JOHN WAIHEE
GOVERNOR

FILE

ESTHER UEDA
EXECUTIVE OFFICER

STATE OF HAWAII

DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT, AND TOURISM
LAND USE COMMISSION
Room 104, Old Federal Building
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September 5, 1990

Dr. Bruce Anderson
Acting Director
Office of Environmental
Quality Control
465 South King Street
Room 104
Honolulu, Hawaii 96813

Dear Dr. Anderson:

Subject: Environmental Impact Statement for Honokohau Industrial Park/LUC Docket No. A89-643

This is to confirm the acceptance of the subject EIS by the State Land Use Commission through its Decision and Order dated May 10, 1990. A copy of this document was transmitted to you earlier.

Sincerely,

ESTHER UEDA
Executive Officer

EU:to

ENVIRONMENTAL IMPACT STATEMENT

FINAL

April 1990

HONOKOHAU INDUSTRIAL PARK

Honokohau, North Kona, Hawaii

TMK 7-4-08:26 and 49

ENVIRONMENTAL IMPACT STATEMENT

FINAL

April 1990

Prepared for:
Robert S. McClean
Trustee of the Robert S. McClean Trust

For Submittal to:
Hawaii Land Use Commission

Prepared by:
Helber Hastert & Kimura, Planners

Mark H. Hastert, Principal-in-Charge

HONOKOHAU INDUSTRIAL PARK

Honokohau, North Kona, Hawaii

TABLE OF CONTENTS

TABLE OF CONTENTS

LIST OF FIGURES

CHAPTER 1

INTRODUCTION AND SUMMARY

1.1 INTRODUCTION

This environmental impact statement (EIS) is prepared pursuant to Chapter 343 Hawaii Revised Statutes (HRS), as amended, and Subchapter 6, Section 15-15-50, Hawaii Land Use Commission (LUC) Rules. The EIS is to support the request for approval in concept to amend the State Land Use District boundaries from Conservation and Agricultural to Urban on all 89.5 acres of land within TMK parcels 7-4-08: 26 and 49 at Honokohau, North Kona, Island of Hawaii, State of Hawaii, and reclassify the 45.5-acre Increment I to the Urban District, as presented in this report consistent with provisions covering incremental districting (LUC Rule 15-15-78) discussed in Section 3.1.3.2. The EIS presents information required by Chapter 200 of Title 11, Administrative Rules, entitled "Environmental Impact Statement Rules" prepared by the State Department of Health.

The proposed action is being requested in order to comply with Condition #9 of Conditional Use Permit No. - HA 1873 (7/7/86) of the Board of Land and Natural Resources (BLNR) covering 3.5 acres in the northwest corner of the subject property. Said condition, as modified, required the petitioner to submit a petition to the Land Use Commission by June 13, 1989 to redesignate the 3.5-acre area covered by the Permit to "another zoning district more appropriate for the type of use". Furthermore, this request would allow for zoning consistent with Conditional Use Permit No. HA-637 (2/14/75) of the BLNR covering all 89.5 acres of the subject property. This permit allows for industrial activities including the quarrying of rock and production of concrete and related materials.

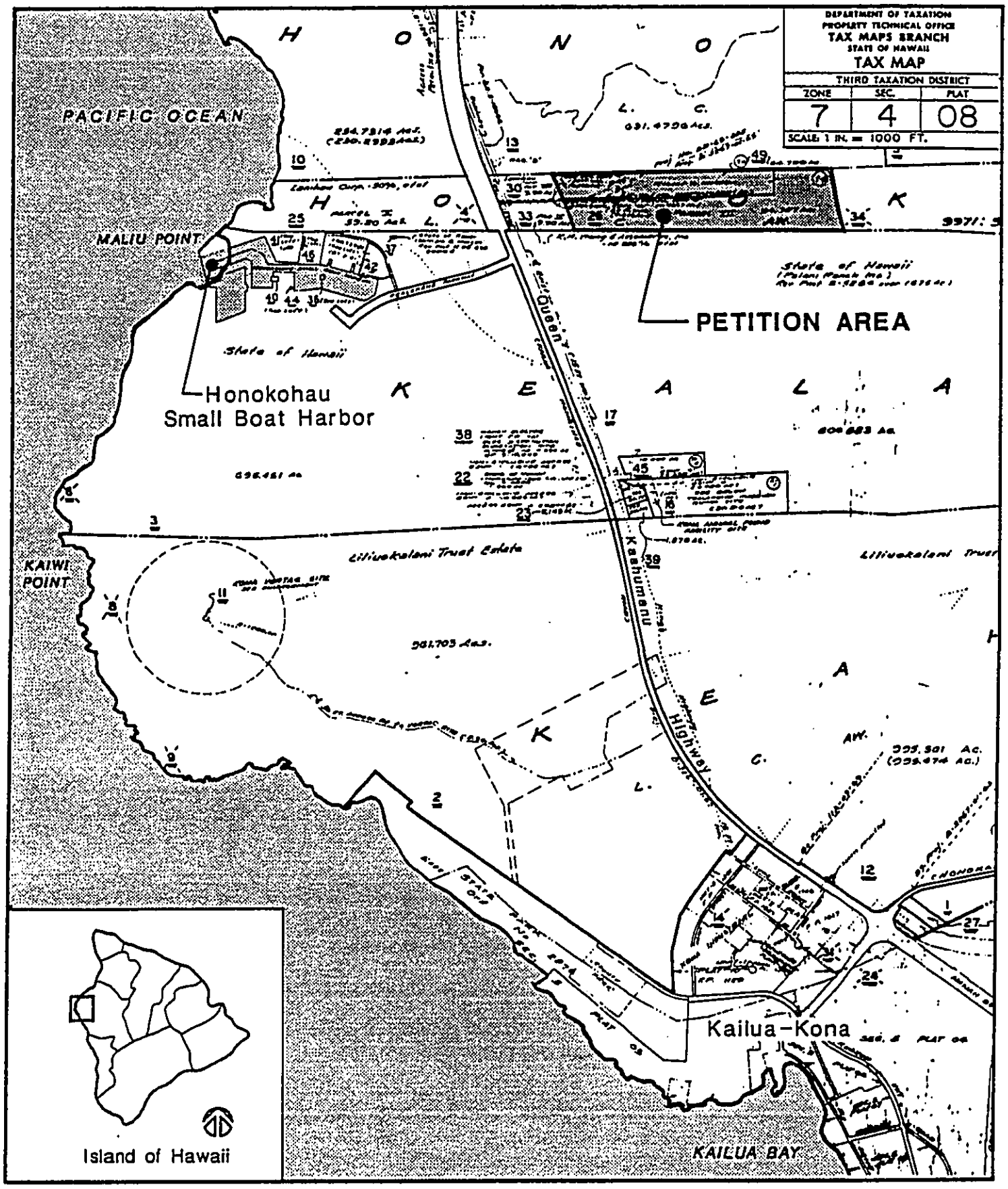
The project site is located about three miles north of Kailua-Kona, approximately 1,000 feet mauka of the Queen Kaahumanu Highway east-northeast of the Honokohau Small Boat Harbor (Figure 1). The makai 74.6 acres of the project site lie within the General Subzone of the State Conservation District. The mauka 14.9 acres are in the State Agriculture District.

1.2 DEFINITION OF TERMS

Petition Area: The 89.5-acre petition area covers two parcels: TMK 7-4-08:26 which covers 54.7 acres and TMK 7-4-08:49 which covers 34.8 acres.

Petitioner: The petitioner is Robert S. McClean, Trustee of the Robert S. McClean Trust, sole owner of the subject property and a resident of Kailua-Kona, Hawaii. The petitioner's residential address is 77-344 Sunset Drive, and mailing address is P.O. Box 3000, Kailua-Kona, Hawaii 96745-3000.

Petition Request: The petitioner requests the Land Use Commission to approve the entire 89.5-acre petition area for future urban development and to redesignate the 45.5-acre first increment from the State Conservation District to the State Urban District. This action is proposed in compliance with Condition #9 of Conditional Use Permit No. - HA 1873 (7/7/86) and for use of the site for various industrial activities as discussed in Section 2.4.



Honokohau Industrial Park

LOCATION MAP

Honokohau, North Kona, Hawaii

0 2000' Figure: 1

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1.3 DEVELOPMENT SUMMARY

Petitioner/ Landowner:	Robert S. McClean, as Trustee of the Robert S. McClean Trust P.O. Box 3000 Kailua-Kona, Hawaii 96745-3000
Petition Area:	89.5 acres (45.5 acres in Increment I)
Location:	Honokohau, North Kona District, Island of Hawaii
Tax Map Key:	Zone 7, Section 4, Plat 08, Parcels 26 and 49
State Land Use District:	Conservation and Agricultural
County of Hawaii General Plan:	Urban Expansion Area
County Zoning:	Open and Unplanned
Existing Uses:	Project site is presently used for quarrying of rock, operation of ready-mix concrete batch plant and production of concrete, sale and loading of aggregates, sale of concrete blocks, machinery repair facilities, boat storage and repair and equipment storage. Approximately 25 acres of the site have been heavily graded and/or excavated. Remainder of the site is covered by rough a'a and pahoehoe lava flows.
Proposed Uses:	Production and sale of concrete and concrete products; boat storage, sales and repair; lumber and hardware sales; automotive sales, service and repair; storage of trucks, buses and construction equipment; self-storage facilities; offices and storage areas for contractors; and, nurseries and other light industrial uses.
Proposed Action:	The petitioner requests the State Land Use Commission to approve the entire 89.5-acre petition area for future urban development and to redesignate the 45.5-acre first increment from the State Conservation District to the State Urban District.

1.4 ALTERNATIVES CONSIDERED

The evaluation of alternatives to the proposed project included no action and alternative uses (see discussion in Chapter 5). The proposed use of the petition area was determined to be the most appropriate alternative based on the following factors: 1) The petitioner's objective of maintaining existing uses (except quarrying) within the petition area; 2) The present demand for industrial land in the Kona area for activities that are proposed herein; and 3) Ongoing State, County, and private development plans being proposed for the general Kona area.

1.5 SUMMARY OF PROBABLE IMPACTS

Regional Land Use

The region between Kailua-Kona and Keahole Airport bisected by the Queen Kaahumanu Highway is undergoing transition from an undeveloped open space corridor to a wide range of urban uses as a result of significant historic and anticipated growth in the West Hawaii economic base. Major resorts, light industrial subdivisions and planned residential communities have been and will be developed within the corridor. Regional public facility improvements planned for the area include major expansion of the Keahole Airport, a new regional wastewater treatment plant, and the widening of the Queen Kaahumanu Highway. State and County regional planning efforts have identified this region as the primary growth center for the Kona area. A notable exception to the projected transition is represented by the proposed development of a National Historic Park, located along the coastline between the Honokohau Small Boat Harbor and the proposed Kohanaiki Resort.

The petition request to reclassify the subject site to the Urban District is viewed as being consistent with the overall development pattern of the region. Mitigative measures proposed herein regarding the management of operations, siting of structures and activities, visual buffering, hazardous material handling and storage, and wastewater/storm drainage systems will serve to minimize potential adverse impacts on adjacent lands and the general area (Section 4.1.2).

Flora and Fauna

Based on a review of biological surveys conducted in the area, no endangered animal or plant species appear to inhabit the project site. As a result, the proposed action is not expected to adversely impact flora and fauna populations in the area (Section 4.1.4).

Historical and Archaeological Resources

An archaeological inventory survey was conducted for the petition area by Paul H. Rosendahl, Ph.D., Inc. The survey identified a total of 60 sites. Fourteen of the sites (which consisted of pahoehoe excavations, cairns, a rock concentration, a faced mound, a wall, a rock overhang, and a modified outcrop) provided sufficient data during the survey and no further study is recommended. The remaining 46 sites have been determined to require additional data collection. Of this total, 36 sites are considered to be significant solely for their information content. The other 10 sites also have possible cultural significance. Nine of these sites may contain burials and are tentatively recommended for preservation "as is" pending further data collection results. One site, a kerbstone trail section, is not assessed as an excellent example of a site type and is not recommended for preservation (Section 4.1.5).

Air Quality

The major sources of pollutants are increased emissions from construction machinery and fugitive dust emissions from exposed ground, earth moving, and vehicular movement along unpaved roads. Long-term air quality could improve with the elimination of quarrying operations (Section 4.1.6).

Traffic

The proposed project is estimated to generate a total of 2,285 weekday vehicle trips to or from the planned uses, when fully developed in 1995. The development would increase traffic volumes entering/exiting the project access road by 234 and 246 vehicles during the morning and afternoon peak hours, respectively. Traffic turning left from the Access Road would experience delays equivalent to Level of Service "F" conditions during both peak periods, which would warrant mitigative actions. Development of the 44-acre Increment II area would generate about 2,760 vehicle trips to or from the project on a typical weekday (Section 4.3.1).

Water

The net increase in demand for potable water in Increment I of the petition area is estimated at approximately 2,000 to 2,500 gpd. Water use within the area will remain at existing levels until new sources are developed or otherwise approved by the County Department of Water Supply. New source development would be required to service Increment II. (Section 4.3.2)

Wastewater

Wastewater disposal within Increment I is expected to be in the range of 5,000 to 6,000 gallons per day. Disposal is proposed to be provided by cesspools, except in a small portion of the makai area where septic tanks may be required. All disposal facilities will be in conformance with applicable State and County regulations. Contaminants introduced by water percolating downward from the project would be diluted and dispersed in the flow of groundwater toward the shoreline. Adverse impact on nearshore and groundwater resources is expected to be minimal from the proposed project (Sections 4.1.9 and 4.3.3).

Storm Drainage

Surface water runoff from the site will be altered. The extent of change will ultimately depend upon the amount of paving and other impermeable surfaces that will occur with the area and the actual configuration of the storm drainage system. Proposed uses in Increment I are estimated to generate a potential surface water runoff of approximately 100 cubic feet per second (cfs) for a 10-year storm. Adverse impact on nearshore and groundwater resources is not expected to occur from storm drainage (Sections 4.3.4).

Power/Communications

Hawaii Electric Light Company estimates the electrical load from Increment I to be approximately 3,753 KVA. New transmission and distribution facilities would be required to accommodate the new load in the petition area. Hawaiian Telephone Company would continue to service the site via its existing line along the Access Road. (Section 4.3.5)

1.6 SUMMARY OF MITIGATING MEASURES

Noise

All development will be designed and constructed to comply with governmental standards. Particular attention will be given to the siting of uses and structures

along the petition area boundary with the Kealakehe area where residential uses are proposed. Uses which are likely to generate higher levels of noise will be located away from residential areas. Lease conditions and/or use covenants will be used to ensure that future residents at Kealakehe are protected from undo noise or other detrimental business activities in the petition area (Section 4.1.7).

Visual/Scenic Impacts

A buffer area with landscaping improvements (similar to those proposed for the parcel makai of the subject property) will be maintained along the property boundary and potential roadways, where appropriate, in order to minimize visual impacts of the industrial activities on adjacent future uses (Section 4.1.8).

Storm Drainage

The on-site drainage system will consist of catch basins and County standard drywells designed to retain storm waters within the site. Drainage runoff will be bermed or curbed such that runoff from individual sites will be contained within the site. Drywells will be added under all terminal catch basins in order to enhance percolation and filtration of storm water into the substrata, rather than have the storm water surface flow towards the ocean (Section 4.3.4).

Industrial Materials/Wastes

Any industrial wastes generated by activities within the petition area will be collected and handled according to applicable Federal, State and County government regulations. Maintenance work on machinery and equipment will be performed on concrete decks, as will the washing down of any equipment. All environmentally harmful materials used in cleaning mechanical parts or for hand washing purposes will be used in contained areas with concrete floors and will be kept in appropriate containers (Section 4.1.11).

Traffic Impacts

By 1995, the traffic turning left to travel south from the project site on Queen Kaahumanu Highway would likely have to be accommodated through a road connection to Kealakehe Parkway, and the use of the traffic signal or grade-separation at its intersection with Queen Kaahumanu Highway. Therefore, the following measures are proposed: 1) Initially, permit left-turns to be made both into and out of the project access roadway (Access Road) at Queen Kaahumanu Highway. Construct a left-turn storage lane on Queen Kaahumanu Highway for southbound vehicles turning into the Access Road; 2) When the mauka extension of Kealakahe Parkway is completed, construct a frontage road or direct roadway connection from the petition area to Kealakahe Parkway for use by exiting southbound project traffic; and 3) Upon completion of item 2, provide signing and channelize the Access Road intersection with Queen Kaahumanu Highway to prohibit left turns. An alternative to the last proposal would be to close the Access Road. The location of the Increment II area, and the volume of trips generated, indicate that this area should be directly connected by an access road to Kealakahe Parkway and/or to future north-south roadways mauka of Queen Kaahumanu Highway. (Section 4.3.1).

1.7 RELATIONSHIP OF LAND USE PLANS AND POLICIES

A discussion of the relationship to land use plans and policies is presented in Chapter 3. The proposed action is consistent with all relevant public goals, objectives, policies, plans and controls, except for the necessary zoning, subdivision and building permits of the County of Hawaii. These permits and others as may be deemed necessary by the County will be the subject of subsequent applications pending reclassification of the site.

1.8 NECESSARY PERMITS AND APPROVALS

The petitioner intends to proceed with change of zone applications and other necessary permits and approvals as may be required by the County of Hawaii pending favorable action of the Land Use Commission regarding the subject petition.

CHAPTER 2

DESCRIPTION OF PROPOSED PROJECT

This chapter describes the proposed Honokohau Industrial Park. The discussion begins with an overview of the project location, which is followed by a discussion of the existing uses at the site. A overview of the development objectives is then presented, leading to the discussion of the petitioner's proposed use of the property. The chapter concludes with the rationale for the proposed uses.

2.1 LOCATION

The petition area is located about three miles north of Kailua-Kona, four miles south of Keahole Airport, and approximately 1,000 feet mauka of the Queen Kaahumanu Highway east-northeast of the Honokohau Small Boat Harbor.

2.2 EXISTING USES

Makai portions of the petition area (Figure 2) are presently used for operations of West Hawaii Concrete that include quarrying of rock, operation of a ready-mix concrete batch plant and production of concrete, sale and loading of aggregates, sale of concrete blocks, machinery repair facilities, a test lab, equipment storage and office space. The area also has 3.5 acres utilized for boat storage and repair. Approximately 25 acres of the site have been heavily graded and/or excavated. The remainder of the site is covered by rough a'a and pahoehoe lava flows.

2.3 DEVELOPMENT OBJECTIVES

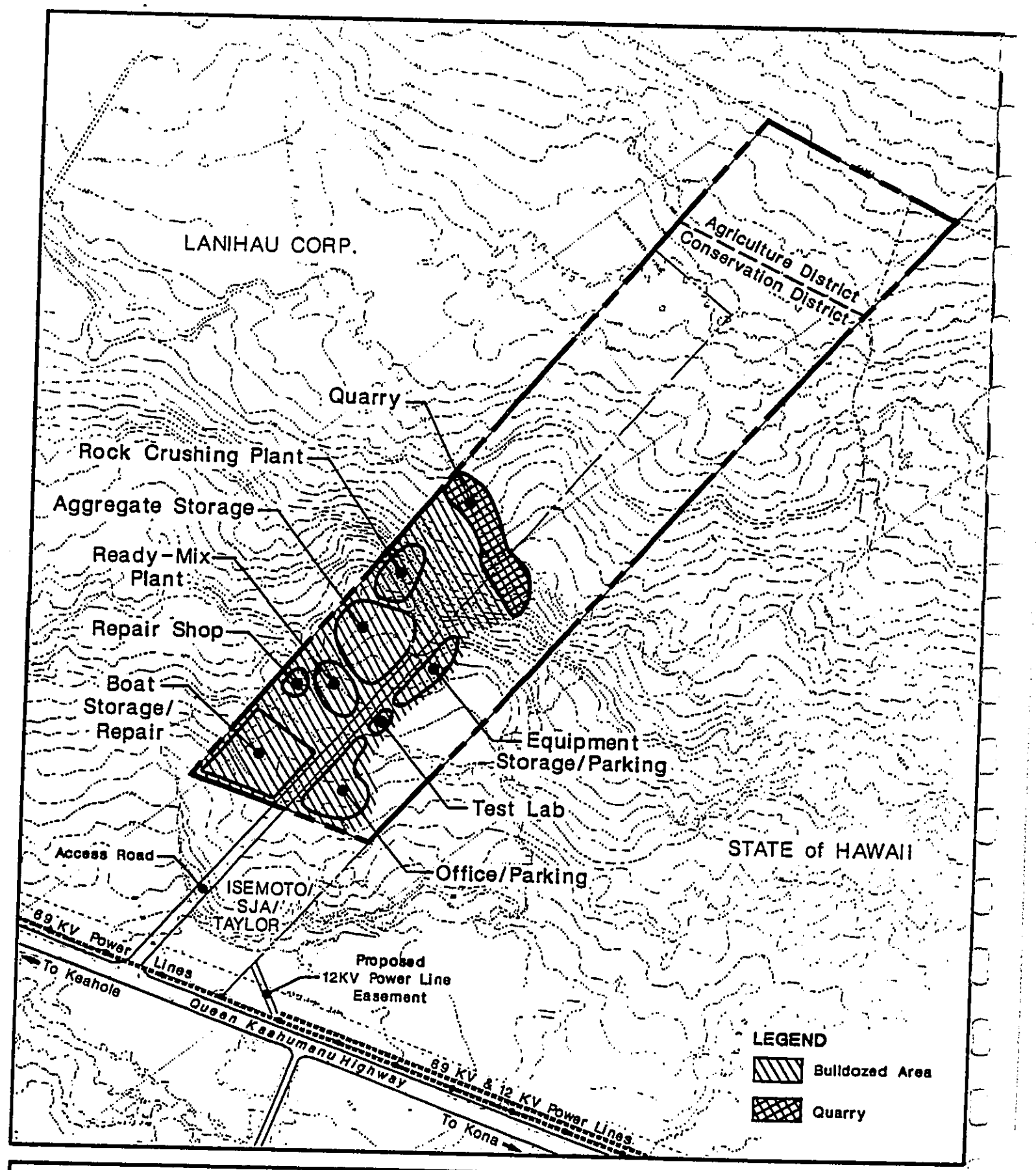
The Honokohau Industrial Park is intended to address the current and future demand for industrial acreage and related uses in the Kona region. Specific development objectives of the petitioner are to:

- Continue existing operations at the site, except for quarrying;
- Provide land for light industrial activities which generally require larger lots and open storage areas; and
- Supply land for business activities which provide support services to civic and retail uses in the area.

2.4 PETITIONER'S PROPOSED USE OF THE PROPERTY

The petitioner seeks incremental districting of the subject property to develop the site for light industrial and commercial/service-related uses. Figure 3 provides an overview of the conceptual development of the 45.5-acre Increment I. The following discussion describes the specific uses being proposed.

Concrete Operations. The petitioner proposes to include approximately 11 acres for West Hawaii Concrete to continue: 1) the production and sale of ready-mix concrete, concrete products, and related activities of concrete pumping, repair and maintenance, and 2) the short-term production and sale of quarry products, and related activities of repair and maintenance.



Honokohau Industrial Park

EXISTING USE/SITE CONDITIONS

Honokohau, North Kona, Hawaii

0 600'

Figure: 2

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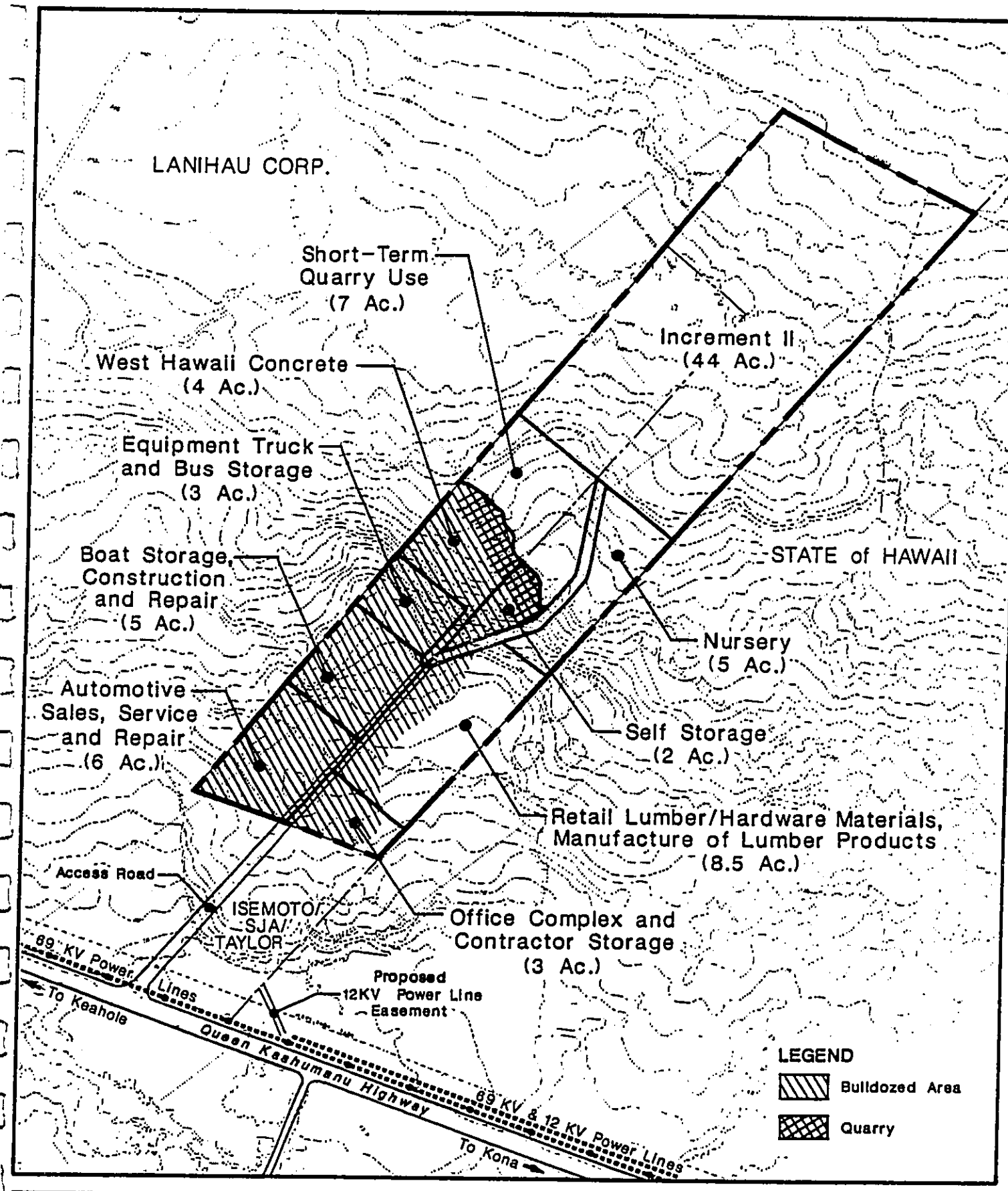

Honokohau Industrial Park

CONCEPT DEVELOPMENT MAP

Honokohau, North Kona, Hawaii

0 600'

Figure: 3

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In the short-term, the existing quarry in the petition area is expected to be an important source of raw materials for the construction industry in Kona. However, as new activities locate within the petition area and development occurs on surrounding lands, the petitioner intends to eliminate quarrying operations at the site. Prior to discontinuation of this activity, the quarry area would be layered and sculptured in order to improve the general characteristics of the site and maximize the amount of land that would be available for new activities.

Marine Industrial. Approximately 5 acres will be provided for the continuation of the storage, construction, repair and maintenance of boats and other marine-related activities, and the potential sale of boats and related marine products.

Lumber/Hardware Operations. Approximately 8.5 acres are intended for the sale of lumber, hardware and other construction materials and services, and the manufacture of lumber products (e.g., trusses, cabinets, furniture).

Storage Operations. Approximately 2 acres are proposed for the development of self-storage facilities.

Automotive Operations. Approximately 6 acres are proposed for the development of an automotive repair and service center, and an automotive sales lot for new and/or used cars.

Equipment Storage. Approximately 3 acres are proposed for the storage of trucks, buses and construction equipment.

Contractor Operations. Approximately 3 acres are intended for office and storage facilities for contractors and small businesses that do not require retail space and exposure.

Nursery Operations. Approximately 5 acres are intended for the production and sale of nursery products.

Roadways. Approximately 2 acres of land will be required for onsite roads which will have a minimum right-of-way of 60 feet.

The activities discussed above and their location within Increment I are subject to future revision, in so far as other types of light industrial uses could be included. Beyond those activities which currently exist within the petition area, the determination at this point in time of additional activities to be included is largely based on discussions with business operators in the area who have indicated an interest in acquiring space from the petitioner. Ultimate development of the area and the specific types of uses will depend on market forces in the region. Nevertheless, Increment I of the petition area is intended to provide space for light industrial activities which generally require larger lots and open storage areas.

Increment II of the petition area is proposed to be developed for commercial and service-related uses. This would include uses intended to support proposed civic activities at Kealakehe, along with uses that would support the general economic development of the region. Specific types of activities could include low-scale offices, restaurants and other related commercial operations, as well as wholesale services to retail businesses (e.g., wholesalers to restaurants), businesses which produce local consumer goods (e.g., bakeries, print shops), business services which support the local building industry, light manufacturing, etc.

2.5 PROJECT RATIONALE

The basic rationale for development of Increment I is the existing lack of available land in the Kona area for industrial development, particularly for those types of uses described above. At present, two areas provide the only supply of industrial acreage in the Kona area. One is the Kona Industrial Subdivision adjacent to Kailua-Kona. This area, which is 100 percent developed, has provided land for industrial activities for many years. However, because of the growth and popularity of the Kona area, land prices in the subdivision (along with prices throughout the entire region) have increased to the point that a number of industrial uses have relocated elsewhere. Today, a majority of activities in the Kona Industrial Subdivision are, in reality, commercial and retail operations rather than industrial.

In the near future, the Queen Liliuokalani Trust (landowner of the Kona Industrial Subdivision and surrounding lands) plans to begin development of 100 acres adjacent to its existing industrial subdivision. This area can be expected to satisfy some of the demand for industrial activities, but is not likely to be suitable for the type of operations proposed for Increment I at the Honokohau Industrial Park. According to Mike Mackin, Commercial and Industrial Real Estate Specialist in the Kona area, "prices for land within the expansion area near Kailua-Kona are not expected to be conducive to warehousing, automotive operations, open storage, and other activities requiring larger lots" (personal communication, January 8, 1990).

The second industrial area is the Kaloko Light Industrial Subdivision, located approximately one mile north of the petition area. This area consists of 194 one-acre lots. All lots within the Kaloko subdivision have been sold, and approximately 50 percent have been developed. Because of the size of the lots and conditions which encumber their use (including restrictions limiting open storage), land within the Kaloko Light Industrial Subdivision is also not conducive for uses proposed in Increment I of the petition area.

The petitioner has maintained quarrying and concrete operations, contractor storage yards, and similar activities within the petition area since 1975. His business expertise, knowledge of the industrial land market in the Kona area, and contacts with other business operators provide the basis for the conceptual development of Increment I. According to Mr. Mackin, "there are no lots of one acre or more in the Kona area available for industrial development" (ibid). This fact, along with the previous discussion, supports the petitioner's proposed land uses within Increment I.

The rationale for the development of the mauka 44-acre Increment II is strongly influenced by State, County, and private land use plans which are being proposed in the area. In particular, ongoing government planning efforts (discussed in Chapter 3) are directing urban expansion and growth of regional activities to the general vicinity of the petition area. Based on the petitioner's determination of the most appropriate uses that would be compatible with development in Increment I, and conceptual land use and roadway plans for the area, the petitioner proposes to provide land in Increment II for commercial and service-related activities as described earlier.

CHAPTER 3

RELATIONSHIP OF THE PROPOSED PROJECT TO EXISTING PUBLIC PLANS, POLICIES AND CONTROLS

This chapter analyzes the relationship of the proposed Honokohau Industrial Park with existing State and County public plans, policies, and controls as required by Section 11-200-17(h) of the Department of Health Chapter 200 Environmental Impact Statement Rules.

3.1 STATE

3.1.1 Hawaii State Plan

The Hawaii State Plan (Chapter 226, HRS, as amended), represents public consensus regarding expectations for Hawaii's future. First enacted in 1978, the plan establishes a set of goals, objectives and policies which serve as long-range guidelines for the growth and development of the State. As the result of a mandated two-year comprehensive review process, the 1986 Legislature updated the State Plan to reflect changes in public priorities.

A review of the overall themes, goals, objectives, policies and priority guidelines of the recently revised State Plan was made to determine the consistency of the proposed action with the Plan. The analysis indicates that the proposed action is in conformance with the State Plan.

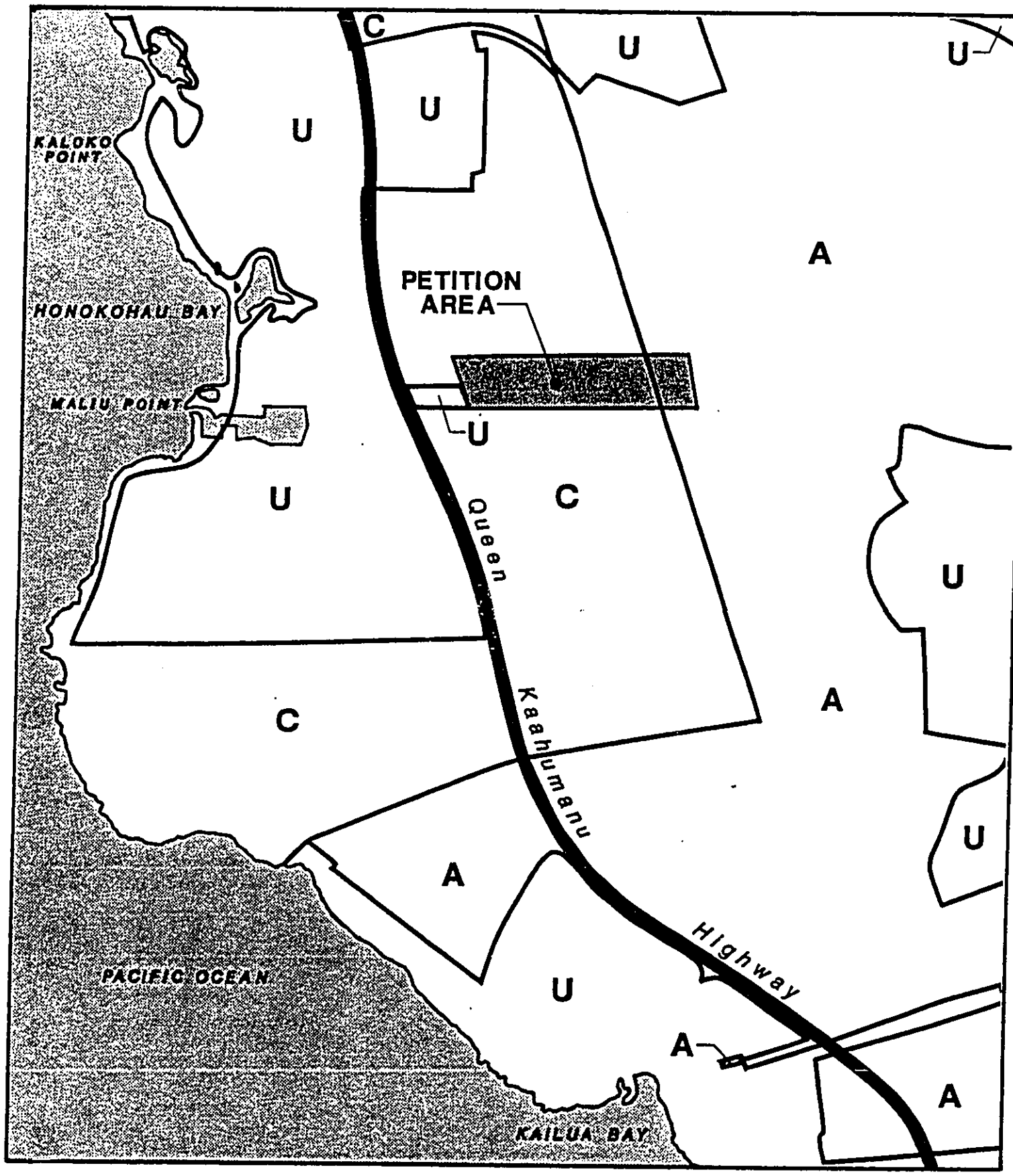
3.1.2 State Functional Plans

The Hawaii State Plan directs the appropriate State agencies to prepare functional plans for their respective program areas. The plans set forth "... the policies, statewide guidelines, and priorities within a specified field of activity, when such activity is proposed, administered, or funded by any agency of the State" (Section 226-2 (10), HRS). Each functional plan contains objectives to be achieved and policies to be pursued within the specified areas. The Hawaii State Plan directs that "...County general plans and development plans shall be taken into consideration in the formulation and amendment of the state functional plans" (Section 226-52(a)(por. 3), HRS)

To date, twelve Functional Plans have been adopted by Legislative Resolution. All twelve plans were reviewed to determine consistency with the proposed action. Relevant plans examined included the State Conservation Land Functional Plan and the State Historic Preservation Functional Plan prepared by the State Department of Land and Natural Resources, the State Health Functional Plan prepared by the State Department of Health, and the State Tourism Plan prepared by the Department of Planning and Economic Development. The review analysis indicated that the proposed action is in general conformance and does not conflict with objectives, policies and implementing actions of the twelve plans.

3.1.3 State Land Use Law

All lands within the State have been classified into one of four land use districts, Urban, Rural, Agricultural, and Conservation, by the State Land Use Commission pursuant to Chapter 205, HRS. The makai 74.6 acres of the petition area lie within the State Conservation District (Figure 4). The remaining 14.9 acres lie within the



Honokohau Industrial Park
STATE LAND USE DISTRICT MAP

Honokohau, North Kona, Hawaii

0 2400'

Figure: 4

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Agricultural District. Urban Districts encompass large tracts of land makai of the Queen Kaahumanu Highway in the vicinity of the petition area. A 10-acre parcel of land makai of the petition area owned by Isemoto, SJA and Taylor was reclassified from Conservation to Urban in April 1989. Approximately one mile north of the petition area lies the Kaloko Light Industrial Subdivision which was reclassified from the Conservation District to the Urban District in 1985. Other lands in the vicinity of the petition area are in the Conservation and Agricultural Districts.

The State Land Use Commission Rules, adopted September 1986, require that an application for a boundary amendment show that it is "reasonable, not violative of Section 205-2 HRS and consistent with the policies and criteria established pursuant to Sections 205-16, 205-17 and 205A-2, HRS" (Hawaii Land Use Commission Rules, Section 15-15-77). In reviewing petitions for reclassification of district boundaries, the commission must specifically consider four criteria. The criteria are presented below, followed by a brief discussion of each criterion.

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;"

Comment: As discussed in Section 3.1.1 and 3.1.2 of this report, the proposed action is consistent with the goals, objectives and policies of the Hawaii State Plan and the guidelines of the State Functional Plans.

2. "The extent to which the proposed reclassification conforms to the applicable district standards."

Comment: The applicable standards for the Urban District are found in Section 15-15-18 of the Land Use Commission Rules. These are reprinted and discussed below.

In determining the boundaries for the Urban District, the following standards will be used:

A. It shall include lands characterized by a "city-like" concentration of people, structures, streets, urban level of services and other related land uses;

B. It shall take into consideration the following specific factors:

- o Proximity to centers of trading and employment facilities except where the development would generate new centers of trading and employment;
- o Substantiation of economic feasibility by the petitioner;
- o Proximity to basic services such as sewers, water, sanitation, schools, parks, and police and fire protection; and
- o Sufficient reserve areas for urban growth in appropriate locations based on a ten year projection;

C. It shall include lands with satisfactory topography and drainage and reasonably free from the danger of floods, tsunami and unstable soil conditions and other adverse environmental effects;

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;

E. It may 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;

F. It may include lands which do not conform to the standards in paragraphs (1) to (5):

- o When surrounded or adjacent to existing urban development; and
- o Only when such lands represent a minor portion of this District;

G. It shall not include lands, the urbanization of which will contribute towards scattered spot urban development, necessitating unreasonable investment in public infrastructure or support services;

H. It may include lands with a general slope of twenty percent or more which do not provide open space amenities 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's health, welfare and safety, and the public's interests in the aesthetic quality of the landscape.

Comment: The petition request meets the Urban District standards. The petition area is located strategically between Kailua-Kona and the Keahole Airport within an area proposed as Urban Expansion Area in the recently revised Hawaii County General Plan (November 1989). Urban District lands are located adjacent to the makai property boundary (property owned by Isemoto/SJA/Taylor was granted urban districting in April 1989), on much of the lands makai of the Queen Kaahumanu Highway and within one mile to the north. Additionally, State and Queen Liliuokalani Trust development plans are expected to create urban areas south of the petition area at Kealakehe and Keahuolu. A significant amount of the petition area is currently used for urban industrial activities and land in the Kona region suitable for the proposed uses is in limited supply.

3. "Impact on Areas of Statewide Concern."

A. Preservation or maintenance of important natural systems or habitats.

Comment: There are no native or endangered species' habitats within the vicinity of the proposed project site (Section 4.1.2).

B. Maintenance of valued cultural, historical, or natural resources.

Comment: An archaeological inventory conducted in the petition area identified a total of 60 sites. Data collected from 14 of these sites is considered sufficient and further analysis is not required. Further data collection is recommended for the remainder of the sites. A data recovery plan will be prepared and implemented for sites that are not ultimately recommended for preservation and interpretation. One site along the southern boundary of the petition area is assessed as significant for

information content, as an excellent example of site type, and as possibly culturally significant. Further data collection, including test excavations, and preservation with interpretive development is recommended for this site.

C. Maintenance of other natural resources relevant to Hawaii's economy, including, but not limited to, agricultural resources.

Comment: The proposed action will not cause the loss of any prime agricultural land or ongoing agricultural activities.

D. Commitment of state funds and resources

Comment: No direct State funds or resources are required for the development of the petition area.

E. Provision for employment opportunities and economic development.

Comment: The proposed action will contribute to the diversification of the economic base of the County and the Kona region and will provide a variety of jobs to island residents.

F. Provision for housing opportunities for all income groups, particularly the low, low-moderate and gap groups.

Comment: No housing is being proposed within the petition area.

4. In establishing the boundaries of the districts in each county, the Commission shall give consideration to the General Plan of the County in which the land is located.

Comment: As noted in Section 3.2, the recently revised Hawaii County General Plan (November, 1989) designates the area as Urban Expansion Area.

3.1.3.1 Conservation Lands

All uses within the State Conservation District fall under the jurisdiction of the State Department of Land and Natural Resources (DLNR) and are subject to the Administrative Rules of the DLNR providing for land use within the Conservation District pursuant to Section 183-41, HRS, as amended.

The makai 74.6 acres of the petition area (encompassing all of the Increment I acreage) currently lie within the General Subzone of the Conservation District. The objective of the general subzone is to "... designate open space where specific conservation uses may not be defined, but where urban uses would be premature" (Section 13-2-14 (a), Administrative Rules). The boundaries of the general subzone generally encompass "... 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; and lands suitable for farming, flower gardening, operation of nurseries or orchards, grazing; including facilities accessory to these uses when said facilities are compatible with the natural physical environment" (Section 13-2-14 (b)(1)(2), Administrative Rules).

The petitioner was granted a Conservation District Use Permit (CDUP) by the State Board of Land and Natural Resources (BLNR) on February 14, 1975 to allow for industrial activities including the quarrying of rock and production of concrete and

related materials. The petitioner was granted a second CDUP by the Board on July 7, 1986, allowing for boat storage and marine repair and maintenance activities. A condition of the CDUP required the petitioner to submit a petition to the Land Use Commission by June 13, 1989 to redesignate to area covered by the second permit "to another zoning district more appropriate for the type of use." Copies of both permits are attached as Appendix A.

3.1.3.2 Project Phasing and Incremental Districting

Full development of the 89.5-acre petition area will take as much as ten years or more to complete. Increment I, the 45.5-acre makai half of the site, is expected to be absorbed within five years after the date of final zoning approval of the property by the County.

Land Use Commission Rules pertaining to incremental districting allow for the reclassification of larger tracts of lands under certain conditions described below:

15-15-78 Incremental Redistricting. (a) If it appears to the Commission that full development of the total premises cannot substantially be completed within 5 years after the date of the final county zoning approval and that the incremental development plan submitted by the petitioner can be substantially completed, and if the Commission is satisfied that all other pertinent criteria for redistricting the premises or part thereof to urban are present, then the Commission may:

(1) Grant the petitioner's request to reclassify the entire property to urban; or

(2) Redistrict to urban only that portion of the premises which the petitioner plans to develop first and upon which it appears that total development can reasonably be completed with five years after the date of the final county zoning approval. At the same time, the Commission will indicate its approval of the future redistricting to Urban of the total premises requested by the petitioner, or so much thereof as shall be justified as appropriate therefore by the petitioner, such approval to indicate a schedule of incremental redistricting to Urban over successive periods not to exceed five years each. The commission may reclassify the subject property to urban, if it finds such a change is justified (Hawaii Land Use Commission Rules).

3.1.4 West Hawaii Regional Plan

The West Hawaii Regional Plan, a regional planning effort coordinated by the Office of State Planning, was finalized in November 1989. The State's interest in formulating and implementing a plan for the West Hawaii region were to:

- Coordinate State activities in the region in order to respond more effectively to emerging needs and critical problems;
- Address areas of State concern;
- Coordinate the Capital Improvements Program within a regional planning framework; and
- Provide guidance to State land use decision-making processes.

The plan is intended to complement the County of Hawaii's General Plan and Community Development Plans.

The planning area of the regional plan includes the judicial districts of North Kohala, South Kohala, and North Kona, in which the petition area is located. The plan specifically recognizes the North Kona region to be a primary growth center in the future. As such, the plan identifies the Kailua-Kona to Keahole Airport area as a "subregional planning area." (Figure 5) This area is intended for the expansion of uses which "support resort development, housing development, industrial development, agricultural development, and a host of ancillary services." Figure 5 shows the petition area is located near the center of the subregional planning area.

The above analysis indicates the proposed action would be in conformance with the intent of the West Hawaii Regional Plan.

