surfaces but did not account for specimens on the sides or undersides of rocks or in numerous small crevices. The population density data thus provide only a relative indicator of actual population density. *Metabetaeus* was not observed within this pool. Microscopic examination of the whitish mineralized deposits on virtually all rock surfaces indicated the presence of an epilithic community of cyanophytes (blue-green algae) and diatoms.

A second small pool (approximately 4 sq. meters) located immediately makai of the aforementioned pool was briefly examined because of the conspicuous presence of at least three large dragonfly nymphs which were readily discernible against the mineralized whitish substrate. Close examination indicated that this pool was nearly devoid of *Halocaridina*. The presence of this large predaceous nymph appeared to be responsible for the near complete absence of atyid shrimp from visible surfaces within this small pool.

A third shallow pool of approximately 20 square meters, (located immediately below the access road) was distinguished by exceptionally high densities of *Halocaridina*. Population densities ranged from 2400/0.25 sq. meter in a shallow (2-3 cm.) makai portion of this elongated pool to approximately 80/0.25 sq. meter in the somewhat deeper (7-11 cm.) mauka portions of the pool. The largest concentration of atyid shrimp was found immediately beneath a clump of fountain grass which was partially submerged. Despite the high density of *Halocaridina*, the predatory alpheid shrimp *Metabetaeus* was occasionally recorded in this pool at an estimated ratio of 400:1 (*Halocaridina*:*Metabetaeus*). *Metabetaeus* was usually detected by localized "explosions" in the *Halocaridina* population, an apparent escape reaction to this predator. The latter ratio is based on mean values from five selected sampling stations within this pool. With the exception of partial shading provided by a keawe tree, and a small clump of grass, this pool demonstrated the same physical and biological features of other mauka pond and pool complexes. These results indicate the significant biological variation possible in even the smallest, seemingly identical pond and pool systems.

meters; whereas the eastern side of the pond averaged less than 20 cm. The deeper side of the pond abutted stands of fountain grass and other low-lying or prostrate ground cover. A small stand of *Chara* dominated several square meters of the deeper portion of the pond. Nowhere in this pond or in other ponds examined was this species associated with anything other than thick, organically-rich, bottom sediments, or sediments overlain with an algal carpet or crust. Although not quantified, there appeared to be a direct relationship between the density and diversity of *Chara* and various mat and crust-forming algae and the distance from pond perimeter vegetation. Such patterns are distinct enough to be clearly evident in color photographs obtained with a polarizing filter. This pattern suggests the apparently critical role of terrestrial and riparian vegetation in anchialine pond successional processes. Once established, *Chara* and *Ruppia* may contribute substantially to the benthic organic mat, but early stages in pond succession would appear to be dependent on vegetation or other inorganic (sand) or organic materials deposited from sources outside the pond. Intermediate ponds are sufficiently removed in distance from soil or sand deposits such as to rule out any significant contribution of materials from these sources. The lack of any significant horizontal water movement within such ponds also suggests that deposited vegetation and particulate organic matter would tend to remain very localized, perhaps accounting for the clearly discernible population patterns which were evident in several pond complexes.

The native snails *Assisinea* sp. and *Melania* sp. were by far the dominant faunal elements with densities between 13 and 193/0.25 sq. meters recorded (from one pond) for the former species and between 4 and 22/0.25 sq. meters for the latter species. Both species occurred throughout all pond habitats but were clearly most abundant on rocks demonstrating an absence of obvious algal growth. Both species appeared to be inactive during the survey period, suggesting that active foraging may take place at night.

The atyid shrimp *Melocerceridina* was detectable in all intermediate ponds though population densities varied by up to two orders of magnitude. The predaceous and slightly larger alpheid shrimp *Metabetaeus lohena* was not present (or at least observed) in all intermediate stage ponds and is present never approached the density recorded in the younger mauka ponds. The palaemonid shrimp *Palaemon debilis* (ocae huna) was an uncommon resident of most intermediate ponds and was generally most numerous on larger boulders with well developed mats of *Rhizoclonia* and an unidentified green filamentous "turf" algae. This species was never observed along

the shallow rocky margins of the ponds or in association with *Schizothrix* crusts. Its absence from appropriate habitat along the margin of the various ponds suggests that predation by waterbirds may be a factor in their distribution, though these larger (2.5-5.5 cm., rostrum to tail) and nearly transparent shrimp would be difficult to census in rocky areas.

The native prawn *Macrobrachium grandimanus* (ocae) appears to be an uncommon resident of intermediate stage ponds. Only three prawns of this species were recorded during the field survey, though their cryptic and nocturnal habits would make an accurate census nearly impossible. MacIolek and Brock (1974) mention two ecotypes of *M. grandimanus*, the "normal, robust, heavily-pigmented" type and the more "delicate, aberrant type characteristic of anchialine pools". The three specimens recorded were of the former ecotype. All three specimens were encountered in rocky, relatively algal-free substrates.

A small (1 cm.) hydrophilid beetle was observed on two occasions within a small stand of *Ruppia*.

5. Sedimented mauka ponds with non-mineralized benthic algal mats

Siltation, the presence of thick benthic sand, occasionally, floating) algal mats, reduced water permeability, encroaching emergent vegetation, and proximity to terrestrial and riparian vegetation characterizes this mauka pond type. This pond type comprises approximately 75% of the surface water of the Kukio anchialine pond complex and forms a nearly continuous large pond across approximately 100 hundred meters of a back-beach lowland, a depression. Although the absence of succulents suggests that this pond complex is not in the final stage of succession or senescence, the presence of extensive stands of emergent vegetation, especially along the mauka margin, indicates that influences external to the pond in part determine the nature of the pond environment. Extensive stands of coastal strand vegetation, *Pandanus*, *haole* *koa*, *keawe*, *coconut* palms and emergent vegetation dominate the mauka margins of the pond and contribute extensive quantities of organic matter to the pond environment. Sedimentation and siltation is generally less apparent mauka of the mauka reaches of the pond but only rarely demonstrates attributes of the former two pond types previously discussed.

The presence of fine sediments and unconsolidated organic material overlain by a yellowish-green algal mat of *Oscillatoria lymbys*, various filamentous green algae and diatoms was a feature unique to the makai portions of this pond type. This dense matrix is colonized by several protozoans and rotifers and forms an effective silt and sediment binder. Fine sediment, silt and organic matter form a thick (at least 0.5 meter) menstruum over the rocky pond bottom. Much of the silt-organic "muck" is anaerobic and disturbances to the benthic mat generate hydrogen sulfide gas and, frequently, clouds of greyish-black silt.

The macrofauna of the benthic mats is not extensive, possibly because of the presence of hydrogen sulfide which is toxic to most aquatic life. A small (2 cm.) polychaete worm was the only macroscopic species associated with such areas. A free-floating surface mat up to nearly a meter in diameter and up to 3 cm. thick characterized portions of the pond margin and occasionally created thick blankets over stands of *Ruppia* and *Chara*, occasionally resulting in death to the latter. This surface mat was composed of the green alga *Volvox*, and a matrix of *lymbys*, *Oscillatoria*, various diatoms and fine sediment. The composition of these surface mats is variable and are not unlike the benthic mats in texture and species composition. Evidence suggests that the floating surface mats eventually sink from the weight of entrapped silt and sediment and either create or contribute material to the benthic mats. Partially submerged surface mats were common within one large makai pond.

Haloceridina rubra occurred in all makai ponds at very low densities. They were absent from all benthic mat areas and were only conspicuous in rocky, algal crust habitats. *Metabetaeus* was not recorded from the makai ponds. *Palaeon debilis* was common in all rocky areas and in areas with extensive green algal turfs. *Macrobrachius* lar, an introduced prawn, was only recorded within the makai ponds. Three live specimens were observed in rocky areas in one study pond and the exoskeletons of other specimens were noted in other ponds. This species, like *M. grandis*, is difficult to census because of their cryptic habit. Both species are probably more common than the survey data would indicate.

The common mullet, *Mugil cephalus*, was the only fish observed within the entire anchialine complex. A single school composed of perhaps a dozen small (12-20 cm.) individuals was observed on several occasions during the field survey. The presence of this species may in part explain the relatively few atyid shrimp observed in the makai pond system. According to a

Hushup Ranch employees, mullet are periodically stocked in the pond when local throw-net fishermen catch mullet too small for human consumption.

4. DISCUSSION

A. KUKIO BAY AND ENVIRONMENT

The marine environment of Kukio Bay demonstrates relatively high biological diversity with respect to represented fishes and macrobenthic invertebrates. By contrast, coral density is low in comparison with similar reefs off the Kohala area. Kohala reefs are less subject to storm-wave damage and show indications of advanced succession and stable climax stages. Kohala reefs typically show low coral species diversity and high coverage of living corals (Belt, Collins & Assoc., 1982). The corals of Kukio Bay appear similar to inshore reef communities occurring throughout most of the Kona and South Kona Districts, where fugitive corals such as *Pocillopora seawardina* tend to dominate (Doller, 1981). However, portions of the northern side of the bay show similarities to Kohala reefs. This similarity is reflected in the increasing abundance of *Porites lobata* and *Porites juba* and the near absence of *Pocillopora seawardina* from all but inshore areas. However, typical Kohala reefs demonstrate approximately 50% living coral coverage; coverage on the north side of Kukio Bay demonstrated an estimated 5% coverage at the 15-foot contour. Although surveys beyond the 15-foot contour were not conducted as a part of this investigation, the increasing abundance of both *Porites lobata* and *Porites compressa* suggests that deeper waters on the reef platform may show similarities with reef communities to the north.

From a marine resource perspective, the Kukio Bay region demonstrates a moderately diverse fauna and a relatively depauperate flora, except for the ubiquitous presence of reef building coralline algae. The low diversity of foliose algae is typical for the west coast of Hawaii and may be the result of lack of nutrient input from surface waters. The east and south coasts of Hawaii generally demonstrate a much more diverse algal community and significantly greater coverage.

None of the sixty-two species of fish recorded in the vicinity of Kukio Bay and Kikaua Point were especially unusual or unique. In comparison with similar studies conducted on the west coast of Hawaii this number of species could be considered about normal for inshore areas of varying topographic relief. Short-term shallow water surveys in the Kohala area revealed 71 species of fish whereas a long-term analysis of fish populations at Honaunau Bay, South Kona, provided a checklist of over 120 species (Doller, 1981; Ludwig, et al. 1980). The exceptionally large size of the goatfish, squirrelfish, parrotfish, and menini at Kukio was surprising, however, considering the apparently light

fishing pressure in the area, this observation is probably not unusual.

From a human resource perspective, Kukio Bay offers an excellent white sand beach and fair to moderate underwater visibility for skin divers. However, the lack of major topographic relief and the low coral cover would confer a rating of "fair" in comparison to the dramatic and unusually complex topography associated with many North Kohala reefs and the reefs in the vicinity of Kealakua Bay and Captain Cook. All inshore (intertidal zone to approximately 10-15 meters seaward) areas of Kukio Bay are exceptionally rough and irregular and laced with small caverns, ledges, holes and crevices. Compounding the physical ruggedness of this zone is the large population of rock-boring urchins, including several venomous species. Urchins not only contribute to the irregularity of this zone but also pose a potential hazard to future beach recreationists and swimmers. Future resort development at Kukio may have to include modifications of the natural shoreline to remove boulders, rock, and rubble which could pose as a hazard to bathers.

B. ANCHIALINE POND COMPLEX

Anchialine ponds represent distinctive but seldom studied natural features of the west coast of Hawaii and the southwest coast of Maui. Natural history studies have been largely limited to the comprehensive work of Wong (1975) on Maui's Cape Kinohiki anchialine ponds and the relatively superficial inventory of west Hawaii ponds by MacIolek and Brock (1974). The work of Holthuis (1973), Banner and Banner (1980), and Chace (1972) represent largely taxonomic descriptions of anchialine pond crustaceans, though Holthuis provides a cursory description of physical environments and major pond biota. The scarcity of information on this unique coastal resource is indicated by the single reference in the University of Hawaii's Hamilton Library Card catalogue to the study of Wong (1976). A contributing factor to the paucity of relevant studies on anchialine ponds is likely the prevailing private ownership which characterizes much of the North Kona and South Kohala Districts. Approximately 87% of the known anchialine ponds on the island of Hawaii occur within these districts. More recent studies on anchialine ponds in the Maikoloa area (the proposed site of a major resort complex) are regarded as proprietary at this time (Blentfang, personal communication, 1984).

Three physically and biologically distinct pond types were defined for the Kukio area: 1) intermittent and permanent biologically depauperate mauia pools; 2) rocky intermediate ponds

with biogenic crusts and 3) sedimented makai ponds with non-mineralized benthic algal mats. Wong (1976) described four pond types on Maui: 1) matted and crustaceous cyanophyte communities; 2) intermediate pools of marine algae and cyanophyte communities; 3) ponds characterized by the presence of *Ruppia ariflora* and 4) ponds with a marine flora of macrophytic chlorophytes and rhodophytes. Although the Maui ponds were characterized by a higher salinity (11-27 parts per thousand) than the Kukio ponds (4.0 - 4.2 parts per thousand) it was obvious from Wong's treatment of the benthic and surface algal mats and algal crusts that the Maui ponds shared some similarities with those at Kukio. Most striking perhaps is the apparent wide range in salinity and temperature tolerance of represented species. *Lynobrya*, an important crust-forming alga at Kukio, thrived in a salinity range of 6-27 parts per thousand (ppt) at Maui and, according to a referenced citation, can tolerate salinities down to 1 ppt. The temperature range experienced on Maui during the study period varied from 17.5-30.4 degrees C. Similarly, *Ruppia ariflora* was reported to thrive at a salinity range between 13.5 and 27 ppt, or in waters roughly four to seven times more saline than Kukio.

The single greatest difference between the Maui and Kukio pond complexes was the near total absence of terrestrial vegetation at Maui and the low diversity of riparian and facultative wetland vegetation at the Maui site. At Kukio, organic matter contributed by coastal strand, riparian and aquatic vegetation is perhaps the single most important determinant of pond succession stages and senescence. This observation leads to the conclusion that proximity to sources of particulate organic material, either direct or by wind deposition, has a significant influence on pond aging processes and the rate of such processes. These observations further suggest that anchialine pond complexes can be effectively managed and controlled for long-term protection and preservation purposes.

On the basis of the west Hawaii anchialine pond survey of Maciolek and Brock (1974), the Kukio pond complex does not appear to possess any unique physical or biological attributes that would warrant special recognition. However, comparison of this survey with that of Maciolek and Brock indicates that changes in the represented species populations have occurred since 1974. *Eleotris sandwicensis* (loopu akupa), a native, bottom-dwelling predator reported in one (pond 6-18) of the six ponds surveyed at Kukio in 1974 was not recorded during the November, 1984 field survey. Although the map of the Kukio ponds surveyed in the Maciolek and Brock report lacks the necessary detail for a positive confirmation, it appears that *Eleotris*

was identified in the makai pond that currently harbors a school of planted mullet. The recent surveys indicated that this pond had a very small population of atid shrimp. The possibility thus exists that the stocking of mullet may have adversely affected the native *opu akupa* and, perhaps indirectly, the *Haloceridina* population. Maciolek and Brock (1974) indicate that mullet and "other native fishes" occurred in only 10% of the anchialine ponds surveyed. *Macrobrachium* is presently an uncommon resident of the makai ponds at Kukio. It was not listed as occurring at Kukio in the 1974 survey. Although M. J. was reported to occur in 5% (16 ponds) of the over 300 ponds surveyed in 1974, unconfirmed reports suggest that this species may have been recently planted at Kukio (Melrose, personal communication, 1984).

All of the Kukio ponds surveyed were striking in the absolute transparency of their waters, despite the significant organic enrichment of some intermediate ponds and virtually all makai ponds. This observation suggests that the ponds are well flushed by tidal fluctuations and the retention time is insufficient to allow phytoplankton to develop to a density where it would be conspicuous. Although dissolved nutrient levels in low saline groundwaters may be low for phytoplankton growth, evidence suggests that these chemicals would not be limiting. Davis and Yamanaga (1973) reported that mixohaline waters occur as far as 4-5 miles inland from the coastlines between Kailua and Kawaihae. Samples of brackish (430 mg/l of chloride) wellwater collected near Kawaihae showed that nitrogen (as nitrate) was present at a concentration of 3.3 mg/l. Although values for phosphorus were not given, it would be extremely unlikely that phosphorus (available as dissolved phosphate) would not also be available. Similarly, the extent of seawater and freshwater mixing would insure that trace elements necessary for plant growth are also present. Thus, an absence of appropriate plant nutrients would not appear to be a limiting factor for phytoplankton development at Kukio.

5. RECOMMENDATIONS

A. Physical disturbances

Future developmental activities should minimize structural and physical changes or disturbances to pond environments to maintain optimum conditions for represented flora and fauna. Particular care should be exercised to maintain existing natural and man-made rock separations and vegetation corridors between ponds since available data suggests that these physical obstructions prevent or at least restrict the movement and dispersal of introduced species such as *Callinectes* and *Macrobathra* larvae. Introduction of exotic or non-native species could significantly modify the natural pond biota. Future development should include provision for an ongoing maintenance program to reduce the potential of non-indigenous species being introduced into the ponds.

Should activities be undertaken which would expand or reduce the surface area of the pond complex, efforts should be made to insure that opportunities for dispersal of non-indigenous species do not occur. In the process of any proposed alteration of the pond area, care should be taken in the use of heavy earthmoving equipment which may compact the substrata and reduce water drainage patterns and percolation rates.

Recognizing the scientific, educational and aesthetic resources of the pond complex, it would seem reasonable to design an interpretive tour of the area to increase public awareness of pond resources. Available information suggests that construction of new pathways for pedestrian use would not be detrimental. Provided natural porous rock materials are utilized, to the extent possible, any such new pathways or walls should take advantage of natural surface contours so that existing drainage, mixing and percolation patterns are maintained. The use of natural lava rock would not pose an obstruction to native shrimp species, inasmuch as they have evolved a hypogeal (growing or maturing underground) habit related to both reproduction and dispersal.

B. Water quality considerations

Available field data and information from the scientific literature suggests that water quality perturbations resulting from upland development activities will not adversely affect anchialine ponds. Except for the makai margins of the larger ponds abutting the back-beach berm, observations suggest that the anchialine ponds are regularly flushed by tidal fluctuations and the apparently continuous downslope movement of well-mixed mixohaline

groundwaters. Perturbations in the form of irrigation water, treated wastewaters, runoff from fertilized areas, etc., would appear to have insufficient residence time to result in any adverse impact to the ponds. Although the makai, sedimented and organically-rich margins of the larger ponds do not appear to drain as effectively as rocky, unsedimented ponds, sufficient rocky areas occur within such ponds or in adjacent, connected or contiguous ponds to facilitate flushing. The addition of freshwater to the ponds resulting from upland irrigation practices may exert a minor effect on the pond waters. However, available data indicates that virtually all anchialine species are extremely euryhaline, and are able to thrive within a broad range of ambient salinities.

C. Landscaping

Existing and any future plantings surrounding the ponds pose perhaps the greatest threat to the maintenance of the existing pond systems. The effect of organic materials from terrestrial, riparian, and aquatic vegetation is responsible for ecological succession patterns apparent in anchialine pond complexes. The rate of pond aging or senescence appears to be determined by the deposition rate of organic materials, silt and sediment. An increase in the deposition rate of these materials would presumably lead to a corresponding increase in pond senescence rates.

Future landscape plantings in the vicinity of the pond complex should utilize trees, palms, shrubs and groundcovers located so as to minimize the potential of leaf droppings contributing to the organic materials introduced into the ponds.

D. Earthmoving

Earthmoving activities should be regulated to reduce or eliminate airborne suspension of dirt and silt which could be deposited in coastal ponds. Clearing or grubbing operations within the coastal strand community should also be regulated to minimize the opportunity for wind-blown sand deposition in the pond complex.

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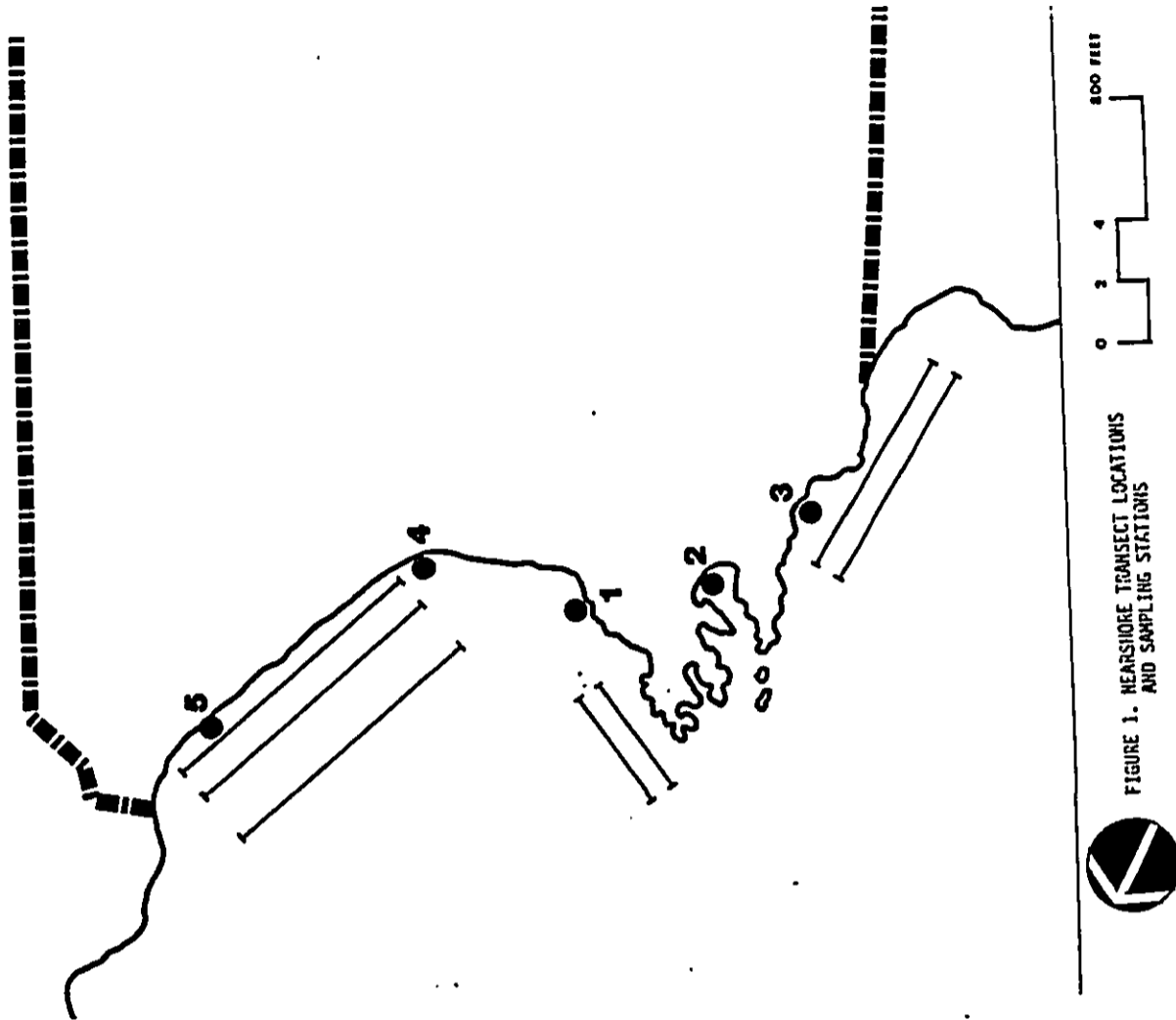


FIGURE 1. NEARSHORE TRANSECT LOCATIONS AND SAMPLING STATIONS

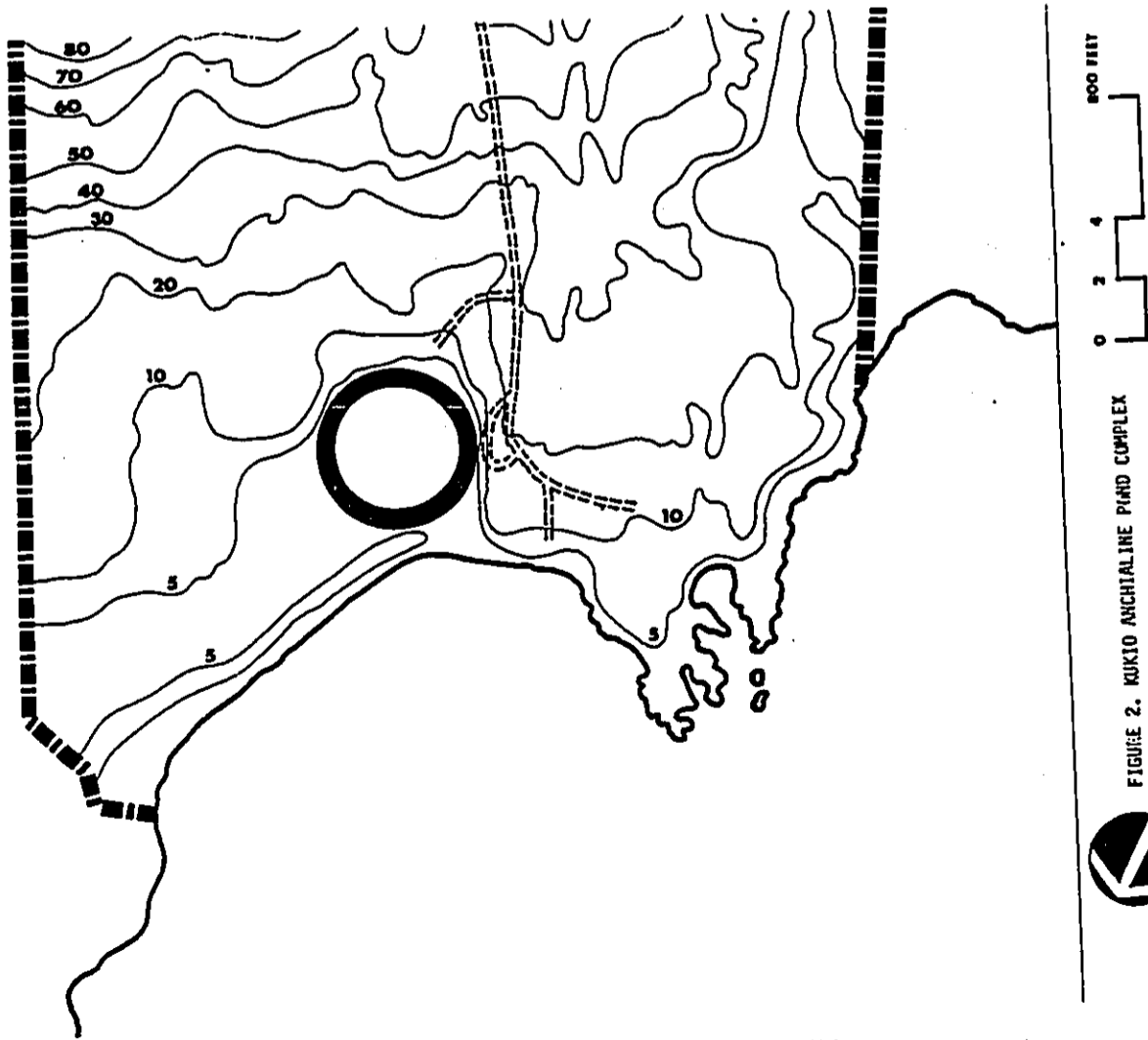


FIGURE 2. KUKIO ANCHORAGE POND COMPLEX

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TABLE 1

MARINE WATER QUALITY DATA - KUKIO BAY AND KIKAUA POINTS

PARAMETER:	DEPTH (M)	TEMP. (C.)	SALINITY (PPT)	DISS. OXYGEN (PPHM)
STATION 1	0.5	28.5	33.1	6.4
	1.0	28.5	33.7	6.3
STATION 2	0.1	28.2	30.5	6.8
	0.5	28.3	30.8	7.0
STATION 3	0.5	28.6	31.0	6.0
	1.0	28.4	31.2	6.0
STATION 4	0.5	28.6	34.7	6.6
	1.0	28.4	34.7	6.5
STATION 5	0.5	28.6	34.7	6.5
	1.0	28.5	34.6	6.5

Sampling Period: November 17, 1984: 1500-1610 HRS

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TABLE 2

ANCHIALINE POND WATER QUALITY

PARAMETER:	DEPTH (M)	TEMP. (C.)	SALINITY (PPT)	DISS. OXYGEN (PPH)
STATION 1 (11/17)	0.1	28.1	4.0	5.2 (0930 HRS)
	1.0	26.8	4.0	5.8
	0.1	25.4	4.1	3.8 (0400 HRS)
	1.0	25.5	4.1	3.6 (1030 HRS)
	0.1	23.5	4.1	5.5
STATION 2 (11/17)	0.1	27.5	4.2	5.2 (0940 HRS)
	1.0	26.5	4.1	5.1
	0.1	25.5	4.1	3.9 (0410 HRS)
	1.0	25.4	4.1	4.1
	0.1	23.5	4.1	5.2 (1051 HRS)
STATION 3 (11/17)	0.1	23.5	4.1	5.2
	0.5	24.1	4.1	
	0.5	27.6	4.1	6.8 (0946 HRS)
	0.5	24.1	4.1	6.4 (1105 HRS)
	0.1	26.7	4.1	5.6 (1015 HRS)
STATION 4 (11/17)	0.1	24.3	4.1	5.5 (1116 HRS)
	0.5	25.5	4.1	6.4 (1129 HRS)
STATION 5 (11/17)	0.5	24.0	4.1	5.1 (0430 HRS)
	0.5	24.2	4.1	6.5 (1134 HRS)

TABLE 3
CHECKLIST OF CORALS

LOCATION	TRANSECT DEPTH	KUKUI BAY	KIKAJA Pt.
		5'	10' 15' 5' 10'
SCLERACTINIAN (HARD CORALS)			
PORITIDAE			
Porites lobata	-	C	C
Porites lutea	-	A	A
Porites compressa	-	-	1
POCILLOPORIDAE			
Pocillopora meandrina	A	A	A
Pocillopora damicornis	A	A	A
Pocillopora eydouxi	-	-	-
ACROPORIDAE			
Montipora verrucosa	-	1	1
ZANTHIDEA (SOFT CORALS)			
Palythoa tuberculosa	C	C	C

TABLE 5
CHECKLIST OF MACROINVERTEBRATES

	LOCATION DEPTH	KUKIIO BAY 5' 10' 15'	KIKALUA P1 5' 10'
PORIFERA (SPONGES)			
<i>Demospongiae</i> sp. (red)		I	I
<i>Spirastrella vagabunda</i>		I	I
ANNELIDA (SEGMENTED WORMS)			
unident. tube worm		I	I
CRUSTACEA (CRUSTACEANS)			
GRAPSIDAE			
<i>Grapsus grapsus</i>			Intertidal
<i>Grapsus tenuicrustatus</i>			Intertidal
MOLLUSCA (MOLLUSKS)			
NERITIDAE			
<i>Nerita picea</i>			Intertidal
CYPRAEIDAE			
<i>Cypraea caputserpentis</i>		I	I
<i>Cypraea mauritiana</i>		R	R
<i>Cypraea maculifera</i>		R	R
CONIDAE			
<i>Conus textile</i>		R	R
MURICIDAE			
<i>Drupa morua</i>		I	I
TROCHIDAE			
<i>Trochus intextus</i>		I	I
LITTORINIDAE			
<i>Littorina pincta</i>			Intertidal
<i>Littorina scabra</i>			Intertidal
TURBINIDAE			
<i>Turbo sandwicensis</i>		I	I
PATELLIDAE			
<i>Cellana exarata</i> (opini)			Intertidal
ECHINODERMATA (ECHINODERMS)			
ASTEROIDEA (SEA STARS)			
<i>Culcita novaequinae</i>		I	I
<i>Linckia guildingi</i>		R	R
<i>Linckia multiflora</i>		C	C

Plectroglyphidodon johnstonianus I
Plectroglyphidodon sindonis I
Stegastes fasciatus I
 SCARIDAE (PARROT FISHES) I
Scarus sordidus (whu) R
 SERRANIDAE (GROUPERS) R
Cephalopholis argus R
 SYNGNATHIDAE (PIPEFISHES) R
 unident. juvenile R
 TETRACANTHIDAE (PUFFERS) I
Canthigaster jactator I
 ZANCLIDAE (MORRISH IDOL) C
Zanclus cornutus (kihikihi) C

TOTAL FAMILIES 20
 TOTAL GENERA 39
 TOTAL SPECIES 62

Symbol Notation:
 A = Abundant, always observed, many individuals counted.
 C = Common, localized concentrations, or even distributions of moderate amount of individuals.
 I = Infrequent, small localized concentrations or only several observations.
 R = Rare, only one or two organisms observed.

TABLE 7
SPECIES CHECKLIST - ANCHIALINE PONDS

	POND #1 (makai)	2	3 (maui)
FLORA			
Schizothrix sp.	X	X	-
Rhizoclonium sp.	X	X	X
unidentified cyanophytes	X	X	X
unidentified diatoms	X	X	-
Oscillatoria sp.	X	X	-
Entophysalis deusta	X	X	-
Lynghya sp.	X	X	-
Chroococcus sp.	X	X	-
Chara salina	X	X	-
Ruppia maritima	X	X	-
WORMS			
Folychaeta sp.	X	-	-
MOLLUSKS			
Assiminea sp.	X	X	-
Melania sp.	X	X	-
CRUSTACEANS			
Metabetaeus lohena	X	-	-
Halocaradina rubra	X	X	X
Palaeomon debilis	X	X	-
Macrobrachium lar	X	-	-
Macrobrachium grandimanus	X	X	-
INSECTS			
Unident. hydrophilid beetle	-	X	X
Dragonfly naiad (nymph)	-	-	-
FISH			
Mugil cephalus (mullet)	X	-	-



Plate 1. Representative makai pond type with shrub and encroaching vegetation.



Plate 2. Representative intermediate scrub pond with intermediate vegetation.



Plate 5. Schizothrix community in intermediate pond.

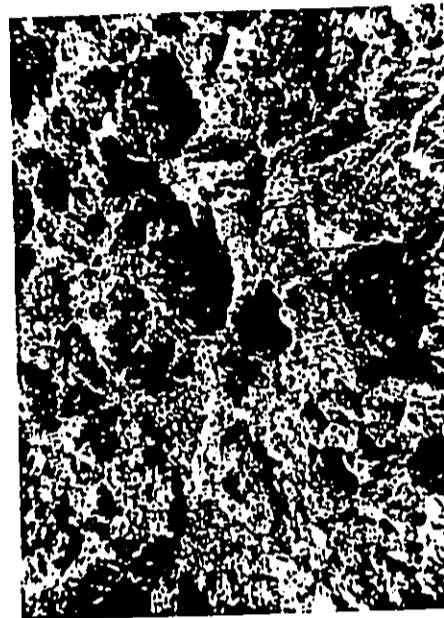


Plate 6. Mixed Schizothrix and Leptothrix community in intermediate pond type.

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Plate 7. Representative mauia cond type.



Plate 8. Close-up of intermediate cond type showing orange biogenic crusts.

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Plate 7. *Chara salina* community in sedimented malai pond.



Plate 8. *Macrobrachium crabs*.



Plate 9. Fauna (left to right: *Helania* sp., *consulida*, *Helania* sp., *glotych*, *Malacostraca* sp., *Helania debilis*, dragonfly nymph).

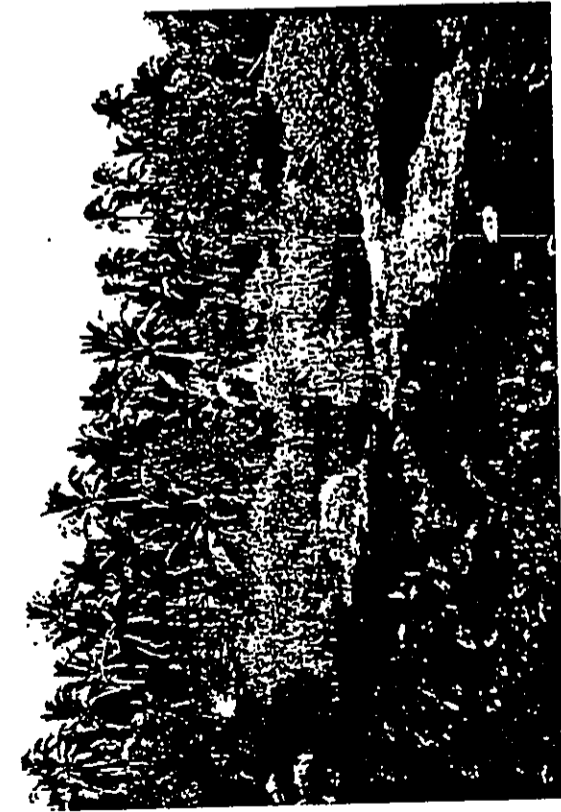


Plate IV. Representative malai pond type.

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Plate II. Representative of the malai pond type with different vegetation.

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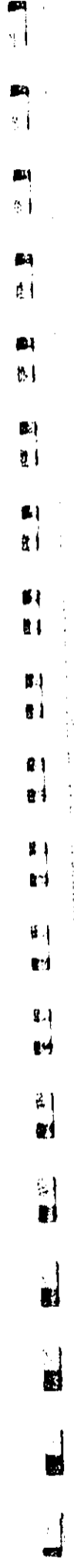




Plate 11. *Chamaecladus* and *Schizothela* tracks in entombed metal plates.

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Plate 12. Developing biogenic crust community in intermediate sand type.

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Plate 14. Confluent algal crust community in intermediate zone
Lupp.

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Plate 15. Overview of malac and intermediate zone Lupp.

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APPENDIX D: MARKET ASSESSMENT

REAL ESTATE APPRAISERS & CONSULTANTS



John Child & Company, Inc.

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of the Pacific
100 Merchant Street,
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Honolulu, Hawaii 96813
(808) 532-2951

January 6, 1986

Mr. Carl A. Carlson, Jr.
General Manager
Huehue Ranch
72-3667 Hawaii Belt Road
Kailua-Kona, Hawaii 96740

Dear Mr. Carlson:

At your request, we have completed our market study for the proposed Kukio Beach Resort in North Kona, Hawaii. The accompanying report presents the detailed findings and conclusions regarding our assessments of the markets for hotel, condominium and resort residential single-family lot development at the proposed resort.

BACKGROUND

Huehue Ranch proposes to develop a master-planned resort community on 675 acres located along Queen Kaahumanu Highway in North Kona, Hawaii. The development is planned to include an 18-hole golf course, resort hotels, multifamily condominiums, resort residential lots and other supportive facilities and amenities. The development is identified as the Kukio Beach Resort (Resort).

Huehue Ranch is preparing a general plan amendment and land use and zoning applications for the Resort. Thus, you have asked John Child & Company, Inc. to prepare a market study for these land uses at the proposed Resort.

STUDY OBJECTIVES

The primary objective of our assistance was to assess the market support for the proposed land uses of the Resort. These uses include the development of hotel and condominium units and single-family lots. The market study may be incorporated in applications for amendments to the County of Hawaii General Plan, Community Development Plan and the State of Hawaii Land Use District, and County Zoning and Special Management Area permits.

Robert J. Warren, M.A.C. CMAA
President, John Child & Company, Inc.
John Y. Enari, M.A.C. ASA
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Paul D. Chalmers, M.A.C. ASA
Paul D. Chalmers, M.A.C. ASA

Mr. Carl A. Carlson, Jr.
January 6, 1986

REPORT ORGANIZATION

The report is organized into five chapters as follows:

- I Executive Summary - reviews the background, objectives and study approach of the market assessment and summarizes the major findings and conclusions of the study.
- II Visitor Industry Review - presents an overview of the visitor market in Hawaii in terms of visitor arrivals and characteristics, major neighbor island resorts and projected visitor arrivals.
- III Hotel Market Assessment - assesses the current and anticipated room demand in the state and county of Hawaii and projects future requirements for the proposed resort hotel(s). This chapter also includes a brief discussion of the proposed commercial center to be located on Queen Kaahumanu Highway and the timing of development of the proposed golf course.
- IV Resort Condominium Market Assessment - reviews trends in condominium development in the state, identifies comparable projects on the islands of Hawaii and Maui and proposes a condominium development plan for the Resort.
- V Residential Lot Market Assessment - assesses trends in residential lot development, identifies comparable projects on the islands of Hawaii, Maui and Kauai and proposes a plan for residential lot development at the Resort.

* * * * *

We appreciate the opportunity to assist you in the planning of this unique master-planned resort.

Very truly yours,

JOHN CHILD & COMPANY, INC.

Karen Char, M.A.C.
Executive Vice President

Enc.

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I - EXECUTIVE SUMMARY

Huehue Ranch has engaged John Child & Company, Inc. (John Child) to prepare a market assessment for the proposed Kukio Beach Resort (Resort) development in North Kona on the island of Hawaii. This chapter presents the background, objectives and approach of this engagement and describes the proposed Resort in terms of its site location, characteristics and the proposed land use developments. The chapter also summarizes the development recommendations and reviews the major findings and conclusions of the study.

BACKGROUND

Huehue Ranch proposes to develop a master-planned resort community on 675 acres located along Queen Kaahumanu Highway in North Kona, Hawaii. The development is planned to include an 18-hole golf course, resort hotels, multifamily condominiums, resort residential lots and other supportive facilities and amenities. The development is identified as the Kukio Beach Resort.

Huehue Ranch is preparing a general plan amendment and land use and zoning applications for the Resort. Thus, Huehue Ranch has asked John Child to prepare a market study for these land uses at the proposed Resort.

OBJECTIVES

The primary objective of John Child's assistance to Huehue Ranch was to assess the market support for the proposed land uses of the Resort. These uses include hotel and condominium units and single-family lots. The market study may be incorporated in applications for amendments to the County of Hawaii General Plan, Community Development Plan and the State of Hawaii Land Use District, and County Zoning and Special Management Area permits.

APPROACH

The study approach to address the above objectives was as follows:

1. Conferred with representatives of Huehue Ranch to review the proposed resort market orientation and facility mix for the Resort.
2. Reviewed the market experience of selected comparable resorts on the Islands of Hawaii, Maui and Kauai.
3. Projected the market orientation of the proposed Resort and assessed the market support for hotel, condominium and residential lot development at the Resort until the year 2005.
4. Summarized our findings in this report.

KUKIO BEACH RESORT

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V-F	Current Sales Prices and Sizes of Lots at Selected Resort Subdivisions	V- 4
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KUKIO BEACH RESORT PROPOSAL

The proposed Resort site is on the Kona coast of the island of Hawaii. The following sections present a brief description of the site location and characteristics as well as the types of development proposed for the Resort.

Location

The 675 acres of the proposed Resort lie along the sunny leeward coast of the island of Hawaii in the district of North Kona, as shown in Exhibit I-A. These lands are presently designated by the County of Hawaii as open space and are classified by the State Land Use Commission as conservation area. The property is approximately one mile south of the Kona Village Resort and six miles north of the Keahole Airport. The resort areas of Waikoloa, Mauna Lani and Mauna Kea lie to the north of the proposed site, as also shown in Exhibit I-A.

The site is bisected by Queen Kaahumanu Highway, as illustrated in Exhibit I-B. Access to the mauka portion of the property is currently controlled by an entry pavilion to the neighboring Kona Village Resort. The mauka portion of the property is accessible via a road which leads to a cattle ranch operated by the Ranch.

The Ranch also operates a trail-riding facility, a bird-hunting operation and a sports fitness camp on the upper mauka lands.

Site Characteristics

At present, rough lava land and dry vegetation characterize the mauka portion of the site while white sandy beach, lava and kiawe thickets comprise the makai side of the property. Anchialine ponds are located on a few acres in the middle of the Kukio coastline.

The shoreline of the property stretches about 3,400 feet and provides one of the few sandy beaches in the North Kona region. The marine resources are similar to other areas of the leeward coastline, sheltering an abundance of fish and offering good skin diving conditions. Ocean access to the extensive beach area is somewhat impaired by a limestone shelf located 20 to 30 feet offshore.

Typical leeward coast climatic conditions prevail at the property site. Temperatures vary between 75 and 85 degrees Fahrenheit along the coastal areas with cooler temperatures in the elevated mauka areas. Winds are often variable and generally milder than the strong winds which characterize the Waikoloa area to the north. Annual rainfall averages less than 20 inches at the site.

Proposed Development Types

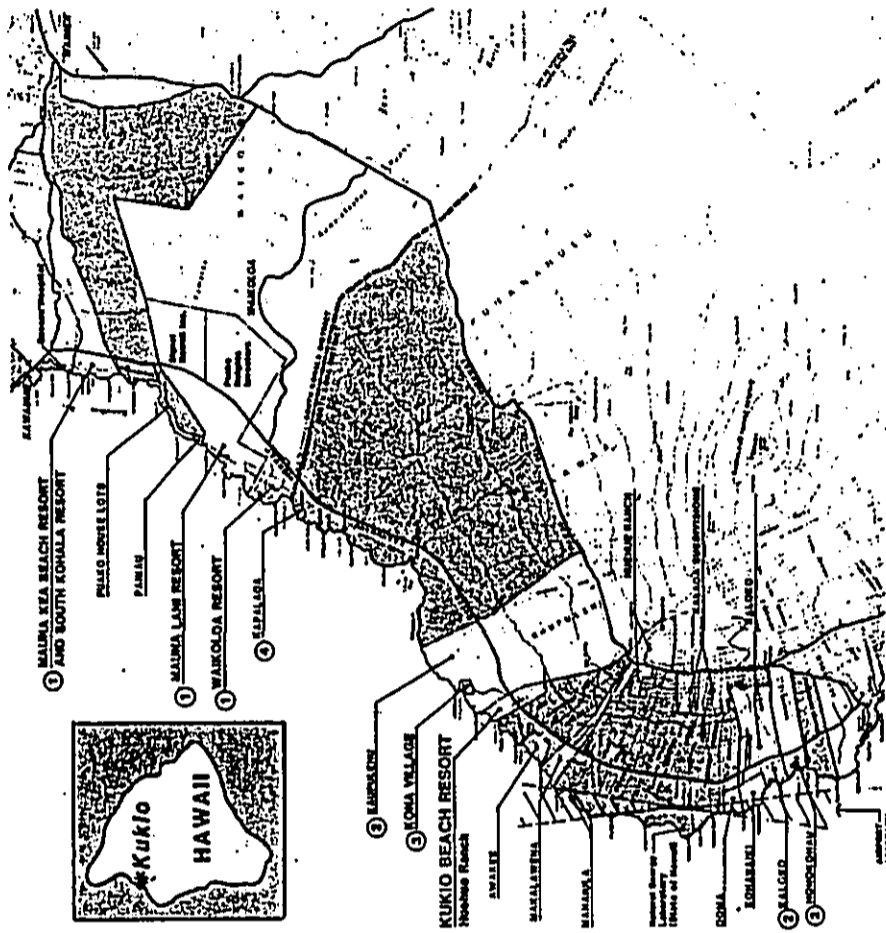
The development is envisioned to be a destination resort on the Kona coast of the island of Hawaii. It would combine visitor and residential lodging with recreational and commercial facilities and activities in a master-planned development.

Exhibit I-B indicates the physical plan for the major types of development proposed for the Resort. The plan includes:

Exhibit I-A

KUKIO BEACH RESORT

Resort Development Location



LEGEND

GENERAL PLANNING RESERVATION		DEVELOPMENT STATUS	
1	Major Resort	2	State Land
2	Intermediate Resort	3	Existing Resort Development
3	Resort Subsite	4	Developable Coastal Lands
4	Medium Density Residential	5	Other Lands

Prepared by Phillips Brandt Reddick & Assoc. (Hawaii), Inc.

- **Hotel complex** - One or two hotels are proposed to be developed within the makai portion of the site. The hotel complex would feature a beach club, shoreline promenade, health club, tennis center and retention of the anchialine ponds located within this area.
- **Residential complex** - Multifamily condominium units and resort residential lots would be located throughout the mauka and makai portions of the property. This complex would be integrated with the Resort's open space and golf course.
- **Recreational complex** - An 18-hole golf course and driving range are proposed adjacent to the residential areas. Plans for the recreational area also include an equestrian center and community park.
- **Commercial complex** - A commercial complex providing convenience shopping and various support services for the resort community is proposed for development near to the highway.

SUMMARY OF DEVELOPMENT RECOMMENDATIONS

This section summarizes the study findings regarding market support for the proposed development types and the recommended development concept. More detailed findings of the chapters are summarized in subsequent sections of this chapter.