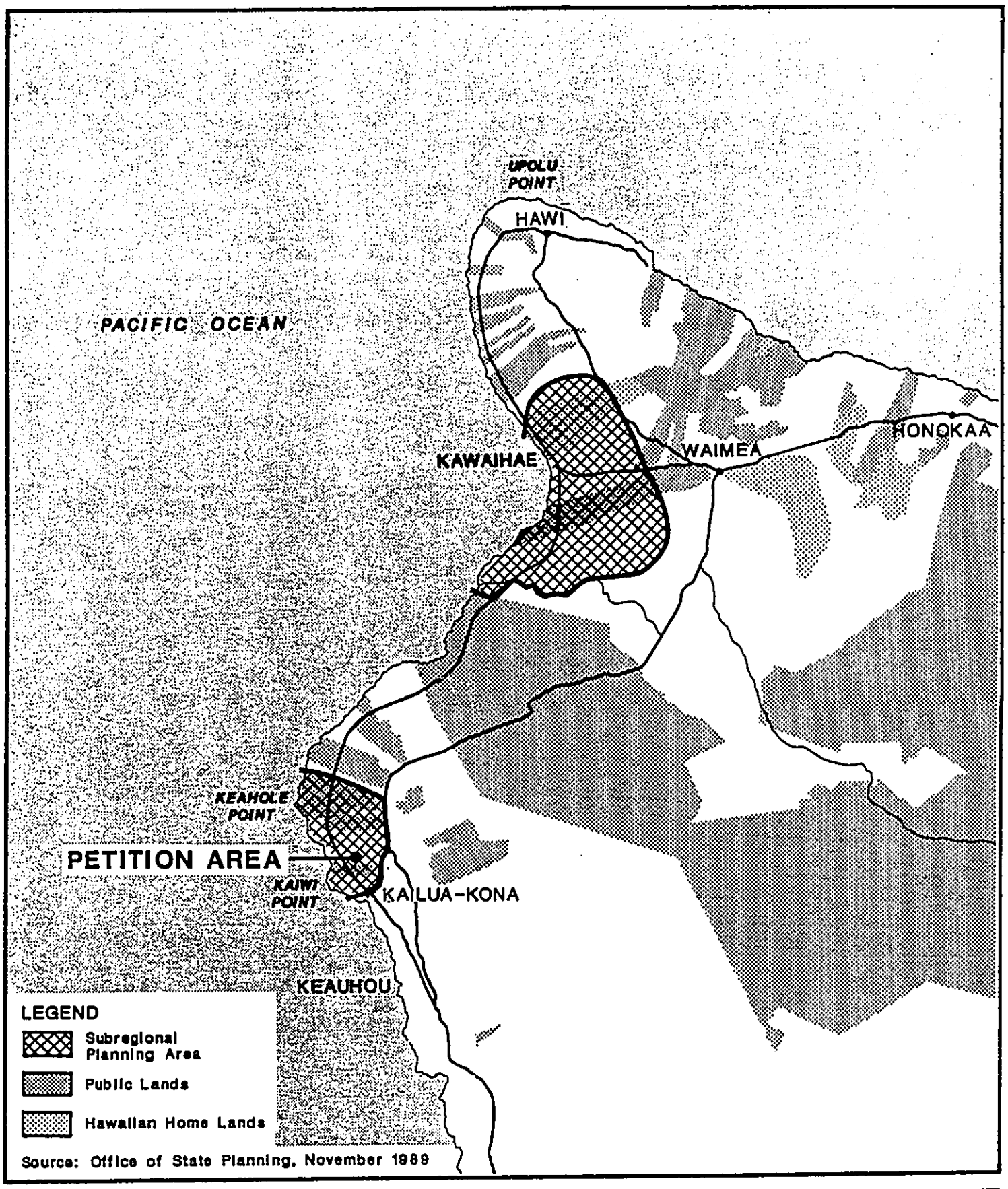
3.1.5 Kealakehe Planned Community Development Plan

On December 15, 1989, the Board of Directors of the Housing Finance and Development Corporation approved a plan for development of State lands at Kealakehe, North Kona, Island of Hawaii. The plan encompasses 840 acres of State land, and up to 450 acres of land to the south owned by the Queen Liliuokalani Trust . The petition area is adjacent to the northern boundary of the Kealakehe Planned Community.

As shown in Figure 6, the primary focus of the approved plan is to provide housing. Depending on the final density of development, a total of approximately 5,400 housing units could be provided within the planning area (HFDC Fact Sheet, December 15, 1989). This housing is intended to be developed around a "Village" concept, similar to the Kapolei Planned Community on Oahu. Other planned uses at Kealakehe include a civic center, golf course, commercial areas, schools (including a new high school), recreational areas, and church/daycare facilities.

Key roadway plan elements include one mauka-makai parkway (120 foot right-of-way), a mid-level parkway (120 foot right-of-way) aligned parallel to Queen Kaahumanu Highway along the mauka boundary of the petition area, and a second mid-level roadway (60 foot right-of-way) located near the existing housing area in the mauka Kealakehe area.

As currently approved, the Kealakehe Community Plan proposes residential uses for most of the land adjacent to the petition area. The first phase of development is expected to include construction of the golf course, 90 acres of residential land adjacent to the existing mauka residential community, and the mauka-makai parkway. The marketability and timing of future phases of development is still uncertain. However, construction is expected to proceed from mauka areas to makai. Therefore, development of lands adjacent to the petition area is not likely to occur within the near future. Conceivably, the actual market for this property could change in the future, with the result being development of uses other than residential. Nevertheless, construction and operation of businesses within the petition area will include mitigative measures to avoid and minimize potential impacts on residential areas resulting from activities in the petition area. (See discussion in Chapter 4 for an analysis of the potential impacts and mitigating measures of the proposed project.)



Honokohau Industrial Park
WEST HAWAII REGIONAL PLAN

Honokohau, North Kona, Hawaii

0 8 Mile

Figure: **5**

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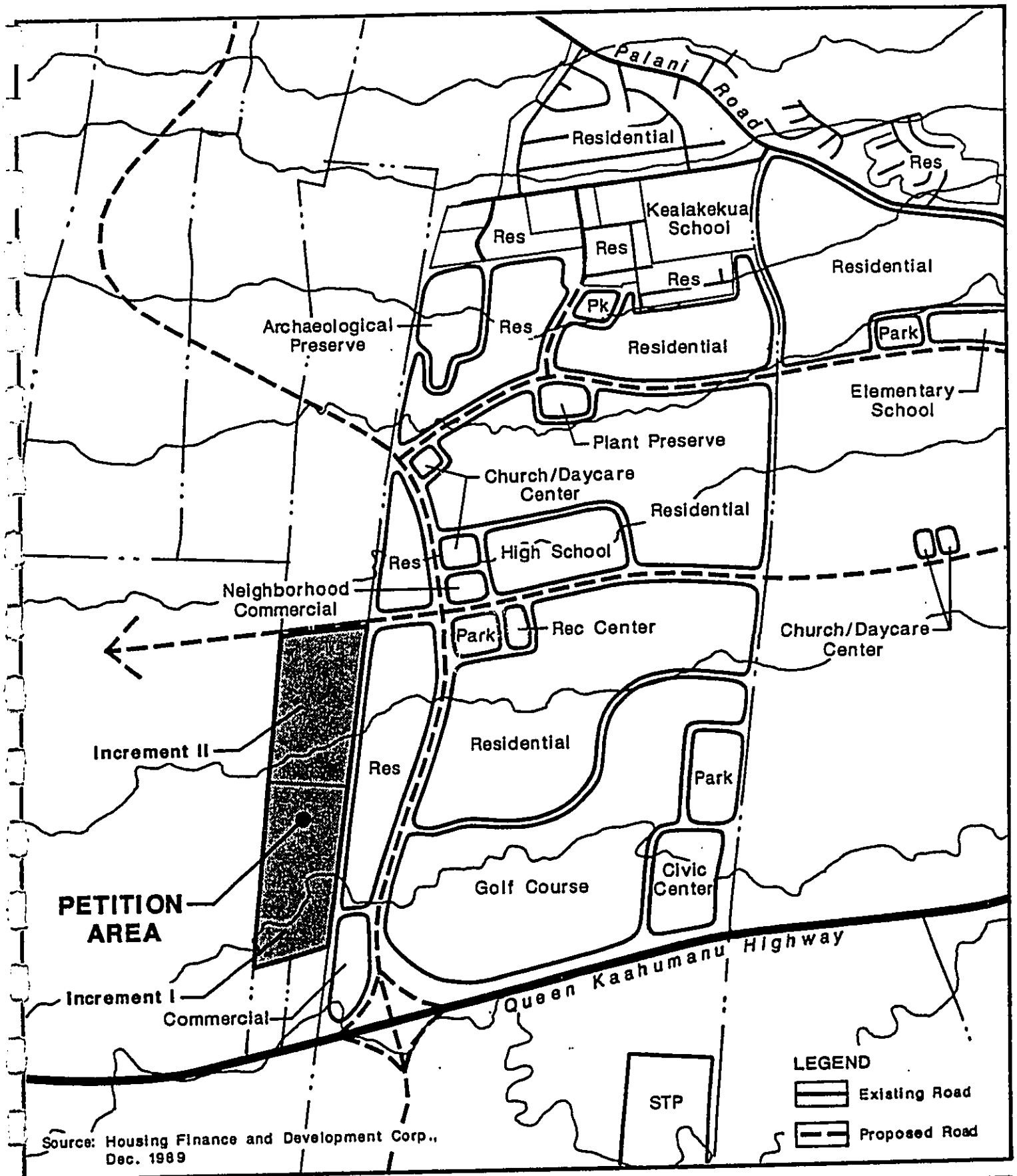

Honokohau Industrial Park
KEALAKEHE PLANNED COMMUNITY MAP
Honokohau, North Kona, Hawaii

0 1600' Figure: **6**

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3.1.6 Environmental Impact Statements (Chapter 343, HRS)

Section 343-5 (a)(2), HRS notes that any uses proposed on lands classified within the Conservation District are subject to the provisions of Chapter 343, HRS. Section 343-5 (c), HRS states that applications proposing actions subject to Chapter 343, HRS "shall prepare an environmental assessment of such proposed action at the earliest practicable time to determine whether an environmental impact statement shall be required."

An environmental assessment (Helber Hastert & Kimura, Planners, May 1989) was duly submitted to the State Land Use Commission. After a review of the assessment, the LUC instructed the petitioner to prepare an EIS for the proposed action.

3.2 COUNTY

3.2.1 County General Plan

The Hawaii County General Plan is the policy document for the long range comprehensive development of the island of Hawaii. The plan contains goals, policies and standards concerning 13 elements (i.e., economic, energy, natural beauty, transportation, etc.), as well as a series of land use maps referred to as General Plan Land Use Pattern Allocation Guide (LUPAG) maps. LUPAG maps delineate 12 different land use categories throughout the County. The current LUPAG map designates the project area as Conservation.

On November 14, 1989, the Hawaii County Council approved a revised Hawaii County General Plan. Although the final text of the General Plan has yet to be published, the petition area is designated as "Urban Expansion Area" according to Keith Kato, a planner for the Hawaii County Planning Department (personal communication, January 4, 1990). This designation is described in the August 1987 draft of the revised General Plan as an area which "allows for a mix of high density, medium density, low density, industrial and/or open designations in areas where new settlements may be desirable, but where the specific settlement pattern and mix of uses have not yet been determined" (page XIII-8).

The above analysis indicates the proposed action is in conformance with the revised Hawaii County General Plan.

3.2.2 Keahole to Kailua Development Plan

The County of Hawaii initiated a planning study in July 1988 to create a plan for development of the Keahole to Kailua-Kona area, with the emphasis being on implementing future development. The goal of the plan is "to develop a mixed residential, commercial, resort, industrial and recreational community, with approximately 8,000 or more residential units, in a functional, attractive, and financially viable manner." To this end, the plan intends to be a tool for the implementation of the County General Plan.

In September 1989, the County published the Draft Keahole to Kailua (K to K) Development Plan. This was followed by a public review period, during which time the County conducted four major meetings and presentations, and held meetings and discussions with landowners, developers, State agencies, and spokespersons from the local community. Based on this process, a revised Land Use/Roadway Plan was

developed and presented to the Planning Commission during a public hearing on March 1, 1990.

Figure 7 shows the revised land use plan as currently proposed by the County. Increment I of the petition area is designated as Limited Industrial. Increment II is proposed for regional center uses. The regional center proposed in the plan is a new urbanized area, distinct from the existing urban center at Kailua-Kona. This area is expected to accommodate projected regional activity growth requirements and avoid serious congestion problems that could adversely impact the character of the existing urban area to the south. The new regional center is envisioned to become the center for government, finance, and a variety of service and retail commercial activities.

The above analysis indicates the proposed project is very much in conformance with the intent of the Draft Keahole to Kailua Development Plan.

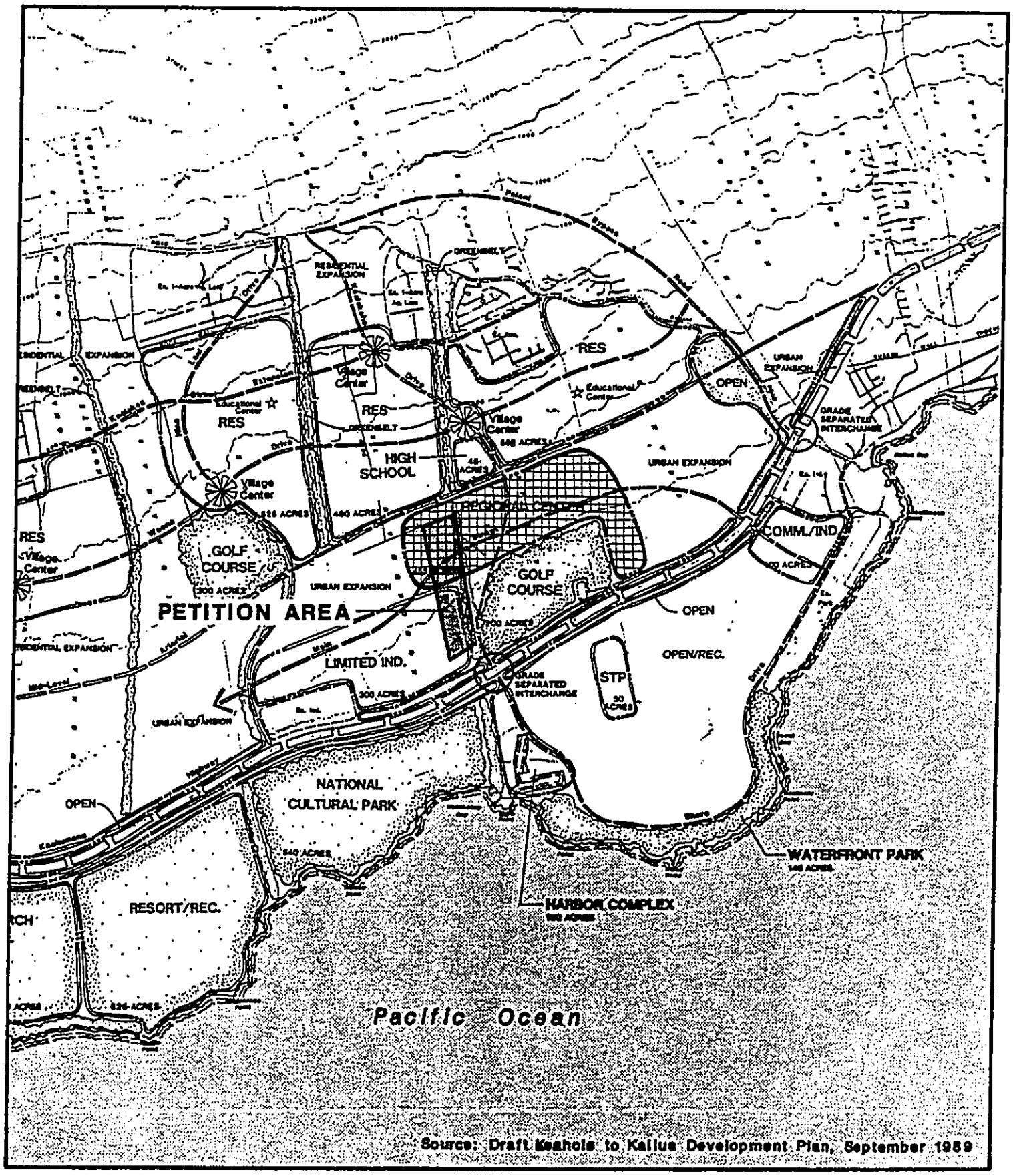
3.2.3 County Zoning

The petition area is currently zoned Open and Unplanned as are most of the Conservation lands in the area between Kailua-Kona and Keahole Airport. The Kaloko Light Industrial Park, located approximately one mile north of the project site, is zoned Light Industrial [ML-1a, Limited Industrial (1-acre lots)].

The petitioner will request a change of present zone designation to a more appropriate industrial zone at a future date.

3.2.4 Special Management Area

The project site does not lie within the Special Management Area as defined by the County of Hawaii, and therefore does not require a Special Management Area Use Permit.



Source: Draft Keahole to Kailua Development Plan, September 1989

Honokohau Industrial Park

DRAFT KEAHOLE TO KAILUA LAND USE PLAN

Honokohau, North Kona, Hawaii

0 4000' Figure: 7

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CHAPTER 4

DESCRIPTION OF THE AFFECTED ENVIRONMENT, PROBABLE IMPACT, AND MITIGATING MEASURES

This chapter describes the physical and socio-economic environment in which the proposed project is situated, and the existing conditions of public facilities and utilities in the area. Discussions of "probable impacts" are confined primarily to those expected to occur during operations of Increment I, and where available, Increment II. In certain cases, a discussion is presented of the "cumulative impacts" resulting from the combined effects of development of the proposed project and surrounding lands. Where appropriate, measures are proposed to mitigate adverse impacts.

4.1 PHYSICAL ENVIRONMENT

4.1.1 General

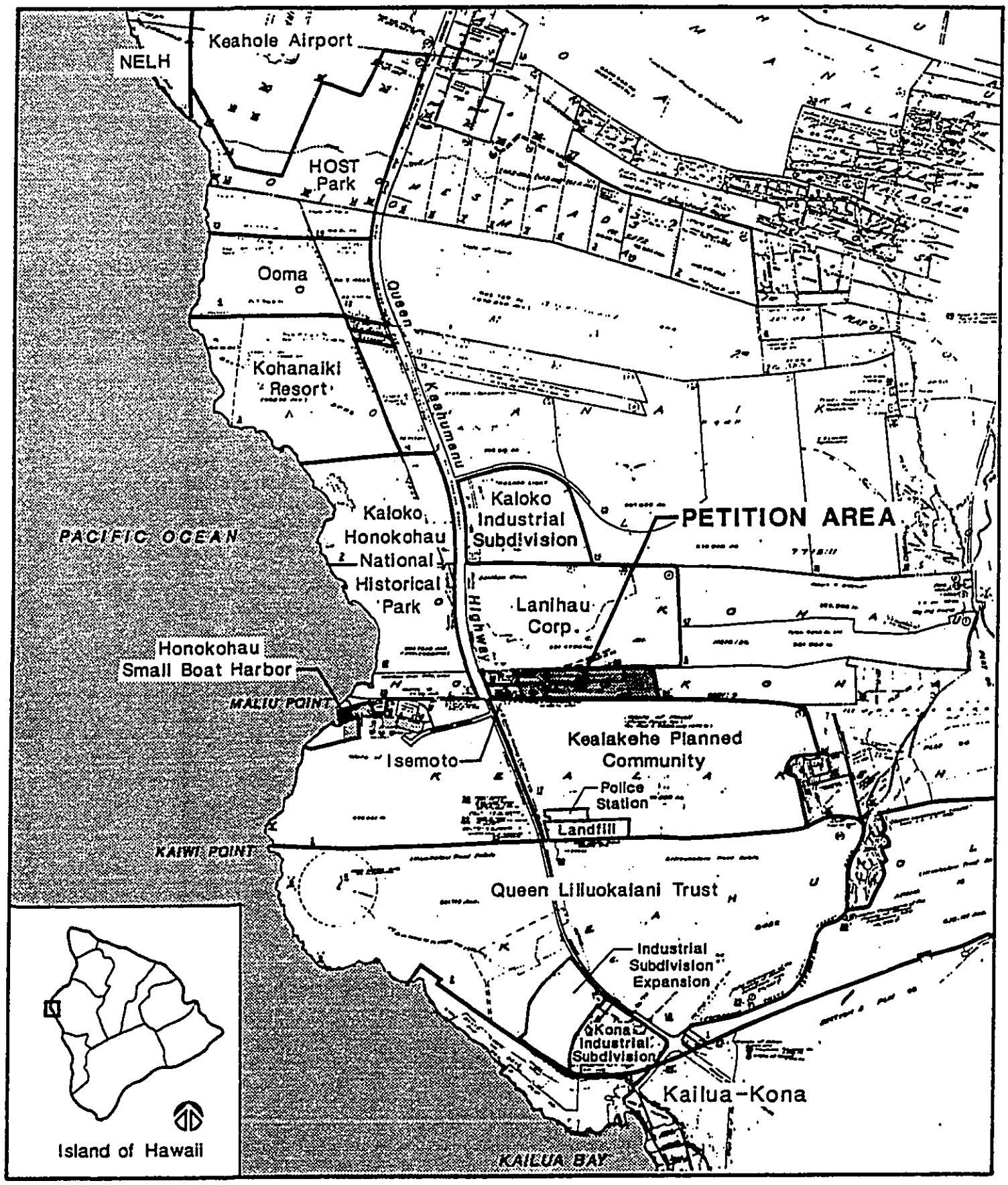
Topography, Physiography, Geology. The petition area ranges in elevation from approximately 85 feet at the makai boundary to 350 feet at the mauka property line. The terrain is an undulating surface of pahoehoe and a'a lava with little soil cover. Average slope is 7.0 percent with a range of 0 to 25 percent.

Climate. Coastal areas of North Kona have a semi-tropical, semi-arid climate. The average annual temperature is 75 degrees Fahrenheit with an average high of 83 degrees Fahrenheit, and an average low of 67 degrees Fahrenheit. Average annual precipitation in Kailua-Kona is 25 inches. The geographic distribution of precipitation closely resembles the topographic contours: a high rainfall belt lies between the 3,000 and 12,000 foot elevations on the leeward slopes of Hualalai and Mauna Loa, with zones of decreasing annual rainfall at lower elevations near the coast and at higher elevations above the rain bearing tradewind regimes.

The North Kona coastal region is largely sheltered from the predominate tradewind system by the land masses of Mauna Loa, Mauna Kea and Hualalai. The prevailing pattern is onshore winds in the morning and early afternoon, often collecting in a cloud bank at higher elevations, then becoming offshore breezes in the late afternoon and evening. Typically wind velocities range between 3 to 14 knots. Relative humidity is also generally stable year round, daily average ranging from 71 to 77 percent.

4.1.2 Regional Land Use

The region between Kailua-Kona and Keahole Airport bisected by the Queen Kaahumanu Highway is undergoing transition from an undeveloped open space corridor to a wide range of urban uses as a result of significant historic and anticipated growth in the West Hawaii economic base. Major resorts, light industrial subdivisions and planned residential communities have been and will be developed within the corridor. Regional public facility improvements planned for the area include major expansion of the Keahole Airport, a new regional wastewater treatment plant, and the widening of the Queen Kaahumanu Highway. As noted in Chapter 3, State and County regional planning efforts have identified this region as the primary growth center for the Kona area. Figure 8 shows the petition area is located near the center of this major growth corridor. A notable exception to the projected transition is represented by the proposed development of a National



Honokohau Industrial Park

REGIONAL MAP

Honokohau, North Kona, Hawaii

0 4000'

Figure: **8**

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Historic Park, located along the coastline between the Honokohau Small Boat Harbor and the proposed Kohanaiki Resort. A review of surrounding existing and proposed land uses is presented below.

Honokohau Small Boat Harbor. The Honokohau Small Boat Harbor is located approximately one mile west-southwest (makai) of the project site on a portion of the State-owned lands of Kealakehe. This is the only protected harbor in the North Kona area and has become a major contributor to the North Kona economic base in terms of revenues generated by the region's famous sport fishing industry. The harbor presently provides slips for 162 boats. Adjacent shore facilities include boat launch ramps and launch/retrieval cranes, boat repair yard and related facilities, fueling dock, administration office, commercial/retail facilities, restrooms and appurtenant surface parking lots. The 1970 master plan for the harbor prepared by Daniel, Mann, Johnson and Mendenhall calls for an ultimate 455 slips to be developed on the 65.5 acre harbor site (25.1 acres of water, 40.4 acres of land).

Proposed Kaloko-Honokohau National Historic Park (NHP). The National Park Service (NPS) has recently acquired c. 650-acres of land directly makai and to the northwest of the project site with the intent of developing a National Historic Park. The Park boundaries include the 20-acre Aimakapa Fishpond, a brackish water pond and wetland providing habitat for endangered Hawaiian waterbirds. migrant waterfowl and shorebirds. Also within the proposed park boundaries lie the Aiopio Fishtrap and several anchialine ponds near the coastline.

The 1975 Draft EIS for the NHP indicates that the "primary purpose of the park will be the preservation of the Hawaiian culture..." (NPS 1975: p. 1). Estimates of visitor capacities made in the EIS identify a daily capacity of 1,500 visitors and a "projected annual visitation" of 500,000 visitors (ibid: p. 6). A tentative description of proposed facilities includes the following: "a parking area for 200 to 250 cars and buses will be constructed adjacent to Queen Kaahumanu Highway... Immediately makai from this will be an orientation structure, and an administrative office totalling 10,000 square feet. The entire area occupied by the parking, orientation structure, and associated roads and walks will be about 5 acres or less..." (ibid).

Kohanaiki Resort. A major integrated resort development is proposed for an oceanfront site located two miles to the northwest of the proposed project. At full-buildout, the 470-acre Kohanaiki Resort will contain three hotels, a marina, golf course, and condominium and residential developments. The developers of the resort have received approvals from the State Land Use Commission (reclassification from Conservation to Urban) and the Hawaii County Council (General Plan amendment to Intermediate Resort and rezoning for the proposed uses). Present plans call for construction of major project infrastructure, one or two hotels, the golf course, some condominiums, and possibly the marina within the next 2-3 years.

O'oma. Approximately 300 acres or coastal land north of Kohanaiki are proposed for future urban development. The O'oma area is tentatively proposed to include an economy hotel and related commercial activities, a research center, business park uses, a golf course, and possibly residential uses. This area is still designated as Conservation land.

Natural Energy Laboratory of Hawaii/Hawaii Ocean Science and Technology Park (NELH/HOST Park). The State of Hawaii is operating and developing a major marine-related 869-acre research/light industrial park on lands located immediately south and west of the Keahole Airport at Keahole Point. The 322-acre NELH

facility has been operating since 1974 and is currently about 25 percent occupied. The 547-acre HOST Park was dedicated in July 1989. The park currently has no tenants but approximately 50 percent of the land is spoken for. A bill before the 1990 Legislature is expected to request approval to merge NELH and HOST Park under one Board of Directors in order to streamline operations.

Keahole Airport. Located approximately four miles to the north, the Keahole Airport consists of a modern terminal complex and a single 6,500 foot runway. The airport has recently undergone a master plan update program which recommended major expansion plans for the facility including strengthening of the existing runway and lengthening to 11,000 feet as well as extensive new terminal facilities.

Kaloko Light Industrial Subdivision. Approximately one mile to the north of the project site is the Kaloko Light Industrial Subdivision consisting of 194 fee simple lots of one acre minimum size.

Lanihau Property. Lanihau Corporation owns a 630-acre parcel of land adjacent to the northern boundary of the petition area. Lanihau also owns a small 9.9-acre parcel to the west fronting on Queen Kaahumanu Highway. Both of these parcels are presently vacant.

Adjacent Industrial Operations. In April 1989, the Land Use Commission approved Urban District designation for a 9.9-acre parcel immediately west of the petition area fronting on Queen Kaahumanu Highway. This parcel (owned jointly by Isemoto Contracting Company, SJA Partnership, and March E. Taylor) is being used for construction baseyard operations. Planned uses in the future include truck equipment storage and an automotive service center.

Kealakehe Planned Community. The State of Hawaii owns approximately 1,540 acres of land within the Kealakehe area immediately south of and adjacent to the petition area. As discussed in Section 3.1.5, the Board of Directors of the Housing Finance and Development Corporation recently approved a plan for development of 840 acres of State land mauka of Queen Kaahumanu Highway and up to 450 acres of Queen Liliuokalani Trust (QLT) land to the south of Kealakehe. The concept for development of this area is similar to the Kapolei Planned Community on Oahu, and construction is expected to take place over a 20-year period. Conceptually, approximately 3,900 residential units are proposed at Kealakehe. Other planned uses at Kealakehe include a civic center, golf course, commercial areas, schools (including a new high school), recreational areas, and church/daycare facilities.

Approximately 700 acres of State land is located makai of Queen Kaahumanu Highway. The future Kealakehe Wastewater Treatment Plant will be located within this area. Plans for this area in the past have proposed expansion of the harbor, resort uses, golf course, and other urban activities. There are currently no approved plans for this area.

Kealakehe Landfill, Police Substation, Amfac Distribution Center and Kona Animal Pound. A mixture of municipal, light industrial and commercial uses are presently located approximately three-quarters of a mile to the south of the site along the Queen Kaahumanu Highway frontage of the State-owned Kealakehe parcel.

Queen Liliuokalani Trust. Queen Liliuokalani Trust owns a significant amount of land within the Keahuolu ahupua'a adjacent to Kailua-Kona. As noted above, State plans for development at Kealakehe could include approximately 450 acres of land

owned by QLT makai of Palani Road. In August of 1989, QLT petitioned the Land Use Commission for an amendment of the State Land Use District Boundary on 1,135 acres of land from Conservation and Agricultural to Urban. Uses envisioned for land mauka of the Queen Kaahumanu Highway include regional commercial activities, offices, and other activities related to the civic center proposed at Kealakehe. Makai of the highway, a 100-acre expansion of the existing industrial subdivision could possibly begin development in 1990.

Probable Impacts

As noted, the project site lies in a major urban growth corridor extending from Kailua-Kona north to the Keahole Airport. The revised Hawaii County General Plan recognized this and correspondingly has identified the area in the vicinity of the project site as "Urban Expansion Area" (see discussion in Section 3.2.1) This designation "allows for a mix of high density, medium density, low density, industrial and/or open designations in areas where new settlements may be desirable, but where the specific settlement pattern and mix of uses have not yet been determined." The petition request to reclassify the subject site to the Urban District is viewed as being consistent with the overall development pattern of the region. Notwithstanding this, implementation of the proposed action may foreclose other land use options within the project site and in the vicinity.

Cumulative Impacts

Development of the petition area will be complimentary to and provide services for urban expansion in the Kailua-Kona to Keahole Airport region. Such urban expansion will provide employment and housing opportunities to meet projected growth in the area, and will require significant investments in public facilities and services including water, sewer, roads, electrical and communication facilities.

Mitigative Measures

Mitigative measures proposed herein regarding the management of operations, siting of structures and activities, visual buffering, hazardous material handling and storage, and wastewater/storm drainage systems will serve to minimize potential adverse impacts on adjacent lands and the general area.

4.1.3 Natural Hazards

Natural hazards which could affect the site include earthquakes and volcanic activity. The entire island of Hawaii is susceptible to earthquakes originating in fault zones under and adjacent to it. Two fault zones, the Kealakekua and Kaloho faults, are located in South Kona, well south of the petition area. The island of Hawaii is classified as a Zone 3 area for the purpose of structural design. The classification system is based on a scale of 0 to 4, increasing in level of risk due to seismic occurrence and danger. The Hawaii County Building Code requires that all new structures be designed to resist forces that might be expected in Zone 3 areas.

The petition area is located on the western slope of Hualalai, one of five volcanos comprising the island. Hualalai is one of three volcanos which have been active in historic times. The last active period of eruption occurred circa 1800. The northwest rift zone at about the 1,600-foot elevation (in the vicinity of the Puhi o Pele Cinder Cone, just makai of the Mamalahoa Highway) produced a lava flow which extended to the shoreline just north of Keahole Point.

Probable Impacts

The occurrence of a natural disaster such as an earthquake or volcanic eruption would pose a risk to life and property within the petition area.

Mitigation Measures

The petitioner will require that all structures within the property will be located, designed, and constructed to conform with local building standards and regulations for potential seismic activity.

4.1.4 Flora and Fauna

Information for this section has been augmented from recent flora and terrestrial faunal surveys conducted in the vicinity of the petition area (Char and Associates, 1986). A biological field inspection of the project site was not conducted.

Much of the project site (that area which has not been subjected to mechanical modification) is comprised of one principal vegetation zone: scrub vegetation. This zone consists of a mixture of grass and shrub species with scattered trees of kiawe (*Prosopis pallida*). Ground cover varies from 40 to 60 percent on pahoehoe flows, and only five to ten percent on the rough, clinkery a'a flows.

Fountain grass (*Pennisetum setaceum*) is the most abundant species in the vegetation type area. Locally common are pili grass (*Heteropogon contortus*) and Natal redtop (*Rhynchelytrum repens*), although in some areas the grass cover may be composed equally of the three species. 'Ilima (*Sida fallax*) and 'uhaloa (*Waltheria indica var. americana*) are the most commonly encountered shrub. Maiapilo (*Capparis sandwichiana* var. *zoharyi*) may form localized patches in some area. Other species occasionally observed in this vegetation type include partridge pea (*Cassia Lechenaultiana*), indigo (*Indigofera suffruticosa*), noni (*Morinda citrifolia*), Christmas berry (*Schinus terebinthifolius*) and klu (*Acacia farnesiana*).

Kiawe may form small clumps composed of a few trees, eight to twelve feet tall. Shrubs such as 'ilima, indigo, and 'uaholoa form a dense scrubby layer beneath these trees. Ferns and a few annual species may be found in the cracks and crevices of the pahoehoe lava where it is damper and shadier.

The presence of mammals such as the mongoose (*Herpestes auropunctatus*), house mouse (*Nus musculus domesticus*), black rat (*Rattus rattus*), polynesian rat (*Rattus exulans hawaiiensis*), and feral cats (*Felis catus*) is possible. Bird surveys conducted in the area have indicated the presence of at least two endangered species. These include the endangered Hawaiian stilt (*Himatopus himatopus knudseni*) which is known to be present in the pond areas along the Koloko and Honokohau coastline and the Hawaiian owl (*Asio flanneus sandwichensis*), which is known to be present in upland areas such as the project site.

Probable Impacts

None of the above listed plants are included in the U.S. Department of the Interior Fish and Wildlife Service's proposed endangered and threatened species plant list. The majority of the plant species listed are not native to the Hawaiian islands and have been brought here intentionally or accidentally after western contact. All of

the plant species are either abundant or locally common in the area and removal of them would not constitute significant impact to the plant colonies.

Because the site is arid with no bodies of water and few trees, save for the Kiawe scrub, development of the site will not impose a significant impact to the endangered bird populations in this region.

Cumulative Impacts

Development proposals by QLT and HFDC in the vicinity of the petition area could urbanize as much as 2,400 acres in the future. Additional expansion of urban uses in the region as currently proposed by the County's Keahole to Kailua Development could add substantially to this figure. Prior to public approvals for development, inventories of existing natural resources should be conducted to ensure that valuable wildlife habitats or native plant species located within an area are preserved.

4.1.5 Historic/Archaeological Resources

An archaeological inventory survey has been conducted for the petition area by Paul H. Rosendahl, Ph.D., Inc. The survey field work was conducted on September 6 and November 20 to December 7, 1989. The survey report is attached as Appendix B and is summarized below.

The archaeological inventory survey identified a total of 60 sites within the petition area (Figure 9). The type of sites found indicated that this area had been used for a variety of purposes including habitation, agriculture, quarrying, and possibly burials. Fourteen of the identified sites (which consisted of pahoehoe excavations, cairns, a rock concentration, a faced mound, a wall, a rock overhang, and a modified outcrop) provided sufficient data during the survey and no further study is recommended. These sites lacked cultural deposits and portable remains, and were measured, mapped, described, photographed, and plotted. One site (Site 12991, faced mound) was also excavated.

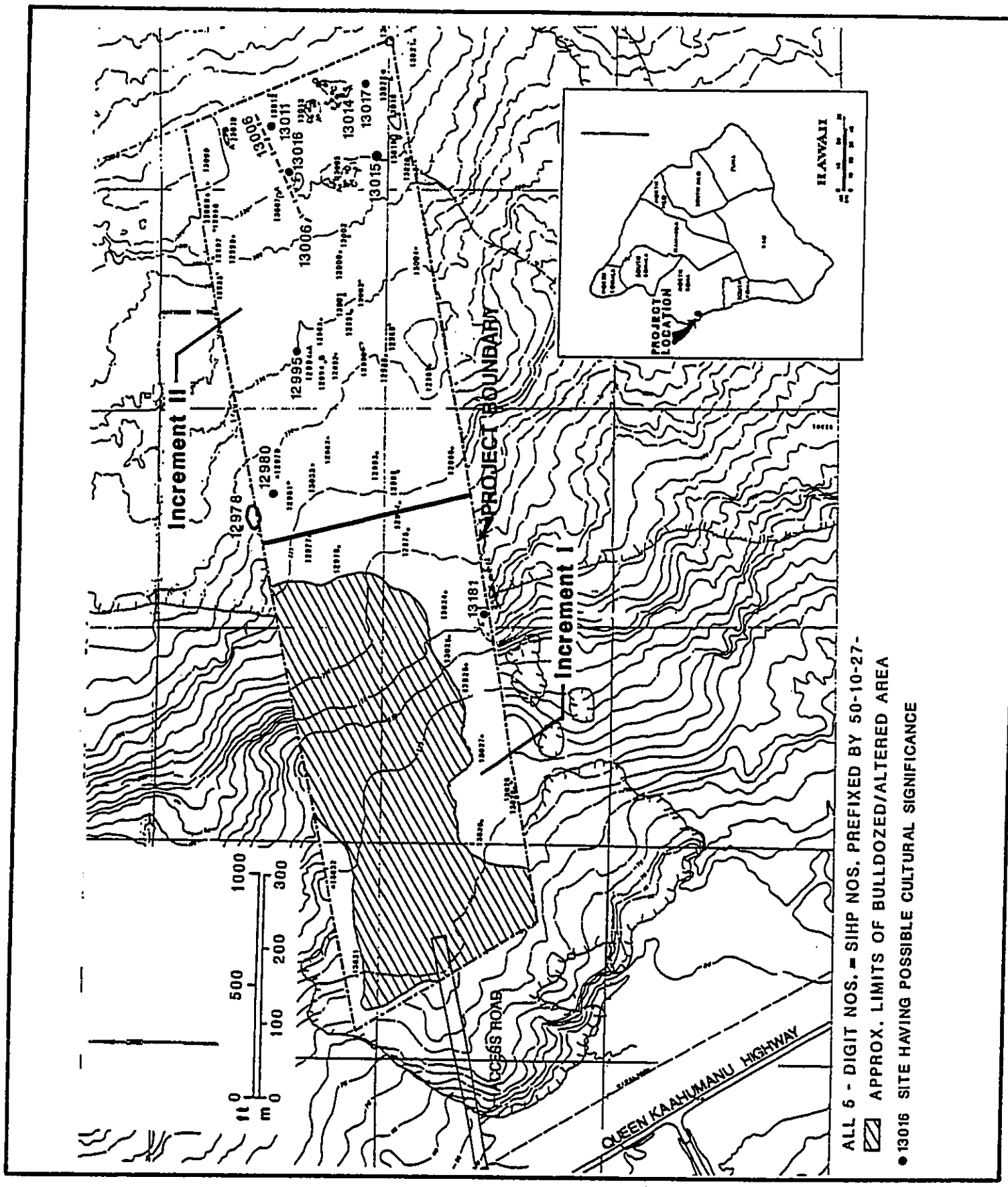
The remaining 46 sites will require additional data collection. Of this total, 36 sites are considered to be significant solely for their information content. The remaining 10 sites (indicated by larger site numbers in Figure 9) also have possible cultural significance. Nine of these sites may contain burials. The remaining site (Site 13006, a kerbstone trail section) is assessed as significant for information content and cultural value. Because the kerbstone trail is a typical example and is only a remnant, the site is not assessed as an excellent example of a site type.

Probable Impacts

Many of the identified archaeological sites are located in the central portion of Increment II and near its mauka boundary. Development of Increment II, including possible roadway alignments, could affect archaeological sites.

Cumulative Impacts

A substantial amount of data covering archaeology in North Kona has been collected as a result of proposals for land development. This body of information has helped to shed light on the extent to which prehistoric and historic sites could be disturbed. At the same time the data base has created opportunities for the effective management of significant resources. Some of the showpieces of Hawaiian prehistory



Honokohau Industrial Park

ARCHAEOLOGICAL/HISTORICAL SITES

Honokohau, North Kona, Hawaii

Figure: **9**

HELBER, HASTERT & KIMURA PLANNERS
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have been preserved in West Hawaii, including the City of Refuge, Puukohola Heiau National Historic Site, and Lapakahi State Historic Park. Continued inventory of historic resources will allow better identification of examples that are unique and which contain high cultural significance so that preservation programs can be coordinated on a regional basis.

Mitigation Measures

The archaeological consultant recommends archaeological data recovery of 37 sites (including the trail which is in poor condition) and preservation "as is" of the nine possible burial sites after fieldwork to determine if they are in fact burials. It is anticipated that an immediate condition of Land Use Commission approval would be a requirement for preparation of a formal written mitigation plan--containing data recovery, burial treatment, and preservation elements as appropriate--to be reviewed and approved by DLNR. In the event that any previously unidentified sites or remains are encountered during construction and site work phases, work in the immediate area will cease until the State Historic Preservation Officer has been notified and is able to assess the impact and make further recommendations for mitigative actions, if warranted.

4.1.6 Air Quality

Currently within the petition area, a limited amount of air pollution is generated by quarrying activities and vehicular traffic associated with operations of West Hawaii Concrete. Blasting at the quarry site, which occurs about once a week when operations are underway, creates dust pollution for brief periods. Cement dust at the batching plant is controlled at the point of transfer from trucks to a hopper within a bag house which is regulated by a permit from the State Department of Health. Other potential sources of pollution (i.e., rock crushing plant, traffic in some unpaved areas) are controlled by frequent water spraying.

For the general Kona area, since there are no large stationary point sources of pollution or heavy vehicular traffic, it can be inferred that the region experiences a high level of air quality (with the exception of periodic volcanic eruptions which significantly impact air quality in the area). Air circulation patterns on the leeward side of the island are self-contained because the area is sheltered from the full impact of the northeast tradewinds. Land-sea breezes dominate the wind regime: east-southeast winds prevail during the early morning and evening hours while west-northwest sea breezes occur during the remainder of the daylight hours.

Probable Impacts

Short-Term Impacts. The major sources of pollutants are expected to be increased emissions from construction machinery and fugitive dust emissions from exposed ground, earth moving, and vehicular movement along unpaved roads.

Long-Term Impacts. The elimination of quarrying activities is expected to improve general air quality conditions within the site. Long-term impacts are principally associated with vehicular emissions, although the proposed uses are not expected to be significant contributors to vehicular traffic.

Cumulative Impacts

Air quality is especially susceptible to the impact of cumulative development. Traffic generated by proposed developments discussed earlier could significantly increase air pollutants in the region.

Mitigation Measures

The impacts on air quality due to site disturbance would be temporary. Methods used to control the amount of airborne particulates will include regular watering of disturbed areas and providing landscaping where appropriate.

4.1.7 Noise

The existing industrial uses in the petition area and on land makai of the site and vehicular traffic moving along the Access Road and on the Queen Kaahumanu Highway are the predominant noise sources in the area.

Probable Impacts

Short-term noise impacts will occur during the initial construction period, generally associated with clearing, grubbing, grading, and building construction activities. The proposed light industrial, commercial, and service-related land uses, along with related traffic that is generated, will contribute to the existing noise environment in the immediate area. However, noise levels are expected to be remain well within acceptable standards. The elimination of quarrying on the site is expected to have a significant positive impact on the ambient noise quality in the area.

Mitigative Measures

All development will be designed and constructed to comply with governmental standards. Particular attention will be given to the siting of uses and structures along the petition area boundary with the Kealakehe area. Uses which are likely to generate higher levels of noise will be located away from State land. Additionally, the use of lease conditions and/or use covenants will serve to protect future residents at Kealakehe from undo noise or other detrimental business activities in the petition area.

4.1.8 Visual/Scenic

The principal views in the vicinity of the petition area are available to motorists travelling along the Queen Kaahumanu Highway and for residents living in mauka areas. From the highway, the landscape is dominated by the black and brown expanse of lava in the foreground with the slopes of Hualalai occupying the predominant mauka view. Views towards the coast from the highway corridor are of the rugged lava coastline with the blue expanse of the Pacific Ocean beyond. Driving from the Keahole Airport into Kailua-Kona, one encounters a number of developments along the roadway corridor, including the Keahole Agricultural Park, the NELH access road entry gate and guard house, the Kaloko Light Industrial Park, the Honokohau Small Boat Harbor entrance and metal buildings and structures located within the Kona Industrial Subdivision. From the existing residential communities in the mauka areas, major view planes extend from the Kohala Mountains in the north to the South Kona area to the south.

Probable Impacts

The petition area is situated 1,000 feet mauka of the Queen Kaahumanu Highway. Development within the site will be lowrise and is not expected to interfere substantially with existing views from the highway corridor or from mauka residential areas. Proposed residential development to the south of the site could be impacted by proposed uses.

Cumulative Impacts

Urban expansion within the region will irretrievably alter the predominantly natural state of the environment to a man-made environment.

Mitigation Measures

The development will conform to applicable County regulations which govern permissible building heights, bulk, and setbacks. In the event of development on surrounding lands, a buffer area with landscaping improvements (similar to those proposed for the parcel makai of the subject property) will be maintained along the property boundary, where appropriate, in order to minimize impacts of the industrial activities on other uses (i.e. residential) that may occur in the future. Similarly, landscaping will be provided along future roadways, particularly along potential major roadways such as the north-south parkway.

4.1.9 Nearshore Water Resources

Anchialine ponds are found in four major concentrations within shoreline areas in the vicinity of the petition area. This includes an area northwest of Kaloko Fishpond (Kaloko), an area just north of the Honokohau Harbor at Maliu Point (Maliu), an area just south of the harbor (Kealakehe), and finally, an area of scattered ponds north of Aimakapa Fishpond (Honokohau). While the Kaloko and Aimakapa fishponds may have significance as cultural and wildlife areas, neither are anchialine ponds by the strict definition of the term. Rather, they are former embayments which have been closed off at their mouths by natural or human activities. The closure at the mouth of Kaloko pond is sufficiently porous that the conditions within the fishpond are more nearly marine than brackish; the closure at Aimakapa is fronted by a well-developed sand beach, and water within it is more nearly fresh.

The biological conditions within the anchialine ponds and the two fishponds were surveyed as part of a larger survey of the ponds of the Kona coast (OI Consultants, 1985). Greatly different biological communities were found within the four pond areas, and significant differences were also seen within areas. The results of this survey are provided in Appendix F.

Probable Impacts

A Hydro-Geologic Impact Assessment was conducted in order to evaluate the potential impacts from the proposed project on groundwater and nearshore waters (see Appendix E). The assessment concluded that only ponds in the Maliu and Kealakehe areas are located in the potential impact area from the proposed project. Within these areas, there is little likelihood of significant environmental impact. The predominant chemical addition to the groundwater flow will be dissolved nutrients (nitrogen and phosphorus), the principal "contaminants" in liquid percolating from

cesspools. These chemicals are already found in high concentration in undisturbed groundwater and the small additions from the project site will not have a negative impact on nearshore aquatic resources. (Also see Sections 4.3.3 and 4.3.4 for related discussions.)

Cumulative Impacts

Cumulative impacts on nearshore waters resulting from the proposed action and related projects could lead to higher levels of sedimentation, changes in groundwater discharge especially in nutrient loads resulting from irrigation and fertilization of golf courses and landscaped areas in the region, and possible changes in marine ecosystems. Significant impacts are expected to be mitigated through the use of proper construction practices, installation of a wastewater treatment system, and frequent monitoring of coastal waters.

4.1.10 Industrial Materials/Wastes

Industrial materials (i.e. fuel oil, gasoline, lube oil) stored at the site are contained within well-controlled areas above ground. There is no underground storage of materials, nor any plans to create any such facilities. There are no industrial wastes stored at the site.

Probable Impacts

The petitioner will notify tenants of Federal hazardous waste regulations set forth in Title 40 of the Code of Federal Regulations Parts 260-270. Any industrial wastes generated by activities within the petition area will be collected and handled according to these Federal regulations, plus applicable State and County government regulations. Maintenance work on machinery and equipment will be performed on concrete decks, as will the washing down of any equipment. All wash water will be channeled into grease traps where any oil or grease will be contained. These traps will be periodically cleaned and the accumulated oil (along with additional oil accumulated from other sources) will be disposed of in accordance with EPA rules. Wash water from the concrete operations will also be channeled into appropriately designed traps. Materials collected by this system can be recycled into the concrete operations. All environmentally harmful materials used in cleaning mechanical parts or for hand washing purposes will be used in contained areas with concrete floors and will be kept in appropriate containers. These management practices and procedures will contain impacts of industrial wastes within the petition area.

4.2 SOCIAL ENVIRONMENT

4.2.1 Population

The 1980 U.S. Census reported a resident population of 13,748 persons in the North Kona District, most of which was centered around the town of Kailua-Kona. This 1980 population figure represented an increase of 185 percent over population of 4,832 reported in 1970. The 1988 State of Hawaii Data Book estimates that the population in the area had increased to 20,500 as of July 1987, an increase of 49 percent between 1980 and 1987. Population projections prepared by market analysts for resort projects in the area (Hallstrom Appraisal Group, Inc., 1985) indicate a potential resident population of 32,500 in 1995. Although this acknowledges a slowing of the growth rate experienced during previous years, the Kona region is expected to continue to be one of the fastest growing areas in the State.

The historic and projected rapid rates of growth have significantly increased demand for light industrial space within the Kona area. In order to maintain levels of service, new light industrial areas must be developed to accommodate the growing population of the West Hawaii Region.

Probable Impacts

The proposed action is seen as responding to increases in population and not contributing to the population growth per se. The proposed action will have an insignificant impact on population.

4.2.2 Economy

Through the early years of Statehood diversified agriculture formed the economic base of the region. However, the importance of diversified agriculture to the region has been eclipsed by the growth of the visitor industry and associated service related jobs. In 1950, 52 percent of the employed persons of Kona listed farm laborer, farm manager, or farmer as their primary occupation. By 1980, only 8 percent of the labor force held agriculturally related jobs (Kona Regional Plan, 1983). Today tourism is the primary economic activity of the North Kona District, supplanting agriculture as the number one revenue generating activity. In 1970, there were approximately 1,752 visitor accommodation units in the Kona area, representing 50 percent of the Big Island visitor units. By 1980, the Kona area supported a total of 3,774 visitor units, increasing by an average growth of 7 percent per year. According to the Hawaii Visitors Bureau, the visitor plant inventory (visitor accommodations in hotels and condominiums) totaled 4,708 units in 1987. The significant growth and development of new visitor units has shifted north to the South Kohala District. Nonetheless, growth in South Kohala has a major impact on the economy of the Kona District.

Other local service industries, such as retailing, real estate and financial services, have benefited from the income introduced by the expanding visitor industry. Property values in general have increased significantly over the past decade, the result of the increased demand of investment from the visitor, resident and retiree populations.

Consistent with the changing economic base and growing population of the North Kona District, new service industries such as contracting, warehousing and storage and moving services are expanding to meet added demands for their services.

Probable Impacts

The use of the site for light industrial and commercial and service-related purposes will contribute to the diversification of the economic base and will provide needed space in the short-term for light industrial operations which require larger parcels of land and open storage areas.

4.3 PUBLIC FACILITIES AND SERVICES

This section describes the existing conditions of public facilities and utilities in the North Kona area. Public facilities are those systems which are provided, staffed, and maintained by governments to serve the public health, safety, and welfare. Public utilities are distributed services (e.g., electricity, water, communications) that

are provided either by a public agency directly or by a publicly regulated company. Project impacts are discussed primarily in terms of anticipated requirements generated by the development. Mitigation measures are proposals for how this demand may be satisfied.

4.3.1 Traffic

Approximately 20 acres of the project site is occupied by a quarry operation, concrete plant, and storage areas. A two-lane paved roadway provides access from Queen Kaahumanu Highway to these activities, with the Access Road approach to Queen Kaahumanu Highway controlled by a stop sign. This intersection is located approximately 800 feet north of the Kealakehe Parkway intersection with Queen Kaahumanu Highway.

Queen Kaahumanu Highway is a two-lane State arterial roadway. It is a limited access roadway, with all cross street and driveway approaches between Kailua and Keahole Airport currently controlled by stop signs.

The most recent State Department of Transportation machine count on Queen Kaahumanu Highway made at Kealakehe Parkway on May 9-10, 1988, recorded about 11,100 vehicles per day. Current peak hour volumes, based on a count made by Wilbur Smith Associates on January 11, 1990, total about 1,000 vehicles in the 7:00 to 8:00 AM morning commute period and 1,300 vehicles in the 3:15 to 4:15 PM afternoon peak period.

At present, an estimated 150 vehicles use the Access Road on a weekday. This includes traffic from the petition area and the 10-acre industrial area to the west. Approximately 40 to 45 vehicles use the road during the morning and afternoon peak hours.

The traffic volumes and 45 miles per hour speed limit along Queen Kaahumanu Highway limit the number of gaps available for traffic turning left out of the project site Access Road, which results in delays for these vehicles. An analysis was made of the conditions for vehicles turning left from the road using the methodology in the Highway Capacity Manual, which rates the expected delays for vehicles exiting from a stop sign-controlled roadway between Level of Service "A" (little delay) to "F" (extreme delay meriting mitigative actions). This analysis indicates that the traffic exiting the Access Road experiences Level of Service "D" (long delays) during morning and evening peak hours.

Probable Impacts

The 45.5-acre Increment I of the Honokohau Industrial Park is estimated to generate a total of 2,285 weekday vehicle trips to or from the planned uses, when fully developed in 1995 (see Appendix C). The development would increase traffic volumes entering/exiting the project access road by 234 and 246 vehicles during the morning and afternoon peak hours, respectively.

Approximately 70 percent of the project traffic is estimated to travel to/from the Kailua direction, with the remainder travelling to/from the Keahole direction. The resultant increases in peak hour traffic on Queen Kaahumanu Highway at the project access road would be:

	North of Site	South of Site
Morning Peak Hour	4.2%	9.1%
Afternoon Peak Hour	3.3%	7.3%

Traffic turning left from the Access Road would experience delays equivalent to Level of Service "F" conditions during both peak periods, which would warrant mitigative actions.

Traffic from the petition area would also have an impact on traffic on Queen Kaahumanu Highway. Slow-moving traffic exiting the project Access Road would often result in slowing of through traffic on Queen Kaahumanu Highway, and would increase exposure potential for traffic accidents.

Development of the 44-acre Increment II area would generate about 2,760 vehicle trips to or from the project on a typical weekday. Approximately 500 vehicle trips would be generated in the morning and afternoon peak hours. Development of a large portion of the area with retail-type uses, such as home improvement centers, could significantly increase vehicle traffic above these levels.

Cumulative Impacts

According to counts made by the State Department of Transportation, during the period from 1984 to 1988, traffic on Queen Kaahumanu Highway increased by 11.2 percent, and traffic on Kealakehe Parkway to Honokohau Harbor increased by 12 percent. Assuming these rates continue from 1990 to 1995, traffic would increase on these roadways by 70 and 76 percent, respectively. With the addition of the State's Kealakehe project and the small industrial project makai of the petition area, the combined increase from general corridor growth and the two nearby projects would be 77 to 78 percent on Queen Kaahumanu Highway. These volumes would be enough to exceed the existing highway design capacity during peak hours.

Mitigative Measures

If the State installs a traffic signal at the Kealakehe Parkway intersection, it would likely increase gaps in traffic flow on Queen Kaahumanu Highway at the Access Road and temporarily improve exiting conditions. The State would be expected to deny any installation of a traffic signal at the Access Road intersection due to its closeness to the Kealakehe Parkway intersection.

By 1995, the traffic turning left to travel south from the project site on Queen Kaahumanu Highway would likely have to be accommodated through a road connection to Kealakehe Parkway, and the use of the traffic signal or grade-separation at its intersection with Queen Kaahumanu Highway. Therefore, the following measures are proposed:

- Initially, permit left-turns to be made both into and out of the project access roadway at Queen Kaahumanu Highway. Construct a left-turn storage lane on Queen Kaahumanu Highway for southbound vehicles turning into the project access road.

- o When the mauka extension of Kealakehe Parkway is constructed, construct a frontage road or direct roadway connection from the project access road to Kealakehe Parkway for use by exiting southbound project traffic.

- o Upon completion of item 2, provide signing and channelize the Access Road intersection with Queen Kaahumanu Highway to prohibit left turns. Continue to permit left turns into the Access Road, and both right turns into and out of the access road. An alternative to this action would be to close the Access Road and direct all traffic onto Kealakehe Parkway.

Impact of the project on the volume-to-capacity ratios for a signal-controlled intersection of Queen Kaahumanu Highway and Kealakehe Parkway is as follows:

	Volume to Capacity Ratio	
	Morning Peak Hour	Afternoon Peak Hour
Without New Point Access Road to Kealakehe Parkway:		
2-Lane Queen Kaahumanu Highway	.81	1.26
4-Lane Queen Kaahumanu Highway	.52	.76
With New Point Access Road to Kealakehe Parkway:		
2-Lane Queen Kaahumanu Highway	.80	1.26
4-Lane Queen Kaahumanu Highway	.54	.82

The location of the Increment II area, and the volume of trips generated, indicate that this area should be directly connected by an access road to Kealakehe Parkway and/or to future north-south roadways mauka of Queen Kaahumanu Highway. The State's Kealakehe Community Development Plan and the County's Keahole to Kailua Development both propose roadway alignments that would satisfy this requirement.

4.3.2 Water

The Hawaii County Department of Water Supply maintains the North Kona water system serving the area between Keahole Airport to the north and Kealakekua to the south. This system is supplied by four wells and a shaft located at Kahaluu, situated between Kailua and Keauhou Bay at the 600 foot level, one to one-and-a-half miles inland from the coast. A 16-inch transmission main runs north along the Queen Kaahumanu Highway decreasing to a 12-inch main between the Honokohau Small Boat Harbor and the project site. The transmission line terminates at a 0.3 million gallon reservoir located directly mauka of the Keahole airport.

The petition area is currently serviced by a 2-inch meter and transmission line which runs along the Access Road. Current water usage within the petition area (which is almost exclusively related to West Hawaii Concrete operations) is approximately 13,000 gallons per day (gpd) according to the County Department of Water Supply (Quirino Antonio, personal communication, January 11, 1990). An estimated 75 percent (or 9,750 gal.) of the daily water usage is used for concrete batch plant and office operations of West Hawaii Concrete. The remaining 25 percent (or 3,250 gal.) of the water is used in the quarry area for dust control. The petitioner also has obtained one (1) unit (600 gpd) of water from the Red Hill Joint Venture.

Probable Impacts

Estimated future water demand for Increment I is approximately 15,150 gpd. This would be a net increase over current consumption levels of about 2,150 gpd. The County Department of Water Supply has indicated that daily water usage above current levels would probably require additional source development.

Cumulative Impacts

The development of projects as currently proposed by various plans for the Kona region will require extensive development of new water sources, along with necessary storage facilities, transmission lines, booster pumps, and distribution facilities.

Mitigative Measures

The Division of Land and Water Development (DOWALD) at DLNR will soon begin drilling a test well in an area mauka of Mamalahoa Highway. Results from this well will determine the potential of the aquifer to provide additional source development. As wells are developed in the future, they will be turned over to the County Department of Water Supply. The Draft Keahole to Kailua Development Plan proposes a regional water plan which identifies future transmission line alignments to accommodate future urbanization in the area. Proposed alignments in this plan would provide service to the petition area. The petitioner proposes to participate in the development of this system.

Until new sources are developed, the County Department of Water Supply will allow the petitioner to maintain water use within the petition area at current levels (approximately 13,000 gpd). Along with conservation measures and water use agreements with lessees, water consumption in the petition area will remain at existing levels unless otherwise approved by the County Department of Water Supply.

4.3.3 Wastewater Disposal

Methods of liquid waste disposal used in the Kona area include private cesspools, septic tanks, and municipal/private treatment plants. The existing municipal wastewater system services only the primary Kailua-Kona area. The nearest connection to the petition area is within the Kona Industrial Subdivision. Revised Department of Health regulations will prohibit the continued installation of cesspools in areas mauka of the Underground Injection Control (UIC) line (located at approximately 550-foot elevation east of the petition area) and below 100-foot elevation. Areas above and below this region are considered to be critical wastewater treatment areas. Individual wastewater systems constructed in accordance with Administrative Rules, Title 11, Chapter 62, "Wastewater Systems" will be required for any new construction that is not tied into the municipal system in these areas. As noted in Section 4.1.1, the petition area ranges in elevation from approximately 85 feet at the makai boundary to 350 feet at the mauka property line. Only a small makai portion of the petition area is therefore located in future restricted zones.

Plans are currently underway to construct a new wastewater treatment plant to service the Kona area. This facility is to be located on State land in the makai area of Kealakehe, approximately one mile from the petition area. A construction contract was recently awarded and site preparation has been initiated (Dennis Reid, Construction Manager, R.M. Towill, Corp., personal communication, January 18,

1990). Completion of the project is estimated for July 1, 1991. Capacity estimates for the first phase of the new facility are 2.8 mgd average daily flow. Since the Kealakehe facility is planned to replace the existing Kona Wastewater Treatment Plant, the new facility will likely be near capacity when it opens, and unable to accommodate additional growth in the area (ibid). The proposed site for development does has sufficient land for expansion and the long-term design of the facility is proposed to have a capacity of 7.8 mgd.

Probable Impacts

The estimated generation of domestic wastewater from Increment I of the proposed project is approximately 5,000 to 6,000 gpd. The maximum per lot is estimated at approximately 1,000 gpd, with most lots being in the 200 to 500 gpd range. A summary findings of the hydro-geologic impact assessment (see Appendix E) indicate the project is likely to impact the groundwater body and receiving waters of groundwater discharge in the following ways:

- Wastewater discharged from project cesspools and disposal wells will influence the receiving groundwater's chemistry, particularly as localized increases in the concentration of certain inorganic constituents.

- The movement of these contaminants will be along prevailing flow paths of the groundwater body toward shoreline discharge.

- Lateral movement of these contaminants by mixing and dispersion can be approximated by a cone which widens with distance from their point of introduction toward the shoreline.

- For the anticipated quantities of wastewater percolating into underlying groundwater, and considering the concentration of contaminants and the effects of dispersion and dilution, the concentrations of contaminants in groundwater near the shoreline will be relatively low. These contaminants will be rapidly dissipated after mixing into nearshore waters.

- The effect of Honokohau Harbor to concentrate discharge of groundwater into it is a significant factor. It is likely to narrow the width of the discharge cone. In fact, most introduced contaminants are likely to be discharged into the harbor itself.

- It is unlikely that the contaminants will travel as far north to reach Aimakapa Fishpond. In the unlikely event that some of these do enter the pond, it would amount to an extremely small fraction of the total contaminant load at a very low concentration.

Cumulative Impacts

The impact of cumulative development in the region will require additional expansion of the proposed wastewater treatment plant at Kealakehe and development of transmission lines to service expanded urban areas.

Mitigation Measures

Wastewater disposal within the petition area is proposed to be provided by cesspools, except in portions of the makai area where such facilities are prohibited. However,

due to the growing concern in West Hawaii regarding the quality of coastal waters, the petitioner will continue to evaluate the benefits and feasibility of alternate disposal systems (such as septic tanks and small on-site package plants) which could further minimize potential adverse impacts from the proposed project on coastal areas. All disposal facilities will be in conformance with applicable State and County regulations.

Uses within the petition area will be connected to the municipal sewer system when such system is available. Dry lines will be installed at the appropriate time.

4.3.4 Storm Drainage

As discussed previously, the North Kona area is considered dry and arid with light rainfall. Presently there are no established drainage ways or structures located on the project site. The natural drainage consists of rainfall percolating through the layers of very porous lava to the underground water table. There is no recorded flooding in this area. According to a letter from the Army Corps of Engineers (September 14, 1989), the property is located in Zone "X", an area determined to be outside the 500-year flood plain, by the Flood Insurance Rate Map, Panel 692, dated September 16, 1988.

Probable Impacts

Surface water runoff from the site will be altered. The extent of change will ultimately depend upon the amount of paving and other impermeable surfaces that will occur within the area and the actual configuration of the storm drainage system. Based on the proposed uses in Increment I, surface water runoff was estimated by Leo Fleming, the consulting civil engineer, to be approximately 100 cubic feet per second (cfs) for a 10-year storm (see Appendix D) Drywells constructed to County standards will be provided within various parcels and along roadways as required. Grease and oil traps will be located, where appropriate, and the contents of the traps will be handled and disposed of in accordance with EPA rules.

Mitigative Measures

The on-site drainage system will consist of catch basins and County standard drywells designed to retain storm waters within the site. Drainage runoff will be bermed or curbed such that runoff from individual operations will be contained within the site. Drywells will be added under all terminal catch basins in order to enhance percolation and filtration of storm water into the substrata, rather than have the storm water surface flow towards the ocean. Specific design and percolation analyses will be completed prior to the siting and installation of final drywell systems.

4.3.5 Electrical Power and Communications

Hawaii Electric Light Company (HELCO) currently maintains a 69 KV transmission line within a power line corridor paralleling the mauka side of the Queen Kaahumanu Highway. A 12 KV line terminates at a power pole approximately 300 feet south of the properties makai of the project site.

At present, HELCO does not service the petition area. All electricity on the site is supplied by generators. The largest electrical requirement on the site is to operate

crushers associated with the quarry operation. A 500 KW generator is used to provide power for this facility.

The Hawaiian Telephone Company transmits telephone communications from base exchanges to telephone substations located in service areas. Consumers are then serviced from these substations by land lines. The petition area is serviced by a line running along the Access Road.

Probable Impacts

The Hawaii Electric Light Company (HELCO) estimates the electrical load from Increment I to be approximately 3,753 KVA (see letter dated March 20, 1990 in Chapter 8). HELCO concludes that "the existing transmission and distribution facilities will not be able to accommodate this new load and new electrical facilities will be required." Little direct impact to existing utility customers is expected since excess electrical capacity if available at the present power plant (Mr. Melvin Yamaki, personal communication, March 21, 1990).

Hawaiian Telephone Company would continue to service the site via its existing line along the Access Road.

Cumulative Impacts

In a letter dated November 16, 1989 from HELCO to the County Planning Director (see Chapter 8 for a copy of the letter), HELCO concludes that two or more additional 69 KV lines will be required in the Kona area to support the County's proposed plan for the area. Full development of the plan would exceed the capacity of the existing power plant and a new plant would have to be constructed.

Mitigative Measures

In order to minimize the estimated future demand for electrical power within the petition area, the petitioner proposes to continue the use of generators to provide power for operations of West Hawaii Concrete. Additionally, energy conservation features such as fluorescent lighting in buildings and sodium lighting in parking lots and along roadways will be incorporated within the project to reduce peak demand. Beyond these measures, the petitioner will participate in the funding of transmission and distribution facility improvements.

4.3.6 Police, Fire and Emergency Services

Police protection for the North Kona area is provided by the Hawaii County Police Department operating from its new regional headquarters on a 10-acre site in Kealakehe, approximately one-half mile south of the project area.

The Hawaii County Fire Department provides fire protection services to Big Island residents. Fire stations are located in the Kona area at Captain Cook and Kailua-Kona. The Kailua-Kona station is located on Palani Road above the Queen Kaahumanu Highway intersection, approximately three miles from the project site (approximate response time of 5 minutes).

Emergency ambulance services are provided by the State Department of Health. Advanced life support ambulance units are located at the Lucy Henriques Medical Center in Waimea, the Kailua-Kona Fire Station and at the Captain Cook Fire

Station. The Kona Hospital houses a basic life support ambulance unit. The Kailua-Kona fire station is equipped for offshore emergencies.

Probable Impacts

The development of the petition area, such as proposed herein will marginally increase demand for police, fire and emergency services.

Cumulative Impacts

Future regional development will require significant increases in personnel and facilities to provide adequate police, fire, and emergency services for the Kona region.

4.3.7 Solid Waste Disposal

The County operates 28 solid waste transfer station chutes at 21 locations around the island, including a new Kailua transfer station which opened in 1986. Refuse collected at these stations is transferred to one of the two active landfill sites: Hilo or Kealakehe (located approximately one half mile south of the project site). Refuse collected by private contractors cannot be deposited at the refuse transfer stations; instead it must be trucked to one of the two landfill sites. Hazardous waste and sludge are not accepted at any of the County landfills.

The Kealakehe landfill, which presently serves the North and South Kona Solid Waste District, is nearing capacity. The County has recently selected a new landfill site located approximately 15 miles north of the airport at Puuwaawaa. A date for opening the new landfill has not yet been set. After its opening, the Kealakehe landfill would be closed and used only as a solid waste transfer station.

Probable Impacts

Individual users of the property will arrange for collection and disposal of solid wastes. The Kealakehe landfill will be used for disposal until the new disposal facility becomes operational.

CHAPTER 5

ALTERNATIVES TO THE PROPOSED PROJECT

Chapter 200 of Title 11, Environmental Impact Statement Rules (Subsection 17(f)), requires a discussion of "any known alternatives... which could feasibly attain the objectives of the action." The rules further specify that the alternatives be explored and evaluated in light of enhancement to the environmental quality or the avoidance or reduction of adverse environmental effects.

The evaluation of alternatives to the proposed project included no action and alternative uses.

5.1 NO ACTION

The no action alternative would continue most of the existing uses on the petition area pursuant to Permit No. HA-637. Advantages associated with this alternative include the economic "savings" incurred from the deferment of on-site and off-site infrastructure improvements required for the proposed operations within the petition area, and the retention of the remainder of the site in its natural state for an undetermined period of time.

One disadvantage of the no action alternative involves the requirement for the petitioner to submit a petition to the Land Use Commission by June 13, 1989 to redesignate a portion of the petition area to a more appropriate zoning district (See Appendix A). A second disadvantage is the limited supply of land available in the Kona area for the proposed uses in the petition area. Existing industrial areas in Kona, including the Kona Industrial Subdivision and the Kaloko Light Industrial Subdivision, do not currently provide lots of over one acre in size. Other factors which make these areas not conducive to activities proposed within the petition area (particularly those within Increment I) include their lease price and restrictions on open storage. Additionally, the above conditions would create an extreme hardship on the boat storage and marine repair and maintenance activities allowed under CDUA Permit No. HA-1873. Space for these types of activities at Honokohau Harbor is occupied, thus highlighting the need for retaining and increasing the acreage within the petition area for such uses.

5.2 ALTERNATIVE USES

As discussed in Section 3.2.1, the revised County General Plan identifies land in Kona, including the petition area, as Urban Expansion Area. This designation "allows for a mix of high density, medium density, low density, industrial and/or open designations in areas where new settlements may be desirable, but where the specific settlement pattern and mix of uses have not yet been determined." In Section 3.2.2, a review of the County of Hawaii Draft Keahole to Kailua Development indicates the petition area is proposed for Regional Center and Urban Expansion uses. Within the context of these plans, alternative land uses considered for the petition area included higher density industrial and regional center activities.

5.2.1 Higher Density Industrial

The discussion in Section 2.5 noted that the supply of available industrial land (for lease or sale) in the Kona area is extremely limited. Development of the petition

area could address this situation by providing smaller lots for a higher density of development. The advantage of this action is that more individual businesses could be provided land in the petition area than what is currently being proposed. Furthermore, higher density development could possibly bring a greater return of investment for the petitioner. Disadvantages would include a higher level of traffic and greater demand for sewer, water, and other types of public infrastructure.

5.2.2 Regional Center Activities

The rapid rate of growth in Leeward Hawaii, and the Kona region in particular, has increased demands for region-serving activities and civic functions that cannot be adequately satisfied by many existing facilities. In accordance with the Draft Keahole to Kailua Development Plan, an alternative development scenario for the petition area could provide a variety of uses such as civic/public buildings and uses, including State offices, County offices, and a judiciary complex, related business and financial office buildings, and/or retail commercial facilities.

One advantage of this alternative would be the development of uses that are more aesthetically and environmentally sensitive to the natural surroundings. The development of an office park or retail commercial facilities would also likely bring a greater return on investment to the petitioner. A final advantage would be the conformance of this alternative with the K to K Development Plan. Disadvantages of this alternative are its failure to meet the development objectives of the petitioner, it would create a much greater impact on all infrastructure facilities in the area, it would not satisfy the market for industrial land that the petioner seeks to address, and it would not be in conformance with the approved Kealakehe Planned Community Development Plan which locates civic activities along Queen Kaahumanu Highway.

5.3 SUMMARY

Given the petitioner's objective of maintaining existing uses within the petition area, the demand for industrial land in the Kona area for activities that are proposed by the petitioner, and additional development plans that are being proposed for the general Kona area, the proposed use of the petition area is believed to be the best of the alternatives considered.

CHAPTER 6

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OR RESOURCES/AND RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OR LONG-TERM PRODUCTIVITY

This Chapter summarizes information presented elsewhere in this report in terms of two requirements of the Environmental Impact Statement Rules. The petitioner is required to discuss: 1) the irreversible and irretrievable commitments of resources that would be involved in the proposed action should it be implemented; and, 2) the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity. These statements are discussed below.

6.1 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Chapter 200 of Title 11, Environmental Impact Statement Rules (11-200-17 (k)) requires the "identification of unavoidable impacts and the extent to which the action makes use of non-renewable resources during phases of the action, or irreversibly curtails the range of potential uses of the environment..."

The construction and long-term operation of the light industrial and commercial service-related uses proposed herein will permanently and irretrievably commit money, time and physical resources. The proposed urban uses will displace the open space currently provided by much of the site (although the perimeter of the site will be landscaped to minimize visual impacts on the proposed Kealakehe Planned Community planned for development immediately to the south). Development of the proposed action will foreclose alternative land uses including other urban uses. Other unavoidable impacts include increased traffic and increased demand on groundwater resources.

6.2 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Chapter 200 of Title 11, Environmental Impact Statement Rules (11-200-17 (j)) requires a brief discussion of the "extent to which the proposed action involves tradeoffs between short-term losses and long-term losses or vice-versa, and a discussion of the extent to which the proposed action forecloses future options, narrows the range of beneficial uses of the environment, or poses long-term risks to health or safety..."

Short-term tradeoffs related to the proposed action are generally associated with the urbanization process. The project area presently consists of quarrying operations, a ready-mix concrete batch plant and related operations, boat storage and repair operations, and vacant land. Much of the site provides an open space amenity to residents of the Kona area. The proposed action will commit the site to particular urban uses (light industrial and commercial) thereby "narrowing the range of [potential] beneficial uses" and possibly foreclosing future options. The construction and operational phases of development will involve greater environmental impacts than are currently generated by the site (i.e., increased water demand, wastewater, traffic, etc.). The open space currently afforded by the site will be altered by the proposed development.

Long-term losses/tradeoffs relate to policy objectives of Hawaii residents as expressed through their elected representatives. The North Kona region is widely

recognized as entering into a major growth period with the proposed development of a number of major destination resorts and the increased accessibility of the region via commercial aircraft utilizing the Keahole Airport. To keep up with this growth and attendant demand for services, suitable areas for support/service industry need to be identified and developed so that present and future residents of the Kona area can share in the economic prosperity associated with a growing urban area.

CHAPTER 7

PARTICIPANTS IN THE CONSULTATION PROCESS AND COMMENTS RECEIVED DURING THE PREPARATION OF THE DRAFT EIS

This chapter presents an overview of those who participated in the preparation of the Draft EIS, agencies and organizations which were consulted during the preparation of the Draft EIS, and all comments received and responses sent relative to the preparation of the Draft EIS.

7.1 PARTICIPANTS IN THE DRAFT EIS PREPARATION PROCESS

This Draft EIS was prepared for Robert S. McClean, Trustee of the Robert S. McClean Trust by Helber Hastert & Kimura, Planners. The following list identifies individuals and organizations who were involved in the preparation of the report and respective contribution.

Helber Hastert & Kimura, Planners

Mark H. Hastert	Principal-in-Charge and Project Manager
David R. Curry	Project Planner and Principal Author
Toshiko Matsushita	Graphic Artist

Technical Consultants

Paul Rosendahl, Ph.D.	Archaeology
Tom Nance	Hydrology
David Ziemann	Oceanography
Terry Brothers	Traffic

7.2 CONSULTED PARTIES AND COMMENTS RECEIVED DURING THE PREPARATION OF THE DRAFT EIS

By a letter dated August 3, 1989, the Hawaii State Land Use Commission determined that the proposed Honokohau Industrial Park would require the preparation of an environmental impact statement pursuant to Chapter 343, HRS. The Environmental Impact Statement Preparation Notice (EISPN) for the Honokohau Industrial Park was publihsed in the OEQC Bulletin by the Office of Environmental Quality Control on August 8, 1989. The 24 agencies and organizations listed below were sent copies of the OEQC notice together with a copy of the EISPN, and a cover letter explaining the process and soliciting comments. A total of 17 agencies/organizations responded to the request for comments and are identified in the list below with an asterisk (*). Copies of the correspondence with them are reproduced on the following pages.

Federal Agencies

* U.S. Department of Agriculture, Soil Conservation Service
* U.S. Department of Interior, Fish & Wildlife Service
* U.S. Army Corps of Engineers
National Park Service

State Agencies

* Department of Accounting and General Services
* Department of Business and Economic Development
* Department of Education
* Department of Health
* Department of Land and Natural Resources
* Department of Transportation
* Housing Finance and Development Corporation
* Office of State Planning
  Office of Environmental Quality Control
  U.H. Environmental Center

County Agencies

* Mayor's Office
* Planning Department
* Public Works Department
* Department of Water Supply
* Department of Parks and Recreation
  Office of Housing and Community Development
* Police Department
  Fire Department

Public Utilities

Hawaii Electric Light Company
Hawaiian Telephone Company

data
August 1, 1989

datafile.doc

sal first last, title
address

Dear sal last:

Environmental Impact Statement Preparation Notice
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Robert S. McClean, Trustee of the Robert S. McClean Trust (hereinafter referred to as "petitioner") seeks incremental districting of a 89.5-acre parcel of land located approximately 3 miles north of Kailua-Kona on the Island of Hawaii, northeast of the Honokohau Small Boat Harbor, approximately 1,000 feet mauka of the Queen Kaahumanu Highway. The petitioner proposes to develop the site in two increments. Conceptual development of the 45.5-acre increment I is intended to provide space for light industrial activities which generally require larger lots and open storage areas. The mauka 44-acre increment II is intended to be for the development of urban uses consistent with the Hawaii County General Plan.

The proposed action requires a petition be filed with the State Land Use Commission to reclassify the parcel from the State Conservation and Agricultural Districts to the Urban District. The State Land Use Commission has determined that an Environmental Impact Statement (EIS) will be required to support the petition, in accordance with Chapter 343, Hawaii Revised Statutes (HRS). Our firm has been retained to assist the petitioner in this process.

The official EIS preparation notice for the Honokohau Industrial Park was published in the August 8, 1989 issue of the Office of Environmental Quality Control (OEQC) Bulletin. A copy of that notice is enclosed. The publication in the OEQC Bulletin begins a 30-day public review period which is scheduled to end on September 6, 1989. We look forward to receiving any comments you may have within this time period.

To aid in your evaluation of potential project-related issues, we have also enclosed a more detailed preparation notice. We would appreciate your assistance in this process by reviewing the enclosed materials and: 1) Sending us your written comments or concerns relative to the proposed action; and/or, 2) Identifying an individual within your organization whom we may contact to discuss the project further.

Thank you for your cooperation.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry
Project Planner

DRC/lf
Enclosures

cc: Robert Smolenski

HELBER
HASTERT
& KIMURA
Planners
HH&K

Grosvenor
Center
PH
Tower
733
Bishop
Street
Suite
2380
Honolulu
Hawaii
96813
Telephone
[808]
545-2055
Telex
634468
HHHKUW
Facsimile
[808]
545-2050

465 SOUTH KING STREET, KEKUANAOA BUILDING #104, HONOLULU, HAWAII 96813 TELEPHONE 808 548-6915

OEQC BULLETIN

JOHN WAIHEE
GOVERNOR

OFFICE OF ENVIRONMENTAL QUALITY CONTROL

MARVIN T. MIURA, Ph.D.
DIRECTOR

Volume VI August 8, 1989 No.15

REGISTER OF CHAPTER 343, HRS DOCUMENTS

All Chapter 343, HRS documents submitted for publication in the OEQC Bulletin must be addressed to the Office of Environmental Quality Control, 465 South King Street, Room 104, Honolulu, Hawaii 96813. Documents addressed otherwise will not be considered for publication.

HONOKOHAU INDUSTRIAL PARK; North Kona, Hawaii; Robert S. McClean/State Land Use Commission (TMK: 7-4-08: 26 and 49)

The petitioner, Robert S. McClean, seeks incremental districting of the subject property to develop the site for light industrial and general urban uses. Conceptual development of the 45.5-acre Increment I is intended to provide space for light industrial activities which generally require larger lots and open storage areas.

Activities envisioned at the site include the following: continuation of ready-mix concrete and quarrying operations of West Hawaii Concrete; sale of boats and marine products and the continuation of the storage, construction, repair, and maintenance of boats and other marine-related activities; sales of lumber, hardware and other construction materials and services, and the manufacture of lumber products; development of self-storage facilities; development of an automotive repair and service center, and an automotive sales lot for new and/or used cars; storage of trucks, buses and construction equipment; office and storage facilities for contractors and small businesses, and productions and sale of nursery products.

The mauka 44-acre Increment II is intended to be for the development of urban uses consistent with the Hawaii County General Plan.

The project site is located about three miles north of Kailua-Kona, approximately 1,000 feet mauka of the Queen Kaahumanu Highway northeast of the Honokohau Small Boat Harbor. The makai 74.6 acres of the project site lie within the General Subzone of the State Conservation District. The mauka 14.9 acres are in the State Agricultural District.

Contact: Robert J. Smolenski
841 Bishop Street, Suite 1717
Honolulu, Hawaii 96813

Deadline: September 6, 1989

CHAPTER 343, HRS
ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE (EISPN)

HONOKOHAU INDUSTRIAL PARK

Honokohau, North Kona, Island of Hawaii

I. Introduction

This environmental impact statement preparation notice is prepared pursuant to Chapter 343, HRS following a determination by the State Land Use Commission that an environmental impact statement is required to accompany a petition requesting approval in concept to amend the State Land Use District boundaries from Conservation and Agricultural to Urban on all 89.5 acres of land within the subject parcel, and reclassify the 45.5-acre increment I to the Urban District consistent with provisions covering incremental districting.

The proposed action is being requested in order to comply with Condition #9 of Conditional Use Permit No. - HA 1873 (7/7/86) of the Board of Land and Natural Resources (BLNR) covering 3.5 acres in the northwest corner of the subject property. Said condition, as modified, requires the petitioner to submit a petition to the Land Use Commission to redesignate the 3.5-acre area covered by the Permit to "another zoning district more appropriate for the type of use". Furthermore, this request would allow for zoning consistent with Conditional Use Permit No. HA-637 (2/14/75) of the Board of Land and Natural Resources (BLNR) covering all 89.5 acres of the subject property. This permit allows for industrial activities including the quarrying of rock and production of concrete and related materials.

II Development Summary

Petitioner/ Landowner:	Robert S. McClean, as Trustee of the Robert S. McClean Trust P.O. Box 3000 Kailua-Kona, Hawaii 96745-3000
Petition Area:	89.5 acres (45.5 acres in Increment I)
Location:	Honokohau, North Kona District, Island of Hawaii
Tax Map Key:	Zone 7, Section 4, Plat 08, Parcels 26 and 49
State Land Use District:	Conservation and Agricultural

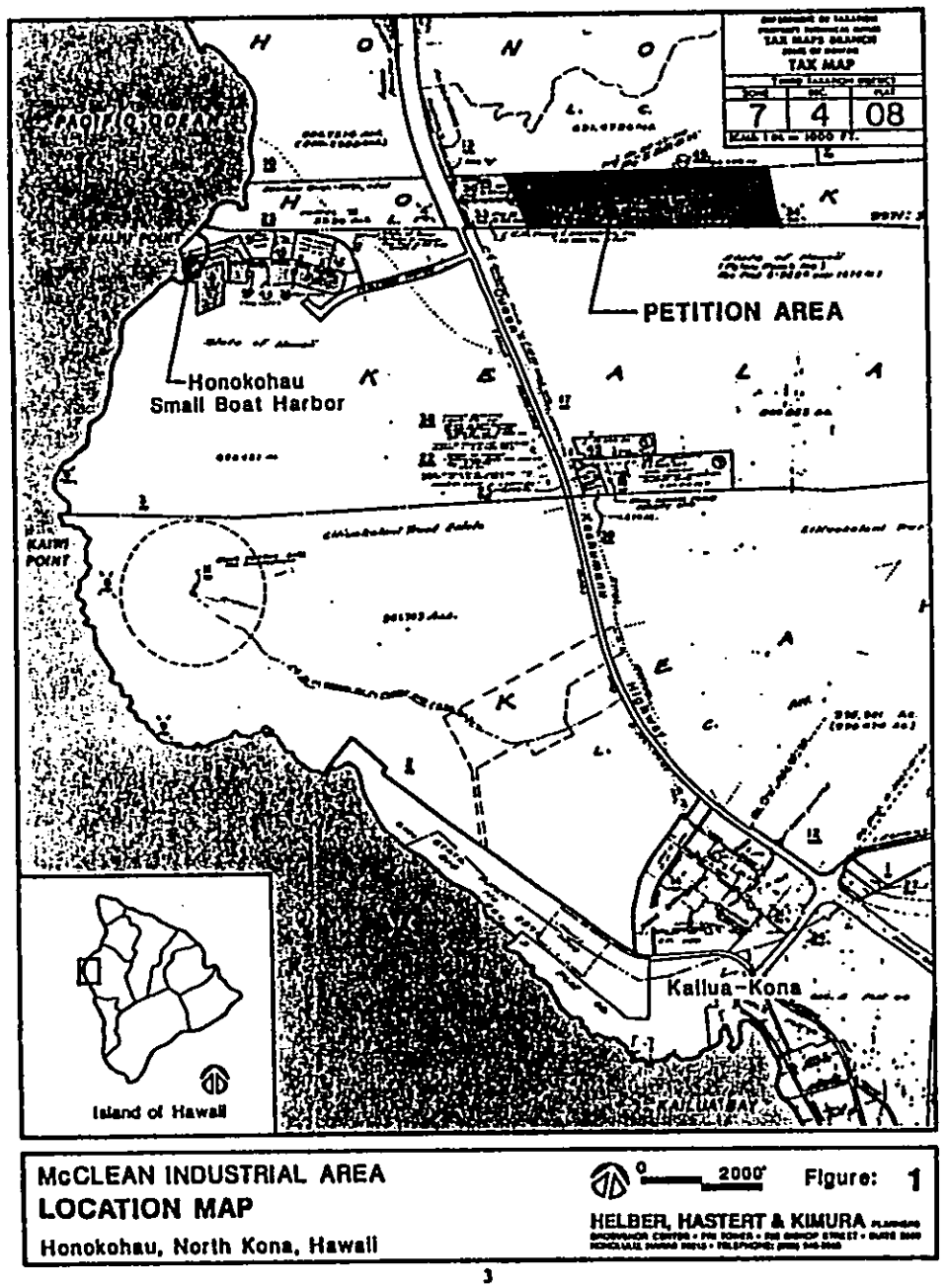
County of Hawaii General Plan:	Conservation (proposed revisions to the Hawaii County General Plan in 1987 recommend a change in designation to Urban Expansion Area.)
Kona Regional Plan:	Open
County Zoning:	Open and Unplanned
Existing Uses:	Project site is presently used for quarrying of rock, operation of ready-mix concrete batch plant and production of concrete, sale and loading of aggregates, sale of concrete blocks, machinery repair facilities, boat storage asb10H and equipment storage. Approximately 25 acres of the site have been heavily graded and/or excavated. Remainder of the site is covered by rough a'a and pahoehoe lava flows.
Proposed Uses:	Production and sale of concrete and concrete products; boat storage, sales and repair; lumber and hardware sales; automotive sales, service and repair; storage of trucks, buses and construction equipment; self-storage facilities; offices and storage areas for contractors; and nurseries and other light industrial uses.
Proposed Action:	The petitioner requests the State Land Use Commission to approve the entire 89.5-acre petition area for future urban development and to redesignate the 45.5-acre first increment from the State Conservation District to the Urban District.

III. Location

The project site is located about three miles north of Kailua-Kona, approximately 1,000 feet mauka of the Queen Kaahumanu Highway northeast of the Honokohau Small Boat Harbor (Figure 1). The makai 74.6 acres of the project site lie within the General Subzone of the State Conservation District. The mauka 14.9 acres are in the State Agricultural District.

IV. Existing Conditions

Portions of the petition area are presently used for operations of West Hawaii Concrete that include quarrying of rock, operation of a ready-mix concrete batch plant and production of concrete, sale and loading of aggregates, sale of concrete blocks, machinery repair facilities, a test lab, equipment storage and office space. The area also has 3.5 acres utilized for boat storage and repair. Approximately 25



3

acres of the site have been heavily graded and/or excavated. The remainder of the site is covered by rough a'a and pahoehoe lava flows.

The site is basically surrounded by undeveloped property. Lands in Kealakehe to the south are owned by the State. The Housing Finance and Development Corporation (HFDC) has recently initiated efforts to develop a master plan for these State lands in Kealakehe. The master plan is intended to have a major component of affordable residential housing, in addition to commercial areas and areas for public uses. Lands on the remaining three sides of the petition area are privately owned. A 9.9-acre site makai (west) of the property was recently granted Urban District designation by the Land Use Commission. Although vacant, this parcel has been bulldozed and is planned for industrial basoyard operations and an automobile service and repair business.

V. Proposed Action

The petitioner desires incremental districting of the subject property to develop the site for light industrial uses (Figure 2). Conceptual development of the 45.5-acre Increment I is envisioned as follows:

- Rental of approximately 11 acres to West Hawaii Concrete to continue: 1) the production and sale of ready-mix concrete, concrete products, and related activities of concrete pumping, repair and maintenance, and 2) the production and sale of quarry products, and related activities of repair and maintenance.

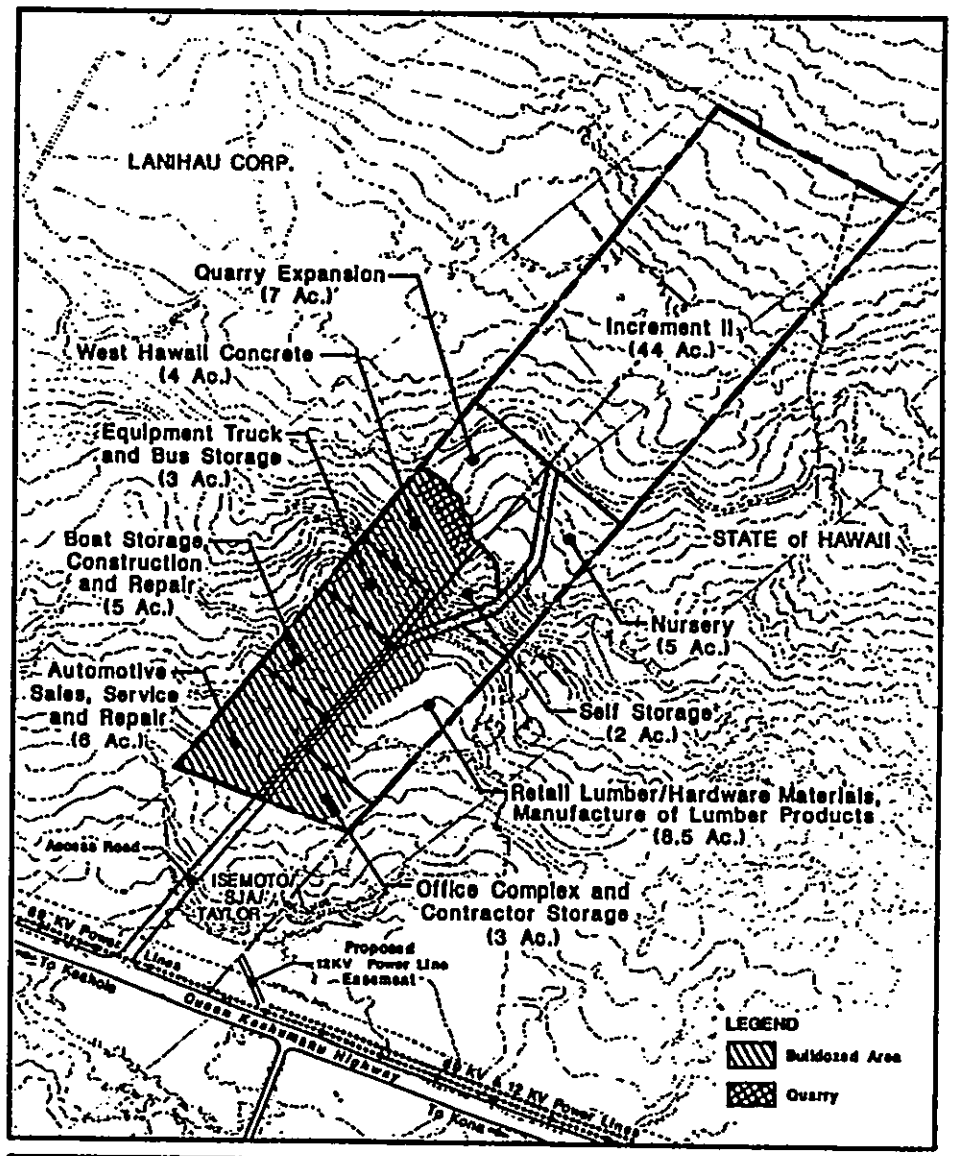
- Rental of approximately 5 acres for the sale of boats and marine products and the continuation of the storage, construction, repair and maintenance of boats and other marine-related activities.

- Rental of approximately 8.5 acres for the sale of lumber, hardware and other construction materials and services, and the manufacture of lumber products (e.g., trusses, cabinets, furniture).

- Rental of approximately 2 acres for the development of self-storage facilities.

- Rental of approximately 6 acres for the development of an automotive repair and service center, and an automotive sales lot for new and/or used cars.

4



McCLEAN INDUSTRIAL AREA
CONCEPT DEVELOPMENT MAP
Honokohau, North Kona, Hawaii

0 600' Figure: 2

HELBER, HASTERT & KIMURA

- Rental of approximately 3 acres for the storage of trucks, buses and construction equipment.
- Rental of approximately 3 acres for office and storage facilities for contractors and small businesses that do not require retail space and exposure.
- Rental of approximately 5 acres for the production and sale of nursery products.
- Development of approximately 2 acres for roads.

The activities and their location as shown in Figure 2 are subject to future revision, in so far as other types of light industrial uses could be included. The proposal of new activities beyond those which currently exist is based on expressions of interest from operators of these types of activities in acquiring space from the petitioner. Ultimate development of the area and the specific types of uses will depend on market forces in the region. However, Increment I of the petition area is intended to provide space for light industrial activities which generally require larger lots and open storage areas.

The mauka 44-acre Increment II is intended to be for the development of urban uses consistent with the Hawaii County General Plan and Sub-Regional Plan now being prepared by the County and its consultants.

VI. Alternatives Considered

The only alternative considered to the proposed action was the no-action alternative. This was determined to be undesirable because of the condition imposed by the Land Board requiring the petitioner submit a petition to the Land Use Commission requesting the redesignation of a portion of the subject property to the Urban District. The limited supply of land available in the Kona region to meet the current demand for the proposed uses in the petition area also made the no-action alternative undesirable.