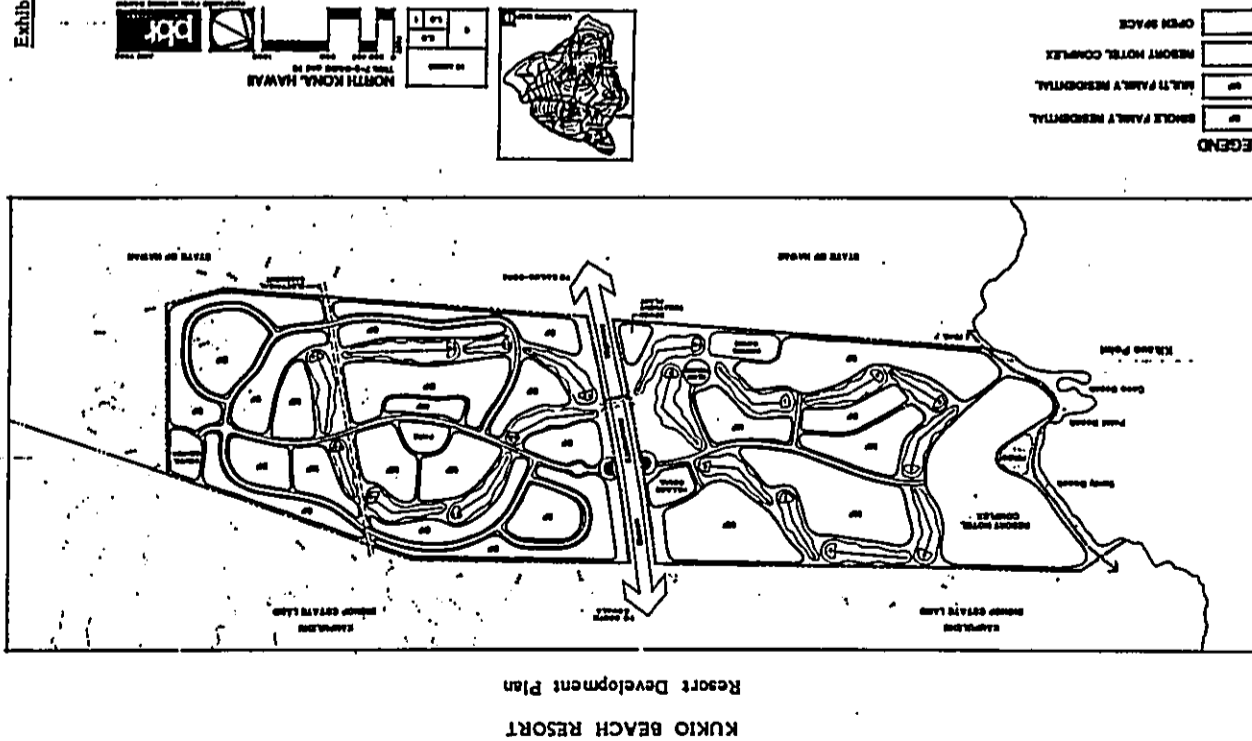
Summary of Market Findings

Because the Hawaii County general plan amendment and other permit processes are expected to take a few years, the market assessments are made for a 15-year period beginning in 1991, or from 1991 to 2005. The level and timing of the market support for the proposed hotel, condominium and residential lot developments are projected to the year 2005 in the table below:

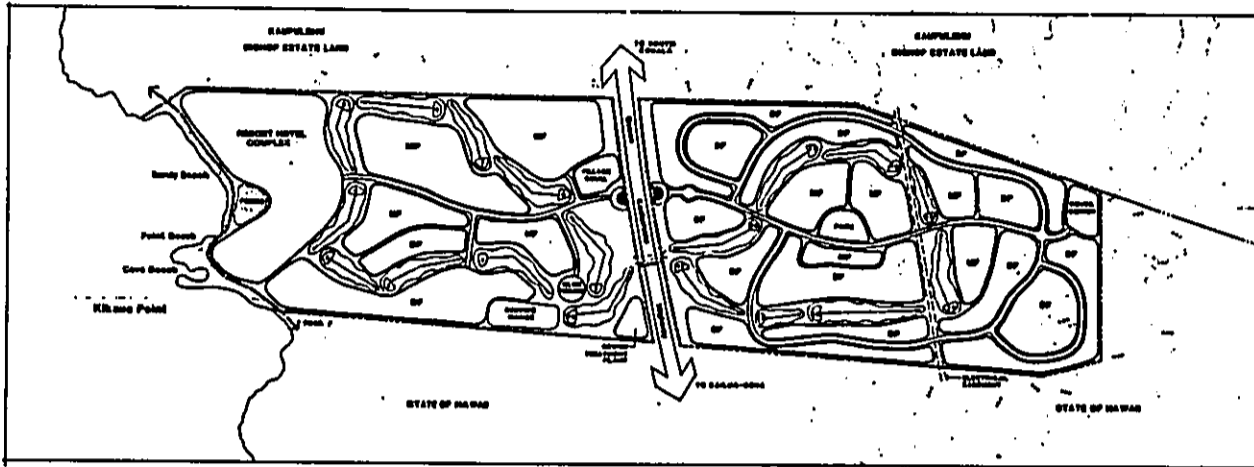
Summary of Projected Market Support for Development at Kukio Beach Resort

	1991 to 2005				Cumulative 1991 - 2005
	1991 - 1995	Additional 1996 - 2000	2001 - 2005		
Hotel units	100 - 300	400 - 500	300 - 400		800 - 1,200
Condominium units	200 - 300	375 - 500	375 - 500		950 - 1,300
Residential lots					
Mauka	100 - 150	125 - 150	125 - 175		350 - 475
Makai	150 - 150	-	-		150 - 150
Subtotal	250 - 300	125 - 150	125 - 175		500 - 625
Total units	550 - 900	900 - 1,150	800 - 1,075		2,250 - 3,125

Exhibit I-B



KUKIO BEACH RESORT
Resort Development Plan



LEGEND

[Symbol]	SINGLE FAMILY RESIDENTIAL
[Symbol]	MULTI FAMILY RESIDENTIAL
[Symbol]	RESORT HOTEL COMPLEX
[Symbol]	OPEN SPACE

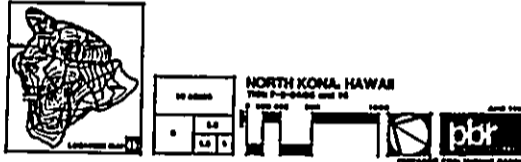


Exhibit 1-B

Prepared by Phillips Brandt Reddick & Assoc. (Hawaii), Inc.

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**Summary of Projected Market Support for
Development at Kukio Beach Resort**

	1991 to 2005			Cumulative 1991 - 2005
	1991 - 1995	Additional 1996 - 2000	2001 - 2005	
Hotel units				
Condominium units	100 - 300	400 - 500	300 - 400	800 - 1,200
Residential lots:				
Mauika	100 - 150	125 - 150	125 - 175	350 - 475
Makai	150 - 150	-	-	150 - 150
Subtotal	<u>250 - 300</u>	<u>125 - 150</u>	<u>125 - 175</u>	<u>500 - 625</u>
Total units	<u>550 - 900</u>	<u>900 - 1,150</u>	<u>800 - 1,075</u>	<u>2,250 - 3,125</u>

Visitor Characteristics

Travel patterns of westbound visitors to the state are discussed as follows:

- Westbound visitors to Hawaii tend to be vacationers.
- Approximately 75% of westbound arrivals travel independently rather than in groups.
- Condominium usage has increased to represent nearly 20% of visitor accommodations in 1984, as compared to less than 1% in 1975.
- Average party size has slowly increased over the last ten years, moving from 1.74 persons in 1975 to 1.84 persons in 1984.
- Average length of stay in the state has remained relatively stable over the last ten years at approximately ten days. Length of stay varies considerably by island, however, and has increased on the neighbor islands in recent years.

Visitor Market Segments

Visitors may be segmented by their travel status. The four major segments of Hawaii's visitor market are reviewed below:

1. Free independent travelers (FIT) have relatively high average incomes, patronize the higher-priced visitor accommodations and travel and plan their itineraries individually rather than with a group. FITs represent over 75% of westbound visitors to the state.
2. Group incentive travelers (GIT) include tours and convention-oriented visitors who typically represent lower income profiles than do the other major market segments.
3. Convention attendees consist of groups gathered for meetings or conventions. This market is often considered a part of the group traveler market.
4. Incentive travelers represent a small but sought-after market segment typically comprised of management personnel and executives who are offered trips as bonuses or perquisites for meeting corporate goals and objectives.

Visitor Expenditures

Visitor expenditures in the state totaled over \$4.3 billion in 1984 and since 1970 have shown double-digit annual percent increases except in 1983. On a per capita basis, expenditures have increased at a slower rate than have total visitor expenditures.

Spending patterns vary significantly by type of visitor, with Japanese visitors spending significantly more per day than do other visitors.

Projected Visitor Arrivals

The Hawaii Department of Planning and Economic Development (DPED) projects a continued increase in visitor arrivals, resulting in more than 8 million visitors to the state by the year 2005. Because of the island of Hawaii's expected emergence as one of the state's major destination resort areas, visitors to the island are expected to represent about 30% of westbound visitors and 9% of eastbound visitors to the state within the next 20 years. This would lead to a total of nearly 2 million visitor arrivals to the island by the year 2005.

Recommended Development Concept

Based on the market findings, development considerations and desirable economies of scale, it is recommended that the Resort pursue a development program as indicated in the following table:

Summary of Development Recommendations for Kukio Beach Resort

	1991 to 2005		Additional		Cumulative	
	1991-1995	1996-2000	2001-2005	2005	1991-2005	2005
Hotel units	350 - 450	300 - 400	150 - 350	800 - 1,200	800 - 1,200	800 - 1,200
Condominium units	275 - 360	400 - 525	275 - 415	950 - 1,300	950 - 1,300	950 - 1,300
Residential lots:						
Maui	140 - 200	150 - 175	60 - 100	350 - 475	350 - 475	350 - 475
Makai	150 - 150	-	-	150 - 150	150 - 150	150 - 150
Subtotal	290 - 350	150 - 175	60 - 100	500 - 625	500 - 625	500 - 625
Total units	915 - 1,160	850 - 1,100	885 - 865	2,250 - 3,125	2,250 - 3,125	2,250 - 3,125

The Resort is proposed to be developed as a master-planned recreational and residential community with a first-class market orientation. The initial five years of development could offer a 350- to 450-room first-class hotel and prestigious vacation and primary residences in a resort environment.

The second and third phases of development could include (1) a second and more exclusive 300- to 400-room first-class resort hotel between 1996 and 2000 and (2) a 150- to 350-room addition to the first hotel between 2001 and 2005. These phases could also include further condominium and residential lot development.

VISITOR INDUSTRY REVIEW

Visitors are the second largest source of income and employment for the state of Hawaii. This section summarizes the major study findings regarding visitor market trends and visitor characteristics, discusses resorts in the state and projects visitor arrivals.

Visitor Arrivals

Visitor arrivals to the state totaled about 4.8 million in 1984. The growth in visitors to the state has historically been strong with an average annual increase of 19.4% between 1960 and 1970, 8.5% between 1970 and 1980 and 5.2% from 1980 to 1984. Over the past ten years westbound visitors have made up about 79% of state visitor arrivals.

Since 1970 the neighbor islands have experienced a relatively faster rate of growth in westbound visitor arrivals than has Oahu. The island of Maui experienced the highest growth rate over the period in the state, at 10.7% per annum, while the island of Hawaii had the lowest, at 3.9% per annum.

HOTEL MARKET ASSESSMENT

This section summarizes hotel industry trends on the island of Hawaii and the study findings regarding room requirements for the island and the market for hotel development at the proposed Resort. The section begins with the definition of the terms "first-class" and "luxury" in the context of this hotel market study.

FIRST-CLASS VERSUS LUXURY HOTELS

Hotel properties may be described in terms of the class of service and facilities they offer. Master-planned destination resorts generally provide either luxury or first-class hotels. Luxury hotels are differentiated from first-class hotels based on the following factors:

- The high quality of accommodations and amenities.
- Their high level of service, personal attention and guest activities.
- Their ability to achieve higher than average room rates. Average room rates of over \$150 per day area typically achieved by luxury facilities.
- Their ability to attract a greater proportion of FIT travelers due to the reputation of the hotel, quality of facilities and level of service.

The typical visitor to a luxury hotel is not constrained by travel costs in the search for unique, exciting and world renowned resort hotels. As such, luxury hotels within the state compete against other luxury hotels on Oahu, Hawaii, Maui, Kauai or Molokai rather than with first-class hotels on the same island. This section reviews existing and planned hotels in the state of Hawaii.

Industry Trends on the Island

As of June 1985 the island of Hawaii had 7,511 visitor units including hotel and condominium units. Hotel rooms represented about 70% and condominiums the remaining 30% of this inventory. About 53% of the island's hotel units were in the Kona area.

The island of Hawaii, and the South Kohala to North Kona region in particular, is expected to undergo major and unprecedented development in its resort infrastructure over the next several years. More than 6,000 hotel units are proposed for development on the island over the next 15 years, the majority to be in the Kohala or Kona areas. However, some of these developments are contingent upon governmental approvals or improved market or financial conditions. At this time, the two most definite planned developments on the island include the 1,260-room Hyatt Regency Waikoloa Hotel at Waikoloa Beach Resort and the 350-room hotel planned for the South Kohala Resort. Together, these two hotels would add 1,610 units to the island's hotel inventory.

Islandwide trends regarding hotel characteristics, occupancy levels and room rates are summarized below:

- Hotel characteristics - Major first-class to luxury hotels on the island range in size from 310 to 563 units. The majority of the recent developments are in master-planned resort environments offering a full range of recreational facilities and amenities.

- Average occupancy levels - Occupancy levels on the island of Hawaii remain significantly lower than the state average, indicating that visitor units on the island may be temporarily overbuilt in relation to the current room demand. Considering selected first-class hotels on the island, occupancy levels over the past four years have generally improved, but the 1984 average still amounted to only 57% to 58% as compared to 72% to 93% on Maui and 64% to 78% on Kauai.

- Average room rates - The island of Hawaii continues to show the lowest average room rates among the neighbor islands despite the emergence of a luxury hotel trade in the South Kohala district. The facility survey shows that average achieved room rates for the selected first-class hotels ranged from \$58 to \$69 in 1984. However, annual increases in room rates in the Kona and Kohala areas averaged 6.4% over the period, or second only to the increases observed in west Maui.

Projected Hawaii Island Room Requirements

The average daily demand for hotel and condominium units on the island is projected to increase from about 3,400 units in 1985 to nearly 13,000 units by 2005, representing a 7% average annual increase in demand over the 20 years, with growth concentrated in the earlier periods. The major assumptions underlying this assessment are discussed in Chapter III.

The projected number of hotel units required on the island is based on the demand for commercial facilities, the share of overnight visitors using hotels and an assumed 70% to 80% average annual occupancy level for hotel establishments. Thus, the island is expected to require between 7,500 and 8,600 hotel units by 1995 and 11,300 and 12,900 units by 2005, as shown in the following tables:

	Projected Demand for Hotel Units on the Island of Hawaii		
	1990	1995	2005
At 80% average annual occupancy	4,900	7,500	11,300
At 70% average annual occupancy	5,600	8,600	12,900

Based on the number of existing hotels and those currently in the planning and development process, the supply of units on the island is expected to exceed demand through 1990. However, market support for about 4,500 to 6,100 additional hotel units could be expected between 1991 and 2005, as shown on the following page:

Projected Market Support for Additional Hotel Units on the Island of Hawaii

1991 - 1995 1996 - 2000 2001 - 2005	Existing and planned units(1)	Projected market support	
		Low(2)	High(3)
	6,882	700	1,800
	6,882	2,100	2,400
	6,882	1,700	1,900
Total		<u>4,500</u>	<u>6,100</u>

- (1) Includes 3,232 existing units on the island plus 1,610 planned units at the Hyatt Regency Walkoloa and the South Kohala Resort.
- (2) Assuming an average annual occupancy of 80%.
- (3) Assuming an average annual occupancy of 70%.

Kukio Beach Resort Hotel Market Assessment

Hotel development at the Resort is recommended to offer first-class facilities and services. This market orientation is considered appropriate for Kukio Beach Resort because of the following factors:

- The planned development of an 18-hole golf course and other recreational facilities.
- The proximity of the property to shopping, dining and other affordably priced recreational opportunities in Kailua Town.
- The prestigious and far-reaching market exposure contributed by the luxury resorts of South Kohala which would also attract travelers with lower budgets to the area.
- The division of the property by the Queen Kaahumanu Highway, making the mauka portion less than ideal for a luxury class resort development.
- The anticipated competition within the luxury market on the island over the next several years.

The target markets for first-class hotel development at the Resort would include FITs, GITs, meeting and convention groups and within-state travelers. The FIT market could be expected to be the most affluent and discriminating segment of this visitor mix.

The market assessment for the Resort considers the locational and physical advantages of the Kukio site, the first-class level of facilities, amenities and service expected to be offered and the expected level of competition from other visitor accommodations on the island. Kukio Beach Resort could be expected to be able to capture about 15% of the

market for additional hotel units on the island initially. This share might increase significantly over time because of the Resort's superior beach frontage in comparison to Keauhou Resort and Kailua Town. Thus, the Resort could be expected to support up to 1,200 units over the 15-year development period, as shown in the following table:

Projected Market Support for Hotel Development at Kukio Beach Resort		
1991 to 2005		
	Market share of new units	Required units(1) Low(2) High(3)
1991 - 1995	15%	100 300
1996 - 2000	20	400 500
2001 - 2005	20	300 400
Total		<u>800</u> <u>1,200</u>

- (1) Additional in period, not cumulative.
- (2) Assuming an average annual occupancy of 80%.
- (3) Assuming an average annual occupancy of 70%.

Because of the relatively lower occupancies anticipated in the first few years of operations and economies of scale related to hotel construction and operations, it is recommended that the Resort develop about 350 to 450 units in its first hotel project between 1991 and 1995. Subsequent developments could number 300 to 400 units in the 1996 to 2000 period and 150 to 350 units between 2001 and 2005, as shown in the following table. This could result in efficient development and operational sizes as well as the achievement of 70% to 80% average annual hotel occupancies at the Resort within 15 years of the first hotel opening.

Recommended Hotel Development Program for Kukio Beach Resort

1991 - 1995 1996 - 2000 2001 - 2005	Units to be completed (1)	
	Low	High
	350	450
	300	400
	150	350
Total	<u>800</u>	<u>1,200</u>

(1) Additional in period, not cumulative.

Key recommendations for the development of the hotel facilities are summarized below:

- 1. Hotel size - The success of the hotels will depend on a volume trade and efficient operations. Two establishments are proposed to be developed at the Resort, one of about 300 to 400 units and one of about 500 to 800 units.

Golf Course Development Timing

A golf course and driving range would represent a significant resort amenity, serving to attract both visitors and potential residents to the Resort. In addition, the golf course is planned to enhance the integration of the mauka and makai portions of the development both conceptually and physically. Thus, it is recommended that an 18-hole golf course and driving range be opened in the initial phase of development to accompany the Resort's first hotel and condominium units and single-family lots.

RESORT CONDOMINIUM MARKET ASSESSMENT

This section summarizes condominium development trends and the market outlook on the island of Hawaii. The character and recent market performance of comparable projects located on the islands of Hawaii and Maui are assessed and the study findings regarding the market support and orientation for condominium development at the Resort are summarized.

Development Trends and Current Inventory

Resort condominiums are a special type of multifamily development because of their relatively high quality, their location in resort areas and their orientation to second homeowners and other vacation users. Condominium units counted by the Hawaii Visitors Bureau (HVB) as part of a visitor rental pool in the South Kohala and North Kona areas represented 98% of the island of Hawaii's total inventory of visitor condominium units in 1984. Condominium units as a percent of all visitor units have increased significantly from about 19% in 1980 to 27% in 1984.

Presently about 363 and nearly 3,300 condominium units exist in the South Kohala and North Kona resort districts, respectively. The current inventory in North Kona generally exceeds demand and several major projects continue to offer inventory for sale. However, recent construction and sales data and the perspectives of real estate brokers active in both North Kona and South Kohala indicate that a market exists for higher quality development north of Kailua Town.

About 1,300 units are proposed (but not necessarily planned) for construction in South Kohala and about 1,500 for Kona by 1990. However, proposed development plans tend to be optimistic and a significant number of these units are not likely to be realized or completed as proposed.

Comparable Project Analysis

The Resort is proposed to be oriented to the first-class market. The condominium units at the Resort would be set back from the ocean on sites with golf course frontage. Some may also be located on the mauka side of Queen Kaahumanu Highway, with a golf course or open space orientation.

To assess the market support for condominium development at the Resort, seven first-class projects on the islands of Maui and Hawaii were selected for comparison. The characteristics of these resort projects are summarized below:

- Project densities - The projects had an average density of about 10 units per acre, ranging from 6.3 to 17 units per acre.

2. Development concepts and phasing - The initial facility developed could be a 350- to 450-unit first increment of the ultimately 500- to 800-unit hotel. This hotel would have a first-class market orientation and could be targeted for completion in the 1991 to 1995 period. A smaller subsequent establishment could seek a slightly more exclusive orientation and could follow the first hotel by four to five years. In the 2001 to 2005 period, market support is anticipated for a 150- to 350-unit expansion to the first hotel.

3. Facilities and amenities - To compete effectively with Kailua Town and with Keauhou Resort, the hotels and the Resort should offer a full complement of recreational activities or facilities and other amenities.

4. Project differentiation - The two hotels should be complementary but differentiated in appearance, function and market appeal to broaden the market exposure of the Resort and to minimize direct competition between the establishments. The projects should also have self-supporting facilities, each providing a full complement of retail, food and beverage and recreational amenities.

OTHER RESORT AMENITY DEVELOPMENT GUIDELINES

This section presents development guidelines for the proposed village commercial center at the Resort in terms of development concept, total acreage, gross leasable area and development timing. It also makes recommendations for the development timing of the Resort's proposed golf course.

Village Commercial Center

Because of its advantageous location on the Queen Kaahumanu Highway, the proposed commercial center could serve visitor and resident market segments from the Kona and Kohala areas as well as from the Resort itself. The proposed commercial development could attract the majority of its market support from regional visitors, but up to 40% from regional residents, given the resort developments planned throughout the region, the development concept for the Resort as a whole and the anticipated levels of population growth for the region. Thus, the center could house retail establishments such as a small grocery store or pharmacy as well as restaurants, snack and take-out food establishments and clothing or gift boutiques.

Based on the other land uses proposed at the Resort and examination of commercial developments at comparable other resorts in the state, the Resort could devote between six and seven acres to the commercial center. At a standard one to four relationship of gross leasable area to total acreage, this would represent about 65,000 to 75,000 square feet of leasable area.

The center could be developed in two phases timed to take maximum advantage of the market support to be generated by the visitor and residential units planned at the Resort. The first phase, representing about half of the total space to be provided, could be leased soon after the opening of the Resort's first hotel and the second, representing the balance of the planned area, about five years later.

- Unit mix - The projects studied included predominantly two-bedroom units and two include two-bedroom units exclusively. Only one project included studio units and none of the comparable projects offered four-bedroom units.
- Unit sizes - One-bedroom units ranged in net area from 800 to 1,100 square feet, two-bedroom units ranged from 1,000 to 1,600 square feet and three-bedroom units ranged from 1,800 to 1,700 square feet.

Market Performance of Islandwide and Comparable Projects

This section reviews the recent market performance of the selected comparable and other resort condominium projects in terms of sales absorption, prices, buyer profiles and buyer motivations.

- Sales absorption - Since 1978 the market absorption of new condominium units on the island of Hawaii has ranged from 118 to 492 units per year with a three-year moving average of approximately 295 units per year.
- Prices - Condominium unit sales prices escalated dramatically in 1979 and 1981 as investment speculation increased; however, in subsequent years prices have generally declined and stabilized.

Recent new condominium sales prices on the island vary considerably between the Kohala and Kona areas. The average new unit in South Kohala sold for about \$882,000 during the first five months of 1985, while the average new condominium sale in the North Kona area was priced at about \$204,000.

- Buyer profile - Purchasers of resort condominiums on the island of Hawaii typically (1) are from the west coast of the mainland, primarily from California, Washington, Oregon and Alaska; (2) have average annual household incomes of \$75,000 or more; (3) are experienced in real estate acquisition and ownership and may own one or more other vacation homes; (4) are married couples, aged 35 to 55, without dependents; and (5) are most often corporate executives, self-employed heads of business, real estate developers or professionals but may also include visitor industry company owners or managers.

- Buyer motivations - Buyers at first-class resort developments are more likely than those at luxury resort developments to be primarily motivated by investment with the majority of the units typically kept in a visitor rental pool. Only a small portion of the condominiums are purchased as primary residences. At the selected comparable projects, full-time residents are estimated to occupy between 4% and 13% of the units.

Resort condominium owners also tend to be repeat visitors to the region's hotel(s) or condominium(s) who have decided to make a greater commitment to the area as a vacation destination.

Market Assessment for Kukio Beach Resort

The marketing of condominium units is recommended to begin in 1991, or close to the opening of the first hotel at the Resort. The condominium units proposed at the Resort would be most appropriately targeted at a first-class market because of the following considerations:

- The proposed first-class market orientation of the hotels.
- The number of affluent visitors expected to be attracted to the Kona and Kohala regions of the island.

Initially, the condominium buyers could be expected to be attracted primarily from visitors to Walkoloa Beach Resort and Keauhou Resort and from condominium property "upgraders" from the Kailua-Kona and Keauhou areas. The prospective market support for condominium development would be principally buyers seeking (1) a vacation or second residence and/or (2) an investment to be kept in a visitor rental pool and resold for a profit after a few or several years.

In addition, the buyers are expected to include a component of persons seeking a primary residence. These buyers could be expected to be relatively more evident at the more affordably priced projects located on the mauka side of the highway.

The rate of new condominium unit sales are expected to increase over historical levels due to the projected increase in visitor arrivals to the island and the expected attraction of more and more affluent visitors. Assuming average annual sales will increase from about 400 to 500 over the period, the island could be expected to absorb about 7,000 new units between 1991 and 2005.

The Resort is projected to capture only about 10% to 15% of the island market for new units in its first five years of sales. However, this share could increase to about 15% to 20% of new unit sales on the island, resulting in a total sales absorption of about 1,000 to 1,300 units at the Resort over the 15-year period, as shown below:

Projected Market Support for Condominium Unit Development at Kukio Beach Resort 1991 to 2005

	Required units(1)	
	Low	High
1991 - 1995	200	300
1996 - 2000	375	500
2001 - 2005	375	500
Total	950	1,300

(1) Additional in period, not cumulative.

However, a greater number of units are typically produced than are sold in a given year because of:

- The greater economies of scale in development and marketing.
- The buyers' desire to see completed units rather than to purchase them sight unseen.
- The developers' need to offer choices in terms of unit sizes, locations and other characteristics.
- The desire to have inventory available in the event of particularly robust sales.

Thus, project developments are recommended to total about 275 to 360 units between 1991 and 1995, 400 to 525 units between 1996 and 2000 and 275 to 415 units between 2001 and 2005, as shown in the following table:

Recommended Condominium Development Program for Kukio Beach Resort

	Units to be completed(1)	
	Low	High
1991 - 1995	275	360
1996 - 2000	400	525
2001 - 2005	275	415
Total	950	1,300

(1) Additional in period, not cumulative.

Further recommendations for the development of resort condominium units are outlined as follows:

- **Development timing** - Assuming development approvals are obtained, marketing of the condominium units could be timed to the opening of the first hotel between 1991 and 1995.
- **Product differentiation** - The various projects should be targeted at slightly different markets that do not compete directly with one another. In the 1996 to 2000 period condominium development should also reflect the wider base of potential buyers expected to be attracted by the opening of the second hotel at the Resort.
- **Amenities** - All of the condominium projects should include one or more swimming pools and a recreation or picnic area. In addition, walking, jogging or bridle paths may be included throughout the Resort with access points from each of the condominium developments. The more upscale projects could also include recreational amenities such as the following:
 - Tennis or paddle tennis courts
 - Health spa
 - Putting green
 - Jacuzzi
- **Average project densities** - Densities could range from about 7 to 9 units per acre for the projects targeted to a more affluent market, up to about 15 units per acre for those targeted to a relatively less affluent market.
- **Unit mix** - The product mix could include predominantly one- and two-bedroom units. Individual projects targeted to the relatively less affluent and investor-oriented market could also include a few studio units, while projects oriented to a more upscale market could include some three-bedroom units.

• **Unit sizes** - Unit sizes are proposed to range as follows:

Unit type	Net square feet
Studio	600 to 700
One-bedroom	900 to 1,100
Two-bedroom	1,100 to 1,600
Three-bedroom	1,500 to 1,700

• **Average sales prices** - Average unit prices would be expected to range from about \$150,000 to \$250,000 in 1985 dollars for the lower priced projects, including those that may be located on the mauka side of Queen Kaahumanu Highway. The more upscale projects could be marketed at average prices ranging from about \$200,000 to \$400,000.

RESORT RESIDENTIAL LOT MARKET ASSESSMENT

This section summarizes the development trends, characteristics and sales performance of existing and planned residential lot subdivisions at selected comparable resort areas in Hawaii and summarizes the study findings regarding the market support for residential lot development at the Resort.

Development Trends

Except for Walkoloa Village and Princeville Resorts, resort areas in Hawaii have primarily focused on the development of hotels, resort condominiums and commercial facilities rather than on residential lots. Residential lot developments were reviewed at five first-class resorts. The resorts were selected based on the historical development of lots at each and the locations, views and amenities offered.

Currently about 2,087 resort residential lots are located in the five selected resorts. The majority of these are at Walkoloa Village and Princeville which contain 968 and 673 lots, respectively.

Over the next two decades, about 6,100 resort lots are proposed at six resorts on the Island. However, of this number, only about 5% are definitely planned to be developed in the near term. The greatest potential development is at Walkoloa Village Resort where about 4,830 additional lots could be developed.

Characteristics of Comparable Resort Lots

This section describes the residential lots at the selected Hawaii resorts in terms of subdivision location, view, size and recreational amenities.

- **Location and type** - Resort residential lots are differentiated by their location with respect to the following amenities within a resort:
 - Oceanfront
 - Golf course
 - Hillside, offering ocean or valley views
 - Other interior lots

The majority of the existing and planned (near-term) resort lots are interior lots. Lot developments that abut golf course fairways or greens and hillside lots are the next most common type developed or planned at the selected resorts.

- Lot view - View orientations are a primary consideration of buyers in this market. Ocean or mountain views may compensate for the locational disadvantages of a resort lot or contribute to its desirability.
- Lot size - Typical lots at the selected projects range from 9,500 to 20,000 square feet. The lots average about 10,000 to 14,000 square feet and are larger than typical nonresort lots in Hawaii. In general, golf course lots are larger than the interior or hillside view lots because buyers at the latter lot types typically seek a buildable lot at a lower cost.
- Amenities - Private recreational facilities and security are major features of successful resort lot developments on the mainland U. S. but have generally not been incorporated in the existing first-class resort subdivisions in Hawaii. However, such features are a major selling point of the new Keaouhou Estates I subdivision where access will be controlled by a private entry with an autogate during the day and manned security at night.

Market Performance of Comparable Projects

Since 1971 an average of about 64 resort residential lots in the state were sold annually. In 1982 and 1983 lot sales were relatively weak, ranging from 6 to 16 annual sales. This decline is primarily due to the decrease in purchases by investors. More recently sales have increased again and resort real estate values have stabilized.

Resort lots currently being offered for sale range from \$55,000 for interior lots at Princeville to \$350,000 for ocean view fairway lots at the Wailea Golf Estates. The prices of resort lots are primarily related to three factors, lot type and view, lot size and the quality of the resort in which the lots are located:

- Lot type and view - Prices for golf course lots are up to 70% higher and are typically 20% to 30% higher than interior lots in the same subdivision.
- Lot size - Large lots may command a greater total price per lot than the typical-sized lot but a lower price per square foot.
- Resort quality - The quality of a resort and its ability to attract a given target market also affects lot prices. Resorts that appeal to the upscale traveler who returns year after year are able to command higher average lot prices than other resorts due to their established visitor bases, five-star hotels and extensive recreational amenities.

The buyers of residential lots in resort areas are characterized in terms of their occupation, age, income, residence and other characteristics. These characteristics are outlined as follows:

- Occupation - Purchasers of lots priced over \$150,000 were typically professionals, business executives or self-employed entrepreneurs. Purchasers of the lots within the \$60,000 to \$140,000 range additionally include mainland and local contractors or financial institutions.

- Age - Buyers are typically 40 to 55 years of age. Purchasers of less expensive property, including the speculative builders, tend to be younger.
- Income - The annual incomes of purchasers range from as low as \$30,000 per year at Princeville (where an extensive employee discount plan has been implemented) to as high as \$250,000 per year at the Keaouhou Estates I.
- Place of primary residence - Purchasers from California represented the majority of the buyers, typically comprising between 20% and 60% of the total purchasers. Purchasers from other west coast states represented the next largest segment. Residents of the island on which the resort is located represented between 10% and 36% of total lot buyers.
- Buyer profile by preference for view lots - Given equal pricing, ocean view lots are the preferred type. Purchasers of interior (nonview) lots include buyers who visit the resort frequently, state residents and those intending to retire. In general, the latter market segment tends to be more price sensitive than do the view lot purchasers.
- Other characteristics - Nearly all of the purchasers of lots at the selected resorts had previously vacationed at the hotel or condominium facilities of the resort. They are repeat visitors who have typically stayed at the resort two to five times before they purchase a resort lot. Many already own a condominium unit or interior lot at the resort and are trading up.

Historically, the majority of purchasers have been motivated to buy resort residential lots for future improvement as a vacation or retirement home, investment or speculative building. In addition, Hawaii is just beginning to follow the California trend in the emergence of an upscale primary home market for resort residential markets.

Market Assessment for Kukio Beach Resort

This section assesses the market support for single-family lot development at the Resort.

The prospective buyer market for residential lot development at the Resort is expected to fall in four major segments, as noted below:

- The vacation or future retirement home market is expected to primarily include persons who reside in southern California or elsewhere in the western United States, but the group may also include persons already resident in the state.
- The primary home market is expected to include mostly persons who are employed in the Kohala or Kona regions.
- The speculative builder market would include local contractors, mainland or Hawaii financial institutions and other partnerships intending to build on and resell the property for a profit. The market share of speculative builders is expected to fluctuate from year to year following trends in resort property values in the state.
- The investor market is expected to be similar to the vacation or retirement home purchasers, but to include proportionately more state residents. Like the speculative builders, their market share would vary with the anticipated rate of appreciation of resort property values.

Because of the current lack of resort residential lots that are situated close to the ocean and the desirability of such property on the island, the Resort could provide about 150 lots on the makai side of Queen Kaahumanu Highway. If lot sales could be underway by 1991, all of the makai lots would be expected to be sold by 1994 or 1995.

Annual sales of lots on the mauka side of the property are projected to range between 20 and 30 lots between 1991 and 1995 and to increase to 25 to 35 lots by 2001. This would result in the absorption of between 350 and 475 lots on the mauka side of the property by 2005, as shown in the following tables:

Projected Market Support for Residential Lot Development at Kukio Beach Resort

	Projected sales absorption(1)					
	Mauka lots(2)		Makai lots(3)		Total	
	Low	High	Low	High	Low	High
1991 - 1995	100	150	150	150	250	300
1996 - 2000	125	150	-	-	125	150
2001 - 2005	125	175	-	-	125	175
Total	350	475	150	150	500	625

- (1) Additional in period, not cumulative.
- (2) Lots to be located on the mauka side of Queen Kaahumanu Highway. Assuming competitive pricing, recreational amenities and typical lot sizes of 15,000 to 25,000 square feet.
- (3) Lots to be located on the makai side of Queen Kaahumanu Highway. Assuming total inventory of about 150 lots on makai side of property and typical lot sizes of 10,000 to 12,000 square feet.

Development Plan Recommendations

Developers at other resort residential lot developments in the state have produced about three years worth of inventory at any given time. As for condominium units, a greater number of lots are typically produced than are sold annually because:

- Greater economies of scale that may be realized in development and marketing.
- Buyers desire to see completed lots rather than to purchase from plans.
- Buyers need to have several lot choices.
- Inventory should be available in the event rapid sales occur.

Based on these findings and the projected sales absorption, the Resort could develop up to 350 lots between 1991 and 1995 to accompany the opening of its first hotel. With the opening of the second hotel between 1996 and 2000, the Resort would experience a broadening of its potential buyer market but would have exhausted its supply of makai lots. Thus, up to 175 mauka lots could be developed in this period. Lot development between 2001 and 2005 could represent the remainder of the lot sales projected over the 15-year period, as shown in the following tables:

Recommended Lot Development Program for Kukio Beach Resort

1991 to 2005

	Lots to be developed(1)					
	Mauka lots		Makai lots		Total	
	Low	High	Low	High	Low	High
1991 - 1995	140	200	150	150	290	350
1996 - 2000	150	175	-	-	150	175
2001 - 2005	60	100	-	-	60	100
Total	350	475	150	150	500	625

(1) Additional in period, not cumulative.

Additional recommendations for the planning and development of the proposed residential lots are outlined below:

- Project phasing and product segmentation - Lot development should be phased so as to minimize competition between areas and individual lots at the Resort. The phases should also be differentiated from one another in terms of lot sizes, views and quality and project amenities.
- Lot types and view orientations - Ocean or mountain views and privacy should be maximized. The first phase of development would offer lots with golf course and, if possible, ocean views to establish a quality resort image.
- Lot sizes - Golf course and other view lots are proposed to be larger than nonview lots because purchasers of view lots tend to seek greater luxury and comfort lots sized to accommodate large homes and possibly swimming pools and to be relatively less price sensitive than those who buy nonview lots. Residential lots developed at the Resort are proposed to be sized as follows:

Proposed Residential Lot Sizes at Kukio Beach Resort

(Square feet)

Lot location and view orientation	Range	Typical
Mauka lots		
Golf course	17,000 - 25,000	20,000
Interior with view	15,000 - 20,000	17,000
Interior nonview	14,000 - 18,000	16,000
Makai lots(1)	10,000 - 13,000	12,000

(1) Typical lot assumed to have golf course view but limited or no ocean views.

II - VISITOR INDUSTRY REVIEW

This chapter reviews recent trends in the visitor industry and visitor arrivals to the state. It also discusses visitor characteristics and expenditures and presents projections of visitor arrivals to the state and Island of Hawaii.

STATE VISITOR ARRIVALS

Visitors are the second largest source of income and employment for the state of Hawaii. The Hawaii Visitors Bureau (HVB) tabulates and reports the estimated overnight visitors to the state. For statistical purposes, the HVB separates visitors in terms of travel direction. Westbound visitors are defined as those arriving from North America and traveling to Hawaii and other destinations in the Pacific and Asian areas. Eastbound visitors are defined as those visitors traveling from Asia (primarily Japan) and the Pacific to Hawaii. This section reviews historical visitor arrivals to the state and the neighbor islands.

State Historical Visitor Arrivals

Visitor arrivals to the state totaled about 4.8 million in 1984, which represents an 11.2% increase over 1983. Of this total, about 3.7 million were westbound visitors and about 1.1 million were eastbound visitors, as shown in Exhibit II-A. The growth in visitors to the state has historically been strong with an average annual increase of 19.8% between 1960 and 1970, 8.5% between 1970 and 1980 and 5.2% from 1980 to 1984. This declining trend in growth may be attributable to the state's increasing visitor base and its matured development as a visitor destination.

Over the past ten years westbound visitors have made up about 79% of state visitor arrivals. Westbound arrivals have increased at average annual growth rates of 18.1% from 1960 through 1970, 8.7% from 1970 through 1980 and 5% from 1980 through 1984. Although a significantly smaller segment of the visitor market, eastbound arrivals have grown at a faster rate than westbound arrivals with average annual increases of 28.9% from 1960 through 1970, 7.8% from 1970 through 1980 and 6.1% from 1980 through 1984.

For the first seven months of 1985, visitor arrivals to the state were severely curtailed by the one-month long United Airlines strike that began in June. However, information on visitor arrivals for July indicates that the rate of increase in visitor arrivals is nearing its pre-strike levels and cumulative visitor arrivals for the first seven months are about 1% higher than in the same period last year.

Neighbor Island Visitor Arrivals

Since 1970 the neighbor islands have experienced a relatively faster rate of growth in westbound visitor arrivals than has Oahu. According to the HVB, the neighbor islands have experienced an average annual growth rate of 7.1% from 1970 through 1984 compared to 6.2% for Oahu, as shown in Exhibit II-B. The island of Maui experienced the highest growth rate in the state over this time period at 10.7% per annum, while the island of Hawaii had the lowest at 3.9% per annum. Differences in growth rates between the individual neighbor islands remain a function of their visitor plant appeal, marketing efforts and relative stage in the resort development life cycle. The rapid increase in visitors to the neighbor islands may be attributed to:

- Sales prices - Golf course and other view lots typically also realize a price premium for the views offered; this is reflected in higher per square foot costs as well as higher total costs. Thus, typical lot sales prices are proposed to range from about \$70,000 to \$260,000, in 1985 dollars, as shown in the following table:

Proposed Residential Lot Selling Prices
at Kukio Beach Resort
(1985 dollars)

Lot location and view orientation	Typical sales price	Per square foot
Mauka lots		
Golf course	\$ 180,000 to 260,000	9 to 13
Interior with view	120,000 to 190,000	7 to 11
Interior nonview	70,000 to 125,000	5 to 9
Makai lots(I)	170,000 to 220,000	14 to 18

(I) Typical lot assumed to have golf course view but limited or no ocean views.

- Facility and amenity development - The Resort should offer significant recreational and other amenities dedicated to individual projects such as 24-hour security, gated access, recreation centers with tennis or paddle tennis courts, swimming pool and/or Jacuzzi, putting greens, an equestrian center, access to walking or riding trails throughout the development and beach access.

KUKIO BEACH RESORT
 Overnight Visitors to the State of Hawaii
 1960 to 1985

Year	Westbound		Eastbound		Total	Average annual percentage growth
	Number	Annual percentage growth	Number	Annual percentage growth		
1960	250,793	-%	43,722	-%	296,517	-%
1965(1)	567,218	17.7	119,710	22.3	686,928	18.6
1970	1,326,133	18.5	420,835	28.6	1,746,970	20.5
1975	2,207,417	12.1	621,688	15.4	2,829,105	13.0
1976	2,551,601	15.6	668,550	7.5	3,220,151	13.8
1977	2,763,312	8.3	670,355	.3	3,433,667	6.6
1978	3,030,999	9.7	639,310	4.6	3,670,309	6.9
1979	3,139,455	3.6	821,076	28.4	3,960,531	7.9
1980	3,046,132	(3.0)	888,372	8.4	3,934,504	(.7)
1981	2,974,791	(2.3)	959,832	8.0	3,934,623	-. (2)
1982	3,278,519	10.2	964,397	.5	4,242,916	7.8
1983	3,395,880	3.6	972,000	.8	4,367,880	2.9
1984	3,721,380	9.6	1,134,200	16.7	4,855,580	11.2
1985 (January to July)	2,198,480	(.5)(3)	678,400	4.7 (3)	2,876,880	.7 (3)
Compound annual percentage increases:						
1960 to 1970		18.1		24.9		19.4
1970 to 1980		8.7		7.8		8.5
1980 to 1984		5.0		6.1		5.2

- (1) Visitor statistics collection system was revised in 1964.
- (2) Not significant.
- (3) Represents change from same period in previous year.

Source: Hawaii Visitors Bureau, annual and monthly reports.

Exhibit II-A

KUKIO BEACH RESORT
 Westbound Visitors by Island
 1970 to 1985

Year	Neighborhood counties					Total
	Oahu	Hawaii	Mauai	Kauai	Other	
1970	1,246,970	443,401	447,985	410,075	1,303,461	
1971	1,311,426	522,166	554,799	472,663	1,549,628	
1972	1,572,380	637,562	710,090	565,386	1,912,998	
1973	1,735,488	694,170	766,791	590,475	2,051,436	
1974	1,877,845	742,839	852,204	601,703	2,196,746	
1975	1,889,790	769,779	931,463	632,821	2,338,443	
1976	2,169,850	816,514	1,110,726	699,275	2,626,315	
1977	2,293,310	839,008	1,257,142	740,501	2,836,691	
1978	2,494,890	908,983	1,403,054	837,712	3,149,749	
1979	2,542,720	860,940	1,419,773	825,366	3,106,079	
1980	2,398,740	761,103	1,376,189	781,409	2,920,701	
1981	2,358,480	672,683	1,389,892	737,811	2,820,366	
1982	2,589,190	673,170	1,550,080	733,295	2,961,545	
1983	2,591,635	712,380	1,648,605	691,940	3,008,923	
1984	2,901,320	756,890	1,849,800	806,620	3,413,310	
1985 (January to July)	1,675,710	413,030	1,101,640	483,790	2,002,460	
Compound annual percentage increase - 1970 to 1984						
	6.2%	3.9%	10.7%	5.0%	7.1%	

Source: Includes westbound visitors to and beyond Hawaii, as reported by the Hawaii Visitors Bureau, tabular release dated July 1984 and Annual Research Reports, annual and records.

Exhibit II-B

- Increased air service to and more effective marketing of the neighbor islands, with three major interisland carriers and direct flights to Kaula, Maui and Hawaii from the mainland U. S.
- Greater number of repeat visitors to the state who seek new destinations and experiences in the islands.
- Greater development of visitor accommodations on the neighbor islands with an emphasis on creating international destination resorts.
- Slower development on Oahu due to a restrictive environment created by the high density of Waikiki and the lack of developable land.
- Aging of the visitor plant on Oahu.

VISITOR CHARACTERISTICS

Travel patterns of westbound visitors to the state are presented in Exhibit II-C and are discussed as follows:

1. **Purpose of trip** - Westbound visitors to Hawaii tend to be vacationers. Nearly 80% of westbound travel to the state in 1984 was for pleasure and another 11% combined business with pleasure. The percentage of pleasure trips to Hawaii has generally increased since 1970.
2. **Travel status** - The travel status of visitors to Hawaii has remained fairly consistent since 1970, with approximately 75% of westbound arrivals traveling independently. Group travelers, including those visitors on tours and conventions, have declined in share since 1980. In 1984 group travelers comprised 18.8% of westbound arrivals. Market segments by travel status are discussed further in the following section.
3. **Visitor accommodations** - Types of accommodations have shifted significantly over the last ten years. Hotels continue to serve the majority of visitors; however, condominiums have increased to nearly 20% of visitor accommodations in 1984, as compared with less than 1% in 1975. The increase in condominium usage may be explained by:
 - Better management and marketing of condominium visitor rental pools by companies specializing in this field.
 - Increases in repeat visitors and relatively large visitor parties, including families that prefer accommodations with cooking facilities and multiple rooms per unit.
 - Development of condominium units which are designed to be managed in visitor rental pools.
 - Greater availability and ownership of condominium units.

4. **Average persons per party** - Average persons per party have slowly increased over the last ten years, moving from an average of 1.74 persons in 1975 to 1.84 persons in 1984. This increase may be attributable to more families visiting the islands and easier access to the state from mainland destinations.

KUKIO BEACH RESORT
Travel Characteristics of
Westbound Visitors to Hawaii
1970 to 1984

	1970	1975	1980	1981	1982	1983	1984
Purpose of trips							
Pleasure	74.6%	76.4%	75.4%	77.7%	80.4%	77.4%	79.7%
Business	3.8	2.6	2.9	2.6	2.2	2.7	2.3
Business and pleasure	9.9	10.7	13.3	12.2	11.3	12.0	11.3
Military and government	.6	.3	.4	.4	.4	.6	.5
Relatives	6.3	3.7	4.1	3.0	2.9	3.7	2.9
Convention	4.3	6.2	3.5	3.7	2.4	2.7	2.7
Other	.3	.1	.4	.4	.4	.5	.4
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Travel status(1):							
Group	21.9	45.1	23.9	22.7	19.7	18.5	18.8
Individual basis	77.5	54.6	72.0	73.3	75.5	76.7	75.0
Incentive	-	-	3.7	3.5	4.4	4.2	5.7
Government - military	.6	.3	.4	.5	.4	.6	.5
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Accommodations:							
Hotel or apartment	84.2	91.7	71.2	70.1	71.6	68.4	69.1
Rented home or apartment	.3	.5	16.4	18.6	17.8	19.5	19.6
Condominium	12.6	6.8	10.6	9.4	8.8	9.7	8.0
Friends or relatives	2.4	1.0	1.8	1.9	1.8	2.4	3.3
Others	-	-	-	-	-	-	-
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Persons per party	1.55	1.74	1.79	1.82	1.82	1.83	1.84
Average stay in states (days)	10.3	10.5	10.6	10.6	10.5	10.3	10.3
Length of stay in states							
1 - 6 days	14.3%	9.0%	8.3%	9.2%	8.8%	9.9%	8.3%
7 - 12 days	55.7	61.1	61.2	60.4	62.0	63.5	65.5
13 - 18 days	23.8	24.9	23.9	23.0	22.2	20.5	20.6
19+ days	6.2	3.0	6.6	7.4	7.0	6.1	5.6
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

(1) Represents percentage of westbound visitors to and beyond Hawaii.

Sources: Hawaii Visitors Bureau, Annual Research Reports annual.

KUKIO BEACH RESORT

Average Length of Stay of Westbound Overnight and Longer Visitors by Island

1970 to 1984
(Days)

Year	Oahu	Hawaii	MauI	Kauai
1970	6.03	2.94	2.97	2.68
1975	5.97	3.08	3.42	2.85
1976	5.99	3.04	3.50	2.85
1977	5.88	3.13	3.62	2.97
1978	5.83	3.23	3.77	3.08
1979	5.85	3.39	4.01	3.27
1980	5.78	3.46	4.08	3.40
1981	5.91	3.56	4.13	3.48
1982	5.77	3.62	4.26	3.51
1983	6.96	4.52	5.61	4.22
1984	7.49	3.64	6.47	4.91

Increase from 1970 to 1984
(days)

1.46

.70

3.50

2.23

Source: Hawaii Visitors Bureau Research Department, March 1985.

II-3

5. Average length of stay - Average length of stay in the state has remained relatively stable over the last ten years at approximately ten days.

By island, however, length of stay varies considerably and has changed over recent years. The average length of stay in 1984 was longest on Oahu at 7.5 days and shortest on the island of Hawaii at 3.6 days, as shown in Exhibit II-D. The greatest increase has occurred on Maui where the average length of stay increased by 3.5 days over the period from 1970 to 1984.

The demographic characteristics of westbound visitors to the state are summarized in Exhibit II-E and discussed as follows:

1. Age - Visitors aged 30 to 49 years were by far the largest age group to visit Hawaii, representing nearly 40% of all westbound arrivals in 1984. Next largest is the 20 to 29-year age group which accounted for about 18% in 1984.
2. Occupation - Persons employed in professional and technical occupations were the largest employment segment to visit the state in 1984, at about 36%. They were followed by visitors employed in business, managerial and official occupations at 25.2%. Since 1970 Hawaii has experienced a slight shift to the higher salaried professional/technical and business/managerial occupational visitor market segments.
3. Number of visits to Hawaii - Slightly more than 50% of Hawaii's visitors are first-time visitors to the state. However, the number of repeat visitors to the state has increased from only 33% in 1970 to 47% in 1984. Repeat visitors typically stay in condominiums or hotels with the reputations, ambience, service and amenities that induce them to visit year after year.
4. Visitor origin - Westbound visitors to the state typically reside in the continental United States. The largest segment is residents of the West Coast states and Alaska, representing 35% of all westbound visitors. Foreign visitors were primarily Japanese and Canadian citizens, but Japanese visitors are most often eastbound arrivals. During recent years, foreign westbound visitor arrivals have declined due to the relatively stronger U. S. dollar.

VISITOR MARKET SEGMENTS

Visitors may be distinguished by their travel status as noted previously. The five major segments of Hawaii's visitor market are:

1. Free independent travelers
2. Organized tour travelers
3. Convention attendees
4. Incentive travelers
5. Government and military visitors

This section reviews the characteristics of the first four of the five major segments, which together represent more than 99% of all visitors to the state.