VII. Summary of Probable Impacts

Flora and Fauna

Based on a review of biological surveys conducted in the area, no endangered animal or plant species appear to inhabit the project site. As a result, the proposed action is not expected to adversely impact flora and fauna populations in the area.

Historical and Archaeological Resources

Identified archaeological sites do not appear significant beyond their informational content. However, additional archaeological survey work will be conducted in the petition area in order to better document the identified sites, to check for additional sites that may be present, to positively identify burial sites and to determine the significance of each site within the area.

Public Facilities and Services

Traffic. The proposed action will generate additional vehicular traffic onto the Access Road (a paved roadway which provides access to the petition area) and Queen Kaahumanu Highway. Level of Service (LOS) at the Access Road intersection is presently LOS B. A service level of LOS E could be reached by 1993. The petitioner requests to participate in a traffic monitoring study with the Department of Transportation and neighboring property owners. When conditions warrant intersection improvements, the petitioner proposes to participate in his appropriate share of the funding and construction of both on-site and off-site transportation improvements necessitated by the proposed action.

Water. Projected potable water demand for Increment I would be 13,000 gallons per day (gpd). Water rights amounting to 5,400 gpd have been purchased by the petitioner from the Red Hill Joint Venture. The petitioner will eventually need to purchase additional water rights and upgrade the existing line in conjunction with the approval of the County Department of Water Supply.

Power/Communications. The petitioner has requested to participate in proposed improvements to the electrical service system that would provide service to the property makai of the petition area by extending the 12 KV line through a 300-foot long utility easement over the adjacent State lands to the south. Hawaiian Telephone Company would continue to service the site via its existing line along the Access Road.

VIII. Agencies to be Consulted During EIS Preparation

A. Federal Agencies

1. U.S. Department of Agriculture, Soil Conservation Service
2. U.S. Department of Interior, Fish & Wildlife Service
3. U.S. Army Corps of Engineers
4. National Park Service

B. State Agencies

1. Department of Accounting and General Services
2. Department of Business and Economic Development
3. Department of Education
4. Department of Health
5. Department of Land and Natural Resources
6. Department of Transportation
7. Housing Finance and Development Corporation
8. Office of State Planning
9. Office of Environmental Quality Control
10. U.H. Environmental Center

C. County Agencies

1. Mayor's Office
2. Planning Department
3. Public Works Department
4. Department of Water Supply
5. Department of Parks and Recreation
6. Office of Housing and Community Development
7. Police Department
8. Fire Department

D. Public Utilities

1. Hawaii Electric Light Company
2. Hawaiian Telephone Company

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
P. O. BOX 50004
HONOLULU, HAWAII
96850

September 14, 1989

Mr. David R. Curry
Project Planner
Helber, Hastert & Kimura, Planners
733 Bishop Street, Suite 2590
Honolulu, HI 96850

RECEIVED
SEP 19 1989
HELBER, HASTERT & KIMURA PLANNERS

Dear Mr. Curry:

Subject: Environmental Impact Statement Preparation Notice (EISPN) -
Honokohau Industrial Park, Honokohau, North Kona, HI -
TMK 7-4-08:26 and 49

7-8

We have reviewed the the above environmental impact statement preparation notice and offer the following comments for your consideration:

Projects of this nature usually produces dust blowing onto adjacent areas, often resulting in nuisance problems on these properties. The environmental impact statement should address what measures will be used to prevent this from happening, during both the construction and operation of the quarry.

We would appreciate the opportunity to reveiw the draft EIS.

Sincerely,

WARREN M. LEE
State Conservationist

November 17, 1989

HELBER HASTERT & KIMURA Planners
HH&K

Grosvenor Center
PH Tower
733 Bishop Street
Suite 2590
Honolulu Hawaii 96813
Telephone (808) 545-2055
Telex 534488 HHHKUW
Facsimile (808) 545-2050

Mr. Warren M. Lee, State Conservationist
U.S. Department of Agriculture
Soil Conservation Service
P.O. Box 50004
Honolulu, Hawaii 96850

Dear Mr. Lee:

Environmental Impact Statement Preparation Notice (EISPN)
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Thank you for your letter of September 14, 1989 regarding the EISPN for the referenced project. Your comments concerning dust pollution are noted and, where appropriate, will be discussed in the Draft EIS.

For your information, we expect to file the Draft EIS with the State Land Use Commission and the Office of Environmental Quality Control (OEQC) in January 1990. Your letter, together with this response, will be published as part of the Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry
Project Planner

DRC/lf

cc: Robert S. McClean
Robert J. Smolenski
Esther Ueda, Land Use Commission

United States Department of the Interior

FISH AND WILDLIFE SERVICE
PACIFIC ISLANDS OFFICE
P.O. BOX 50167
HONOLULU, HAWAII 96850

RECEIVED
AUG 26 1989
HELBER, HASTERT & KIMURA
PLANNERS

ES
Room 6307
AUG 24 1989

Mr. David R. Curry
Helber Hastert & Kimura, Planners
Grosvenor Center, PRI Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Re: Environmental Impact Statement Preparation Notice for Honokohau Industrial Park, Honokohau, North Kona, Hawaii TMK 7-4-08:26 and 49.

Dear Mr. Curry:

We have reviewed the referenced notice which was forwarded to us with your letter of August 21, 1989. To the best of our knowledge, there are no species present within the project area which are listed or eligible for listing as threatened or endangered by the Fish and Wildlife Service.

We recommend that the environmental impact statement being prepared for the proposed action discuss potential impacts of construction and operation of industrial facilities on groundwaters, and subsequent secondary effects upon coastal ponds and nearshore marine waters. This discussion should address the impacts of petroleum and pesticide use, leaching (e.g. from treated lumber), and accidental spillage within the project area upon groundwaters.

Thank you for providing this opportunity to comment.

Sincerely,

Ernest Kosaka
Ernest Kosaka
Field Office Supervisor
Environmental Services

cc: OEQC

7-9

HELBER HASTERT & KIMURA Planners
HH&K
Grosvenor Center
PRI Tower
733 Bishop Street
Suite 2590
Honolulu Hawaii 96813
Telephone (808) 545-2055
Telex 634468 HHHK UW
Facsimile (808) 545-2050

November 17, 1989

Mr. Ernest Kosaka, Field Office Supervisor
Office of Environmental Services
U.S. Department of the Interior
Fish and Wildlife Service
300 Ala Moana Blvd.
P.O. Box 50167
Honolulu, Hawaii 96850

Dear Mr. Kosaka:

Environmental Impact Statement Preparation Notice (EISPN)
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Thank you for your letter of August 24, 1989 regarding the EISPN for the referenced project. Your concern regarding the potential for contamination on groundwaters, and subsequent secondary effects upon coastal ponds and nearshore marine waters are noted and will be discussed in the Draft EIS.

For your information, we expect to file the Draft EIS with the State Land Use Commision and the Office of Environmental Quality Control (OEQC) in January 1990. Your letter, together with this response, will be published as part of the Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry

David R. Curry
Project Planner

DRC/lf

cc: Robert S. McClean
Robert J. Smolenski
Esther Ueda, Land Use Commission

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

REPLY TO ATTENTION OF

September 14, 1989

Planning Branch

Helber, Hastert & Kimura, Planners
Attention: Mr. David R. Curry
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Curry:

Thank you for the opportunity to review the Environmental Impact Statement Preparation Notice for the Honokohau Industrial Park, North Kona, Hawaii (TMK 7-4-08: 26 & 49). The following comments are provided:

a. A Department of the Army Permit will not be required for this project.

b. The project is located in Zone "X", an area determined to be outside the 500-year flood plain, by the Flood Insurance Rate Map, Panel 692, dated September 16, 1988.

Sincerely,

C Fy

Kisuk Cheung
Chief, Engineering Division

7-10

HELBER HASTERT & KIMURA Planners
HH&K

Grosvenor Center
PPI Tower
733 Bishop Street
Suite 2590
Honolulu Hawaii 96813
Telephone (808) 545-2055
Telex 634488 HHMKUW
Facsimile (808) 545-2050

November 17, 1989

Mr. Kisuk Cheung, Chief
Engineering Division
Department of the Army
U.S. Army Engineering District, Honolulu
Building 230
Honolulu, Hawaii 96858-5440

Attn: Planning Branch

Dear Mr. Cheung:

Environmental Impact Statement Preparation Notice (EISPN)
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Thank you for your letter of September 14, 1989 regarding the EISPN for the referenced project. The information you provided is appreciated and will be included in the Draft EIS.

For your information, we expect to file the Draft EIS with the State Land Use Commission and the Office of Environmental Quality Control (OEQC) in January 1990. Your letter, together with this response, will be published as part of the Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry

David R. Curry
Project Planner

DRC/lf

cc: Robert S. McClean
Robert J. Smolenski
Esther Ueda, Land Use Commission

JOHN WAIHEE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
DIVISION OF PUBLIC WORKS
P. O. BOX 119, HONOLULU, HAWAII 96810

RUSSEL S. NAGATA
COMPTROLLER

JAMES M. YAMURA
DEPUTY COMPTROLLER

LETTER NO. (P)1818.9

AUG 24 1989

RECEIVED
AUG 26 1989
HELBER, HASTERT & KIMURA
PLANNERS

Mr. David R. Curry
Helber, Hastert and Kimura
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Curry:

Subject: Honokohau Industrial Park
Honokohau, North Kona, Hawaii
EIS Preparation Notice

Thank you for the opportunity to review the subject document. We have no comments to offer.

Should there be any questions, please contact Mr. Cedric Takamoto of the Planning Branch at 548-7192.

Very truly yours,

TEUANE TOMINAGA
State Public Works Engineer

CT:jk

7-11

HELBER HASTERT & KIMURA Planners

HHK

Grosvenor Center
PH Tower
733 Bishop Street
Suite 2590
Honolulu, Hawaii 96813
Telephone (808) 545-2055
Telex 634-486 HRMK UW
Facsimile (808) 545-2050

November 17, 1989

Mr. Teuane Tominaga, State Public Works Engineer
State Department of Accounting
and General Services
Division of Public Works
P.O. Box 119
Honolulu, Hawaii 96810

Dear Mr. Tominaga:

Environmental Impact Statement Preparation Notice (EISPN)
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Thank you for your letter of August 24, 1989 regarding the EISPN for the referenced project. Although you have no comments at this time concerning the project, we appreciate the time you and your staff spent reviewing the EISPN.

For your information, we expect to file the Draft EIS with the State Land Use Commission and the Office of Environmental Quality Control (OEQC) in January 1990. Your letter, together with this response, will be published as part of the Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry

David R. Curry
Project Planner

DRC/lf

cc: Robert S. McClean
Robert J. Smolenski
Esther Ueda, Land Use Commission

DEPARTMENT OF BUSINESS AND ECONOMIC DEVELOPMENT

JOHN WAIHEE
GOVERNOR

ROBERT A. ULVELING
DIRECTOR

BARBARA KIM STANTON
DEPUTY DIRECTOR

LESLIE S. MASUMURA
DEPUTY DIRECTOR

August 25, 1989

RECEIVED
AUG 26 1989
HELBER, HASTERT & KIMURA PLANNERS

Mr. David R. Curry
Project Planner
Helber Hastert & Kimura
Planners
Grosvenor Center
PRI Tower, Suite 2590
733 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Curry:

Thank you for the opportunity to comment on the Environmental Impact Statement Preparation Notice, Honokohau Industrial Park, TMK 7-4-08: 26 and 49. The Department of Business and Economic Development has no pertinent comments to offer at this time.

Sincerely,

for Roger A. Ulveling

7-12

HELBER HASTERT & KIMURA Planners

HH&K

Grosvenor Center
PRI Tower
733 Bishop Street
Suite 2590
Honolulu Hawaii 96813
Telephone [808] 545-3055
Telex 634468 HHHKUW
Facsimile [808] 545-3050

November 17, 1989

Mr. Roger Ulveling, Director
Department of Business and Economic Development
State of Hawaii
250 S. King Street
P.O. Box 2359
Honolulu, Hawaii 96804

Dear Mr. Ulveling:

Environmental Impact Statement Preparation Notice (EISPN)
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Thank you for your letter of August 25, 1989 regarding the EISPN for the referenced project. Although you have no comments at this time concerning the project, we appreciate the time you and your staff spent reviewing the EISPN.

For your information, we expect to file the Draft EIS with the State Land Use Commission and the Office of Environmental Quality Control (OEQC) in January 1990. Your letter, together with this response, will be published as part of the Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry
Project Planner

DRC/lf

cc: Robert S. McClean
Robert J. Smolenski
Esther Ueda, Land Use Commission

JOHN WAIHEE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF EDUCATION
P. O. BOX 2360
HONOLULU, HAWAII 96804

OFFICE OF THE SUPERINTENDENT

CHARLES T. TOGUCHI
SUPERINTENDENT

RECEIVED
SEP -5 1989
HELBER, HASTERT & KIMURA PLANNERS

August 30, 1989

Mr. David R. Curry
Project Planner
Helber, Hastert, & Kimura
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Curry:

SUBJECT: Environmental Impact Statement Preparation Notice
Honokohau Industrial Park, Honokohau, North Kona, Hawaii: TMK: 7-4-08: 26 and 49

Our review of the proposed industrial park indicates that it will have negligible impact on our area schools.

Thank you for the opportunity to comment.

Sincerely,

Charles T. Toguchi
Superintendent

CTT:jl

cc: Mr. E. Imai
Dr. A. Garson

7-13

HELBER
HASTERT
& KIMURA
Planners

HH&K

Grosvenor
Center
PH
Tower
733
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Suite
2590
Honolulu
Hawaii
96813
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(808)
545-2055
Telex
634468
HHMK UW
Facsimile
(808)
545-2050

November 17, 1989

Mr. Charles T. Toguchi, Superintendent
Department of Education
State of Hawaii
P.O. Box 2360
Honolulu, Hawaii 96804

Dear Mr. Toguchi:

Environmental Impact Statement Preparation Notice (EISPN)
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Thank you for your letter of August 30, 1989 regarding the EISPN for the referenced project. We note that the project will have negligible impact on schools in the area and appreciate the time you and your staff spent reviewing the EISPN.

For your information, we expect to file the Draft EIS with the State Land Use Commission and the Office of Environmental Quality Control (OEQC) in January 1990. Your letter, together with this response, will be published as part of the Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry
Project Planner

DRC/lf

cc: Robert S. McClean
Robert J. Smolenski
Esther Ueda, Land Use Commission

JOHN WAIHEE
GOVERNOR OF HAWAII

JOHN C. LEWIN, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HAWAII 96801

In reply, please refer to:
EPHSD/EPO

October 4, 1989

Mr. David R. Curry, Project Planner
Helber, Hastert & Kimura, Planners
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Curry:

Subject: Environmental Impact Statement (EIS) Preparation Notice for the Honokohau Industrial Park, Honokohau, North Kona, Hawaii Tax Map Key No. 7-4-08: 28 and 49

Thank you for the opportunity to review the subject document. We have examined the preparation notice and have the following comments to offer:

7-14

Drinking Water

1. The EIS must adequately address the issue of providing potable water for the planned project. The preparation notice indicates that the developer still needs to purchase additional water rights and upgrade the existing water line. The developers should be reminded that any new potable water source(s) and distribution system will be subject to the Department's Administrative Rules, Title 11, Chapter 20, "Potable Water Systems."

2. Section 11-20-29 of Chapter 20 requires that all new sources of potable water serving a public water system be approved by the Director of Health prior to their use. Such an approval is based primarily upon the submission of a satisfactory engineering report which addresses the requirements set in Section 11-20-29.

3. Section 11-20-30 of Chapter 20 requires that new or substantially modified distribution systems for public water systems be approved by the Director. However, if the water system is under the jurisdiction of the County of Hawaii, the Department of Water Supply will be responsible for the review and approval of the plans.

4. The EIS must also address wastewater and stormwater disposal. A more detailed location map(s) will be required to determine the location of the project site with respect to the Underground Injection Control (UIC) line which delineates underground sources of drinking water.

Wastewater Disposal

We recommend that an individual wastewater system be constructed in accordance with Administrative Rules, Title 11, Chapter 62, "Wastewater Systems" and dry sewer lines also be constructed for future connection to the municipal sewer system as conditions of approval.

Hazardous Waste

The envisioned "light industrial" tenants to be located in the "Increment I" phase commonly generates solid wastes that are hazardous. The developer/owner is recommended to notify its tenants of current federal hazardous waste regulations set forth in Title 40 of the Code of Federal Regulations Parts 260 - 270.

Solid Waste

The EISPN should address the used oil and lead-acid battery statutes and the possible environmental impact from the automotive service, repair and storage activities proposed at the park.

Underground Storage Tank

The proposed actions described in the notice, such as the repair and maintenance facilities for marine-related activities and the automotive repair and service center, usually involve the installation of underground storage tank systems used for petroleum product storage.

The petitioner (Robert S. McClean Trust) should be aware that the U. S. Environmental Protection Agency's final technical rules and regulations for underground storage tanks (USTs) containing petroleum and hazardous substances were published in the Federal Register on September 23, 1988 and became effective on December 22, 1988. These rules and regulations set forth specific requirements that must be undertaken by owners and operators for UST installation, operation, release detection, release response and corrective action. We are enclosing a copy of the EPA's final technical rules and regulations for the petitioner's information and use (Attachment A).

The petitioner should also realize that the federal financial responsibility requirements for USTs containing petroleum became effective on January 24, 1989 Federal Register 10-26-89 (see Attachment B). A copy of these federal regulations are also enclosed for the petitioner's reference.

The petitioner should review the attached federal UST rules and regulations carefully. Any possible impacts due to a release of regulated substances from such tank systems should be addressed in the draft environmental

statement. This discussion should include all provisions which shall be undertaken by the petitioner in order to comply with the federal UST rules and regulations. The petitioner should also contact the appropriate County Fire Department regarding any county regulations applicable to UST systems.

Sincerely,

BRUCE S. ANDERSON, PH.D.
Deputy Director for
Environmental Health

Attachments

7-15

November 17, 1989

HELBER HASTERT & KIMURA Planners
HH&K
Grosvenor Center
PPI Tower
733 Bishop Street
Suite 2590
Honolulu Hawaii 96813
Telephone (808) 545-2055
Telex 634468 HHMKUW
Facsimile (808) 545-2050

Dr. John C. Lewin, Director
Department of Health
State of Hawaii
P.O. Box 3378
Honolulu, Hawaii 96801

Attn: Bruce S. Anderson, PH.D.

Dear Dr. Lewin:

Environmental Impact Statement Preparation Notice (EISPN)
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Thank you for your letter of October 4, 1989 regarding the EISPN for the referenced project. Your comments concerning the availability of potable water, wastewater disposal, handling of solid and hazardous wastes, and guidelines for underground storage facilities are noted and will be discussed in the Draft EIS.

For your information, we expect to file the Draft EIS with the State Land Use Commission and the Office of Environmental Quality Control (OEQC) in January 1990. Your letter, together with this response, will be published as part of the Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry
Project Planner

DRC/lf

cc: Robert S. McClean
Robert J. Smolenski
Esther Ueda, Land Use Commission

JOHN WAIHEE
GOVERNOR OF HAWAII

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

REF:OCEA:SOR

NOV 17 1989

WILLIAM W. PATY, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES
LIBERT K. LANDGRAF
MAHARU TAKAHASHI
RUSSELL N. FUKUMOTO

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

FILE NO.: 90-120
DOC. NO.: 6815E

RECEIVED
NOV 21 1989

Mr. David R. Curry
Project Manager
Helber, Hastert & Kimura (HH&K)
Planners
Grosvenor Center, PRI Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Curry:

SUBJECT: Environmental Impact Statement Preparation Notice
Honokohau Industrial Park, Honokohau, North Kona, Hawaii; TMK 7-4-08: 26 & 49

Thank you for giving our Department the opportunity to review this matter. We have reviewed the materials you submitted and have the following comments.

The applicant already has determined that an archaeological inventory survey of unaltered (non-bulldozed and non-quarry) lands is needed. We are waiting for the findings of the survey, and we recommend that the findings be submitted to our Department for review as soon as the survey report is concluded.

The industries now operating on this site have been subject to several approved Conservation District Use reviews (HA-637, HA-1873, and HA-2219) since 1975. No adverse environmental impact had been reported from the existing activities.

However, we suggest that the petitioner discuss in the DEIS, what precautions or mitigation measures are planned to be taken to prevent petroleum products, detergents, cement by-products, and other contaminants associated with industrial development, from impacting the aquatic environment, especially during storm runoff.

7-16

Thank you again for your cooperation in this matter. Please feel free to call Jay Lembeck at our Office of Conservation and Environmental Affairs, at 548-7837, if you have any questions.

Very truly yours,

WILLIAM W. PATY

January 9, 1990

HELBER
HASTERT
& KIMURA
Planners
HHBK

Grosvenor
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PH
Tower
733
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2590
Honolulu
Hawaii
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(808)
545-2055
Telex
634466
HHMHK UW
Facsimile
(808)
545-2050

Mr. William W. Paty, Chairperson
Board of Land and Natural Resources
Department of Land and Natural Resources
State of Hawaii
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Paty:

Environmental Impact Statement Preparation Notice (EISPN)
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Thank you for your letter of November 17, 1989 regarding the EISPN for the referenced project. Your comments concerning mitigation measures related to hazardous material impacts on the aquatic environment are noted and, where appropriate, will be discussed in the Draft EIS.

For your information, we expect to file the Draft EIS with the State Land Use Commission and the Office of Environmental Quality Control (OEQC) in January 1990. Your letter, together with this response, will be published as part of the Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry

David R. Curry
Project Planner

DRC/lf

cc: Robert S. McClean
Robert J. Smolenski
Esther Ueda, Land Use Commission

7-17

JOHN WAIHEE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

EDWARD Y. HIRATA
DIRECTOR

DEPUTY DIRECTORS
JOHN K. UCHIMA
RONALD N. HIRANO
DAN T. KOCHI
JEANNE K. SCHULTZ

IN REPLY REFER TO:
HWY-PS
2.8100

September 1, 1989

RECEIVED
SEP - 5 1989
HELBER, HASTERT & KIMURA
PLANNERS

Mr. David R. Curry
Helber, Hastert & Kimura, Planners
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Curry:

Environmental Impact Statement Preparation
Notice, Honokohau Industrial Park,
North Kona, TMK: 7-4-08: 26 and 49

Thank you for your letter of August 21, 1989 requesting our review of the subject EISPN.

A traffic impact assessment report must be submitted for our review and approval. The report should identify the effects of the traffic generated from the project on the highway system and possible mitigation measures.

Also, construction for work within our highway rights-of-way will require a permit from the Highways Division.

Very truly yours,

Edward Y. Hirata
Director of Transportation

7-18

HELBER
HASTERT
& KIMURA
Planners
HH&K

Grosvenor
Center
PH
Tower
733
Bishop
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Suite
2590
Honolulu
Hawaii
96813
Telephone
(808)
545-2055
Telex
634468
HHMBKUW
Facsimile
(808)
545-2050

November 17, 1989

Mr. Edward Y. Hirata, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Dear Mr. Hirata:

Environmental Impact Statement Preparation Notice (EISPN)
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Thank you for your letter of September 1, 1989 regarding the EISPN for the referenced project. Your concerns regarding potential traffic impacts on the highway system are noted. A discussion of potential impacts and mitigation measures will be presented in the Draft EIS.

For your information, we expect to file the Draft EIS with the State Land Use Commission and the Office of Environmental Quality Control (OEQC) in January 1990. Your letter, together with this response, will be published as part of the Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry
Project Planner

DRC/lf

cc: Robert S. McClean
Robert J. Smolenski
Esther Ueda, Land Use Commission

JOHN WAIHEE
GOVERNOR

JOSEPH K. CONANT
EXECUTIVE DIRECTOR

STATE OF HAWAII
DEPARTMENT OF BUDGET AND FINANCE
HOUSING FINANCE AND DEVELOPMENT CORPORATION
SEVEN WATERFRONT PLAZA, SUITE 300
500 ALA MOANA BOULEVARD
HONOLULU, HAWAII 96813
FAX (808) 543-6041

IN REPLY REFER TO:

89:PLNG/3541 JT

September 9, 1989

Mr. David R. Curry
Helber, Hastert & Kimura Planners
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Curry:

Re: Environmental Impact Statement Preparation Notice for Honokohau Industrial Park

I apologize for the late response and thank you for the opportunity to review the subject EIS preparation notice.

The Housing Finance and Development Corporation is proposing to develop a master planned community on lands adjacent to the proposed project. Conceptually, approximately 3,900 residential units, 60% of which would be offered at affordable levels, are planned for development in the proposed Kealakehe Planned Community. The HFDC has recently commenced with the master planning of the entire project and we will be taking into consideration the uses on private lands adjacent to our project. Plans are also underway for the development of approximately 100 acres of land which is adjacent to the existing Kealakehe Houselots and which is presently designated for urban use and zoned residential.

We are very concerned with the industrial use of lands adjacent to our proposed community, which will be primarily residential. We therefore request that the environmental impact assessment address the impacts of the proposed industrial park on the Kealakehe Planned Community. For example, the assessment should evaluate such negative impacts as dust, noise, traffic, hazardous waste, etc. which may result from industrial operations.

Sincerely,

JOSEPH K. CONANT
Executive Director

7-19

Helber
HASTERT
& KIMURA
Planners
HH&K

Grosvenor
Center
PPR
Tower
733
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2590
Honolulu
Hawaii
96813
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[808]
545-2055
Telex
634468
HHMK UW
Facsimile
[808]
545-2050

November 17, 1989

Mr. Joseph Conant, Executive Director
Housing Finance and Development Corporation
Department of Budget and Finance
Seven Waterfront Plaza, Suite 300
500 Ala Moana Boulevard
Honolulu, Hawaii 96813

Dear Mr. Conant:

Environmental Impact Statement Preparation Notice (EISPN)
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Thank you for your letter of September 9, 1989 regarding the EISPN for the referenced project. We note your comments on HFDC's proposed development at Kealakehe. Your concerns about the potential of the proposed industrial park to impact upon the Kealakehe Planned Community will be addressed in the Draft EIS.

For your information, we expect to file the Draft EIS with the State Land Use Commission and the Office of Environmental Quality Control (OEQC) in January 1990. Your letter, together with this response, will be published as part of the Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry

David R. Curry
Project Planner

DRC/lf

cc: Robert S. McClean
Robert J. Smolenski
Esther Ueda, Land Use Commission

7-20

OFFICE OF STATE PLANNING
Office of the Governor
STATE CAPITOL, HONOLULU, HAWAII 96813 TELEPHONE (808) 548-3980

JOHN WAIHEE, Governor

September 13, 1989

RECEIVED
SEP 18 1989
HELBER, HASTERT & KIMURA PLANNERS

Mr. David R. Curry
Helber, Hastert & Kimura, Planners
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Curry:

Subject: Environmental Impact Statement Preparation Notice -
Honokahau Industrial Park, TMK: 7-4-08: 26 and 49
Honokahau, North Kona, Hawaii
(Proposal to reclassify approximately 89.5 acres from the State Conservation and Agricultural Districts to the Urban Land Use District)

The compatibility of the proposed uses with existing and proposed land uses of the surrounding area should be thoroughly discussed. The EIS should also address the impacts that the project may have on groundwater and ocean water quality and the adequacy of infrastructure to support the proposed development.

Thank you for the opportunity to comment.

Sincerely,

Harold S. Masumoto
Director

HELBER HASTERT & KIMURA Planners
HH&K

Grosvenor Center
PPI Tower
733 Bishop Street
Suite 2590
Honolulu Hawaii 96813
Telephone (808) 545-2055
Telex 634468 HHHKUW
Facsimile (808) 545-2050

November 17, 1989

Mr. Harold Masumoto, Director
Office of State Planning
Office of the Governor
State Capitol
Honolulu, Hawaii 96813

Dear Mr. Matsumoto:

Environmental Impact Statement Preparation Notice (EISPN)
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Thank you for your letter of September 13, 1989 regarding the EISPN for the referenced project. Your comments concerning the compatibility of the proposed uses and potential impacts of the project are noted and, where appropriate, will be discussed in the Draft EIS.

For your information, we expect to file the Draft EIS with the State Land Use Commission and the Office of Environmental Quality Control (OEQC) in January 1990. Your letter, together with this response, will be published as part of the Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry
Project Planner

DRC/lf

cc: Robert S. McClean
Robert J. Smolenski
Esther Ueda, Land Use Commission

Bernard K. Akana
Mayor
Susan Labrenz
Managing Director
Gregory R. Meeers
Deputy Managing Director

Office of the Mayor

25 Aupuni Street, Rm. 215 • Hilo, Hawaii 96720 • (808) 961-8211 • Fax (808) 961-6553

RECEIVED
SEP - 7 1989
HELBER, HASTERT & KIMURA PLANNERS

September 1, 1989

Mr. David R. Curry
Helber, Hastert & Kimura, Planners
Grosvenor Center, PRI Tower
733 Bishop Street, Suite 2590
Honolulu, HI 96813

Dear Mr. Curry:

Environmental Impact Statement (EIS) Preparation Notice
Honokohau Industrial Park
Honokohau, North Kona, Hawaii

Thank you for soliciting our comments for the Environmental Impact Statement which you will be preparing for the proposed Honokohau Industrial Park at Honokohau, North Kona.

Since the Planning Department is involved in both the State Land Use Boundary Amendment petition for this project and is also working on a detailed regional development plan for the surrounding area, I have asked Planning Director, Duane Kanuha, to coordinate our response and to serve as the contact person for further discussions on this project.

Aloha,

Bernard K. Akana
MAYOR

cc: Planning Director

7-21

HELBER HASTERT & KIMURA Planners
HH&K
Grosvenor Center
PRI Tower
733 Bishop Street
Suite 2590
Honolulu, Hawaii 96813
Telephone (808) 545-2055
Telex 634468 HHMKUW
Facsimile (808) 545-2050

November 17, 1989

Honorable Bernard K. Akana, Mayor
Office of the Mayor
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mayor Akana:

Environmental Impact Statement Preparation Notice (EISPN)
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Thank you for your letter of September 1, 1989 regarding the EISPN for the referenced project. Although you have no comments at this time concerning the project, we appreciate the time you and your staff spent reviewing the EISPN.

For your information, we expect to file the Draft EIS with the State Land Use Commission and the Office of Environmental Quality Control (OEQC) in January 1990. Your letter, together with this response, will be published as part of the Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry
Project Planner

DRC/lf

cc: Robert S. McClean
Robert J. Smolenski
Esther Ueda, Land Use Commission

Mayor
Duane Kanuha
Director
William L. Moore
Deputy Director

Planning Department
25 Aupuni Street, Rm. 109 • Hilo, Hawaii 96720 • (808) 961-8288

September 7, 1989

Mr. David Curry
Helber, Hastert & Kimura, Planners
Grosvenor Center, PRI Tower
733 Bishop Street, Suite 2590
Honolulu, HI 96813

Dear Mr. Curry:

EIS Preparation Notice
Honokohau Industrial Park, Honokohau, North Kona
SLU Boundary Amendment Petition (A89-643)
Robert S. McClean, Trustee of Robert S. McClean Trust
TMK: 7-4-08:26 and 49

In addition to those items which were enumerated during the State Land Use Commission hearing by both the State Office of State Planning and County Planning Department, the traffic analysis in the EIS should determine when improvements to Queen Kaahumanu Highway would be needed and should also consider alternative access routes.

Please contact Norman Hayashi of my staff should you wish to discuss this project further.

Sincerely,

DUANE KANUHA
Planning Director

VKG:lv

Mayor
Duane Kanuha
Director
William L. Moore
Deputy Director

Planning Department
25 Aupuni Street, Rm. 109 • Hilo, Hawaii 96720 • (808) 961-8288

August 9, 1989

Mr. Robert J. Smolenski
1717 Davies Pacific Center
841 Bishop Street
Honolulu, HI 96813-3970

Dear Mr. Smolenski:

State Land Use Boundary Amendment (LUC A89-643)
Petitioner: Robert S. McClean as Trustee of the Robert S. McClean Trust
Request: Conservation to Urban
TMK: 7-4-08:26 and 49

For your information and appropriate action, we are transmitting comments received from the Department of Water Supply relating to the above-described petition. Given the lack of water to service the proposed project, please inform us of your plans to obtain the necessary water.

Should you have any questions concerning this matter, please feel free to contact the Planning Department.

Sincerely,

DUANE KANUHA
Planning Director

CRK:lv

Enclosure

November 17, 1989

HELBER
HASTERT
& KIMURA
Planners
HH&K

Grosvenor
Center
PH
Tower
733
Bishop
Street
Suite
2590
Honolulu
Hawaii
96813
Telephone
(808)
545-2055
Telex
534488
HHHKUW
Facsimile
(808)
545-2050

Mr. Duane Kanuha, Director
Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Kanuha:

Environmental Impact Statement Preparation Notice (EISPN)
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Thank you for your letters of August 9 and September 7, 1989 regarding the EISPN for the referenced project. Your comments concerning the availability of potable water and the potential traffic impacts of the proposed project are noted and, where appropriate, will be discussed in the Draft EIS.

For your information, we expect to file the Draft EIS with the State Land Use Commission and the Office of Environmental Quality Control (OEQC) in January 1990. Your letter, together with this response, will be published as part of the Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry

David R. Curry
Project Planner

DRC/lf

cc: Robert S. McClean
Robert J. Smolenski
Esther Ueda, Land Use Commission

7-23

Bernard K. Akana
Mayor
Hugh Y. Ono
Chief Engineer
Bruce C. McClure
Deputy Chief Engineer

Department of Public Works

25 Aupuni Street, Rm. 202 • Hilo, Hawaii 96720 • (808) 961-8321 • Fax (808) 969-7138

August 30, 1989

RECEIVED
SEP - 7 1989
HELBER, HASTERT & KIMURA PLANNERS

MR DAVID CURRY
HELBER HASTERT & KIMURA PLANNERS
733 BISHOP STREET SUITE 2590
HONOLULU HI 96813

SUBJECT: EISPN FOR HONOKOHAU INDUSTRIAL PARK
HONOKOHAU, N. KONA, HI.
TMK: 7-4-8:26 & 49

Our comments on the SLU Boundary Amendment were:

1. Building shall conform to all requirements of code and statutes pertaining to building construction.

2. All development generated runoff shall be disposed on site and shall not be directed toward any adjacent properties.

3. Applicant shall be informed that if drywells are included in the subject improvements, Chapter 23, Underground Injection Control (UIC), Administrative Rules, Dept. of Health, prohibit any person from operating, constructing or modifying an injection well (drywell) unless authorized by a permit issued by the Director of Health, State of Hawaii.

4. Provide a County dedicable access road meeting commercial standards. The minimum right-of-way is 60'.

5. Provide intersection improvements at the Queen Kaahumanu Highway, i.e. channelization.

6. We prefer a grade separated intersection but this may be an excessive request since the applicant does not own the makai property across the Queen Kaahumanu Highway.

for Robert K. Yanabu, Division Chief
Engineering Division

DEM:aaa

cc: Engineering
DOT - Hilo

7-24

HELBER HASTERT & KIMURA Planners
HH&K

Grosvenor Center
PRI Tower
733 Bishop Street
Suite 2590
Honolulu Hawaii 96813
Telephone (808) 545-2055
Telex 534488 HHMKUW
Facsimile (808) 545-2050

November 17, 1989

Mr. Hugh Y. Ono, Chief Engineer
Department of Public Works
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Attn: Robert K. Yanabu

Dear Mr. Ono:

Environmental Impact Statement Preparation Notice (EISPN)
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Thank you for your letter of August 30, 1989 regarding the EISPN for the referenced project. Your comments concerning the proposed project are noted and, where appropriate, will be discussed in the Draft EIS.

For your information, we expect to file the Draft EIS with the State Land Use Commission and the Office of Environmental Quality Control (OEQC) in January 1990. Your letter, together with this response, will be published as part of the Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry
Project Planner

DRC/lf

cc: Robert S. McClean
Robert J. Smolenski
Esther Ueda, Land Use Commission

DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAII

25 AUPUNI STREET • HILO, HAWAII 96720

August 3, 1989

TO: Planning Department

FROM: H. William Sewake, Manager

SUBJECT: STATE LAND USE BOUNDARY AMENDMENT
APPLICANT - ROBERT S. McCLEAN
TAX MAP KEY 7-4-08:26 AND 49

Please be informed that the Department's existing water system facilities cannot support the proposed subdivision at this time. Extensive improvements and additions, including source, storage, transmission, booster pump, and distribution facilities, must be constructed. Currently, sufficient funding is not available and no time schedule is set.

Should you have any questions, please contact us at 969-1421.

7-25

H. William Sewake
H. William Sewake
Manager

CS

... Water brings progress...

HELBER HASTERT & KIMURA Planners
HHK

Grosvenor Center
PPI Tower
733 Bishop Street
Suite 2590
Honolulu Hawaii 96813
Telephone (808) 545-2055
Telex 634468 HHMKUW
Facsimile (808) 545-2050

November 17, 1989

Mr. H. William Sewake, Manager
Department of Water Supply
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Sewake:

Environmental Impact Statement Preparation Notice (EISPN)
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Thank you for your letter of August 3, 1989 regarding the EISPN for the referenced project. Your comments concerning the existing water system facilities in West Hawaii are noted. The availability of potable water to the project will be discussed in the Draft EIS.

For your information, we expect to file the Draft EIS with the State Land Use Commission and the Office of Environmental Quality Control (OEQC) in January 1990. Your letter, together with this response, will be published as part of the Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry
David R. Curry
Project Planner

DRC/lf

cc: Robert S. McClean
Robert J. Smolenski
Esther Ueda, Land Use Commission

Bernard K. Akana
Mayor
Larry Tanimoto
Director
George Yoshida
Deputy Director

Department of Parks and Recreation

25 Aupuni Street, Rm. 210 • Hilo, Hawaii 96720 • (808) 961-8311

August 25, 1989

RECEIVED
AUG 30 1989
HELBER, HASTERT & KIMURA PLANNERS

Mr. David R. Curry
Project Planner
Helber, Hastert & Kimura Planners
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Subject: Honokohau Industrial Park, North Kona - EISPN

Dear Mr. Curry:

We have reviewed the subject EISPN and foresee no impacts on the County's park system.

Thank you for the opportunity to review the report.

Sincerely,

Larry Tanimoto
Director

7-26

HELBER HASTERT & KIMURA Planners
HH&K

Grosvenor Center
PPI Tower
733 Bishop Street
Suite 2590
Honolulu Hawaii 96813
Telephone (808) 545-3066
Telex 634488 HHHKUW
Facsimile (808) 545-2050

November 17, 1989

Mr. Larry Tanimoto, Director
Department of Parks and Recreation
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Tanimoto:

Environmental Impact Statement Preparation Notice (EISPN)
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Thank you for your letter of August 25, 1989 regarding the EISPN for the referenced project. We note that the project would not impact on the County's park system and appreciate the time you and your staff spent reviewing the EISPN.

For your information, we expect to file the Draft EIS with the State Land Use Commission and the Office of Environmental Quality Control (OEQC) in January 1990. Your letter, together with this response, will be published as part of the Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry
Project Planner

DRC/lf

cc: Robert S. McClean
Robert J. Smolenski
Esther Ueda, Land Use Commission

Police Department
349 Kapiolani Street • Hilo, Hawaii 96720 • (808) 961-2244 • Fax (808) 961-2702

Mayor
Victor V. Vierra
Chief of Police
Wayne G. Carvalho
Deputy Chief of Police

August 30, 1989

Mr. David R. Curry
Project Planner
Helber, Hastert & Kimura, Planners
Grosvenor Center
PRI Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Curry:

Subject: Environmental Impact Statement Preparation Notice
Honokohau Industrial Park, Honokohau, N. Kona, HI
TMK: 7-4-08: 26 and 49

From the police standpoint, a traffic concern exists at the entrance to Queen Kaahumanu Highway. An overpass and deceleration, acceleration, and dedicated left turn lanes should be required prior to approval.

Additionally, this project along with the many others in North and South Kona will further tax police resources.

Submitted for your review and disposition.

Sincerely,

VICTOR V. VIERRA
CHIEF OF POLICE

HJS:lli

7-27

HELBER HASTERT & KIMURA Planners
HH&K
Grosvenor Center
PRI Tower
733 Bishop Street
Suite 2590
Honolulu Hawaii 96813
Telephone (808) 545-2055
Telex 634466 HHHKUW
Facsimile (808) 545-2050

November 17, 1989

Mr. Victor Vierra, Chief of Police
Hawaii County Police Department
349 Kapiolani Street
Hilo, Hawaii 96720

Dear Mr. Vierra:

Environmental Impact Statement Preparation Notice (EISPN)
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Thank you for your letter of August 30, 1989 regarding the EISPN for the referenced project. Your comments concerning the potential impacts of the proposed project are noted and, where appropriate, will be discussed in the Draft EIS.

For your information, we expect to file the Draft EIS with the State Land Use Commission and the Office of Environmental Quality Control (OEQC) in January 1990. Your letter, together with this response, will be published as part of the Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry
Project Planner

DRC/lf

cc: Robert S. McClean
Robert J. Smolenski
Esther Ueda, Land Use Commission

CHAPTER 8

COMMENTS RECEIVED DURING THE PREPARATION OF THE FINAL EIS

Sixty (60) copies of the Draft Environmental Impact Statement (DEIS) were delivered to the Office of Environmental Quality Control (OEQC) on January 22, 1990. Notice of the DEIS was published in the January 23, 1990 issue of the OEQC Bulletin. Copies of the report were then distributed to interested public agencies, organizations, and individual listed below. As of March 23, 1990, a total of 19 comments (identified by an asterisk below) had been received. These comments along with responses are reprinted on the following pages.

Federal Agencies

* U.S. Department of Agriculture, Soil Conservation Service
U.S. Army-DAFE (Facilities Eng.-USASCH)
* U.S. Army Corps of Engineers
U.S. Coast Guard
* U.S. Navy
U.S. Department of Interior, Fish & Wildlife Service
Environmental Protection Agency

State Agencies

* Department of Accounting and General Services
* Department of Agriculture
* Department of Business and Economic Development
* Department of Defense
Department of Health
* Department of Land and Natural Resources
* Department of Transportation
* Housing Finance and Development Corporation
* Office of State Planning
* Office of Environmental Quality Control
* State Energy Office
State Archives
* U.H. Environmental Center

County Agencies

* Planning Department
* Public Works Department
* Department of Water Supply
* Department of Parks and Recreation
Department of Research and Development
University of Hawaii-Hilo Campus Library

News Media

Honolulu Star-Bulletin
Honolulu Advertiser
Sun Press
Hawaii Tribune Herald
West Hawaii Today

Public Utilities

* Hawaii Electric Light Company

Libraries

State Main Library
Kaimuki Regional Library
Kaneohe Regional Library
Pearl City Regional Library
Hilo Regional Library
Wailuku Regional Library
Lihue Regional Library
Kailua-Kona Library
U.H. Hamilton Library, Hawaiian Collection
Legislative Referenc Bureau

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
P. O. BOX 50004
HONOLULU, HAWAII
96850

March 8, 1990

Ms. Esther Ueda
State Land Use Commission
335 Merchant Street, Room 104
Honolulu, HI 96813

RECEIVED
MAR - 9 1990
HELBER HASTERT & KIMURA PLANNERS

Dear Ms. Ueda:

Subject: Draft Environmental Impact Statement (DEIS) - Honokohau Industrial Park, North Kona, Hawaii

A review of your draft EIS produced the following comments:

The use of cesspools for waste disposal in an area underlain with lava is a potential water pollution hazard. The porous soils could allow the movement of waste from the cesspools to reach the underground water supply. A detailed hydrologic study of this situation is recommended before making a final decision on the use of cesspools.

8-3 Two additional measures need to be addressed because the project is located above the Honokohau Boat Harbor and close to Kaloko-Honokohau Natural Historic Park.

1. A disposal system for paper waste needs to be provided for the industrial park.

2. Dust from the quarry operation needs to be controlled.

Thank you for the opportunity to review the DEIS and would appreciate it if we could review the final EIS.

Sincerely,

WARREN M. LEE
State Conservationist

cc:
Mr. Robert S. McClean, c/o David E. Curry, Halbert Hastert & Kimura, Planners, 733 Bishop Street, Suite 2590, Honolulu, HI 96813
Dr. Marvin T. Miura, Director, Office of Environmental Quality Control, 465 S. King Street, Room 104, Honolulu, HI 96813

Helber Hastert & Kimura
Planners

April 3, 1990

Mr. Warren M. Lee, State Conservationist
U.S. Department of Agriculture
Soil Conservation Service
P.O. Box 50004
Honolulu, Hawaii 96850

Dear Mr. Lee:

Draft Environmental Impact Statement (DEIS)
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Thank you for your letter of March 8, 1990 regarding the DEIS for the referenced project. We appreciate the time you and your staff spent reviewing the DEIS. Your comments are summarized below followed by our response.

1. Use of cesspools is a potential water pollution hazard. A detailed hydrologic study is recommended before making a final decision on the use of cesspools.

The petition area is located in an area where cesspools will continue to be allowed according to soon to be revised Department of Health regulations. Two studies, a Hydro-Geologic Impact Assessment and an Anchialine Pond Impact Assessment, were conducted for the proposed project and are appended in the EIS as Appendices E and F, respectively. Conclusions from these studies stated the project would not have a significant impact on groundwater resources or nearshore ponds. Section 4.3.3 of the EIS notes that uses within the petition area will be connected to the municipal sewer system when such system becomes available.

2. A disposal system for paper waste needs to be provided for the industrial park.

Section 4.3.7 of the EIS states that individual users of the property will arrange for collection and disposal of solid wastes, which would include paper wastes. Lessees would have the option of contracting services that would remove materials to a landfill fill site or recycling center.

3. Dust from the quarry operation needs to be controlled.

Dust particles from existing quarry operations are controlled by regular watering of disturbed areas. This practice will continue as long as quarrying occurs on the site.

Grosvenor Center, Mauka Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813
Telephone 808 545 2055
Facsimile 808 545 2050

We hope our responses have adequately addressed your concerns. For your information, we intend to file the Final EIS with the State Land Use Commission and the Office of Environmental Quality Control (OEQC) in the near future. Your letter, together with this response, will be published as part of the Final EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry
Project Planner

cc: Esther Ueda, Land Use Commission
Dr. Marvin T. Miura, OEQC
Robert McClean
Robert Smolenski

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, HONOLULU
BUILDING 230
FT. SHAFTER, HAWAII 96858-5440

REPLY TO ATTENTION OF:

February 22, 1990

Planning Division

RECEIVED
FEB 26 1990

Hawaii State Land Use Commission
Attn: Esther Ueda
335 Merchant Street, Room 104
Honolulu, Hawaii 96813

Dear Members of the Commission:

We have reviewed the Draft Environmental Impact Statement (DEIS) for the proposed Honokohau Industrial Park, Honokohau, North Kona, Island of Hawaii. Our previous comments in response to the Preparation Notice (letter dated September 14, 1989) have been included in the DEIS. We have no additional comments.