KUKIO BEACH RESORT

Demographic Characteristics of Westbound Visitors to Hawaii

	1970 to 1984						
	1970	1975	1980	1981	1982	1983	1984
Age:							
Under 20	11.6%	9.2%	10.5%	11.1%	10.6%	11.5%	10.9%
20 - 29	22.9	16.2	17.6	18.7	20.3	18.2	18.1
30 - 39	34.0	36.0	38.0	37.4	38.3	38.5	39.4
40 - 49	18.9	22.8	19.4	18.1	16.5	16.2	15.9
50 and older	12.6	13.8	14.5	14.7	14.3	15.6	15.7
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Median age	40.7	44.5	41.3	40.2	39.1	39.8	40.1
Occupations:							
Professional and technical	27.9%	33.5%	35.8%	35.0%	36.1%	36.7%	36.3%
Business, managerial and official	21.6	26.9	26.2	26.0	25.4	25.0	25.2
Clerical, office and sales	12.2	11.2	9.7	10.2	10.5	9.1	9.6
Military and dependents	13.7	9	1.0	1.2	1.2	1.4	1.3
Other employed	7.2	8.0	7.6	7.6	7.5	6.8	7.0
Retired	7.6	12.5	11.5	11.8	11.5	13.1	13.6
Students and unemployed	9.8	7.0	8.2	8.2	7.8	7.9	7.0
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Trips to Hawaii:							
First	67.2	60.3	51.6	52.9	54.1	49.6	52.7
Second	14.7	17.1	18.8	18.3	18.1	18.9	18.6
Third	5.6	7.2	9.1	8.7	8.7	9.3	8.6
Fourth	12.5	15.4	20.5	20.1	19.1	22.2	20.1
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Repeat visitors	32.8%	39.7%	48.4%	47.1%	45.9%	50.4%	47.3%
Origins:							
United States	33.4	24.8	30.6	30.3	29.5	34.3	27.2
California	8.6	9.7	10.1	8.8	8.0	7.6	8.0
Other Pacific Coast	5.7	5.2	6.4	6.7	6.7	7.2	6.7
Mountain Central	26.7	29.2	23.4	23.9	23.7	23.5	28.4
Atlantic	20.0	19.0	16.9	15.6	18.8	17.2	19.7
Canada	94.4	87.9	87.4	85.3	86.7	89.8	90.0
Other foreign	5.0	11.0	11.0	9.7	9.3	8.0	8.4
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Hawaii Visitors Bureau, Annual Research Reports, annual.

Free Independent Travelers

Free independent travelers (FIT) are those that travel and plan their itineraries individually rather than with a group. FITs typically have relatively high average incomes and patronize the higher-priced visitor accommodations. These travelers are often repeat visitors who are familiar with the state. FITs have been increasing as a percent of total state visitors over the last decade from 33% in 1975 to 73% in 1984.

The increase in this visitor type has been fostered by the increasing sophistication of travelers and the deregulation of airlines which has encouraged tour companies to offer FIT packages at nearly identical prices as those offered to groups. The negative growth in this market segment in 1981 was due to the air traffic controllers' strike, rising fuel prices and a stagnant national economy.

Group Inclusive Travelers

The group inclusive traveler (GIT) market includes tours and convention-oriented visitor packages. GITs typically represent lower income profiles than do the other major market segments. In contrast to FITs, the group travelers have declined as a percentage of westbound visitors over the last decade from 30% in 1975 to 11% in 1984.

Convention Attendees

The convention market consists of groups gathered for meetings or conventions and it has been fluctuating between 6% and 9% of total westbound visitors in recent years. This market is often considered a part of the GIT market. The convention market is irregular, and a large meeting can distort figures for a given year. This occurred in 1975 when the 30,000-member Lions International convened in Hawaii and this visitor segment represented 13.5%.

Incentive Travelers

Incentive groups represent a small but sought after market segment. Typically, management personnel and executives are offered all-expense paid trips to Hawaii as a bonus or perquisite for meeting corporate goals and objectives. As a whole, this group usually is compensated well, has a higher propensity to return as FIT visitors, and frequents more expensive restaurants and hotel accommodations. Although data for this group was not available before 1978, it has shown an upward trend and represented 3.6% of westbound visitors in 1984.

Overview of Market Segments

Exhibit II-F presents visitor arrivals of the five major visitor market segments between 1978 and 1984. In summary, FITs account for the largest market segment, representing over 73% of westbound visitors. While visitors to the state as a whole have increased by 4% over the past seven years, relatively faster rates of growth were experienced by incentive groups at 18% and FITs at 8%. In contrast, convention travelers have remained relatively stable, while group and other travelers have declined by 1% and 11%, respectively.

KUKIO BEACH RESORT
Hawaii Visitor Market Segments
1978 to 1984

Year	FIT	Group	Incentive group	Convention	Government military/other(1)	Total westbound visitors to Hawaii(2)
1978	1,563,746	738,897	68,750	230,273	97,165	2,698,831
1979	-1,826,895	632,817	101,639	178,753	65,709	2,805,813
1980	1,934,393	410,646	100,367	230,891	42,566	2,718,863
1981	1,914,140	412,370	90,972	181,662	11,998	2,611,142
1982	2,163,210	396,797	126,615	167,558	42,075	2,896,255
1983	2,272,080	344,386	127,340	211,764	132,450	3,088,020
1984	2,482,360	367,388	189,800	255,152	91,180	3,385,880
Compound annual percentage increase (decrease)	8.0%	(11.0)%	18.4%	1.7%	(1.1)%	3.9%

(1) Includes nonrespondents.

(2) Includes all westbound visitors to Hawaii (exclusive of visitors traveling beyond Hawaii).

Sources: Hawaii Visitors Bureau, Annual Research Reports, annual.

Exhibit II-F

SEASONALITY

Tourism is relatively stable throughout the year, as shown in Exhibit II-G. Despite this lack of overall seasonality, the characteristics of the visitors change over the months of the year. The first quarter of the year includes many repeat visitors who reside in colder areas on the mainland and Canada. These guests tend to be more affluent and are more likely to purchase or own resort condominiums in the state than are visitors during other times of the year. Due to their longer than average lengths of stay, Hawaii's hotel occupancy rates traditionally are at their highest during this period. Summer months, by contrast, experience the largest number of visitors, but their stays are shorter than their first quarter counterparts.

VISITOR EXPENDITURES

Visitor expenditures in the state totaled over \$4.8 billion in 1984 and have shown double-digit percent increases in every year since 1970 except for 1983, as shown in Exhibit II-H. On a per capita basis, expenditures have also increased but at a slower rate than have total visitor expenditures. The faster growth in total expenditures might be explained by the relatively greater increase in the number of visitors to the state.

Visitor spending patterns vary significantly by type of visitor. Visitor expenditure surveys conducted by the HVB indicate that Japanese visitors spend significantly more per day than do all other visitors. For example, in 1983 the average daily expenditure for Japanese visitors was \$227, or 160% more than the \$86 spent by all other visitors, as shown in the table below:

Average Daily Expenditures of Visitors to Hawaii	
1983	
	Daily expenditure
Japanese visitors	\$ 227.32
All other visitors:	
Oahu only	81.23
Statewide	85.88

Sources: Hawaii Visitors Bureau.

These expenditure patterns are influenced by the relatively shorter average length of stay of eastbound visitors (4.9 days compared to 10.3 days in 1983) and the Japanese gift-giving tradition of "omiyage." As also shown in the table, visitors who visit only Oahu tend to spend less than the average non-Japanese visitor to the state. According to statistics provided by the HVB, this relatively greater expenditure total for neighbor island visitors is due to their greater expenditures for lodging, ground transportation and tours.

RESORTS IN HAWAII

A resort is a place developed to provide for the sojourn of visitors providing multiple facilities for their accommodations, leisure and other needs. A resort is defined as a visitor destination area known to a sufficient number of potential visitors to justify it as a self-sufficient entity. A resort, through its reputation, is able to attract and motivate travel itself.

Exhibit II-G

KUKIO BEACH RESORT
Seasonality of Visitors to Hawaii
1983 and 1984

Month	1984		1983	
	Number	Percent	Number	Percent
January	378,980	7.8%	324,960	7.4%
February	396,680	8.2	348,040	8.0
March	442,800	9.1	396,310	9.1
April	383,320	7.9	319,130	7.3
May	388,860	8.0	341,120	7.8
June	431,450	8.9	411,310	9.4
July	434,630	9.0	411,080	9.4
August	446,220	9.2	417,810	9.6
September	345,270	7.1	317,320	7.3
October	390,550	8.0	351,220	8.0
November	383,810	7.9	330,200	7.6
December	433,010	8.9	399,180	9.1
	<u>4,855,580</u>	<u>100.0%</u>	<u>4,367,860</u>	<u>100.0%</u>
January to April		33.0%		31.8%
May to August		35.1		36.2
September to December		31.9		32.0

Source: Hawaii Visitors Bureau, Annual Research Report, 1984.

Exhibit II-H

KUKIO BEACH RESORT
Visitor Expenditures in
the State of Hawaii
1970 to 1984

Year	Expenditures per visitor		Total visitor expenditures	
	Amount	Compound annual percentage increase	Amount (000s)	Compound annual percentage increase
1970	\$ 341	- %	\$ 393	- %
1975	481	7.1	1,360	18.0
1976	509	5.8	1,660	20.6
1977	537	5.3	1,885	12.5
1978	585	8.9	2,146	16.3
1979	641	9.6	2,337	18.2
1980	731	14.0	2,875	13.3
1981	813	11.2	3,200	11.3
1982	872	7.3	3,700	15.6
1983	910	4.4	3,974	7.4
1984 (preliminary)	944	3.7	4,852	22.1

Source: Hawaii Visitors Bureau, Annual Research Report, annual.

KUKUI BEACH RESORT
Characteristics of Neighbor Island Resorts

	Kaunohiki Beach	Island of Hawaii resorts	Maui	Molokai
Site area (acres)	699	1,400	610	
Distance from nearest airport	17 miles (Kaunohiki)	24 miles (Kaunohiki)	20 miles (Kaunohiki)	6 major line roads
Special air characteristics	Protected bay 3,000 people Parasailing Beach courts Ancient trail	Protected bay Beach courts Ancient trail	Beach courts Ancient trail	Parasailing Ancient trail
Existing developments	93	1,200	318	351
Hotel rooms	—	—	—	—
Condominiums and single-family lots	—	71	—	—
Total units	93	71	318	351
Available beach	White sand	White sand	White sand	Sandy, rocky bottom
Swimline (beach level)	7,000	13,000	11,000	11,000
Percent usable for commercial space in shopping centers	37%	8%	37%	19%
Cell phone service	Prepared	N/A	Prepared	Prepared
Beach courts	4	11	18	18
Other activities	Deep-sea fishing, scuba diving, water skiing, volleyball	Fishing, surfing, windsurfing, scuba diving	Deep-sea fishing, scuba diving, water skiing, windsurfing	Jogging, tennis, sailing, scuba diving, windsurfing
Hotel developments	Hotel class 170 units 1983	Hotel class 170 units 1983	Hotel class 170 units 1983	Hotel class 170 units 1983
Typical condominium unit sales price (1983)	\$11 - \$200	\$11 - \$180	\$11 - \$180	\$11 - \$180
Market appeal	Quality hotel and golf course developments Beach courts and tennis courts	Activity-oriented resort which benefits from proximity to the Kula-Kaunohiki area and area visitor structures	Form-class destination resort with a wide range of amenities and a wide visitor base	Quality hotel, condominium and golf course developments incorporated in a master plan with a wide range of amenities and a wide visitor base
Typical visitor profile	State-oriented family, to GTR and commercial groups. Planned development to cater to the very special week-class market. Average room rates for 1983 projected to be \$100 per night.	Oriented to both GTR and FIT visitors from outside the state and region annually.	Carries its reputation as a first-class resort and region annually.	Marketed to affluent individual visitors.

(Continued)

On the neighbor islands, facility development has increasingly occurred in master-planned resorts. The characteristics of major neighbor island resorts are summarized in Exhibit II-1.

As shown in the exhibit, all but Keaouhou Resort have a good swimming beach. Developments completed to date range between 400 units or lots at the smallest (Mauna Kea), the relatively new Mauna Lanii Resort and Molokai's Kahua Koi Resort) to 5,500 units at Kaunohiki Resort. Resort amenities generally include golf, tennis and extensive water sports.

In terms of hotel class, three of the four resorts on the island of Hawaii cater to the luxury hotel market (Mauna Kea, Mauna Lanii and the proposed development at Waikoloa), while the Keaouhou Resort caters to the tourist and first-class market. Resorts on Maui, Kauai and Molokai generally cater to a broader range of guests ranging from economy class to the luxury market.

The appeal of the resorts differs markedly among resorts. The majority of the resorts benefit from locational characteristics and the complete array of recreational, commercial and dining/entertainment facilities offered within the resort. Resorts which cater to the luxury traveler market typically host older FIT guests who return year after year, while those catering to the first-class or tourist market have a broader range of age groups including GTR and package groups.

PROJECTED VISITOR ARRIVALS

In 1984 visitor arrivals to Hawaii amounted to more than 4.8 million to the state of Hawaii and 0.8 million to the island of Hawaii, as shown in Exhibit II-2. Visitor arrivals to the state have increased at an average of 7.6% per annum since 1970. The increase in visitors has been a function of many factors including the following:

- Improved air access to the islands
- More effective marketing
- Greater development of visitor accommodations with an emphasis on resort development
- Increased disposable incomes in sending regions

The State of Hawaii Department of Planning and Economic Development (DPED) projects that visitor arrivals should continue to increase, but at a lower rate of growth than in the 1970s. This is projected to result in more than eight million visitors to the state by the year 2003.

Because of the island of Hawaii's expected emergence as one of the state's major destination resort areas, visitors to the island are expected to represent about 30% of westbound visitors and 9% of eastbound visitors to the state within the next 20 years. For comparison, the market shares of statewide westbound visitors traveling to the major islands since 1970 are as indicated in the following table:

Percentage of Westbound Overnight and Longer Visitors Visiting the Major Hawaiian Islands

Year	1970 to 1984			
	Oahu	Hawaii	MauI	Kauai
1970	94.0%	35.6%	33.8%	30.9%
1975	85.6	34.9	42.2	28.7
1980	78.7	25.0	45.2	25.7
1981	80.6	21.8	45.2	24.6
1982	79.0	21.5	49.1	23.2
1983	76.3	21.8	50.1	21.1
1984	78.0	20.3	49.7	21.7

Sources: Westbound visitors to and beyond Hawaii indicating intention to visit the respective islands, as reported by the Hawaii Visitors Bureau, tabular release dated July 1984 and Annual Research Report, annual.

Based on the anticipated share of the state market, visitor arrivals to the island are projected to increase at a compounded average annual rate of 4.5% over the next 20 years. This growth would result in a total of nearly two million visitor arrivals to the island by the year 2009, as also shown in Exhibit II-3.

III - HOTEL MARKET ASSESSMENT

This chapter reviews trends in the hotel industry in the state and on the island of Hawaii, projects hotel room requirements for the island to the year 2005 and assesses the market for hotel development at the proposed Kukilo Beach Resort. The chapter also makes recommendations for the size and timing of the commercial center proposed for development on Queen Kaahumanu Highway.

HOTEL INDUSTRY TRENDS

This section reviews recent trends in the hotel industry in the state and on the island of Hawaii in terms of the distinction between luxury and first-class hotels, existing and planned inventory of visitor accommodations, the characteristics of major neighbor island hotels and recent indicators of the market performance of selected hotels. This information serves as a background to the ensuing projections of hotel unit requirements and the market assessment for hotel development at the Resort.

First-Class Versus Luxury Hotels

Hotel properties may be described in terms of the class of service and facilities they offer. Master-planned destination resorts generally provide either luxury or first-class hotels. Luxury hotels are differentiated from first-class hotels based on the following factors:

- The high quality of accommodations and amenities.
- Their high level of service, personal attention and guest activities.
- Their ability to achieve higher than average room rates. Average room rates of over \$150 per day area typically achieved by luxury facilities.
- Their ability to attract a greater proportion of FIT travelers due to the reputation of the hotel, quality of facilities and level of service.

The typical visitor to a luxury hotel is not constrained by travel costs in the search for unique, exciting and world renowned resort hotels. As such, luxury hotels within the state compete against other luxury hotels on Oahu, Hawaii, Maui, Kauai or Molokai rather than with first-class hotels on the same island. This section reviews existing and planned hotels in the state of Hawaii.

In Hawaii, the luxury hotel market consists of only five hotels which, together, represent 1,681 rooms or less than 3% of the total visitor rooms (including hotels and condominiums) in the state. These hotels are noted in the following table:

KUKIO BEACH RESORT
Characteristics of Neighbor Island Resorts, Continued

Exhibit II-1, Cont.

Size area (acres)(1)	Maui (1970)		Kauai (1970)		Kauai - Historical		Maui - Historical	
	1970	1975	1970	1975	1970	1975	1970	1975
Distance from Interisland Airport	23 miles (Kahului)	13 miles (Kahului)	27 miles (Kahului)	23 miles (Kahului)	23 miles (Kahului)	11 miles (Kahului)	11 miles (Kahului)	11 miles (Kahului)
Special air characteristics	Long service of local beach front property	Architectural	Isolated location	Close proximity to main road	Close proximity to main road	Close proximity to main road	Close proximity to main road	Close proximity to main road
Existing developments	1,417 1,775 21	790 790 127	190 225 1	190 225 1	220 220 1	220 220 1	220 220 1	220 220 1
Hotel developments	1,417 1,775 21	790 790 127	190 225 1	190 225 1	220 220 1	220 220 1	220 220 1	220 220 1
Typical construction unit	1,417 1,775 21	790 790 127	190 225 1	190 225 1	220 220 1	220 220 1	220 220 1	220 220 1
Market appeal	1,417 1,775 21	790 790 127	190 225 1	190 225 1	220 220 1	220 220 1	220 220 1	220 220 1
Typical visitor profile	1,417 1,775 21	790 790 127	190 225 1	190 225 1	220 220 1	220 220 1	220 220 1	220 220 1

(1) Includes all major island resorts, including manufactured or construction and hotel areas. Figures may not be master-planned for development at site level.
 (2) Includes all major island resorts, including manufactured or construction and hotel areas as published by the Hawaii Visitors Bureau, Annual Research Report, 1980 and 1983.
 (3) Hawaii State Farm Bureau, Multiple Listing Service and documents with developer or realtor of the respective resort.
 Sources: Compiled by John O'Neil & Company, Inc. based on the Hawaii Resort Developers' Conference, Essentials of Resort Development, 1981 and other published sources.

KUKIO BEACH RESORT

Historical and Projected Visitor Arrivals to the State and Island of Hawaii
1970 to 2005

	Westbound		Island		Eastbound(1)		Total visitors	
	State	Percent of state	Island of Hawaii	Percent of state	Island of Hawaii	State	Island of Hawaii	
Historical								
1970	1,326,133	33.6%	443,401	420,836	N/A	1,769,534	N/A	
1975	2,207,017	34.9	769,779	621,688	N/A	2,976,796	N/A	
1980	3,096,132	23.0	761,103	885,372	3.2%(2)	3,881,504	807,303	
1983	3,395,880	21.0	712,380	377,000	6.6 (2)	4,108,260	739,380	
1985	3,721,380	20.3	756,890	1,134,200	5.0 (2)	4,454,470	817,640	
Projected								
1985	3,833,300(3)	20.0	766,700	1,166,700(4)	5.0	5,000,000	825,000	
1990	4,461,000(3)	23.0	1,026,000	1,422,300(4)	6.0	5,883,300	1,123,300	
1995	5,171,700(3)	27.0	1,396,000	1,880,500(4)	7.0	6,972,200	1,528,000	
2000	5,709,900(3)	30.0	1,713,000	2,076,300(4)	8.0	7,786,200	1,837,600	
2005	6,001,100(3)	30.0	1,800,300	2,182,300(4)	9.0	8,183,400	1,996,700	
Projected compound annual increase - 1985 to 2005	2.2%		5.0%	2.2%	6.3%	2.3%	5.5%	

N/A Not available.

- (1) Eastbound visitors not estimated prior to 1980.
- (2) Estimated based on surveys of Japanese visitors to Hawaii county as reported by the Hawaii Visitors Bureau, Annual Research Report, 1980 and 1983.
- (3) Non-Japanese visitors as projected by the Department of Planning and Economic Development, State of Hawaii, less those estimated to be traveling eastbound.
- (4) Japanese visitors as projected by the Department of Planning and Economic Development, State of Hawaii, plus 33% non-Japanese estimated to be traveling westbound.

Sources: Hawaii Visitors Bureau, Annual Research Report, 1980; ibid, Survey of Westbound Visitors to the Island of Hawaii, 1983; and Department of Planning and Economic Development, State of Hawaii, Hawaii Population and Economic Projection and Simulation Models: Updated State and County Forecasts, 1984.

Exhibit II-1

Luxury Hotels in Hawaii
1985

Hotel	Rooms	Island	Year of completion
Kahala Hilton	370	Oahu	1964
Mauna Kea Beach	310	Hawaii	1965
Kapalua Bay	194	Maui	1978
Mauna Lani Bay	331	Hawaii	1983
Halekulani	456	Oahu	1983

Existing Development

Visitor accommodations in Hawaii currently include more than 480 visitor facilities with about 66,000 units. About 59% of this inventory is located on Oahu, as compared to 63% in 1980. The island of Hawaii includes about 11% of the state's visitor units; Kauai, 5% and Maui, 21%, as shown in Exhibit III-A.

The development of visitor accommodations since 1970 has been relatively more rapid on the neighbor islands than on Oahu, with average annual unit increases ranging from 5.1% on Kauai to 10.9% on Maui, as compared to 4.5% on Oahu. The island of Hawaii's stock of visitor units increased at an average annual rate of 5.5% between 1970 and 1985, as also shown in the exhibit.

The visitor accommodations inventory, however, includes condominium units designated for transient use as well as hotel units. Condominium units currently represent approximately one-third of total visitor accommodations in the state, with the share varying by county, as shown in the following table:

Condominium Units as a Percent of
Total Visitor Units
February 1985

County:	
Honolulu	23.4%
Hawaii	30.3
Maui	59.6
Kauai	36.7
State	33.1

Sources: Hawaii Visitors Bureau,
February 1985, Visitor Plant
Inventory.

As of June 1985 the island of Hawaii had 7,311 visitor units including hotel and condominium units. Hotel rooms represented about 70% and condominiums the remaining 30% of this inventory. About 5,232 hotel rooms and 2,279 condominium units served as visitor accommodations on the island, as shown in Exhibit III-B.

About 33% of the island's hotel units were in the Kona area. The Kohala area currently includes 24% of the island's hotel inventory. Hilo, the visitor destination area of the island which grew quickly after statehood, now accounts for only about 23% of the hotel room inventory.

KUKIO BEACH RESORT
Visitor Rooms in Hawaii
1970 to 1985

Year	Oahu	Hawaii	Kauai	Maui(1)	State total
1970	19,030	3,182	2,567	2,720	27,519
1975	25,428	5,386	3,145	6,018	39,977
1976	25,773	5,936	3,724	7,378	42,811
1977	27,827	6,031	3,868	8,397	46,143
1978	29,193	6,064	4,097	8,680	48,034
1979	31,411	6,056	4,064	9,654	51,185
1980	34,393	6,260	4,435	10,483	55,571
1981	33,566	6,859	4,832	11,245	56,502
1982	34,766	7,106	5,207	12,278	59,357
1983	34,378	7,368	4,475	12,680	58,901
1984	37,910	7,209	5,501	13,316	63,936
1985	38,600	7,511	5,656	14,152	65,919
Percent of states:					
1970	69.2%	11.6%	9.3%	9.9%	100.0%
1985	58.6	11.4	8.6	21.4	100.0

Compound annual percentage increase -
1970 to 1985

Oahu	4.5	Hawaii	5.5	Kauai	5.1	Maui	10.9	State	5.6
------	-----	--------	-----	-------	-----	------	------	-------	-----

(1) Includes the Islands of Molokai and Lanai.

Sources: Figures represent number of visitor units including all hotel units and condominium units designated for transient visitor accommodations as of June of the year indicated, as reported by the Hawaii Visitors Bureau, Annual Research Report, 1984 and Research Report, June 1985.

Exhibit III-B

KUKIO BEACH RESORT

**Distribution of Existing Visitor Accommodations
on the Island of Hawaii**

June 1985

	Hotel units		Condominium units		Total	
	Number	Percent	Number	Percent	Number	Percent
Hilo - Honokaa	1,183	22.6%	130	5.7%	1,313	17.3%
Ka'u	13	.2	35	1.5	48	.6
Kohala	1,251	24.0	114	5.0	1,365	18.2
Kona	2,748	52.5	2,000	87.8	4,748	63.2
Volcano	37	.7	-	-	37	.5
Total units	5,232	100.0%	2,279	100.0%	7,511	100.0%
Percent of total units		69.7%		30.3%		100.0%

Source: John Child & Company, Inc. based on information by the Hawaii Visitors Bureau, Visitor Plant Inventory and Research Report (June 1985).

About 2,000 units, or 38%, of the total island of Hawaii condominium units are in the Kona area and another 11%, or 5% are in the Kohala area, as also shown in the exhibit.

The development of visitor facilities in the Kona and Kohala areas is increasingly in master-planned resort areas. This trend has been encouraged by the availability of land under single ownership, the establishment of the horizontal property regime laws and a market trend towards more discriminating travelers. The major resort areas on the Kona and Kohala coast include:

- South Kohalas:
 - Mauna Kea Resort
 - Mauna Lani Resort
 - Waikoloa Beach and Village Resorts

- North Kona:
 - Kona Village Resort
 - Keauhou Resort

Planned Developments

Major hotel development plans for the neighbor islands suggest that about 5,700 luxury or first-class units will be added over the next four or five years, as shown in Exhibit III-C.

The island of Hawaii, and the South Kohala region in particular, is expected to undergo major and unprecedented development in its resort infrastructure over the next several years. The largest single development currently planned is the 1,260-room Hyatt Regency Waikoloa Hotel at Waikoloa Beach Resort, which is projected to break ground in 1986 and to open in 1988. Including the 350-room hotel planned for the South Kohala Resort but excluding the Puaou Bay Hotel project at Mauna Lani Resort, which has not yet secured a developer, hotels currently in planning and development stages on the island represent about 1,610 units.

Additional hotel development is proposed elsewhere on the island; however, these developments are generally in the market or feasibility study stage. Significant other developments, for instance, are proposed for Mauna Lani Resort and Waikoloa Beach Resort in South Kohala, the Barnwell property, and Keauhou Resort in North Kona, SeaMountain Resort in Ka'u and at the proposed Mahukona Resort in North Kohala.

In total, more than 6,000 hotel units are proposed for development on the island over the next 15 years, the majority to be in the Kohala or Kona areas. However, some of these developments are contingent upon governmental approvals or improved market or financial conditions.

Hotel Characteristics

Hotels on the neighbor islands are distinguishable from the older visitor plant of Oahu. Oahu's visitor plant is highly concentrated in the many unrelated and competing establishments of Waikiki; in comparison, the majority of the recent neighbor island hotel developments are in master-planned resort environments offering a full range of recreational facilities and amenities.

Characteristics of selected neighbor island hotels are summarized in Exhibit III-D. The establishments range in size from 310 to 815 units, and the majority offer restaurants, meeting rooms, good or excellent beach frontage, swimming pools, tennis courts and one

KUKI'O BEACH RESORT
Major Hotel Developments Planned on the Neighbor Islands
1984 to 1990

	Location	Number of rooms	Quality	Estimated date of completion					1991 or later (indeterminable)	Comments
				1984	1987	1988	1989	1990		
Hawaii Unnamed	South Kohala Resort	330	Luxury	-	-	-	330	-	-	Government approvals obtained but referendum effort to obtain a negative declaration was underway as of December 1983.
Hyatt Regency Waikoloa	Waikoloa Beach Resort	1,260	First-class to luxury	-	-	1,260	-	-	-	\$360 million project at Waikoloa Beach Resort. Requires Army Corps of Engineers' permit for development.
Panama Bay Hotel	Mauna Lani Resort	600	First-class to luxury	-	-	-	600	-	200	Presently seeking developer and operator. Site could accommodate expansion to total of 600 rooms.
Total Hawaii		2,210				1,260	730		200	
MauI MauI Surf	Kaanapali Beach Resort	762	Luxury	-	762	-	-	-	-	213-room addition to existing 549 rooms planned by Homemaker Development.
Makona Prince Hotel	Makona Resort	310	Luxury	-	310	-	-	-	-	Managed by the Prince Hotel group of Japan and Canada. To be similar to the Kapalan Bay Hotel. Estimated cost: \$40 million.
Total MauI		1,072			1,072					\$42 million project.
Kauai Hanalei Plantation Hotel	Princeville Resort	200	Luxury	-	200	-	-	-	-	Hotel rooms. Estimated cost: \$30 to \$40 million.
Kaui Hilton & Beach Villas	Nukoli Resort	330	First-class	330	-	-	-	-	-	Beach villas.
Kaui Surf	Nukoli Resort	150	First-class	150	-	-	-	-	-	\$80 million project; will add 296 rooms to an existing hotel.
Unnamed Paipu hotel (Mal Ventura)	Lihua	848	Luxury	-	848	-	-	-	-	Site could vary from 300 to 550 rooms, depending on operator selected. Estimated cost: \$75 to \$95 million.
Total Kauai		2,028		200	1,048		400		150	
Molokai - Kalaka Rock	Kaha Kai Resort	373	Luxury	-	-	-	373	-	-	\$75 million project; awaiting SMA permit from Maui Planning Commission.
Total		2,735		500	2,120	1,260	1,223		250	

Sources: Discussions with developers, filed environmental impact statements or other published sources.

Exhibit III-C

KUKI'O BEACH RESORT
Guest Facilities of Selected Neighbor Island Hotels

	Number of guest rooms	Number of food and beverage facilities			Meeting rooms	Largest convention/meeting capacity (square feet)	Quality of beach
		Restaurants/ snack bars	Lounges/nightclubs	Meeting rooms			
Hawaii							
Mauna Kea Beach	310	6	1	-	600	Excellent	
Mauna Lani Bay	353	6	1	-	420	Good	
Sheraton Royal Waikoloa	543	3	3	-	450	Good	
Kaui Hilton	832	6	1	N/A	600	Poor	
Kaui Surf Resort	533	3	1	-	1,000	Poor	
Kaui							
Kaui Surf	333	6	3	10	800	Good	
Waiohai Resort	460	6	3	-	600	Excellent	
Sheraton Kauai	344	2	1	-	250	Excellent	
MauI							
Kaanapali/Kapalus	815	6	6	1	1,200	Good	
Hyatt Regency MauI	431	3	3	1	-	Good	
Kaanapali Beach	720	3	3	1	1,300	Good	
MauI Marriott	336	4	-	1	800	Excellent	
MauI Surf	318	3	1	3	300	Good	
Royal Lahaina	323	2	2	-	125	Good	
Sheraton MauI	196	6	1	2	250	Excellent	
Kapalan Bay							
Waiohai	400	2	2	1	300	Good	
MauI Intercontinental Waiohai	330	3	2	1	300	Good	
Stouffer's Waiohai Beach							

(Continued)

Exhibit III-D

KUKI'O BEACH RESORT

Guest Facilities of Selected Neighbor Island Hotels, Continued

	Swimming pool/ spas	Tennis courts	Golf course(1)	Other amenities/attractions	Market orientation/appeal
Hawaii					
Moune Kea Beach	1	9	18 holes	Water sports	Developed by Rockefeller, attracts affluent clientele.
Moune Lanai Bay	1	10	18 holes	Water sports, natural fishponds	Luxury hotel with high degree of service for FITs and incentive travelers.
Sheraton Royal Waikoloa	1	6	36 holes(2)	Jacuzzi, water sports	FIT and group hotel in emerging resort.
Kona Hilton	2	N/A	27 holes	Water sports	Group hotel.
Kona Surf Resort	2	N/A			Group and convention hotel.
Kaunali	1	10	18 holes	Water sports	Cell and convention hotel (property being renovated by VMS Realty).
Kaunali Surf	1				Elegant FIT hotel on fine beach.
Waiohai Resort	3	N/A	Nearby	Water sports, health spa	FIT hotel on Poipu Beach.
Sheraton Kaunali	1		Nearby	Shuffleboard, volleyball	
Mauai					
Kaanapali-Kapaha	1	N/A	36 holes	Half-acre pool with bar, garden stream and health club	Attracts group and incentive travelers as well as FITs.
Hyatt Regency Maui	1	N/A	36 holes	Shuffleboard	FIT and group hotels.
Kaanapali Beach	1	N/A	36 holes	Shuffleboard	High-quality standards, strong marketing.
Maui Marriott	2	3	36 holes	Water sports	FIT hotel near on Wailea Village shops.
Maui Surf	1	3	36 holes	Volleyball	Total resort complex.
Royal Lahaina	2	11	36 holes	Shuffleboard, putting green	Good location.
Sheraton Maui	2	3	36 holes		FIT hotel within a prestigious resort.
Kapaha Bay	3	10	36 holes	Attached shopping complex	
Wailea					FIT and group travelers.
Maui Intercontinental Wailea	3	11	36 holes	Water sports	FIT and group travelers.
Steinbock's Wailea Beach	1	10	36 holes	Water sports	

N/A Not available.
 (1) Golf course holes available to hotel visitors.
 (2) Available at the Beach Resort and Village golf courses.

Sources: Pacific Area Travel Association, Pacific Travel News, June 15, 1984; Hawaii Visitors Bureau and discussions with managers of the respective facilities and observations by John Child & Company, Inc.

Exhibit III-D, Cont.

or more golf courses. The two Kona establishments surveyed, the Kona Hilton and the Kona Surf Resort, offer relatively the least in terms of recreational amenities since neither offers beach frontage or golf.

Average Occupancy Levels

Hotel and resort condominium occupancy levels measure the demand for visitor accommodations relative to room supply. In general, occupancy levels have improved significantly in 1984 and 1985 compared to the previous four years. The average annual occupancy level for visitor accommodations in the neighbor islands, including condominium units, was 76% in 1984 and 78% in the first six months of 1985, as shown in Exhibit III-E. By contrast, statewide occupancy rates from 1980 to 1983 ranged from 68% to 70%. The generally higher occupancies since 1984 are attributed to a decline in the construction of new visitor units coupled with an 11% increase in visitor arrivals between 1983 and 1984.

Oahu has historically experienced the highest occupancy levels in the state, but the island of Maui is beginning to achieve comparable occupancies. Both islands experienced annual occupancy levels of about 81% in 1984 and 82% to 83% during the first six months of 1985. Occupancy levels on the islands of Hawaii and Kauai, however, remain significantly lower than the state average. Visitor units on the island of Hawaii experienced an average annual occupancy of about 56% and Kauai about 63% in 1984. These relatively low occupancy levels indicate that visitor units on these islands may be temporarily overbuilt in relation to the current room demand and require time for visitor arrivals to expand in order to meet the excess capacity.

It should be noted that the data base excludes several major hotel chains, most notably the Hilton and Sheraton chains. The exclusion of these sizable facilities may misrepresent the actual industrywide occupancy levels. Also, because hotel facilities experience significantly higher occupancies than do condominium facilities, the figures shown in Exhibit III-E are likely to underestimate the performance of the hotels. As a result, the market performance of hotels that are comparable to those proposed for the Resort was surveyed. Again, occupancy levels over the past four years have generally improved. The recent occupancy rates of selected first-class neighbor island hotels are presented in Exhibit III-F.

Average Room Rates

Average room rates at neighbor island hotels vary significantly by island and region. Increasing average room rates reflect the completion of several high-quality projects and the higher occupancy levels achieved by different regions, most notably west Maui. The average room rate for Maui hotels as a whole in 1984 was about \$89 per day, while in west Maui it was about \$97, as shown in Exhibit III-C.

The island of Hawaii continues to show the lowest average room rates among the neighbor islands despite the emergence of a luxury hotel trade in the South Kohala district. The average 1984 room rate on the island was about \$77.

The changing market mix of the island, however, is reflected in that annual increases in room rates in the Kona and Kohala areas averaged 6.4% over the period, or second only to the increases observed in west Maui.

Exhibit III-E

KUKIO BEACH RESORT
Occupancy Levels of
Neighbor Island Visitor Accommodations
1980 to 1985

Location	1980 to 1985					First six months 1985
	1980	1981	1982	1983	1984	
Hills	39.4%	35.3%	37.7%	39.2%	58.2%	60.4%
Kona	29.0	49.5	46.9	47.0	54.9	59.7
Island of Hawaii	51.0%	44.9%	44.0%	44.7%	55.6%	59.9%
West Maui	74.8	73.7	78.0	77.8	84.1	86.1
Other Maui	67.9	58.1	61.4	67.0	70.3	74.0
Island of Maui	73.0%	70.3%	73.9%	75.2%	80.5%	82.2%
East Kauai	75.1	68.5	63.4	59.3	63.0	66.6
South Kauai	52.5	46.2	44.2	50.2	63.0	72.9
Island of Kauai	69.6%	62.7%	57.5%	57.2%	63.0%	68.8%
State total	69.3%	68.3%	70.4%	69.7%	76.0%	78.8%

N/A Not available.

Sources: Pannell Kerr Forster, Trends in the Hotel Industry, monthly. (Data presented excludes several major hotels which are not surveyed.)

Exhibit III-F

KUKIO BEACH RESORT
Average Annual Achieved Occupancy Rates for
Selected Comparable Neighbor Island
First-Class Hotels
1981 to 1984

	1981	1982	1983	1984
	Deluxe hotels (on three islands)(1)			
Range:				
Low	54.0%	55.6%	58.6%	53.3%
High	90.2	86.9	78.9	74.6
Average	77.6	74.9	70.1	66.6
Island of Hawaii(1)				
Range:				
Low	43.7	43.7	48.1	57.2
High	64.5	58.1	52.5	57.9
Average	53.0	51.9	50.3	57.6
Island of Maui(2)				
Range:				
Low	74.0	55.8	65.3	72.3
High	86.1	88.3	89.8	93.3
Average	83.2	78.4	78.1	88.0
Island of Kauai(3)				
Range:				
Low	- (4)	- (4)	47.7	64.3
High	- (4)	- (4)	62.3	77.6
Average	- (4)	- (4)	55.9	71.8

Notes: Occupancy rates exclude first-year occupancies at selected hotel facilities.

- (1) Includes the Sheraton Royal Waikoloa, Kona Hilton and Kona Surf Hotels.
- (2) Includes the Hyatt Regency Maui, Kaanapali Beach, Maui Marriott, Maui Surf, Maui Intercontinental Wailea and Stouffer's Wailea Beach Hotels.
- (3) Includes the Kaula Surf and Waiohai Resort Hotels.
- (4) Information not presented because data was not representative of the area.

Sources: Survey conducted by John Child & Company, Inc.

KUKIO BEACH RESORT
Average Room Rates of Neighbor Island Hotels
1980 to 1985

Location	1980	1981	1982	1983	1984	Compound annual percentage increase (decrease) 1980-1984	First six months 1985
Hilo	\$ 33.71	30.53	30.01	30.41	32.30	(1.1)%	\$ 34.76
Kona and Kohala	49.96	52.81	53.49	55.42	64.06	6.8	73.78
Island of Hawaii	\$ 46.40	47.16	47.25	48.84	57.17	5.4 %	\$ 65.83
West Maui	63.19	77.82	81.19	89.52	97.12	11.3	111.66
Other Maui	55.30	53.49	51.50	52.82	61.26	2.6	75.04
Island of Maui	\$ 61.34	73.27	75.02	81.60	88.89	9.7 %	\$ 101.34
East Kauai	52.66	54.67	55.63	56.54	57.85	2.4	62.61
South Kauai	66.36	61.90	67.53	72.41	82.67	5.6	94.43
Island of Kauai	\$ 55.16	56.06	58.51	59.78	65.05	4.2 %	\$ 72.36

Source: Pannell Kerr Forster, Trends in the Hotel Industry, monthly.

Exhibit III-G

III-5

The achieved room rates of individual Hawaii hotels are related to hotel quality, location, reputation and guest mix. Selected comparable first-class hotels surveyed on Maui and Kauai achieved average rates between \$70 and \$138 per room in 1984, as shown in Exhibit III-H. The achieved room rates of these facilities were about one-half those of luxury hotels on the same islands (not shown in the exhibit).

The selected comparable facility survey again shows that hotel accommodations are relatively the least expensive on the island of Hawaii, where average achieved room rates for the selected first-class hotels ranged from \$58 to \$69 in 1984, as also shown in the exhibit.

PROJECTED HAWAII COUNTY ROOM REQUIREMENTS

This section assesses the market support for additional hotel development on the island. This assessment is based on the projected rapid growth in visitor arrivals to the island as presented in the previous chapter.

Projected Demand for Hotel and Condominium Accommodations

The average daily demand for hotel and condominium units on the island is projected to increase from about 3,400 units in 1983 to nearly 13,000 units by 2005, as shown in Exhibit III-I. This would represent a 7% average annual increase in demand over the 20 years, with growth concentrated in the earlier periods. The major assumptions underlying this assessment are discussed below:

1. West- and eastbound visitor arrivals are as shown previously in Exhibit II-J and assume a significant increase in the share of state visitors who visit the island.
2. Hotel and condominium users represent the approximately 90% of westbound visitors that stay in commercial accommodations rather than with friends or relatives.
3. Average nights of stay are projected to increase as a result of the continued development of major destination resorts on the island. The projected increase is consistent with the recent experience of Maui county where the average stay has increased from 3.0 days to 6.5 days between 1970 and 1984. Average nights of stay is calculated as average days of stay less one, and is assumed to increase to 5.0 nights for westbound and 0.9 nights for eastbound visitors to the island.
4. Average party size is based on the most recent observations for the island, as reported by the HVB. Average party size is not expected to change significantly over the projection period.
5. State residents seeking hotel accommodations on the island are projected to increase over their estimated 1984 levels at about 5% per year, or at a slightly higher rate than the rate of resident population growth projected by the DPED.

Projected Hotel Unit Requirements

The projected number of hotel units required on the island is based on the demand for commercial facilities, the share of overnight visitors using hotels and an assumed 70% to 80% average annual occupancy level for hotel establishments.

KUKIO BEACH RESORT
Achieved Room Rates for
Selected Comparable Neighbor Island First-Class Hotels

1981 to 1984

	1981	1982	1983	1984
Island of Hawaii(1)				
Range:				
Low	\$ 42.80	45.80	58.70	58.00
High	52.80	57.00	62.30	69.00
Average	48.30	52.80	60.50	63.50
Island of Maui(2)				
Range:				
Low	62.80	65.70	65.80	73.90
High	95.00	112.90	126.30	138.00
Average	73.80	77.90	87.30	90.60
Island of Kauai(3)				
Range:				
Low	- (4)	- (4)	63.30	70.00
High	- (4)	- (4)	79.80	90.50
Average	- (4)	- (4)	71.40	80.30

Note: Achieved room rates exclude first-year occupancies at selected hotel facilities.

- (1) Includes the Sheraton Royal Waikoloa, Kona Hilton and Kona Surf Hotels.
- (2) Includes the Hyatt Regency Maui, Kaanapali Beach, Maui Marriott, Maui Surf, Maui Intercontinental Wailea and Stouffer's Wailea Beach Hotels.
- (3) Includes the Kaula Surf and Waiohai Resort Hotels.
- (4) Information not presented because data was available for one facility only.

KUKIO BEACH RESORT
Historical and Projected Demand for
Commercial Accommodations for the Island of Hawaii

1980 to 2003

	Historical	1981	1982	1983	Projected
Westbound visitor demand					
Visitor arrivals	760,940	766,700	1,026,000	1,396,400	1,713,800
Hotel and condominium units(1)	2.6	3.0	3.2	3.0	3.2
Average nights of stay(2)	1.9	1.9	1.9	1.9	1.9
Annual visitor nights	1,790,600	2,070,090	3,231,900	5,027,040	6,937,630
Daily occupied hotel and condominium rooms, rounded	2,370	2,790	4,650	7,230	10,000
Eastbound visitor demand					
Visitor arrivals(1)	56,700	58,300	97,300	131,600	174,600
Average nights of stay(2)	1.2	1.2	1.2	1.2	1.2
Annual visitor nights	28,350	29,150	58,580	92,120	139,680
Average per stay(2)	1.7	1.7	1.7	1.7	1.7
Daily occupied hotel and condominium rooms, rounded	50	50	90	130	290
Total daily room demands	2,420	2,840	4,740	7,360	10,290
Out-of-state visitors(2)	330	330	430	510	730
State residents(2)	3,090	2,510	4,310	6,850	9,560
Estimated total daily room demand, rounded	3,420	3,170	5,170	8,170	11,850

- (1) About 10% of all visitors projected to stay with friends, relatives, or in other noncommercial accommodations. Hawaii Visitors Bureau, A Study of Westbound Visitors to the Island of Hawaii, 1983.
- (2) Historical figures estimated, based on unpublished Hawaii Visitors Bureau data on length of stay for westbound overnight and longer visitors as of July 1983, adjusted to account for one-day visitors and to reflect visitor nights.
- (3) Historical figures estimated, based on Hawaii Visitors Bureau, A Study of Westbound Visitors to the Island of Hawaii, 1983.
- (4) All eastbound visitors assumed to stay in commercial hotel or condominium accommodations.
- (5) Historical figures based on the Hawaii Visitors Bureau Annual Research Report, 1983, Japanese visitor profile.
- (6) Sum of west- and eastbound visitor room demands as shown above.
- (7) Projected to increase over estimated 1984 levels at a compounded rate of 3% per year (numbers rounded).

Sources: John Child & Company, Inc.

Exhibit III-4

KUKI'O BEACH RESORT
 Achieved Room Rates for
 Selected Comparable Neighbor Island First-Class Hotels
 1981 to 1984

	1981	1982	1983	1984
Island of Hawaii(1):				
Range:				
Low	\$ 42.80	\$5.80	\$8.70	\$8.00
High	52.80	57.00	62.30	69.00
Average	48.30	52.80	60.50	63.50
Island of Maui(2):				
Range:				
Low	62.80	65.70	65.80	73.90
High	95.00	112.90	126.30	138.00
Average	73.80	77.90	87.30	90.60
Island of Kauai(3):				
Range:				
Low	-(4)	-(4)	63.30	70.00
High	-(4)	-(4)	79.80	90.50
Average	-(4)	-(4)	71.80	80.30

Note: Achieved room rates exclude first-year occupancies at selected hotel facilities.

- (1) Includes the Sheraton Royal Waikoloa, Kona Hilton and Kona Surf Hotels.
- (2) Includes the Hyatt Regency Maui, Kaanapali Beach, Maui Marriott, Maui Surf, Maui Intercontinental Wailea and Stouffer's Wailea Beach Hotels.
- (3) Includes the Kauai Surf and Waiholo Resort Hotels.
- (4) Information not presented because data was available for one facility only.

KUKI'O BEACH RESORT
 Historical and Projected Demand for
 Commercial Accommodations for the Island of Hawaii
 1984 to 2003

	Historical 1984	Projected				
		1985	1990	1995	2000	2003
Westbound visitor demands:						
Visitor arrivals	760,980	766,700	1,026,000	1,396,000	1,713,000	1,800,300
Hotel and condominium users(1)	681,866	690,038	923,000	1,256,760	1,541,700	1,620,270
Average nights of stay(2)	2.5	3.0	2.5	3.0	4.2	2.0
Annual visitor nights	1,780,600	2,070,090	3,231,900	5,027,040	6,937,630	8,101,330
Average party size(3)	1.2	1.2	1.2	1.2	1.2	1.2
Daily occupied hotel and condominium rooms, rounded	3,370	2,990	4,660	7,230	10,000	11,680
Eastbound visitor demands:						
Visitor arrivals(4)	56,700	58,300	97,300	131,600	174,600	196,400
Average nights of stay(5)	1.2	1.2	1.2	1.2	1.2	1.2
Annual visitor nights	28,330	29,130	58,380	92,120	139,680	174,760
Average party size(5)	1.2	1.2	1.2	1.2	1.2	1.2
Daily occupied hotel and condominium rooms, rounded	30	30	90	120	30	290
Total daily room demands:						
Out-of-state visitors(6)	2,620	3,020	4,750	7,600	10,230	11,970
State residents(7)	230	320	450	320	720	930
Estimated total daily room demand, rounded	3,000	3,400	5,200	8,000	11,000	12,900

- (1) About 10% of all visitors projected to stay with friends, relatives, or in other noncommercial accommodations. Hawaii Visitors Bureau, A Study of Westbound Visitors to the Island of Hawaii, 1983.
- (2) Historical figure estimated, based on unpublished Hawaii Visitors Bureau data on length of stay for westbound overnight and longer visitors as of July 1985, adjusted to account for one-day visitors and to reflect visitor nights.
- (3) Historical figure estimated, based on Hawaii Visitors Bureau, A Study of Westbound Visitors to the Island of Hawaii, 1983.
- (4) All eastbound visitors assumed to stay in commercial hotel or condominium accommodations.
- (5) Historical figure based on the Hawaii Visitors Bureau Annual Research Report, 1983, Japanese visitor profile.
- (6) Sum of west- and eastbound visitor room demands as shown above.
- (7) Projected to increase over estimated 1984 levels at a compounded rate of 5% per year (numbers rounded).

Source: John Child & Company, Inc.

Exhibit III-1

About 80% of the commercial room demand on the island is presently estimated to be served by hotels. However, hotels are expected to account for a smaller share of total demand in the future as the island's industry matures and more repeat visitors seek the less costly and more spacious condominium accommodations. Thus at the assumed 70% to 80% average occupancy levels, the island is expected to require between 7,500 and 8,600 hotel units by 1993 and 11,300 and 12,900 units by 2003, as shown in Exhibit III-3.

Based on the number of existing hotels and those currently in the planning and development process, the supply of units on the island is expected to exceed demand through 1990. However, market support for about 4,500 to 6,100 additional hotel units could be expected by 2003, as shown in Exhibit III-K.

**KUKIO BEACH RESORT
HOTEL MARKET ASSESSMENT**

This section assesses the market for hotel development at the Resort in terms of the anticipated market segments, required rooms and development plan recommendations.

Anticipated Market Segments

Hotel development at the Resort is recommended to offer first-class facilities and services. This market orientation is considered appropriate for Kukio Beach Resort because of the following factors:

- The planned development of an 18-hole golf course and other recreational facilities would attract and support visitors who seek at least first-class accommodations.
- The proximity of the property to shopping, dining and other affordably priced recreational opportunities of Kalita Town would provide added attractions to the first-class market.
- The prestigious and far-reaching market exposure contributed by the luxury resorts of South Kohala would also attract travelers with lower budgets to the area.
- The division of the property by the Queen Kaahumanu Highway makes the mauike portion less than ideal for a luxury class resort development.
- The large number of planned and proposed developments oriented to the luxury market on the island and throughout the state are expected to lead to intense competition within the luxury market over the next several years.

The target markets for first-class hotel development at the Resort are described as follows:

1. **FITs** - This segment would be composed primarily of upper middle-class repeat visitors to the state and possibly also to the island who seek a quality resort environment in a new setting that offers golf, sandy beaches and other recreational facilities and amenities. Such visitors could be expected to be primarily couples or small families with householders aged 33 to 50 years.