Sincerely,

Clarence Fujii
Acting Director, Engineering

Copy Furnished:

Robert S. McClean
c/o David R. Curry
Helber Hastert & Kimura, Planners
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Marvin T. Miura, Ph.D.
Director
Office of Environmental Quality Control
465 S. King St., Room 104
Honolulu, Hawaii 96813

8-5

Helber Hastert & Kimura
Planners

April 3, 1990

Mr. Clarence Fujii, Acting Director
Engineering Division
Department of the Army
U.S. Army Engineering District, Honolulu
Building 230
Honolulu, Hawaii 96858-5440

Attn: Planning Branch

Dear Mr. Fujii:

Draft Environmental Impact Statement (DEIS)
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Thank you for your letter of February 22, 1990 regarding the DEIS for the referenced project. We appreciate the time you and your staff spent reviewing the DEIS. Your letter, together with this response, will be published as part of the Final EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry

David R. Curry
Project Planner

cc: Esther Ueda, Land Use Commission
Dr. Marvin T. Miura, OEQC
Robert McClean
Robert Smolenski

Davies Pacific Center, PBN Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813
Telephone (808) 545-2055
Facsimile (808) 545-2050

DEPARTMENT OF THE NAVY
COMMANDER
NAVAL BASE PEARL HARBOR
BOX 110
PEARL HARBOR, HAWAII 96860-5020

IN REPLY REFER TO:
5090
Ser 00F2/387
26 Jan 1990

State Land Use Commission
Attn: Esther Ueda
335 Merchant Street, Room 104
Honolulu, Hawaii 96813

RECEIVED
JAN 31 1990
HELBER, HASTERT & KIMURA PLANNERS

Dear Ms. Ueda:

HONOKOHAU INDUSTRIAL PARK

The Draft Environmental Impact Statement for Honokohau Industrial Park has been reviewed, and we have no comments to offer. Since we have no further use for the document, it is being returned to the Office of Environmental Quality Control.

Thank you for the opportunity to review the draft.

Sincerely,

W. K. Liu

W. K. LIU
Assistant Base Civil Engineer
By direction of
the Commander

Copy to:
✓Robert S. McClean
OEQC (w/DEIS)

8-6

HELBER
HASTERT
& KIMURA
Planners
HH&K
Grosvenor
Center
PH
Tower
733
Bishop
Street
Suite
2580
Honolulu
Hawaii
96813
Telephone
(808)
545-2055
Telex
634468
HHMKUW
Facsimile
(808)
545-2050

February 8, 1990

Mr. W.K. Liu, Assistant Base Civil Engineer
c/o Commander
Department of the Navy
Naval Base Pearl Harbor
Box 110
Pearl Harbor, Hawaii 96860-5020

Dear Mr. Liu:

Draft Environmental Impact Statement (DEIS)
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Thank you for your letter of January 26, 1990 (ref. 5090 Ser 00F2/387) regarding the DEIS for the referenced project. We appreciate the time you and your staff spent reviewing the DEIS. Your letter, together with this response, will be published as part of the Final EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry

David R. Curry
Project Planner

cc: Esther Ueda, Land Use Commission
Robert McClean
Robert Smolenski

RECEIVED
FEB - 1 1990
HELBER, HASTERT & KIMURA PLANNERS

JAN 29 1990

(P)1058.0

State Land Use Commission
335 Merchant Street, Room 104
Honolulu, Hawaii 96813

Attention: Ms. Esther Ueda

Gentlemen:

Subject: Honokohau Industrial Park
Draft EIS

00-7 Thank you for the opportunity to review the subject document. We have no comments to offer.

Should there be any questions, please contact Mr. Cedric Takamoto of the Planning Branch at 548-7192.

Very truly yours,

TEUANE TOMINAGA
State Public Works Engineer

CT:em
cc: Mr. Robert S. McClean
Dr. Marvin T. Miura

HELBER HASTERT & KIMURA Planners
HH&K
Grosvenor Center
PRI Tower
733 Bishop Street
Suite 2590
Honolulu Hawaii 96813
Telephone (808) 545-2055
Telex 634468 HHMHKUW
Facsimile (808) 545-2050

February 8, 1990

Mr. Teuane Tominaga, State Public Works Engineer
State Department of Accounting
and General Services
Division of Public Works
P.O. Box 119
Honolulu, Hawaii 96810

Dear Mr. Tominaga:

Draft Environmental Impact Statement (DEIS)
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Thank you for your letter of January 29, 1990 regarding the DEIS for the referenced project. We appreciate the time you and your staff spent reviewing the DEIS. Your letter, together with this response, will be published as part of the Final EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry
Project Planner

cc: Esther Ueda, Land Use Commission
Robert McClean
Robert Smolenski

JOHN WAIHEE
GOVERNOR

YUKIO KITAGAWA
CHAIRPERSON, BOARD OF AGRICULTURE

SUZANNE D. PETERSON
DEPUTY TO THE CHAIRPERSON

State of Hawaii
DEPARTMENT OF AGRICULTURE
1428 So. King Street
Honolulu, Hawaii 96814-2512

FAX: 548-6100

Mailing Address:
P. O. Box 22159
Honolulu, Hawaii 96822-0159

March 7, 1990

RECEIVED
MAR - 9 1990
HELBER, HASTERT & KIMURA PLANNERS

Ms. Esther Ueda, Executive Officer
State Land Use Commission
335 Merchant Street, Room 104
Honolulu, Hawaii 96813

Dear Ms. Ueda:

Subject: Draft Environmental Impact Statement (DEIS) for
Honokohau Industrial Park
Agricultural and Conservation to Urban
Robert S. McClean Trust
TMK: 7-4-08: 26, 49. North Kona, Hawaii
Area: 89.5 acres

The Department of Agriculture has reviewed the subject document and offers the following comments.

Based on the information found in the subject document, the Increment I development (45.5 acres) will require about 19,000 gallons of water per day (gpd), which surpasses the County's existing allowable water limits by 2,000 to 3,000 gpd (DEIS, pages 4-21 and 4-22). This information is different from what is stated in the applicant's petition for State Land Use District Boundary amendment (Land Use Commission docket number A89-643) (Exhibit 1, Environmental Assessment, page 21) which states that the projected water demand of Increment I would be 13,000 gpd.

With this new information, our finding that the applicant's earlier request "will not adversely affect the agricultural resources of the area" is no longer applicable. The Ka-Ahole Agricultural Park (34 lots, 179 acres), which is situated across the airport, is dependant upon the same water supply sources and distribution system as that of the proposed project. Any further reduction of irrigation water supply, even over the short run (DEIS, page 2-3), could adversely affect existing and planned agricultural uses within the Park.

The EIS should investigate the extent to which the approval and subsequent operation of the subject project will adversely

affect the existing water situation at the Ke-Ahole Agricultural Park. If there is adverse impact, we must insist that the applicant develop beforehand, or acquire through other means, the water supply necessary to meet the needs of the project.

When it becomes available, please send us a copy of the Final EIS.

Thank you for the opportunity to comment.

Sincerely,

Yukio Kitagawa

YUKIO KITAGAWA
Chairperson, Board of Agriculture

Attachment

cc: Helber Hastert and Kimura
Office of Environmental Quality Control
Office of State Planning (attention: Land Use Division)
Hawaii County Planning Department
Agricultural Resource Management Division

Helber Hastert & Kimura
Planners

April 3, 1990

Mr. Yukio Kitagawa, Chairperson
Board of Agriculture
State Department of Agriculture
1428 South King Street
Honolulu, Hawaii 96814-2512

Dear Mr. Kitagawa:

Draft Environmental Impact Statement (DEIS)
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Thank you for your letter of March 7, 1990 regarding the DEIS for the referenced project. We appreciate the time you and your staff spent reviewing the DEIS. Your comment is reproduced below followed by our response.

1. **The EIS should investigate the extent to which the approval and subsequent operation of the subject project will adversely affect the existing water situation at the Keahole Agricultural Park.**

The County Department of Water Supply will allow the petitioner to continue water use within the project area at current consumption levels (personal communication, Mr. Quirino Antonio, March 14, 1990). The EIS notes that quarrying operations at the site will be eliminated in the short term. This will allow approximately 3,250 gallons of water per day to be used for other proposed activities. Along with conservation measures and water use agreements with current and potential lessees, the petitioner will maintain water consumption within increment I at existing levels unless otherwise approved by the Department of Water Supply. Therefore, no adverse impact will occur to the existing water supply at the Keahole Agricultural Park.

We hope our responses have adequately addressed your concerns. For your information, we intend to file the Final EIS with the State Land Use Commission and the Office of Environmental Quality Control (OEQC) in the near future. Your letter, together with this response, will be published as part of the Final EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry
Project Planner

cc: Esther Ueda, Land Use Commission
Dr. Marvin T. Miura, OEQC
Robert McClean
Robert Smolenski

Grosvenor Center, Pauahi Tower 733 Bishop Street, Suite 2590 Honolulu, Hawaii 96813 Telephone 808 545 2055 Facsimile 808 545 2050

DEPARTMENT OF BUSINESS AND ECONOMIC DEVELOPMENT

JOHN WAIHEE
GOVERNOR
ROGER A. ULVELING
DIRECTOR
BARBARA KIM STANTON
DEPUTY DIRECTOR
LESLIE S. MATSUBARA
DEPUTY DIRECTOR

KAMAMALU BUILDING, 250 SOUTH KING ST., HONOLULU, HAWAII
MAILING ADDRESS: P.O. BOX 2359, HONOLULU, HAWAII 96804 TELEX: 7430250 HCPRD FAX: (808) 548-0466

January 30, 1990

'90 FEB -2 A8:50

OFC. OF ENVIR.
QUALITY CON

RECEIVED
MAR 28 1990
HELBER, HASTERT & KIMURA
PLANNERS

Mr. Marvin Miura
Office of Environmental Quality Control
465 South King Street, Room 104
Honolulu, Hawaii 96813

Re: Draft Environmental Impact Statement
Honokohau Industrial Park
Honokohau, North Kona, Island of Hawaii
TMK: 7-4-08:26 and 49

Dear Mr. Miura:

The Department of Business and Economic Development supports the proposed development of light industry inasmuch as this area needs infastructure to support general business growth.

Returned is our copy of the Draft EIS for Honokohau Industrial Park.

Sincerely,

Roger A. Ulveling

RAU:dqn
Enclosure

8-10

Helber Hastert & Kimura
Planners

April 3, 1990

Mr. Roger A. Ulveling, Director
Department of Business and Economic Development
State of Hawaii
P.O. Box 2359
Honolulu, Hawaii 96804

Dear Mr. Ulveling:

Draft Environmental Impact Statement (DEIS)
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Thank you for your letter of January 30, 1990 regarding the DEIS for the referenced project. We appreciate the time you and your staff spent reviewing the DEIS. Your letter, together with this response, will be published as part of the Final EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry
Project Planner

cc: Esther Ueda, Land Use Commission
Dr. Marvin T. Miura, OEQC
Robert McClean
Robert Smolenski

Government Center, 13th Floor
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813
Telephone: (808) 545-2055
Facsimile: (808) 545-2050

JOHN WAIHEE
GOVERNOR

ALBERT T. LIMA
MAJOR GENERAL
ADJUTANT GENERAL

MYLES M. NAKATSU
COLONEL
DEPUTY ADJUTANT GENERAL

STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE ADJUTANT GENERAL
3949 DIAMOND HEAD ROAD, HONOLULU, HAWAII 96816-4495

January 26, 1990

Engineering Office

Dr. Marvin T. Miura, Director
Officer of Environmental Quality Control
465 South King Street, #104
Honolulu, Hawaii 96813

Dear Dr. Miura:

Honokohau Industrial Park
North Kona, Hawaii

Thank you for providing us the opportunity to review the above subject project.

We have no comments to offer at this time regarding this project.

Sincerely,

Jerry M. Matsuda
Lieutenant Colonel
Hawaii Air National Guard
Contracting & Engineering Officer

cc: State Land Use Commission
Attn: Esther Ueda
335 Merchant Street, Rm 104
Honolulu, Hawaii 96813

Robert S. McClean
c/o David R. Curry
Helber Hastert & Kimura, Planners
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

NATIONAL GUARD
Americans At Their Best.

8-11

RECEIVED
JAN 30
HELBER, HASTERT & KIMURA PLANNERS

HELBER
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& KIMURA
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February 8, 1990

Mr. Jerry M. Matsuda, Lieutenant Colonel
Hawaii Air National Guard
Contracting & Engineering Officer
Department of Defense
State of Hawaii
Office of the Adjutant General
3949 Diamond Head Road
Honolulu, Hawaii 96816-4495

Dear Mr. Matsuda:

Draft Environmental Impact Statement (DEIS)
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Thank you for your letter of January 26, 1990 regarding the DEIS for the referenced project. We appreciate the time you and your staff spent reviewing the DEIS. Your letter, together with this response, will be published as part of the Final EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry
Project Planner

cc: Esther Ueda, Land Use Commission
Robert McClean
Robert Smolenski

JOHN WAIHEE
GOVERNOR OF HAWAII

REF:OCEA-VIH

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

WILLIAM W. PATY, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES
Keith W. Ahue
MARVIN TADAOKA
RUSSELL M. FUKUMOTO

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

File: 90-460
Doc.: 7663E

MAR 14 1990

MEMORANDUM

TO: Honorable Marvin T. Miura, Director
Office of Environmental Quality Control

FROM: William W. Paty, Chairperson
Board of Land and Natural Resources

SUBJECT: Draft EIS
Honokohau Industrial Park
North Kona, Hawaii
TMK: 7-4-08: 26, 49

8-12

Thank you for giving our Department the opportunity to comment on this matter. We have reviewed the materials you submitted and have the following comments.

On May 27, 1988 the Board of Land and Natural Resources approved a request to modify a condition on approved Conservation District Use Application HA-1873 for Boat repair and storage facility at Honokohau, North Kona, Hawaii subject to conditions.

Condition 2 states the following:

> That the new deadline to file a petition with the Land Use Commission to redesignate the 3-1/2 acre facility to another zoning district more appropriate for the type of use is June 13, 1989.

We request documentation be submitted to our office verifying that a petition to the Land Use Commission redesignating the 3-1/2 acre area to another zoning district occurred by June 13, 1989.

In addition, we have reviewed the archaeological inventory survey report attached as Appendix B (Donham 1990. Archaeological Inventory Survey, Honokohau Industrial Park (Parcel VII), Land of Honokohau 2nd, North Kona District, Island of Hawaii. PHRI.). We believe the survey has adequately covered the project area, finding a total of 60 historic sites.

These sites reflect a prehistoric settlement pattern of informal agricultural plots with a few temporary shelters and possibly a few scattered burials. We believe that sufficient information has been gathered to evaluate the significance of the sites, and we agree with the significance evaluations. Fourteen sites can be considered "no longer significant" as they were significant solely for their information content and an adequate amount of this information was recovered during the survey.

To ensure proper recording of this information in the Statewide inventory of historic places, we do need a non-reduced copy of the survey report, a PHRI list of photographs for the sites which are no longer significant, and copies of relevant PHRI sketch maps of any such sites which do not have maps in the report.

This means that only 46 significant historic sites are still in the project area. We agree 36 are significant solely for their information content and 10 for multiple criteria (1 trail and 9 possible burials). It is important to realize that a number, if not all, of the possible burial sites might prove with further study not to be burials.

The archaeological report proposes the following general mitigation plan:

> Archaeological data recovery of 37 sites, including the trail, which is in poor condition) and preservation in place of the 9 possible burial sites after fieldwork to determine if they are indeed burials. If any of the possible burial sites proved not to be burials, then they will be data recovered.

We agree with this general mitigation plan, since it conforms with our policy of preservation of burial sites in place when at all possible.

The Draft EIS does not quite use correct historic preservation wording. In essence, however, it says 46 sites are still significant (p. 4-7), and it appears to commit to PHRI's mitigation recommendations - data recovery of 37 and preservation of the 9 possible burial sites (p. 4-7 through -9). It correctly states that a condition should be attached to any LUC approval.

To ensure proper mitigation and "no adverse effect" to the 46 significant sites, we recommend the following condition be attached to any approved LUC petition:

> 37 Significant historic sites shall undergo archaeological data

recovery. 9 sites, as possible burials, shall be preserved. However, if further evaluation of these 9 sites indicates some are not burials, the non-burial sites shall undergo data recovery and the Historic Preservation Program (HPP) shall be so notified.

To ensure adequate mitigation, a detailed historic preservation mitigation plan (scope of work), consisting of an archaeological data recovery plan and a preservation plan, shall be submitted to the HPP for approval. The preservation plan must include acceptable buffers around the sites to be preserved. The HPP must verify successful execution of this plan prior to construction.

Furthermore, the industries now operating on this site have been subject to several approved Conservation District Use reviews since 1975. No adverse environmental impacts have been reported from the existing activities.

Mitigation measures to prevent potential impacts to the aquatic environment from drainage and storm runoff of petroleum products, detergents, cement by-products and other contaminants associated with the proposed industrial development have been adequately described in the Draft EIS and should be incorporated into the project.

8-13

If you have any questions, please feel free to call me or Cathy Tilton at our Office of Conservation and Environmental Affairs at 548-7837.

WILLIAM W. PATY

cc: DAR, Historic Preservation Program

Heller Hastert & Kimura
Planners

April 3, 1990

Mr. William W. Paty, Chairperson
Board of Land and Natural Resources
Department of Land and Natural Resources
State of Hawaii
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Paty:

Draft Environmental Impact Statement (DEIS)
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Thank you for your letter of March 14, 1990 regarding the DEIS for the referenced project. We appreciate the time you and your staff spent reviewing the DEIS. Your comments are reproduced below followed by our response.

1. We request documentation be submitted to our office verifying that a petition to the Land Use Commission redesignating the 3-1/2 acre area to another zoning district occurred by June 13, 1989.

A petition was filed with the Land Use Commission on June 13, 1989 to redesignate the subject property to another zoning district. The petitioner will provide the necessary documentation of this action to DLNR.

2. To ensure proper recording of [the findings of the archaeological inventory survey] in the Statewide inventory of historic places, we do need a non-reduced copy of the survey report, a PHRI list of photographs for the sites which are no longer significant, and copies of relevant PHRI sketch maps of any such sites which do not have maps in the report.

The petitioner acknowledges this request and will provide the necessary documentation to DLNR.

3. To ensure adequate mitigation, a detailed historic preservation mitigation plan (scope of work), consisting of an archaeological data recovery plan and a preservation plan, shall be submitted to the HPP for approval.

The petitioner acknowledges and will comply with this request.

Grosvenor Center, Mauka Tower 733 Bishop Street, Suite 2590 Honolulu, Hawaii 96813 Telephone 808 545 2055 Facsimile 808 545 2050

4. **Mitigation measures to prevent potential impacts to the aquatic environment from drainage and storm runoff of petroleum products, detergents, cement by-products and other contaminants associated with the proposed industrial development have been adequately described in the Draft EIS and should be incorporated into the project.**

Mitigation measures to prevent impacts on the aquatic environment as described in the EIS will be incorporated into the project.

We hope our responses have adequately addressed your comments. For your information, we intend to file the Final EIS with the State Land Use Commission and the Office of Environmental Quality Control (OEQC) in the near future. Your letter, together with this response, will be published as part of the Final EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry

David R. Curry
Project Planner

cc: Esther Ueda, Land Use Commission
Dr. Marvin T. Miura, OEQC
Robert McClean
Robert Smolenski

JOHN WAIHEE
GOVERNOR

EDWARD Y. HIRATA
DIRECTOR

DEPUTY DIRECTORS
DAN T. KOCHI (PRIMARY)
RONALD N. HIRANO
JEANNE K. SCHULTZ
CALVIN M. TSUDA

IN REPLY REFER TO
HWY-PS
2.1002

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

RECEIVED
MAR 27 A8:08
OFC. OF ENVIRONMENTAL QUALITY CONTROL

March 23, 1990

RECEIVED
MAR 28 1990
BELBER, HASTERT & KOMAKA PLANNERS

MEMORANDUM

TO: Dr. Marvin T. Miura, Director
Office of Environmental Quality Control

FROM: Director of Transportation

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT
HONOKOHAU INDUSTRIAL PARK, NORTH KONA, HAWAII
TMK: 7-4-08:26, 49

Thank you for your transmittal of January 24, 1990 requesting our review of the subject DEIS.

We have the following comments:

1. The construction of the channelized intersection at the access connection should be coordinated with the Isemoto-Taylor Subdivision.

2. The TIAR should be re-submitted for review and approval. It should be summarized and referenced in the EIS. The TIAR must include the following:

   a. Projected traffic in the Ritz-Carlton Mauna Lani Development TIAR.

   b. Projected traffic by the Isemoto-Taylor Subdivision.

   c. Level-of-Service summary and calculations.

3. Queen Kaahumanu Highway will eventually be developed into a high-speed, four-lane divided freeway with interchanges, limited access, and frontage roads. The Housing Finance and Development Corporation (HFDC) plans to move the proposed Kealakehe Parkway Mauka extension southward and connect it to the frontage road system. The TIAR should address these future developments and how the subject project will tie into the future highway system.

4. This proposed development should be coordinated with HFDC which is planning some of the area's major roadways.

5. All work within the State highway right-of-way must be submitted to the Highways Division for approval. The applicant shall bear the costs for the improvements recommended to mitigate the traffic impacts.

Edward Y. Hirata

Heller Hastert & Kimura
Planners

April 3, 1990

Mr. Edward Y. Hirata, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Dear Mr. Hirata:

Draft Environmental Impact Statement (DEIS)
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Thank you for your letter of March 23, 1990 regarding the DEIS for the referenced project. We appreciate the time you and your staff spent reviewing the DEIS. Your comments are listed below followed by our response.

1. **Construction of the channelized intersection should be coordinated with the Isemoto-Taylor Subdivision.**

The petitioner acknowledges this comment and will coordinate improvements along the access road with the Isemoto-Taylor Subdivision.

2. **The TIAR should be re-submitted for review and approval.**

The Traffic Impact Assessment Report (TIAR) prepared by Wilbur Smith Associates, contains the requested information and will be re-submitted for your review and approval.

3. **The TIAR should address traffic improvements planned by the State for Queen Kaahumanu Highway and by HFDC for the Kealakehe area and how the subject project will tie into the future highway system.**

The TIAR assumes that by 1995, State plans to widen Queen Kaahumanu Highway to four lanes and HFDC plans to construct the mauka extension of Kealakehe Parkway would be complete. The TIAR recommends that when the extension of Kealakehe Parkway is constructed, a frontage road or direct roadway connection from the petition area to the Parkway be constructed for use by exiting southbound project traffic.

4. **This proposed development should be coordinated with HFDC which is planning some of the area's major roadways.**

The petitioner acknowledges this comment and will coordinate roadway improvements with HFDC and the DOT Highways Division planning staff.

5. **All work within the State highway right-of-way must be submitted to the Highways Division for approval. The applicant shall bear the costs for the improvements recommended to mitigate the traffic impacts.**

The petitioner acknowledges the above conditions.

Grosvenor Center, Mauka Tower 733 Bishop Street, Suite 2590 Honolulu, Hawaii 96813 Telephone 808 545 2055 Facsimile 808 545 2050

Heller Hastert & Kimura
Planners

We hope our responses have adequately addressed your concerns. For your information, we intend to file the Final EIS with the State Land Use Commission and the Office of Environmental Quality Control (OEQC) in the near future. Your letter, together with this response, will be published as part of the Final EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry

David R. Curry
Project Planner

cc: Esther Ueda, Land Use Commission
Dr. Marvin T. Miura, OEQC
Robert McClean
Robert Smolenski

JOHN WAIHEE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF BUDGET AND FINANCE
HOUSING FINANCE AND DEVELOPMENT CORPORATION
SEVEN WATERFRONT PLAZA, SUITE 380
500 ALA MOANA BOULEVARD
HONOLULU, HAWAII 96813
FAX (808) 548-6041

RECEIVED
MAR 12 1990
HEIBER, HASTERT & KIMURA PLANNERS

JOSEPH K. CONANT
EXECUTIVE DIRECTOR

IN REPLY REFER TO:

90:PLNG/1087 jt

March 8, 1990

MEMORANDUM

TO: Ms. Esther Ueda
State Land Use Commission

FROM: Joseph K. Conant

SUBJECT: Draft Environmental Impact Statement for the Proposed Honokohau Industrial Park

We have reviewed the subject draft EIS and offer the following comments.

The concept development plan for the subject property indicates that less intensive industrial uses will be sited next to the proposed Kealakehe Planned Community. However, the statement is made that the "ultimate development of the area and the specific types of uses will depend on market forces in the region". Thus, despite the proposed mitigative measures, we are still very concerned with the industrial use of lands adjacent to residential uses within our proposed project. Furthermore, the concept development map for the proposed project sites a lumber/hardware operation along the Kealakehe side of the property. We believe that this type of establishment may adversely impact residents in proximity to the operation.

While the siting of structures and activities in the proposed industrial park is very important, of equal importance is the management of operations. We believe that proper lease conditions and/or use covenants should be required to ensure that residents are protected from any detrimental business activities or practices of lessees in the proposed industrial park. For example, if a new or used car dealership were to allow

prospective purchasers to test drive automobiles on minor collector streets within the planned residential community, the community association could be given the opportunity to work with the lessor to stop this practice for safety and "neighborly" reasons.

Thank you for the opportunity to comment.

JOSEPH K. CONANT
Executive Director

cc: Robert S. McClean
Dr. Marvin Miura

Helber Hastert & Kimura
Planners

April 3, 1990

Mr. Joseph Conant, Executive Director
Housing Finance and Development Corporation
Department of Budget and Finance
Seven Waterfront Plaza, Suite 300
500 Ala Moana Boulevard
Honolulu, Hawaii 96813

Dear Conant:

Draft Environmental Impact Statement (DEIS)
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Thank you for your letter of March 8, 1990 regarding the DEIS for the referenced project. We appreciate the time you and your staff spent reviewing the DEIS. Your comments are summarized below followed by our response.

1. Despite the proposed mitigative measures, we are still very concerned with the industrial use of lands adjacent to residential uses within our proposed project.

At the present time, the petitioner has determined that the most appropriate use for property in Increment I is to continue existing activities (except quarrying), and provide space for new activities that are compatible with them. According to the approved Kealakehe Planned Community Master Plan (December 1989), a site of approximately 20 acres for commercial use is planned near the intersection of Kealakehe Parkway and Queen Kaahumanu Highway. This area would incorporate approximately 800 feet (40 percent) of the boundary between Kealakehe and Increment I of the petition area. It is our understanding that the remainder of land adjacent to Increment I will likely not be developed into residential use for as much as 10 to 20 years. In the future, changes in land use and value within the region could alter the present appropriate use of Increment I to one more compatible with residential activities.

The conceptual development plan for Increment II is strongly influenced by HFDC's plan for Kealakehe which includes significant residential development, along with a civic center, commercial uses, high school, a golf course, and other urban amenities. With a major north-south roadway alignment as proposed in HFDC's plan, the petition area (particularly Increment II) provides an ideal location for commercial and service-related uses that could provide services to residents and businesses in Kealakehe and the region. Specific types of activities could include low-scale offices, restaurants and other related commercial operations, as well as wholesale services to retail businesses (e.g., wholesalers to restaurants), businesses which produce local consumer goods (e.g., bakeries, print shops), business services which support the local building industry, light manufacturing, etc.

We believe that measures discussed in the EIS, along with County zoning, subdivision, and building codes, would provide sufficient precautions relating to setbacks and buffering to mitigate adverse impacts between the two types of uses.

Gateway Center, PH1 Tower | 733 Bishop Street, Suite 2590 | Telephone 808 545 2055
Honolulu, Hawaii 96813 | Facsimile 808 545 2050

Helber Hastert & Kimura
Planners

2. We believe that proper lease conditions and/or use covenants should be required to ensure that residents are protected from any detrimental business activities or practices of lessees in the proposed industrial park.

The petitioner concurs and will work with his neighbors to provide management of operations through the use of lease conditions and/or use covenants which serve to protect future residents at Kealakehe from detrimental business activities in the petition area.

We hope our responses have adequately addressed your concerns. For your information, we intend to file the Final EIS with the State Land Use Commission and the Office of Environmental Quality Control (OEQC) in the near future. Your letter, together with this response, will be published as part of the Final EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry

David R. Curry
Project Planner

cc: Esther Ueda, Land Use Commission
Dr. Marvin T. Miura, OEQC
Robert McClean
Robert Smolenski

OFFICE OF STATE PLANNING
Office of the Governor

March 6, 1990

RECEIVED
MAR 13 1990

Ms. Esther Ueda
Executive Officer
State Land Use Commission
335 Merchant Street, Room 104
Honolulu, Hawaii 96813

Dear Ms. Ueda:

Subject: Draft Environmental Impact Statement for the Proposed Honokohau Industrial Park, Consisting of 89.5 Acres in North Kona, Hawaii.

We have reviewed the Draft Environmental Impact Statement (EIS) for the proposed Honokohau Industrial Park to be located three miles north of Kailua-Kona, mauka of the Queen Kaahumanu Highway and east-northeast of the Honokohau Small Boat Harbor. The following comments are provided for your consideration.

The applicant, Robert S. McClean, is requesting the Land Use Commission to approve the entire 89.5-acre petition area for future urban development and to redesignate the 45.5-acre first increment (Increment I) from the State Conservation District to the State Urban District. The existing uses on Increment I include a quarry, rock crushing plant, boat storage/repair, test lab, and other light industrial operations. The proposed uses for Increment I include: the expansion of quarrying and concrete operations, and storage facilities; the development of automotive operations, nurseries, lumber/hardware operations, and other light industrial uses; and the addition of contractor operations. The proposed uses in Increment II, which consists of the remaining 44 acres, would include commercial and service-related facilities such as offices, restaurants, wholesalers and light manufacturing.

We have serious concerns regarding both the existing and proposed uses in Increment I. Such concerns include the effects of industrial wastes, groundwater contamination, and surface runoff on ponds in the vicinity of the petition area, Honokohau Small Boat Harbor, and the proposed Kaloko-Honokohau National Historic Park; the sufficiency of existing roads to accommodate increased traffic; the availability of water for the project; and the compatibility with planned residential communities on adjacent properties.

The draft EIS failed to address the real issues concerning the proposed uses in Increment II. The final EIS should provide discussions on this increment, such as its definite plans, proposals, and operations; its probable impacts on the environment; its water needs; and its suitability in the region.

Thank you for the opportunity to comment.

Sincerely,

Harold S. Masumoto
Director

cc: Dr. Marvin T. Miura, OEQC
✓Mr. Robert S. McClean

8-19

April 3, 1990

Mr. Harold Masumoto, Director
Office of State Planning
Office of the Governor
State of Hawaii
State Capitol
Honolulu, Hawaii 96813

Dear Mr. Matsumoto:

Draft Environmental Impact Statement (DEIS)
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Thank you for your letter of March 6, 1990 regarding the DEIS for the referenced project. We appreciate the time you and your staff spent reviewing the DEIS. Your comments are summarized below followed by our response.

1. We have serious concerns regarding both the existing and proposed uses in Increment I. Such concerns include:

   a. The effects of industrial wastes, groundwater contamination, and surface runoff on ponds in the vicinity of the petition area, Honokohau Small Boat Harbor, and the proposed Kaloko-Honokohau National Historic Park.

Discussions of potential adverse impacts from proposed wastewater disposal, storm drainage, and the handling of industrial materials are presented in Sections 4.3.3, 4.3.4, and 4.1.10, respectively. In summary, the EIS concludes that cesspools and drywells are allowable and widely used disposal methods in the North Kona region, provided they are designed, constructed, operated, and maintained in accordance with State and County regulations. The EIS further concludes that these disposal methods, along with appropriately designed areas and facilities to contain industrial materials within the petition area (which are also applicable to Federal, State, and County regulations), will provide sufficient mitigation to prevent any adverse impacts to areas makai of the petition area.

Section 4.1.9 of the EIS also provides an overview of anchiline pond resources along the shoreline in the vicinity of the petition area. The EIS concludes that only ponds in the Maliu and Kealakehe areas are located in the potential impact zone from the proposed project. Within these areas, there is little likelihood of significant environmental impact. Dissolved nutrients (e.g., nitrogen and phosphorus) in liquid percolating from cesspools are already found in undisturbed groundwater and any small additions from the project site will not have a negative impact on nearshore aquatic resources.

We note that in a letter dated March 14, 1990 (included in Chapter 8 of the EIS), the Department of Land and Natural Resources states that "the industries now operating on this site have been subject to several approved Conservation District Use reviews since 1975. No adverse environmental impacts have been reported from the existing activities."

Grosvenor Center, Mauka Tower 733 Bishop Street, Suite 2590 Honolulu, Hawaii 96813 Telephone 808 545 2055 Facsimile 808 545 2050

Helber Hastert & Kimura
Planners

   b. The sufficiency of existing roads to accommodate increased traffic.

A major element of the State's plan for the Kealakehe area is the construction of a mauka-makai extension of Kealakehe Parkway. At present, the expected date of completion for this roadway is late 1992. Other probable improvements to existing roads in the area include upgrading Queen Kaahumanu Highway into a high-speed, four-lane divided freeway with interchanges, limited access, and frontage roads, and one or more north-south roadways as proposed in the County's Keahole to Kailua Development Plan.

The discussion in Section 4.3.1 of the EIS identified the impact of the project on the volume-to-capacity ratios for a signal-controlled intersection at Queen Kaahumanu Highway and Kealakehe Parkway. If no improvements were made to existing roadways other than the construction of the Parkway, the level of service at the intersection during morning peak hour would be level of service (LOS) D (long delays). During the afternoon peak hour, the LOS would be F (extreme delay meriting mitigative actions). If Queen Kaahumanu Highway were widened to a 4-lane highway, conditions at the intersection would be LOS A (little delay) in the morning peak hour, and LOS C (occasional delay) in the afternoon peak hour. Similar level of service conditions would result if a new access road from the petition area to the Kealakehe Parkway were constructed.

   c. The availability of water for the project.

The County Department of Water Supply will allow the petitioner to continue water consumption within the project area at current consumption levels, or approximately 13,000 gallons per day (personal communication, Mr. Quirino Antonio, March 14, 1990). The EIS notes that quarrying operations at the site will continue in the near term, but will be phased out in the future as development begins to occur. This will allow approximately 3,250 gpd to be used for other proposed activities. Along with conservation measures and water use agreements with current and potential lessees, the petitioner will maintain water consumption within Increment I at existing levels unless otherwise approved by the County Department of Water Supply.

   d. The compatibility with planned residential communities on adjacent properties.

Where appropriate, the EIS discussed mitigative measures designed to minimize adverse impacts that proposed uses may have on future residential development on surrounding lands. The EIS also notes that quarrying at the site will be phased out because of its incompatible nature with other activities. Beyond measures discussed in the EIS, County zoning, subdivision, and building codes provide sufficient precautions relating to setbacks and buffering to mitigate adverse impacts between the two types of uses.

The development of the site as described in the EIS does not necessarily foreclose options to redevelop the site for other urban uses at a later date, provided all relevant government regulations are met. At the present time, the petitioner has determined that the most appropriate use for the property is to continue existing activities, and provide space for new activities that are compatible with them. In

the future, however, changes in land use and value within the region could alter currently proposed uses to activities more compatible with residential activities.

2. **The Draft EIS failed to address the real issues concerning the proposed uses in Increment II. The final EIS should provide discussions on this increment, such as it definate plans, proposals, and operations; its probable impacts on the environment; its water needs; and its suitability in the region.**

Section 2.4 of the EIS presented a conceptual overview of proposed development in Increment II of the petition area. On a general level, Increment II is proposed to be developed for commercial and service-related uses. This would include uses intended to support proposed civic activities at Kealakehe, along with uses that would support the general economic development of the region. Specific types of activities could include low-scale offices, restaurants and other related commercial operations, as well as wholesale services to retail businesses (e.g., wholesalers to restaurants), businesses which produce local consumer goods (e.g., bakeries, print shops), business services which support the local building industry, light manufacturing, etc.

Proposed development of Increment II is strongly based on current State and County plans being prepared for the general area, as well as the desire to promote uses that would be compatible with development of Increment I. The ultimate market for land in Increment II will be significantly affected by the location of future roadway improvements, the location of civic center activities, the availability of water, and other planning issues that are at this point unresolved. Therefore, it is extremely difficult to provide definite plans, proposals, and operations for Increment II. When the petitioner requests actual Urban designation for the property within Increment II, a clearer understanding of the area's market should be apparent and a detailed discussion of proposed activities will be presented. At a minimum, however, impacts that can be expected to occur include the creation of jobs, increased traffic, demand for water, wastewater and electrical services, higher ambient noise levels, and alteration of the natural character of the land to an urban use. These have been addressed at a general level in the EIS, and further information will be provided when Increment II is submitted to the Land Use Commission for approval at a later date.

Regarding the suitability of the proposed project in the region, Section 3.1.3 of the EIS discusses criteria used for reviewing petitions for reclassification of district boundaries. The EIS concluded that the proposed project was consistent with goals, objectives, and policies of the Hawaii State Plan and guidelines of the State Functional Plans, satisfied the Urban District standards, would not impact on areas of statewide concern, and was consistent with the County General Plan for the area.

Helber Hastert & Kimura
Planners

We hope our responses have adequately addressed your concerns. For your information, we intend to file the Final EIS with the State Land Use Commission and the Office of Environmental Quality Control (OEQC) in the near future. Your letter, together with this response, will be published as part of the Final EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry

David R. Curry
Project Planner

cc: Esther Ueda, Land Use Commission
Dr. Marvin T. Miura, OEQC
Robert McClean
Robert Smolenski

JOHN WAIHEE
GOVERNOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
465 SOUTH KING STREET, ROOM 104
HONOLULU, HAWAII 96813

MARVIN T. MIURA, Ph.D.
DIRECTOR

TELEPHONE NO.
548-6915

RECEIVED
MAR 13 1990
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

March 9, 1990

Mr. David Curry
Helber, Hastert & Kimura, Planners
733 Bishop St.; Suite 2590
Honolulu, HI 96813

Dear Mr. Curry:

The Office of Environmental Quality Control has reviewed the Draft Environmental Assessment for the Honokohau Industrial Park. A number of issues need to be resolved before construction begins.

Sewage disposal using cesspools will not be allowed in the project area under the new revisions to Chapter 62 Wastewater Systems of the Administrative Rules. The project site is in a critical wastewater disposal area. We have confirmed with Harold Sugiyama of the County of Hawaii's Wastewater Branch that capacity at the new and not yet constructed Kailua Wastewater Treatment Plant will not be available for this project. Alternatives such as a small package plant with effluent irrigation or piping the effluent to a private plant off-site should be covered in the final EIS.

There is confusion over water availability for even the first increment of the project. Page 6-22 of the draft EIS states "the projected water demand for Increment I would surpass existing allowable water limits by 2,000 to 2,500 gpd." Additionally, on page 6-22 it states, "at this time there is no assurance of sustainable new potable water sources, or a plan for distribution if sources are found." Alternatives such as off-site water development by the developers of this project or a joint venture with other developers should be discussed in the final EIS. The final EIS should also discuss the impact to the project if existing potable water supplies go instead to the Keelakeha housing project or other developments proposed in the area. A presumption is made in the draft EIS that the remaining potable water supplies will go to this project.

The draft EIS does not address the expected electrical load from the proposed project or the ability of Hawaii Electric Light Company to supply the additional load. Section 4.3.3 only addresses powerlines and need for a substation. These are secondary to the actual ability of the utility to supply power. The final EIS should address the current and projected loads of the project and the ability of the utility to supply that power. It should also cover energy conservation measures at the proposed industrial park to mitigate the environmental impacts of additional power generation. Air quality in the Kona area has been severely impacted by vog, air and ground transportation, and the generation of power by energy-inefficient diesel generators. Mitigation measures should include such things as co-generation, low pressure sodium street lighting, energy control systems, solar architecture, heat pumps and solar water heaters, and similar technologies.

The draft EIS does not discuss the impacts on traffic flow on Queen Kaahumanu Highway from the project, it only discusses the impacts on traffic leaving the project site. Slow moving traffic from the project site pulling across one lane of traffic and into another has the potential to create accidents and to slow traffic down. This is especially true with commercial trucks, heavy equipment, and vehicles pulling trailers with boats. Since the proposed industrial park plans to include boat storage, bus storage, concrete manufacture, quarrying, and lumber sales, such traffic can be expected. The final EIS should include an analysis of the impacts to traffic on Queen Kaahumanu Highway and appropriate mitigative measures or alternatives.

Sincerely,

Marvin T. Miura, Ph.D
Director, Office of Environmental
Quality Control

Helber Hastert & Kimura
Planners

April 3, 1990

Mr. Marvin T. Miura, Ph.D., Director
Office of Environmental Quality Control
465 South King Street, Room 104
Honolulu, Hawaii 96813

Dear Mr. Miura:

Draft Environmental Impact Statement (DEIS)
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Thank you for your letter of March 9, 1990 regarding the DEIS for the referenced project. We appreciate the time you and your staff spent reviewing the DEIS. Your comments are summarized below followed by our response.

1. **Sewage disposal using cesspools will not be allowed in the project area under the new revisions in Chapter 62 Wastewater Systems of the Administrative Rules.**

The analysis conducted for the Draft EIS found that soon to be revised Department of Health regulations will prohibit use of cesspools in Kona below 100-foot elevation and above the Underground Injection Control (UIC) line. Following publication of the DEIS, this conclusion was verified by Mr. Harold Yee, an Environmental Engineer for the Department of Health Wastewater Branch (March 14, 1990). Maps at the Wastewater Division show the UIC line is located mauka of the petition area at approximately 550-foot elevation. Since the elevation of the petition area ranges from approximately 85 to 350 feet, Mr. Lee agreed that, except for a small makai portion of the site, cesspools would be an allowable wastewater disposal method.

Uses proposed in Increment I will generate relatively small amounts of wastewater effluent. Studies conducted for the project (Hydro-Geologic Impact Assessment and Anchialine Pond Impact Assessment, which are appended in the EIS) conclude the proposed action would not have a significant impact on groundwaters or coastal ponds. Notwithstanding this fact, as a resident of Kona, the petitioner shares concerns over water quality in the region. Therefore, alternative wastewater disposal methods (e.g., septic tanks and small package plants) will be evaluated prior to construction to determine their benefits and feasibility within the project. Section 4.3.3 notes that uses within the petition area will be connected to the municipal sewer system when such system becomes available.

2. **There is confusion over water availability for even the first increment of the project. The final EIS should discuss off-site water development by the developers of the project or by a joint venture with other developers. Also, the final EIS should discuss the impact to the project if existing potable water supplies go instead to the Kealakehe housing project or other developments in the area.**

The County Department of Water Supply will allow the petitioner to continue water consumption within the project area at current consumption levels, or approximately 13,000 gallons per day. With the elimination of quarrying operations at the site, the projected water demand for Increment I is approximately 15,150 gpd. Along with conservation measures and water use agreements with current and potential lessees, the petitioner will maintain water consumption within Increment I at existing levels unless otherwise approved by the County Department of Water Supply.

Section 4.3.2 notes that the State is expected to begin drilling a test well in an area mauka of Mamalahoa Highway in the near future. The results from this first well will determine the potential of the aquifer to provide additional source development. The Draft Keahole to Kailua Development Plan proposes a regional water plan which identifies future transmission line alignments to accommodate urbanization in the area. Proposed alignments in this plan would provide service to the petition area. The petitioner proposes to participate in the development of this system.

3. **The Draft EIS does not address the expected electrical load from the proposed project or the ability of Hawaii Electric Light Company to supply the additional load.**

A review of the proposed project by the Hawaii Electric Light Company (HELCO) estimates the electrical load for Increment I to be approximately 3,753 KVA. HELCO concludes that "existing transmission and distribution facilities will not be able to accommodate this new load and new electrical facilities will be required ..." In a follow-up communication with Mr. Melvin Yamaki, an Electrical Engineer with HELCO, he stated that existing power plant facilities could supply the additional power needed for the project if proper transmission lines and related facilities are constructed. The petitioner will continue to utilize existing generators on site for West Hawaii Concrete operations and will incorporate fluorescent and sodium lighting, and other conservation features to reduce the peak demand at the site.

4. **The draft EIS discusses the impacts on traffic leaving the project site. The final EIS should include an analysis of the impacts to traffic on Queen Kaahumanu Highway and appropriate mitigative measures of alternatives.**

Slow-moving traffic exiting the project access road would often result in slowing of through traffic on Queen Kaahumanu Highway, and would increase exposure potential for traffic accidents. The EIS proposes that the left-turn movement from the project access road onto Queen Kaahumanu Highway be prohibited. A roadway connection is proposed from the project to the planned extension of Kealakehe Parkway mauka of the Highway. It is assumed that a traffic signal will be installed at the Kealakehe Parkway intersection with Queen Kaahumanu Highway since the harbor and planned State housing project volumes will exceed levels that can be accommodated by stop sign controls. The routing of the project's left-turn vehicles to this intersection will mitigate the expressed concerns of impacts on Queen Kaahumanu Highway.

We hope our responses have adequately addressed your comments. For your information, we intend to file the Final EIS with the State Land Use Commission and the Office of Environmental Quality Control (OEQC) in the near future. Your letter, together with this response, will be published as part of the Final EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry
Project Planner

cc: Esther Ueda, Land Use Commission
Robert McClean
Robert Smolenski

Grosvenor Center, Pali Tower 733 Bishop Street, Suite 2590 Honolulu, Hawaii 96813 Telephone 808 545 2055 Facsimile 808 545 2050

8-24

DEPARTMENT OF BUSINESS AND ECONOMIC DEVELOPMENT

JOHN WAIHEE
GOVERNOR
ROGER A. ULVELING
DIRECTOR
BARBARA KIM STANTON
DEPUTY DIRECTOR
LEIKE S. MATSUBARA
DEPUTY DIRECTOR

ENERGY DIVISION, 335 MERCHANT ST., RM. 110, HONOLULU, HAWAII 96813 FAX: (808) 586-2536

January 26, 1990

RECEIVED
JAN 31 1990

State Land Use Commission
335 Merchant Street
Room 104
Honolulu, Hawaii 96813

Attention: Ms. Esther Ueda

Dear Sir:

Subject: Honokohau Industrial Park, North Kona, Hawaii

We wish to inform you that we have no comments to offer on the subject environmental impact statement.

Thank you for the opportunity to review the document.

Sincerely,

Maurice H. Kaya
Energy Program Administrator

MHK:if

cc: Mr. Robert S. McClean, Helber Hastert & Kimura, Planners
Dr. Marvin T. Miura, Office of Environmental Quality Control

HELBER HASTERT & KIMURA Planners
HHK

Grosvenor Center
Pitt Tower
733 Bishop Street
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Honolulu Hawaii 96813
Telephone (808) 545-2055
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Facsimile (808) 545-2050

February 8, 1990

Mr. Maurice H. Kaya, Energy Program Administrator
Energy Division
Department of Business and Economic Development
State of Hawaii
335 Merchant Street, Room 110
Honolulu, Hawaii 96813

Dear Mr. Kaya:

Draft Environmental Impact Statement (DEIS)
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Thank you for your letter of January 26, 1990 regarding the DEIS for the referenced project. We appreciate the time you and your staff spent reviewing the DEIS. Your letter, together with this response, will be published as part of the Final EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry
Project Planner

cc: Esther Ueda, Land Use Commission
Robert McClean
Robert Smolenski

University of Hawaii at Manoa

Environmental Center
Crawford 317 • 2550 Campus Road
Honolulu, Hawaii 96822
Telephone (808) 948-7361

March 9, 1990
RE:0551

State Land Use Commission
Attention: Esther Ueda
335 Merchant Street, Room 104
Honolulu, Hawaii 96813

Dear Ms. Ueda:

Draft Environmental Impact Statement (EIS)
Honokohau Industrial Park
Honokohau, North Kona, Hawaii

The above referenced document proposes development of 89.5 acres in the North Kona District for the production and sale of concrete and concrete products; boat storage, sales and repair; lumber and hardware sales; automotive sales, service and repair; storage of trucks, buses, and storage areas for contractors; and, nurseries and other light industrial uses. This will require the redesignation of the 45.5-acre first increment from the State Conservation District to the State Urban District.