**KUKIO BEACH RESORT
Projected Demand for Hotel Units
on the Island of Hawaii
1990 to 2003**

	Cumulative requirements		
	1990	2000	2003
Average daily visitor room demand (hotel and condominium)	5,200	8,000	11,000
Average daily occupied hotel rooms, rounded(1)	3,900	6,000	7,700
Hotel units required, rounded: At 80% average annual occupancy	4,200	7,200	9,600
At 70% average annual occupancy	5,600	8,600	11,000
			12,900

(1) Assuming the share of the visitor market served by hotel units decreases from about 80% of visitor accommodations in 1985 to 70% by 2003.

Source: John Child & Company, Inc.

KUKIO BEACH RESORT
 Projected Market Support for Hotel Development
 on the Island of Hawaii
 1989 to 2005

	Existing and planned units(1)	Average 70% occupancy			Average 80% occupancy		
		Total units required(2)	New units required(3)		Total units required(2)	New units required(3)	
			Additional	Cumulative		Additional	Cumulative
1989 - 1990	6,842	5,600	-	-	4,900	-	-
1991 - 1995	6,842	8,600	1,800	1,800	7,500	700	700
1996 - 2000	6,842	11,000	2,400	4,200	9,600	2,100	2,800
2001 - 2005	6,842	12,900	1,900	6,100	11,300	1,700	4,500

(1) Includes 5,232 existing units on the island plus 1,610 planned units at the Hyatt Regency Waikoloa and the South Kohala Resort.

(2) As shown in Exhibit III-J.

(3) Rounded.

Source: John Child & Company, Inc.

Exhibit III-K

III-7

2. GITs - This segment would be composed of visitors traveling with "package tour" groups and could be expected to represent a slightly lower income profile than would the FITs. Group travelers are also more likely to include older age groups than FITs.
3. Meeting and convention groups - This segment would be composed of small- to medium-sized groups who seek a range of recreational opportunities to complement their business activities. Occasionally, this group could be expected to include midlevel corporate managers, professionals and successful entrepreneurs.
4. Within-state travelers - This segment would include both business persons and vacationing couples or families, primarily those who are Oahu residents. Given appropriate marketing, the within-state market may also overlap with the meeting and convention group market described above.

Projected Market Support

This section assesses the market support for hotel development at the Resort to 2005. The assessment is based on an assumed share of the island's additional unit requirements, the locational and physical advantages of the Kukio site and the expected first-class level of facilities, amenities and services to be offered at the Resort.

The visitor accommodations market on the island is estimated to be presently served by the various resorts or resort areas, as shown in the table below:

Resort or area(1)	Estimated Visitor Accommodations Market Shares for the Island of Hawaii	
	1985	1985
Keanouou Resort	Estimated visitor room nights	Market share
Kaliua-Kona area(2)	1,060	23%
Mauna Kea/Mauna Lanai/Waikoloa Resorts	1,450	35
Hilo/Kaui/Volcano areas	830	20
	820	20
	<u>4,160</u>	<u>100%</u>

(1) Smaller resorts have been combined with larger regions to preserve the confidentiality of occupancy rates for individual facilities.

(2) North Kona district except for Keanouou Resort, mostly in Kaliua Town.

The three South Kohala resorts of Mauna Kea, Mauna Lanai and Waikoloa are expected to increase their market share as additional facilities are developed and national and international reputations are increasingly established for each. However, due to its generally luxury orientation, the hotel facilities of the South Kohala district, including those planned at the South Kohala Resort, would not compete directly with the first-class hotel developments on the island.

In the first-class market, Keauhou Resort and Kailua Town are expected to continue to enjoy large market segments due to their size and years of market exposure.

Considering this competitive setting, Kukio Beach Resort could be expected to be able to capture about 15% of the market for additional hotel units on the island initially. This share might increase significantly over time because of the Resort's superior beach frontage in comparison to Keauhou Resort and Kailua Town. Thus, the Resort could be expected to support up to 1,200 units over a 15-year development period beginning in 1991, as shown in Exhibit III-L.

Development Plan Recommendations

Because of typical occupancies anticipated in the first few years of operations and economies of scale related to hotel construction and operations, it is recommended that the Resort develop about 350 to 450 units in its first hotel project between 1991 and 1993. Subsequent developments could number 300 to 400 units in the 1996 to 2000 period and 150 to 350 units between 2001 and 2003, as also shown in Exhibit III-L. This would result in efficient development and operational sizes as well as the achievement of 70% to 80% average annual hotel occupancies at the Resort within 15 years of the first hotel opening.

Recommendations for the development of the hotel facilities are further outlined below:

1. **Hotel size** - Because of their first-class orientation, the success of the hotels will depend on a volume trade and efficient operations. First-class neighbor island hotels in Hawaii are found to range in size from about 300 to 800 units. Two establishments are proposed to be developed at the Resort, one of about 300 to 400 units and one of about 500 to 800 units.
2. **Development concepts and phasing** - The initial facility developed could be a 350- to 450-unit first increment of the ultimately 500- to 800-unit hotel. This hotel would have a first-class market orientation and could be targeted for completion from 1991 to 1993. A smaller subsequent establishment could seek a slightly more exclusive orientation and could follow the first hotel by four to five years. By developing a second and differently oriented hotel establishment in this period, the Resort could also broaden its visitor and real property purchasing markets. In the 2001 to 2003 period, market support is anticipated for a 150- to 350-unit expansion to the first hotel.
3. **Recreational facilities** - To compete effectively with Kailua Town and with Keauhou Resort, the hotels and the Resort should offer a full complement of recreational activities or facilities such as golf, tennis, swimming pools, sailing, windsurfing, snorkeling and health spa or gym facilities.
4. **Other facility and amenity requirements** - To attract the targeted market segments, the hotels should also offer the following:
 - Mid-sized meeting or conference facilities designed to accommodate up to 400 persons at the larger property.
 - Multiple restaurants and cocktail lounges or nightclubs at each property.

KUKIO BEACH RESORT

Projected Market Support and Development Recommendations for Hotel Development at Kukio Beach Resort

1991 to 2003

	Islandwide demand for additional units Low(3) High(4)		Market share of new units	Kukio Beach Resort					
				Required hotel units(2)		Recommended hotel units(1)			
				Low(3)	High(4)	Low	High	Low	High
1991 - 1993	700	1,800	15%	100	300	350	450(5)	350	450
1996 - 2000	2,100	2,400	20	400	500	300	400(6)	650	850
2001 - 2003	1,700	1,900	20	300	400	150	350(7)	800	1,200
Total	4,500	6,100		800	1,200	800	1,200		

- (1) The recommended hotel units consider economies of scale and typical occupancy levels of new hotels.
- (2) Additional in period, not cumulative.
- (3) Assuming an average annual occupancy of 80%.
- (4) Assuming an average annual occupancy of 70%.
- (5) First hotel.
- (6) Second hotel.
- (7) Expansion of first hotel.

Sources: John Child & Company, Inc.

5. Design guidelines - Buildings should be low-rise, and the design should incorporate Hawaiian themes offering an open and relaxed vacation setting. Units could include a mix of standard, superior and deluxe rooms, with a small complement of larger "junior suites." The smaller and more exclusive establishment should offer relatively larger and more luxurious rooms than the larger establishment.

6. Other development guidelines - The two hotels should be complementary but differentiated in appearance, function and market appeal to broaden the market exposure of the Resort and to minimize direct competition between the establishments. For instance, the first could include a multitude of facilities for activity-oriented business or vacation travelers, while the second hotel could cater to a slightly older and more sophisticated market segment seeking an elegant and more exclusive environment.

The projects should also have self-supporting facilities, each providing a full complement of retail, food and beverage and recreational amenities to serve the daily needs of its guests.

OTHER RESORT AMENITY DEVELOPMENT GUIDELINES

This section presents development guidelines for the proposed village commercial center at the Resort in terms of development concept, total acreage, gross leasable area and development timing. It also makes recommendations for the development timing of the Resort's proposed golf course.

Village Commercial Center

Because of its advantageous location on the Queen Kaahumanu Highway, the proposed commercial center could serve visitor and resident market segments from the Kona and Kohala areas as well as from the Resort itself. The proposed commercial development could attract the majority of its market support from regional visitors, but up to 40% from regional residents, given the resort developments planned throughout the region, the development concept for the Resort as a whole and the anticipated levels of population growth for the region. Thus the center could house retail establishments such as a small grocery store or pharmacy as well as restaurants, snack and take-out food establishments and clothing or gift boutiques.

Based on the other land uses proposed at the Resort and examination of commercial developments at comparable other resorts in the state, the Resort could devote between six and seven acres to the commercial center. At a standard one-to-four relationship of gross leasable area to total acreage, this would represent about 65,000 to 75,000 square feet of leasable area.

The center could be developed in two phases timed to take maximum advantage of the market support to be generated by the visitor and residential units planned at the Resort. The first phase, representing about half of the total space to be provided, could be leased soon after the opening of the Resort's first hotel and the second, representing the balance of the planned area, about five years later.

Golf Course Development Timing

A golf course and driving range would represent a significant resort amenity, serving to attract both visitors and potential residents to the Resort. In addition, the golf course is planned to enhance the integration of the mauka and makai portions of the development both conceptually and physically. Thus it is recommended that an 18-hole golf course and driving range be opened in the initial phase of development to accompany the Resort's first hotel and condominium units and single-family lots.

KUKIO BEACH RESORT
Private Multifamily Housing Authorizations
for the State and Island of Hawaii
1970 to 1984

**IV - RESORT CONDOMINIUM
MARKET ASSESSMENT**

This chapter reviews recent development trends in the condominium market in the state and on the island of Hawaii and the market outlook for the island. It also identifies comparable projects located on the islands of Hawaii and Maui and assesses their character and recent market performance. The last sections project the market support and orientation for condominium development at the Resort.

DEVELOPMENT TRENDS AND CURRENT INVENTORY

Condominium development in the state was most rapid in the early 1970s with a resurgence in building at the turn of the decade. Trends and current inventories in the multifamily market in general and in the resort condominium market in particular are reviewed below.

Multifamily Authorizations

Multifamily unit authorizations on the island of Hawaii show a pattern similar to that noted for the state, as shown in Exhibit IV-A. The emergence of more luxurious resort condominium projects on the island is reflected in the rapid rise of average multifamily construction permit values in recent years. Through 1979 the average value of a multifamily authorization on the island was lower than that for the state as a whole. The average value for the island surpassed that of the state in 1980 and continued to rise until 1983. In 1984 the average value of a multifamily permit in Hawaii County was about \$91,000 or nearly twice that for the state as a whole.

Resort Condominiums

Resort condominiums are a special type of multifamily development because of their relatively high quality, their location in resort areas and their orientation to second homeowners and other vacation users. The increasing value of the average unit on the island underestimates the price trends occurring in the resort condominium market.

Condominium units counted by the HVB as part of a visitor rental pool in the South Kohala and North Kona areas and for the island as a whole are shown in Exhibit IV-B. Together, the South Kohala and North Kona areas included 98% of the island's total inventory of visitor condominium units in 1984. These two areas are expected to remain the center of visitor-related condominium facilities on the island; however, other resort condominium developments are currently proposed at Mahukona Resort in North Kohala and at SeaMountain Resort in the Ka'u district.

As also shown in the exhibit, condominium units as a percent of all visitor units have increased significantly from about 19% in 1980 to 27% in 1984.

CONDOMINIUM MARKET OUTLOOK FOR
SOUTH KOHALA AND NORTH KONA

This section assesses the trends in the condominium market in South Kohala and North Kona in terms of new project completions, existing inventory and proposed developments of visitor-related condominium units on the island. The analysis indicates a temporary oversupply concentrated in the Kailua-Kona area, but this oversupply does not appear to affect the higher quality resort developments to the north of Kailua Town.

Year	State of Hawaii		Island of Hawaii	
	Number of units	Average value (1)	Number of units	Average value (1)
1970	5,281	\$ 20,913	395	\$ 14,522
1971	5,788	17,234	838	14,850
1972	9,336	17,834	834	15,287
1973	12,374	21,064	479	17,948
1974	15,474	23,101	994	23,256
1975	7,469	34,083	507	27,012
1976	3,560	32,144	129	15,837
1977	3,193	36,100	133	23,789
1978	4,637	41,357	334	35,734
1979	4,989	50,536	714	47,500
1980	6,738	73,544	739	76,218
1981	3,321	76,797	283	94,333
1982	3,070	50,071	245	110,780
1983	1,479	66,815	96	141,969
1984	1,280	48,938	181	90,834

(1) Value of permits for new construction, in current dollars.

Source: Bank of Hawaii, Construction in Hawaii, 1985.

KUKIO BEACH RESORT
Visitor Unit Supply on the Island of Hawaii(1)
1980 to 1984

	1980	1981	1982	1983	1984
Hotel units:					
South Kohala	362	910	904	1,255	1,237
North Kona	2,781	2,788	2,698	2,683	2,681
Island total	3,143	3,698	3,602	3,938	3,918
Condominium units(2):					
South Kohala	100	121	97	84	117
North Kona	1,033	1,969	1,639	1,860	1,761
Island total	1,133	2,090	1,736	1,944	1,878
Total visitor units	4,276	5,788	5,338	5,882	5,796
South Kohala	462	1,031	1,001	1,339	1,374
North Kona	3,794	4,717	4,337	4,543	4,442
Island total	4,256	5,748	5,338	5,882	5,816
Condominium units as a percent of total island visitor units	19.2%	27.5%	25.1%	26.6%	26.7%

(1) Figures are cumulative as of June of each year.
 (2) Units designated as part of a visitor rental pool.

Sources: Hawaii Visitors Bureau and Hawaii Business, as reported in Hawaii Business, 1984.

Project Completions

Condominium development on the island has been concentrated in Kailua Town. Project completions for South Kohala and the two major areas of North Kona development, Kailua-Kona and Keauhou Resort, are shown in Exhibit IV-C. Counting the individual projects and their various phases, Kailua Town included 33 condominium projects by 1980 and 13 more were constructed between 1980 and 1985. By contrast, six projects existed in the Keauhou area in 1980 and eight more were added by 1985. In South Kohala, only three condominium projects existed prior to 1980 and only seven have been added since.

In October 1985, 86% of all condominium projects on the island were located in North Kona with most of the inventory concentrated in Kailua Town, as also shown in Exhibit IV-C. Because of the rapid construction in North Kona during the 1970s, the condominium markets in Kailua Town and in Keauhou were relatively saturated by the early 1980s and no new projects have been completed between 1983 and 1985.

The four South Kohala projects completed in 1980 and 1981 were in the Waikoloa Village area and included the Peniolo Club Phases I, II and III (totaling 76 units) and the Waikoloa Village Condominiums (38 units). The district's major beach resorts did not have condominium units in place until 1983 when the Mauna Lani Terrace's 80 units were completed. In 1984 the Mauna Kea Beach Resort completed 40 luxury units at The Villas Phases I and II. The latter are some of the most luxurious condominium units in the state.

Existing Inventory

Presently about 363 and nearly 3,500 condominium units exist in the South Kohala and North Kona resort districts, respectively. The current inventory in North Kona generally exceeds demand and several major projects continue to be available for sale. However, recent construction and sales data and the perspectives of real estate brokers active in both North Kona and South Kohala indicate that a market exists for higher quality development north of Kailua Town.

Proposed Developments

The only major project currently under construction is the 116-unit Mauna Lani Point. However, five projects are reported to be planned in the North Kona district. These projects include 418 units in the following projects:

- Onco Bay Villas
- Kona Makani Kai
- Malu Malu
- Holua at Keauhou
- Kahaluu Bay Villas

About 1,300 units are proposed (but not necessarily planned) for construction in South Kohala and about 1,500 in Kona by 1990. If current proposals are realized, by 1990 nearly 1,700 condominium units would be in South Kohala and about 3,000 units in North Kona. In addition, rezoning and other governmental approvals have been requested for condominium development at the proposed:

- Kohala Makai in South Kohala
- Barnwell property in North Kona
- Mahukona Resort in North Kohala

However, proposed development plans tend to be optimistic and a significant number of these units are not likely to be realized or completed as proposed.

KUKIO BEACH RESORT

Project Completions by Area in the
South Kohala and North Kona Districts(1)

1980 to 1985

Year	South Kohala district		North Kona district		Total
	district	Town	Keaunohou	Total district	
Pre-1980	3	33	6	39	42
1980	3	5	5	10	13
1981	1	6	2	8	9
1982	-	4	1	5	5
1983	1	-	-	-	1
1984	2	-	-	-	2
1985	(2)	-	-	-	-
Total	10	48	14	62	72
Percent	13.9%	66.7%	19.4%	86.1%	100.0%

(1) Phases of developments counted as separate projects.

(2) One project, the Mauna Lani Point at Mauna Lani Resort, is presently under construction.

Sources: Hastings, Martin, Comboy, Braig & Associates, Ltd., Condominium Market Study; Island of Hawaii, 1983; and John Child & Company, Inc.

COMPARABLE PROJECT ANALYSIS

To assess the market support for condominium development at the Resort, first-class projects on the Islands of Maui and Hawaii were selected for comparison. Historically these islands have exhibited strong market support for luxury and first-class developments and include some of the state's best known resorts and destination areas. This section identifies and describes resort projects considered comparable to the proposed development.

Identification of Comparable Projects

The Resort is proposed to be oriented to the first-class market. The condominium units at the Resort would be set back from the ocean on sites with golf course frontage. Some may also be located on the mauka side of Queen Kaahumanu Highway with a golf course or open space orientation. Thus, the units could be expected to be marketed in a price range comparable to similar nonocean, first-class resort condominium projects. Resort condominium projects were selected for comparison based on the following criteria:

- Golf course or interior frontage
- Low-rise design
- Location within a master-planned resort
- First-class market orientation

Based on these criteria, the following resort condominium projects on the Islands of Hawaii and Maui were selected for comparison:

- Island of Hawaii
 - Keaunohou Resort
 - Country Club Villas
 - Keaunohou Punahele
 - Kanaloa (Fairway Villas)
- Island of Maui
 - Kaanapali Beach Resort - Kaanapali Royal
 - Wailea Resorts
 - Wailea Ekahi
 - Wailea Ekolu
 - Wailea Ekaia Village

These resort projects are briefly described as follows:

- Keaunohou Resort - Country Club Villas. The 116 fee simple units at the Country Club Villas I and II are set in two, three-story buildings that front the 17th and 18th holes of the Keaunohou golf course. Unit prices ranged from \$94,500 to \$172,000 when they were first marketed in 1978. Project amenities include a tennis court, swimming pool and whirlpool.
- Keaunohou Resort - Keaunohou Punahele. The Keaunohou Punahele is a fee simple project developed in two phases overlooking the Keaunohou golf course. Phase I was completed in 1979 and consists of 48 units in three buildings while Phase II was completed in 1980 with 45 units in three buildings. Original sales prices ranged from \$100,000 to \$172,000. Project amenities include a recreation pavilion with bar, barbecue, swimming pool, whirlpool and shower facilities.

- Keaouhou Resort - Kanaloa (Fairway Villas). The Fairway Villas was the first of three phases located within the Kanaloa at Keaouhou project and fronting the Keaouhou golf course. It consists of 62 one- and two-bedroom units in low-rise wood buildings on fee simple land. Prices ranged from \$150,000 to \$265,000 when the units were first offered for sale in 1979. Project amenities include a recreation area, two tennis courts, meeting rooms, three swimming pools and a whirlpool.
- Kaanapali Beach Resort - Kaanapali Royal. The Kaanapali Royal consists of 103 two-bedroom units in 13 three-story buildings. The units are on leasehold land located on a golf course. The units were completed in 1980 and were originally marketed at prices ranging from \$275,000 to \$380,000. Project amenities include a recreation center, two tennis courts and a tennis shelter, a swimming pool, spa and sauna.
- Wailea Resort - Wailea Ekahi. The Wailea Ekahi is a low-rise, fee simple condominium complex overlooking the Wailea Blue Golf Course. The project consists of 294 units located in 34 buildings which were constructed in three phases. The first phase was completed in 1973 and sold at prices ranging from \$72,500 to \$132,000. The second and third phases were completed in 1976 and 1977, respectively. Project amenities include a private beach with pavilion, a recreation area, two swimming pools, a tennis court, putting green and three shuffleboard courts.
- Wailea Resort - Wailea Ekolu. The Wailea Ekolu consists of 148 units in 17 two-story buildings. The units are located on fee simple land fronting the Wailea Blue Golf Course. The project was completed in 1979 and units originally sold at a price range of \$125,000 to \$230,000. Project amenities include two swimming pools, a recreational pavilion and a barbeque area.
- Wailea Resort - Wailea Elua Village. The Wailea Elua Village was completed in three phases between 1977 and 1981. Located on fee simple land fronting the ocean, the project consists of 152 units in 24 low-rise buildings. Original sales prices ranged from \$90,000 to \$230,000 for Phase IA, \$135,000 to \$275,000 for Phase IB and \$250,000 to \$600,000 for Phase II. Project amenities include a beach pavilion, two swimming pools, a recreational facility, barbeque area and a wet bar. This project was built at a gross density of only 6.3 units per acre.

Project Densities

Exhibit IV-D shows gross densities for the seven projects considered. The projects had an average density of about 10 units per acre. The more exclusive projects at Wailea Resort on Maui were the least dense, at 6.3 to 8.8 units per acre. The Country Club Villas at Keaouhou Resort are the most densely configured, at 17 units per acre.

Unit Mix

The resort projects studied included predominantly two-bedroom units, as shown in Exhibit IV-E. Two projects, the Country Club Villas and the Kaanapali Royal, include two-bedroom units exclusively. The Wailea Ekahi is the only project that has more one- than two-bedroom units. None of the projects have more three-bedroom units than two-bedroom units. Only one project, the Wailea Ekahi, included studio units and none of the comparable projects offered four-bedroom units.

Exhibit IV-D

KUKIO BEACH RESORT
Unit Densities of Selected
Resort Condominium Projects

Project	Number of units	Land area (acres)	Units per acre
Island of Hawaii			
Keaouhou Resorts			
Country Club Villas	116	6.8	17.0
Keaouhou Punahele	93	5.8	16.0
Kanaloa (Fairway Villas)	62	6.3	9.3
Island of Maui			
Kaanapali Beach Resort - Kaanapali Royal	103	7.1	14.8
Wailea Resorts			
Wailea Ekahi	294	33.5	8.8
Wailea Ekolu	148	17.6	8.4
Wailea Elua Village	152	24.0	6.3
Total or average	976	101.3	9.6

Source: John Child & Company, Inc.

Unit Sizes

Exhibit IV-F displays the unit sizes for the resort projects considered. One-bedroom units ranged in net area from 800 to 1,100 square feet; two-bedroom units ranged from 1,000 to 1,600 square feet; and three-bedroom units ranged from 1,400 to 1,700 square feet. Studio units at Wailea Ekahi III were about 500 square feet in size. Units were most spacious at the Maui projects and at the Kanaioa on Hawaii.

MARKET PERFORMANCE OF ISLANDWIDE AND COMPARABLE PROJECTS

This section reviews the recent market performance of the selected comparable and other resort condominium projects on Hawaii and Maui. Market performance is reviewed in terms of sales absorption, prices, buyer profiles and buyer motivations.

Sales Absorption

Annual sales of new resort condominiums on the island are based on sales information provided by Hawaii TMK Service and the Multiple Listing Service (MLS) for sales in the Kohala and Kona areas. Because less than 2% of the resort condominiums on Hawaii are located outside of these two areas, Kohala and Kona condominium sales are representative of the island of Hawaii resort condominium market. Recorded condominium units which were not sold through the MLS are considered representative of new condominium unit sales.

Annual new condominium unit sales recorded in the two areas between 1978 and 1984 have fluctuated dramatically from a low of 118 units in 1983 to over 492 units in 1979. This represents an average of 279 units sold per year over the seven-year period, as shown in Exhibit IV-C. Using a three-year moving average to smooth the year-to-year fluctuations, the market absorbed about 293 new units per year over the seven-year period.

Exhibit IV-H presents total condominium sales by resort for both new and resale activity on the islands of Hawaii and Maui. Approximately 60% of the resort condominium sales on Hawaii between 1981 and mid-1985 was within Keauhou Resort and was oriented to the first- or tourist-class market. Hawaii's two luxury resorts, Mauna Lani and Mauna Kea, which have just begun to market condominium units, together accounted for about 26% of the island's unit sales in this period. In contrast, sales activity on Maui was fairly evenly divided between the Kaanapali, Wailea and Kapalua Resorts.

Prices

Statewide condominium unit sales prices escalated dramatically in 1979 and 1981 as investment speculation increased; however, in subsequent years prices have generally declined and stabilized.

On the island of Hawaii, recent new condominium sales prices vary considerably between the Kohala and Kona areas. The upper end of the price range reflects the relatively high-quality units offered at the first- and luxury-class resorts of South Kohala as compared to those available at the first- and tourist-class areas of Kailua-Kona and Keauhou Resort. Since 1983 the average new unit sold in South Kohala has ranged from about two to over four times the cost of the average new unit sold in North Kona, as shown in Exhibit IV-L.

Exhibit IV-E

KUKIO BEACH RESORT
Unit Mix of Selected Resort
Condominium Projects

Project	Percent distribution			Total units
	Studio	One-bedroom	Two-bedroom	
Island of Hawaii	-	-	-	116
Keauhou Resorts	-	-	-	93
Country Club Villas	-	-	-	62
Keauhou Punahele	-	-	-	62
Kanaioa (Fairway Villas)(1)	-	-	-	62
Island of Maui	-	-	-	103
Kaanapali Beach Resort - Kaanapali Royal	-	-	-	103
Wailea Resorts	-	-	-	294
Wailea Ekahi	7.5	22.1	20.4	188
Wailea Ekolu	-	27.0	73.0	122
Wailea Eka Village	-	23.0	64.3	10.5

(1) Percentages represent the distribution for all three phases at Kanaioa.

Sources: John Child & Company, Inc.

KUKIO BEACH RESORT
 Historical Kohala and Kona
 New Condominium Sales
 1978 to May 1985

Year	Annual new condominium sales(1)	Three-year moving average
1978	147	-
1979	492	-
1980	283	307
1981	419	398
1982	205	302
1983	118	247
1984	336	220
1985 (January to May)	63	-
Average	272	295

(1) Estimated based on the number of sales recorded at the Bureau of Conveyances which do not go through a broker as reported by Hawaii TMK Service and the Multiple Listing Service.

Sources: Hawaii TMK Service, Multiple Listing Service and John Child & Company, Inc.

KUKIO BEACH RESORT
 Unit Sizes of Selected Resort
 Condominium Projects(1)

Net square feet

Project	Studio	One- bedroom	Two- bedroom	Three- bedroom
Island of Hawaii:				
Keauhou Resorts:				
Country Club Villas	-	-	1,000 - 1,200	-
Keauhou Punahale	-	-	1,200	1,400
Kanaloua (Fairway Villas)(2)	-	1,000 - 1,100	1,300 - 1,600	1,500 - 1,700
Island of Maui:				
Kaanapali Beach Resort*:				
Kaanapali Royal	-	-	1,500 - 1,600	-
Wailea Resorts:				
Wailea Ekahi	500	800 - 1,000	1,100 - 1,600	-
Wailea Ekolu	-	900	1,100 - 1,500	-
Wailea Elua Village	-	900 - 1,000	1,300 - 1,500	1,600 - 1,700
Range	500	800 - 1,100	1,000 - 1,600	1,400 - 1,700

(1) Excluding lanai areas.

(2) Represents units sold since January 1, 1982.

Sources: John Child & Company, Inc.

Exhibit IV-I

KUKIO BEACH RESORT
Average Sales Prices of New Condominium Units
in Kohala and Kona
1982 to May 1983

	Kohala	Kona
1982:		
One-bedroom	\$ -	197,400
Two-bedroom	-	146,575
Three or more bedrooms	-	-
All units	-	133,836
1983:		
One-bedroom	302,500	194,440
Two-bedroom	469,571	218,229
Three or more bedrooms	735,000	-
All units	434,902	211,968
1984:		
One-bedroom	307,500	229,050
Two-bedroom	703,718	186,667
Three or more bedrooms	918,333	-
All units	683,261	197,263
January to May 1983:		
One-bedroom	-	159,000
Two-bedroom	450,000	250,000
Three or more bedrooms	1,097,500	-
All units	881,667	204,500

Sources: Hawaii TMK Service and Multiple Listing Service.

Exhibit IV-H

KUKIO BEACH RESORT
Annual Resort Condominium Sales by Resort
for the Islands of Hawaii and Maui
1971 to July 1983

Island/resort	1971 to July 1983			Percent of Island sales 1981 - July 1983
	1971 - 1973	1976 - 1980	1981 - July 1983	
Island of Hawaii				
Keauhou	23	224	224	59.8%
Waikoloa Village	12	42	52	13.9
Mauna Kea	-	-	26	7.0
Mauna Lani	-	-	72	19.3
Island of Hawaii total	35	266	376	100.0%
Island of Maui				
Kaanapali	158	294	287	38.9
Wailea	-	48	208	28.2
Kapalua	-	224	233	32.9
Island of Maui total	158	566	738	100.0%

Sources: John Child & Company, Inc.

(1) Gross square feet including lanai and deck areas.
 (2) 1984 and 1985 average selling prices as reported by Guidelines Corporation, Maui Condominiums, January 1985, updated) and TMK service computer run provided by Monitor Hawaii, Inc.
 (3) Excludes Kanaia at Keauhou.
 Sources: Compiled by John Child & Company, Inc.

KUKIO BEACH RESORT			
Average Selling Price for Resort Condominium Units 1984 and 1985			
Unit Type	Units per acre	Average unit size(1)	Average price(2) per gross square foot
Higher priced: Wailua Resort Wailua Ekahi III	10.3	1,500	\$ 195
Wailua Ekolu Wailua Ekua Village	8.4	1,430	150
Fairway to beach	8.4	1,430	230
Ocean	6.2	1,600	230
Fairway	14.8	1,950	135
Keauhou Beach Resort - Kaanapali Royal	11.0	1,550	135
Keauhou Resort - Kanaia at Keauhou	8.6(3)	1,600	170
Average		270,000	164,000
Lower priced - Keauhou Resorts Keauhou Funahelo Country Club Villas	16.0	1,450	100
Fairway/highway	17.0	1,425	130
Average		143,000	110

During the past three years the Kona condominium market has been characterized by many "distress" sales where speculative buyers sold units below the prices paid for them and sometimes under their mortgage amounts due to their unwillingness to carry continued negative cash flows generated by the units and/or decreased confidence in their investment potential. Prices have steadily increased in South Kohala; however, average prices in North Kona have fluctuated and increased negligibly over the last three years.

The average new unit in South Kohala sold for about \$887,000 during the first five months of 1985. Three- and four-bedroom units in the region sold for an average of more than \$1 million. In contrast, the average new condominium sale in the North Kona area was priced at about \$204,000; no new unit sales were noted among three- or four-bedroom units.

Exhibit IV-7 presents 1984 and 1985 average sales data for the selected comparable projects at the first-class resorts of Wailua, Kaanapali Beach and Keauhou. Two levels of quality may be discerned in this first-class market. The relatively higher priced projects are those with good fairway frontage, built at densities ranging from 6 to 15 units per acre, and with gross unit areas averaging about 1,600 square feet. The relatively lower priced projects have interior or fairway and highway frontage, densities varying from 16 to 17 units per acre and generally offer smaller units. The higher priced units sold for an average price of \$270,000, while the relatively lower priced units in this first-class market sold for an average price of \$164,000, as also shown in the exhibit.

Buyer Profile

Purchasers of resort condominiums on the island of Hawaii are typically from the west coast of the mainland and are primarily from California, Washington, Oregon and Alaska, as shown in the table below:

Principal Place of Residence of South Kohala and North Kona Condominium Owners(1)	
	Percentage distribution
West coast United States	36.3%
California	2.6
Oregon	3.8
Washington	12.8
Alaska	55.5
Subtotal	26.2
Hawaii	1.1
Northeast United States	14.8
Other United States	2.4
Foreign	100.0%

(1) Based on tax address data for buyers recorded since January 1, 1982.

Sources: Hawaii TMK Service.

During the past three years the Kona condominium market has been characterized by many "distress" sales where speculative buyers sold units below the prices paid for them and sometimes under their mortgage amounts due to their unwillingness to carry continued negative cash flows generated by the units and/or decreased confidence in their investment potential. Prices have steadily increased in South Kohala however, average prices in North Kona have fluctuated and increased negligibly over the last three years.

The average new unit in South Kohala sold for about \$322,000 during the first five months of 1985. Three- and four-bedroom units in the region sold for an average of more than \$1 million. In contrast, the average new condominium sale in the North Kona area was priced at about \$204,000; no new unit sales were noted among three- or four-bedroom units.

Exhibit IV-3 presents 1984 and 1985 average sales data for the selected comparable projects at the first-class resorts of Wailea, Kaanapali Beach and Keauhou. Two levels of quality may be discerned in this first-class market. The relatively higher priced projects are those with good fairway frontage, built at densities ranging from 6 to 15 units per acre, and with gross unit areas averaging about 1,600 square feet. The relatively lower priced projects have interior or fairway and highway frontage, densities varying from 16 to 17 units per acre and generally offer smaller units. The higher priced units sold for an average price of \$270,000, while the relatively lower priced units in this first-class market sold for an average price of \$164,000, as also shown in the exhibit.

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Subtotal	26.2
Hawaii	1.1
Northeast United States	14.8
Other United States	2.4
Foreign	100.0%

(1) Based on tax address data for buyers recorded since January 1, 1982.
Source: Hawaii TMK Service.

KUKIO BEACH RESORT
Average Selling Price for Resort Condominium Units
1984 and 1985

	Unit type	Units per acre	Average unit size(1)	Average price(2)	
				Total	Per gross square foot
Higher priced:					
Wailea Resorts	Interior/access to beach	10.3	1,500	\$ 290,000	\$ 195
Wailea Ekahi III					
Wailea Ekolu	Fairway	8.4	1,430	215,000	150
Wailea Elua Village	Ocean	6.3	1,600	371,000	230
Kaanapali Beach Resort - Kaanapali Royal	Fairway	14.8	1,950	267,000	135
Keauhou Resort - Kanaloa at Keauhou	Fairway	11.0	1,350	208,000	135
Average		<u>8.6(3)</u>	<u>1,600</u>	<u>270,000</u>	<u>170</u>
Lower priced - Keauhou Resorts:					
Keauhou Punahele	Fairway/highway	16.0	1,450	143,000	100
Country Club Villas	Fairway/highway	17.0	1,425	185,000	130
Average		<u>16.5</u>	<u>1,430</u>	<u>164,000</u>	<u>110</u>

(1) Gross square feet including lanai and deck areas.
(2) 1984 and 1985 average selling prices as reported by Guidelines Corporation, Maui Condominiums, January 1985, updated; and TMK service computer run provided by Monitor Hawaii, Inc.
(3) Excludes Kanaloa at Keauhou.

Source: Compiled by John Child & Company, Inc.

State residents are also an important market segment. State residents represent about 26% of recent condominium purchasers on the island. Unlike on Maui, Canadian buyers have not represented a major market for condominiums on Hawaii.

Other characteristics of the first-class buyer market are noted below:

- Income - Buyers at first-class resort projects tend to have average annual household incomes of \$75,000 or more.
- Property ownership - The buyers are experienced in real estate acquisition and ownership. Many own at least one other vacation home.
- Marital status and age - Most buyers are married couples, aged 35 to 55, without dependents.
- Occupation - The buyers are most often corporate executives, self-employed heads of business, real estate developers or professionals. They may also include visitor industry company owners or managers.

Buyer Motivations

Buyers at first-class resort developments are more likely than those at luxury resort developments to be primarily motivated by investment. The majority of the units are typically kept in a visitor rental pool in order to defray the carrying costs of the purchase. Only a small portion of the condominiums are purchased as primary residences. At the selected comparable projects, full-time residents are estimated to occupy between 4% and 13% of the units, as shown in the table below:

Estimated Unit Usage as Primary Homes of Selected Resort Projects

July 1985

Project	Total number of sold units	Units with home exemption	
		Number	Percent
Island of Hawaii:			
Keauhou Resort	116	15	12.9%
Country Club Villas Keauhou Punahale	88	6	6.8
Island of Maui:			
Wailea Resort	294	13	4.4
Wailea Ekohu	148	7	4.7
Wailea Elua Village	150	14	9.3

Source: Tax office records indicating owners claiming primary home exemptions at the selected projects.

Resort condominium owners also tend to be frequent visitors to the resort or region where property is purchased. They are typically repeat visitors to the region's hotel(s) or condominium(s) who have decided to make a greater commitment to the area as a vacation destination. In summary, successful resort areas have established comparable but unique markets based on faithful and satisfied clientele. The markets for each tend to be separate from the markets associated with other resort areas.

MARKET ASSESSMENT FOR KUKIO BEACH RESORT

This section assesses the market for condominium development at the proposed Resort. The marketing of condominium units is recommended to begin in 1991, or close to the opening of the first hotel at the Resort. The discussions below address the recommended market orientation and the prospective buyer markets, projected unit sales absorption and recommendations for the development and planning of the condominium units.

Market Orientation

The condominium units proposed at the Resort would be most appropriately targeted at a first-class market because of the following considerations:

- The proposed first-class market orientation of the hotels, as discussed in the previous chapter.
- The number of affluent visitors expected to be attracted to the Kona and Kohala regions of the island.

Prospective Market Segments

Initially, the condominium buyers could be expected to be attracted primarily from visitors to Waikoloa Beach Resort and Keauhou Resort and from condominium property "upgraders" from the Kailua-Kona and Keauhou areas.

With a first-class resort orientation, the prospective market support for condominium development would be principally buyers seeking one or both of the following:

1. A vacation or second residence to be kept primarily for the owner's personal use.
2. An investment to be kept in a visitor rental pool and resold for a profit after a few or several years. Units kept in visitor rental pools may be expected to represent up to 50% of those developed.

In addition, the buyers are expected to include a component of persons seeking a primary residence. These buyers could be expected to be relatively more evident at the more affordably priced projects located on the mauka side of the highway.

The demographic characteristics of the identified markets are expected to be similar to those of comparable first-class projects in the state. In summary, buyers are projected to be:

- Successful entrepreneurs, business executives and professionals such as doctors or lawyers.
- Affluent, with average annual incomes of \$75,000 or more in 1985 dollars.
- Predominantly married couples, aged 35 to 60 years.
- Physically active and seeking access to golf courses, tennis courts, beaches and restaurants.
- Primarily from the western United States, particularly from southern California.

Projected Sales Absorption

The sales absorption of condominium units at the Resort is projected based on the historical and projected new condominium sales on the island and the estimated market share for the Resort.

Since 1978 the market absorption of new condominium units on the island has ranged from 118 to 492 units per year, with a three-year moving average of approximately 293 units per year, as previously discussed.

The rate of new condominium unit sales are expected to increase over these historical levels due to the projected increase in visitor arrivals to the island and the expected attraction of more and more affluent visitors. Thus, the island could be expected to absorb about 7,000 new units between 1991 and 2005, as shown in Exhibit IV-K.

A number of the proposed competitive condominium developments would be located in existing resorts with established markets such as Keauhou and Waikoloa Beach Resorts. As a result, the Resort would not be as competitive in its initial marketing efforts.

Because of this potential competition, the Resort is projected to capture about 10% to 15% of the island market for new units in its first five years of sales. However, with its two hotels, this share could increase to about 15% to 20% of new unit sales on the island. These projections would result in a total sales absorption of about 1,000 to 1,300 units at the Resort over the 15-year period, also shown in Exhibit IV-K.

Development Plan Recommendations

A survey of recently completed resort condominium projects in the state suggests that developers are willing and able to produce and carry sufficient inventory to satisfy about a two-year sales demand. A greater number of units are typically produced than are sold in a given year because of:

- Greater economies of scale that may be realized in development and marketing.
- Buyers' desire to see completed units rather than to purchase from plans.
- Buyers' need to have several unit choices.
- Inventory should be available in the event of particularly rapid sales.

KUKIO BEACH RESORT

**Projected Market Support and Development Recommendations
for Condominium Unit Development at Kukio Beach Resort**

1991 to 2005

	Island of Hawaii		Kukio Beach Resort					
	Average annual sales(3)	Total new condominium unit sales	Projected unit sales(2)		Recommended development(1) Additional units		Cumulative units	
			Low(4)	High(5)	Low	High	Low	High
1991 to 1995	400	2,000	200	300	275	360	275	360
1996 to 2000	500	2,500	375	500	400	525	675	885
2001 to 2005	500	2,500	375	500	275	415	950	1,300
Total		7,000	950	1,300	950	1,300		

- (1) Units recommended for development to allow adequate opportunity for alternative selections.
- (2) Additional in period, not cumulative.
- (3) Projected average annual absorption of new units marketed by developers.
- (4) Assuming the Resort's share of the island market increases from about 10% initially to 15% in the last period.
- (5) Assuming the Resort's share of the island market increases from about 15% initially to 20% in the last period.

Source: John Child & Company, Inc.

Kukio Beach Resort
Proposed Unit Sizes

Unit type	Typical unit size (square feet)(1)
Studio	600 - 700
One-bedroom	900 - 1,100
Two-bedroom	1,100 - 1,600
Three-bedroom	1,300 - 1,700

(1) Net square feet, excluding lanais.

• Average sales prices - Average unit prices would be expected to range from about \$150,000 to \$250,000 in 1985 dollars for the lower-priced projects, including those that may be located on the mauka side of Queen Kaahumanu Highway. The more upscale projects could be marketed at average prices ranging from about \$200,000 to \$400,000.

Thus, project developments are recommended to total about 275 to 360 units between 1991 and 1995, 400 to 525 units between 1996 and 2000 and 275 to 415 units between 2001 and 2005, as also shown in Exhibit IV-K. Condominium development could be expected to be greatest between 1996 and 2000 because of the opening of the second hotel in that period would attract a slightly different potential buyer market to the Resort and these buyers would be expected to seek slightly different products.

Based on a review of the design and market performance of comparable projects on Hawaii and Maui and the projected market performance of the Resort, further recommendations for the development of resort condominium units are outlined as follows:

- Development timing - Assuming development approvals are obtained, marketing of the condominium units could begin in 1991. The market could be expected to improve as the Resort hotels become operational.
- Product differentiation - Market segmentation within the Resort should be planned so that the various projects are targeted at slightly different markets and do not compete directly with one another. The various projects may be differentiated by their location on the mauka or makai sides of the highway, their unit densities, sizes, quality and style of development, their view orientations and their amenities.

In the 1996 to 2000 period condominium development should also reflect the wider base of potential buyers expected to be attracted by the opening of the second hotel at the Resort. Thus, at least one project developed in this period could be targeted at a slightly more affluent and discriminating market than in previous projects.

• Amenities - The majority of the buyers of the proposed condominiums would be expected to be relatively young and physically active. Recreational amenities would be an important factor in distinguishing the Resort's products from those of the relatively overbuilt tourist-class market elsewhere in Kona. Consequently, all of the condominium projects would include one or more swimming pools and a recreation or picnic area. In addition, walking, jogging or bridle paths may be included throughout the Resort with access points from each of the condominium developments. The more upscale projects could also include recreational amenities such as the following:

- Tennis or paddle tennis courts
- Health spa
- Putting green
- Jacuzzi

• Average project densities - Densities could range from about 7 to 9 units per acre for the projects targeted to a more affluent market, up to about 15 units per acre for those targeted to a relatively younger, less affluent market.

• Unit mix - The product mix could include predominantly one- and two-bedroom units. Individual projects targeted to the relatively less affluent and investor-oriented market could also include a few studio units, while projects oriented to a more upscale market could include some three-bedroom units.

• Unit sizes - Unit sizes are proposed to range as shown in the following tables:

V - RESORT RESIDENTIAL LOT MARKET ASSESSMENT

V-1

This chapter reviews the development trends, characteristics and sales performance of existing and planned residential lot subdivisions at selected comparable resort areas in Hawaii and assesses the market support for residential lot development at the Resort.

Resort residential lots are differentiated from other residential lots by their integration within a master-planned and self-supporting resort community. Resort communities are oriented towards recreational activities and usually include golf and tennis facilities. In addition, homes built on resort lots are primarily used as secondary or vacation homes.

DEVELOPMENT TRENDS

Residential lot developments at five first-class resorts were studied. The resorts were selected based on the historical development of lots at each and the location, views and amenities offered at the various subdivisions. The selected resorts were as follows:

- Island of Hawaii
 - Waikoloa Village
 - Keaunohou
- Island of Maui
 - Kaanapali Beach
 - Wailea
- Island of Kauai
 - Princeville

Historical Resort Residential Lot Development

Except for Waikoloa Village and Princeville Resorts, resort areas in Hawaii have primarily focused on the development of hotels, resort condominiums and commercial facilities rather than on residential lots.

Resort lot development in Hawaii began in 1971 with the completion of 108 lots at Princeville and 24 at Keaunohou Resorts. About 70% of the total lots developed at the selected resorts had been completed by 1975. Thereafter, no further resort lots were developed until the peak of resort real estate activity in 1979 and 1980.

Currently about 2,087 resort residential lots are located in the five selected resorts. The majority of these lots are at Waikoloa Village and Princeville which contain 968 and 673 lots, respectively, as shown in Exhibit V-A. This represents 46% and 37%, respectively, of the total inventory sampled at these first-class resorts.

Planned Resort Residential Lot Development on the Island

Over the next two decades, about 6,100 resort lots are proposed at six resorts on the island, as shown in Exhibit V-B. However, of this number, only about 5% are planned for development before 1990.

KUKIHO BEACH RESORT
Historical Residential Lot Development at Selected Hawaii Resorts
1971 to 1985

Resort subdivision	Total existing lots	Year of completion	Annual lot completions																
			1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985		
Waikoloa Village Resort	968	1971 - 1972	-	968	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Keaunohou Resorts	24	1971	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Keaunohou subdivision (1)	24	1983	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24
Keaunohou Estates I	24	1983	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24
Subtotal	108		24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	48
Wailea Resorts	31	1973	-	-	-	-	31	-	-	-	-	-	-	-	-	-	-	-	-
Fairway Homesites	100	1980	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wailea Kai Homesites	22	1982	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wailea Golf Estates I	22	1982	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal	150		-	-	-	-	21	-	-	-	-	-	-	-	-	-	-	-	21
Kaanapali Beach Resorts	35	1972	-	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kaanapali Vista	15	1972	-	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Royal Kaanapali Estates	20	1983	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kaanapali Hillside I	23	1983	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kaanapali Hillside BA	23	1983	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal	157		-	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35
Princeville Resorts	108	1971	108	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Increment I	95	1971	95	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Unit IV	131	1973	-	-	131	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Unit III	216	1973	-	-	216	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Unit II	34	1979	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Unit I	24	1980	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Increment II, Units III	24	1981	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunset Drive	24	1981	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Increment II, Units II	27	1981	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Increment II, Units I	27	1981	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal	673		203	-	131	-	216	-	-	-	-	-	-	-	-	-	-	-	27
Total	2,087		227	1,018	131	216	31	-	-	-	-	-	-	-	-	-	-	-	227

(1) Keaunohou Resorts also includes the 25-lot Keaunohou Bay subdivision which was developed in the 1930s by Bishop Estate before the establishment of the resort.

Sources: Developers or representatives of the respective resorts.

Exhibit V-A

The greatest potential development is at Waikoloa Village Resort, where about 4,830 additional lots could be developed. No single-family lots are planned to be developed at the Waikoloa Beach Resort. Significant lot development is also planned at Keauhou Resort which currently has State Land Use approvals permitting 880 additional lots. About 400 lots are planned at the four other resorts on Hawaii.

In addition, about 500 lots are being considered for development at the proposed resort at the Barmwell property in North Kona.

CHARACTERISTICS OF COMPARABLE RESORT LOTS

This section describes the residential lots at the selected Hawaii resorts in terms of subdivision location, view, size and recreational amenities.

Location and Type

Resort residential lots are differentiated by their location with respect to the following amenities within a resort:

- Oceanfront
- Golf course
- Hillside, offering ocean or valley views
- Other interior lots

The majority of the existing and planned (near-term) resort lots are interior lots, as shown in Exhibit V-C. Lot developments that abut golf course fairways or greens and hillside lots are the next most common type while oceanfront lots represent only about 3% of lots developed or planned at the selected resorts. Oceanfront sites are typically used for hotel or condominium development where more units may benefit from the ocean frontage. The 40 oceanfront resort lots developed to date are on a cliff at Princeville.

Historically, each resort has developed the better quality lots (including golf course and oceanfront lots) early in the development of the resort and the lower quality (interior) lots later as the resort matures. This trend is particularly evident at Princeville which developed subdivisions with a greater number of ocean and golf course frontages during 1971 to 1975 and mainly interior lots after 1979. In contrast, Wailea Resort's strategy was to offer an alternating quality of lots in each successive subdivision development to permit a mix of market appeals at any given time.

Lot View

View orientations are also a primary consideration of buyers in this market. Ocean or mountain views may compensate for the locational disadvantages of a resort lot or contribute to its desirability. For example, the majority of lots at the Wailea Golf Estates has lush fairway frontage as well as ocean or mountain views. Similarly, many interior lots at Wailea and Princeville Resorts command ocean or mountain views which compensate for their lack of fairway or ocean frontage.

The importance of views is illustrated by the experience at the Wailea Golf Estates where interior lots sold more quickly than fairway lots due to ocean views and

Exhibit V-B

KUKIO BEACH RESORT
Master-Planned, Single-Family Residential
Developments at Hawaii Island Resorts

Resort subdivision	Number of lots		Total planned or proposed
	Planned, 1985 to 1990	Proposed, Indefinite	
Mauna Kea Resort - The Estates(I)	26	-	26
Proposed South Kohala Resort	-	110	110
Mauna Lani Resort	-	160	160
Waikoloa Villages	130	170	300
Unnamed Jitchaku development Highlands at Waikoloa	70	-	70
Master-planned lots	-	4,460	4,460
Subtotal	200	4,630	4,830
Keauhou Resorts	50	-	50
Keauhou Estates II	-	830	830
Master-planned lots	-	-	-
Subtotal	50	830	880
SeaMountain at Punaiuru	20	51	71
Total, rounded	300	5,780	6,100

(1) Expected to be developed as single-family attached units on leasehold land.

Source: Discussions with developers of the respective resorts, public documents filed with the State Land Use Commission and other published sources.