The Environmental Center has reviewed this Draft EIS with the assistance of Joseph Halbig, Geology/UH Hilo; Kem Lowry, Urban and Regional Planning; Terry Hunt, Anthropology; and Carolyn D. Cook, Environmental Center.

8-25

Wastewater Disposal

Our reviewers have expressed concerns that the Draft EIS does not provide enough information regarding mitigation plans for wastewater impacts on coastal waters and ground water. We note that at present, sewerage infrastructure is lacking in the area, and concern has been expressed by state and county officials over the potential for contamination of ground water, anchialine ponds (see below) and coastal waters.

We suggest that, as a potential mitigating measure, wells for observing and monitoring water quality be drilled downslope and some distance away from the project.

Hazardous Materials Contamination

Industrial materials and commercial stockpiles of lumber products are to be stored in above ground containers (p. 4-16) and on various premises within the development. Reviewers would like to have more design details of storage facilities in order to be able to assess the capability of storage tanks to prevent spillage and leakage, and to assess the potential leaching of wood preservatives and insecticides into the environment.

Anchialine Ponds

Four major clusters of anchialine ponds are located along the shoreline within the potential drainage area of the proposed industrial park. The drainage from the project, especially that flowing through lava tubes, could possibly contaminate these pond ecosystems with harmful bacteria, herbicides, pesticides, and petroleum products resulting in changes of the ecosystems in the ponds (Appendix F, p. 2). Projects of this nature should include provisions for comprehensive management of wastewater and runoff to ensure that it does not contain potentially harmful pathogens or overload the ground water with organic pollutants.

Water Supply

The County of Hawaii's Department of Water Supply has informed Honokohau developers that their existing water system facilities are not capable of supporting the proposed subdivision. We note that at present there is no assurance of sustainable new potable water sources or any plan for distribution if they are found (p. 4-22). Furthermore, potential and timing of such development is not clear. Should such a large project proceed without firm plans for a potable water supply?

Cumulative Impacts

We note that other significant developments, notably the Kealakehe Housing project, have been proposed for this immediate area. EIS rules specifically prescribe that, "[t]he interrelationships and cumulative environmental impacts of the proposed action and other related projects shall be discussed in the Draft EIS" [Section 11-200-17(i) DOH Administrative Rules]. Given constraints on water supply and infrastructure, and in view of potential migration of dust from industrial activities into the housing area, our reviewers find the Draft EIS critically deficient in the assessment of cumulative impacts, and we recommend that the document not be accepted until this deficiency has been satisfactorily remedied.

Volcanic Hazards

The volcano, Hualalai, last erupted in 1801 and is technically an active volcano. Since it has the potential to affect the Honokahau Industrial Park area, it would be appropriate to address this issue in the Draft EIS.

Thank you for the opportunity to comment on this Draft EIS. We hope that our comments will be helpful in preparing the final document.

Yours truly,

John T. Harrison, Ph.D.
Environmental Coordinator

cc: OEQC
Helber Hastert & Kimura, Planners
L.S. Lau
Joseph Halbig
Ken Lowry
Terry Hunt
Carolyn Cook

8-26

Helber Hastert & Kimura
Planners

April 3, 1990

Mr. John T. Harrison, Ph.D.
Environmental Coordinator
University of Hawaii Environmental Center
2550 Campus Road, Crawford 317
Honolulu, Hawaii 96822

Dear Mr. Harrison:

Draft Environmental Impact Statement (DEIS)
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Thank you for your letter of March 9, 1990 regarding the DEIS for the referenced project. We appreciate the time you and your staff spent reviewing the DEIS. Your comments are summarized below followed by our response.

1. **The Draft EIS does not provide enough information regarding mitigation plans for wastewater impacts on coastal waters and groundwater.**

A discussion of potential adverse impacts from proposed wastewater disposal within the petition area is presented in Section 4.3.3. In summary, the EIS concludes that cesspools are an allowable and widely used disposal method in the North Kona region, provided they are designed, constructed, operated, and maintained in accordance with State and County regulations. In a meeting held at the Department of Health Wastewater Branch (March 14, 1990), Mr. Harold Yee, an Environmental Engineer for the Department, agreed that cesspools would be an allowable method of wastewater disposal within the petition area. The EIS also states that uses within the petition area will be connected to the municipal sewer system when such system is available.

We note that in a letter dated March 14, 1990 (see Chapter 8 of the EIS), the Department of Land and Natural Resources states that "the industries now operating on this site have been subject to several approved Conservation District Use reviews since 1975. No adverse environmental impacts have been reported from the existing activities."

2. **Industrial materials and commercial stockpiles of lumber products are to be stored in above ground containers and on various premises within the development. Reviewers would like to have more design details of storage facilities in order to be able to assess the capability of storage tanks to prevent spillage and leakage, and to assess the potential leaching of wood preservatives and insecticides in the environment.**

As discussed in Section 4.1.10 of the EIS, any industrial materials used by activities within the petition area or wastes generated by these activities will be collected and handled according to applicable Federal, State and County government regulations. Maintenance work on machinery and equipment will be performed on concrete decks, as will the washing down of any equipment. All wash water will be channeled into grease traps where any oil or grease will be retained. These traps will be periodically cleaned and the accumulated oil (along with additional oil

Grosvenor Center, Mauka Tower | 733 Bishop Street, Suite 2590, Honolulu, Hawaii 96813 | Telephone: 808 545 2055 | Facsimile: 808 545 2050

accumulated from other sources) will be disposed of in accordance with EPA rules. Wash water from the concrete operations will also be channeled into appropriately designed traps. Materials collected by this system can be recycled into the concrete operations. All environmentally harmful materials used in cleaning mechanical parts or for hand washing purposes will be used in contained areas with concrete floors and will be kept in appropriate containers. At present, there are no plans to include wood treatment processing within the petition area. Currently, there are two such processing operations in the Hilo area which operate within guidelines of the EPA. Land within the petition area would be used for the storage of lumber (after processing), building of trusses for houses and other small structures, and the wholesaling of hardware goods to contractors.

3. **Drainage from the project could possibly contaminate anchialine ponds along the shoreline. Provisions for comprehensive management of wastewater and runoff are needed.**

Responses to comments 1 and 2 above provide information contained in the EIS that describe measures to be incorporated within the project to protect against adverse impacts to groundwaters and the aquatic environment along the shoreline. Appendices E and F in the EIS present assessments of the potential hydro-geological impacts from the proposed project and the resulting impacts that may be expected to occur within anchialine ponds along the shoreline. These assessments concluded that only ponds in the Malia and Kealakehe areas are located in the potential impact area from the proposed project. Within these areas, there is little likelihood of significant environmental impact. Dissolved nutrients (e.g., nitrogen and phosphorus) in liquid percolating from cesspools are already found in undisturbed groundwater and any small additions from the project site will not have a negative impact on nearshore aquatic resources.

4. **Should such a large project proceed without firm plans for a potable water supply?**

The existing level of water consumption in the petition area is approximately 13,000 gpd. According to the County Department of Water Supply, this quantity of water would be available for use in the future for West Hawaii Concrete or any other activity on the site. The EIS concludes that the estimated water demand in Increment I (assuming the elimination of quarrying at the site), will be approximately 15,150 gpd. This would be an increase of about 2,150 gpd over existing consumption levels. In terms of the overall water consumption in the region, we believe this is a very small impact on existing water resources. Nonetheless, through the use of conservation measures and water usage agreements, the petitioner intends to maintain water consumption in Increment I at existing levels unless otherwise agreed to by the County Department of Water Supply.

The petition area is located near the center of an area proposed for major urban expansion in the future. The State will soon begin drilling wells to determine the potential of the aquifer in the areas mauka of the project site. As wells are developed, they will be turned over to the County Department of Water Supply. Current proposals in the County's Keahole to Kailua Development Plan indicate extensive development of water mains to service the region, including the petition area.

5. **The interrelationships and cumulative environmental impacts of the proposed action and other related projects, notably the Kealakehe Housing project, should be discussed in the EIS.**

Chapter 3 of the EIS provides a detailed discussion of proposed public plans in Kona. Section 3.1.5 specifically discusses the Kealakehe Planned Community Development Plan and the interrelationship of the proposed project with it. Section 3.2.2. discusses the County's Keahole to Kailua Development Plan. The revised version of this plan (March 1, 1990) designates Increment I of the petition area Limited Industrial, and Increment II Regional Center. The proposed use of the subject property as described in the EIS is very compatible with the County's plan, and with mitigative measures described in the EIS, we also believe the project is very compatible with specific plans at Kealakehe.

Chapter 4 of the EIS discusses existing constraints on water supply and infrastructure, and clearly notes that development of Increment II is dependent on new construction of roads, water and sewer lines, and other related improvements. Current State and County planning efforts discussed above are dealing with these issues. As a landowner, the petitioner seeks to participate in the process of developing necessary improvements which will meet the future growth requirements in the area.

The EIS has been revised to reflect your comments concerning a discussion of cumulative impacts.

6. **The EIS should address the potential affect of a volcanic eruption.**

The EIS has been revised to reflect this comment.

We hope our responses have adequately addressed your comments. For your information, we intend to file the Final EIS with the State Land Use Commission and the Office of Environmental Quality Control (OEQC) in the near future. Your letter, together with this response, will be published as part of the Final EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry
Project Planner

cc: Esther Ueda, Land Use Commission
Dr. Marvin T. Miura, OEQC
Robert McClean
Robert Smolenski

Mayor
Duane Kanuha
Director
William L. Moore
Deputy Director

Planning Department

25 Aupuni Street, Rm. 109 • Hilo, Hawaii 96720 • (808) 961-8288

COPY

March 7, 1990

Ms. Esther Ueda
State Land Use Commission
335 Merchant Street, Room 104
Honolulu, HI 96813

Dear Ms. Ueda:

Comments - DEIS Honokohau Industrial Park
Tax Map Key: 7-4-8:26 and 49

We have received the subject draft EIS and have the following comments to offer:

1. Page 2-3: The proposed quarrying and concrete operations and marine industrial uses are not permitted in light industrial zoned areas.

2. Page 3-12: The General Plan LUPAG Map delineates 12 land use categories rather than 13; Flood plain is not considered as one of the categories.

3. Page 3-13: Current zone for the petition area should also include Unplanned designation.

4. Page 4-9: Mitigative measures for archaeological resources should be discussed separately.

5. Page 4-11 (Visual Scenic): The EIS should address potential impacts to existing and future mauka residential areas, proposed north-south parkway near top of subject site, and any mitigation measures proposed.

6. Page 4-11 (Wastewater Disposal): The EIS should address the installation of dry lines and inter-connection with the proposed Kealakehe STP.

7. Page 4-14 (Storm Drainage): Further substantiation for the projected groundwater "cone" should be discussed in the EIS. The draft EIS does not provide any quantitative basis for the conclusion stated.

Thank you for the opportunity to review and comments on the subject document. Should you have any questions, please feel free to contact Alice Kawaha of this office at 961-8288.

Sincerely,

DUANE KANUHA
Planning Director

AKtaeb

cc: Robert S. McClean
Marvin T. Miura, Ph.D.

8-28

April 3, 1990

Mr. Duane Kanuha, Director
Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Kanuha:

Draft Environmental Impact Statement (DEIS)
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Thank you for your letter of March 7, 1990 regarding the DEIS for the referenced project. We appreciate the time you and your staff spent reviewing the DEIS. Your comments are reproduced below followed by our response.

1. **The proposed quarrying and concrete operations and marine industrial uses are not permitted in light industrial zoned areas.**

The petitioner acknowledges the above statement and will request future zoning appropriate for uses within the site. Quarrying will be eliminated in the short term.

2. **The General Plan LUPAG Map delineates 12 land use categories rather than 13.**

The EIS has been revised to reflect this comment.

3. **Current zone for the petition area should also include Unplanned designation.**

Section 1.3 provides a development summary which indicates that the petition area is currently in the Open and Unplanned zones. The discussion in Section 3.2.3 to which you refer, identifies the proposed zone for the area according to the revised County General Plan.

4. **Mitigative measures for archaeological resources should be discussed separately.**

The EIS has been revised to reflect this comment.

5. **The EIS should address potential impacts to existing and future mauka residential areas, proposed north-south parkway near the top of the subject site, and any mitigation measures proposed.**

In Section 4.1.7 of the EIS, a discussion of the potential visual impacts on future development on surrounding lands is presented. The EIS states that a buffer area with landscaping improvements will be maintained along the property boundary where appropriate. The EIS has be revised to include impacts on existing housing and the north-south parkway.

Grosvenor Center, Pali Tower | 733 Bishop Street, Suite 2590, Honolulu, Hawaii 96813 | Telephone 808 545 2055, Facsimile 808 545 2050

Helber Hastert & Kimura
Planners

6. **The EIS should address the installation of dry lines and inter-connection with the proposed Kealakehe STP.**

The discussion in Section 4.1.8 of the EIS states that uses within the petition area will be connected to the municipal sewer system when such system is available. The EIS has been revised to note that dry lines will be installed at the appropriate time.

7. **Further substantiation for the projected groundwater "cone" should be discussed in the EIS. The Draft EIS does not provide any quantitative basis for the conclusion stated.**

According to Tom Nance, the consultant who prepared the Hydro-Geologic Impact Assessment for the project, numerical modeling and other analytical techniques which are used to predict the flow of groundwater will represent the movement of stormwater and other injected fluids from the project site toward shoreline discharge as a streamline with no horizontal component of flow. In other words, the lateral movement by processes of diffusion and dispersion which are represented in the EIS do not have a quantitative substantiation. The processes are known to occur but cannot be reasonably modeled by numerical methods. In this case, the diffusion/dispersion cone has been represented by judgment alone. In all probability, it is wider than would actually occur. In the very limited field testing that has been done in Hawaii, cones of this width have never been demonstrated. The flow of any potential pollutants from the project site is more likely to be concentrated in a narrower band.

We hope our responses have adequately addressed your concerns. For your information, we intend to file the Final EIS with the State Land Use Commission and the Office of Environmental Quality Control (OEQC) in the near future. Your letter, together with this response, will be published as part of the Final EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry
Project Planner

cc: Esther Ueda, Land Use Commission
Dr. Marvin T. Miura, OEQC
Robert McClean
Robert Smolenski

Bernard K. Akana
Mayor
Hugh Y. Ono
Chief Engineer
Bruce C. McClure
Deputy Chief Engineer

Department of Public Works

25 Aupuni Street, Rm. 202 • Hilo, Hawaii 96720 • (808) 961-8321 • Fax (808) 969-7138

February 26, 1990

STATE LAND USE COMMISSION
ATTN: MS ESTHER UEDA
335 MERCHANT ST RM 104
HONOLULU HI 96813

SUBJECT: HONOKOHAU INDUSTRIAL PARK - DEIS
N. Kona, HI
TMK: 7-4-8: 26 & 49

The following were our comments to the State Land Use Boundary Amendment:

1. Building shall conform to all requirements of code and statutes pertaining to building construction.

2. All development generated runoff shall be disposed on site and shall not be directed toward any adjacent properties.

3. Applicant shall be informed that if drywells are included in the subject improvements, Chapter 23, Underground Injection Control (UIC), Administrative Rules, Dept. of Health, prohibit any person from operating, constructing or modifying an injection well (drywell) unless authorized by a permit issued by the Director of Health, State of Hawaii.

4. Provide a County dedicable access road meeting commercial standards. The minimum right-of-way is 60'.

5. Provide intersection improvements at the Queen Kaahumanu Highway, i.e. channelization.

6. We prefer a grade separated intersection but this may be an excessive request since the applicant does not own the makai property across the Queen Kaahumanu Highway.

After reviewing the subject document, we have these comments:

1. A dry sewer system will be required.

2. When will the mauka extension of Kealakehe Parkway be constructed? Traffic problems may develop if it takes too long to construct the Parkway.

3. Who will construct and pay for connection to the Kealakehe Parkway?

4. Prohibition of left turns are difficult to control. Can't the Queen Kaahumanu Highway access be closed once the access to the Parkway is constructed?

5. Will the developer contribute to the signalization and improvements to the Parkway intersection?

ROBERT K. YANABU, Division Chief
Engineering Division

DHM:sah

8-30

April 3, 1990

Mr. Hugh Y. Ono, Chief Engineer
Department of Public Works
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Attn: Robert K. Yanabu

Dear Mr. Ono:

Draft Environmental Impact Statement (DEIS)
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Thank you for your letter of February 26, 1990 regarding the DEIS for the referenced project. We appreciate the time you and your staff spent reviewing the DEIS. Your earlier comments to the State Land Use Boundary Amendment have been addressed in the DEIS. Comments on the DEIS are reproduced below followed by our response.

1. **A dry sewer system will be required.**

The petitioner acknowledges the above condition and will install dry sewer lines along with other infrastructure improvements.

2. **When will the mauka extension of Kealakehe Parkway be constructed? Traffic problems may develop if it takes too long to construct the Parkway.**

The petitioner shares your concern for the timely development of a new mauka-makai roadway. The alignment for the Parkway is presently being surveyed. Completion is estimated for late-1992.

3. **Who will construct and pay for connection to the Kealakehe Parkway?**

Land use plans currently proposed by the Housing Finance and Development Corporation show several possible connection points from the petition area to the proposed mauka-makai roadway. Financing of these connections has not yet been addressed by the parties involved.

4. **Prohibition of left turns are difficult to control. Can't Queen Kaahumanu Highway access be closed once the access to the Parkway is constructed?**

Left turns from the existing access road, which would take vehicles in a southerly direction towards Kailua-Kona, could be controlled by channeling. Closing of the access road is a possible alternative in the future. However, this is not favored by the petitioner at this time. In a letter included in this section, the State Department of Transportation notes that "Queen Kaahumanu Highway will eventually be developed into a high-speed, four-lane divided freeway with interchanges, limited access, and frontage roads." Continued use of the access road will be coordinated with planning for improvements within the Queen Kaahumanu Highway corridor.

Grosvenor Center, Mauka Tower 733 Bishop Street, Suite 2590 Honolulu, Hawaii 96813 Telephone 808 545 2055 Facsimile 808 545 2050

Helber Hastert & Kimura
Planners

5. **Will the developer contribute to the signalization and improvements to the Parkway intersection?**

Roadway improvements within the petition area will be coordinated with HFDC. The possibility of petitioner contributions to intersection improvements has not yet been addressed.

We hope our responses have adequately addressed your concerns. For your information, we intend to file the Final EIS with the State Land Use Commission and the Office of Environmental Quality Control (OEQC) in the near future. Your letter, together with this response, will be published as part of the Final EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry
Project Planner

cc: Esther Ueda, Land Use Commission
Dr. Marvin T. Miura, OEQC
Robert McClean
Robert Smolenski

COPY

DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAII
25 AUPUNI STREET • HILO, HAWAII 96720
TELEPHONE (808) 969-1421 • FAX (808) 969-6996

February 2, 1990

RECEIVED
FEB 13 1990
HELBER, HASTERT & KIMURA PLANNERS

State Land Use Commission
ATTENTION: MS. ESTHER UEDA
335 Merchant Street, Room 104
Honolulu, HI 96813

HONOKOHAU INDUSTRIAL PARK
TAX MAP KEY 7-4-08:26 AND 49

Thank you for giving us the opportunity to comment on the subject Environmental Impact Statement.

Water is not available to the proposed project as extensive improvements to our existing facilities are required. (Reference August 3, 1989 Department of Water Supply to Planning Department - Page 7-25).

Reference is made to Pages 4-21 and 4-22 of the report. Water is committed to the existing West Hawaii Concrete operations only. An additional water unit (600 gallons per day) was acquired by the applicant from Red Hill Joint Venture. This unit cannot support Increment I or Increment II of the project. Water conservation measures and water usage agreements between the petitioner and potential lessee are not in our opinion a viable method to maintain daily water usage within the allowable limits.

There is an inconsistency in the report. Section 4.3.2 Water states that quarry operations will be phased out. However, elsewhere in the report there is a 7-acre quarry expansion planned in Increment I.

Should the petitioner wish to proceed with the development of Increment I and/or Increment II, a potable water source must be developed and necessary off-site and on-site improvements including storage, transmission pipeline, booster pumps, and distribution facilities must be constructed.

H. William Sewake
Manager

CS

cc - Mr. Robert S. McClean
Marvin T. Miura, Ph.D.

... Water brings progress...

8-32

Helber Hastert & Kimura
Planners

April 3, 1990

Mr. H. William Sewake, Manager
Department of Water Supply
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Sewake:

Draft Environmental Impact Statement (DEIS)
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Thank you for your letter of February 2, 1990 regarding the DEIS for the referenced project. We appreciate the time you and your staff spent reviewing the DEIS. Each of your comments is summarized below followed by our response.

1. **The report is inconsistent; stating that quarry operations will be phased out, while indicating elsewhere a 7-acre site for quarry expansion.**

We concur that phrasing in the report is inconsistent. Section 2.4 of the EIS notes that the existing quarry within the petition area is expected to be an important source of raw materials for the construction industry in Kona within the short-term. Over the long-term, however, as development occurs, this operation is intended to be phased out due to its incompatibility with other activities. The 7-acre expansion area identified in Figure 3 is only for the continued operation of the quarry area in the near term. This area will be layered and sculptured in the future in order to improve the general characteristics of the site and maximize its use for other activities. There are no plans to expand or enlarge existing concrete and quarrying operations at the site. The EIS has been revised to clarify this inconsistency.

2. **Water is committed to the existing West Hawaii Concrete only. Water conservation measures and water usage agreements are not a viable method to maintain daily water usage within the allowable limits.**

In order to clarify the future availability of water to the petition area, contact was made with Mr. Quirino Antonio of the County Department of Water Supply (phone conversation, March 14, 1990). Mr. Antonio indicated that the existing level of water consumption at the site (approximately 13,000 gpd), would be available for use in the future for West Hawaii Concrete or any other operation on the site. Therefore, any decrease in water use by West Hawaii Concrete (whether partially or totally), would allow water to be used for other activities proposed by the petitioner. The EIS concludes that the estimated water demand in Increment I (assuming the elimination of quarrying at the site), will be approximately 15,150 gpd. This would be an increase of about 2,150 gpd over existing consumption levels. Through the use of conservation measures and water usage agreements, the petitioner intends to maintain water consumption in Increment I at existing levels unless otherwise agreed to by the County Department of Water Supply.

Grosvenor Center, PH1 Tower | 733 Bishop Street, Suite 2590 Honolulu, Hawaii 96813 | Telephone 808 545 2055 Facsimile 808 545 2050

3. In order to proceed with the development of Increment I and/or Increment II, a potable water source and related infrastructure must be constructed.

We believe that the above discussion indicates that water is available to allow development of Increment I to proceed. We concur that new potable water sources would have to be developed in order to accommodate water demand within Increment II. It is our understanding that the State will soon begin the drilling of a test well in an area mauka of Mamalahoa Highway. The test results from this first well will determine the potential of the aquifer in this area to provide additional source development. The Draft Keahole to Kailua Development Plan proposes a regional water plan which identifies future water main locations to accommodate future urbanization in the area between Kailua-Kona and the Keahole Airport. Proposed water main alignments in this plan would provide service to the petition area. The petitioner proposes to participate in the development of this system.

We hope our responses have adequately addressed your concerns. For your information, we intend to file the Final EIS with the State Land Use Commission and the Office of Environmental Quality Control (OEQC) in the near future. Your letter, together with this response, will be published as part of the Final EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry

David R. Curry
Project Planner

cc: Esther Ueda, Land Use Commission
Dr. Marvin T. Miura, OEQC
Robert McClean
Robert Smolenski

Bernard K. Akana
Mayor
George Yoshida
Director
Juliette M. Tulang
Deputy Director

Department of Parks and Recreation

25 Aupuni Street, Rm. 210 • Hilo, Hawaii 96720 • (808) 961-8311

March 6, 1990

State Land Use Commission
Attn: Esther Ueda
335 Merchant St., Room 104
Honolulu, Hawaii 96813

MAR 20 8 15 AM '90
LAND USE COMMISSION
STATE OF HAWAII

Subject: Honokohau Industrial Park, North Kona, Hawaii-EIS
TMK: 7-4-08:26 & 49

Dear Ms. Ueda:

Although we foresee no direct adverse impact on the County's parks system, the project site has been designated by the Keauhou to Kailua Development Plan as an urban regional center and for uban expansion uses. As such, the proposed industrial use may conflict with the desired government, finance, and service/retail commercial uses.

This potential conflict of land uses should be resolved.

Thank you for the opportunity to review the EIS report.

Sincerely,

George Yoshida
Director

8-34

Helber Hastert & Kimura
Planners

April 3, 1990

Mr. George Yoshida, Director
County Department of Parks and Recreation
25 Aupuni Street, Room 210
Hilo, Hawaii 96720

Dear Mr. Yoshida:

Draft Environmental Impact Statement (DEIS)
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Thank you for your letter of March 6, 1990 regarding the DEIS for the referenced project. We appreciate the time you and your staff spent reviewing the DEIS. Your comments are summarized below followed by our response.

1. The proposed industrial use may conflict with the desired government, finance, and service/retail commercial uses as proposed in the County's Keahole to Kailua Development Plan.

According to the revised Land Use Plan presented to the Hawaii County Planning Commission on March 1, 1990, the Draft Keahole to Kailua Development Plan designates Increment I of the petition area as Limited Industrial. Increment II is designated as Regional Center. The petitioner proposes light industrial uses within Increment I, and service-related and commercial uses in Increment II. These proposals are compatible with the Keahole to Kailua Development Plan.

We hope our responses have adequately addressed your comments. For your information, we intend to file the Final EIS with the State Land Use Commission and the Office of Environmental Quality Control (OEQC) in the near future. Your letter, together with this response, will be published as part of the Final EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry
Project Planner

cc: Esther Ueda, Land Use Commission
Dr. Marvin T. Miura, OEQC
Robert McClean
Robert Smolenski

Grosvenor Center, Mauka Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813
Telephone 808 545 2055
Facsimile 808 545 2050

Hawaii Electric Light Company, Inc. • PO Box 1027 • Hilo, HI 96721-1027

ENV
H-H/G

March 20, 1990

State Land Use Commission
355 Merchant Street, Room 104
Honolulu, Hawaii 96813

Attention: Ms. Esther Ueda

Gentlemen:

Subject: Environmental Impact Statement
Proposed Honokahau Industrial Park
North Kona, Hawaii TMK 7-4-08:26, 49

I apologize for the late response to the EIS, however, we appreciate the opportunity to review and comment on it. The project is in the Kailua-Keahole Development plan proposed by the County of Hawaii Planning Department. Our comments were provided to Duane Kanuha, copy attached, which is relative to the overall project.

Specifically, for the Honokahau Industrial Park, we estimate the load to be approximately 3,753 KVA. The existing transmission and distribution facilities will not be able to accommodate this new load and new electrical facilities will be required as outlined in our response to the County. The developer must contribute to the cost of these new facilities.

We encourage that energy conservation features suitable to reduce the peak demand be considered by the future subdivision. For example, fluorescent lighting should be used in buildings and sodium lighting specified for parking lots and roadways. Our Consumer Service is prepared to assist you in providing rate analysis and other recommendations involving heating and cooling needs of the tenants. Contact Tom Goya, Director of Customer and Consumer Service Administration Department at 969-0131.

If there are any questions on this, please call me at 969-0323.

Very truly yours,

Melvin S. Yamaki

Melvin S. Yamaki
Electrical Engineer
Engineering Department

CHN:MSY:ts

cc: C. Nagata
H. Kamigaki
T. Goya

8-35

Hawaii Electric Light Company, Inc. • PO Box 1027 • Hilo, HI 96721-102

GENPP
H-H/G

November 16, 1989

Planning Department
County of Hawaii
25 Aupuni Street, Room 109
Hilo, Hawaii 96720

Attention: Mr. Duane Kanuha, Planning Director

Gentlemen:

Subject: Keahole to Kailua Development Plan

Thank you for allowing us the opportunity to comment on the Keahole to Kailua Development Plan.

Based on the plan, we estimated an addition of approximately 100 MW of load. This will have a major impact on our system. Additional generation and transmission lines will be required.

Existing Conditions:

1. HELCO has three (3) 69KV transmission lines serving Kona. One 69KV line is along the Hawaii Belt Highway from Waimea to Kailua and the other along Queen Kaahumanu Highway from Keahole to Kailua. The third line is along Hamalahoa Highway from South Point direction toward Kailua.

2. The three (3) 69KV transmission lines serve distribution substations which step the voltage down from 69KV to 12.47KV. The 12.47 KV overhead distribution line on Hawaii Belt Highway originates from a substation in Kona Industrial Subdivision on Kaiwi Street. There are six (6) substations on Queen Kaahumanu and Kuakini Highways.

Proposed Conditions:

1. Ninety per cent or 12,622 acres of the 14,000 acres of undeveloped land in the area are owned by several large landowners. The estimated load for the existing land use is 20 MW now and will be at least 100 MW when fully developed.

2. Preliminary analysis, show that two (2) or more additional 69KV lines will be required in the Kona area to support this added load. The routing and termination points of these lines will be dependent upon the location of major load centers and easement availability. Developers are required to contribute to the cost of additional facilities and must provide the necessary lots for the substations, and easements for the transmission and distribution lines. One or more 69KV transmission line corridors will be required between Keahole and Kailua. Perhaps the

proposed Kailua bypass road could be used for one or two of these lines. The easement should be a minimum of 75' wide per line if located in private property.

In order for us to make a thorough study of the system improvements required, we would appreciate receiving a twenty (20) year load projection, time schedule, size and location of the loads.

Very truly yours,

Clyde H. Nagata, Manager
Engineering Department

CHN:MSY:ts

cc: J. Oda
H. Kamigaki
D. Kiyosaki

Helber Hastert & Kimura
Planners

April 3, 1990

Mr. Clyde H. Nagata, Manager
Engineering Department
Hawaii Electric Light Company, Inc.
P.O. Box 1027
Hilo, Hawaii 96721-1027

Dear Mr. Nagata:

Draft Environmental Impact Statement (DEIS)
Honokohau Industrial Park, Honokohau, North Kona, Hawaii
TMK 7-4-08: 26 and 49

Thank you for your letter of March 20, 1990 regarding the DEIS for the referenced project. We appreciate the time you and your staff spent reviewing the DEIS. Your comments are summarized below followed by our response.

1. We estimate the load [from the proposed project] to be approximately 3,753 KVA. The existing transmission and distribution facilities will not be able to accommodate this new load and new electrical facilities will be required. The developer must contribute to the cost of these new facilities.

The discussion in 4.3.5 of the EIS states that West Hawaii Concrete operations will continue to use existing generators for electrical power. This could significantly reduce the potential demand estimated for Increment I of the project. Nonetheless, the petitioner acknowledges that urban expansion in the area will require new transmission and distribution facilities and will participate in the funding of these improvements.

2. We encourage energy conservation features suitable to reduce the peak demand be considered by the future subdivision.

The petitioner acknowledges this comment. The EIS has been revised to include language addressing this issue.

We hope our responses have adequately addressed your comments. For your information, we intend to file the Final EIS with the State Land Use Commission and the Office of Environmental Quality Control (OEQC) in the near future. Your letter, together with this response, will be published as part of the Final EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

David R. Curry
Project Planner

cc: Esther Ueda, Land Use Commission
Dr. Marvin T. Miura, OEQC
Robert McClean
Robert Smolenski

Grosvenor Center, Mauka Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813
Telephone (808) 545-2055
Facsimile (808) 545-2050

CHAPTER 9

REFERENCES

Belt Collins & Associates. Environmental Impact Assessment for Kona Industrial Subdivision Expansion and Commercial Development. Prepared for Liliuokalani Trust. December 1979.

_____. Final Environmental Impact Statement for the Ritz Carlton Mauna Lani. Prepared for the Ritz Carlton Hotel Company. July 1987.

Char and Associates. Flora and terrestrial fauna surveys prepared for the O'oma II Environmental Impact Statement and the Kohana-iki Resort Community EIS. June 1986.

Hallstrom Appraisal Group, Inc. O'oma II Resort Community Market Study and Highest and Best Use Analysis. Prepared for the O'oma II Resort Community Environmental Impact Statement. July 1985.

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_____. State Historic Preservation Functional Plan. June 1984.

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Hawaii, State of, Office of State Planning. West Hawaii Regional Plan. November 1989.

Helber, Hastert & Kimura, Planners. Kohana-iki Resort Community Final Environmental Impact Statement. Prepared for Kona Beach Development Venture, L.P. August 1986.

_____. O'oma II Final Environmental Impact Statement. Prepared for Kahala Capital Corporation. September 1986.

_____. Final Environmental Impact Statement for Isemoto/SJA/Taylor Subdivision. Prepared for Isemoto/SJA/Taylor Partnership. August 1988.

R. M. Towill Corporation. Draft Keahole to Kailua Development Plan. Prepared for the County of Hawaii Planning Department. September 1989.

Wilson Okamoto & Associates, Inc. Kaloko Light Industrial Subdivision, Final Environmental Impact Statement. July 1981.

APPENDICES

APPENDIX A

CONSERVATION DISTRICT USE PERMITS

FILE
HONOKOHAU
P-14-2

George R. Ariyoshi
GOVERNOR OF HAWAII

DIVISIONS:
CONVEYANCES
FISH AND GAME
FORESTRY
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

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

HA-2/14/75-637
180-Day Expires 8/13/75

FINDINGS OF FACT, DECISION AND ORDER CONSERVATION DISTRICT USE APPLICATION FOR QUARRY USE AT HONOKOHAU, ISLAND OF HAWAII

I. FINDINGS OF FACT

Applicant: K. M. Young and Associates at the request of Manfred Cieslik Kailua-Kona, Hawaii — OWNER OF FEE

Use Requested: Excavation and Quarrying

Location: Honokohau; TMK: 7-4-08:26
Area of Parcel: 290 Acres
Area of Use: 81.7 Acres

Subzone: General Use, Section 2B(1)(j) of Regulation No. 4.

Description of Area:

The site is located about 2.8 miles north of Kailua-Kona and 4.4 miles south of the entrance to Keahole Airport.

The site is presently vacant. North of the site is a quarry operated by Pacific Concrete and Rock Company. South of the site is a large State-owned parcel which is being planned for residential use.

The proposed quarry is to be about 1,000 feet mauka of Kaahumanu Highway between the (present) 100 and 340 foot elevations.

The soil in this area is aa with scattered pahoehoe. Under the aa is pahoehoe. Beneath this is grey basalt. The parcel slopes at about 6%.

Vegetation is sparse and consists of dryland types such as kiawe, haole koa, christmas berry, etc.

Rainfall is about 25 inches.

Access to the parcel is by Kaahumanu Highway. Power, water and telephone are available at the site.

Most of the proposed site is in Conservation (about 74.9 acres). A portion (about 14.6 acres) is in Agriculture. A more precise determination of the boundary between Conservation and Agricultural lands was sought from the Land Use Commission.

The EIS for this project includes a letter report of a walk through survey by Bishop Museum in which seven archaeological sites including cairns, lava tubes, platforms, house site and walls were found. The report says these sites were previously not recorded, and other sites may have been missed. It suggests a possible relationship of these sites to those in the coastal areas of Kealakehe to Kaloko. It strongly recommends that more thorough studies be made and says no evaluation can be made until the studies have been completed.

Description of Use:

The landowner, K. M. Young and Associates, proposes to let the applicant, Mr. Manfred Cieslik, operate a quarry on the 89-1/2 acre site.

Access and utilities will be by a 60-foot right-of-way, about 1,020 feet long, from Kaahumanu Highway.

The applicant proposes to use basalt and other material from the site for aggregate for use in highways, paving and buildings. Approximately 2,000,000 cubic yards would be excavated, crushed, processed, stockpiled and removed. His grading plan indicates the material will be stripped from the site - in effect, leveling the site. Cuts of 15 feet or more are expected along the northern, mauka and southern faces of the site.

The applicant proposes to cover these cut faces with landscaping such as bougainvillea, wiliwili and royal poinciana.

As part of the quarry operation, the applicant plans to have two buildings. One building would be the scale house and office building. It would be 15 feet high and be about 25 feet by 40 feet. The second building would be 25 feet high and be about 60 feet by 90 feet.

The applicant proposes to have a tenant, Shielf Pacific, a firm which presently operates a batching and tile-making storage yard in a residential section of Kailua-Kona on Alii Drive.

During an interview with Mr. Cieslik, on March 22, 1975, he indicated he had little need for washwater because the overburden was primarily lava. Dust would stay in the material or be controlled by sprinklers. He felt the site was isolated and thus would cause little dust or noise problems. He said the overburden would be used for fill or for roadwork. He indicated he would like the use approved for 30 years because of fencing. He indicated the quarrying rate was difficult to schedule and that it would depend on growth in the area.

Comments Received:

By letter dated February 28, 1975, the Department of Water Supply asked how much water the project would require and what schedule was planned for the development. By letter dated March 17, the applicant advised that water needs, when the quarry is in operation, would not exceed 50,000 gallons a day on five day a week basis. The applicant also advised quarry operation is to begin 30 days after approval is granted. Related operation such as batching would be moved to the site about six months after approval is granted with about three months being needed to become operational.

water resources except for landscaping needs.

There are areas of archaeological value on the quarry site. These sites should be salvaged.

The quarry will be located across the highway from a national historic landmark. Its ugliness will be reduced by the length of the setback and the masking afforded by the uneven lava terrain. Trucks entering and leaving the quarry will raise dust unless the entrance road is paved. Any roadway signs should be unobstrusive if not eliminated altogether.

The record contains a generalized grading plan (40 feet contour intervals). It shows there will be a slight departure from the natural grade except in the mauka sections. The side and rear cuts, however, will exceed the natural angle of soil respose (40%).

The proposed use is desired by Kona businessmen because quarry services to the area may be improved and because Shield-Pacific's present operation on Alii Drive is a nuisance and should be relocated.

Staff recommends approval of this application subject to the following conditions:

1. The use shall be for 20 years but batching and tile storage activities may be continued after that time by the Board if it can be shown no nuisance exists at that time.

2. Shield-Pacific's operation on Alii Drive shall be fully terminated within one year of the date of this approval.

3. Blasting and operation of crushers, sorters, drills, and rock loaders shall be confined to the hours of 7:00 a.m. and 5:00 p.m. Mixers and aggregate and cement loaders shall be confined to the hours of 5:00 a.m. and 9:00 p.m.

4. All cut slopes shall not exceed 40%.

5. The quarry operation shall be adequately screened and buffered by planting trees and bushes of sufficient width and height along the boundaries of the site, particularly the makai boundary. The plans to achieve this shall be prepared by a landscape architect for the Chairman's approval before the quarry operation commences. The trees and plants shall be planted within six months after the plan is approved and shall be maintained in a manner acceptable to the Dept. of Land and Natural Resources throughout the period of quarry operation on the subject site.

6. Entrance road leading to the quarry site shall be paved to a width of twenty (20) feet prior to commencement of quarry operation. Fugitive dust shall be controlled.

7. Detailed, time-phased quarrying plans shall be filed for the Chairman's approval before the proposed use commences.

8. A site plan identifying and showing the location of all buildings, structures and structural equipment, signs and utilities shall be filed for the Chairman's approval before the proposed use commences.

archaeological sites shall be salvaged or otherwise treated as recommended by a competent archaeologist.

10. The applicant shall comply with Sections 2C and 2F of Regulation No. 4.

11. The applicant shall notify the Division of Forestry upon the commencement and at the completion of all work.

N/A 12. The applicant shall obtain approval from the County for any work to be performed within the Shoreline Setback Area.

13. The applicant shall take appropriate measures prior to and during construction of the project to minimize degradation of the offshore waters of the State.

N/A 14. Prior to commencing any work or activity on State-owned lands, proper clearances and permits shall be obtained from the Division of Land Management.

15. The applicant, its successors and assigns shall indemnify and hold the State of Hawaii harmless from and against any loss, libility, claim or demand for property damage, personal injury and death arising out of any act or omission, and not occasioned through the fault of the State, of the applicant, its successors, assigns, officers, employees, contractors and agents under this permit and also any loss, liability, claim or demand for property damage, personal injury and death arising out of or relating to or connected with the granting of this permit, and not occasioned through the fault of the State.

✓ 16. That within sixty (60) days of official date of this request, the applicant shall submit to the Land Board, the necessary legal documents which would:

a. Assure the termination and relocation of Shield-Pacific, Ltd.'s operations along Alii Drive within one (1) year of official date of approval of this request;

b. Assure that the Shield-Pacific, Ltd.'s site along Alii Drive will then be used only for a use commensurate with its County zoning; and

c. Acknowledge the applicant's understanding that should any of the two above proivisions not be complied with or implemented, the use shall be immediately and automatically terminated.

17. The Board shall have the authority to terminate the quarry operation on the subject site whenever the Board finds that (a) one or more of the above enumerated conditions is not being fully complied with; (b) the department has issued repeated warnings of the non-compliance of the condition(s); and (c) the applicant has not remedied the non-compliance within a period of three months.

II. DECISION AND ORDER

Based on the above Findings of Fact, it is the decision of the Board of Land and Natural Resources that the application for Excavation and Quarrying Operation Use be approved subject to the conditions as recommended by staff.

I hereby certify that the foregoing is the Findings of Fact and Decision and Order rendered by the Board of Land and Natural Resources on July 11, 1975.

Dated at Honolulu, Hawaii, this 28th day of July, 1975.

C. Cobb

CHRISTOPHER COBB
Chairman of the Board

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

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

SUSUMU ONO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES
EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN

DIVISIONS:
AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

JUL 07 1986

FILE NO.: HA-12/18/85-1873
180-Day Exp. Date: 6/17/86
DOCUMENT NO.: 1289B

Mr. Robert S. McClean
McClean Properties, Inc.
P.O. Box 3000
Kailua Kona, Hawaii 96745-3000

Dear Mr. McClean:

We are pleased to inform you that your Conservation District Use Application to develop a boat repair and storage at Honokohau, North Kona, Hawaii was approved on June 13, 1986, subject to the following conditions:

1. The applicant shall comply with all applicable statutes, ordinances, rules and regulations of the Federal, State and County governments, and applicable parts of Section 13-2-21, Administrative Rules, as amended;

2. The applicant, its successors and assigns, shall indemnify and hold the State of Hawaii harmless from and against any loss, liability, claim or demand for property damage, personal injury and death arising out of any act or omission of the applicant, its successors, assigns, officers, employees, contractors and agents under this permit or relating to or connected with the granting of this permit;

3. If any unanticipated sites or remains of historic or prehistoric interest (such as shell, bone or charcoal deposits, human burials, rock or coral alignments, paving, or walls) are encountered during construction, the applicant shall stop work and contact the Historic Preservation Office at 548-7460 or 548-6408 immediately;

4. The applicant shall comply with all applicable Public Health Regulations;

5. Prior to the commencement of any construction, alteration, or repair of any building or other improvement, four (4) copies each of the final location map, plans, and specifications shall be submitted to the Chairperson, or his authorized representative, for approval of which three (3) copies will be returned;

6. Any work or construction to be done on the land shall be initiated within one (1) year of the approval of such use, and all work and construction must be completed within three (3) years of the approval of such use. Failure to comply with this condition shall render this application null and void;

7. The applicant must submit a contingency plan to handle fuel spoils and waste oil disposal; the plan must also state the precautionary measures to be taken in the facility;

8. This permit shall authorize the use of 3-1/2 acre; any expansion beyond 3-1/2 acre shall require a separate application;

9. Within 2 years from the date of approval of this permit, the applicant shall submit a petition to the Land Use Commission to redesignate the 3-1/2 acre facility to another zoning district more approriate for the type of use; and

10. Other terms and conditions as prescribed by the Chairperson.

Please acknowledge receipt of this permit with the above noted conditions in the space provided below. Please sign two copies. Retain one and return the other.

Should you have questions on any of these conditions, please feel free to contact our Office of Conservation and Environmental Affairs staff at 548-7837.

Very truly yours,

SUSUMU ONO, Chairperson
Board of Land and Natural Resources

Receipt acknowledged:

McClean Enterprises, Ltd.
Robert S. McClean

Applicant's Signature

cc: Oahu County Board Member
Oahu District Land Agent
C&C, Dept. Land Utilization
C&C, Dept. General Planning
DOH/OEQC/EC/DPED/OHA

APPENDIX B

ARCHAEOLOGICAL INVENTORY SURVEY
PAUL H. ROSENDAHL, INC.

Archaeological Inventory Survey
Honokohau Industrial Park
(Parcel VII)

Land of Honokohau 2nd
North Kona District, Island of Hawaii

by

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Supervisory Archaeologist

Prepared for

Helber, Hastert & Kimura, Planners
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January 1990

PHRI
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SUMMARY

At the request of Mr. David Curry of Helber, Hastert & Kimura, Planners, Paul H. Rosendahl, Ph.D. Inc. (PHRI) conducted an archaeological inventory survey of the c. 89.5 acre proposed Honokohau Industrial Park project area (also referred to as Parcel VII) located in the Land of Honokohau 2nd, North Kona District, Island of Hawaii (TMK:3-7-4-08:26,49).

The survey field work was conducted September 6 and November 20-December 7, 1989 and consisted of a 100%-coverage pedestrian survey, augmented with an aerial reconnaissance survey. During the survey, 54 sites were newly identified and eight previously identified sites were relocated and were designated as six sites, for a total of sixty identified sites. One of the previously identified sites was listed on the State Inventory of Historic Places (Site 13181*). All other sites (59) were assigned SIHP numbers during this survey.

Analysis of survey findings indicates that the predominant feature types present in the project area are pahoehoe excavations, modified outcrops, and terraces and rock mounds (69% of the 207 identified features); these types are for the most part associated with agricultural activities. Features assumed to be associated with temporary habitation (10) comprise a relatively small proportion of the features (4.8%). No sites or features representative of permanent habitation were located within the project area.

Among the 60 sites identified within the project area, 14 are assessed as having information value that has been mitigated during this survey, and no further work is determined necessary. Further data collection only is recommended for 36 sites, which appear to have value only for information content. Further data collection and a provisional recommendation of preservation "as is" are recommended for nine sites pending the identification of human skeletal remains at the sites. Finally, a single site is assessed as significant for information content and for cultural value as a transportation route. Further data collection is recommended for this site.

*State Inventory of Historic Places (SIHP) site designation system: all five-digit site numbers prefixed by 50-10-27 (50=State of Hawaii, 10=Island of Hawaii, 25 or 27=USGS 7.5'series quad map ["Keahole, Hawaii"]).

CONTENTS

ILLUSTRATIONS

Figure

ILLUSTRATIONS (cont.)

Figure

TABLES

Table

INTRODUCTION

BACKGROUND

This report presents the results of an archaeological inventory survey conducted at the proposed Honokohau Industrial Park project area, located in the Land of Honokohau 2nd, North Kona District, Island of Hawaii (TMK:3-7-4-08:26,49). The survey was conducted by Paul H. Rosendahl, Ph.D., Inc. (PHRI) at the request of Mr. David Curry of Helber, Hastert & Kimura (HH&K), Planners. The overall purpose of the survey was to provide information appropriate to and sufficient for the preparation of an Environmental Impact Statement (EIS) that could be submitted in conjunction with a Land Use Boundary Amendment petition to the State Land Use Commission.