Exhibit V-C

KUKUI BEACH RESORT
Location and View Orientation of
Residential Lots at Selected Hawaii Resorts

Resort subdivision	Year of completion/expected completion	Primary view orientation	Ocean-front	Golf course	Lots by type			Total lots
					Hillside	ocean view/walley view	interior	
Waialeale Village Resort	1971 - 1972	interior	-	N/A	N/A	N/A	948	
Keauhou Resorts								
Keauhou subdivision (I)	1971	Golf course	-	8	-	16	24	
Keauhou Estates I	1983	Hillside ocean view	-	22	63	-	85	
Keauhou Estates II	1987 - 1988	Hillside ocean view	-	-	30	-	30	
Wailea								
Fairway Homesites	1973	Golf course	-	31	-	-	31	
Wailea Kai Homesites	1980	interior	-	34	-	-	34	
Wailea Golf Estates I	1982	Golf course	-	34	-	-	34	
Wailea Klub	1984	interior	-	-	-	-	-	
Wailea Golf Estates II	N/A	Golf course	-	33 (D)	-	-	33	
Manapali Beach Resorts								
Manapali Villa	1972	Golf course	-	33	-	-	33	
Manapali Estates	1972	Golf course	-	15	-	-	15	
Manapali Hillside I	1983	Hillside ocean view	-	-	-	-	-	
Manapali Hillside II	1984	Hillside ocean view	-	-	-	-	-	
Manapali Hillside III	1985	Hillside ocean view	-	-	-	-	-	
Princeville Resorts								
Increment I	1971	interior	7	22	23	44	108	
Unit IV	1971	interior	18	11	9	38	93	
Unit III	1971	interior	19	13	30	62	131	
Unit II	1973	interior	-	83	-	133	216	
Unit I	1973	interior	-	-	11	24	24	
Increment II, Unit III	1979	interior	-	15	16	31	34	
Sunset Drive	1980	Golf course	-	-	-	22	22	
Increment II, Unit II	1981	interior	-	-	-	27	27	
Increment II, Unit I	1981	interior	-	-	-	44	44	
Keauhou Park	1983	interior	-	-	-	44	44	
Lot 3	N/A	interior	-	-	-	1	1	
Total lots			30	341 (D)	211 (D)	600	2,032	
Percent (D)			2.9 %	34.0 %	21.0 %	59.1 %	100.0 %	
Average lots per subdivision							60.4	

N/A Not available.

(I) Leasehold.
(D) Estimated based on type of lots offered in Wailea Golf Estates I. Excluding those for which data are not available.

Sources: Developers or representatives of the respective resorts.

substantially lower prices compared to the fairway lots. The primary view orientations of lots at the selected comparable subdivisions are also noted in Exhibit V-C.

Lot Size

Typical lots at the selected projects range from 9,300 to 20,000 square feet. The lots average about 10,000 to 14,000 square feet and are larger than nonresort lots in Hawaii which are often only 6,000 to 9,000 square feet. In general, the higher priced golf course lots are larger than the interior or hillside view lots because purchasers of golf-front lots are more willing to pay for the luxury of additional space.

Amenities

Private recreational facilities and security are major features of successful resort lot developments on the mainland U. S. These features have generally not been incorporated in the existing first-class resort subdivisions in Hawaii. Instead, most of the subdivisions offer short-term, complimentary or voluntary memberships at the resorts' golf or tennis facilities to suggest their inclusion in the resort community.

The Sunset Drive subdivision in Princeville is the only existing subdivision which has private recreational facilities for its residents. The 26-lot subdivision has a recreation center which features a private pool, tennis court and pavillion. Pinesapple Hill, a luxury subdivision currently being marketed in Kapalua, will also feature extensive condominium-like recreational amenities including a full-time, on-site resident manager, two tennis courts and a swimming pool.

Private security has not been a significant feature of the existing resort subdivisions in Hawaii. However, security is a major selling point of the new Keauhou Estates I subdivision where access will be controlled by a private entry with an autobogate during the day and manned security at night.

MARKET PERFORMANCE OF COMPARABLE PROJECTS

This section examines the market performance of the selected comparable subdivisions since the first offering of resort residential lots at Princeville and Keauhou Resorts in 1971. Market performance is examined in terms of historical sales and price trends, buyer profile and purchase motivations.

Historical Sales

Since 1971 an average of about 64 resort residential lots in the state were sold annually, as shown in Exhibit V-D. Annual lot sales were relatively brisk between 1971 and 1974 when about 60 to 100 lots were sold annually. In 1975 and 1976 lot sales decreased to 24 and 33 lots, respectively, coinciding with the slump in the economy and real estate activity. Lot sales increased again in 1978 and 1981 and as new inventory was offered at Princeville and Wailea Resorts, respectively.

In 1982 and 1983 lot sales have been relatively weak, ranging from 6 to 46 annual sales, as also shown in the exhibit. This decline is primarily due to the decrease in purchases by investors. In the past, investors represented a major market segment, but investor purchases were limited by the high interest rates and the economic slump of 1981 to 1983 when resort real estate values declined. More recently sales have increased again and resort real estate values have stabilized.

KUKIHO BEACH RESORT
Annual Sales of Residential Lots
at Selected Hawaii Resorts
1971 to 1983

Resort/subdivision	Total lots offered	Annual lot sales														Total lots sold
		1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1983(1)	
Wailea Resorts																
Fairway Homesites	31				2	11	18									
Wailea Kai Homesites	180															
Wailea Golf Estates I	22															
Subtotal	199				2	11	18									
Kaanapali Beach Resorts																
Kaanapali Hillside I	25															
Kaanapali Hillside IIA	23															
Subtotal	48															
Keauhou Resorts																
Keauhou subdivision	25	25														
Keauhou Estates I	23															
Subtotal	48	25														
Princetonville Resorts																
Increment I	108	17	29	23	22	22	22	22	22	22	22	22	22	22	22	22
Unit IV	25															
Unit III	131															
Unit II	43															
Unit I 216	2															
Increment II, Unit III	2															
Sunset Drive	2															
Increment III, Unit II	2															
Increment III, Unit I	2															
Subtotal	276	17	29	23	22	22	22	22	22	22	22	22	22	22	22	22
Total	521	42	29	23	22	22	22	22	22	22	22	22	22	22	22	22
Average lot sales																
1971 to July 1983																
1982 to July 1983																

(1) As of July 31.
(2) Reservations sales had not closed as of October 1983.

Source: TMK Service as compiled by John Child & Company, Inc. and interviews with developers or representatives of the respective resorts.

Exhibit V-D

Lots that have sold since 1982 have typically been either lower-priced lots or those which were offered at discounted sales prices or with attractive financing terms. For instance, the 28 lots at Kaanapali Hillside, priced between \$120,000 and \$125,000, sold within an eight-month sales period with 50% of the lots being sold to a California financial institution that plans to build homes for speculative purposes and offer long-term financing to prospective house and lot purchasers. Sales discounts of 10% at Wailea Golf Estates I and between 5% and 10% for multiple lot sales at Princetonville also produced increased sales activity compared to prior periods. In addition, Princetonville credited a financing plan which featured 7% to 9% interest only payments for the first 3 years of the loan for the 15 new sales recorded at the resort during the first 4 months of 1984 compared to only 5 sales during all of 1983.

On the average, 1 lot was sold every 19 days at the selected resort subdivisions for an average annualized sales rate of 19 lots per year, as shown in Exhibit V-E.

Among individual projects, the variation in average annual sales per year ranged from as high as 365 lots per year at the Keauhou subdivision (where 28 lots sold in two weeks in 1971) to a low of only 3 lots per year at Princetonville's Increment II, Unit II subdivision which was first offered for sale in February 1980.

The subdivisions with high average annualized lot sales were Kaanapali Hillside I and the first four phases of Princetonville's Increment I development. As mentioned previously, at Kaanapali Hillside, about 12 of the 28 lots were sold to speculative builders for home construction and immediate resale. Of the remaining lots, the majority of the relatively lower-priced lots were thought to be purchased for intended use as a primary residence rather than for part-time or vacation use.

At Princetonville's Increment I, the low initial sales prices and discounts offered for employee purchases contributed to the sales of an average of between 26 and 45 lots per year, most of which sold between 1971 and 1978. In contrast, the Increment II has experienced lower-than-average annualized lot sales. This is attributed to a combination of factors including a downturn in visitor arrivals to Kauai following Hurricane Iwa, the economic recession and the relatively lower quality and variety of lots that are currently available for sale.

Prices

Resort lots currently being offered for sale range from \$55,000 for interior lots at Princetonville to \$350,000 for ocean view fairway lots at the Wailea Golf Estates, as shown in Exhibit V-F. The prices of resort lots are primarily related to three factors: lot type and view, lot size and the quality of the resort in which the lots are located.

Prices for golf course lots are up to 70% higher and typically 20% to 50% higher than interior lots in the same subdivision. For example, at the Wailea Golf Estates I interior lots are currently sold for \$9.00 to \$13.00 per square foot while the golf course lots with views of Haleakala command \$17.70 to \$20.30 per square foot, and golf course lots with ocean views are priced at \$20.00 to \$26.00 per square foot, as shown in Exhibit V-F.

The size of resort lots also affects the sales price. Large lots may command a greater total price per lot than the typical-sized lot but a lower price per square foot.

KUKIO BEACH RESORT
Average Annualized Sales of Residential Lots
at Selected Resort Subdivisions
As of July 1983

Exhibit V-E

Resort subdivision	Date offered	Months on market to date	Average Annualized Sales		Average annualized sales per year
			Number of lots sold	Value of lots sold	
Kaunohou - Kaunohou Estates I	1971	6.5	20	20	363
Kaunohou - Kaunohou Estates II	1970 - 1971	N/A	13	15	N/A
Kaunohou - Kaunohou Estates III	1970 - 1971	N/A	12	15	N/A
Princetonville	March 1971	31.0	108	108	91
Increment I, Unit IV	March 1971	34.0	93	93	20
Increment I, Unit III	March 1971	60.0	131	131	26
Increment I, Unit II	April 1971	53.0	216	216	43
Increment I, Unit I	June 1971	27.0	31	31	16
Waihee - Fairway Homesites	July 1972	84.0	26	26	4
Princetonville	July 1972	72.0	34	34	4
Sunset Drive	July 1972	72.0	26	26	4
Increment II, Unit III	February 1980	63.0	15	15	3
Increment II, Unit II	September 1980	99.0	27	27	9
Increment II, Unit I	September 1980	99.0	18	18	9
Waihee Kai Homesites	November 1980	27.0	100	72	19
Waihee Golf Estates I	June 1982	27.0	39	61	18
Kaunohou Beach	January 1983	4.0	20	20	27
Kaunohou Hillside I	June 1983	13.0	23	40	27
Kaunohou Hillside II	June 1983	11.0	32	100	27
Kaunohou Hillside III	August 1983	11.0	32	24	19
Kaunohou Resort - Kaunohou Estates I		264.3	1,119	279	150
Total or average(1)					

(1) Excludes lots at Kaunohou where market period is not available.
Source: TALK Service as compiled by John GILD & Company, Inc. and interview with developers and representatives of the respective resorts.

KUKIO BEACH RESORT
Current Sales Prices and Sizes of Lots at
Selected Resort Subdivisions
1983

Resort subdivision	Location and view orientation	Typical lot size (square feet)	Typical sales price	Price per square foot
Waihee Resorts				
Waihee Kai Homesites	Interior	9,300	\$ 76,000 - 128,000	7.70 - 10.15
Waihee Golf Estates	Interior	10,600	155,000 - 190,000	9.00 - 13.00
Interior lots	Fairway/mountain view	10,600	265,000 - 275,000	17.70 - 20.30
Fairway with mountain view	Fairway/ocean view	10,600	300,000 - 350,000	20.00 - 24.40
Fairway with ocean view				
Kaunohou Beach Resorts				
Kaunohou Hillside IIA	Hillside/ocean view	11,000	110,000 - 132,000	11.10
Kaunohou Hillside IIB	Hillside/ocean view	11,000	119,000 - 143,000	11.30
Kaunohou Resort - Kaunohou Estates(I)				
Interior lots (some view obstruction)	Hillside/ocean view	16,300	94,000 - 120,000	4.10 - 10.00
Interior lots (180° view)	Hillside/ocean view	16,300	150,000 - 165,000	8.00 - 10.20
Fairway	Fairway	16,300	190,000 - 204,000	9.40 - 13.30
Waihee Resort - Waihee Village (not resales)	Not available	11,000 - 13,000	35,000 - 65,000	3.40 - 4.20
Princetonville Resort(I)				
Increment II, Units I and II	Interior	10,000 - 13,000	33,000 - 60,000	4.30 - 3.40
Sunset Drive	Fairway/interior	13,500 - 20,000	87,000 - 103,000	6.50 - 5.70

(1) Discount for cash or multiple purchases may also apply.

Exhibit V-F

The quality of a resort and its reputation and ability to attract a given target market also affects the lot prices. For example, the Mauna Kea and Kapaliua Resorts appeal to the upscale traveler who returns year after year. Thus these resorts are able to command higher average lot prices than other resorts due to their established visitor bases, five-star hotels and extensive recreational amenities.

Buyer Profile

The buyers of residential lots in resort areas are characterized in terms of their occupation, age, income, residence and other characteristics. These characteristics are outlined as follows:

- **Occupation** - Occupational profiles vary according to the quality and price of the subdivision. Purchasers of lots within the \$150,000 to \$350,000 range, such as at Wailea Golf Estates I, were typically professionals, business executives or self-employed entrepreneurs and small businessmen, as shown in Exhibit V-G.
 - Purchasers of the lots within the \$60,000 to \$140,000 range, such as at Kaanapali Hillside, Princeville and Keaunou Estates I, additionally include mainland and local contractors or financial institutions. The latter buyers are often investor-builders who purchase and develop lower-priced lots in areas which are residential-oriented.
 - **Age** - Buyers are typically 40 to 55 years of age. Purchasers of higher-priced lots tend to be older while purchasers of less expensive property, including the speculative builders, tend to be younger, as also shown in Exhibit V-G.
 - **Income** - The annual incomes of purchasers range from as low as \$30,000 a year at Princeville (where an extensive employee discount plan has been implemented) to as high as \$250,000 a year at the Keaunou Estates I, as also shown in the exhibit. In general, buyers of the most expensive resort lots are believed to have income in excess of what would be needed to qualify to purchase the lot since the investment is typically for a vacation or future retirement home which is a second or third residence.
 - **Place of primary residence** - Purchasers from California represented the majority of the buyers, typically comprising between 20% and 60% of the total purchasers. Purchasers from other west coast states represented the next largest segment, as shown in Exhibit V-H.
- Residents of the island on which the resort is located also represent between 10% and 56% of total lot buyers. In comparison to other resort areas, Keaunou Estates I, Kaanapali Hillside, Waikoloa Village and Princeville attracted a relatively higher proportion of island residents due to their relatively lower prices. As lot prices continue to rise, the potential market for lots from local residents is expected to be reduced due to the smaller proportion of residents who can qualify for financing of the property.
- **Buyer profile by preference for view lots** - Given equal pricing, ocean view lots are the preferred type. However, interior and golf course lots without views have recently been successfully marketed at Princeville, Wailea and Waikoloa Village resorts.

KUKUI BEACH RESORT
 Characteristics of Residential Lot Buyers
 at Selected Hawaii Resorts

Resort subdivision	Occupation	Typical age	Minimum annual household income	Typical net worth
Wailea Golf Estates I	<ul style="list-style-type: none"> • Professionals: lawyers, doctors, architects • Business owners • Retired business owners 	45 - 55	\$ 125,000 - 170,000	N/A
Keaunou Resort - Keaunou Estates I	<ul style="list-style-type: none"> • Business owners • Hawaii Island contractors 	35 - 60	200,000 - 250,000	3,000,000+
Kaanapali Beach Resorts Kaanapali Hillside I	<ul style="list-style-type: none"> • Most small business owners: electrical equipment, tour company, bakery, art gallery • Corporate purchasers: California finance companies, Alaska trading company 	N/A	60,000 - 150,000	300,000 - 500,000
Kaanapali Hillside II and III	<ul style="list-style-type: none"> • Most small business owners • California financial institutions and partnerships 	40 - 55	72,000 - 88,000	200,000 - 400,000
Princeville Resort - all developments, by year of lot sales				
1971 - 1982	<ul style="list-style-type: none"> • Professionals • Small business owners • Princeville employees 	30 - 55	N/A	N/A
1983 - 1985	<ul style="list-style-type: none"> • Professionals • Small business owners • Contractors • Managers 	30 - 55	30,000 - 40,000	N/A

N/A Not available.

Sources: Developers or representatives of the respective resorts.

KUKIO BEACH RESORT

Percent Distribution of Principal Residence of Residential Lot Buyers at Selected Hawaii Resorts

Resort subdivision	Mainland United States			State of Hawaii		Foreign
	California	Other west coast and Alaska	Other mainland United States	Island residents	Other State residents	
Mauna Kea Resort - Fairways at Mauna Kea North	50%	10%	30%	10%	-	-
Wailea Resorts: Wailea Kai Homesites	Majority	Second largest group	N/A	N/A	N/A	N/A
Wailea Golf Estates I		57%	10%	25%	8%	-
Keauhou Resorts: Keauhou subdivision		20%		56%	20%	4%
Keauhou Estates	24%	-	6%	52%	18%	-
Kaanapali Beach Resorts: Kaanapali Hillside I	42%	16%	-	42%	-	-
Kaanapali Hillside IIA	60%	-	-	40%	-	-
Waikoloa Village Resort		38%		32%	30%	N/A
Princeville Resort - all developments, by year of initial lot sales:						
1971 - 1973	16%	3%	22%	23%	34%	2%
1974 - 1978	17%	4%	15%	29%	17%	18%
1979 - 1982	47%	3%	30%	11%	6%	3%
1983 - June 1985	33%	-	7%	26%	34%	-

N/A Not available.

Sources: Developers or representatives of the respective resorts.

Exhibit V-H

Purchasers who are willing to forego ocean views include buyers who visit the resort frequently, state residents and those intending to retire. This market segment tends to be more price sensitive than do the view lot purchasers. Purchasers who require ocean views are typically mainland residents who visit infrequently and for whom an ocean view represents Hawaii. These purchasers are often accustomed to acquiring prestigious property and are generally in higher income brackets than purchasers of nonview lots.

Other characteristics - Nearly all of the purchasers of lots at the selected resorts had previously vacationed at the hotel or condominium facilities of the resort. They are repeat visitors who have typically stayed at the resort two to five times before they purchase a resort lot. Many already own a condominium unit or interior lot at the resort and are trading up.

On-site sales offices were responsible for almost all of the lot sales at the selected resorts. Very few purchases are thought to be motivated by national advertising or by hotel or developer mailings.

Purchase Motivations

Historically, the majority of purchasers have been motivated to buy resort residential lots for future improvement as a vacation or retirement home, investment or speculative building. These market segments are discussed below:

- Vacation or retirement home - Individuals purchasing a lot for a vacation or retirement home tend to buy at resorts that are well developed in terms of visitor facilities and amenities. These buyers are generally mainland residents who vacation regularly at the resort, know its facilities well and have friendships ties among its clientele. Those seeking a vacation home typically purchase the higher-priced, well-located lots.

Such buyers are believed to value the privacy of a single-family dwelling in choosing a lot over a condominium. They may also prefer a custom-designed home and are willing and able to pay for it.

- Investment - Investment purchasers seek long-term appreciation. This group includes local as well as mainland residents. Investor purchases represented a sizable segment of lot buyers at Wailea Kai and Princeville where the majority of lots were sold between 1980 and 1981. Such purchases are highly elastic with respect to the anticipated appreciation of resort real estate values.

- Speculative building - Speculative builders are a relatively recent segment of the resort lot buyer market. These purchasers include both Hawaii and mainland financial institutions, developers or home contractors who begin construction almost immediately and price the improved property with the expectation of realizing a profit.

During the last three to five years, there has been a significant reduction in the number of investor lot purchases and an increase in the proportion of intended vacation home and retirement purchases. This trend is attributed to the stabilization of real estate values in recent years, high interest rates and the higher quality and prices of the more recently marketed subdivision.

In addition, Hawaii is just beginning to follow the California trend in the emergence of an upscale primary home market for resort residential markets. The Wailea Fairway subdivision has the highest percentage of full-time residents with about 25% claiming a primary home exemption. Princeville is next most likely to include year-round residents with about 8% of lot owners claiming a home exemption.

MARKET ASSESSMENT FOR KUKIO BEACH RESORT

This section assesses the market support for single-family lot development at the Resort. The marketing of lots is assumed to begin in the 1991 to 1993 period, coinciding with the development of hotel and condominium units at the Resort. The subsections below address prospective buyer market segments, the projected lot sales absorption and recommendations for the type and phasing of residential lot development.

Prospective Buyer Market Segments

The prospective buyer market for residential lot development at the Resort is expected to fall in four major segments, as noted below:

- Persons seeking a vacation or future retirement home
- Persons seeking a primary residence in a prestigious community
- Speculative builders
- Investors

These market segments may be further characterized as follows:

- The vacation or future retirement home market is expected to primarily include persons who reside in southern California or elsewhere in the western United States, but the group may also include persons already resident in the state. The typical buyer of this group is expected to be married, between 40 and 55 years of age and the head of a two- to four-person household. Occupationally, the buyers could be expected to be successful entrepreneurs, professionals or corporate executives with annual household incomes of \$75,000 or more in 1985 dollars. This group is also likely to include persons who already own condominium property in North Kona or South Kohala who desire increased privacy, space or prestige.

These establishing a vacation home could be expected to visit the Resort two or more times per year and to stay for periods up to a few months on any given visit.

- The primary home market is expected to include mostly persons who are employed in the Kohala or Kona regions. Such buyers could be expected to be comparable in terms of age, income, household size and occupational profile to the vacation or retirement home group described above.

- The speculative builder market would include local contractors, mainland or Hawaii financial institutions and other partnerships intending to build on and resell the property for a profit within a year or two. Members of this group could be expected to range from 35 to 50 years of age. The market share of speculative builders is expected to fluctuate from year to year following general trends in resort property values in the state.

- The investor market is expected to be comparable to the vacation or retirement home purchasers in terms of occupation and household income, but to include proportionately more state residents, a wider spread of age groups and more single-person households than would the former group.

Investors are expected to be less common in the resort single-family market as compared to the condominium market at the Resort. However, like the speculative builders, their market share would vary with the anticipated rate of appreciation of resort property values.

Projected Sales Absorption

A review of the market experience of resort residential lot developments indicates that annualized lot sales at the most comparable resorts have ranged from about 2 1/2 to 63 lots as shown in the table below:

Total Lot Sales at Selected Comparable First-Class Resorts 1971 to 1985

	Period		Average annualized lot sales
	Total lots sold	Number of years	
Kaanapali Beach Resort(1)	64	1983 to 1985	2.5
Wailea Resort	31	1973 to 1977	14
	133	1980 to 1985	28
Princeville	550	1971 to 1979(2)	63
	90	1978 to 1985(3)	13

(1) Excludes sales at the Kaanapali Vista and the Royal Kaanapali Estates, both completed about 1972.

(2) Increment 1.

(3) Increment II and Sunset Drive.

The rate of resort residential lot sales is related to visitor facility development and resort age because many buyers are repeat visitors who acquire the property while staying at the resort. When Wailea offered its first 31-lot Wailea Fairway subdivision in mid-1973, there was no completed hotel development and only two lots were sold by the end of that year. However, when the Wailea Intercontinental Hotel was completed in 1976, the subdivision sold out within two years even though the state was still recovering from a recession. In 1985 Wailea has two hotels with 950 rooms and as of July, lot sales had closed at an equivalent annual rate of 39 per year.

Sales of lots on the mauka side of the property could be expected to increase with the opening of the two proposed hotels. Thus annual sales of the mauka lots are projected to range between 20 and 30 lots between 1991 and 1993, but to increase to between 25 and 35 lots by 2001. This would result in the absorption of between 350 and 475 lots on the mauka side of the property by 2003, as shown in Exhibit V-1.

KUKIO BEACH RESORT

Projected Market Support and Development Recommendations
for Residential Lot Development at Kukio Beach Resort

1991 to 2005

	Projected sales absorption(1)					Recommended development(2)						
	Mauka lots(3)		Makai lots(4)		Total	Mauka lots		Makai lots		Total		
	Low(5)	High(6)	Low(7)	High(8)	Low	High	Low	High	Low	High		
1991 - 1995	100	150	150	150	250	300	140	200	150	150	290	350
1996 - 2000	125	150	-	-	125	150	150	175	-	-	150	175
2001 - 2005	125	175	-	-	125	175	60	100	-	-	60	100
Total	350	475	150	150	500	625	350	475	150	150	500	625

- (1) Additional in period, not cumulative.
- (2) Units required to allow for selection opportunity.
- (3) Lots to be located on the mauka side of Queen Kaahumanu Highway. Assuming competitive pricing, recreational amenities and typical lot sizes of 15,000 to 25,000 square feet.
- (4) Lots proposed to be relocated to the makai side of Queen Kaahumanu Highway. Assuming total inventory of about 150 lots on makai side of property and typical lot sizes of 10,000 to 12,000 square feet.
- (5) Based on an average sales rate of 20 lots per year initially, increasing to 25 per year by 1996.
- (6) Based on an average sales rate of 30 lots per year initially, increasing to 35 per year by 2001.
- (7) Based on an average sales rate of 30 lots per year.
- (8) Based on an average sales rate of 40 lots per year. Inventory would be fully absorbed in late 1994.

Sources: John Child & Company, Inc.

Exhibit V-1

Because of the current lack of resort residential lots that are situated close to the ocean and the desirability of such property on the island, the Resort could provide about 150 lots on the makai side of Queen Kaahumanu Highway. Sales of these lots would be expected to be relatively rapid, ranging between 30 and 40 lots per year. At the high range, all lots would be expected to be sold by 1994.

Development Plan Recommendations

Developers at other resort residential lot developments in the state have produced about three years worth of inventory at any given time. As for condominium units, a greater number of lots are typically produced than are sold in a given year due to:

- Greater economies of scale that may be realized in development and marketing.
- Buyers desire to see completed lots rather than to purchase from plans.
- Buyers need to have several lot choices.
- Inventory should be available in the event rapid sales occur.

This production may be more accelerated than for multifamily properties because of the (1) lower exposure to financial risk and (2) lower infrastructure investments required for lot developments than for condominium developments.

Based on these findings and the projected sales absorption, the Resort could develop 140 to 200 mauka lots and all 130 makai lots between 1991 and 1995, as shown in Exhibit V-1. With the opening of the second hotel between 1996 and 2000, the Resort would experience a broadening of its potential buyer market and hence could support the development of up to 175 mauka lots in this period. Lot development between 2001 and 2005 could represent the remainder of the lot sales projected over the 15-year period, or between 60 and 100 lots, as also shown in the exhibit.

Additional recommendations for the planning and development of the proposed residential lots in terms of project phasing, lot types and view orientations, lot sizes, sales prices and other design and development considerations are outlined below:

- Project phasing and product segmentation - Lot development should be phased so as to minimize competition between areas and individual lots at the Resort. The phases should also be differentiated from one another in terms of lot sizes, views and quality and project amenities.
- Lot types and view orientations - Ocean or mountain views and privacy should be maximized. The first phase of development would offer lots with golf course and, if possible, ocean views to establish a quality resort image.
- Water amenities should be considered to enhance the views from lots or sites that do not offer golf course frontage or natural views. The resort lots would include three lot types: golf course lots, interior lots with natural or created views and interior nonview lots.
- Lot sizes - Golf course lots are typically purchased by relatively affluent individuals who construct vacation or retirement homes. Thus, these lots should be large enough to permit the development of 2,500- to 4,000-square foot homes and maintain ample open space to give a feeling of seclusion and privacy between homes. In addition, the lots should be large enough to permit the construction of swimming pools but not so large as to affect the affordability of the lot.

Facility and amenity development - To distinguish the Resort's market from that of the other proposed resort lot developments on the island and to generate market interest in the years before the development of the first hotel, the Resort should follow the emerging trend of resort residential developments on the mainland and offer significant recreational and other amenities dedicated to individual projects. Such amenities could include 24-hour security, gated access, recreation centers with tennis or paddle tennis courts, swimming pool and/or Jacuzzi, putting greens, an equestrian center, access to walking or riding trails throughout the development and beach access.

Other marketing considerations - A significant share of buyers are expected to represent a sophisticated vacation or retirement home market seeking recreational opportunities in a resort residential environment. As a result, the Resort should offer golf club membership at preferential rates to property purchasers.

Interior lots may also be purchased by vacation or retirement home purchasers. Their competitive prices could also offer greater accessibility to less affluent markets than would golf course lots. Interior lots also tend to be favored by speculative builders who are more concerned with having a buildable lot of adequate size and reasonable price and less concerned about the view orientation or additional lot area.

In view of these factors, the size of residential lots developed at the Resort are proposed to be as follows:

Proposed Residential Lot Sizes
at Kukko Beach Resort

(Square feet)

Lot location and view orientation	Range	Typical
Mauka lots	17,000 - 25,000	20,000
Golf course	15,000 - 20,000	17,000
Interior with view	14,000 - 18,000	14,000
Interior nonview	10,000 - 13,000	12,000
Makai lots(1)		

(1) Typical lot assumed to have golf course view but limited or no ocean views.

Golf course and other view lots typically also realize a price premium for the views offered; this is reflected in higher per square foot costs as well as higher total costs.

Sales prices - Based on the review of prices at the comparable resorts, lots at the Resort are proposed to be typically priced between \$9 and \$13 per square foot for golf course lots, \$7 and \$11 for interior lots with views and between \$5 and \$9 for interior lots without views, in 1985 dollars. This would result in lot sales prices ranging from about \$70,000 to \$260,000, as shown in the following tables:

Proposed Residential Lot Selling Prices
at Kukko Beach Resort

(1985 dollars)

Lot location and view orientation	Typical sales price	Per square foot
Mauka		
Golf course	\$ 180,000 to 260,000	9 to 13
Interior with view	120,000 to 190,000	7 to 11
Interior nonview	70,000 to 125,000	5 to 9
Makai lots(1)	170,000 to 220,000	14 to 18

(1) Typical lot assumed to have golf course view but limited or no ocean views.

APPENDIX E: ECONOMIC AND FISCAL IMPACT ASSESSMENT



**Economic and Fiscal Impact
Assessment
for the Proposed
Kukio Beach Resort
North Kona, Island of Hawaii**

**Prepared for
HUEHUE RANCH**

February 1986

**KUKIO BEACH RESORT
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- 4. Projected the economic and fiscal impacts of the proposed hotel, condominium, single-family lot and golf course facilities proposed for the Resort.
- 5. Summarized our findings in this report.

SUMMARY OF PROPOSED DEVELOPMENTS

The following subsections present a brief description of the site location and characteristics as well as the types of development proposed for the Resort.

Location

The 675 acres of the proposed Resort lie along the leeward coast of the island of Hawaii in the district of North Kona. The property is approximately one mile south of the Kona Village Resort and six miles north of the Ke-ahole Airport. The resort areas of Waikoloa, Mauna Lani and Mauna Kea lie to the north of the proposed site. The site is bisected by Queen Kaahumanu Highway.

Proposed Development Types

The project is envisioned to be a destination resort combining visitor and residential lodging with recreational and commercial facilities and activities in a master-planned development. The major types of development proposed for the Resort includes:

- **Hotel complex** - One or two hotels are proposed to be developed within the makai portion of the site. The hotel complex would feature a beach club, shoreline promenade, health club, tennis center and retention of the anchialine ponds located within this area.
- **Residential complex** - Multifamily condominium units and resort residential lots would be located throughout the mauka and makai portions of the property. This complex would be integrated with the Resort's open space and golf course.
- **Recreational complex** - An 18-hole golf course and driving range are proposed adjacent to the residential areas. Plans for the recreational area also include an equestrian center and community park.
- **Commercial complex** - A commercial complex providing convenience shopping and various support services for the Resort community is proposed for development near to the highway.

Summary of Proposed Developments

Because the Hawaii County General Plan amendment and other permit processes are expected to take a few years, the facility development is projected for a 15-year period beginning in 1991, or from 1991 to 2005. For projection purposes, project completion is assumed to occur in the year 2005. At that time 100% of planned hotel and condominium units will be completed and about 45% of single-family lots will have homes constructed on them. The hotel, condominium and residential lot developments at project completion are shown in the following table:

1 - EXECUTIVE SUMMARY

In February 1986 Huehue Ranch engaged Peat, Marwick, Mitchell & Co. (Peat Marwick) to prepare an economic and fiscal impact assessment for the proposed Kukio Beach Resort development in North Kona on the island of Hawaii. This chapter presents the background, objectives and approach of this engagement and reviews the major findings and conclusions of the study. The sections following describe the proposed developments and summarize the projections of the economic and fiscal impacts of the Kukio Beach Resort development.

BACKGROUND

Huehue Ranch proposes to develop a master-planned resort community on 675 acres located along Queen Kaahumanu Highway in North Kona, Hawaii. The development is planned to include an 18-hole golf course, hotels, multifamily condominiums, resort residential lots and other supportive facilities and amenities. The development is identified as the Kukio Beach Resort (Resort).

Huehue Ranch is preparing the General Plan amendment, land use and zoning applications for the Resort. Thus, Huehue Ranch has asked Peat Marwick to prepare an economic and fiscal impact assessment for the proposed Resort.

STUDY OBJECTIVES

The objectives of Peat Marwick's assistance to Huehue Ranch were to:

1. Project the economic impacts of the proposed Resort with respect to:
 - Visitor expenditures
 - Employment
 - Resident Income
 - Population
 - Housing
2. Project the fiscal impacts of the proposed Resort with respect to:
 - County government revenues and expenditures
 - State government revenues and expenditures

STUDY APPROACH

The study approach to address the above directives was as follows:

1. Conferred with Huehue Ranch representatives to review the proposed development concept for the Resort.
2. Assessed the economic and demographic conditions of the Kona and Kohala regions and the island of Hawaii.
3. Surveyed the economic and fiscal impacts of other comparable resort developments in the state.

Including direct, indirect, and induced effects, total additional expenditures in the state attributable to the Resort's visitors are projected to total between \$99 million and \$143 million per year at project completion, in 1985 dollars, as also indicated in the table.

Construction Employment
 The planned developments at the Resort will generate short-term employment during the construction of new facilities and long-term employment in the operation and maintenance of those facilities. Employment effects may also be classified as being direct, indirect or induced.

The direct demand for construction employees is estimated based on the employment experiences of comparable resort-related facility construction projects in the state. Direct construction employment demand may be expected to amount to about 2,800 to 3,600 person-years for the total project, as shown in the following table:

Projected Total Construction Employment
 at Kukio Beach Resort
 (Total person-years)

Type of employment	Total project	
	Low	High
Direct	2,754	3,645
Indirect and induced	3,303	4,374
Total employment(1)	6,057	8,019

(1) Projected at 2.4 times direct employment. State of Hawaii, Department of Planning and Economic Development, Hawaii Construction Model: Further Developments, 1982.

This employment demand would have been distributed throughout the 15-year development period. Through multiplier effects, construction of the Resort could have generated a total demand for 6,100 to 8,000 person-years of employment by the project's completion.

Operational Employment

Based on the nature of the facilities proposed and on employment estimates at other comparable resorts in the islands, the Resort could be expected to support about 1,540 to 2,080 full-time equivalent direct operational positions at project completion, as shown in the following table:

Projected Total Operational Employment
 at Kukio Beach Resort

Type of employment	At project completion	
	Low	High
Direct	1,540	2,078
Indirect and induced	1,289	1,728
Total	2,829	3,806

**Summary of Proposed Developments
 at Kukio Beach Resort**

	At project completion
Hotel units	800 - 1,200
Condominium units	950 - 1,300
Residential lots:	
Maui	350 - 475
Makai	150 - 150
Subtotal	500 - 625
Total units	2,250 - 3,125

Sources: Phillips, Brandt, Reddick & Associates and John Child & Company, Inc.

ECONOMIC IMPACTS

This section summarizes the expected impacts of the Resort on visitor expenditures, employment, resident income and housing demand at the time of project completion.

Visitor Expenditures

The Resort will generate direct, indirect and induced visitor expenditures in the state. Visitors to the Resort will make direct expenditures for food, accommodations, gift items and other goods and services. These expenditures will, in turn, generate indirect and induced expenditures throughout the state through multiplier effects.

Direct visitor expenditures are estimated to amount to \$93 and \$86 per day for hotel and condominium guests, respectively, in 1985 dollars. Thus, direct annual visitor expenditures, in 1985 dollars, could amount to \$51 million to \$74 million by project completion, as shown in the following table:

Projected Total Annual Visitor Expenditures
 Attributable to Kukio Beach Resort
 (In 1985 dollars; millions)

Average daily visitor population at Kukio Beach Resort	At project completion	
	Low	High
	1,560	2,255
Expenditure type:		
Direct	\$ 51.4	74.3
Indirect and induced	47.7	69.1
Total(1)	\$ 99.1	143.4

(1) Projected at \$1.93 per \$1.00 of direct expenditure. Based on unpublished 1984 data from the state of Hawaii, Department of Planning and Economic Development.

Summary of On- and Off-Resort
Population Impact

(Average daily population)

	At project completion	
	Low	High
On-resort Visitor	1,560	2,255
Resident	721	948
Subtotal	2,281	3,199
Off-resort: Operational employees	308	415
Construction employees	88	72
Other household members	388	526
Subtotal	784	1,013
Total population impact	3,025	4,212

In summary, the facility development at the Resort is projected to generate population growth at the Resort by visitors and residents in the Resort's facilities, and in the community by the in-migrant operational and construction employees and their other household members. Total projected population impact is projected to range from about 3,030 to 4,210 at project completion.

EMPLOYEE HOUSING REQUIREMENTS

This section presents the analysis of the additional housing demand expected to be generated in the county by the employment generated at the Resort.

Construction Employees

Construction employment is temporary and therefore does not generate the long-term housing demands that are associated with operational employment. With the generous housing subsidy allowances typically paid to construction workers, the construction employee demand for residential housing is expected to be absorbed by units available in the short-term rental market of the Kona region. This approach has been found to be the most satisfactory solution to meeting construction employee housing needs at other major development projects in the Kona and Kohala regions.

Operational Employees

Direct operational employees demanding additional housing on the island of Hawaii are estimated as shown in the following table:

Through multiplier effects, the operations of the Resort could result in the generation of a total of between 2,830 and 3,840 full-time equivalent positions at project completion, as shown in the previous table.

Personal and Household Income

The Resort could be expected to have a significant impact on personal income for residents of the island and state. Personal income is defined as the wages and salaries paid to the direct construction and operational employees of the Resort. Personal income is projected on the basis of average industry wages and salaries for the various types of employment anticipated and on the projected future employment demands.

Personal income earned directly from the expenditures of visitors to the Resort may be expected to range between \$21.2 million and \$29.3 million at project completion, in 1985 dollars, as shown in the table below.

Projected Annual Personal and Household
Income From Direct Employment

(In 1985 dollars; thousands)

Type of employment	At project completion	
	Low	High
Total personal income	\$ 21,163	29,271
Total household income	\$ 32,326	46,801

Total household income generated by visitor expenditures at the Resort would include the fringe benefits and proprietor's income paid by establishments that sell goods and services directly to visitors as well as the wages and salaries noted above. In addition, household income includes income generated through the effects of indirect and induced visitor expenditures. Through multiplier effects, it is projected that the Resort could contribute between \$32.3 million and \$46.8 million per year to total household income in the state at project completion, in 1985 dollars, as also shown in the table.

Population

The development of facilities will increase population at the Resort and elsewhere on the island. The average daily population at the Resort was projected to be about 2,280 to 3,200 persons at project completion, as previously shown.

The Resort will also impact the county's population by attracting employees and through household members who accompany the in-migrant construction and operational employees. Based on projections of employment at other resorts, it was assumed that 20% of operational employment would be filled by in-migrants at project completion. About 30% of construction workers are assumed to come from off-island.

In-migrant supervisory and managerial operational employees were assumed to bring an average two additional household members. Other in-migrant operational employees were assumed to average one additional household member and construction workers from off-island were assumed to bring an average of 0.5 dependents per person. Based on these assumptions, total off-resort population impact is projected to range from about 740 to 1,010 by project completion, as shown in the following table:

Projected Affordable Housing Units Needed

	At project completion	
	Low	High
Additional housing unit demand by non-managerial and nonspecialty employees	238	321
Share in affordable housing price ranges	95	128
At 40%	119	161
At 50%		

FISCAL IMPACTS

This section describes the expected fiscal impacts of the proposed developments in terms of additional revenues and expenditures to the governments of the county of Hawaii and the state of Hawaii.

Revenues

Based on current real property tax rates in the county, the hotel, condominium, single-family, commercial and golf course facilities envisioned at the Resort could be expected to generate between \$4.0 million and \$5.5 million per year at project completion, in 1985 dollars, as shown in the table below.

Projected County and State Government Annual Revenues Attributable to Development at Kukio Beach Resort

(in 1985 dollars; millions)

	At project completion	
	Low	High
County	\$ 4.0	5.5
State	5.7	6.6
Total	\$ 9.7	12.1

Additional tax revenues to the state would be generated by the 4% general excise tax on (1) direct, indirect and induced expenditures by the Resort's visitors and (2) expenditures by the Resort's part- and full-time residents. In addition, the Resort's residents would pay individual income taxes and other state taxes such as specific excise tax on liquor, tobacco, fuel, inheritance, estate and conveyance taxes. Based on state tax receipts in fiscal 1984, it is estimated that per capita individual income and other taxes amounted to \$552 per resident.

Thus, total tax revenues to the state are expected to range between \$4.7 million and \$6.6 million per year, in 1985 dollars, at project completion. Thus, total tax revenues to state and county governments are estimated to be between \$8.7 million and \$12.1 million per year at project completion, in 1985 dollars, as also shown in the table above.

Direct Operational Employees Projected to Demand Additional Housing on the Island of Hawaii

Labor supply component	At project completion	
	Low	High
On-island labor	74	100
Available labor		
Regional turnover	31	42
Other turnover		
Off-island labor:	56	75
Managerial	252	340
Other		
Total demanding new housing	413	557

The demand for additional housing on the island of Hawaii is projected to be less than the number of employees requiring housing because some households could be expected to include more than one Resort employee. However, such "doubling up" is not projected for managerial or specialty personnel who may be expected to be principally heads of households.

The cumulative demand for additional housing directly attributable to the Resort's expansion is projected to amount to about 290 to 400 units at project completion. Between 19% and 23% of this unit demand would occur among persons in managerial or specialty positions with a relatively greater ability to afford housing. The remainder of the projected additional housing demand, about 240 to 320 units at project completion, would come from the Resort's nonmanagerial and nonspecialty employees who would have lower incomes and a lesser ability to afford housing.

Data on the household incomes of hotel employees from the Hawaii State Department of Health's Health Surveillance Survey enables estimation of income distribution of the households projected to demand new housing. The survey suggests that about 40% of Resort service-related household incomes fell below \$27,000 per year and about 50% fell below \$30,000 per year, in 1985 dollars. A household earning \$27,000 per year would be able to afford a housing unit costing \$73,000 assuming an 11% interest rate, 30-year amortization period, 10% down payment and mortgage payments equal to 28% of gross monthly income. A household earning \$30,000 per year would enable purchase of a housing unit costing about \$82,000 under the same financing assumptions.

A survey of the pricing structure of a single-family home for sale in the North Kona district taken from the Hawaii Island - Kona Board of Realtors Multiple Listing Service, January 1986, shows a limited availability of single-family homes priced at or below \$80,000. Only about 8% of total single-family listings were priced at \$80,000 or below. Assuming employees with annual household incomes of \$27,000 or less would not be able to find affordable housing and employees with annual household incomes between \$27,000 and \$30,000 would have difficulty in finding affordable housing, about 100 to 160 affordable housing units would be demanded in the county by project completion, as shown in the following table:

Expenditures

The visitors to the Resort and the part- and full-time residents that could be expected to live at its condominium and single-family units would also necessitate additional expenditures of public resources. In addition, the county would incur expenses on behalf of those who relocate from elsewhere in the state in order to take employment at the Resort.

Hawaii County government expenditures for fiscal year 1984 were analyzed with respect to the relevant service population for each government function. This analysis indicates that county government expenditures in 1984 totaled about \$340 per resident and \$340 per visitor. Thus, expenditures by the county government on the behalf of the new residents and visitors attracted by the Resort could be expected to total about \$1.3 million to \$1.8 million per year at project completion, in 1985 dollars, as shown in the table below:

Projected County and State Government Annual Expenditures
Attributable to Development at Kukio Beach Resort
(In 1985 dollars; millions)

	At project completion	
	Low	High
County	\$ 1.3	1.8
State	1.7	2.4
Total	\$ 3.0	4.2

A similar analysis of state government expenditures and the on-resort population effects indicates that state expenditures on behalf of residents of or visitors to the Resort could be expected to total between \$1.7 million and \$2.4 million per year at project completion, as also shown above.

Revenue/Expenditure Analysis

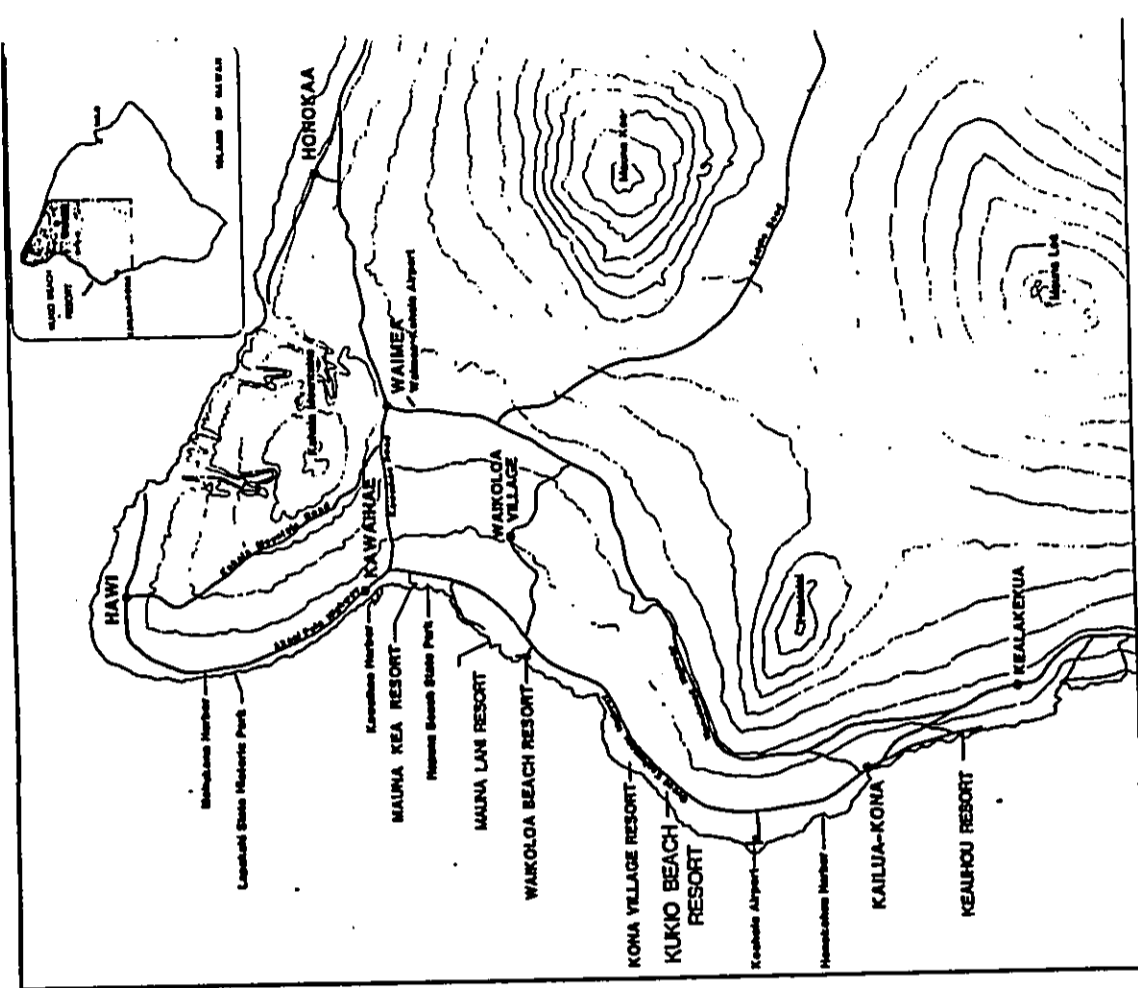
The net fiscal impacts of the Resort's development to the county and state are estimated by comparison of the projected revenues and expenditures. The county may expect to net about \$2.7 million to \$3.6 million per year at project completion, in 1985 dollars, as shown in the table below:

Projected Annual Net Revenues and Revenue/Expenditures
Ratios for the County and State Governments
(In 1985 dollars; millions)

	At project completion	
	Low	High
Net additional revenues:		
County	\$ 2.7	3.6
State	3.0	4.2
Total	\$ 5.7	7.8
Revenue/expenditure ratios:		
County	3.1	3.0
State	2.8	2.8

Combined net fiscal benefits to the state and county governments are projected to range from \$5.7 million to \$7.8 million per year at project completion, in 1985 dollars. The analysis also indicates that additional county revenues generated by the Resort would range between about 3.0 and 3.1 times the expenditures incurred by the county, as also shown in the previous table. Additional state revenues generated by the Resort would be about 2.8 times the expenditures incurred, as also shown in the table above.

KUKIO BEACH RESORT
Location Map of the Kukio Beach Resort



II - REGIONAL ECONOMIC SETTING
AND PROJECT DESCRIPTION

This chapter reviews the regional economic setting of the proposed Kukio Beach Resort including primary economic activities, population and employment patterns. The project is also described in terms of its location, site characteristics and the proposed developments.

REGIONAL ECONOMIC SETTING

The entire island of Hawaii is defined for projection purposes as the Resort's impact area. However, economic and fiscal impacts will tend to be concentrated in the North and South Kohala and North and South Kona districts. These four districts are located along the western coast of the island of Hawaii, as shown in Exhibit II-A. A generation or two ago, the Kohala area was an agrarian community dominated by sugar plantations and pasture lands, while Kona was an area of coastal fishing villages with a handful of independent farmers on the mountain slopes. The economy of this region has changed considerably since Hawaii's statehood.

Primary Economic Activities

Coffee production and ranching provided Kona's economic base through much of this century, but it was an unsteady economy due to great fluctuations in the international coffee market. In the years following statehood and the introduction of jet service to the islands, the Kona coastline began to host an increasing number of visitors. In the 1960s and 1970s North Kona fueled a building boom that spread to South Kohala and resulted in hundreds of new hotel and condominium units and residential dwellings.

Today the region is primarily supported by its real estate and visitor industries. The Kohala and Kona districts have ideal weather conditions, a black lava coastline with scattered sandy beaches and important historical sites. Among the major visitor attractions of the region are the City of Refuge, Captain Cook monument and Kona billfishing. Currently the South Kohala and North Kona districts are the heart of the island's visitor industry. As of October 1984 the 5,690 hotel and visitor condominium units in these two districts represented 82% of the island's total.

The availability of large parcels of land under single ownership and the establishment of horizontal property regime laws have permitted high-quality master-planned development in several resort areas along this coast. Six resort areas currently exist in the South Kohala and North Kona districts. In South Kohala these are:

- Mauna Kea Resort
- Mauna Lani Resort
- Waikoloa Village and Waikoloa Beach Resort

And in North Kona:

- The Kailua-Kona area
- Keauhou Resort
- Kona Village Resort

Population

Nearly one-third of Hawaii Island's population resides in the two Kohala and two Kona districts. The resident population of these four districts was 27,518 in 1980, as shown in Exhibit II-B. Since 1970 the resident population for the area has increased at an annually compounded rate of growth of 6.6% per year, or nearly twice the 3.8% rate for the county as a whole. The North Kona district (which includes Kailua-Kona, Kona Village and Keauhou Resorts) experienced the most rapid population growth at 11% per year, followed by the South Kohala district (including the Mauna Lani, Mauna Kea and Waikoloa Resorts) at 7.1% per year. There were 8,960 households in the Kohala and Kona districts in 1980 with an average household size of 3.07 persons each.

In 1980 the median age in the region ranged by district from 28.8 to 32 years of age, with the relatively older populations residing in areas less impacted by the visitor industry and recent population growth, as shown in Exhibit II-C.

As also shown in the exhibit, median family incomes in the North and South Kona districts were higher than the county average of \$19,132, while in the North and South Kohala districts they were notably lower than the county average.

Employment Patterns

Because of the expanding visitor trade, the hotel, retail, construction, real estate and financial industries of South Kohala and North Kona have experienced significant growth. Altogether, these hotel-related industries were estimated to have accounted for 49.8% of civilian employment in South Kohala, 45.6% in North Kohala and 64.2% in North Kona in 1980, based on U. S. Bureau of the Census data.

Also in 1980, employment and labor force participation in the Kohala and Kona districts were higher than for the county as a whole. Labor force participation among persons aged 16 years and older was 68.2% in the region, compared to the countywide rate of 61%, as shown in Exhibit II-D. Additionally, the Kohala and Kona districts' unemployment rate of 5.9% was lower than the 7% observed in the county as a whole in 1980. Since 1980 unemployment rates in the Kohala and Kona districts and in the county as a whole have increased. The average unemployment rate in 1985 for South Kohala, North Kona and South Kona was 6.8%. The unemployment rate for the county in December 1985 was 8.5%.

The occupational distributions shown in Exhibit II-D also reflect the emerging visitor industry base of West Hawaii's economy. Employment in the Kohala and Kona districts tends to be in technical, sales, administrative support and service occupations. Together, these sectors account for about 46% of the districts' employment. Managerial and professional occupations account for about 18.9% of the districts' employment, while agricultural-, production- and operations-related employment each represent between 10.5% and 13.1%.

PROJECT DESCRIPTION

The Resort would be located on the Kona coast of the Island of Hawaii. The following subsections present a brief description of the site location and the types of development proposed for the Resort.

KUKIO BEACH RESORT
District and County
Resident Population and Households
1970 and 1980

District	Resident population		Households 1980
	1970	1980	
North Kona	4,832	13,748	4,602
South Kona	4,004	5,914	1,853
North Kohala	3,326	3,249	1,022
South Kohala	2,310	4,607	1,483
Total region	14,472	27,518	8,960
County of Hawaii	63,468	92,053	29,237
			Compounded annual percentage growth
			11.0 %
			4.0
			(.2)
			7.1
			6.6 %
			3.8 %

Source: U. S. Bureau of the Census, Census of Population and Housing, 1980 and 1981.

KUKIO BEACH RESORT
Kona and Kohala Districts
Employment Characteristics
1980

	North Kona (tracts 215, 216)	South Kona (tracts 213, 219)	North Kohala (tract 218)	South Kohala (tracts 217)	Total Region
Labor force participation (persons 16 years and over)	72.2%	66.2%	60.2%	69.1%	N/A
Civilian unemployment rate	5.3%	5.7%	9.2%	6.3%	N/A
Employed persons by occupations:					
Managerial and professional	1,462	362	187	407	2,418
Technical, sales and administrative support	1,988	661	169	279	3,157
Service	1,486	460	421	335	2,722
Farming, forestry and fishing	491	520	175	277	1,463
Precision production, craft and repair	839	394	119	327	1,679
Operators, fabricators and laborers	687	263	159	233	1,344
Total	6,913	2,662	1,230	1,978	12,783
					100.0%
					10.5
					13.1
					11.5
					21.3
					24.7
					18.9%

Source: U. S. Bureau of the Census, 1980.

N/A Not applicable.

KUKIO BEACH RESORT
Median Age and Family Income
in the Kona and Kohala Districts

District	Median age (years)	Median family income(1)
North Kona	28.8	\$ 21,134
South Kona	30.1	20,068
North Kohala	32.0	15,719
South Kohala	29.5	17,923
County of Hawaii	29.4	19,132
State of Hawaii	28.3	22,750

(1) Income of households in 1979.

Source: U. S. Bureau of the Census, Census of Population and Housing, 1980, special tabulation by the Department of Planning and Economic Development, 1982.

Exhibit II-C

KUKIO BEACH RESORT
Median Age and Family Income
in the Kona and Kohala Districts

District	Median age (years)	Median family income(1)
North Kona	28.8	\$ 21,134
South Kona	30.1	20,068
North Kohala	32.0	15,719
South Kohala	29.5	17,923
County of Hawaii	29.4	19,132
State of Hawaii	28.3	22,750

(1) Income of households in 1979.

Source: U. S. Bureau of the Census, Census of Population and Housing, 1980, special tabulation by the Department of Planning and Economic Development, 1982.

KUKIO BEACH RESORT
Kona and Kohala Districts
Employment Characteristics
1980

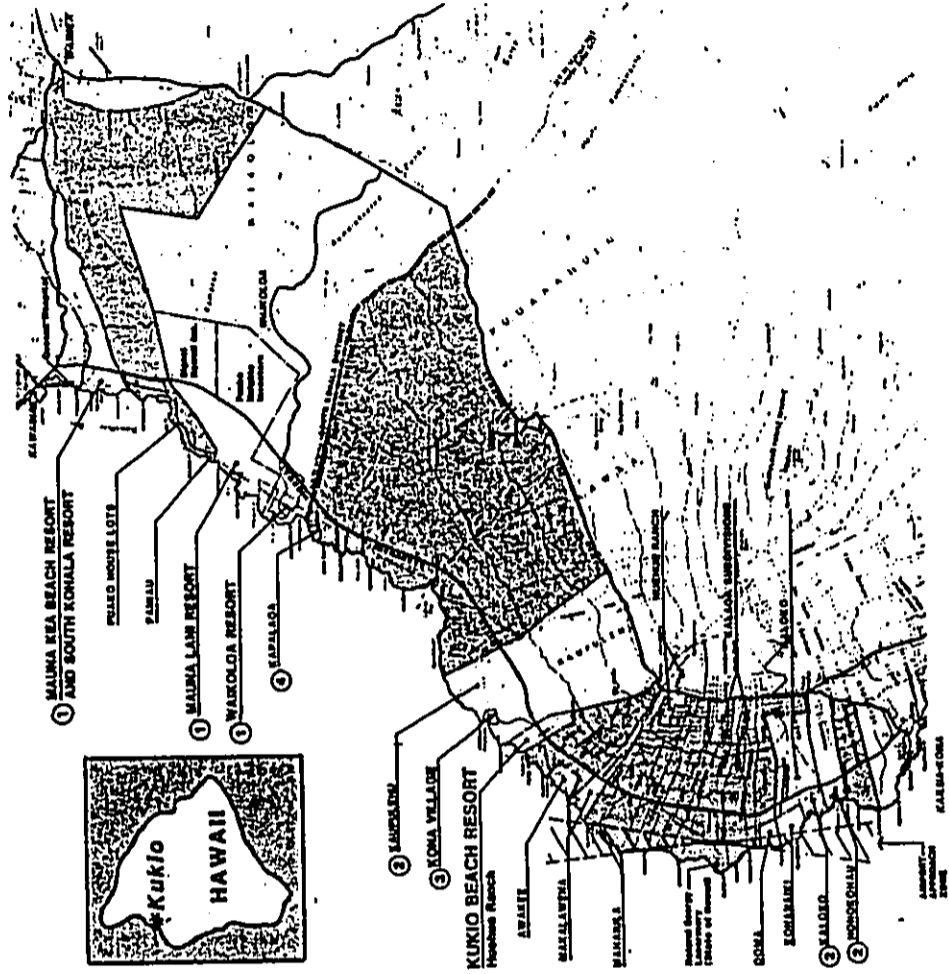
	North Kona (tracts 213, 216)	South Kona (tracts 213, 214)	North Kohala (tract 218)	South Kohala (tract 217)	Total region	
					Number	Percentage
Labor force participation (persons 16 years and over)	<u>72.2%</u>	<u>66.2%</u>	<u>60.2%</u>	<u>64.1%</u>	N/A	<u>68.2%</u>
Civilian unemployment rate	<u>5.3%</u>	<u>5.7%</u>	<u>9.2%</u>	<u>6.3%</u>	N/A	<u>5.9</u>
Employed persons by occupation:						
Managerial and professional	1,462	362	187	407	2,418	18.9%
Technical, sales and administrative support	1,948	661	169	379	3,157	24.7
Service	1,486	460	421	355	2,722	21.3
Farming, forestry and fishing	491	320	175	277	1,463	11.5
Precision production, craft and repair	839	394	119	327	1,679	13.1
Operators, fabricators and laborers	687	263	159	233	1,344	10.5
Total	<u>6,913</u>	<u>2,662</u>	<u>1,230</u>	<u>1,978</u>	<u>12,783</u>	<u>100.0%</u>

N/A Not applicable.

Source: U. S. Bureau of the Census, 1980.

Exhibit II-D

KUKIO BEACH RESORT
Resort Development Location



LEGEND

GENERAL PLAN DESIGNATION

1 Major Resort

2 Intermediate Resort

3 Resort District

4 Medium Density Residential

State Road

Prepared by Phillips Brandt Reddick & Assoc. (Hawaii), Inc.

II-3

Location

The 675 acres of the proposed Resort lie along the leeward coast of the island of Hawaii in the district of North Kona, as shown in Exhibit II-E. The property is approximately one mile south of the Kona Village Resort and six miles north of the Ke-ahole Airport. The three resorts of Waikoloa, Mauna Lani and Mauna Kea lie to the north of the proposed site, as also shown in Exhibit II-E. The weather at the project site is considered to be better than in South Kohala as the site is located to the south of the Kohala-Kona "wind line."

The site is bisected by Queen Kaahumanu Highway, as illustrated in Exhibit II-F. Access to the makai portion of the property is currently controlled by an entry pavilion to the neighboring Kona Village Resort. The mauka portion of the property is accessible via a road which leads to a cattle ranch operated by the Ranch.

Among other uses, the Ranch currently operates a trail-riding facility, a bird-hunting operation and a sports fitness camp on the upper mauka lands.

Summary of Proposed Developments

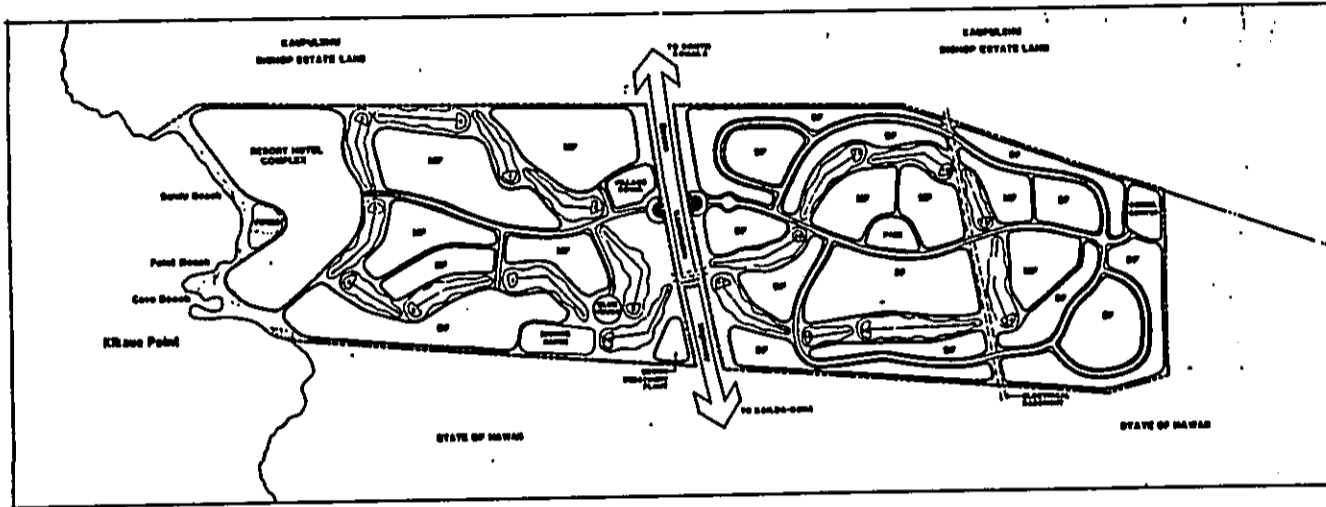
The project is envisioned to be a destination resort on the Kona coast of the Island of Hawaii. It would combine visitor and residential lodging with recreational and commercial facilities and activities in a master-planned development.

Exhibit II-F indicates the physical plan for the major types of development proposed for the Resort. The plan includes:

- **Hotel complex** - One or two hotels are proposed to be developed within the makai portion of the site. The hotel complex would feature a beach club, shoreline promenade, health club, tennis center and retention of the anchialine ponds located within this area.
- **Residential complex** - Multifamily condominium units and resort residential lots would be located throughout the mauka and makai portions of the property. This complex would be integrated with the Resort's open space and golf course.
- **Recreational complex** - An 18-hole golf course and driving range are proposed adjacent to the residential areas. Plans for the recreational area also include an equestrian center and community park.
- **Commercial complex** - A commercial complex providing convenience shopping and various support services for the resort community is proposed for development near to the highway.

A summary of the proposed development schedule for hotel, condominium and residential lot development is shown in the following table:

KUKIO BEACH RESORT
Proposed Development Plan
1991 to 2005



- LEGEND**
- SINGLE FAMILY RESIDENTIAL
 - MULTI FAMILY RESIDENTIAL
 - RESORT HOTEL COMPLEX
 - OPEN SPACE

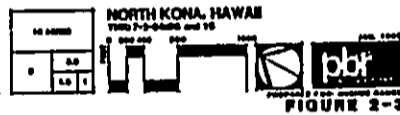
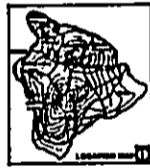


FIGURE 2-3

Exhibit II-F

Summary of Proposed Developments
at Kukio Beach Resort

	Total at completion
Hotel units	800 - 1,200
Condominium units	950 - 1,300
Residential lots:	
Mauika	350 - 475
Makai	150 - 150
Subtotal	500 - 625
Total units	2,250 - 3,125

KUKIO BEACH RESORT
Cumulative Residential and Visitor Unit
Facility Development

Facility type	At project completion(1)	
	Low	High
Hotel units	800	1,200
Condominium units	950	1,300
Single-family lots:		
Homes built(2)	222	268
Homes unbuilt	278	357
Total units	2,250	3,125
Commercial square feet	65,000	75,000

(1) Assumed to occur in year 2005; 100% of hotel and condominium units completed, about 40% single-family lots have homes constructed on them.

(2) Homes built on sold houselots. Construction on sold houselots projected at 5% within 4 years following lot sale, 30% between 5 and 9 years of lot sale, and 60% between 10 and 14 years.

Source: John Child & Company, Inc., January 1986.

III - ECONOMIC IMPACTS

This chapter describes the expected economic impacts of the Kukio Beach Resort in terms of visitor expenditures, employment, resident income, population and housing. These impacts are assessed for the proposed hotel, condominium, single-family and commercial developments.

VISITOR EXPENDITURES

The Resort will generate direct, indirect and induced visitor expenditures in Hawaii. Visitors to the Resort will make direct expenditures for food, accommodations, gift items and other goods and services. These expenditures will, in turn, require those establishments serving direct visitor demands to purchase goods and services from other establishments in the state. The latter expenditures are considered an indirect effect of the original visitor expenditures. Induced expenditures are those made by employees and proprietors with income derived from the establishments serving the direct and indirect visitor demands.

In order to estimate these expenditure effects, the analysis begins with a projection of the growth in visitor population expected to be driven by the proposed developments.

Visitor Population

Estimation of the average daily visitor population at the Resort is the basis for projecting the visitor expenditure impact of the Resort. The projected visitor population is based on the proposed facilities for visitor accommodations and on average occupancy and party size assumptions derived from a survey of comparable properties in the state.

The projected residential and visitor unit facility development at the Resort could amount to 2,250 to 3,125 units by project completion. The facility development consists of approximately 37% hotel units, 42% condominium units and 21% single-family lots, as presented in Exhibit III-A.

All of the hotel units and 65% of the condominiums units could be assumed to be used for visitor rentals. The projected occupancy rates were assumed to be 80% for the hotel units and 50% for the condominium units at project completion. Party size was estimated at 1.9 and 2.1 for the hotel and condominium units, respectively. Exhibit III-B presents the assumptions regarding resident/visitor distribution, occupancy rates and average party size for the planned facilities.

Thus, the projected visitor population could be expected to range from 1,560 to 2,260 persons by project completion, as presented in Exhibit III-C.

Direct Visitor Expenditures

Direct visitor expenditures are projected based on average daily 1985 expenditures of \$93 and \$86 for hotel and condominium guests, respectively. These expenditures were estimated based on 1983 Hawaii Visitors Bureau (HVB) expenditure data and consumer price index trends as reported by the U. S. Bureau of Labor Statistics. The direct visitor expenditures, in 1985 dollars, could amount to \$51 million to \$74 million per year at project completion, as shown in Exhibit III-D.

Exhibit III-C

KUKIO BEACH RESORT
Projected Visitor Population

Facility type	At project completion	
	Low	High
Hotel units	912	1,368
Condominium units	668	887
Total	1,580	2,255

Source: Peat, Marwick, Mitchell & Co.

Exhibit III-B

KUKIO BEACH RESORT
Assumptions for On-Resort Population Projections

Facility and occupational types	Percentage of distribution		Average party size(2)
	(1)	Occupancy	
Hotel units	100%	80%	1.9
Condominium units:			
Full-time residents	15	95	2.5
Part-time residents	20	25	2.5
Visitors	65	50	2.1
Single-family units:			
Full-time units	25	95	2.8
Part-time units	75	25	2.8

(1) Distribution of uses within facility type.

(2) Occupied units only.

Sources: Based on interviews with resort operators and brokers at similar first-class resort developments and Hawaii Visitors Bureau, Profiles: The Resort Condominium Market and Profiles: The Resort Hotel Market, 1987.

Indirect and Induced Visitor Expenditures

Based on multipliers derived from the most recent information available from the Department of Planning and Economic Development's state Input/Output Model, the projected direct visitor expenditures could be expected to generate indirect and induced expenditures amounting to \$48 million to \$69 million per year at project completion, as also shown in Exhibit III-D.

Including direct, indirect and induced effects, expenditures in the state attributable to the Resort visitors are projected to total \$99 million to \$143 million per year at project completion, in 1985 dollars.

EMPLOYMENT IMPACT

Planned developments at the Resort will generate short-term employment during the construction of new facilities and long-term employment in the operation and support of those facilities. Employment effects may also be classified as being direct, indirect or induced. Direct effects are those directly supported by visitor expenditures, such as the employment of hotels and other establishments that serve visitors. Direct employment would generally be located in the county of Hawaii both at and outside of the Resort.

Indirect effects occur when directly affected establishments purchase goods or services from other businesses in order to fill new visitor demand. Induced effects are those supported throughout the state's economy when employees or proprietors directly or indirectly dependent on visitor expenditures spend their earnings.

Direct Construction Employment

Direct construction employment is that which would be supported directly by the construction of the various facilities. Such employment would include the on-site laborers, operatives and craftsmen, as well as the professional, managerial, sales and clerical workers whose usual places of employment may be elsewhere on the island or in the state.

Direct demand for construction employees is estimated based on the employment experiences of comparable resort-related facility construction projects in the state. Direct construction employment demand may be expected to amount to about 2,800 to 3,600 person-years over the entire construction period to project completion, as shown in Exhibit III-E.

Indirect and Induced Construction Employment

The direct employment of construction workers at Resort projects will stimulate additional purchases of goods and services on the island of Hawaii and elsewhere in the state. In its most recent (1982) revisions to a model of the construction industry in Hawaii, the DPED calculated that 2.4 full-time jobs are created in the state for every full-time job in the building construction industry. This multiplier is used to project the indirect and induced employment to be supported by the direct construction employment.

A 1975 study of Kauai's economy suggested a regional capture rate of total indirect and induced employment amounting to about 70% of direct employment. Although the island of Hawaii's future economy may be expected to be more developed than was Kauai's economy in 1975, this figure is assumed to be appropriate due to the number of

Exhibit III-D

KUKIO BEACH RESORT

Projected Total Annual Visitor Expenditures

(In 1985 dollars; millions)(1)

Expenditure type and place of stay	At project completion	
	Low	High
Direct:		
Hotel(2)	\$ 31.0	46.4
Condominium(3)	20.4	27.9
Subtotal	51.4	74.3
Indirect and Induced	47.7	69.1
Total(4)	\$ 99.1	143.4

(1) 1983 Hawaii Visitors Bureau expenditure data updated to 1985 dollars based on consumer price index data reported in the U. S. Bureau of Labor Statistics.

(2) Average daily expenditures estimated at \$93 in 1985 dollars.

(3) Average daily expenditures estimated at \$86 in 1985 dollars.

(4) Projected at \$1.93 per \$1.00 direct expenditure. Based on unpublished 1984 data from the Department of Planning and Economic Development, personal communication.

Sources: Hawaii Visitors Bureau, 1984 and 1983 Visitor Expenditure Survey; First Hawaiian Bank-Research Department, November/December 1985, Economic Indicators; and U. S. Bureau of Labor Statistics, 1984.

Exhibit III-E

construction workers who are expected to come from off-island. (The actual share of construction employment going to off-island workers will depend on the timing of other major projects planned throughout the state.)

Exhibit III-F applies these findings to project the indirect and induced employment effects of construction for the total project. Indirect and induced construction employment effects are expected to provide employment equivalent to 3,900 to 5,100 person-years for the entire project as shown in the exhibit. The county could be expected to capture between 600 and 700 person-years of direct and induced construction employment effects for the entire project.

Direct Operational Employment

The majority of direct operational employment at the Resort would occur in the two proposed hotels because of their relatively large size and their expected first-class levels of service. First-class resort hotels in Hawaii are found to employ between 0.8 and 1.0 full-time equivalent direct employees per hotel unit. The overall direct hotel operational employment at the Resort is projected at 0.9 full-time equivalent employees per unit.

Thus, the Resort could be expected to have generated about 1,540 to 2,080 full-time equivalent direct operational positions at project completion, as shown in Exhibit III-G.

Indirect and Induced Operational Employment

The direct operational positions would also generate additional employment elsewhere in the state. Recent studies on the economic impacts of tourism by the DPED indicate that each full-time hotel, resort residential and resort administrative employee supports 0.9 indirect and induced full-time equivalent positions elsewhere in the state. In addition, the factor for resort retail and restaurant positions was determined to be about 0.6 indirect and induced positions for each direct position. Thus, indirect and induced operational employment could be expected to amount to about 1,290 to 1,760 full-time equivalent positions at project completion, as shown in Exhibit III-H.

Total Operational Employment

Total direct, indirect and induced operational employment is estimated to represent between 2,830 and 3,840 positions at project completion, as also shown in Exhibit III-H.

RESIDENT INCOME

The Resort could be expected to have a significant impact on personal and household income for residents of the island and state. The Resort would generate resident income as employee wages, salaries and fringe benefits and as income to proprietors.

Personal Income

Personal income is defined as the wages and salaries paid to the direct construction and operational employees of the Resort. Personal income is projected on the basis of average industry wages and salaries for the various types of employment anticipated and on the projected future employment demands.

Personal income paid to Hawaii residents may be expected to range between \$21.2 million and \$29.3 million per year at project completion, in 1985 dollars, as shown in Exhibit III-I.

KUKIO BEACH RESORT
Projected Direct Employment for Facility Construction
(Person-years)

Facility type	Total project	
	Low	High
Hotel units(1)	800	1,200
Condominiums(2)	998	1,365
Single-family lots		
Lot development(3)	123	150
Home construction(4)	444	535
Commercial(5)	39	45
Infrastructure(6)	100	100
Recreational amenities(7)	250	230
Other(8)	2,754	3,645
Total person-years		

- (1) Employment demand calculated at 0.5 full-time equivalent jobs per year per unit and an average two-year construction period per hotel.
- (2) Demand calculated at 0.7 full-time equivalent jobs per year per unit and an average 18-month construction period per project.
- (3) Demand calculated at 0.02 full-time equivalent jobs per year per lot and an average one-year construction period per lot.
- (4) Demand calculated at 2.0 full-time equivalent jobs per year per home and an average one-year construction period per home.
- (5) Demand calculated at 0.6 person-years per 1,000 square foot gross leasable space.
- (6) Estimates based on construction cost estimates provided by Phillips, Brandt, Reddick & Associates.
- (7) Includes an 18-hole golf course, clubhouse, beach club, tennis center and equestrian center.
- (8) Includes sewage treatment, roads, water lines, electrical facilities, reservoir and drainage wells.

Exhibit III-G

KUKIO BEACH RESORT
Projected Direct Employment
for Kukio Beach Resort Operations

Facility type	At project completion	
	Low	High
Hotel(1)	720	1,080
Resort residential(2)	420	538
Commercial(3)	325	375
Resort administration(4)	75	85
Total operational employment	1,540	2,078

- (1) Projected at 0.9 full-time equivalent jobs per hotel unit.
- (2) Projected at 0.2 full-time equivalent jobs per condominium unit and 0.3 full-time equivalent jobs per sold single-family lot.
- (3) Projected at 1.0 job per 200 gross leasable square feet of commercial space.
- (4) Estimated to follow growth of facility development. This category includes miscellaneous resort employment such as resort administration, property development and sales, accounting, maintenance of golf course and other grounds-keeping and infrastructural facilities.

Exhibit III-F

KUKIO BEACH RESORT
Projected Indirect and Induced Employment
for Facility Construction
 (Total person-years)

Type of employment	Total project	
	Low	High
Total employment(1)	6,610	8,748
Less direct employment(2)	2,754	3,645
Indirect and induced	3,856	5,103
Indirect and induced:		
On island(3)	551	729
Elsewhere in state	3,305	4,374

- (1) Direct employment multiplied by 2.4. State of Hawaii, Department of Planning and Economic Development, Hawaii Construction Model: Further Developments, 1982.
- (2) From Exhibit III-E.
- (3) Direct employment multiplied by 0.2. Anderson, et al., Kauai Socioeconomic Profile, 1975.

KUKIO BEACH RESORT

Projected Annual Personal and Household
Income From Direct Employment
(In 1985 dollars; thousands)(1)

Type of employment	At project completion	
	Low	High
Construction(2)	\$ 3,578	5,436
Hotel and resort(3)	14,317	20,064
Commercial(4)	3,268	3,771
Total personal income	\$ 21,163	29,271
Total household income(5)	\$ 32,326	46,801

(1) 1984 Department of Labor and Industrial Relations data updated to 1985 dollars based on changes in the average wages as reported by Department of Labor and Industrial Relations, Unemployment Insurance Division.

(2) Average annual wage of \$22,581, reflecting 30% workers from off-island and an average income of \$26,786 for construction workers throughout the State and \$20,723 for construction workers in the county of Hawaii (Department of Labor and Industrial Relations, 1985, pages 2 and 10).

(3) Excluding tips. Hotel, resort residential and resort administration employment wages projected at the county of Hawaii hotel industry average of \$11,780 (Department of Labor and Industrial Relations, 1985, page 10).

(4) Commercial sector wages projected at \$10,056, based on average wages in retail industries on the island, industry classifications (Department of Labor and Industrial Relations, 1985, page 10; Department of Planning and Economic Development, 1983, Page 215).

(5) Based on Department of Planning and Economic Development estimate of \$0.63 total household income for each \$1.00 spent by visitors to the state in 1983.

Sources: Department of Labor and Industrial Relations, 1985. Employment and Payrolls in Hawaii: 1984; and Department of Labor and Industrial Relations, Unemployment Insurance Division, 1985 in Pacific Business News, January 6, 1986.

KUKIO BEACH RESORT

Projected Direct, Indirect and Induced Employment
for Resort Operations

Type of employment	At project completion	
	Low	High
Direct(1)	1,380	2,078
Indirect and Induced: Hotel and resort(2)	1,094	1,533
Commercial(3)	193	225
Subtotal	1,289	1,758
Total	2,829	3,836

(1) As shown in Exhibit III-C.

(2) Related to direct employment at the hotels, condominium units and in resort administrative positions. Estimated as 0.9 indirect and induced employees per direct employees. Department of Planning and Economic Development, 1983, "The Economic Impact of Tourism in Hawaii: 1970-1980."

(3) Estimated as 0.6 indirect and induced employees per direct employees. Ibid.

Household Income

The dispersion of indirect and induced employment effects among many industries make it difficult to project the total income benefits of the Resort's development. However, estimation of total household income effects based on visitor expenditure levels permits a perspective on the statewide income benefits that would result from the Resort's further development.

Total household income generated by visitor expenditures at the Resort would include the fringe benefits and proprietor's income paid by establishments that sell goods and services directly to visitors as well as the wages and salaries noted above. In addition, household income includes income generated through the multiplier effects of indirect and induced visitor expenditures.

The DPED reports that the multiplier effects of visitor expenditures throughout the community have declined in recent years, but that each \$1.00 spent by visitors in 1983 is estimated to have generated \$0.63 in total income to households in the state. Assuming a similar multiplier effect for the expected expenditures of visitors to the Resort, it is projected that the Resort could contribute between \$32.3 million and \$46.8 million per year in total household income in the state at project completion, in 1985 dollars, as also shown in Exhibit III-1.

PROJECTED POPULATION IMPACT

The development of facilities will increase population at the Resort and elsewhere on the island. On any given day there will be visitors staying at the Resort's hotels and in residential units that have been put in visitor rental pools. There will also be persons residing during most or parts of each year at multi- or single-family properties at the Resort. In addition, operational and construction employees attracted from off-island will add to the population of the region. This section discusses the on-resort and employee population impacts of the Resort's development.

Off-Resort Population Impact

The Kukio Beach Resort will impact the county's population by attracting employees for the Resort's construction and operation from off-island. Additional population growth will come from household members who accompany the in-migrant operational employees. Based on projections of employment at other resorts, it was assumed that 20% of operational employment would be filled by in-migrants at project completion.

Based on past experience, between 20% and 50% of direct construction employees may be expected to come from off-island with the actual amount related to the amount and scheduling of other major construction projects in the state. For purposes of projection, about 30% of construction workers at the Resort were assumed to come from off-island labor pools.

Operational supervisory and managerial employees at the Resort were assumed to have two additional household members, while other operational employees were assumed to have one additional household member. Construction workers temporarily resident on the island are assumed to be accompanied by an average of one-half an additional household member. Based on the above assumptions, total off-resort population impact is projected to range from about 740 to 1,010 at project completion, as shown in Exhibit III-3.

KUKIO BEACH RESORT
Projected Off-Resort Population Impact
 (Average daily population)

In-migrant type	At project completion	
	Low	High
Managerial and supervisory: Operational employees(1) Other household members(2)	36 <u>112</u>	75 <u>150</u>
Subtotal	<u>168</u>	<u>225</u>
Other:		
Operational employees(3)	252	340
Construction employees(4)	48	72
Other household members(5)	<u>276</u>	<u>376</u>
Subtotal	<u>376</u>	<u>788</u>
Total	<u>744</u>	<u>1,013</u>

(1) In-migrants projected to account for 20% of operational employment at project completion based on projections at other resorts. Managerial and supervisory positions assumed to be 11% of total operational employees of which 33% are filled from off-island.

(2) Projected at two additional persons per household.

(3) Remainder of off-island operational employee in-migrants.

(4) Assuming 30% of workers come from off-island.

(5) Projected at one additional person per operational employee and one-half additional person per construction employee.

KUKIO BEACH RESORT
 Summary of On- and Off-Resort
 Population Impact
 (Average daily population)

Population category	At project completion	
	Low	High
On-resort:		
Visitor(1)	1,560	2,255
Resident	721	944
Subtotal	2,281	3,199
Off-resort(2):		
Operational employees	308	415
Construction employees	48	72
Other household members	388	526
Subtotal	744	1,013
Total population impact	3,025	4,212

(1) As shown in Exhibit III-C.
 (2) As shown in Exhibit III-J.

III-5

On-Resort Population Impact

On-resort population is comprised of visitors staying at the hotels and condominiums and residents in condominiums and single-family residences at the Resort. Average daily visitor population was projected to be about 1,560 to 2,260 at project completion, as previously shown in Exhibit III-C. On-resort resident population was projected using the assumptions concerning condominium and single-family home development at the Resort shown previously in Exhibit III-A and assumptions about full- and part-time residential usage of the housing units found previously in Exhibit III-B. On-resort resident population was projected to be between 720 to 940 at project completion, as shown in Exhibit III-K. Resident population would represent about 20% of on-resort population by 1995 and about 30% of on-resort population by 2005.

Total Projected Population Impact

In summary, the facility development at the Resort is projected to generate population growth at the Resort by visitors and residents at the Resort's facilities, and in the community by the in-migrant operational employees and their accompanying household members. Total projected population impact is projected to range from about 3,030 to 4,210 persons at project completion, as also shown in Exhibit III-K.

EMPLOYEE HOUSING REQUIREMENTS

This section presents the analysis of the additional housing required to support the direct construction and operational employment expected to be generated at the Resort.

Construction Employees

Construction employment is temporary and therefore does not generate the long-term housing demands that are associated with operational employment. With the generous housing subsidy allowances typically paid to construction workers, the demand for residential housing by construction employees is expected to be absorbed by units available in the short-term rental market of the Kona region. This approach has been found to be the most satisfactory solution to meeting construction employee housing needs at other major development projects in the Kona and Kohala regions.

Operational Employees

Exhibit III-L shows the anticipated labor market sources of the Resort's direct operational employees. The majority are expected to come from "available" sources of labor such as unemployed and underemployed persons and labor market entrants.

In Exhibit III-M, figures from Exhibit III-L are used to project the number of employees that may be expected to demand new housing. The labor supply components are discussed below:

- Off-island labor - The largest segment is expected to be in-migrants from off-island, all of whom would require additional housing.
- Available labor - Those hired from the "available" labor pool of the island may form new households in conjunction with their new employment, especially those who are recent graduates. It is projected that about 15% of the "available" labor component may be expected to seek housing after becoming employed at the Resort.

Exhibit III-M

KUKIO BEACH RESORT
 Direct Operational Employees Projected
 to Demand Additional Housing

Labor supply component	At project completion	
	Low	High
On-island labor	74	100
Available labor (1)	-	-
Regional turnover(2)	31	42
Other turnover(3)	56	75
Off-island labor	252	340
Managerial(4)		
Other(5)		
Total	413	537

- (1) New household formation projected at 15%.
- (2) Assumed to be already settled in area or accustomed to commute.
- (3) About 10% of transfers projected to generate additional housing demand on island.
- (4) About 11% of operational employees assumed to be in a managerial and supervisory position of which 33% of managerial and supervisory positions assumed to be filled from off-island.
- (5) Remainder of off-island in-migrants.

Exhibit III-L

KUKIO BEACH RESORT
 Projected Mix of Operational Employees

Labor supply component	At project completion	
	Low	High
On-island sources:	493	665
Available labor(1)	431	583
Regional turnover(2)	308	416
Other turnover(3)	308	416
Off-island sources - In-migrant(4)		
Total operational employment	1,540	2,078

- (1) Unemployed and underemployed persons on island and labor market entrants. Projected to account for 40% of on-island labor component.
- (2) Persons attracted from other work in North Kona. Projected to account for 35% of on-island labor component.
- (3) Persons attracted from other work elsewhere on the island. Projected to account for 25% of on-island labor component.
- (4) Based on projections of employment at other area resorts, projected to account for 20% at project completion.

• **Regional turnover** - Persons formerly employed elsewhere in Kona are presumed to be already settled in the area, or to be accustomed to commuting to work. Some of this labor segment may have taken new employment in order to be closer to their place of residence. Hence, no additional housing demand is projected for the regional turnover group.

• **Other turnover** - Those who had previously worked elsewhere on the island may be expected to generate some in-migration into the North Kona area. The homes that movers vacate are likely to be within commuting distance of Kona and hence could serve as potential housing for employees hired to refill the jobs that are vacated. However, 10% of this labor supply component may be expected to create additional demands for housing in the North Kona region as a result of employment at the Resort.

The demand for additional housing on the island of Hawaii is projected to be less than the number of employees requiring housing because households could include more than one Resort employee. The projected demand for additional housing units is shown by class of worker in Exhibit III-N. About one-fourth of the off-island in-migrants that were shown in Exhibit III-L could be expected to be experienced personnel brought to fill managerial or specialty positions. Such persons may be expected to be principally heads of households; thus, each managerial level in-migrant is projected to generate demand for one additional home. On the other hand, experience has shown that many service employees share housing. Thus nonmanagerial and nonspecialty employees in need of new housing are projected to generate a housing unit demand at a ratio of 1.5 employees per additional housing unit.

The cumulative demand for additional housing directly attributable to the Resort's expansion is projected to amount to about 290 to 400 units at project completion, as shown in Exhibit III-N. Between 19% and 23% of this unit demand would occur among persons in managerial or specialty positions with a relatively greater ability to afford housing. The remainder of the projected additional housing demand, about 240 to 320 units at project completion, would come from the Resort's nonmanagerial and nonspecialty employees who would have lower incomes and a lesser ability to afford housing.

Data on the household incomes of hotel employees from the Hawaii State Department of Health's Health Surveillance Survey enables estimation of income distribution of the households projected to demand new housing. The survey suggests that about 40% of Resort service-related household incomes fell below \$27,000 per year and about 50% fell below \$30,000 per year, in 1985 dollars. A household earning \$27,000 per year would be able to afford a housing unit costing \$73,000 assuming an 11% interest rate, 30-year amortization period, 10% down payment and mortgage payments equal to 28% of gross monthly income. A household income of \$30,000 per year would enable purchase of a housing unit costing about \$82,000 under the same financing assumptions.

A survey of the pricing structure of a single-family home for sale in the North Kona district taken from the Hawaii Island - Kona Board of Realtors Multiple Listing Service, January 1986, shows a limited availability of single-family homes priced at or below \$80,000. Only about 8% of total single-family listings were priced at \$80,000 or below. Assuming employees with annual household incomes of \$27,000 or less would not be able to find affordable housing and employees with annual household incomes between \$27,000 and \$30,000 would have difficulty in finding affordable housing, about 100 to 160 affordable housing units would be demanded in the county by project completion, as shown in Exhibit III-O.

KUKIO BEACH RESORT

Projected Additional Housing Unit Demand for Direct Operational Employees on the Island of Hawaii

Class of worker	At project completion	
	Low	High
Managerial or specialty(1)	56	75
Other(2)	238	321
Total	294	396

(1) Projected at 1.0 hotel employee per household.
 (2) Projected at 1.5 hotel employees per household.

KUKIO BEACH RESORT

Projected Affordable Housing Units Needed

	At project completion	
	Low	High
Additional housing unit demand by non-managerial and nonspecialty employees(1)	238	321
Share in affordable housing range:		
At 40%	95	128
At 50%	119	161

(1) From Exhibit III-N.

IV - FISCAL IMPACTS

The fiscal impacts of the Resort's proposed developments may be evaluated by comparing the tax revenues and expenditures that could be expected to be incurred. This chapter describes the expected fiscal impacts of the proposed developments in terms of additional revenues and expenditures to the county of Hawaii and the state of Hawaii.

REVENUES

Development at the Kukio Beach Resort would bring additional tax revenues to the county and state. County revenues would be principally in the form of real property taxes on the new facilities. Revenues to the state would be composed principally of general and specific excise taxes and personal income taxes. The sections following project the additional revenues that could be generated for the county and state governments as a result of the Resort's development.

County

Real property in the county is currently taxed at \$10.00 per \$1,000 of assessed value for land and \$8.50 per \$1,000 of assessed value for buildings, for all uses with the exception of improved residential land which is taxed at \$8.50 per \$1,000 assessed value.

Based on these rates, the hotel, condominium, single-family, commercial and golf course facilities envisioned at the Resort could be expected to generate between \$4.0 million and \$5.5 million per year at project completion, in 1985 dollars, as shown in Exhibit IV-A. In the long run, the majority of these revenues would be attributable to the property value of the hotels and condominium units.

State

Additional tax revenues to the state would be generated by the 4% general excise tax on direct, indirect and induced expenditures by the Resort's visitors and also on expenditures by the Resort's part- and full-time residents. In addition, the Resort's full-time residents would pay individual income taxes and other state taxes such as liquor, tobacco, fuel, inheritance, estate and conveyances taxes. Based on state tax receipts in fiscal 1984, it is estimated that the individual income and other taxes mentioned above amounted to \$552 per capita.

Total tax revenues to the state are expected to range between \$4.7 million and \$6.6 million per year at project completion, in 1985 dollars, as shown in Exhibit IV-B.

EXPENDITURES

The visitors to the Resort and the part- and full-time residents that could be expected to live at its condominium and single-family units would also necessitate additional expenditures of public resources. County expenditures on behalf of residents would also increase in proportion to the number of employees coming from off-island to work in the operations of the new Resort.

Exhibit IV-A

KUKIO BEACH RESORT

Projected Annual Real Property Tax Revenues
Attributable to Development at Kukio Beach Resort
(In 1985 dollars; millions)

Source of property tax revenue	At project completion	
	Low	High
Hotel units(1)	\$ 1.04	1.57
Multifamily units(2)	1.92	2.63
Single-family units(3)	.57	.68
Single-family lots(4)	.39	.50
Commercial space(5)	.04	.04
Golf course(6)	.01	.01
Total revenues	\$ 3.97	5.43

- (1) Based on estimated value of \$145,000 per room and a combined land and building tax rate of \$9.00 per \$1,000 assessed value.
- (2) Based on estimated value of \$225,000 per unit and a combined land and building tax rate of \$9.00 per \$1,000 assessed value.
- (3) Based on estimated value of \$300,000 per unit and a combined land and building tax rate of \$8.50 per \$1,000 assessed value.
- (4) Based on estimated value of \$165,000 per lot and a tax rate of \$8.50 per \$1,000 assessed value.
- (5) Based on estimated value of \$60.00 per net leasable square foot and a combined land and building tax rate of \$9.00 per \$1,000 assessed value.
- (6) Based on estimated assessed value of \$1,500 per acre and a tax rate of \$10.00 per \$1,000 assessed value, and clubhouse valued at \$500,000 and a tax rate of \$8.50 per \$1,000 assessed valuation.

Sources: Phillips, Brandt, Reddick & Associates, Inc., "Kukio Beach Resort Cost Estimates," January 16, 1986.
Tax Foundation of Hawaii, Government in Hawaii, A Handbook of Financial Statistics, 1985. John Child & Company, Inc., "Hotel, Condominium and Single-Family Market Assessment for the Proposed Kukio Beach Resort," January 1986.

Exhibit IV-B

KUKIO BEACH RESORT

Projected Annual Revenues to the State
Government Attributable to Development at
Kukio Beach Resort
(In 1985 dollars; millions)

Revenue source	At project completion	
	Low	High
Visitors - general excise tax(1)	\$ 4.0	5.7
On-resort residents: General excise tax(2)	.4	.5
Individual income and other taxes(3)	.3	.4
Total	\$ 4.7	6.6

- (1) Based on 4% of direct, indirect and induced visitor expenditures.
- (2) Based on 4% of selected household budget items. Household incomes assumed to be \$60,000 for full-time residents and \$150,000 for part-time residents based on a survey of resort developers and real estate brokers at other resorts by Peat, Marwick, Mitchell & Co.
- (3) Estimated at \$552 per year per on-resort full-time resident.

Sources: Department of Planning and Economic Development, The State of Hawaii Data Book, 1986, 1985. Tax Foundation of Hawaii, Government in Hawaii, A Handbook of Financial Statistics, 1985.

Visitors are seen to necessitate public costs in terms of (1) public safety (such as increased needs for police and fire protection), (2) development and upkeep of highways, recreational facilities and natural resources, (3) health and sanitation measures and (4) cash capital improvements. Residents necessitate public costs in all the aforementioned areas, and also in education, retirement and pension funds, public welfare and other government functions.

County

The various county government expenditures for fiscal year 1984 were analyzed with respect to the relevant service population for each government function. This analysis indicates that county government expenditures in 1984 totaled about \$40 per resident and \$340 per visitor, as shown in Exhibit IV-C.

Based on these county government outlays, public expenditures by the county on the behalf of the Resort's residents or visitors and employee in-migrants to the county could be expected to total about \$1.3 million to \$1.8 million per year at project completion, in 1985 dollars, as shown in Exhibit IV-D.

State

A similar analysis of state government expenditures and the relevant populations for the various services indicates that expenditures in 1984 totaled about \$2,000 per resident and \$210 per visitor, as shown in Exhibit IV-E.

Based on this analysis, state public expenditures on behalf of residents or visitors to the Resort could be expected to be slightly lower than county expenditures initially. However, the state expenditures would be expected to exceed county expenditures as Resort residents become a greater portion of the additional population as the Resort matures. State government expenditures are projected to total between \$1.7 million and \$2.4 million per year at project completion, as shown in Exhibit IV-F.

REVENUE/EXPENDITURE ANALYSIS

The net fiscal impacts of the Resort's development to the county and state are estimated by comparison of the projected revenues and expenditures.

County

Comparison of projected public revenues and expenditures indicates that the county may expect to net about \$2.7 million to \$3.6 million per year at project completion, in 1985 dollars, as shown in Exhibit IV-G. The analysis also indicates that additional county revenues generated by the Resort would be 3.0 to 3.1 times the expenditures incurred by the county at project completion, as also shown in the exhibit.

State

Net fiscal benefits to the state are projected to range from \$3.0 million to \$4.2 million per year at project completion, in 1985 dollars, as shown in Exhibit IV-H. The analysis also indicates that additional state revenues generated by the Resort would be about 2.8 times the expenditures incurred at project completion, as also shown in the exhibit.

KUKIO BEACH RESORT
County of Hawaii Per Capita Government Expenditures
1984

Function	Expenditures (000\$K)	Service popula- tion(2)	1984 annual expenditure Per resident	Per visitor
General government	\$ 8,157	106,800	\$ 76.38	-
Public safety	22,701	114,600	198.09	198.09
Highways	5,214	114,600	45.50	45.50
Health and sanitation	2,922	114,600	25.50	25.50
Public welfare	2,406	106,800	22.53	-
Education	281	106,800	2.63	-
Recreation	5,300	114,600	46.25	46.25
Interest	3,563	106,800	-	-
Bond redemption	1,177	106,800	-	-
Retirement and pension	7,485	106,800	70.08	-
Mass transit	1,392	106,800	12.57	-
Cash capital improvements	2,891	114,600	25.23	25.23
Miscellaneous	1,442	106,800	13.50	-
Total	\$ 64,881		538.26	340.57

(1) County operating expenditures for fiscal year ended June 30, 1984 (Tax Foundation of Hawaii, 1985, Government in Hawaii, page 47).

(2) Resident or de facto population estimates for the county as of January 1, 1984.

Exhibit IV-E

KUKIO BEACH RESORT
State of Hawaii Per Capita Government Expenditures
1984

Function	Expenditures (000)(1)	Service population(2)	1984 annual expenditure Per resident	Per visitor
General government	\$ 128,131	1,028,500	\$ 124.58	-
Public safety	73,344	1,127,700	65.04	65.04
Highways	49,081	1,127,700	43.49	43.49
Natural resources	17,172	1,127,700	15.23	15.23
Health and sanitation	72,631	1,127,700	64.41	64.41
Hospitals and institutions	114,557	1,028,500	111.38	-
Public welfare	328,400	1,028,500	319.30	-
Education	696,238	1,028,500	676.96	-
Recreation	13,827	1,127,700	12.26	12.26
Utilities and other enterprises	76,990	1,028,500	74.86	-
Debt service	213,293	1,028,500	207.38	-
Retirement and pension	126,006	1,028,500	122.51	-
Employee health and hospital insurance	24,856	1,028,500	24.17	-
Unemployment compensation	78,278	1,028,500	76.11	-
Grants-in-aid to counties	18,173	1,028,500	17.67	-
Urban redevelopment and housing	11,618	1,028,500	11.30	-
Cash capital improvements	9,987	1,127,700	8.86	8.86
Miscellaneous	25,111	1,028,500	24.42	-
Total	\$ 2,077,673		1,999.93	209.29

(1) State operating expenditures for fiscal year ended June 30, 1984 (Tax Foundation of Hawaii, 1985, Government in Hawaii, page 43).

(2) Resident or de facto population estimates for the state as of January 1, 1984.

Exhibit IV-D

KUKIO BEACH RESORT
Projected Annual County Government Expenditures
Attributable to Development at
Kukio Beach Resort
(In 1985 dollars; millions)

Population and expenditure type	At project completion	
	Low	High
Populations:		
On-resort visitors	1,560	2,255
On-resort residents	721	944
Off-resort residents	744	1,013
Total population	3,025	4,212
Expenditures:		
On-resort visitors(1)	\$.5	.8
On-resort residents(2)	.4	.5
Off-resort residents(2)	.1	.5
Total expenditures	\$ 1.0	1.8

(1) Visitors estimated to require \$340 per capita in county government expenditures.

(2) Residents estimated to require \$540 per capita in county government expenditures.

Exhibit IV-F

KUKIO BEACH RESORT

Projected Annual State Expenditures Attributable
to Development at Kukio Beach Resort

(In 1985 dollars; millions)

Population and expenditure type	At project completion	
	Low	High
Population:		
On-resort visitors	1,560	2,255
On-resort residents	721	944
Total	<u>2,281</u>	<u>3,199</u>
Expenditures:		
On-resort visitors(1)	\$.3	.5
On-resort residents(2)	<u>1.4</u>	<u>1.9</u>
Total expenditures	<u>\$ 1.7</u>	<u>2.4</u>

(1) Visitors estimated to require \$210 per capita in state government expenditures.