The survey field work consisted of both aerial and pedestrian reconnaissance of the project area. The aerial reconnaissance (by helicopter) was conducted on September 6, 1989 by Supervisory Archaeologist Theresa K. Donham, M.A. The pedestrian reconnaissance was conducted November 20-December 7, 1989. The field crew for the pedestrian reconnaissance consisted of six to seven persons under the supervision of PHRI Supervisory Archaeologist Debra Soper, B.S. Approximately 400 man-hours of labor were expended in conducting the pedestrian reconnaissance. Principal Archaeologist Dr. Paul H. Rosendahl provided overall guidance for the project.

An interim report of findings and general significance assessments for the present project was prepared recently (Walker and Rosendahl 1990). The present report constitutes the final report for the project.

SCOPE OF WORK

The purpose of an inventory survey is to identify—to discover and locate on available maps—all sites and features of potential archaeological significance present within a specified project area. An inventory survey comprises an initial level of archaeological investigation. It is extensive rather than intensive in scope, and is conducted, basically, in order to determine the presence or absence of archaeological resources within a specified project area. This level of survey indicates both the general nature and variety of archaeological remains present, and the general distribution and density of such remains. It permits general significance assessments of the archaeological resources, and facilitates formulation of realistic recommendations and estimates for any subsequent mitigation work as might be necessary or appropriate. Such work could include further data collection involving detailed recording of sites and features, and limited excavations; and possibly subsequent data recovery research excavations, construction monitoring, interpretive planning and development, and/or preservation of sites and features with significant scientific research, interpretive, and/or cultural values.

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

Based on a review of readily available background literature, and on discussions with Mr. Curry of HH&K, and with Dr. Ross Cordy, chief archaeologist with the Hawaii State Department of Land and Natural Resources-Historic Sites Section/State Historic Preservation Office (DLNR-HSS/SHPO), and with Ms. Virginia Goldstein, staff planner and historic sites specialist in the Hawaii County Planning Department (HCPD), the following specific tasks were determined to constitute an adequate and appropriate scope of work for the inventory survey:

1. Conduct archaeological and historical documentary background research involving review and evaluation of readily available archaeological and historical literature, historic documents and records, and cartographic sources relevant to the immediate project area;

2. Conduct a 100%-coverage, low-level (30-50 ft altitude) aerial reconnaissance survey (helicopter) of the entire project area, with special emphasis on (a) identification of (1) any sites (both new and previously recorded) with surface structural remains and (2) areas devoid of sites (e.g., mechanically altered quarry operation lands), and (b) locational plotting of all sites on aerial photos and/or topographic maps;

3. Conduct variable-coverage (partial to 100%), variable- intensity (30-90 ft intervals) surface survey of the entire project area, with (a) relatively higher-intensity coverage being given any non-modified lands and (b) relatively lower intensity coverage to lands extensively modified by historic period and/or recent activities;

4. Conduct limited subsurface testing of selected sites identified within the project area, by means of mechanical hand tools, (a) to determine the presence or absence of potentially significant buried cultural features or deposits, and (b) to recover samples of portable remains (artifacts and/or midden) and materials for dating; and

5. Analyze background and field data, and prepare appropriate reports.

The inventory survey was carried out in accordance with the standards for inventory-level survey recommended by DLNR-HSS/SHPO.

The significance of all archaeological remains identified within the project area were to be assessed in terms of the National Register criteria contained in the Code of Federal Regulations (36CFR Part 60) and criteria for evaluation of traditional cultural values prepared by the national Advisory Council on Historic Preservation. These criteria are used by the DLNR-HHS/SHPO for the evaluation of cultural resources.

PROJECT AREA DESCRIPTION

The proposed Honokohau Industrial Park project area consists of a 89.5 acre parcel (Parcel VII) located c. 305.0 m east of Queen Kaahumanu Highway (Figure 1). The parcel is approximately 275.00 m wide by 1.25 km long. The southern boundary of the project area is the ahupua'a boundary between Honokohau 2nd and Kealakehe. The northern boundary of the project area follows the boundary between Honokohau 1st (Nui) and Honokohau 2nd (Iki).

Honokohau ahupua'a is situated along the western slope of Hualalai Volcano, where Pleistocene to recent Hualalai Series lavas form the surface mantle. These flows are comprised primarily of alkalic olivine basalt, and are both aa and pahoehoe types (Macdonald, Abbott, and Peterson 1983:366). The flows consist of pahoehoe flats, fissures, upthrusts, collapsed blisters and tubes, and fingers of aa that are generally oriented east-west. Although the surface topography is relatively rough in places, the overall aspect of the project area is a gradual slope from east to west. Elevation in the area ranges from 85 ft to 330 ft AMSL, representing a drop of approximately .06 m per linear meter along an east to west axis. The lower portion of the project area is approximately 2.6 km inland of the coastline. The upper portion of the area is approximately 3.8 km from the coastline.

Annual median rainfall within the project area is approximately 30 in (Armstrong 1983). Annual rainfall is greater at elevations above the maximum elevation of the project area, and in general, the density of vegetation cover along the slopes of Hualalai increases with increasing elevation and rainfall. Vegetation density is relatively uniform along the elevational gradient within the project area, and there appears to be only minor environmental variation that might be expected to correlate with site or settlement patterning.

Predominant tree species within the project area are kiawe (*Prosopis pallida* [Humb. and Bonp. ex Willd.] HBK), koa-haole (*Leucaena leucocephala* [Lam.] de Wit), alahe'e (*Canthium odoratum* [Frost.] Seem.), and Christmasberry (*Schinus terebinthifolius* Raddi.). Understory plants consist predominantly of lantana (*Lantana camara* L.), klu (*Acasia farnesiana* [L.] Willd.), 'ilima (*Sida fallax* Walp.), fountain grass (*Pennisetum setaceum* [Forsk.] Chiov.), California grass, (*Brachiaria mutica* [Forsk.] Stapf, Jamaica vervain (*Stachytarpheta jamaicensis* [L.] Vahl), and air plant (*Bryophyllum pinnatum* [Lam.] Kurz).

A major section in the western end of the project area, between the western boundary and approximately 225 ft elevation, has been affected by bulldozing, which has destroyed all surface features within that section. The bulldozed area measures approximately 550.0 m east-west and 150.0 to 200.0 m north-south; it encompassed roughly 28% of the project area. On the basis of overall site density within the project area, it is not unreasonable to assume that approximately 15-20 sites once were present in this area.

The project area above the bulldozed section is currently used for cattle grazing, and is within the historically delineated kula grazing land zone. It is likely that this zone, as it is defined today, has been used for cattle and livestock for about 100 years (see Historical Background). This area has been affected by livestock, limited bulldozer grubbing, and vegetation clearing by what appears to have been chain dragging. Evidence of surface feature disturbance was observed throughout the area; however, it is difficult to predict the extent of disturbance.

HISTORIC BACKGROUND AND SUMMARY OF HISTORICAL DOCUMENTARY RESEARCH

The area of North Kona between Kailua Bay and Keauhou Bay to the south is generally recognized as the population core and fertile agricultural district of North Kona (Kirch 1985:166, Kelly 1983). To the north of Kailua Bay, beginning at Honokohau, is the relatively dry Kekaha

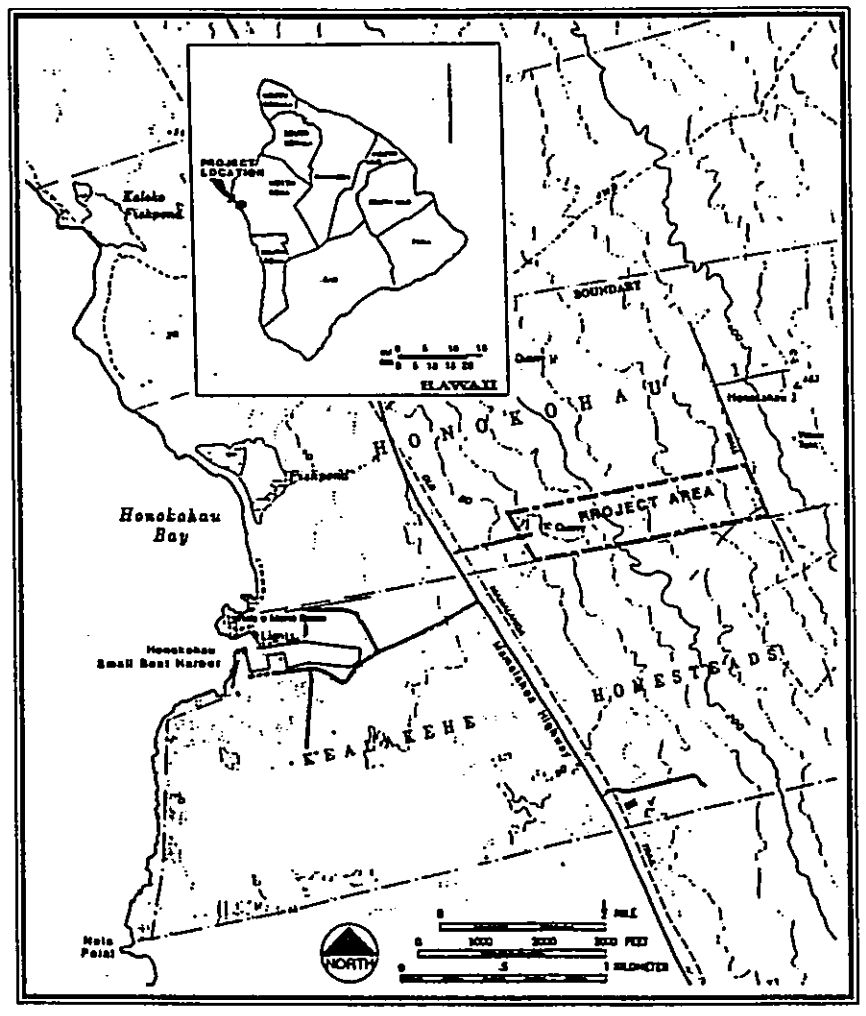

Figure 1. PROJECT AREA LOCATION MAP

ARCHAEOLOGICAL INVENTORY SURVEY
HONOKOHAU INDUSTRIAL PARK (PARCEL VII)
Land of Honokohau 2nd, North Kona District
Island of Hawaii (TMK:3-7-4-08:26,49)

PHRI Report 89-694 *January 1990*

District of North Kona, with its barren lava inlands and coastal fishponds (Springer 1986:121). Because it is a transitional area between these two contrasting environmental districts, Honokohau might possess a unique history of adaptation and use not readily characterized by the general patterns of either Kailua or Kekaha.

There is little historic information concerning traditional Hawaiian land use for the inland area of Honokohau. Historical documentary research by Silva (1987) and more recently by Wong-Smith (Appendix B) failed to locate references to subsistence or settlement specific to the project area. Ellis, during his 1822 tour of Hawaii Island, described an area he referred to as the "suburbs of Kailua," which may have included lower Honokohau. According to Ellis:

> The environs were cultivated to a considerable extent; small gardens were seen among the barren rocks on which the houses are built, wherever soil could be found sufficient to nourish the sweet potatoe [sic], the watermelon, 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 (Ellis 1963:31).

Nineteenth century descriptions of inland Honokohau and the adjacent ahupua'a of Kealakehe and Keahuolu by government surveyors tend to reflect land assessment values that were not necessarily reflective of traditional Hawaiian land values. Their descriptions of Honokohau and Kealakehe present an environment more like Kekaha than the Kona agricultural lands. The 1865 roster of government lands describes this area as including some land "which will do for goat pasture, balance nothing but rocks." Emerson in 1882, discounted the entire ahupua'a of Kealakehe as "of comparatively small value." McDougall in 1893 describes the land as "worthless" or at best as "of very little value".

During Emerson's 1880 government survey of North Kona, he identified the lower (makai [seaward]) edge of a forest zone, which he described as "lava covered with scattering forest and dense masses of ki root" (Kelly 1983:58). The land below this forest edge was described as "rocks covered with long grass" (Kelly 1983:58). According to Kelly's estimations, the forest edge occurred at an average elevation of 550 to 650 ft around Kailua and to the south (1983:58). However, it appears that the forest edge was somewhere between 750 and 800 ft elevation in Honokohau (see reproduction of Emerson's map in Kelly 1983:59). This approximation places the nineteenth century forest edge well to the east of the eastern (mauka [inland]) boundary of the project area. According to Emerson's documentation of nineteenth century vegetation, the project area would therefore be within the kula zone.

At the time of the Mahele, Honokohau 2nd (Ili) was granted to William Pitt Leleiohoku (LCA 9971). According to Wong-Smith (Appendix B), Leleiohoku was married to Nahienaena, the sister of Liholiho (Kamehameha II) and Kauikeaouli (Kamehameha III). After Nahienaena's death in 1836, Leleiohoku married Ruth Keelikolani, who was c. 15 years old at the time. Leleiohoku, who is described as Kuakini's adopted son and heir, died in 1848 (Kelly 1983:28,29). Ruth Keelikolani, who served as governess of Hawaii Island from 1855 until 1874, administered the extensive land holdings of her estate and sold considerable portions to American entrepreneurs during the latter decades of the nineteenth century.

No kuleana land grants were registered within the project area. In general, kuleana awards around Kailua tended to involve land at elevations between 1,000 and 1,500 ft AMSL, in the kalualu or breadfruit zone. The patterning of historic kuleana awards in this portion of North Kona (within the forested zone as defined by Emerson) cannot, however, be taken as a literal indicator of traditional Hawaiian land use. As noted by Kelly:

> Although there is ample evidence in the registered claims and other documents—as well as in the remnants of agricultural activity found on the ground—that Hawaiian farmers were cultivating kula lands in the 1840s, no kuleana gardens were awarded in that zone. The kula was given by the Board of Commissioners to the konohiki, the owner of the ahupuaa...The kula became the land in which the konohiki could graze their cattle and horses. This left the common farmer without access to grazing areas for their animals, or to garden lands that they had cultivated in the kula zone (Kelly 1983:67).

It was shortly after the systematic delineation of kula lands as grazing land that Kuakini Wall was constructed. This wall extends from Kahaluu Bay to the southern portion of Keahuolu, at an average distance of 1.6 km from the coastline. At the northern end, in Keahuolu, the wall is at an elevation of 220 ft; further to the south, its average elevation is 160 ft. The purpose of the wall was to keep the kula livestock contained, and out of the coastal settlements. Kuakini Wall does not cross Honokohau, and it is likely that the grazing land zone here extended makai at least as far as Mamalahoa Trail, which is 2.3 km from the coastline at Honokohau.

According to an 1893 testimonial from McDougall, there appears to have been no major pasture demarcations between Honokohau, Kealakehe, and Keahuolu ahupua'a. McDougall offered $300 for c. 1,600 acres of Kealakehe land, which was valuable to him because he owned land on both sides (Honokohau and Keahuolu) and "...it would take more than all it is worth to fence it in" (Interior Dept. 3/9/1893).

Historical evidence indicates that there were very few residencies within the project area (or within most of the kula zone of Honokohau 2nd) during the later part of the nineteenth century, since this zone was mostly given over to ranching. Transportation through the ahupua'a, presumably between the residential/garden zone in the uplands and the coast, is suggested by the remnants of a nineteenth century kerbstone mauka-makai trail (Site 13006) located during this survey.

The coastal portions of Honokohau 1st and 2nd contain the documented remains of pre- and post-contact Hawaiian settlement. Among the documented remains are three fishponds, including Aimakapa, the largest fishpond along the Kona coast (see Clark quotation in Appendix B). A reconnaissance survey of coastal Honokohau, conducted by Emory and Soehren (1971), located a wide range of site types, including heiau, houses, corrals, burials, enclosures, ponds, petroglyphs, walls, and platforms. Their findings are summarized in the following section.

Additional information regarding historic documentation is presented in Appendix B.

PREVIOUS ARCHAEOLOGICAL WORK

Coastal Honokohau

The earliest archaeological field investigations in Honokohau took place along the coast. These investigation, which included the coastlines of adjacent ahupua'a, focused on major sites. In his study of Hawaiian heiau, Stokes (1919) described a coastal heiau site at Maliu Point, along the south shore of Aiopio Pond, at the boundary between Honokohau 2nd and Kealakehe. Stokes referred to this heiau (name unknown) as one of the finest platform type heiau extant in Kona (Appendix B). This site was later described and mapped by Reinecke (1930) as Site 38. Emory and Soehren later recorded it as the Heiau Puuoina (B.P. Bishop Museum Site D12-1).

In 1930, Reinecke conducted a survey of the West Hawaii coastline and identified nine sites in Honokohau (Sites 38-47). Six of Reinecke's sites are complexes consisting of a number of residential features with associated pens, yard areas, petroglyphs, and clearings. Reinecke also recorded the heiau, a cemetery, and a complex of modified brackish water ponds (Reinecke 1930:11-12).

Reinecke's sites were relocated and assigned B.P. Bishop Museum site numbers by Emory and Soehren in 1961 during their reconnaissance survey of coastal Koloko, Honokohau, and Kealakehe (Emory and Soehren 1971). During this study, which preceded development of Honokohau Harbor, 32 sites were identified in Honokohau, 27 sites were identified in Kealakehe, and 18 sites were identified in Koloko.

The Honokohau sites include two heiau and a shrine, six habitation sites, six enclosures or corrals, four burial sites, three platforms, three walls, two ponds, two clearings, a salt pan complex, petroglyphs, and a holua slide (Emory and Soehren 1971:3). Ten of the Honokohau sites, including the two heiau, the ponds, the holua slide, and selected habitation sites were recommended for preservation by Emory and Soehren. Three sites in northern Kealakehe and six sites in Koloko were also recommended for preservation.

In 1969, a second reconnaissance survey was conducted in coastal Honokohau by Cluff (1971). This project area included all Honokohau lands (1st and 2nd) between the shoreline and Queen Kaahumanu Highway. Cluff divided the project into six areas; Area 6 included the major portion of the area covered in Emory and Soehren's survey. Over 354 features were identified in the other areas (1-5); 252 of these were in Areas 4 and 5, which were adjacent to the inland sides of Area 6. Area 4 included 16 grave sites, 16 walled shelters, seven enclosures, six platforms, three overhangs, two pavements, trails, and the holua slide. Features identified in Area 5 were interpreted as, predominantly, small shelters. Cluff recommended preservation of a major portion of Area 6, and data recovery excavation at 23 sites (1971).

Subsequent to Emory and Soehren's and Cluff's surveys, the National Park Service commissioned a study for a proposed 1,300-acre Koloko-Honokohau national cultural park, to be located in coastal Honokohau and Koloko (Honokohau Study Advisory Commission 1974). This study outlines the archaeological, historical, and cultural significance of coastal Honokohau and Koloko.

In the wake of development in and around the Honokohau Harbor area, excavation was conducted at three sites in northern Kealakehe previously identified by Emory and

Soehren (Ladd 1968; Sekido 1968). These included a house platform and burial site (Ladd 1968), and a habitation cave (Sekido 1968). Later expansion of the harbor area to the east prompted a 100-acre reconnaissance survey by Sinoto (1975). This survey relocated three sites and recommended no further archaeological work in the area (Sinoto 1975:3).

In 1980, Soehren examined a 40-acre parcel and an access road corridor in coastal Kealakehe at the site of a proposed wastewater treatment plant (Soehren 1980). A single trail (State Inventory of Historic Places Site 7704) was identified. According to Soehren, this trail connected Aimakapa Pond in Honokohau with a small settlement at Pawai Bay, in northern Keahuolu (Soehren 1980).

Inland Areas

Archaeological work in inland portions of North Kona generally began with the construction of Queen Kaahumanu Highway. Ching and Rosendahl completed a reconnaissance survey and testing program of the highway corridor prior to construction (Ching and Rosendahl 1968; Ching 1971). Three sites were located along the corridor in Honokohau, including a possible terrace (T-1), a platform interpreted as a burial monument (T-2), and a foot trail (T-3; see discussions in Appendix B and Rosendahl 1987).

Shortly after highway completion, Soehren conducted a reconnaissance survey of Honokohau 2nd lands between the highway and a boundary established at an elevation of 360 ft. Soehren's survey area included the current survey area (Parcel VII) in its entirety, as well a 9.9 acre parcel between this project area and Queen Kaahumanu Highway (Parcel IX). Soehren identified 19 sites, 11 of which are within the current project area.

Sites located by Soehren outside the present project area, in Parcel IX, include a foot trail (Site 1) that began at Aimakapa Pond in Honokohau and crossed into Kealakehe just east of the highway, where it terminated at "a series of burials at the base of the (aa) flow" (Soehren 1975:2). This trail probably correlates with Ching and Rosendahl's Site T-3. Soehren on his project area map identified eight burials in Kealakehe but did not present descriptive information, as they were outside of his project area. The features interpreted by Soehren as burials were relocated during a recent survey of Kealakehe by PHRI (Site 13253; 11 features identified; Donham 1990).

In addition to the foot trail, Soehren located other features within Parcel IX—a portion of Mamalahoa Trail, a habitation platform and paved area, and five platforms inferred to be burials. Four of the five features identified by Soehren as burial monuments were disassembled during his study, and no human skeletal remains were located. Soehren suggests that the absence of human remains in the features is an indication that they are of sufficient antiquity (c. 200 years) to have provided time for complete disintegration of the remains (Soehren 1975:2).

A brief summary of the eleven sites identified by Soehren within the project area follows (Soehren 1975:4-5):

Site 9 - A platform interpreted as a burial monument and a nearby cleared pahoehoe depression interpreted as a planting area;

Site 10 - A platform interpreted as a burial monument;

Site 11 - A semicircular platform interpreted as a burial monument;

Site 12 - A "simple semicircular windbreak," or C-shape shelter;

Site 13 - A curved burial platform;

Site 14 - A lava tube cave with midden deposit;

Site 15 - A disturbed platform, interpreted as a possible burial monument;

Site 16 - A small platform that is "undoubtedly a burial";

Site 17 - Another probable burial platform

Site 18 - Two contiguous burial platforms, both disturbed; and

Site 19 - A small lava tube cave; no midden observed.

Eight of the above eleven sites were relocated during this survey. Sites 9, 12, and 13 were not relocated. These sites were in areas affected by subsequent bulldozer activity and have apparently been destroyed.

The following year, Soehren conducted a reconnaissance survey of a parcel immediately north of Parcel IX (Soehren 1976). Three sites were located in this parcel, including previously identified Mamalahoa Trail (Site 1), a collapsed cairn (Site 2), and a low stone wall (Site 3). No further work was recommended in this parcel (Soehren 1976).

A second reconnaissance survey was conducted of the undeveloped portions of Parcel IX in 1987 by PHRI (Rosendahl 1987). Two sites were located during this survey, and were assigned SIHP numbers. Site 10642 is described as a complex of two terraces and an enclosure, and appears to correlate with Soehren's previously identified Site 3. Site 10643 is a small terrace thought to correlate with Ching and Rosendahl's previously identified Site T-1 (Rosendahl 1987:2). The located sites were mapped and recorded, and no further work was recommended for this parcel (Rosendahl 1987).

A number of reconnaissance and testing projects have been conducted to the south of the project area, in inland portions of Kealakehe and Keahuolu (Sinoto 1977,1983; Hammatt 1984,1987; Hammatt, Shideler, and Borthwick 1987; Soehren 1983; Rosendahl 1983; Walker and Haun 1987; and Bonk 1987). These studies are summarized and discussed in a recent PHRI inventory survey report (Donham 1990). The most recent work conducted to the south (conducted in adjacent lands) was by PHRI. In 1989 PHRI conducted inventory surveys of undeveloped Keahuolu lands between the old Kona Airport and Palani Road, and of all undeveloped lands in Kealakehe between Queen Kaahumanu Highway and Kealakehe Road (a total of c. 2,050 acres). A total of 239 sites with at least 1,746 component features were identified in the Keahuolu project area and 82 sites with 840 component features were identified in the Kealakehe project area. The majority of identified features were agricultural, and included pahoehoe excavations, rock mounds, terraces, and modified outcrops. Analysis of the findings of these two extensive surveys is pending. A preliminary research design has been developed for the Kealakehe project area; this design will be expanded and used conjunctively with the Keahuolu data. Given the proximity of the Honokohau project area to Kealakehe, it appears that research problems addressed here should likewise reflect the overall research concerns of the adjacent study areas.

Of particular relevance to the research problems addressed in this and studies of adjacent survey areas is a regional study conducted by Schilt (1984) for a portion of North Kona transected by the Kuakini Highway Realignment Corridor. Archaeological field work along the corridor was conducted in 1980-83 by B.P. Bishop Museum (Schilt 1984). The corridor crossed 24 ahupua'a located between Palani Road and Kilohana Subdivision to the south. The northern end of the 4.96 km corridor was in Keahuolu. A total of 134 sites (455 features) were identified along the corridor, and 22 radiocarbon dates were determined from samples collected during the Kuakini mitigation project (Schilt 1984:262). On the basis of the dated samples, their contexts, and other information, Schilt postulated that agricultural use of the kula was probably not intensive until after AD 1400-1500. Schilt suggests that erosional deposition of soil from agricultural areas located upslope was probably a major factor in permitting such use of the kula (Schilt 1984:274). She also suggests that due to differences in rainfall patterns, initial exploitation of the kula zone at the north end of the project area (in Keahuolu, Kealakehe, and Honokohau) occurred later (c. AD 1550-1650) than use of this zone at the southern end (c. AD 1400-1650; 1983:274).

Additional findings and postulations offered by Schilt are considered in the following section.

RESEARCH PROBLEMS AND APPROACH

Selected research issues of importance to further archaeological investigations in Honokohau 2nd, Kealakehe, and Keahuolu are presented here in order to provide an explicit context for assessing the research significance of sites identified within the project area. These issues fall under three general approaches to archaeological interpretation—culture history, settlement pattern analysis, and human ecology.

Culture History

Culture history has as its primary concern the formulation and testing of temporal models. Of major importance is the documentation of earliest human presence in a given area, and the chronological placement of significant cultural changes, events, or individuals. The development of a local cultural history, or chronology, is often viewed as a necessary first step in the pursuit of other archaeological problems, because in the absence of temporal control, synchronic patterns cannot be distinguished from diachronic problems.

On the basis of prior analyses of archaeological data and age determinations of charcoal samples recovered from areas near the project area (discussed above), it is reasonable to expect that most of the identified habitation and agricultural features should post-date AD 1300-1400. In order to test

this assumption, and to better determine the culture history and chronology of the project area, it was deemed important to locate and collect datable charcoal samples and to identify any variance in formal or functional types that may reflect temporal change. One of the goals of the present field reconnaissance was to locate deposits in caves or other sites that had potential for containing carbonized material for dating, and to collect dating samples. Such deposits were located at only three cave sites (12981, 12994, and 13019); however, it is expected that buried deposits of carbonized material will be located during further data collection.

In the absence of numerous features with associated absolute dates, the determination of period of use through formal attributes becomes more crucial, yet more difficult. It is hoped that analysis of the numerous agricultural features at Kealakehe and Keahuolu will provide bases for a feature typology that can also be applied to the Honokohau project area.

Settlement Pattern Analysis

Settlement Pattern Analysis is an integral component of archaeological studies due to its utility in summarizing locational strategies and changes in land utilization through time. Settlement pattern analysis requires the development and application of an accurate functional typology for sites and component features, and reliable temporal control. When land use models developed through settlement pattern analysis attempt to account for or explain interrelationships between human populations and their environment, elements of the human ecology approach are being manifest. This approach adds another dimension to a local cultural history and settlement pattern by attempting to provide insight into the dynamics of group survival, as reflected in ecofactual remains left at sites or in the relationship between specific functional feature types and aspects of the reconstructed environment.

On the basis of previous findings in inland Honokohau, Kealakehe, and Keahuolu, it was expected that the predominant material remains within the project area would be agricultural features that normally contain little to no foodstuff remains and a relatively limited range of ecofactual information. The formal variation exhibited within this general functional category has not been specifically examined for the area of North Kona located at the transition between the Kailua agricultural zone and barren rocklands of Kekaha. Of particular interest in the study of these features at Honokohau, Kealakehe, and Keahuolu is to determine the extent to which they can provide heretofore untapped knowledge of the settlement pattern and human ecology of North Kona. A brief background to the study of agricultural systems in North Kona follows.

Honokohau 2nd is situated at the northern edge of an extensive traditional Hawaiian agricultural district known as the Kona Field System (Newman 1970). The Kona Field System was characterized by Newman primarily on the basis of field configurations in the area above Kealakekua Bay. The definition of the system has since been expanded to include a wide range of intensive agriculture landscaping patterns that occur in a continuous belt from Kealakekua Bay to Kailua Bay, an area of roughly 139 sq km (Kirch 1985:225). Knowledge of the northern margins of the field system has been scant until recently, due to a lack of archaeological investigations in this area and due to prior assumptions that the area contained evidence of only very limited agricultural activities (cf. Soehren 1975; Handy and Handy 1972).

The rainfall and vegetation gradient which generally follows elevation changes within the area of the Kona Field System creates distinctive ecological variation, which has implications for potential land use patterns. Kelly (1983) and Schilt (1984) outline four subzones along the ecological gradient which correlate with traditional Hawaiian cultivation zones, as identified in historic sources and in kuleana land claim descriptions (Kelly 1983:47-64, Schilt 1984:3-11). The four subzones and their estimated elevation ranges are as follows: (1) the kula, from 0 to c. 500 ft AMSL; (2) the kalualu, or breadfruit zone, from c. 500 to 1,000 ft AMSL; (3) the ana, from c. 1,000 to 2,500 ft AMSL; and (4) the mauu, or upland jungle, from c. 2,500 to 4,000 ft AMSL (Schilt 1984:6). According to this model, the current project area encompasses portions of the kula subzone.

As indicated by Schilt, the elevation ranges of specific subzones appear to vary on a north to south gradient, along with variation in rainfall patterns. The upper extent of the kula zone should therefore be at a higher elevation in the northern reaches of the agricultural district, where rainfall isohyets swing inland, away from the coast. A higher elevation for the kula/kalualu transition in Honokohau is also supported by cartographic data from two primary sources. Emerson's survey map (discussed above), places the forest edge at approximately 750-800 ft in Honokohau. In addition, the western boundary of both kuleana awards and homestead grants in Kealakehe is at approximately 800 ft.

Kelly and Schilt's environmental/land use models are both based on the premise that the boundaries of the traditional kula and kalualu subzones coincided with nineteenth century

general land use areas. That is, the kula/kalualu transition would coincide with the inland boundary of the grazing land, which would coincide with the makai extent of the kuleana and homestead grants, which were in turn confined to the kalualu zone.

Preliminary analysis of historic and archaeological data in Kealakehe has suggested that the historic model for distinguishing traditional cultivation subzones does not permit an accurate location of the subzone transition. At Kealakehe, the mauka boundary of the historic kula grazing land is at least 200 ft lower in elevation than the lower edge of the area designated for native kuleana and homestead claims. It appears that archaeological data may provide a more accurate reflection of the traditional environmental/cultivation subzones than nineteenth century land use patterns.

In addition, it remains to be demonstrated that the relatively extensive areas included in the kula subzone in Honokohau and other nearby ahupua'a north of Kailua are internally uniform, with no environmental gradations that affected traditional Hawaiian agricultural patterns.

One of the research goals of further study in Honokohau is to develop a more fine-grained model of land use, using the elevation and north-south gradients and a specific formal feature typology as indicators of environmental variability and of potential functional adaptations. The approach to this problem is to use the inventory survey data compiled for Honokohau, Kealakehe, and Keahuolu as a baseline for developing a formal typology of agricultural features and complexes that will permit comparison of feature occurrence patterns and density along the elevation gradient, as well as the north-south gradient. Ideally, specific functions (i.e., likely cultigens) and possible temporal patterns will eventually be suggested for the various feature types. These interpretations will be based on more systematic data collection and analysis, to be conducted during the data collection phase.

FIELD PROCEDURES

Aerial reconnaissance of the project area was conducted September 7, 1989, via helicopter, by Supervisory Archaeologist Theresa K. Donham and Keala Kauhi, field archaeologist. The survey was conducted at the lowest elevation permissible, in overlapping sweeps oriented north-south. The survey indicated that cultural features occurred on all undisturbed lava types present within the area, and that much of the surface at the western portion of the project area was extremely disturbed by bulldozer grubbing. In addition, visibility of the surface from the air was somewhat limited by vegetation. Sites located from the air included the kerbstone trail (Site 13006), numerous rock piles, caves, and larger terraces.

The pedestrian survey was conducted November 20-December 7, 1989 by a crew of six to seven persons. The survey was conducted under the field supervision of Supervisory Archaeologist Debra Soper, B.S., and under the overall direction of Principal Archaeologist Dr. Paul H. Rosendahl. Crew members included Supervisory Archaeologist Ann Charvet-Pond, M.A., and Field Archaeologists Ranae Ganske, Charlane Gross, Jack Harris, Nick Kailipaka, Keala Kauhi, Robert Noah, Kim Pua-Kaipo, Joanne SanFillipo, and Steven Tachera. During the first phase of the survey, the project area was swept by way of pedestrian transects oriented north-south, with crew members spaced c. 10.0 m apart. Survey transects were flagged in order to ensure complete coverage, and all identified features were marked with PHRI temporary site numbers and were plotted on a 1":200 ft scale aerial photograph. A total of 83 temporary site numbers were assigned during the pedestrian sweeps. Of the 83, 24 were either combined with other temporary sites during the recording phase, or were deleted upon vegetation clearing and determination that the feature was noncultural. One site (13181) was not given a temporary site number during sweeps, since it had been previously recorded as part of a prior survey in Kealakehe. All identified sites were subsequently assigned SIHP permanent site numbers (Table 1.)

Following completion of the pedestrian sweeps, the crew split into groups of two to three crew members and returned to all flagged sites in order to record them. At this time, sites were cleared of vegetation, and if they were determined to be cultural, they were tagged with metal site tags. Sites were also photographed, measured and described, and in certain cases, mapped. An attempt was made to define as accurately as possible the boundaries of the site. The overall site area was then measured along two perpendicular axes. In some areas, very poor surface visibility affected the accuracy of site boundary definitions. Further field work—particularly vegetation clearing—in some areas may indicate that some sites are parts of one continuous complex.

In general, surface visibility was such that all or nearly all surface features could be located with persons spaced c. 10.00 m apart on the sweep line. There may be some rock mounds, pahoehoe excavations, and other minor agricultural features that were missed. Of the features located, the ones in large agricultural complexes could not be all measured

and described. At these complexes, an attempt was made to obtain an accurate count of the various feature types within a measured area so that feature density could be estimated. Features counted, but not individually recorded in all cases, included rock mounds, pahoehoe excavations, and modified outcrops.

Following completion of recordation, subsurface testing was conducted at four sites—at a faced mound that was partially disassembled in order to determine if it contained human skeletal remains (Site 12991), and at three cave shelters (Sites 12981, 12994, and 13019). At the latter three sites, 0.25 by 0.25 m sq units were excavated, and all soil was collected in levels as bulk samples. The bulk samples were transported to the PHRI Hilo laboratory where they were either prepared for shipment to Beta Analytic, Coral Gables, Florida for radiometric age determination, or were screened through nested 1/4- and 1/8-inch mesh hardware cloth for collection of portable remains. All lithic, botanical, and faunal materials collected from the 1/4-inch mesh samples were sorted and weighed. Materials recovered from the 1/8-inch mesh were examined for artifacts, fish and mammal remains, and shellfish species not represented in the 1/4-inch collections. Recovered artifacts were catalogued, drawn, measured, and described prior to curation.

Bulk dating samples were collected from the three cave sites tested, and additional charcoal for dating was obtained from screened soil from Sites 12981 and 12994. Ecofactual remains other than charcoal were obtained from screened samples collected at Sites 12994 and 13019.

Table 1.

CORRELATION OF SITE NUMBERS

SIHP Number	PHRI Number	Soehren (1975)	SIHP Number	PHRI Number	Soehren (1975)
12975	T-03	—	13005	T-51	—
12976	T-06	—	13006	T-52	—
12977	T-07	—	13007	T-53	—
12978	T-08	—	13008	T-54	—
12979	T-10	—	13009	T-55	—
12980	T-11	—	13010	T-56	—
12981	T-14	—	13011	T-57	18
12982	T-19	—	13012	T-58	19
12983	T-22	—	13013	T-59	—
12984	T-24	—	13014	T-60	16,17
12985	T-25	—	13015	T-61	15
12986	T-26	—	13016	T-62	—
12987	T-27	—	13017	T-63	—
12988	T-28	—	13018	T-64	—
12989	T-32	—	13019	T-65	14
12990	T-33	—	13020	T-66	—
12991	T-34	—	13021	T-69	—
12992	T-35	—	13022	T-70	—
12993	T-36	—	13023	T-73	—
12994	T-37	—	13024	T-74	—
12995	T-38	—	13025	T-75	—
12996	T-40	—	13026	T-76	—
12997	T-41	—	13027	T-77	—
12998	T-42	—	13028	T-78	—
12999	T-43	—	13029	T-79	—
13000	T-44	—	13030	T-80	—
13001	T-45	—	13031	T-81	—
13002	T-46	—	13032	T-82	—
13003	T-47	—	13033	T-83	—
13004	T-50	—	13181	—	10,11

FINDINGS

SURFACE FINDINGS

Prior to the present study, 11 archaeological sites had been located within the project area (Soehren 1975). Two of these sites (10 and 11) were included as features of a larger complex (Site 13181) that was located during a survey of an adjacent parcel in Kealakehe (Donham 1990). The remaining nine sites had not been listed on the SIHP. Six of the nine sites were relocated during this survey and were assigned SIHP numbers. Soehren's Sites 16 and 17 were combined into one site because they were proximate to each other. In all, a total of 60 archaeological sites with 207 component features were located/relocated and recorded within the project area (Figure 2; Table 2, at end). Of the 60, 27 (45%) consist of a single feature. All other sites consists of two to 24 features. Only four sites contain more than ten features; in these cases, high feature count is attributable to numerous pahochoe excavations.

The overall distribution of sites and features across the project area shows a general pattern of increasing density with increasing elevation. There are currently ten sites at elevations of 200 ft or less. Unfortunately, the site distribution data for elevations less than 200 ft are radically affected by disturbances. Twenty-eight sites are located between 200 and 300 ft AMSL (above mean sea level), and 22 are above 300 ft AMSL. The upper elevation zone (greater than 300 ft AMSL) is about one third the area of the 200-300 ft AMSL zone, yet it contains nearly as many sites. In addition, over half (111, 54%) of the 207 identified features occur at sites located above 300 ft AMSL. Three of the four agricultural complexes with over 10 features are above 300 ft AMSL.

Features identified and recorded within the project area represent 17 different formal categories. The occurrences (by site) and counts for these types are summarized in Table 3. Frequencies of formal categories clearly indicate the predominance of pahochoe excavations, modified outcrops, and rock mounds, piles or concentrations, which together comprise 61% (127 of 207) of all features. Over half of the formal categories (9) are represented by less than 2% of the features. The predominance of a few categories and very low frequencies of several indicate that much of the activities conducted in the area were generally similar and probably within a relatively limited functional range. Features represented in the various formal categories are summarized below, and occurrence patterns are compared with findings from Kealakehe and sometimes Keahuolu, immediately to the south.

Alignments

All seven of the identified alignments occur at complexes with four or more features, and at elevations greater than 200 ft. All alignments co-occur with terraces, and most also co-occur with either walls or enclosures. In general, the alignments are less than 4.0 m long. One exception is an 8.0-m-long alignment at Site 13005, which may actually be a tumbled wall. Most of these features are constructed so as to incorporate natural bedrock formations. Specific functions are difficult to determine; they appear to be present at sites associated with agricultural activities.

Cairns

With one exception, the cairns identified may be characterized as generally small, informal stacks or loose conical piles of slabs and cobbles with no core filling or faced sides. A single cairn, located at Site 12980, consists of a single upright boulder 0.7 m high. Six of the fifteen cairns occur as isolated features (12979, 12980, 12985, 12989, 13002, and 13033). All of these cairns are present between elevations of 225 and 300 ft AMSL, and are distributed across the project area north to south. Four cairns occur in pairs at two sites which have no additional features (12986 and 13022).

Cairn sites 12986, 12985, 13033, 12979, and 12980 occur in a north-south alignment at c. 230-235 ft AMSL. These features may have marked a north-south footpath that is no longer distinguishable.

Caves

Among the five cave sites identified, four occur as isolated features, and one occurs with a terrace (at the entrance) and two modified outcrops (Site 12984). The caves are widely dispersed across the project area; all are above 200 ft AMSL. All five of the caves exhibit soil deposits ranging in thickness from c. 0.05 to 0.31 m thick. Relatively sparse amounts of portable remains, such as shellfish, mammal bone, kukui nut shell, and volcanic glass, was observed in four of the caves. The Site 12981 cave appears to contain none of these materials, but does contain carbonized plant remains and ashy soil.

Of the caves, Site 13019 (Soehren's Site 14), located near the southern boundary of the project area at 325 ft AMSL, may have been utilized the most extensively. This

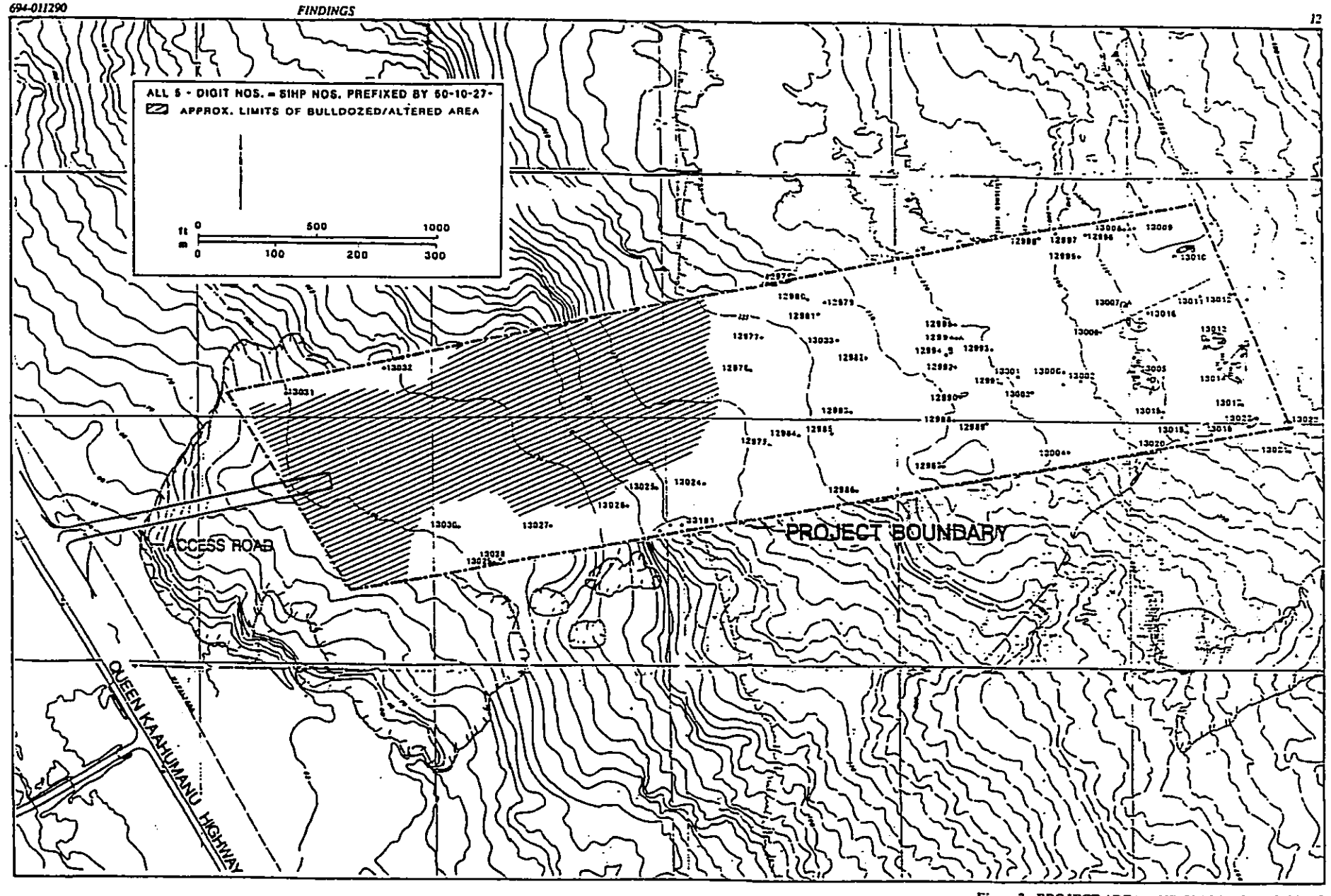

Figure 2. PROJECT AREA AND SITE LOCATION MAP

Table 3.

OCCURRENCES AND COUNTS OF FEATURES BY FORMAL CATEGORIES

Formal Category	SIHP Site Number	Fea. Total	%
Alignment	12976(1*), 12978(1), 12987(1), 12999(1), 13005(2), 13013(1)	7	(3.4%)
Cairn	12977(1), 12979(1), 12980(1), 12985(1), 12986(2), 12987(1), 12989(1), 12990(1), 13002(1), 13014(1), 13022(2), 13028(1), 13033(1)	15	(7.3%)
Cave	12981(1), 12984(1), 12994(1), 13012(1), 13019(1)	5	(2.4%)
Cleared area	12988(1)	1	(0.5%)
C-Shape	12988 (1)	1	(0.5%)
Enclosure	12987(2), 13003(1), 13013(1), 13029(1)	5	(2.4%)
Filled crevice	12978(1), 13000(1), 13014(1), 13020(2)	5	(2.4%)
Kerbstone trail	13006(1)	1	(0.5%)
Modified outcrop	12984(1), 12995(1), 13000(1), 13005(1), 13014(1), 13015(1), 13018(15), 13021(3), 13024(1)	25	(12.1%)
Overhang	12976(1), 13010(1), 13032(1)	3	(1.5%)
Pahoehoe excav.	12975(1), 12976(6), 12982(1), 12984(1), 12987(19), 12998(1), 13001(1), 13004(2), 13005(2), 13008(2), 13013(1), 13018(9), 13020(14), 13203(6), 13024(1), 13025(1), 13027(1), 13028(3), 13030(2)	74	(35.8%)
Pavement	12980(1), 13001(1), 13014(1), 13016(1)	4	(1.9%)
Platform	13181(3)	3	(1.5%)
Rock concen.	12977(1), 12988(1), 13007(1)	3	(1.5%)
Rock mound/pile	12983(3), 12991(1), 12999(1), 13007(1), 13009(16), 13015(1), 13020(1), 13023(1)	25	(12.1%)
Terrace	12978(2), 12984(1), 12988(2), 12990(1), 12992(1), 12993(1), 12996(1), 12997(1), 12999(1), 13005(2), 13007(1), 13011(2), 13013(1), 13014(3), 13017(1), 13021(2), 13023(1), 13026(1)	25	(12.1%)
Wall	12978(1), 12990(1), 13004(1), 13031(1)	4	(1.9%)
	Grand Total:	207	(99.8%)

* Number of features present

cave contains a soil and midden deposit up to 0.31 m thick. Portable remains observed on the surface of the site include gourd, kukui nut shell, volcanic glass, marine shell, mammal bone, coral and basalt abraders, and waterworn basalt pebbles.

A relatively intensive occupation is indicated for the Site 12994 cave, which has a thin deposit, but contains a higher concentration of portable remains than Site 13019. Materials recovered from the caves are discussed below.

Dated carbon samples were collected from cave Sites 12981, 12994, and 13019. Samples from Sites 12981 and 12994 are very similar and extend into the modern era. Corrected and calibrated calendric ranges of AD 1650-1955 and 1630-1950, respectively, were obtained from these deposits. Three dates were obtained from the three excavation levels of Site 13019. Calendric ranges from the upper two levels also extended into the modern era. The date from the lowest excavation level was assayed at 660+/-200 BP, with a corrected calendric range of AD 980-1650. The radiocarbon dates are further discussed in the Age Determinations section.