(2) Residents estimated to require \$2,000 per capita in state government expenditures.

Exhibit IV-G

KUKIO BEACH RESORT

County Government Annual Revenue
and Expenditure Comparison

(In 1985 dollars; millions)

	At project completion	
	Low	High
New revenues	\$ 4.0	5.4
New expenditures	<u>1.3</u>	<u>1.8</u>
Net additional revenues	<u>\$ 2.7</u>	<u>3.6</u>
Revenue/expenditure ratio(1)	<u>3.1</u>	<u>3.0</u>

(1) New revenues divided by new expenditures.

Exhibit IV-H

KUKIO BEACH RESORT

**State Government Annual Revenue
and Expenditure Comparison
(In 1985 dollars; millions)**

	At project completion	
	<u>Low</u>	<u>High</u>
New revenues	\$ 4.7	6.6
New expenditures	<u>1.7</u>	<u>2.4</u>
Net additional revenues	\$ <u>3.0</u>	<u>4.2</u>
Revenue/expenditure ratio(1)	<u>2.8</u>	<u>2.8</u>

(1) New revenues divided by new expenditures.

APPENDIX F:
ASSESSMENT OF POTENTIAL QUALITATIVE SOCIAL IMPACTS

ASSESSMENT OF POTENTIAL QUALITATIVE SOCIAL IMPACTS
OF THE PROPOSED KUKIO BEACH RESORT PROJECT

North Kona, Hawaii

Presented to:

Phillips Brandt Reddick and Associates

Presented by:

Community Resources, Inc.
Honolulu, Hawaii

April 1986

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I. INTRODUCTION

A. Purpose

The purpose of this report is to provide a discussion and analysis of potential qualitative social impacts of the proposed project -- particularly human interaction, lifestyle issues, and family or individual well-being. More quantitative social concerns -- such as estimated numbers of new jobs, population growth, and housing need -- are outside the scope of this report but have been addressed in the Economic and Fiscal Impact Assessment for the Proposed Kukio Beach Resort (Peat, Marwick, Mitchell & Co., 1986).

B. Methods and Assumptions

Methods consisted of reference to secondary sources, as well as limited original research. The latter consisted primarily of key informant interviews conducted by Community Resources personnel with various social agency and resort spokesmen (see Appendix A for a complete listing).

Much of the report is based on our professional knowledge both of generic social impacts from rural Hawaii resort development and also of the West Hawaii social setting. This knowledge has been developed through four published resort-related social impact reports (for the Waikoloa Hyatt in South Kohala, the Mahukona Resort in North Kohala, Princeville on Kauai, and Kuliima on Oahu); several other resort assessments now in progress; and socio-economic analyses for two other potential West Hawaii projects (Kona's HOST Park project and possible ocean mineral processing activities in Kohala).

Consequently, the conclusions in this report are general in nature and would pertain to most proposed new West Hawaii resort developments. It is uncertain whether any more specific conclusions could be drawn about impacts of the Kukio project in particular, as opposed to other resort developments. This is because West Hawaii (and especially North Kona) has already been undergoing far-reaching social changes for the past several decades, as a result of the area's ongoing transformation from an agriculture-based economy to a service-based one. Numerous additional resort projects are planned or proposed (Thompson, 1986), and it may prove impossible even in retrospect to identify which social impacts are attributable to Kukio alone. Under such circumstances, it may well be more appropriate to discuss cumulative resort development impacts than those from Kukio alone.

At the same time, the Kukio Beach Resort does represent a form of resort development which (other than the Kona Village) does not currently exist in North Kona -- a self-contained recreational community which does not immediately border any established settlements. (The Keauhou project somewhat resembles Kukio in that it incorporates hotels, condominiums, commercial centers, and residential property. However, Keauhou is to a

certain degree an extension of Kailua-Kona due to the connecting Alii Drive developments.) The self-contained Kohala resort areas provide some precedents for estimating social impacts of such projects in West Hawaii.

On the other hand, the County is now considering a number of other resort proposals in North Kona in the general area of Kukio, at least one of which (Ka'upulehu) is immediately adjacent to the Kukio property. Assuming Kukio is approved and developed, it cannot now be stated with certainty whether Kukio would be part of a larger pattern of urbanization north of Kailua-Kona (although clearly separated from Kailua-Kona by State-owned lands) or whether it would in fact be an isolated new community with few or no bordering urban areas. This uncertainty provides another reason why social impacts must be discussed in a very general fashion.

The remainder of this report is in three sections:

- (1) Documentation of issues and concerns -- analysis of recent attitudes surveys and similar studies to document community values, needs, and attitudes relevant to the proposed project.
- (2) Discussion of potential social impacts at a generic level.
- (3) Suggested potential mitigations and enhancements to aid in achieving a preponderance of social benefits over social costs.

II. ISSUES AND CONCERNS

The purpose of this section is to identify major community concerns which may be directly or indirectly relevant to this project. The information provided is derived from community surveys undertaken during the last five years by academic researchers, government agencies, or others. The issues presented are grouped into two categories: (1) general needs and values; and (2) specific attitudes towards resort development.

A. General Needs and Values

This sub-section addresses recent survey data on general community opinions regarding perceived needs, values, and attitudes toward overall socio-economic issues. It is further broken down into Islandwide and West Hawaii data.

1. Islandwide Concerns

Public opinion surveys taken on the Big Island during the 1980's consistently indicate that the major islandwide concern is for more jobs and more economic development. For example, in the State Department of Planning and Economic Development's (DPEd's) most recent Hawaii State Plan Survey (SMS Research, 1984), the Big Island sample was asked to choose which of 11 major goals constituted the single most important thing for government to concentrate on. Leading the list was "getting more jobs and industry for Hawaii" -- selected by 32% of Big Islanders, as compared to 16% to 17% in Hawaii's three other counties.

The County's own Survey of Big Island Residents on Planning and Housing Concerns (Hawaii Opinion, 1983) found that 68% of the 1,055 respondents felt "the Big Island's economy is in bad shape," and only 41% felt the county economy would be in better shape three years later (i.e., in 1986).

This survey also included a number of other questions about broader community needs and values. Selected relevant results are reproduced in Table 1, which also shows results for the West Hawaii (Kona and Kohala) sub-samples. Results generally indicate a high value attached to (and/or satisfaction with) social and environmental factors but serious concerns about economic factors such as jobs and housing costs.

2. West Hawaii Concerns

Table 1 suggests that West Hawaii residents (particularly those in North and South Kona) are less satisfied with roads, schools, medical services, and other government services than is the overall Big Island population. Kona residents particularly value the climate and weather on their side of the island, and they are more concerned with high housing and general living costs than most other Big Island residents.

Table 1:
General Community Needs and Values — Islandwide and West Hawaii

	Islandwide	Kona	Kohala
good weather/climate	38%	56%	38%
not overpopulated/open space	28	28	41
nice friendly people	27	26	16
slow paced lifestyle	26	21	27
familiar (born here, family here)	12	11	7
peace/quiet	10	8	17
clean air/environment	9	11	10

(13 other items received less than 10% mention islandwide or in West Hawaii)

"What are the two best things about living on the Big Island?"

	Islandwide	Kona	Kohala
high cost of living	18%	23%	19%
low salaries/employment problems/ no job opportunities	15	10	9
ineffective/bad government	9	12	9
rain/bad weather	7	1	4

(20 other items received less than 7% mention islandwide; a few of these are shown below because of comparatively higher scores in West Hawaii.)

	Islandwide	Kona	Kohala
lack of recreational facilities	6	9	3
lack of services (e.g., medical)	5	7	9
traffic problems/poor roads	5	9	10

(Percentage "Very Good" or "Somewhat Good" in response to questions as to whether following items are rated good or bad on Big Island.)

	Islandwide	Kona	Kohala
quiet, slow lifestyle	97%	97%	100%
safe, secure urban areas	77	71	82
a good university	67	33	45
good medical services	64	52	59
good schools	60	32	49
good shoreline recreation areas	56	43	74
reasonably priced housing	37	23	26
high paying jobs	24	16	33
many job opportunities	13	16	17
base:	(1,035)	(338)	(90)

Source: Hawaii Opinion (1983), pp. 4-7.

B. Attitudes Toward Resort Development

Available survey evidence is again broken down by islandwide and West Hawaii responses.

1. Islandwide Attitudes and Concerns

In the most recent State Plan Survey (SMS Research, 1984), 40% of the Big Island sample said it was "extremely important" to maintain an "economically healthy visitor industry," and another 49% said it was "important." But other results from the same survey indicate Big Island residents are eager to diversify the economy by developing other types of industries. For example, while 58% agreed that "tourism is still our best bet, even though some of its jobs may be part-time and may not pay as well," residents of other counties agreed by much higher margins. And a majority of the Big Island sample preferred to develop other industries rather than relying primarily on tourism.

However, in the County's planning survey (Hawaii Opinion, 1983), 86% of the islandwide sample favored providing "funds for tourism promotion on the Big Island" — the most preferred of several suggested economic development strategies. And when residents were asked which industries should receive the most financial support on the Big Island, tourism ranked only slightly behind diversified agriculture and far ahead of sugar, geothermal, research, or "heavy industry (e.g., manganese nodules)."

An isolated but significant finding from this survey was that two-thirds of Hawaii County residents would oppose any form of economic development if it "restricted the public access to a recreational area" (ibid., p. 9). In Kona, opposition reached 77%.

The most comprehensive study of Big Island resident attitudes toward tourism was commissioned four years ago by the Big Island Visitor Appreciation Committee. At that time, more than 75% of those polled believed tourism was "good for the Big Island" (Ward Research, 1982). Most of the perceived benefits were economic in nature — more jobs and more money for the economy — but there were also some references to social benefits such as intercultural stimulation and amenities for residents. Negative aspects were less frequently mentioned, but usually involved perceived overcommercialization and impacts on natural beauty, crime, and economic overdependence on tourism. Residents with relatively less positive attitudes (i.e., larger minorities against tourism) included people aged 30 years or younger, those of Hawaiian descent, and rural-area residents.

2. West Hawaii Attitudes and Concerns

The Kona and Kohala sub-samples of the County's planning survey (Hawaii Opinion, 1983) were equally or more supportive of tourism promotion than residents elsewhere on the island.

Earlier surveys -- now somewhat dated -- asked about Kona and/or Kohala residents' perceptions of advantages and disadvantages from tourism development. Results (Public Affairs Advisory Services, 1979, 1980) indicate that jobs and general economic benefits constituted the major advantages of tourism, while perceived negative aspects included:

- o impacts on housing costs;
- o destruction of environment and historic sites;
- o reduced open space;
- o rapid population growth and immigration of transients.

Key informant interviews conducted in the Kohala area for the Waikoloa Hyatt social impact assessment (Community Resources, 1984) found similar concerns on the part of community leaders. There were some apprehensions about whether longtime local residents -- particularly young people and/or native Hawaiians -- would continue to receive their desired share of employment-related benefits. Recent controversies had sensitized residents to concerns over shoreline access in resort areas; preservation of historical sites; and housing cost inflation associated with temporary in-migration of hotel construction workers. And there were also lingering concerns from early resort development years over family impacts associated with wives entering the labor force. However, the predominant attitude was one of enthusiasm for resort development, coupled with a desire to manage possible negative side effects.

III. POTENTIAL IMPACTS

As indicated in the Introduction, the primary focus for this social impact assessment is on the qualitative aspects -- particularly human interaction, lifestyle issues, and family or individual well-being.

The present analysis will be conceptualized in terms of social dynamics. Sub-section III.B explains the approach to be taken here.

However, prior to discussing likely tourism development impacts (from Kukio or other Kona projects) at any level, it is appropriate to consider background context on the overall socio-economic fabric for West Hawaii and for North Kona in particular.

A. Socio-Economic Context

Concern over the qualitative social impacts of West Hawaii resort development first emerged in response to a number of studies in the late 1960's and early 1970's regarding impacts of initial tourism development in the Kohala area. These initial studies (Cottington, 1969; Smith, 1972; Hawaii State Department of Planning and Economic Development, 1972; Fukunaga, 1975) asserted various impacts, including:

- o Wives of plantation laborers made their initial entry into the labor force as resort employees, with consequent negative impacts on husbands' self-images; mixed impacts on women's self-images; negative impacts on marital stability; and negative impacts on children due to reduced parental supervision.

- o Crime was alleged to have increased.

- o As more in-migrants from the Mainland moved into the area, the social structure changed, and there were adjustment problems between newcomers and "oldtimers."

Several points are important to make in considering the validity of these early findings (many of them at least partially anecdotal) for application to the Kukio case:

- (1) Many of the concerns stemmed from the initial entry into the labor force of previously unemployed wives and mothers. This is part of a nationwide trend which has now become a commonplace situation in Hawaii.
- (2) Negative aspects of work in tourism (or any other particular industry) must be weighed against social or psychological problems associated with lack of work. A significant body of research literature has demonstrated that unemployment and/or poverty correlate with both family problems (e.g., Bakke, 1934; Root, 1979; Gordus, Jarley, and Ferman, 1981) and emotional

(3) disturbances (e.g., Hollingshead and Redlich, 1958; Brabburn, 1969; Brenner, 1973; Dooley and Catalano, 1980; and, utilizing Hawaii data, Frank, 1981).

Kukio is located in North Kona, which has been undergoing rapid population growth and attendant socio-economic change for several decades. Even when its economy was focused primarily on agriculture, Kona was an area of independent small farmers, rather than a highly structured and cohesive plantation community such as North Kohala once was.

By 1970, Kona's agricultural employment had declined sharply, and the visitor industry had already become the central prop of North Kona's economy. During the 1970's, a resort construction boom made North Kona the Big Island's fastest-growing district. Tables 2 and 3 reproduce selected 1970 and 1980 U.S. Census data for the state, the county, North Kona, and other West Hawaii districts. As may be observed in these tables:

-- North Kona's population nearly tripled in ten years.

-- The ethnic mix shifted islandwide, but particularly sharply in North and South Kona, where Oriental proportions dropped. North Kona is now predominantly Caucasian.

-- While more than half the population of the rest of the island had lived in the same house five years previously, the figure for North Kona was less than 40%, indicating substantial mobility and transience.

-- North Kona's labor force profile (occupation and industry) differs sharply from the islandwide profile, in ways which indicate the area's heavy and increasing reliance on tourism-based retail and service activities.

In short, tourism impacts on North Kona's social structure are already pervasive and have been for some years.

The outlook for the future -- with or without Kukio -- is for a continuation of these trends. In its draft Kona Regional Plan, the Hawaii County Planning Department (1983) assumes continued high growth rates in West Hawaii resort units and a tourism-dominated economy. Three alternative scenarios -- differing primarily in assumptions as to whether the preponderance of tourism growth will be in Kona or Kohala -- were used to generate different projected year 2000 populations for the combined North and South Kona areas. The projections range from a low of 33,200 to a high of 46,300, as compared to the combined 1980 figure of 19,662. Given this context, it becomes necessary to consider summarizing Kona tourism impacts, since it will be difficult to isolate effects from the Kukio project alone.

Table 2: Total Population and Demographic Breakdown: State and County of Hawaii, and West Hawaii Districts, 1970 and 1980

Race	STATE OF HAWAII		COUNTY OF HAWAII		NORTH KONA		SOUTH KONA		NORTH KOHALA		SOUTH KOHALA	
	1970	1980	1970	1980	(C.T. 218-216)	(C.T. 218-216)	(C.T. 218-216)	(C.T. 218-216)	(C.T. 218)	(C.T. 218)	(C.T. 218)	(C.T. 218)
White	28.8	34.4	28.8	34.4	28.8	34.4	28.8	34.4	28.8	34.4	28.8	34.4
Hispanic	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Other	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Japanese	28.8	24.9	28.8	24.9	28.8	24.9	28.8	24.9	28.8	24.9	28.8	24.9
Chinese	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8
Filipino	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2
Hawaiian	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2
Other	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Age	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
Less than 5 yr.	26.6	20.5	26.6	20.5	26.6	20.5	26.6	20.5	26.6	20.5	26.6	20.5
5 - 17 yr.	28.5	27.8	28.5	27.8	28.5	27.8	28.5	27.8	28.5	27.8	28.5	27.8
18 - 64 yr.	28.5	24.4	28.5	24.4	28.5	24.4	28.5	24.4	28.5	24.4	28.5	24.4
65 or more yr.	3.8	7.9	3.8	7.9	3.8	7.9	3.8	7.9	3.8	7.9	3.8	7.9
Median age	25.0 yr.	28.4 yr.	25.0 yr.	28.4 yr.	25.0 yr.	28.4 yr.	25.0 yr.	28.4 yr.	25.0 yr.	28.4 yr.	25.0 yr.	28.4 yr.
Place of Birth	75	75	75	75	75	75	75	75	75	75	75	75
Hawaii	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Other U.S.	14.2	14.2	14.2	14.2	14.2	14.2	14.2	14.2	14.2	14.2	14.2	14.2
Foreign country	49.8	62.0	49.8	62.0	49.8	62.0	49.8	62.0	49.8	62.0	49.8	62.0
Same house	49.8	49.8	49.8	49.8	49.8	49.8	49.8	49.8	49.8	49.8	49.8	49.8
Same island	23.2	23.2	23.2	23.2	23.2	23.2	23.2	23.2	23.2	23.2	23.2	23.2
Different island	26.8	26.8	26.8	26.8	26.8	26.8	26.8	26.8	26.8	26.8	26.8	26.8
Different state	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4
Different country	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1
Education	24.8	24.8	24.8	24.8	24.8	24.8	24.8	24.8	24.8	24.8	24.8	24.8
0-8 years only	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2
Hi school only	33.1	33.1	33.1	33.1	33.1	33.1	33.1	33.1	33.1	33.1	33.1	33.1
College, 4+ yr.	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0

Notes: Figures based on 10% sample; hence, numbers represent estimates. **Including persons born in U.S. territories, and persons born abroad or at sea to American parents. *1970 categories or bases "Not Comparable" to 1980 (1970 Census kept a "non-response" category, while 1980 Census allocated non-responses to other categories shown). **U.S. Bureau of the Census, 1970 Census of Hawaii, 1973, DEMOGRAPHIC STATISTICS: HAWAII, PHC(1)-801.

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Table 2:
Total Population and Demographic Breakdowns: State and County of Hawaii, and West Hawaii Districts, 1970 and 1980

	STATE OF HAWAII		COUNTY OF HAWAII		NORTH KONA (C.T. 215-216)		SOUTH KONA (C.T. 213-214)		SOUTH KOHALA (C.T. 217)		NORTH KOHALA (C.T. 218)	
	1970	1980	1970	1980	1970	1980	1970	1980	1970	1980	1970	1980
TOTAL POPULATION	767,313	769,621	63,469	72,033	4,832	13,748	4,004	3,714	2,310	1,607	1,324	3,217
ETHNICITY												
Caucasian	38.8	34.4	28.8	33.0	44.0	53.8	17.7	30.0	39.2	46.5	23.6	27.8
Japanese	28.3	24.9	37.5	26.4	23.1	11.8	39.6	27.5	24.4	14.6	23.8	16.1
Chinese	4.8	5.8	2.9	1.7	3.7	1.4	0.8	0.8	1.3	1.4	4.3	1.0
Filipino	12.2	13.7	14.5	13.9	8.4	7.2	24.2	13.0	6.6	5.6	29.2	24.0
Hawaiian	9.3	12.3	12.3	18.8	19.3	22.1	14.7	23.5	26.4	28.5	15.3	24.7
Other	4.6	9.0	2.0	4.1	1.5	3.5	1.0	5.2	2.0	3.4	1.7	6.4
AGE												
Less than 5 yr.	9.2	8.1	8.4	9.1	9.1	9.1	9.0	9.8	9.3	10.2	10.0	9.2
5 - 17 yr.	24.4	20.5	27.8	21.5	27.0	20.5	29.8	20.7	28.3	23.6	29.4	22.9
18 - 64 yr.	58.5	63.5	54.4	59.2	53.7	63.9	48.9	58.8	54.1	58.6	51.1	54.4
65 or more yr.	5.8	7.9	9.2	10.2	8.2	4.7	12.4	10.6	4.4	7.7	9.5	13.6
Median age	25.0 yr	28.4 yr	28.9 yr	29.4 yr	28.6 yr	28.9 yr	29.7 yr	29.7 yr	28.1 yr	29.3 yr	27.3 yr	31.9 yr
PLACE OF BIRTH												
Hawaii	NC	37.8	NC	70.5	NC	54.4	NC	71.2	NC	64.9	NC	75.4
Other U.S.**	NC	28.0	NC	20.0	NC	39.9	NC	20.8	NC	30.4	NC	13.6
Foreign country	NC	14.2	NC	9.4	NC	5.7	NC	7.8	NC	4.7	NC	10.8
RESIDENCE 5 YRS. PREVIOUS												
Same house	44.0	49.3	43.5	52.9	51.1	38.8	54.1	57.4	43.4	50.7	49.9	68.9
Same island	NC	23.2	NC	24.9	NC	28.1	NC	22.9	NC	17.3	NC	12.1
Different island	NC	2.8	NC	8.1	NC	7.0	NC	4.5	NC	14.9	NC	4.4
Different state	NC	16.9	NC	11.1	NC	23.1	NC	10.7	NC	16.4	NC	11.6
Different country	NC	5.9	NC	3.1	NC	3.0	NC	1.2	NC	0.7	NC	3.1
EDUCATION: completed												
0-8 years only	24.8	16.2	37.2	20.1	28.9	8.0	24.1	23.4	24.1	8.6	44.2	29.0
Hi school only	35.9	33.1	31.6	33.5	44.0	40.9	21.9	33.8	34.2	37.0	30.0	39.0
College, 4+ yr.	14.0	20.3	7.5	15.2	8.8	18.8	4.4	12.4	13.1	20.7	5.9	8.1

Notes: *figures based on 15% sample; hence, numbers represent estimates.
 **including persons born in U.S. territories, and persons born abroad or at sea to American parent/s.
 "NC" = 1970 categories or bases "not comparable" to 1980 (1970 Census kept a "non-response" category, while 1980 Census allocated non-responses to other categories shown).

SOURCE: U.S. Bureau of the Census, 1972 Census of Population and Housing: Census Tracts: Honolulu, Hawaii, PHC(1)-89; 1980 Summary Tape Files 1-A and 3-A; State of Hawaii, 1973, Countywide Profiles for Hawaii.

Table 3:
Labor Force Size and Characteristics: State and County of Hawaii, and West Hawaii Districts, 1970 and 1980

	STATE OF HAWAII		COUNTY OF HAWAII		NORTH KOHA (C.T. 215-216)		SOUTH KOHA (C.T. 213-214)		SOUTH KOHALA (C.T. 217)		NORTH KOHALA (C.T. 218)	
	1970	1980	1970	1980	1970	1980	1970	1980	1970	1980	1970	1980
CIVILIAN LABOR FORCE												
EDGE issued 1981	322,018	723,479	43,075	47,203	7,632	10,113	2,429	4,245	1,446	3,290	2,240	2,284
not in labor force	34.1%	31.7%	39.5%	38.7%	41.3%	27.8%	41.4%	33.8%	34.2%	33.9%	38.4%	39.8%
armed forces	9.5	8.1	0.4	0.3	0.0	0.1	0.0	0.0	0.0	0.0	1.1	1.0
civilian labor force	56.4	60.2	60.1	61.0	55.7	72.1	58.4	66.2	65.8	64.1	60.5	59.3
CIVILIAN LABOR FORCE												
unemployed	294,484	435,780	25,889	41,004	2,022	7,293	1,035	2,823	951	2,110	1,355	1,359
	3.0%	4.7%	2.7%	7.0%	4.8%	5.2%	2.3%	5.7%	4.1%	6.3%	1.9%	9.2%
TOTAL EMPLOYED CIVILIAN LABOR FORCE	283,534	410,181	25,186	38,199	1,920	6,913	1,500	2,642	912	1,978	1,330	1,230
OCCUPATION												
service	15.4%	17.9%	14.3%	16.8%	19.3%	21.3%	16.0%	17.3%	15.9%	18.0%	25.9%	34.2%
manager./profes.	NC	23.5	NC	20.0	NC	21.2	NC	13.6	NC	20.6	NC	15.2
technical, sales & admin.	NC	32.0	NC	26.1	NC	28.2	NC	24.8	NC	19.2	NC	13.7
farm/fish/forest	NC	3.4	NC	10.3	NC	7.1	NC	19.8	NC	14.0	NC	14.2
precision, craft, repair	NC	11.6	NC	12.7	NC	12.1	NC	14.8	NC	16.3	NC	9.7
operators, fabri- cators, laborers	NC	11.7	NC	14.4	NC	9.9	NC	10.0	NC	11.8	NC	12.9
INDUSTRY (selected)												
agric., forest, fish, mining	4.7%	3.6%	12.5%	11.2%	N/A	4.2%	N/A	19.4%	N/A	16.8%	N/A	8.1%
construction	9.3%	7.2%	10.6%	9.1%	23.6%	11.2%	20.4%	14.3%	15.6%	12.3%	2.6%	5.0%
manufacturing	10.9	7.9	15.0	8.3	1.0	1.9	3.2	1.2	2.3	5.1	29.3	8.1
retail trade	17.4	19.9	14.8	17.5	13.1	23.6	8.9	18.4	15.9	13.8	2.9	7.0
financial, insur., real estate	5.0	7.6	2.8	5.7	4.0	8.6	3.5	4.5	3.5	7.6	1.1	2.3
personal, entertain. & recreat. services	8.5	9.2	11.2	10.9	N/A	20.7	N/A	15.2	N/A	14.0	N/A	31.4
health, educ. & professional	17.2	17.7	14.1	16.7	7.8	11.4	18.3	13.1	13.9	14.8	14.7	20.5
public admin.	11.4	10.0	6.5	7.3	4.2	2.7	3.7	4.8	3.1	2.1	5.5	8.1
COMMUTE TO WORK												
45 minutes or more	N/A	13.5%	N/A	6.0%	N/A	4.8%	N/A	4.8%	N/A	13.9%	N/A	22.6%
mean travel (min.)	N/A	21.5 m	N/A	16.5 m	N/A	16.4 m	N/A	20.6 m	N/A	21.7 m	N/A	24.1 m

Notes: All figures based on 15% sample; hence, numbers represent estimates.
"N/A" = "Not Available" in published form. "NC" = 1970 categories or bases "Not Comparable" to 1980 Census.
Source: U.S. Bureau of the Census, 1972 Census of Population and Housing: Census Tracts—Hawaii, PHC(1)-88; 1980 Summary Tape File 3-A; State of Hawaii, 1975, Economic Outlook for Hawaii.

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B. Conceptual Overview of Resort Social Impacts

Figure 1 provides a partial model of the impacts which can be expected from resort development in relatively rural Hawaii areas. Like all such models, it is an incomplete and simplified picture of what is typically a very complex process.

The model sets forth three separate aspects of the social change process:

- o Resort components which produce social changes;
- o Social dynamics affected by these components;
- o Consequent indicators of social cohesion.

To simplify the present report, the analysis will not include each and every one of the model's components and factors. Rather, the following sub-sections will focus on:

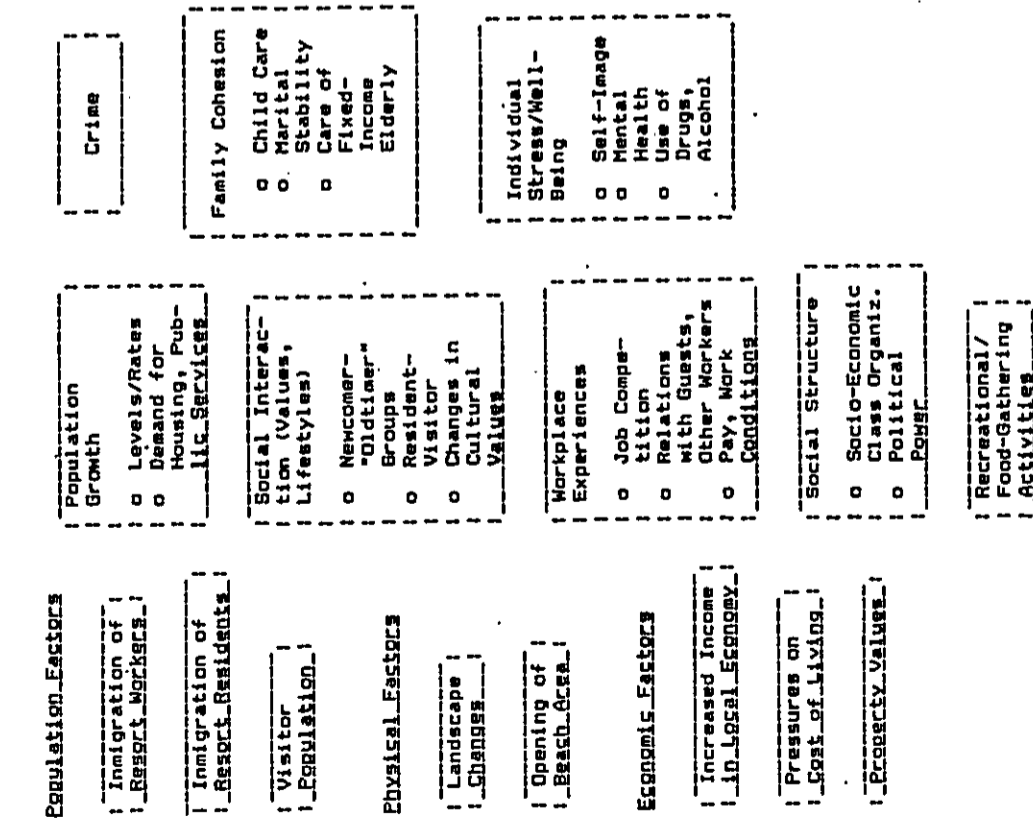
- (1) **Population-Based Change Components:** The physical and economic components are omitted because they are discussed elsewhere in the EIS and because the basis of this report (Draft EIS Sec. 3.21.6) has primarily to do with "people impacts." Discussion for each of these three change components is linked with one of the social dynamic components which is particularly correlated:
 - o Worker in-migration (linked with job competition);
 - o Resort residents (linked with the rapid population growth "boomtown" syndrome);
 - o Visitor population (linked with resident-visitor interaction patterns).
- (2) **Indicators of Social Cohesion:** The three components shown in the model will be discussed in relation to cumulative West Hawaii resort impacts:
 - o Crime;
 - o Family cohesion;
 - o Individual stress and well-being.

C. Population-Based Change Components

1. Worker Immigration and Job Competition

According to the Draft Kukio EIS (Phillips Brandt Reddick, 1986, pp. 3-48 and 3-49), worker immigration is expected to increase the West Hawaii population by 740 to 1,010 at project completion. These numbers are based on the assumption that 20%

Figure 1:
Simplified General Model of Resort Development Social Impacts



of operational positions would be filled by immigrants. The report did not set forth assumptions about what proportion of the remaining 80% would come from workers currently employed elsewhere in West Hawaii, thus generating indirect population growth by causing off-site job vacancies.

The total number of permanent jobs (full-time equivalents) forecast to be generated by this project at completion is a range of 2,830 to 3,840 (Phillips Brandt Reddick, 1986, p. 3-47). This number includes off-site indirect and induced jobs, some of which may be located outside West Hawaii. These jobs would be created gradually over several decades.

While a detailed labor absorption study is beyond the scope of this study, it is possible that the Kukio project alone would not strain the West Hawaii labor supply. This statement is based on the current rapid rate of population growth in West Hawaii and reports by employment agency and resort personnel of labor surpluses in the area for a number of years. (NOTE: According to the Hawaii State Census Statistical Areas Committee, 1985, the combined populations of North and South Kona and South Kohala had increased from 24,269 in the 1980 census to an estimated 30,928 by July 1, 1984 — a 27.4% increase in just four years.)

However, given the cumulative impact of many thousand additional planned and proposed West Hawaii resort units, it is reasonable to consider the possibility that labor demand could exceed supply in West Hawaii at some point during the next few decades. If this occurs, it could be necessary to import labor, with the possible consequences that:

- o the proportion of longtime or Hawaii-born residents in the resort workforce would decline; and
- o a sense of resentment or job rivalry could develop between longtime residents and newcomers competing for jobs.

The purpose of the present discussion is to provide a preliminary and largely qualitative assessment of this possibility. Additionally, "Mitigations" Section IV.A discusses the possibility of regional job training programs to continue maximizing West Hawaii resort employment for local residents. The immediately following paragraphs provide context from other areas which are pertinent to both the general topic of job competition and also job training needs. However, the Kona situation is somewhat different, as will be subsequently noted.

Experiences Elsewhere Regarding Efforts to Maximize Local Resident Employment in Resorts: In the course of several different projects during the past two years, Community Resources has interviewed numerous rural resort operators throughout Hawaii to determine opportunities for (or obstacles to) maximizing employment and advancement opportunities for longtime local residents. It is important to note that these interviews were largely in quite rural settings — Kohala, Kuliima, Molokai, etc.

Some of the principal findings would include:

- o Most resort operators prefer to hire longtime residents (regardless of ethnicity) because their history of stability suggests lower turnover and training costs.
- o For most entry-level jobs, qualifications are minimal. Academic skills are less critical than a positive attitude and a willingness to learn. However, "basic skills" (including communication skills) become important for those seeking promotions.
- o However, resorts report increasing difficulty in finding or keeping longtime residents for entry-level jobs, particularly among the younger generation. Reasons are thought to include:

- Language and communication barriers discourage some longtime residents (and immigrants as well) from applying for "front-of-the-house" jobs involving substantial contact with guests. (Alternately, some workers feel that management discourages local workers from seeking such jobs unless they are very proficient in standard Mainland English.)

- Some local residents, particularly younger ones, are viewed by management as having poor work habits and attitudes. Some of this involves negative attitudes toward "service" jobs in particular, but other tentative explanations include lack of preparation for any structured work setting, cultural aversions to pressure for individual achievement, and/or discomfort with close supervision by superiors (who are often of a different cultural group).

- Transients with good communication skills and higher educational levels are often more willing to work for low pay, since they view the job as a very temporary interlude in their life.

- o Mid-level supervisory jobs (which are usually filled from through promotion from the rank and file) are most difficult to keep staffed with longtime local residents, some of whom may actually reject invitations for promotions. Reasons here include:

- lack of basic academic skills such as reading and mathematics;

- lack of background in "people management";

- social factors such as reluctance to supervise friends and family, overall preference for egalitarian rather than hierarchical human relations, and/or reluctance to leave the area for needed training;

- family constraints which interfere with need to work different shifts, to stay after hours for training, etc.

- o Lack of local residents in top management jobs (which constitute only about five percent of all positions) is often most responsible for feelings of resentment. However, local residents with travel industry management degrees are normally rotated by national chains to posts in other states or countries.

Current Situation in Kona: For this report, various resort and employment-agency key informants (see Appendix A) were interviewed to determine the applicability of the foregoing findings for the North Kona area. According to these informants, Kona -- which is a rapidly urbanizing area -- differs in some important respects:

- (1) There is an abundant labor supply in Kona today. Each new hotel job opening generates many applications. There are concerns about shortages in certain skilled positions, but programs being developed by the West Hawaii branch operations of the University of Hawaii at Hilo -- with input from the Hawaii Hotel Association -- are thought to be adequate to address these selected shortages (see Section IV.A).

According to the State Department of Labor and Industrial Relations (personal communication, Ricky Higashidi, Research Statistician, April 17, 1986), the estimated average unemployment rate for 1985 was 6.3% for North Kona and 6.9% for South Kona, as compared to an 8.5% islandwide figure. The North Kona figure is close to full employment, since a certain number of individuals are always between jobs.

- (2) Longtime local residents reportedly are well-represented in the workforce, including supervisory and management positions. A generation or two of Kona residents has grown up with the visitor industry and has learned to seize upon its opportunities.

- (3) The pattern whereby Mainlanders tend to work "front-of-the-house" jobs and local-born residents "back-of-the-house" is fading. Some resort personnel officers claim it has disappeared entirely. Others say it remains to an extent, but for reasons other than local reluctance to interact with visitors. Rather, many front-of-the-house positions are characterized either by high stress (e.g., front desk operations) or by minimum wages and uncertain or split-shift hours (e.g., food service). These conditions are less appealing to local residents in search of long-term secure and peaceful working conditions.

- (4) There is little reported sense of antagonistic rivalry among different ethnic or cultural groups. Both social agency and resort informants said earlier tensions between young

Caucasians and local residents have largely disappeared with the end of the "hippie" era. Today's North Kona Caucasian majority is felt to consist more of older, affluent people (many of whom do not enter the labor force) or younger families. Also, with the passage of time, many Kona-born local people have grown up with more of a "Mainland" lifestyle.

One possible exception involves apprehension among some longtime residents over a recent influx of immigrants from Asia (primarily the Philippines, but also some Southeast Asian countries). Several social agency informants commented on this concern, although there was less awareness among resort management. Only two of the nine resort personnel directors or managers contacted for this report had noticed an increase in applications or workers from the immigrant population, suggesting that immigrants may prefer to work in places which have already hired some of their families or countrymen. The Kona Employment Office Job Specialist (personal communication, Gifford Matsuoka, April 18, 1986) said recent Filipino immigrants are more interested in agricultural work, but they may apply for part-time temporary resort work in the agricultural off-season.

Future Scenarios and Local Resident Labor Sources: The most problematic scenario would be one in which all planned/proposed West Hawaii resort projects develop rapidly and find there is a market for this full development. This would produce a major labor shortage in West Hawaii. However, rapid development which strains the market would result in an immediate construction slow-down, thereby reducing the magnitude of any labor shortage.

Because new hotels fill many of their positions by attracting current employees from other hotels who are seeking better wages or more responsibility, labor shortages usually have more impact on existing establishments than on new ones. Ultimately, however, such shortages are experienced as a regional problem.

The most likely model for Kona in the event of a regional labor shortage would be West Maui, which experienced such difficulties in the late 1970's and early 1980's. No quantitative studies are available to document the results, but conventional wisdom within the visitor industry (personal communication, Peter L'Orange, Hawaii Leeward Planning Conference, April 24, 1986) is that:

- o there was an immigration of Filipino or other immigrants for some of the jobs; and
 - o there was an even greater importation of young Mainlanders -- primarily single people willing to live in dormitory-style employee housing or to share apartments.
- Contrary to reported rumors in some West Hawaii communities that "importation" of labor would mean active recruiting in

places such as the Philippine Islands, industry leaders say that most hotels tend to hire all but top management positions only from people who have demonstrated a commitment by actually living in the area (personal communication, Dennis Koci, Hawaii Hotel Association, April 24, 1986). Word of mouth usually assures that increased job opportunities will swell the local population even before hiring takes place.

However, County agencies have expressed a desire for resort jobs to benefit (1) existing West Hawaii population, possibly followed by (2) unemployed East Hawaii residents or former Big Island residents who could return when job opportunities become more abundant than previously.

Table 4 indicates some of the possible target groups for any programs designed to keep the future West Hawaii resort workforce more "local" in nature. It also indicates some of the possible obstacles to achieving this objective for the respective labor supply sources. (NOTES: The contents of Table 4 should be considered a preliminary assessment, subject to further discussion and verification. They are based on key informant discussions and, to some extent, Census data which are rapidly becoming outdated. However, they also reflect results of research efforts at several other rural resort areas throughout the state.)

Table 4:
Potential Local Labor Supply Sources and Potential Barriers to Full Development of Each

Target Group	Potential Barriers
Females (particularly mothers of younger children)	Entry Level Upgrade Child care Child Care
Disadvantaged/discouraged residents (e.g., young adults, possibly some native Hawaiians)	Job Training Attitudes Job Insecurity Transportation Basic skills
Future high school graduates	Vocat. Courses Job Insecur. Exposure
East Hawaii unemployed	Housing Job Insecurity
Former residents	Housing Job Insecurity
Projected "normal" population growth (natural increase, continuation of historic immigration trends)	Housing

Generally, the "target groups" in Table 4 are of two types: (1) existing resident groups among whom the labor force participation rate could be increased (females, disadvantaged unemployed, high school residents) and (2) potential immigrants who have some "local" roots or characteristics (East Hawaii unemployed, former West Hawaii residents). The final target group -- future West Hawaii population growth expected to occur without labor importation -- could actually overlap with other groups and is added primarily to reinforce the emphasis on housing concerns.

Following is a more specific discussion of each group.

Female: U.S. Census data indicate West Hawaii females had a lower unemployment rate than males in 1980 but were also much less likely to be in the labor force. Table 5 contains 1980 Census data showing that West Hawaii females had a labor force participation rate some 20 percentage points lower than the rate for males, although West Hawaii females -- and particularly those in North Kona -- were more likely than East Hawaii females to be in the labor force.

A national and statewide trend is for a narrowing of the gap between male and female labor force participation rates. If the West Hawaii population continues to increase at anything like present rates, the numbers in Table 5 would be greatly increased by the year 2000. For example, an annual average 6.5% growth rate would increase the number of North Kona females over age 16 from 4,998 in 1980 to 17,611 in the year 2000. If the West Hawaii female participation rate increases by just ten percentage points over the 1980 level, this would mean an additional 1,761 female workers from North Kona alone.

The right-hand columns in Table 5 indicate that females with children aged less than six years are much more likely to remain out of the labor force than other females in general. While this may in some cases reflect values and preferences, the particularly high participation rates of women with older children suggest that lack of child care may be a barrier to needed or desired employment on the part of mothers of younger children.

Resort personnel offices also report that lack of child care facilities can be a barrier to promotions. After-work classes or on-the-job upgrade training may require periods of evening or weekend work. This presents problems to the parents, particularly the mothers, of minor children of any age.

Disadvantaged/Discouraged Residents: are those for whom chronic unemployment or lack of job preparation has resulted in withdrawal from the labor force. Estimates of exact numbers of such individuals in West Hawaii are not available, but social agency informants suggest there are largely young adults, often of native Hawaiian ancestry. Some would be teen-aged mothers, so there would be overlap with the preceding group.

Table 5
Civilian Labor Force Participation by Sex and (for Females) Age of Own Minor Children At Home -- 1980

		ALL MALES		ALL FEMALES		FEMALES WITH CHILDREN UNDER 6		FEMALES WITH CHILDREN 6 - 17	
		in labor force	not in labor force	in labor force	not in labor force	in labor force	not in labor force	in labor force	not in labor force
North Kona	no.: X :	4194 (82%)	917 (18%)	3098 (62%)	1900 (38%)	548 (55%)	450 (45%)	629 (75%)	208 (25%)
South Kona	no.: X :	1699 (76%)	534 (24%)	1124 (55%)	908 (45%)	198 (45%)	240 (55%)	147 (58%)	108 (42%)
Sub-Total	no.: X :	5893 (80%)	1451 (20%)	4222 (60%)	2808 (40%)	746 (52%)	690 (48%)	776 (72%)	316 (28%)
South Kohala	no.: X :	1329 (78%)	368 (22%)	781 (49%)	812 (51%)	123 (35%)	224 (65%)	185 (66%)	94 (34%)
Sub-Total	no.: X :	7222 (80%)	1819 (20%)	5003 (58%)	3620 (42%)	869 (49%)	914 (51%)	961 (70%)	410 (30%)
North Kohala	no.: X :	755 (68%)	357 (32%)	600 (52%)	552 (48%)	133 (63%)	78 (37%)	155 (70%)	66 (30%)
WEST HAWAII SUB-TOTAL	no.: X :	7977 (79%)	2176 (21%)	5603 (57%)	4172 (43%)	1002 (50%)	992 (50%)	1116 (70%)	476 (30%)
EAST HAWAII SUB-TOTAL	no.: X :	16022 (68%)	7668 (32%)	11404 (49%)	11975 (51%)	2242 (48%)	2443 (52%)	2748 (68%)	1321 (32%)
BIG ISLAND TOTALS	no.: X :	23999 (71%)	9844 (29%)	17007 (51%)	16147 (49%)	3244 (49%)	3435 (51%)	3864 (68%)	1797 (32%)

NOTE: All figures based on 15% sample; hence, numbers represent estimates. Data are for adults aged 16 or more. Excludes Armed Forces (208 people islandwide). SOURCE: U.S. Bureau of the Census, 1980 CENSUS DATA FILE 3-A.

Job training represents a vital need for the disadvantaged. The term "job training" is used here in both the specific sense (training for a particular job) and also in the broader sense (acquiring education and work discipline for any job.) Thus it could be extended to include some of the related barriers listed in Table 4 -- i.e., counseling for attitudinal/cultural problems and remedial education to inculcate basic academic and communication skills. (As noted on p. 14, basic academic skills tend to be more crucial for career advancement in hotel work than for obtaining entry-level jobs.) "Job training" in the broad sense could also include vocational classes.

Section IV.A will provide a review of current and planned West Hawaii efforts involving job training or the related activities of vocational education, remedial basic skills courses, and counseling in attitudes or work habits. As will be seen, significant steps are underway, but there is also need for additional activities, particularly in regard to facilitating communication and coordination among various service providers, clients, and employers.

Other potential barriers listed in Table 4 include job insecurity (discussed shortly) and transportation. Limited public transportation on the Big Island means there are limits to the abilities of less affluent families to take jobs far from home. As secondary wage earners in families which may be able to afford only one vehicle, women would again be particularly affected.

Future High School Graduates: Konawaena High School's graduating class of 1986 will number approximately 280, but the class of 1987 will jump to 350 (and subsequent class sizes are expected to remain the same or larger). By 1990, it is projected that grades 9 - 12 there will contain 2,000 students (personal communication, Claire Yoshida, vice-principal, April 24, 1986). This is a substantial potential labor source, even excluding those who may go on to college in fields other than the visitor industry. Principal Edward Murali (personal communication, April 24, 1986) believes that vocational programs there have made a good start at introducing students to West Hawaii's visitor industry, but both he and several visitor industry informants contacted for this report expressed a desire for further improvements to the vocational courses and for more communication between business and school personnel. Kohala and Hanalei High Schools could also contribute to the West Hawaii labor supply.

It is reasonable to assume that the proportion of students entering the West Hawaii visitor industry could be increased by additional vocational training programs and more exposure to the industry via class field trips and in-school presentations by the industry spokesmen.

Another concern listed in Table 4 has to do with perceived job insecurity (including the aspect of unpredictable and/or inconvenient work hours). As will be further discussed in Section III.D, frequent characteristics of resort-related employment (particularly for entry-level, low-seniority workers) are shift

work, reduced hours, seasonal lay-offs or "on-call" status, etc. This translates not only into time scheduling inconvenience, but also financial insecurity. A consistent observation from social agency informants interviewed for this report was that local residents find these conditions very problematic unless and until they attain seniority. If this situation is further exacerbated (whether by overdevelopment and low occupancy rates, or by some cyclical aspect of market ups and downs), there could be further difficulties in attracting local residents to the jobs. For high school students or recent graduates, such experiences or perceptions may not deter them from taking entry-level jobs but could discourage young people from remaining in the industry and seeking promotions. For other residents, the "insecure" reputation of such jobs could discourage them even from seeking entry-level work.

East Hawaii Unemployed: As indicated by previously noted unemployment figures, East Hawaii has a higher unemployment rate than West Hawaii and a higher absolute population base. While the County hopes to stimulate further economic development there, it is also possible that some Big Island residents from that side of the island may ultimately be interested in moving to Kona in order to remain somewhere on their home island.

However, the current West Hawaii housing shortage presents barriers to any new population not already housed there, whether this be immigration from East Hawaii, other islands, or elsewhere. Alu Like attempts to interest some East Hawaii unemployed residents in Kona/Kohala resort work have already suffered from such residents' simple inability to afford West Hawaii housing rates (personal communication, Maui Chong-Martin, Alu Like Career Counselor, April 24, 1986).

Economic Residents Who Could Return: Available Census data unfortunately do not indicate how many Big Island residents have left the county in recent years, much less how many are willing to return if additional economic opportunities are made available. However, the 1980 Census indicates that Oahu alone had 14,842 persons who had been living on a Neighbor Island in 1975; applying the Big Island's 1975 population share to this figure would produce an estimate of 6,853 Big Islanders who moved to Oahu in that time period. A somewhat related group of people would be residents of other islands attracted to West Hawaii by economic or other living conditions there. Between six and seven percent of the 1980 Kona population, and 15% of the South Kohala population, had lived on another island five years previously.

Potential barriers would again include housing conditions and any events which exacerbate the image of resort jobs as being insecure and/or inconvenient in terms of scheduling. These concerns apply to any anticipated source of population increase, including projected "normal" immigration (continuation of historic trends) or even, to an extent, natural increase from existing population, since they could encourage outmigration.

2. Resort Residents and "Boontown" Effects

According to the Draft Kukio EIS (Phillips Brandt Reddick, 1986, p. 3-49), an estimated 720 to 940 permanent residents are expected to live at Kukio upon project completion. It may be assumed that these residents would be fairly affluent and initially comprised of individuals who are retired or are part-time Kona residents with principal residences on the Mainland or Oahu.

Few studies have been conducted on the social integration of recreational community residents with surrounding longtime residents. Based on key informant reports gathered by Community Resources (1980a) for the Princeville project, some of the likely potential patterns would include:

- o Initially, Resort residents may be inclined to function as a self-contained community, having little interaction with the outside community. Depending on the standards set forth and enforced by the community association, the architectural style and landscaping of their homes may seem alien to longtime residents and discourage them from spending time at the project or interacting with Resort residents. (However, given the current prevalence of "Mainland-style" housing subdivisions for the relatively affluent in Kona, this reaction may be much less pronounced than in other rural parts of Hawaii.)

- o With the passage of time, such patterns should alter in the direction of greater social integration. More Resort residents would live on-site year-round, increasing their interest in the wider community. Some would become involved in regional senior citizen or other civic activities. As longtime residents make occasional use of Kukio restaurants or recreational facilities, their sense of comfort and familiarity with the new community would increase.

- o Kukio residents may be expected to contribute to a prevailing trend for Kona to feature a more conservative political character than other parts of the island, as well as a more "Mainland" lifestyle. They also may be expected to add some articulate voices to West Hawaii's political efforts to gain more government services and infrastructure.

An additional possible impact on social dynamics could include the so-called "boontown" syndrome, which refers to social difficulties associated with rapid population growth in relatively rural areas. This discussion is subject to the following qualifications:

- (1) The linkage with resort residents is a matter of convenience here, since population growth is due to both resort residents and immigrant workers.

- (2) Kona is already in the midst of a population "boom" and has been for many years (see Section III.A).

- (3) Kukio's own contribution to the continuation of such conditions would be relatively small (particularly in light of a development timetable expected to extend for many years), and the entire discussion is rooted in the concept of cumulative impacts of multiple developments.

The "boontown" social impact concerns have been most extensively discussed in regard to energy or mining activities in sparsely populated portions of the Mainland (or Canadian) West. Much of the socio-economic impact literature of the 1970's and early 1980's has been rooted in studies of such small communities undergoing rapid population growth.

"Boontown" areas have reportedly been subject to two broad types of social impacts:

- o **Stagnation on infrastructure and services** (including housing); These are a function strictly of population growth, without regard to types of people. Resident frustration with crowding and inadequate services can lead to family and mental health impacts. Established businesses and government agencies may lose workers to the better-paying new industries, and consequent manpower shortages eventually lead to further labor in-migration (Gilmore, Hammond, Moore, Johnson, and Coddington, 1981). Proposed mitigations have included day care, targeted training/recruitment, and other measures aimed at increasing labor force participation of nonworking spouses of current residents (Halstead, Leistriz, and Albrecht, 1984).

- o **Social disruption:** These are primarily a function of alleged conflicts between different types of people (newcomers vs. oldtimers). A spate of early "boontown" studies blamed crime, mental health, and family disruption on such sociological factors as breakdown of traditional social roles, informal ties, and values; alienation; lack of "community"; newcomer-oldtimer antagonism; etc. (c.f., Kohrs, 1974; Cortese and Jones, 1977; Melaz, 1979; Freudenberg, 1981). These early views were challenged in a pair of highly controversial articles by Wilkinson and colleagues (Wilkinson, Thompson, Reynolds, and Ostresh, 1982; Reynolds, Wilkinson, Thompson, and Ostresh, 1982), which asserted that early case studies had failed to use solid research techniques and were biased due to an anti-growth orientation. Wilkonson et. al. did not argue that rapid population growth was problematic, but they did call for better research techniques and for consideration of the view that many of the problems were rooted more in simple population strains than in abstract disturbances to the existing social order.

Subsequent social research has featured better research design but more contradictory results. A number of studies (e.g., Bland, Orr, and Sinha, 1984; Krannich and Greider, 1984;

England and Albrecht, 1984) have indicated that "boomtown" communities have few if any more serious psychiatric and social problems than comparable slow-growth communities, but they do exhibit a sense of frustration and community breakdown due to strains on services and infrastructure:

"The results show that ... [boomtowns are perceived as] less friendly, less helping, and have poorer family environments and poorer community spirit ... In general, the analysis shows that boomtowns do disrupt virtually all community services from amenities to informal relationships. The exception is economic support, which is strengthened." (England and Albrecht, 1984, p. 242)

The limited number of key informant interviews conducted in Kona for this survey tends to support the view that social stress currently being experienced there has more to do with simple population growth than newcomer-olddtimer conflicts. As will be discussed further in Section III.D, several social agency representatives do believe that Kona is experiencing strains in a number of ways, but there was a virtual consensus that simple population growth -- rather than cultural conflicts or (with limited exceptions) resort work conditions -- was primarily to blame. Kukio could possibly contribute to the continuation of this current trend, depending on the population growth rate (rather than ultimate level).

3. Visitor Population and Resident-Visitor Interaction

The Draft Kukio EIS estimates average daily visitor population as about 1,560 to 2,260 upon project completion (Phillips Brandt Reddick, 1986, p. 3-49).

Social scientists have devoted considerable time to identifying factors which affect resident-visitor relations, both in Hawaii (Knox, 1979; Liu and Var, 1984) and elsewhere (UNESCO, 1976; Knox, 1978; Graburn, 1983; Liu and Var, 1984). These variables are generic in nature, and there is little reason to believe that the Kukio project has any particular unique characteristics in these regards.

Factors discussed here are presented less for the purpose of forecasting exact outcomes than for the purpose of identifying variables that can be monitored and, to some extent, managed.

Individual Economic Dependence on Tourism: Perhaps contrary to conventional wisdom, Hawaii surveys have consistently found no relationship between real or perceived direct economic dependence on tourism and attitudes toward tourists or the tourism industry (Research Associates, 1974; Public Affairs Advisory Services, 1975; Knox, 1979; Ward Research, 1982). Knox (1979) found that perceptions on economic dependence can have opposite effects in different types of people, with some feeling "gratitude" and others reacting with "resentment." Simply expanding tourism's role in the economy does not necessarily either increase or decrease social harmony between residents and visitors.

Competition for Resources is an important factor to be considered in any resort project in Hawaii. Residents and visitors may sometimes compete for food and entertainment resources, shelter, or even members of the opposite sex. However, spatial competition resources comprise a particularly sensitive issue in Hawaii. As noted in Section II, 77% of Kona residents would oppose any development which would interfere with recreational access, and the survey for the Big Island Visitor Appreciation Committee (Ward Research, 1982) also registered resident apprehension over tourism impact on beach park access. Analyses conducted for the Waikoloa Hyatt and Kuliima social impact assessments (Community Resources, 1984; Community Resources and A. Lono Lyman, Inc., 1985) indicate that guests of self-contained resorts such as the proposed Kukio project are unlikely to "take over" off-site beach parks. However, controversies over beach access at the Mauna Kea Beach Resort indicate that West Hawaii residents will desire access to good sand beaches on-site at resorts, even if these beaches were not available prior to resort development. Shoreline access agreements to be worked out between the County and the Kukio developer are likely to be a significant factor in determining resident attitudes toward Kukio guests and/or hotel operators.

Displaced Political Resentment: The idea that visitors are sometimes "scapegoats" for a resident sense of "lost political and economic control" has been argued in the World Bank's analysis of tourism impact (Noronha, 1979). In that study, it was suggested that a standard pattern of tourism development has been for residents to feel increasingly dependent on outside investors and owners as the visitors industry expands. Anger at the invisible and absent power broker is displaced and focused on the visible and present tourist. The fact that Kukio's owner and developer (Hughes Ranch) is a longtime Big Island establishment is a favorable indication for the project, although it is likely that many purchasers and some hotel operators would be based outside Hawaii.

Age: In every Hawaii survey, younger residents have been more negative towards tourists and tourism than older residents. The reasons for this have not been conclusively established, but they could involve factors such as greater sense of identity with peer groups and less concern with economic benefits during early stages of the life cycle. To the extent that young people in the region feel alienated, they may be inclined to act out frustrations through rudeness and petty crime toward tourists.

Visitor Respect for Local Culture: In one of the few studies of Hawaii resident attitudes toward Japanese tourists, Kuroda (1976) found that a significant determinant of such attitudes includes beliefs about Japanese respect for island customs. And while there is considerable concern over the "commercialization" of Hawaiian culture for tourist consumption, there is also a general recognition in Hawaii that the visitor industry has helped sustain Hawaiian crafts and arts -- C.F. Farrell's (1982) commentary on tourism contributions on Maui.

D. Indicators of Social Cohesion

When social dynamics or social structure are negatively affected, the observable consequences are usually in the form of increased crime, family strains, or individual stress indicators. The remainder of this section reviews evidence about likely resort impacts on these social outcomes. The general picture is that few quantitative links have been conclusively demonstrated, but that family impacts would appear to be the one area where there is some reason to believe that a resort economy (as opposed to simply population strains) is a causal factor.

1. Crime

Tourism development is often alleged to generate increased crime rates, either because visitors are easy targets, or because of resentment over the apparent wealth of visitors (or permanent resort residents), or else because of general social pressures and friction between newcomers and longtime residents. Thus, crime impacts would be a cumulative consequence of interaction between longtime residents and all three foregoing groups of new residents (plus any new criminals attracted to the area).

Community Resources has studied Kona crime data both for the HOST Park socio-economic analysis (contained in Traversa Group, Inc., 1985) and for several resort social impact assessments (Community Resources, 1984; Community Resources and A. Lono Lyman, Inc., 1985).

These data do not indicate a clear and straightforward link between crime rates and tourism development. The Kona police district (North and South Kona combined) has long had a higher serious crime rate than the rest of the island. However, during the 1970's, when Kona tourism was increasing most rapidly, the crime rate rose less rapidly in Kona than elsewhere on the Big Island.

As part of the Kuliia social assessment, Community Resources (and A. Lono Lyman, Inc., 1985, pp. 208 - 223) undertook a comprehensive review of three sources of evidence on crime-tourism links: (1) academic research or reported crime statistics; (2) actual 1970 and 1980 crime and juvenile delinquency rates for several rural Hawaii resort areas somewhat comparable with one another; and (3) key informant interviews with police officers in Kona, Kohala, Maui, Molokai, and Kauai. Major results of this review included:

- o The nine academic studies (including six based on Hawaii data) were generally contradictory and inconclusive, in large part because of different definitions and methods. There was some consistency in finding a statistical relationship (usually slight to moderate) between tourism and the crimes of rape and robbery, but not other crimes such as murder or assault.

- o Overall serious crime rate changes from 1970 to 1980 exceeded countywide increase in only one of three study areas - West Maui. However, juvenile delinquency rates showed much higher than average increases in all three rural resort areas.

- o Police perceptions provided the most consistent, if still complex, picture:

- On-site crime at self-contained West Hawaii destination resorts is minimal (due to effective security efforts) and is usually limited to theft by hotel workers. Residential components of such resorts do not generate disproportionate crime.

- Off-site, the major crime impact is likely to involve increased petty thefts from visitors at beach parks or other tourist attractions. Perpetrators are likely to be juveniles. There are often minor spurts in such crimes following completion of major new hotel projects in rural areas, but crime figures tend to level off after a year or so.

- Most police do not believe that local residents are any more likely to be crime victims if they live near resorts, nor do they believe that (with the possible exception of some juveniles) otherwise law-abiding residents are tempted to crime by the presence of tourists.

- Tourism is felt to have some indirect effect on crime rates. "Street scenes" in tourist towns such as Kailua-Kona or Lahaina are associated with increased juvenile problems. Social adjustment problems between longtime residents and newcomers can lead to conflicts, and Mainland-raised individuals are more likely to commit even minor crimes.

Thus, some relationship between tourism and crime does appear to exist, but in a variety of minor and often indirect ways rather than in any simple or major fashion. As a self-contained destination area, Kulo is less likely to increase Big Island crime rates than would be the expansion of tourist-oriented "street scenes." Public access to the beach at Kulo may be expected to generate opportunities for theft of tourist belongings, but this can be somewhat controlled through private security and limits on hours during which access is permitted.

Kona police contacted for this report generally confirmed the foregoing picture. A longtime Kona police officer (personal communication, Officer Blane Takamine, April 18 and 21, 1986) stated that population increase rather than either tourism development or newcomer-older conflicts seems more implicated in Kona crime increases. However, he did note some recent increases in family-related problems.

2. Family Cohesion

Available evidence about tourism impact on family life in Hawaii is even less quantitative and more anecdotal than evidence about impacts on crime. The early Kohala case studies cited in Section III.A raised three areas of concern: (1) marital problems (at that time attributed to husbands' jealousy and negative reaction to value changes in their working wives); (2) child behavior problems associated with lack of parental supervision; and (3) problems faced by the elderly — either lack of family care or difficulties associated with fixed incomes as cost of living increased.

Marital Problems: Analyses conducted for the Maikoloa Hyatt and Kuliima social impact reports (Community Resources, 1984, 1985) suggested that the original prime concern — male response to the initial entry of wives into the labor market — has faded, even in very rural areas, as working wives have become a commonplace phenomenon. However, other factors were reported as social agency and resort informants as sometimes contributing to marital stress among resort employees:

- o **Shift work,** common for hotels and other service establishments, presents logistical problems for families with children, and it may reduce the amount of time which husbands and wives can share at home together.
- o **"Glamour-and-gossip" environment** of some hotels may still constitute a challenge to the established values of some rural employees, and the close-knit nature of the workforce can result in gossip about even innocent smiles or flirtations between workers and guests.
- o **Changing sex roles** now affect men as well as women, since the resort workforce is increasingly male. For many males, initial resort work experiences may represent their first exposure to both (a) personal "service" aspects of employment, and/or (b) many female co-workers.

Discussions with Kona police and social service agencies suggest that the latter two factors — which primarily involve adjustment to new conditions — are less significant in Kona, since these adjustments have already largely taken place. (Exceptions would involve Asian immigrants or a limited number of longtime residents who have not yet entered the service economy.)

More lasting resort-related factors involve inherent aspects of tourism jobs (particularly in hotels and restaurants). Not only shift work, but also seasonality, "on-call" employment, limited hours for some types of jobs, and low fixed wages for many entry-level jobs — all may combine to produce either financial or family time-scheduling difficulties. These problems are most acute for people with entry-level jobs, since seniority ultimately results in longer and more stable hours, better pay, and rights to choose preferred shifts. (However, a pattern reported by some resort personnel offices is that working

mothers often prefer to work days in order to be with children in evenings, while many males prefer to work nights because hotel jobs for them are often secondary employment.)

A more indirect tourism impact on family life in Kona involves stresses produced by the area's population "boom." According to the Mental Health Supervisor for the State Department of Health's West Hawaii Counseling Service (personal communication, Hug Macicase, April 18, 1986), the shortage of affordable housing has forced many families to "double up" in substandard units with consequent impacts on sense of privacy, feelings of overcrowding, and uncertainties as to household roles and authority.

As previously noted in Section III.A, tourism-related family problems must be weighed against the demonstrated negative marital impacts of unemployment. Additionally, tourism is not the only type of work which may produce family strains.

Child Care Problems: Table 6 indicates that West Hawaii — particularly North and South Kona — has witnessed an explosion of reported child abuse and/or neglect reports in the past several years. West Hawaii accounted for less than one-quarter of reported islandwide cases in 1982, but nearly one-half in 1984. This has resulted in a special budget request to this year's Legislature for four additional Kona positions in the Department of Social Service and Housing's (DSSH's) Child Protective Services Unit. (NOTE: Some caution should be used in viewing the numbers in Table 6, which pertain to reported incidents of child abuse/neglect. To some extent, a nationwide increase in reports is felt to reflect a growing willingness of neighbors to report problems, as opposed to a growing number of problems. Also, the data may contain reports of multiple incidents involving the same children.)

However, there is at present no clear indication that tourism per se is associated with these reported problems. A DSSH social worker in Kona's Child Protective Services Unit (personal communication, Deborah Chang Abreu, April 22, 1986) stated that rapid population growth, rather than any particular economic activity, appears to be more associated with the increased number of cases.

Child care difficulties may represent a social impact even if they do not result in abuse/neglect cases. The breakdown of the traditional extended family in rural Hawaii (and/or the immigration of new people without such extended families) has removed or reduced one important child care resource. However, one positive aspect of the need for families to "double up" in housing units is the occasional creation of reciprocal child care support systems (personal communication, Hug Macicase, Mental Health Supervisor, West Hawaii Counseling Service, State Department of Health, April 18, 1986).

While child care represents a statewide and national concern quite independent of tourism, resort jobs do have some

Table 6:
Reported Hawaii County Child Abuse/Neglect Cases: 1982 - 1984

	1982	1983	1984
West Hawaii	56	164	221
-- North Kona	-- 45	--118	--128
-- South Kona	-- 10	-- 22	-- 64
-- South Kohala	-- 1	-- 16	-- 22
-- North Kohala	-- 0	-- 8	-- 7
East Hawaii	232	207	238
Total	288	371	459

Source: Unpublished data provided by Maureen Yano, Research Statistician, State Department of Social Services and Housing.

characteristics which may exacerbate child care problems. These are the same work-related factors which affect marital stability: night or weekend shifts and unpredictable scheduling due to seasonality or "on-call" status. Except for frequent references in interviews with resort personnel, however, no data exist to indicate the true severity or extent of these problems.

Problems of the Elderly: Despite initial attention in the early Kohala studies, little social research has been conducted into this aspect of tourism social impact. Presumably any factors which interfere with workers' ability to care for children would also interfere with ability to care for disabled elderly parents. However, it is likely that a much smaller proportion of the workforce has immediate responsibility for aging parents than for minor children.

Some of Kona's elderly longtime residents now face economic hardships due to fixed incomes in the face of rising costs (personal communication, Lilly Kong, Hawaii County Economic Opportunity Council, Kona District Coordinator, April 18, 1986). It continued tourism expansion further increases living costs, these people would face more difficulties. Research is needed to indicate whether costs have stabilized or will keep rising.

3. Individual Stress and Well-Being

The State Department of Health's Mental Health Division has conducted a number of studies in recent years to measure alcohol/drug abuse and psychiatric symptomatology in various parts of the state. However, available results for the Big Island are island-wide rather than specific to Kona or West Hawaii:

"According to the 1983 Household Well-Being Survey, Hawaii County has the highest percentage of the population in the State who are in need of substance abuse treatment. For alcohol, the rate is 19.8%, and for drugs it is 11.9%. Also, the Big Island has the third highest [of nine districts statewide] overall percentage of individuals expressing psychiatric symptomatology (31.3%)." (Hawaii State Department of Health, Mental Health Division, 1986, p. 1)

On a more qualitative level, the State's Mental Health Supervisor (personal communication, Hug Macicase, April 18, 1986) for the West Hawaii Counseling Service expressed the following beliefs about tourism-stress linkages:

- o Major concerns would involve the previously-discussed family stresses, some of which are attributable to rapid population growth (i.e., an indirect tourism link) rather than directly to tourism.
- o Population growth is also producing disproportionate increases in alcohol and drug abuse. Many of the younger retirees fill leisure time with drinking (although

alcohol also is prevalent in local culture). Abundant marijuana grown in West Hawaii is often traded to Mainland visitors or part-time residents in exchange for cocaine. (Kona police confirmed increased drug trafficking and cocaine use in recent years.)

Earlier social impact analyses in the West Hawaii area (Community Resources, 1980b) indicated that newcomers were more likely than longtime residents to exhibit psychiatric symptomatology in response to stress -- partially because of the lack of support networks and partially because Mainland-raised individuals appear more likely to internalize stress while many local residents vent their frustrations externally (i.e., fights, minor crime, family arguments).

Some social critics of Hawaii's tourism industry (c.f., Kent, 1975) have asserted that resort work involves residents in a "master-servant" relationship with visitors which is damaging to self-esteem. However, this proposition has never been tested through any quantitative research, and it did not emerge as an issue in key informant interviews with resort or social agency personnel. The available evidence tends to indicate that any individual stress problems are due more to indirect effects of rapid population growth than to the actual nature of tourism jobs (with the possible exception of uncertain pay and hours for entry-level workers).

IV. MITIGATIONS

A. Job Training/Support Services to Maximize Resident Employment

This discussion should appropriately begin with the comment that resident-oriented job training is not a panacea for potential labor shortages due to cumulative labor demands of future new West Hawaii resorts. Nor would it be the sole type of activity needed to assure future maximal tourism employment benefits for local-born residents.

As may be seen from Section III.C.1:

- o Continuation of historic West Hawaii population growth rates could well assure adequate labor supply for new resorts (depending, of course, on their build-out rates), although labor shortages are possible for particular types of skilled positions.
- o However, lack of affordable housing stands as a possible major barrier to such population growth, including growth from importation of unemployed East Hawaii residents and/or return of former Big Island residents to take new jobs.
- o Additionally, inherent financial and scheduling uncertainties surrounding hotel work in particular could affect longtime resident interest in such jobs. A stable tourism economy would assure stable pay and working conditions for persons with seniority, but sharp downturns due to the national economy or world conditions could be discouraging to newer workers repeatedly placed on call or laid off.

These qualifying statements having been made, job training and related activities (vocational education, remedial basic skills, counseling, etc.) clearly remain important tools for maximizing resident employment share.

1. Suggested/Planned Job Training Initiatives

- (1) Hawaii Community College Programs. Discussions with resort and employment-related social agencies suggest these currently have the highest visibility in Kona. They have been undertaken by the West Hawaii branches of two University of Hawaii at Hilo branches: Hawaii Community College (HCC) and the Center for Continuing Education and Community Services (CCECS).

According to Milton Leslie, West Hawaii coordinator for the programs, they consist of:

- o educational and training needs assessments based on (1) telephone surveys; (2) statistical analyses of trends; and (3) interviews with visitor industry leaders;

o a Culinary Arts program (located in the Keauhou Beach Hotel) begun in the fall of 1985 as a part-time program ... based on visitor industry input indicating that chefs and similar skilled food preparation positions were among the hardest to fill with local candidates ... offering two degrees (one-year Certificate of Completion or two-year Associate of Science degree) ... serving both entry-level candidates and employed persons seeking skills upgrading in cooking ... guided by an advisory committee comprised of representatives from the Hawaii Hotel Association and the Chef de Cuisine Association)

o tentative plans for making the program full-time in 1987, and also adding programs for front-desk operations, groundskeeping, and mid-management skills.

The 1987 expanded program would depend on funding and acquisition of new facilities. Long-range, there may be need for an actual West Hawaii campus for UH Hilo, a goal being pursued by citizen groups as well. The 1986 State Legislature passed a resolution asking the University of Hawaii to conduct a study within the next year on whether West Hawaii's needs would best be served by new facilities or some other means. In the interim, the Legislature appropriated \$161,300 to fund five new positions for the West Hawaii efforts.

At a broader, islandwide level, an October 1985 conference was staged in Hilo as an initial step toward improving communication among university officials, other government agencies, and business regarding educational and training needs (Hawaii Island Economic Development Board and the University of Hawaii at Hilo, 1985). Among the recommendations in the training area:

o HCC Provost Mitsuo Sumada and County Deputy Managing Director Gregory Moores would work with the State Department of Labor and Industrial Relations to develop long-term forecasts for numbers and types of jobs for which training will be needed on the Big Island (an effort which is currently underway);

o To supplement numerous community advisory committees for specific classes and programs, an overall UH Hilo community council should be formed to provide community input at a broader policy level.

(2) Individual Hotel Training Programs still represent the bulk of major job-specific training efforts in West Hawaii. For start-up training, many hotels contract with the community college system's Employment and Training Office area. Hotels tend to provide their own customized upgrade programs. Management for the new Waikoloa Hyatt (under construction) has voiced the intent to fashion a comprehensive and community-based job training effort involving input from area civic organizations, public schools, and community colleges.

(3) Kona Employment Service provides counseling and placement services to all job applicants. It also administers federal Job Training Partnership Act (JTPA) funds, which may be used for such purposes as hotel start-up training and/or paying up to 50% of a disadvantaged employee for up to six months during the training period. Business input to decisions about use of JTPA funds is obtained through a Private Industry Council (PIC). However, because JTPA funding fluctuates year to year, planning is only done on a two-year horizon. For this reason, according to Roy Kagawa, Hawaii State Employment Service branch manager (personal communication, April 24, 1986), the community college system is the better public-sector agency to take the lead for long-term planning of job training efforts.

(4) Alu Like -- Placements and OJT: Alu Like's Kamuela office (which provides weekly outreach services in Kona) has an arrangement with a number of West Hawaii hotels for referral and placements of its native Hawaiian clientele. Additionally, there is an agreement with several of these hotels that clients will be guaranteed OJT (on-the-job training), with Alu Like paying up to 50% of the trainee's wages for a six-month maximum period.

(5) Alu Like -- Statewide Research Program: The statewide Alu Like office has begun a major research effort to identify any barriers and gaps to employment and/or promotion of native Hawaiians in several "high-demand" industries -- tourism, medical facilities, and high-technology manufacturing. The purpose is to provide guidelines for future funding decisions regarding training programs in these areas.

Through Kamehameha Schools and several other subcontractors, Alu Like is interviewing both employers and employees in these industries to determine the status of Hawaiian employees, their training needs, and relevant characteristics of employers. Preliminary results are expected in the fall of 1986.

Given anecdotal but repeated reports of cultural and psychological difficulties faced by Hawaiians in "Western" work settings, one particularly valuable aspect of the research will involve exploration of attitudinal and mental-health factors in these jobs situations. This will permit some relatively solid quantitative assessment of this type of concern.

(6) Kona High School offers strong "Pre-Industrial Program" (PIP) vocational courses for disadvantaged students, including several relevant to the visitor industry. There are also classes in conversational Japanese and food technology, along with "job search" instruction (self-presentation in job interviews, resume preparation, etc.). Some students have been placed in part-time jobs through work-study courses.

Although there are various community and business advisory groups for specific vocational programs, both the Kona/maena principal and vice-principal -- along with various visitor industry representatives interviewed for this report -- independently expressed the feeling that it would be valuable to have some improved communication mechanism for improving the match between academic programs and Kona employers' needs. Principal Edward Mural (personal communication, April 24, 1986) said he felt one reason for the lack of urgency in accomplishing this has been the abundance of available labor for limited new job openings in the past few years.

(7) Other Department of Education (DOE) efforts include adult education programs, including remedial basic skills courses; occasional "Career Day" type courses for high school students; and development of new curricula to implement the State's new education Functional Plan (which calls for more attention to preparing students for jobs in the visitor industry and other major sources of employment). In the Kohala area, resort developers and operators have worked closely with the DOE to institute job shadowing, arrange field trips to hotels, have visitor industry spokesmen give lectures in class, and make other opportunities to acquaint students with resort employment.

(8) Hawaii Hotel Association's Statewide "Adopt-a-School" PROGRAM is in the very initial stages of development on the Big Island, according to chapter president Dennis Koci (personal communication, April 24, 1986). He noted there is a problem applying the concept to the Big Island because of the geographical dispersion of schools in relation to the concentration of hotels in West Hawaii.

2. Potential Aspects of a Regional Job Training Program

Responsibility for implementation: On Oahu, as a condition for land use approvals, the City and County of Honolulu has required the planning and implementation of developer-sponsored, resort-wide, resident-oriented job training programs for West Beach and Kuliima. (The latter resort began designing its job training project on a voluntary basis.)

The situation in West Hawaii is different in several respects from Kuliima or West Beach, each of which could ultimately be the principal employer for relatively isolated and rural areas. Kona is a more urbanized environment, with a plethora of employers (both inside the visitor industry and outside of it). A new destination area such as Kukio is not a major new employer, but simply one more addition to an existing base of many resorts and destination areas.

Under such conditions, any new job training programs logically should be a regional effort rather than being confined to a particular destination resort.

Additionally, responsibility for implementing any such regional effort may reasonably rest more with hotels and other business operators than with developers. Virtually all visitor industry representatives contacted for this report assumed that operators rather than developers would have the most stake in such programs and would naturally desire the most input. A recent meeting of the Kohala Coast Resort Association considered the question of new job training initiatives but quickly decided that this was a matter for hotel operators (personal communication, Will Sanburn, president, April 24, 1986).

A regional association of operators would be a natural organization to plan or implement private-sector aspects of these programs. While it is clearly beyond the scope of the present report to recommend any one group which "should" be involved, it is also perhaps apparent from the preceding pages that the Big Island chapter of the Hawaii Hotel Association -- which includes not only hotels but also support businesses such as car rental agencies -- already has some history of involvement. On the public-sector side, the efforts of the Hawaii Community College and CCECS (West Hawaii) have had the greatest public visibility.

Developers might arguably still make contributions of land, cash, or facilities to meet such needs as a community college campus with training facilities; child care; or transportation systems. On the other hand, developers could well argue that there is a vast abundance of vacant State-owned land in West Hawaii for campuses or other facilities; that child care is another matter of more concern to operators; and that transportation is the responsibility either of government or of operators.

Potential New Components: The proposed new "Employment Resource Center" action plan for Oahu's Kuliima resort lists the following components (Kuliima Development Company and North Shore Career Training Corporation, 1986):

- o Assistance to residents in obtaining construction jobs;
- o Intake, counseling, and placement;
- o Job preparation (basic skills and job search courses);
- o Vocational training (referrals);
- o In-service upgrade training;
- o Community outreach and education;
- o Information on resources for entrepreneurial training.

Virtually all of these activities are currently under way in Kona, although with varying degrees of strength and emphasis. (A possible exception involves construction job assistance, although the need for this in Kona has yet to be assessed.)

Given this, the present discussion will not attempt to reproduce the detailed descriptions of the foregoing components which have already been provided in the Kuliima plan and/or the Kuliima socio-economic assessment (Community Resources and A. Lono Lyman, Inc., 1985). Rather, the focus will be on needs unique to the Kona situation.

(1) **Private-Sector Coordination of Existing Services:** If the need for or value of private-sector contributions to an improved regional job training effort is accepted, perhaps the most cost-effective single expenditure would be to fund staff whose main role would be to facilitate communication and coordinate needs and services.

This assertion is set forth based primarily on two observations made in the course of interviews conducted for this report:

- o First, there was a virtual consensus on the part of all relevant informants that there is a need for improved communication and coordination.
- o Second, while both private businesses and government/educational agencies are now making good-faith efforts to fill this need, it is apparent that the volunteer nature of these efforts naturally takes second priority to each volunteer's principal business, so that there is a need for staff assistance and/or leadership.

Perhaps the most intensive efforts currently are being made through the Hawaii Community College and its West Hawaii operations. However, there are several reasons why it may be of value to supplement these efforts with private-sector staff. The private sector is not limited in its mandate to "pure" training or educational needs, but could also explore feasible ways to cope with secondary obstacles to resident employment such as child care or transportation assistance, if needed. And private-sector staff in West-Hawaii would be physically close to ultimate decision makers on a board of directors, as compared to the greater physical distances and layers of decision-making authority which face the community college or any other government agency.

(2) **Increased Networking with the DOE and Hawaiian-Oriented Social Service Agencies:** Although this must be labeled a particularly tentative impression, the key informant contacts for this report led to the conclusion that these agencies are now more outside the existing communication "networks" than may be ultimately desirable. It may also prove valuable to have more contact between the visitor industry and the Hawaii County Economic Opportunity Council, which provides Job Corps referrals, some pre-school services, and programs for the elderly.

(3) **Exploring the Feasibility of Addressing Secondary Employment Obstacles (e.g., Child Care or Transportation):** While more detailed needs assessments would be desirable, the preliminary contacts made for this report suggest that child care is a particularly crucial obstacle to maximizing employment and/or career advances for many local residents. Also, the startling recent increase in number of reported child abuse/neglect cases -- while not demonstrably linked to tourism -- presents a clear community problem.

The City and County of Honolulu has begun requesting developers to provide land for child care facilities, and it is also considering an ordinance to include this among a list of alternative "community impact" donations which each developer must provide. San Francisco already has a law requiring major developers to create employer-sponsored day care programs.

However, resort businesses tend to operate 24 hours a day, seven days a week. The need is not just for "day care," but round-the-clock child care. This need would not be met by a multiplicity of developer-dedicated small parcels of land up and down the West Hawaii coast. Rather, a smaller number of centralized sites and actual facilities would be more valuable. The suggestion here is not necessarily for establishment of a visitor-industry-sponsored facility for employees, but simply for a careful assessment of actual need and of difficulties facing small entrepreneurs (e.g., high insurance costs) which may or may not be less problematic to larger organizations.

Similarly, some social agency informants have suggested that transportation represents an employment barrier for less affluent families. If true, such a need may be more acute for resorts like Kukio which are located a number of miles outside the Kailua-Kona urban core. Again, the immediate recommendation is simply for an assessment of the feasibility of some sort of privately-funded shuttle system such as has been implemented in Kohala.

In summary, if additional private-sector involvement in such areas is warranted, the recommendations here have not been for "job training" in the narrow sense, but for greater coordination of existing activities and increased attention to secondary obstacles to the maximization of resort employment for West Hawaii residents. An important lingering question would be the proper organization to undertake such action -- especially whether developers as opposed to operators would have any appropriate role -- and what self-interest factors could motivate this organization.

B. Comprehensive, Management-Oriented Research

Preceding pages have noted a number of current efforts to gather existing data and/or generate useful new data -- e.g.,

contacts with the State DLIR by the HCC Provost and the County's deputy managing director to obtain future job estimates for the Like surveys now underway; the Legislature's mandate Hawaii's University of Hawaii to study best ways to serve West Hawaii's training and education needs.

However, preceding pages have also been filled with comments about unavailability of data on major social concerns. Some of the more important explicit or implicit research needs include:

- o An islandwide study of Hawaii County's unemployed (or those discouraged from entering the labor force) — their numbers, characteristics, geographical location, willingness to move to other parts of the island, and factors which may affect that willingness.
- o Better information (quantitative and qualitative) about labor immigration patterns in West Maui or other Hawaii resort areas where labor demand began to exceed supply.
- o An ongoing tracking system to monitor changes in the West Hawaii resort and/or general workforce profiles.
- o Projected labor absorption rates under various scenarios for the future of West Hawaii.
- o Survey data to provide more solid (less anecdotal) evidence about the true extent and magnitude of family impacts connected directly with tourism employment or indirectly through rapid population growth.

For the most part, such studies would more appropriately be carried out by government than developers or other private-sector organizations. One possible vehicle might be the proposed new "Tourism Social Impact Management System." The 1986 State Legislature appropriated \$100,000 to allow the State Department of Planning and Economic Development to initiate the system (although the Governor has yet to sign the appropriation bill as of this writing). Exact activities are still to be determined, but a social research data collection effort would represent the heart of the system, as outlined in a consultant report to the State (Coopers & Lybrand, 1986).

The concept represents a significant opportunity for government and the private sector to obtain information of use for future planning in West Hawaii. However, if the proposal is implemented, it is recommended the County and interested visitor industry representatives push for two changes:

- (1) The consultant report provides a "menu" of possible research topics, with priority going to a general population survey. For West Hawaii, priority should also go to profiling and surveying resort workers on a periodic basis.
- (2) The Coopers & Lybrand approach ruled out analysis of indirect tourism effects through population growth. However, these are perhaps most crucial for managing Kona's future.

APPENDIX A: INDIVIDUALS INTERVIEWED FOR THIS REPORT

Visitor Industry

Fred Duerr, Manager,
Kona Village Hotel

Albert Gusman, Union Representative,
King Kamehameha Hotel

Bob Herkes, Manager,
Kona Surf Hotel

Dennis Koci, General Manager,
Kona Hilton, and President,
Hawaii Hotel Association (Hawaii
Island Chapter)

Peter L'Orange, Executive Director
Hawaii Leeward Planning Conference

Mrs. Masae, Secretary,
Kona Ball Condominiums

Alana Padillio, Resort Manager,
Kona by the Sea

Will Sanburn, President,
Kohala Coast Resort Association

Donna Souza, Accounting Clerk,
Kona Lagoon

Marilyn Tanabe, Personnel Director,
Keauhou Beach Hotel

Lellani Thompson, Personnel Director,
Kona Hilton

Sharon Wago, Personnel Director, Hyatt Hotels

Mike White, Former Manager,
Mauna Lani Bay Hotel
(Currently Manager Kaanapali Beach Hotel, Maui)

Government and Private Social Agencies

Deborah Chang Abreu, Social Worker,
Child Protective Services Unit,
Hawaii State Department of Social Services & Housing

Bella Bell, Coordinator,
Native Hawaiian Vocational Educational Needs
Assessment, Alu Like

Maui Chong-Martin, Career Counselor,
Alu Like (West Hawaii Office, Kamuela)

Stafford De Cambra, Director and Chief Instructor,
Food and Service Program,
University of Hawaii, College of Continuing Education
and Community Services

Ricky Higashidi, Research Statistician,
Hawaii State Department of Labor and Industrial
Relations

Steve Elredge, Planner, Mental Health Division,
Hawaii State Department of Health

Thomas Foye, Evaluation/Planning Specialist,
Kamohameha Schools

Lily Kong, Kona District Coordinator,
Hawaii County Economic Opportunity Council

Milton Leslie, Program Coordinator,
Culinary Arts Program in West Hawaii, Hawaii Community
College, and Center for Continuing Education and Commu-
nity Service in West Hawaii

State Rep. Andrew Levin, Chair,
Higher Education Committee, State House of
Representatives

Hug Macicase, Mental Health Supervisor,
West Hawaii Counseling Service,
Hawaii State Department of Health

Gifford Matsuoka, Job Specialist,
Kona Employment Office,
Hawaii State Department of Labor and Industrial
Relations

Gregory R. Mooers, Deputy Managing Director,
County of Hawaii

Edward Murai, Principal, Kona Waena High School

Sharon Murakami, Ph.D., Mental Health Division,
Hawaii State Department of Health

Mitsuo Sumada, Provost, Hawaii Community College

Blane Takamine, Officer, Kailua/Kona Police Department

Maureen Yano, Research Statistician,
Hawaii State Department of Social Services and Housing

Claire Yoshida, Vice-Principal, Kona Waena High School

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APPENDIX G:
DRAFT—TENTATIVE ANCHIALINE POND MANAGEMENT PLAN

APPENDIX G

DRAFT

TENTATIVE
ANCHIALINE POND MANAGEMENT PLAN
for
KUKIO BEACH RESORT
North Kona, Hawaii

APPENDIX G

DRAFT

TENTATIVE ANCHIALINE POND MANAGEMENT PLAN
FOR
KUKIO BEACH RESORT
North Kona, Hawaii

PREFACE/INTRODUCTION

Based primarily on the "Tentative Anchialine Pond Management Plan" (Appendix B, FINAL EIS, Waikoloa Beach Resort, 1985) prepared by the U.S. Army Corps of Engineers, this Anchialine Pond Management Plan for the Kukio Beach Resort, North Kona, Hawaii has been prepared to identify the primary pond management concerns. Both the Corps of Engineers and the U.S. Fish and Wildlife Service (USFWS) are studying the anchialine pond organisms and have interests and/or responsibilities to manage or regulate pond modification and use. The USFWS may decide to include some of the species found in the ponds on the Federal List of Endangered and Threatened Species and may designate critical habitats; the action would place the species and the critical habitats under the protection of the Endangered Species Act. If so designated, any future permits to fill or excavate anchialine ponds could be prohibited, subject to satisfying compliance with the Endangered Species Act.

Considering the uniqueness of these ponds and organisms that are found within them, the pond management plan for Kukio has several primary objectives:

- 1) Maintain the environmental integrity of the existing cluster of ponds (approximately 3 acres);
- 2) Protect and manage this coastal resource to provide educational and interpretive opportunities to the public;
- 3) Provide a designed landscape setting that complements the aesthetic character of the ponds and their relationship to adjacent resort use.
- 4) Control and monitor construction activities at Kukio so that any secondary impacts may be identified and mitigated to avoid any detrimental impacts to the ponds; and
- 6) Provide for a responsible pond manager to implement the management plan and conduct scientific monitoring programs.

The final pond management plan and designation of a pond manager will be determined in the Special Management Area permit review process by the County of Hawaii Planning Department.

A. DEFINITIONS

1. **Adjacent Sites.** The term "Adjacent Sites" means those parcels which share a common border with the Anchialine Pond Management Area.
2. **Owner.** The term "Owner" means Huehue Ranch and their authorized representatives, and their successors and assigns.
3. **Management Zones.** Management Zones shall consist of the following three areas:
 - a. **Anchialine Pond Management Area.** "Anchialine Pond Management Area" shall mean that area containing anchialine ponds to be preserved and managed for the continuation of anchialine pond organisms.
 - b. **Management Area Buffer Zone.** "Management Area Buffer Zone" shall mean that area immediately adjacent to the Anchialine Pond Management Area in which development activities are limited.
 - c. **Upgradient Control Zone.** "Upgradient Control Zone" shall mean areas upgradient or inland of the Anchialine Pond Management Area in which additional ground injection of wastewater and stormwater runoff are prohibited.
4. **Policing.** "Policing" shall mean the collection and carrying away of trash and other refuse.
5. **Pond Manager.** "Pond Manager" shall be designated by the owner and be responsible for the management responsibilities contained herein. The Pond Manager shall be an individual, organization, or government agency with a record of experience in wildlife conservation, management, environmental awareness, education and public relations.

B. BOUNDARIES

1. **Depiction of Boundaries**
 - a. The boundaries of the Management Zones as described in Section A herein above shall be those depicted on the map and metes and bounds attached hereto.

(Note: drawings and metes and bounds are to be completed and attached after Management Plan is finalized.)

- b. Prior to initiating the activities authorized by this permit, the Anchialine Pond Management Area boundary will be marked off or delineated on the ground by the Owner.
 - c. The Owner shall notify the Pond Manager so that the boundary delineation can be verified. Once verified, permanent markers shall be installed by the applicant marking the limits (corner points) of the Anchialine Pond Management Area.
2. **Method of Conveyance of Management Rights**
- a. Limited rights to manage the Anchialine Pond Management Area are to be granted by the applicant to the Pond Manager in the form of a conservation easement.

C. CONSTRUCTION AROUND THE MANAGEMENT AREA

1. **Notification of the Start of Construction**
 - a. The Owner shall notify the Pond Manager at least two weeks prior to the start of any major construction or earth moving on parcels adjacent to the Anchialine Pond Management Area.
2. **Initial Construction Restrictions In Areas Adjacent to the Anchialine Pond Management Area**
 - a. The toe of any fill placed around the Anchialine Pond Management Area shall not penetrate the Anchialine Pond Management Area boundary, and in no event shall the toe of any fill be closer than five (5) feet to the edge of a preserved pond. This restriction applies unless a written variation is authorized by the Pond Manager.
 - b. The slope of any fill within the Management Area Buffer Zone shall have an angle of repose sufficient to prevent the fill material from slumping into the ponds, except that no slope shall be steeper than one (1) to one (1).
 - c. The slope of any fill within the Management Area Buffer Zone shall be revegetated or stabilized where necessary to prevent fill material from eroding or leaching into the ponds.

D. CONSTRUCTION WITHIN THE MANAGEMENT AREA BUFFER ZONE

1. A Management Area Buffer Zone shall be maintained adjacent to the Anchialine Pond Management Area. The width of the Management Area Buffer Zone shall be determined by on-site inspection of the various edge conditions and may vary depending on natural site features, except that it shall be thirty (30) feet where a structure abutting the Anchialine Pond Preservation Area has a height greater than forty (40) feet. The width shall be measured from the perpendicular plane of the management area boundary.
2. The Owner shall notify the Pond Manager when the Management Area Buffer Zone boundary is delineated on the ground by corner points so that the boundary can be verified.
3. Construction in the Management Area Buffer Zone
 - a. Major above grade structures, such as hotel, condominium units, restaurants or snack bars, shops, restroom facilities, and outdoor showers are not allowed within the Management Area Buffer Zone.
 - b. Walkways and roadways, bench areas, adequate trash receptacles, drinking fountains, utility lines and other necessary infrastructure, landscaping, display areas, and other similar facilities and improvements are allowed within the Management Area Buffer Zone.
 - c. Landscaping within the Management Area Buffer Zone shall utilize a preponderance of native vegetation.

E. OTHER CONSTRUCTION AND DESIGN RESTRICTIONS

1. Site grading shall be such that stormwater drainage from walkways, roadways, buildings, and other covered areas shall not flow into the Anchialine Pond Management Area or the Management Area Buffer Zone.
2. The wastewater collection, treatment, and disposal system shall be designed to prevent overflow during power outages or other emergencies from entering into the pond management area or into the Upgradient Control Zone.
3. All structures in Adjacent Sites, whether above or below grade, used for the storage of chemicals and petroleum products shall be designed to prevent spillage or leakage from entering into the Management Zones.

F. ANCHIALINE POND MANAGEMENT AREA USE RESTRICTIONS

1. Activities Prohibited Within the Anchialine Pond Management Area include:
 - a. Disposal of trash, stormwater, wastewater, or other unauthorized material of any kind.
 - b. Introduction of organisms of any kind into the ponds without the expressed written consent of the U.S. Fish and Wildlife Service.
 - c. Unauthorized feeding of pond organisms.
 - d. Unauthorized removal of pond organisms, to include fishing, gathering, collecting, or netting without the written consent of the Pond Manager.
 - e. Unauthorized use of pond organisms.
 - f. Any physical or hydrologic modification in the Anchialine Pond Management Area without written consent of the Pond Manager.
2. Controlled scientific collecting shall be limited to those experiments determined to be necessary for understanding the pond ecosystem and organism life requirements as determined and authorized by the Pond Manager.

G. ANCHIALINE POND MANAGEMENT AREA OPERATIONS

1. Objectives. The primary objectives of the pond management plan include, but are not limited to:
 - a. Maintenance of a viable anchialine pond ecosystem.
 - b. Expansion of scientific understanding of the anchialine pond ecosystems and the effects of urban development on them.
 - c. Education of residents and visitors of the unique nature and value of the anchialine pond resource in Hawaii.
2. Pond Management
 - a. The Pond Manager shall manage the Anchialine Pond Management Area.

- b. The Pond Manager can contract services to accomplish its responsibilities.
- c. In the event that the Pond Manager is unable to fulfill its management responsibilities, an individual, organization or government agency with a record of experience in wildlife conservation, management, environmental awareness, education and public relations will be designated as the Pond Manager by the Owner.
3. Responsibilities of the Pond Manager
- The Pond Manager shall carry out or cause to be carried out the following duties:
- a. Implement the programs required under the pond management plan, including the Anchialine Pond Management Area use restrictions described in Section F herein above.
 - b. Initiate programs to communicate the pond management objectives and use restrictions to adjacent landowners, their employees, and other users of adjacent lands.
 - c. Develop, schedule, and conduct resident and visitor education seminars, tours, and other programs to achieve the management objectives.
 - d. Monitor groundkeeping activities by the applicable hotel or condominium grounds keepers in the Management Area Buffer Zone to insure that their activities do not adversely affect the pond management area and to enforce the use restrictions.
 - e. Conduct a surveillance program to monitor the presence or absence of exotic fish in the ponds and, if exotic fish species are found, formulated and executed corrective measures.
 - f. Monitor and regulate human activities in the Anchialine Pond Management Area to prevent human disruption of the anchialine pond habitats and the unauthorized introduction of live organisms.
 - g. Conduct or assist in carrying out the monitoring program described in Section I of this plan.
 - h. Conduct, assist, facilitate, schedule, or coordinate scientific or education activities in the pond management area.

1. Provide semi-annual update and annual status reports concerning activities undertaken and actions occurring in the pond management area and provide results of the monitoring program to the Owner.
2. Notify the Owner of any unforeseen, deleterious events or occurrences in the Anchialine Pond Management Area.
- k. Carry out the monitoring program.
1. After all contemplated construction and development on Adjacent Sites have been completed, the Pond Manager will:
 - 1) Assume maintenance and replacement responsibility for signs posted initially by the applicant in accordance with the provisions of Section G, 4. a. herein below.
 - 2) Undertake and administer the policing of the Anchialine Pond Management Area. Provide all equipment and consumable supplies required for such activities.
4. Responsibilities of the Owner
 - a. Through the completion of construction and development of Adjacent Sites, the Owner shall post and maintain signs around the ponds informing viewers of the intent of the Anchialine Pond Management Area, use restrictions, and the availability of educational tours and seminars presented by the Pond Manager. The design of the signs shall be consistent with signage to be used elsewhere within the Kukio Beach Resort. Their informational content will be determined in consultation with the Pond Manager.
 - b. The Owner shall cooperate with the Pond Manager's efforts to assure that resort employees are made aware of the value and sensitive nature of the pond resource.
 - c. The Owner shall be responsible for providing funding support for the Anchialine Pond Management Plan to the extent stipulated in Section J herein below.
 - d. The Owner shall provide all notifications required from the Owner by this agreement, including advance notification of intended construction activity.

H. POND MONITORING REQUIREMENTS

1. The Pond Manager shall monitor water quality and faunal assemblages within the Pond Management Area on a periodic basis to assess the ecological viability and conditions of the pond ecosystems.
2. Construction Monitoring Requirements
 - a. Prior to beginning substantial new construction on a parcel adjacent to the Anchialine Pond Management Area, the applicant shall notify the Pond Manager of the nature of the proposed construction activity. This information will be used by the Pond Manager to determine the need for, and the appropriate duration of, any additional monitoring needed to establish baseline conditions and to detect and characterize daily and seasonal variations.
 - b. During the course of construction on Adjacent Sites, the preserved ponds shall be monitored by the Pond Manager at a frequency necessary to detect any adverse impacts on such ponds.
 - c. The ponds shall be monitored at least once each calendar quarter for a period of two years following completion of a construction project on an Adjacent Site. The monitoring frequency shall then be reduced to a frequency necessary to detect any long-term trends in pond water quality and faunal assemblages.
3. Parameters to be Monitored by the Pond Manager
 - a. Physical parameters to be monitored shall include, but are not limited to: salinity, temperature, water clarity, and dissolved oxygen profiles.
 - b. Chemical parameters to be monitored shall include, but are not limited to: nitrates, nitrites, phosphates, ammonia, petrochemicals, and chlorinated hydrocarbons.
 - c. Measurements shall be taken during all tidal cycles to detect any correlation between physical and chemical parameters and tidal influence.
 - d. Plant and animal populations shall be inventoried to develop detailed species lists and to calculate population, biomass, density, distribution and frequency of occurrence.

- 1) Inventories shall be conducted during all tidal cycles to detect any correlation between anchialine pond organism occurrence, population, biomass, density, distribution, behavior and the tides and physical and chemical parameters, and other parameters necessary to detect short-term and long-term changes.
 - e. Chlorophyll levels will be measured to monitor phytoplankton growth in the ponds.
6. Data Analysis
 - a. The data gathered in the monitoring program shall be used to further the scientific understanding of anchialine pond ecology.

I. REMEDIAL AND CORRECTIVE MEASURES

1. If there is the occurrence of such an unforeseen deleterious event, the Pond Manager shall determine the need for remedial and corrective action and shall undertake such action using monies provided for in Section J herein below.
2. The Pond Manager shall be responsible for implementing any corrective action or measures when any unforeseen, deleterious event or occurrence impacts the ecological viability of the pond preservation area.
3. Notwithstanding any future permit or regulatory approval conditions dealing with liability or responsibility of the Owner, the Owner shall be liable for funding any corrective work directed by the Pond Manager when an unauthorized action by the Owner or its employees or agents, within the scope of employment, which is intended to harm the ecological viability of the Anchialine Pond Management Area occurs.

J. FINANCIAL OBLIGATIONS

1. Funding. The purpose of this section is to provide sufficient money to administer the business contemplated under this Anchialine Pond Management Plan.
 - a. The Owner shall contribute an initial funding of _____ and pay an annual cost, in accordance with an agreed upon schedule subject to adjustments based on the Consumer Price Index, to provide sufficient money to administer the business contemplated under this Anchialine Pond Management Plan.

b. The funds contributed by the Owner under Paragraph J. 1. a. above shall be administered by _____ and shall be used to conduct the affairs of the Anahiale Pond Management Plan as set forth herein. The funds shall be managed under the doctrine of cy pres.

2. Office Facilities

a. Because of the necessity for the Pond Manager to be on-site for extended periods during monitoring, the Owner will provide, without rental compensation, by the Pond Manager space within the Kukio Beach Resort suitable for use by the Pond Manager on a non-exclusive basis, such space to be suitable for use as an office and equipment storage area. The Pond Manager shall also be granted ready access to available toilet facilities maintained by the Owner or its designees.