The relatively thin nature of the cave deposits and their relatively sparse contents suggest that their use was short-term and relatively limited, although in some cases use was repetitive (e.g., at Sites 12994 and 13019). Nevertheless, the caves exhibit the most concentrated occurrences of portable remains located to date within the project area; none of the terraces, platforms, or complexes exhibit similar kinds of surface scatters.

In general, habitation cave frequency is greater for Honokohau than for Kealakehe, where only two such features were located within an 800-acre area. Both of the Kealakehe caves were at elevations greater than 550 ft. The most intensively utilized cave at Kealakehe is associated with agricultural features and is 710 ft AMSL (Donham 1990).

C-Shape

The only C-shape identified is present at a complex consisting of two terraces, a cleared area, and a rock concentration (Site 12988). No portable remains were located in or around the C-shape, which abuts a natural outcrop to form a small enclosed area. The feature could have functioned as either a temporary shelter or a planting area.

Enclosures

Five enclosures were identified at widely dispersed locations (100-330 ft AMSL) within the project area. Two of the enclosures are isolated features, and two are adjoining features in a complex with 21 additional features, including 19 pahoehoe excavations (Site 12987). Interior area of all enclosures is within a relatively limited range, between 4.0 and 24.6 sq m.

In general, the enclosures are circular to rectilinear, with curved, unfaced, or loosely faced sides. None of the enclosures appear to have been constructed for use as cattle pens, and the walls are generally too low to have functioned as goat or pig pens (under 0.90 m high). Most of the enclosures are built with or are abutting natural bedrock outcrops. No portable remains were observed in any of the enclosures; however, soil deposits were observed. These features could have functioned as either temporary shelters or planting areas. Given the absence of midden remains and the presence of soil deposits, the latter function seems more likely. Subsurface testing will aid in providing more substantive functional interpretations.

Ten enclosures were identified at Kealakehe, which is an occurrence rate of one per 80 acres, as opposed to one per every 18 acres in Honokohau. Formally, the Kealakehe enclosures are much larger (12.7-369.6 sq m) than the Honokohau enclosures, and they exhibit a much wider range of construction techniques, which in turn suggest they had various functions.

Filled Crevices

All five of the filled crevices were identified at sites which had other features such as modified outcrops, terraces, and pahoehoe excavations. Possible functions for the crevices include burial or agriculture. Two of the crevices (12978 and 13014) are large enough and appear deep enough to contain human interments. The remainder are too small and shallow, and are probably agricultural features. Filled crevices were not identified at Kealakehe.

Kerbstone Trail

A section of a kerbstone trail (Site 13006) was identified near the center of the project area, at its upper elevations (300-330 ft AMSL). This section exhibits characteristics of the graded government "3 ft" roads constructed during the nineteenth century. Sections of two kerbstone trails were identified in Kealakehe, at or above a similar elevation. All of three trail sections are oriented mauka-makai and probably intersected with Mamalahoa Trail, and they may have continued to the coast.

To date, no cartographic documentation has been located for the Honokohau trail section; the Kealakehe trails, however, are shown on a government survey map completed by Emerson (1882). A section of Emerson's map reproduced in Hamman, Shideler, and Borthwick (1987) shows the location of a house labeled "McDougall's" house in the center of Honokohau 2nd at an elevation of approximately 900 ft. McDougall was a local rancher who owned or leased land in Honokohau, Kealakehe, and Keahuolu. It is quite possible that the Site 13006 trail continued mauka of the project area and passed by the McDougall residence.

Modified Outcrops

Modified outcrops in the project area consist of natural pahoehoe depressions, slopes, and flats cleared of large loose rocks and then filled with gravels and small cobbles, usually producing a small, relatively leveled surface. The larger stones are generally arranged around or near the outer perimeter of the cleared area in loose piles or alignments. In some cases, the resulting feature is somewhat terrace-like in appearance, or may be very similar to a filled crevice. Modified outcrops are distinguished from pahoehoe excavations in that the lava mantle is not penetrated. They may otherwise have similar morphological characteristics. As currently used, the modified outcrop category is relatively subjective and broad; a more precise means of defining these features is currently being examined.

Twenty-five modified outcrops at nine sites were identified within the project area. The greatest concentration of these features (15) occurs at Site 13018, located near the southern boundary of the project area at 325 ft AMSL. Isolated modified outcrops are located primarily above 300 ft AMSL; only two are lower than this elevation, at 220 and 275 ft AMSL.

Pahoehoe Excavations

The pahoehoe excavations in the project area characteristically consist of small lava blisters that have the surface broken away, creating a hole where the gas pocket existed. Depth of the hole usually ranges from 0.4 to 0.9 m. The blocks and pieces of pahoehoe debris broken away are usually arranged around the perimeter of the hole in a circular alignment, or are piled loosely near the hole. In some cases, the large blocks are placed inside the hole, along the rim. The hole is often partially filled with pieces of pahoehoe that are size-sorted (smaller pieces on the bottom, larger pieces on top). The gravels that occur in lower layers of these holes are often very angular and unweathered, and appear to be artificially produced by crushing larger rocks. Soil is often mixed with the gravels; the soil is not visible unless the upper layer of larger rocks is removed. It is expected that the formal attributes of these features, such as fill contents, modifications of the interior and exterior, exposure, depth, and overall size, hold potential clues to specific functions.

Pahoehoe excavations present within the project area are assumed to have functioned principally as agricultural features. They are referred to as "planting pits" by Soehren (1975), who observed an unknown quantity in Honokohau during his survey, but states that "[n]o attempt was made to record such features" (1975:1). It would be difficult to accurately characterize the pre-contact land use of Honokohau and adjacent ahupua'a without a close consideration of the patterning and formal variation of these features.

Among the 74 identified pahoehoe excavations, five are isolated features, four are single features in association with other feature types as complexes, and 63 are in association with other pahoehoe excavations. It appears that isolated excavations are relatively rare. The greatest concentration of these features (19) is at Site 12987, located along the southern boundary of the project area at 260 ft AMSL. A second relatively dense concentration (14) of pahoehoe excavations is present at Site 13020, located a short distance (c. 20.0 m) west of Site 13018, which has a concentration of modified outcrops. The Site 13019 habitation cave is situated between these two complexes.

Observations of pahoehoe excavations in Kealakehe and Keahuolu indicate that they tend to be more concentrated in the upper elevations (above 550 ft) of these ahupua'a. Three complexes in Keahuolu and one in Kealakehe, all above 550 ft AMSL, contain more than 20 excavations, with counts up to 40 (Donham 1990). It is therefore likely that a similar pattern is present in Honokohau.

Measurements were recorded for 32 of the 74 identified pahoehoe excavations. Within the measured group, only five exhibit excavation surface areas greater than 10.0 sq m (maximum excavated area is 40.0 sq m). None of the measured excavations were between 20.0 and 39.0 sq m in area. A similar pattern of large (40.0 sq m or larger) vs. small excavations (less than 20.0 sq m) was observed among measured excavations in Kealakehe (Donham 1990). Among the Honokohau excavations with areas less than 10.0 sq m (n=27), the average area is 2.9 sq m (range 0.4-9.5 sq m).

Pavements

Four paved areas at four sites were identified within the project area. Two general groupings were present. Sites 12980 and 13016 are isolated features consisting of pavements of cobble fill, outlined by larger cobbles set on edge. The depth of these features is indeterminate without excavation, and they are included in the group of possible burials. The second group of pavements consist of single layers of small cobble and pebbles placed on slightly irregular surfaces, creating a more level area. The larger of these two pavements (18.9 sq m) occurs with two pahoehoe excavations; the smaller (2.97 sq m) occurs with several terraces and modified outcrops. It is difficult to determine a specific function for these features. They are frequently associated with permanent habitation and yard area landscaping; however, they occur at sites that do not exhibit characteristics of permanent habitation.

Platforms

Three platforms were identified at a single site (13181). This site is located along the boundary of the project area and is partially in Kealakehe. The exact location of the boundary across the site is uncertain, but it appears that at least two of the features are definitely in Honokohau. The three platforms exhibit formal characteristics of burial monuments; the surface area is relatively small and height is relatively high in comparison to habitation platforms. All of the platforms have heights of 1.50 m and surface areas ranging between 9.75 and 31.9 sq m. The platforms are faced on all sides and have flat surfaces.

Rock Mounds/Piles

One of the 25 identified rock mounds/piles occurs as an isolated feature; all others are associated with other mounds or with terraces, modified outcrops, and pahoehoe excavations. The isolated mound (Site 12991) is the only faced mound identified within the group; this feature was partially disassembled in order to determine if human skeletal remains were present. No such remains were identified and it is assumed that the mound did not function as a burial monument.

A number of faced rock mounds were identified in Kealakehe by Hamman et al. (1987); these mounds were immediately south and upslope of the project area. Eight of the mounds were tested in order to determine if human skeletal remains were present beneath them (Hammatt et al. 1987:8, 63, 64). No skeletal remains, midden, or artifacts were recovered, and it was concluded that the faced mounds were relatively formalized "clearance mounds."

Among the 24 unfaced mounds, the greatest concentration (16) is at Site 13009, located in the northeastern corner of the project area at 325 ft AMSL. Areas where other mounds are present are usually above 300 ft AMSL. Nearly all of the identified mounds are circular to oval in plan, with an average surface area at the base of 5.0 sq m or less. The largest circular mound is 5.5 by 3.8 m at the base. A single, short curved mound, 1.45 by 4.50 m was also identified. No linear mounds were observed.

Overhangs

The three overhangs identified are widely dispersed within the project area, and are at elevations of 120 ft, 220 ft, and 320 ft. Two of the overhangs are isolated features; one is associated with pahoehoe excavations (Site 12976). Only one of the overhangs (Site 13032) contains a cultural deposit; this deposit consists of sparsely scattered marine shell fragments, flecks of charcoal, and kukui nut shell.

Terraces

The 25 terrace features are all at elevations greater than 225 ft AMSL. Five terraces are isolated features, two of which may be burial monuments (13011 and 13017). In general, the terraces are associated with modified outcrops, pahoehoe excavations, alignments, and rock piles. They are usually constructed across natural depressions on outcrops and tend to be small. Among the 23 non-burial terraces, only four have surface areas greater than 10.0 sq m. The larger terraces are linear in plan, measuring 3.5 by 8.5 m and 6.5 by 12.5 m. Nearly half of the recorded terraces have surface areas less than 5.0 sq m. Maximum heights range from 0.1 to 1.0 m, with a mode of 0.6 m.

No portable remains were observed on any of the terraces; soil was observed on the surface of the largest terrace, which is stepped (12.5 by 6.5 by 1.0 m), and in a faced pit located on a possible burial terrace. The two possible burial monuments are of sufficient size to have functioned as habitation features (19.5 and 47.5 sq m). The majority of the terraces are, however, too small for habitation; these are most likely agricultural features.

The Honokohau terraces appear to be generally smaller than terraces identified in Kealakehe. Among the 67 terraces identified in Kealakehe, dimensional data is available for 47. Only 21% (10 of 47) of the Kealakehe terraces have surface areas less than 10.0 sq m, whereas 58% (11 of 19) of the measured Honokohau terraces are less than 10.0 sq m. Likewise, four Kealakehe terraces have surface areas greater

than 50.0 sq m, compared with one in Honokohau. This difference is probably affected by the inclusion of features from higher elevations in the Kealakehe data; only 12% of the Kealakehe terraces are at elevations less than 400 ft.

Walls

The four wall features identified are widely dispersed across the project area. One of these (13031) is an isolated feature; all others are in complexes with agricultural features. The isolated wall is curved and has a generally mounded construction. It is the longest identified wall (17.0 m). The remaining three walls are 5.0 m or less in length and 0.8 or less in height. None of the walls are faced or core-filled.

SUBSURFACE FINDINGS

Subsurface testing was conduced at one of the previously identified sites (Soehren's Site 14, SIHP Site 13019) and at three newly identified sites (12981, 12991, and 12994). Three of the tested sites are caves and one (12991) is a faced rock mound. Subsurface materials were collected from three test units at three cave sites (12981, 12994, and 13019). Portable remains other than charcoal were recovered from two of the caves (12994 and 13019; Table 4).

The test units were 0.25 by 0.25 m sq and were excavated to the bedrock floor of the caves. Deposits at Sites 12981 and 12994 were excavated in single levels. These deposits consist of single layers of brown to grayish-brown fine silt with numerous rootlets, and have maximum thicknesses of 0.05 and 0.07 m, respectively.

Three 0.05 m levels were excavated at Site 13019, where two layers were encountered. The uppermost layer (surface to 0.06/0.09 m below surface; Levels 1 and 2) consisted of dark gray fine silt with ashy constituents and numerous rootlets. Layer II consisted of light gray silt with greater ash content and ranged in thickness from 0.01 to 0.06 m (Level 3).

A total of 6.40 g of shellfish remains (>1/8 in size grade) was recovered from the test unit at Site 12994. Relatively equal amounts (by weight) of Cypraeidae and Isognomonidae were recovered; and about half of the total weight is Echinoidea (Table 4).

The Site 13019 test unit contained 7.18 g of shellfish, which represents a lower density per volume unit of deposit. The Site 13019 deposit is twice the thickness of the Site 12994 deposit. Three gastropod species and Echinoidea were recovered from Site 13019, with the greatest density occurring in the uppermost level of the deposit.

The Site 12994 deposit exhibits a significantly greater density of kukui nut shell as compared with Site 13019. This difference may be the effect of sampling, since the test units are quite small. The kukui shell is charred at both sites.

Species identification of the mammal bone has not been completed to date. It is suspected that an unknown proportion of the mammal bone is nonculural, and is possibly mongoose or goat.

Table 4.

SUMMARY OF MIDDEN REMAINS

Midden	SITE 12994 Level 1	SITE 13019 Level 1	SITE 13019 Level 2	SITE 13019 Level 3	Total
Conidae	—	0.37	—	—	0.37
Cypraeidae	1.62	2.10	—	—	3.72
Isognomonidae	1.77	0.94	0.48	0.25	3.44
Unident. gastro.	—	—	—	0.82	0.82
Echinoidea	3.01	0.94	1.10	0.13	5.18
Total Shellfish	6.40	4.35	1.58	1.20	13.58
Kukui nut shell	59.81	1.25	—	—	61.06
Mammal bone	6.73	2.41	1.81	—	10.95

The relatively low quantities and varieties of midden remains at the caves, in conjunction with the thinness of the deposits, indicates relatively low-intensity cave use.

Artifacts were recovered from screened fill at Sites 12994 and 13019. Four minute pieces of volcanic glass were recovered from Site 12994 and a single piece was recovered from Level 1 at Site 13019. These pieces represent fragments of debitage flakes.

SURFACE COLLECTION

A scoria abrader was collected from the surface of Feature A, a cave, at Site 12984. The abrader is 97.41 mm long by 68.10 mm wide and 19.10 mm thick (wt 101.32 g). It is hexagonal and is ground on all six faces. In addition to this artifact, shellfish (Cypraeidae, Isognomonidae, *Nerita polita*, Brachiodantes, and Echinoidea), kukui nut shell, gourd, and mammal bone were observed. No soil deposit was present at the cave.

AGE DETERMINATIONS

Five bulk samples of ash and carbonized wood were submitted to Beta Analytic, Coral Gables, Florida for radiometric age determination. The samples were obtained during test unit excavation at cave sites 12981, 12994, and 13019. Single samples were taken from the first two sites, and three samples were taken from each of the three excavation levels at Site 13019 (Table 5). The corrected and calibrated calendric ranges for samples from Sites 12981 and 12994 are very similar, and extend into the modern era, with ranges of AD 1650-1955 (BETA-34927) and 1630-1950 (BETA-34928), respectively. Similarly, the ranges for samples from the upper levels of the test unit at Site 13019 extend into the modern era. The date from the uppermost level at 13019 has two alternative calendric ranges of AD 1513-1602 or 1610-1950. Given the fact that the Level 2 calendric range is AD 1670-1955, it is likely that the most recent date is most suitable for the Level 1 sample. This sample required extended counts due to small size.

The sample obtained from Level 3 of Site 13019 was also given extended counts due to small size, and has an excessively high standard deviation of 200 years. The sample was assayed at 660+/-200 BP, or AD 1290+/-200. The corrected calendric range at two sigmas is AD 980-1650. This range is sufficiently large to be of limited interpretive value, although it does indicate a likely late Pre-Contact Period occupation.

The dates obtained from the Honokohau sites are very consistent with dates recently assayed from Kealakehe. A date with a corrected calendric range of AD 1645-1950 was obtained from a sample collected by Hammatt, Shideler, and Borthwick at Site 11 in Kealakehe (Hammatt et al. 1987:60). A calendric range extending into the modern period was also determined from a sample collected by PHRI at a cave (Site 13188) in Kealakehe (BETA-34210). Nearly all of these dates support Schilt's postulation that relatively intensive use of the kula zone north of Kailua occurred during the late Pre-Contact Period, after c. AD 1400 (Schilt 1984:274). The only problematic date regarding this model is the Site 13019, Level 3 date, which could represent pre-AD 1400 activities.

Table 5.

SUMMARY OF RADIOCARBON AGE DETERMINATIONS

PHRI Lab. No. RC-	Lab. No. BETA-	Provenience	C-14 Age Yrs. B.P. (one sigma)	C-13/ C-12 Ratio	C-13 Adj. C-14 Age Yrs. B.P.	*Calendric Range Yrs. AD
SITE 12981						
644	34927	TU-1, Layer I, Level 1, 0-5 cmbd	60±70	-21.5	120±70	1650-1955#
SITE 12994						
645	34928	TU-1, Layer I, Level 1, 0-7 cmbd	40±60	-16.2	180±60	1630-1950
SITE 13019						
641	34924	TU-1, Layer I, Level 1, 15-20 cmbd	180±70	-23.3	200±70	1513-1602 1610-1950
642	34925	TU-1, Layer I, Level 2, 20-25 cmbd	100.2±0.7% modern	-18.8	80±60	1670-1955#
643	34926	TU-1, Layer I, Level 3, 25-31 cmbd	630±200	-22.8	660±200	980-1650

* Calibrated according to Stuiver and Pearson (1986). Range at two sigmas.
# Denotes influence of bomb C-14

CONCLUSION

DISCUSSION

The 18 formal feature categories discussed above may be most effectively interpreted by subdividing them into six general functional groups (Table 6). These groups are briefly summarized here and proportional data are compared with the findings from Kealakehe.

Agricultural features comprise nearly three-quarters of all identified features within the project area. These features occur most commonly in complexes and are most concentrated in the upper elevations of the project area. The three largest agricultural complexes are above 300 ft AMSL, as are the majority of the pahoehoe excavations and modified outcrops, the most frequently occurring agricultural features. Two large complexes (13018 and 13020), which together account for 41 agricultural features (27% of the group), are proximate to each other along the southern boundary of the project area. Located between these two complexes is the Site 13019 habitation cave, which is within 10.0 m of the edges of the respective complexes. These three sites probably represent a single extensive agricultural complex.

Within the agriculture group, pahoehoe excavations account for nearly half of the 154 features, followed by relatively equal proportions of rock mounds (17.5%), terraces (13.0%), and modified outcrops (16.2%). These proportions contrast with the agricultural group for Kealakehe and Keahuolu, which has nearly half (46.3% of 736 features) represented by rock mounds, a third (32.9%) represented by pahoehoe excavations, and comparable but small proportions represented by modified outcrops (6.3%) and terraces (7.7%) (Donham 1990). Although pahoehoe excavations are very common in both areas, the agricultural group at Honokohau appears to be more dispersed than the group in the ahupua'a to the south. This difference is probably more a factor of elevational differences than differences on the north-south gradient.

Habitation features in Honokohau are relatively few, and none of the features exhibit surface or subsurface evidence of permanent habitation. The features most likely represent short-term shelters and are associated with agricultural features in 80% of the cases. Very low incidence of habitation is indicated for Kealakehe as well, where only 1.4% of all features were in this group. A single radiometric date was obtained from charcoal in a cave deposit at Kealakehe (Site 13188). This sample returned a modern date (Donham 1990).

Only one transportation feature was identified in Honokohau. This kerbstone trail is of nineteenth century construction, but it may be contiguous with a Pre-Contact Period trail. It is oriented mauka-makai and is located near the center of the ahupua'a. No cartographic documentation has been located which indicates the total extent of the trail, but it is likely that it extended at least as far west as Mamalahoa Trail and at least as far east as the MacDougall residence, c. 900 ft AMSL.

Transportation features are more common in Kealakehe, where kerbstone trails, steppingstone trails and cleared footpaths (total 17) were identified. One factor in the greater incidence of trails in Kealakehe is the higher proportion of surface area covered in aa. Steppingstone trails are generally confined to this lava type, and many footpaths are only discernible where they cross aa fields.

A relatively wide range of formal types is included in the possible burial functional group. Some of these features (terraces) were originally interpreted as burials by Soehren (1975) and could not be adequately tested during the allotted field time for this project. The formal feature types commonly placed in other functional groups, such as modified outcrop and paved area, were characterized as possible burials due to unique construction attributes, such as placement of perimeter stones on edge, relatively formalized facing and surfacing, and overall size. Of the possible burial features, the platforms exhibit the characteristics most associated with burial monuments.

The 14 features in the indeterminate/possible agricultural group occur most frequently in association with agricultural features, although some may have functioned as temporary shelters. There are no portable remains associated with these features.

No features definitely associated with ranching, such as bifaced walls, large enclosures, etc., were identified within the project area, and no ceremonial features, such as heiau or shrines were identified. The platforms and larger terraces placed in the possible burial group could alternatively represent some form of ceremonial function, in the absence of evidence indicating interment.

Table 6.

FREQUENCY OF FORMAL FEATURE TYPES BY FUNCTIONAL CATEGORIES

	Count	% of Category	% of Total
Agricultural Features			
Enclosures	4	2.6	--
Filled crevices	3	1.9	--
Modified outcrops	25	16.2	--
Pahoehoe excavations	75	48.7	--
Rock mounds/piles	27	17.5	--
Terraces	20	13.0	--
Subtotal:	154	99.9	74.4
Habitation Features			
Caves	5	50.0	--
C-shape	1	10.0	--
Enclosure	1	10.0	--
Overhangs	3	30.0	--
Subtotal:	10	100.0	4.8
Transportation Features			
Kerbstone trail	1	100.0	--
Subtotal:	1	100.0	0.5
Possible Burial Features			
Filled crevices	2	15.4	--
Modified outcrop	1	7.7	--
Paved areas	2	15.4	--
Platforms	3	23.0	--
Terraces	5	38.5	--
Subtotal:	13	100.0	6.3
Indeterminate/Possible Agricultural Features			
Alignments	7	50.0	--
Cleared area	1	7.1	--
Pavements	2	14.3	--
Walls	4	28.6	--
Subtotal:	14	100.0	6.8
Markers			
Cairns	15	--	7.2
Total Number of Features:	207	--	100.0

GENERAL SIGNIFICANCE ASSESSMENTS AND RECOMMENDED GENERAL TREATMENTS

A summary of tentative general significance assessments is given (Table 7) in order to facilitate DLNR-HSS/SHPO review and cultural resource management planning. Significance categories are based on the National Register criteria for evaluation, as outlined in the Code of Federal Regulations (36CFR Par 60). Sites determined to be potentially significant for information content (Category A, Table 7) are assessed under Criterion D, which defines significant resources as ones which "...have yielded, or may be likely to yield, information important in prehistory or history." Sites potentially significant as excellent examples of a unique site or site type (Category B) are evaluated under Criterion C, which defines significant resources as those which "...embody the distinctive characteristics of a type, period or method of construction...or that represent a significant and distinguishable entity whose components may lack individual distinction."

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

To further facilitate management decisions regarding the subsequent treatment of resources, the general significance of the archaeological resources identified during the inventory survey were also evaluated in terms of potential scientific research, interpretive, and/or cultural values (PHRI Cultural Resource Management [CRM] Value Modes; see Table 2 for individual assessments of sites). Using this frame of reference, 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 refers to the potential of archaeological resources for the preservation and promotion of cultural and ethnic identity and values. These three value modes are derived from the above state and federal evaluation criteria.

Among the 60 sites identified within the project area, 50 are assessed as significant solely for the information content (National Register Criterion D). Nine sites are assessed as significant for information content and as provisionally significant for cultural values as possible burials, pending the findings of subsurface investigations. One site is assessed as having information value and as having cultural value as a historic and possibly traditional transportation route. The recommended treatments for these three assessment groups include no further work, further data collection, and further data collection with provisional preservation "as is."

No Further Work

Among the 50 sites assessed as being significant solely for information content, no further work is recommended for 14 sites. Included in this group are seven cairn sites (12977, 12979, 12985, 12986, 12989, 13022 and 13033), three isolated pahoehoe excavations (12975, 12982, and 12998), an overhang with no deposit or internal modifications (13010), two small complexes consisting of modified outcrops, pahoehoe excavations, and/or a wall (13004 and 13024), and a faced mound (12991). The faced mound was disassembled during the current project and was found to contain no buried remains or deposits. All other features in this group lack cultural deposits and portable remains; they have been measured, mapped, described, photographed, and plotted. Data collected from them during the present survey is considered sufficient, and their preservation cannot be recommended under the federal or state assessment guidelines.

Further Data Collection

Thirty-six of the 50 sites assessed as having significant information content are recommended for further data collection only. The majority of these sites are agricultural complexes that contain additional information pivotal to understanding Pre-Contact and early Historic Period agricultural systems in the transition zone between Kailua-Kona and Kekaha. Also in this group are sites which, based on existing information, could not be reliably assigned to a functional group, and habitation features which, based on findings of test excavations, warrant total excavation.

Further data collection is also recommended for Site 13006, a kerbstone trail section that is assessed as significant for information content and cultural value. Currently, this

Table 7.

SUMMARY OF GENERAL SIGNIFICANCE ASSESSMENTS AND RECOMMENDED GENERAL TREATMENTS

*SIHP Site Number	Significance Category				Recommended Treatment			
	A	X	B	C	FDC	NFW	PID	PAI
12975	-	+	-	-	-	+	-	-
12977	-	+	-	-	-	+	-	-
12979	-	+	-	-	-	+	-	-
12982	-	+	-	-	-	+	-	-
12985	-	+	-	-	-	+	-	-
12986	-	+	-	-	-	+	-	-
12989	-	+	-	-	-	+	-	-
12991	-	+	-	-	-	+	-	-
12998	-	+	-	-	-	+	-	-
13004	-	+	-	-	-	+	-	-
13010	-	+	-	-	-	+	-	-
13022	-	+	-	-	-	+	-	-
13024	-	+	-	-	-	+	-	-
13033	-	+	-	-	-	+	-	-
Subtotal:	0	14	0	0	0	14	0	0

General Significance Categories:

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

Recommended General Treatments:

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

* State Inventory of Historic Places (SIHP) numbers. SIHP numbers are five-digit numbers prefixed by 50-10-27 (50=State of Hawaii; 10=Island of Hawaii; 27=USGS 7.5' series quad map ["Kealhole Pt., Hawaii"]).

Table 7. (cont.)

SIHP Site Number	Significance Category				Recommended Treatment			
	A	X	B	C	FDC	NFW	PID	PAI
12976	+	-	-	-	+	-	-	-
12981	+	-	-	-	+	-	-	-
12983	+	-	-	-	+	-	-	-
12984	+	-	-	-	+	-	-	-
12987	+	-	-	-	+	-	-	-
12988	+	-	-	-	+	-	-	-
12990	+	-	-	-	+	-	-	-
12992	+	-	-	-	+	-	-	-
12993	+	-	-	-	+	-	-	-
12994	+	-	-	-	+	-	-	-
12996	+	-	-	-	+	-	-	-
12997	+	-	-	-	+	-	-	-
12999	+	-	-	-	+	-	-	-
13000	+	-	-	-	+	-	-	-
13001	+	-	-	-	+	-	-	-
13002	+	-	-	-	+	-	-	-
13003	+	-	-	-	+	-	-	-
13005	+	-	-	-	+	-	-	-
13007	+	-	-	-	+	-	-	-
13008	+	-	-	-	+	-	-	-
13009	+	-	-	-	+	-	-	-
13012	+	-	-	-	+	-	-	-
13013	+	-	-	-	+	-	-	-
13018	+	-	-	-	+	-	-	-
13019	+	-	-	-	+	-	-	-
13020	+	-	-	-	+	-	-	-
13021	+	-	-	-	+	-	-	-
13023	+	-	-	-	+	-	-	-
13025	+	-	-	-	+	-	-	-
13026	+	-	-	-	+	-	-	-
13027	+	-	-	-	+	-	-	-
13028	+	-	-	-	+	-	-	-
13029	+	-	-	-	+	-	-	-
13030	+	-	-	-	+	-	-	-
13031	+	-	-	-	+	-	-	-
13032	+	-	-	-	+	-	-	-
Subtotal:	36	0	0	0	36	0	0	0

Table 7. (cont.)

SIHP Site Number	Significance Category				Recommended Treatment			
	A	X	B	C	FDC	NFW	PID	PAI
12978	+	-	-	*	+	-	-	*
12980	+	-	-	*	+	-	-	*
12995	+	-	-	*	+	-	-	*
13011	+	-	-	*	+	-	-	*
13014	+	-	-	*	+	-	-	*
13015	+	-	-	*	+	-	-	*
13016	+	-	-	*	+	-	-	*
13017	+	-	-	*	+	-	-	*
13181	+	-	-	*	+	-	-	*
Subtotal:	9	0	0	9	9	0	0	9
13006	+	-	-	+	+	-	-	-
Subtotal:	1	0	0	1	1	0	0	0
Total:	46	14	0	10	46	14	0	9

* Provisional assessment; definite assessment pending completion of further data collection.

trail is represented by a relatively short intact section, although further work may result in the discovery of additional portions. The section that is currently known cannot be recommended for preservation on the basis of interpretive value, due to its state of poor preservation, but could be considered for inclusion into development landscaping, due to its cultural value.

Further Data Collection with Provisional Preservation "As Is"

Fourteen features at nine sites are currently significant for information content and may also be found to contain human interments. These sites are recommended for further data collection, and the specific features are recommended for preservation "as is," if they are found to contain burials. Specifically, the following features are recommended for provisional preservation "as is": 12978, Feature C (filled crevice); 12980, Feature A (paved area); 12995, Feature A (modified outcrop); 13011, Features A and B (terraces; Soehren's Site 18); 13014, Feature C (paved area; Soehren's Site 16) and Feature E (terrace; Soehren's Site 17); 13015, Feature A (mound or collapsed platform; Soehren's Site 15) and Feature B (filled crevice); 13016, Feature A (paved area); 13017, Feature A (terrace); and 13181, Features A-C (platforms).

If the specific features are burials and are not preserved "as is," it is required that the procedures of Section 43 of Chapter 6E (Historic Preservation, Haw. Rev. Stat., as amended) be followed. DLNR-HSS/SHPO should be notified and will contact the Office of Hawaiian Affairs (OHA). A mitigation plan for burials, with osteological analyses, should be worked out with DLNR-HSS/SHPO. In addition, a search for direct lineal descendants should be undertaken, consisting minimally of publishing a public notice in a newspaper of general circulation. If direct lineal descendants are found, the osteological analyses shall be subject to their wishes. Lastly, a plan for final disposition of the remains should be developed in accordance with Section 43 of Chapter 6E. It is recommended that any remains found be reinterred within the project area. If this is not possible, they should be reinterred in a nearby cemetery. A disinterment permit may be required from the State Department of Health.

As an important initial step prior to further data collection, it is recommended that all identified sites recommended for further archaeological work 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 (further data collection, data recovery, and/or preservation) to be more accurately considered on a site-by-site basis.

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

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APPENDIX A

SIHP NO: 12975
PHRI TEMP. SITE NO: T-3
SITE TYPE: Pahoehoe excavation
ELEVATION: 208 ft AMSL
VEGETATION: Koa-haole, fountain grass
CONDITION: Good
INTEGRITY: Feature appears unaltered; surrounding area bulldozed
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Agriculture/possible quarry
DIMENSIONS: 5.00 m in diameter by 0.60 m deep
DESCRIPTION: Site 12975 is situated in the center of a lava blister along a rocky slope that has been severely disturbed by bulldozing. The excavation consists of an isolated hole in the blister. Pahoehoe cobbles and pebbles are present in the hole. Whether these have been excavated from the hole, or whether they have fallen naturally from the rim of hole cannot be ascertained. There is no formal arrangement to the stones. A thin deposit of silty loam is present inside the excavation.

SIHP NO.: 12976 *(Figure A-1)*
PHRI TEMP. SITE NO.: T-6
SITE TYPE: Complex (8)
ELEVATION: 207 ft AMSL
VEGETATION: Koa-haole, alabe'e, fountain grass
CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Agriculture/possible temporary habitation
APPROXIMATE SITE AREA: 20.00 m N-S by 20.00 m E-W
DESCRIPTION: This site is situated in an area of pahoehoe outcrops, along a sloping lava channel. The site consists of six pahoehoe excavations (Features A and D), an unmodified overhang shelter (Feature B), and a rock alignment (Feature C). Measurements were recorded for two of the six pahoehoe excavations. No portable remains were observed on the site.

Feature A is a pahoehoe excavation that may have had an agricultural function. The feature measures 2.51 m NE-SW by 1.60 m NW-SE by 0.30 m average depth. The feature consists of an artificially created depression that has been partially cleared of rubble. Loose pahoehoe cobbles and pebbles line the interior perimeter of the excavation. A few scattered stones are present in the center of the floor of the excavation, which is level and soil-covered.

Feature B is an overhang that may have been used for habitation. The overhang is located east of Feature A. The entrance to the feature measures 1.40 m E-W. The overhang ceiling is about 0.7 m high, and the width of the overhang chamber is 1.5 m. The floor of the overhang is level and is soil-covered. The area in front of the overhang appears to have been cleared of rocks, and the rocks loosely aligned. No cultural remains were observed inside the overhang.

Feature C is a rock alignment with an indeterminate function. The alignment is located 0.4 m southeast of the opening to Feature B, and is probably associated with the feature. The alignment measures 1.2 m NE-SW by 0.4 m wide by 0.5 m high. It consists of loosely stacked pahoehoe cobbles and small boulders.

Feature D is a pahoehoe excavation assigned an agricultural function. The feature is located immediately north of Feature A, and 3.5 m west of Feature B. It abuts the west face of a pahoehoe outcrop that rises 1.30 m above the feature level. Along the west side, the pahoehoe outcrop surface is 0.7 m above the base of excavation. Feature D measures 1.30 m NW-SE by 0.9 m NE-SW by 0.7-1.3 m deep and consists of a cleared oval area which is level and which contains soil.

SIHP NO: 12977
PHRI TEMP. SITE NO.: T-7
SITE TYPE: Complex (2)
ELEVATION: 217 ft AMSL
VEGETATION: Kiawe, fountain grass
CONDITION: Poor
INTEGRITY: Questionable
PROBABLE AGE: Possibly Prehistoric
FUNCTIONAL INTERPRETATION: Possible marker
APPROXIMATE SITE AREA: 11.00 m E-W by 2.00 m N-S
DESCRIPTION: This site is situated on an undulating surface, along the west edge of a major pahoehoe crevice. The site consists of a small concentration of pahoehoe cobbles (Feature A) and an upright pahoehoe slab (Feature B). The two features were 10.00 m apart on an east-west axis. No portable remains were observed at the site.

Feature A is a rock concentration that may have functioned as a marker. The feature measures 0.70 m by 0.60 m by 0.22 m high and consists of four pahoehoe cobbles, stacked loosely, two courses high.

Figure A-1. SITE 12976, FEATURE B, VIEW TO NORTH (PHRI Neg. 1320-24)

Feature B is a triangular pahoehoe upright slab interpreted as a possible marker. The feature is situated on lava along the edge of a 2.0 m wide ravine, and the feature measures 0.23 m wide (at base) by 0.16 m thick by 0.42 m high.

SIHP NO.: 12978
PHRI TEMP. NO.: T-8
SITE TYPE: Complex (5)
ELEVATION: 217 ft AMSL
VEGETATION: Koa-haole, 'a'ali'i, fountain grass
CONDITION: Fair
INTEGRITY: Altered; affected by erosion
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Indeterminate
APPROXIMATE SITE AREA: 40.00 m SW-NE by 17.40 m N-S
DESCRIPTION: Site 12978 is situated among upthrust pahoehoe outcrops in an area of irregular pahoehoe. The site consists of sections of a wall and alignments (Features A-1 thru A-3), a terrace (Feature B), and a filled crevice (Feature C). The features are situated between and along the edges of pahoehoe outcrops; the outcrops are incorporated into the features. No portable remains were found at the complex.

Feature A is a wall assigned an agricultural/indeterminate function. The wall measures 1.31 m by 0.54 m by 0.80 m high and is situated across a depressed area, between two pahoehoe outcrops. The wall consists of basalt cobbles and small boulders that are loosely stacked up to three courses high; the sides of the wall are not faced.

Feature A-2 is a linear alignment assigned a possible agriculture/indeterminate function. The feature measures 3.00 m NE-SW by 0.72 m by 0.56 m high and is situated 2.0 m southwest of Feature A-1 between two pahoehoe outcrops. The alignment is oriented parallel with A-1 and appears to delineate the same area as A-1. The alignment consists of a single course of pahoehoe cobbles and boulders.

Feature A-3 is a single-course alignment of pahoehoe boulders and cobbles; the alignment is wedged between two outcrops. The feature has been assigned an indeterminate/possible agriculture function; it measures 4.00 m NE-SW by 0.88 m by 0.26 m high and is situated 5.5 m southwest of the end of A-2, oriented in the same direction as A-2.

Feature B is a terrace assigned an agriculture function. The terrace measures 5.0 m NE-SW by 0.4 m by 0.4 m high (max.) and is located at the southwestern end of the Feature A wall/alignment, c. 40.0 m from the eastern end of A-1. The long axis of the terrace follows the wall/alignment axis. The terrace abuts two sloping pahoehoe outcrops and spans a depressed channel located between the outcrops. Pahoehoe is exposed in the center of the terrace; to the west of this exposed area is a leveled area filled with cobbles, and to the east is a level, soil-filled area. The soil-filled section is recessed 0.4 m below the top of the stacked perimeter of the terrace; the cobble-filled section is recessed 0.1 m below the top of the alignment portion of the perimeter. Pahoehoe outcrops define the north, west, and south sides of the terrace. The east side of the terrace consists of a 2.4 m long section of loosely stacked (two courses) small boulders and a 2.6 m long connective section of aligned cobbles.

Feature C is a filled pahoehoe crevice assigned a possible agriculture/possible burial function. The crevice is located 5.0 m from Feature A, between two pahoehoe outcrops; it measures 3.2 m N-S by 1.3 m E-W. The crevice is of indeterminate depth; it is filled with small pahoehoe boulders and cobbles. A small hole in the fill occurs at the northern end of the crevice.

SIHP NO.: 12979
PHRI TEMP. SITE NO.: T-10
SITE TYPE: Cairn
ELEVATION: 243 ft AMSL
VEGETATION: kiawe, fountain grass
CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Indeterminate
FUNCTIONAL INTERPRETATION: Marker
DIMENSIONS: 1.30 m N-S by 0.80 m E-W by 0.75 m maximum height
DESCRIPTION: This site is located on gently sloping, heavily vegetated pahoehoe. The cairn consists of flat pahoehoe slabs and is oval in plan view. The top of the cairn is flat. The west side of the cairn is nearly vertical, whereas the east side slopes outward from apex to base. No portable remains were found at the site.

SITE NO: 12980 *(Figure A-2)*
PHRI TEMP. SITE NO: T-11
SITE TYPE: Complex (2)
ELEVATION: 240 ft AMSL
VEGETATION: Various grasses, fountain grass, and kiawe
CONDITION: Poor
INTEGRITY: Altered; fallen slabs
PROBABLE AGE: Historic
FUNCTIONAL INTERPRETATION: Possible burial
APPROXIMATE DIMENSIONS: 1.8 m by 1.5 m
DESCRIPTION: Site 12980 consists of a paved compartment (Feature A) and an upright stone (Feature B) situated on a gentle slope. No cultural deposit or portable remains were found at the site.

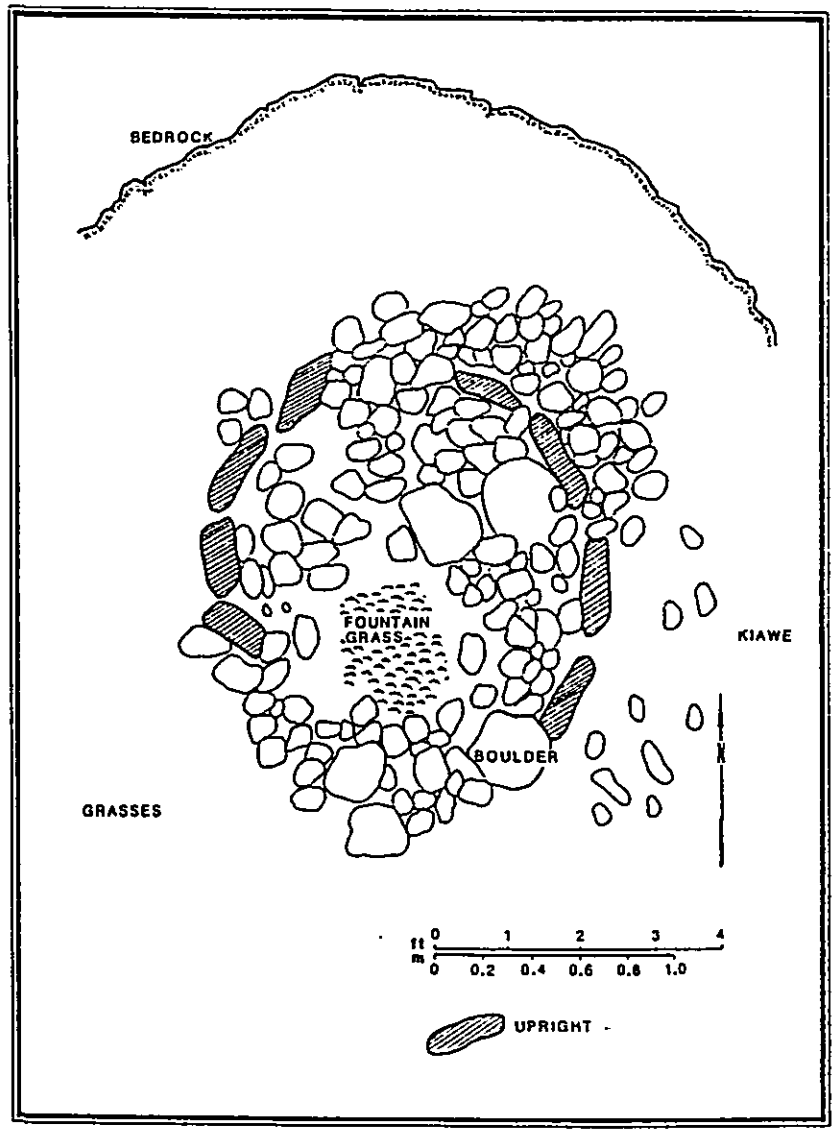

Figure A-2. SITE 12980, FEATURE A

Feature A is generally oval and consists of a pavement of loose cobbles. The perimeter of the pavement is lined intermittently with large slabs placed on edge.

Feature B consists of a large upright stone on an outcrop. The outcrop is situated in a dangerous area 180 degrees Az of Feature A and 215 degrees Az of Site 12981. The stone may serve as a warning marker.

SIHP NO: 12981 *(Figure A-3)*
PHRI TEMP. SITE NO: T-14
SITE TYPE: Cave
ELEVATION: 239 ft AMSL
VEGETATION: Various grasses, koa-haole, lichen
CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric/Early Historic
FUNCTIONAL INTERPRETATION: Temporary habitation
APPROXIMATE DIMENSIONS: 7.25 m E-W by 6.0 m N-S by 1.0 m high
DESCRIPTION: Site 12981 is situated on a gentle southwest sloping pahoehoe flow. The cave is small and is irregular in plan view. Present within the cave, just inside the entrance, is a very thin cultural deposit containing marine shell, charcoal, and kukui fragments.

TU-1 was placed within the cultural deposit. Layer I of the unit ranged from 1-5 cmbs and consisted of fine brown silt. Within the silt were charcoal fragments. A bulk soil sample was taken from the unit for possible radiocarbon dating analysis.

SIHP NO: 12982
PHRI TEMP. SITE NO: T-19
SITE TYPE: Pahoehoe Excavation
ELEVATION: 242 ft AMSL
VEGETATION: Koa-haole, fountain grass
CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric-Historic
FUNCTIONAL INTERPRETATION: Agricultural or Quarry
APPROXIMATE DIMENSIONS: 0.70 m N-S by 0.50 m E-W by 0.45 m deep
DESCRIPTION: This site is situated on a gentle southwest slope; it consists of a small generally oval pit excavated within a pahoehoe blister. No soil was observed within the pit, and no cultural remains were present at the site.

SIHP NO: 12983
PHRI TEMP. SITE NO: T-22
SITE TYPE: Rock mounds
ELEVATION: 234 ft AMSL
VEGETATION: Various grasses, kiawe
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric-Historic
FUNCTIONAL INTERPRETATION: Agricultural
APPROXIMATE SITE AREA: c. 3.0 m in diameter
DESCRIPTION: Site 12983 is situated in an open field, on a southwest facing mountain slope. Interspersed throughout the field are basalt outcroppings. The site consists of three rock mounds consisting of loosely piled cobbles. The cobbles are exposed; no grass covers them. No cultural deposit or portable artifacts were present at the site.

SIHP NO: 12984
PHRI TEMP. SITE NO: T-24
SITE TYPE: Complex (4)
ELEVATION: 220 ft AMSL
VEGETATION: Various grasses, koa-haole
CONDITION: Poor-Fair
INTEGRITY: Unaltered-Altered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Temporary habitation and agriculture
APPROXIMATE COMPLEX AREA: 20.0 m by 30.0 m
DESCRIPTION: Site 12984 is situated in the inland portion of the project area on undulating pahoehoe. The site consists of four features—a cave (Feature A), a terrace (Feature B), a modified outcrop (Feature C), and a pahoehoe excavation (Feature D). Present at the site was a cultural deposit containing shell midden and kukui.

Feature A is situated in the center of the complex; it measures 12.0 m E-W by 9.0 m N-S by 0.5-1.5 m high. The interior of the feature has been cleared of rubble; the rubble is stacked along the south wall. Present within the cave is a deposit containing shell midden, kukui, mammal bone, bird bone, gourd, and land snails. Also within the cave was a scoria abrader (collected). Outside the cave, 11.5 m at c. 178 degrees from the entrance, is a pahoehoe excavation which measures 1.2 m E-W by 0.4 m N-S.

The Feature B terrace is situated 4.4 m northwest of Feature A. The terrace measures 4.3 m E-W by 1.5 m N-S by 0.45-0.60 m high. The perimeter of the terrace consists of a core-filled wall of pahoehoe cobbles and boulders stacked 2-3 courses high. No portable remains or cultural deposits were present at the feature.

Figure A-3. SITE 12981. VIEW TO SOUTH. (PHRI Neg.1320-36)

Feature C consists of an outcrop modified with excavated boulders to create what may be a planting area. The feature measures c. 2.0 m in diameter.

Feature D is located 15.0 m at 82 degrees from Feature A. The feature consists of a level soil area created by excavating stones from a basalt outcrop; the soil area measures c. 2.0 m in diameter by 0.7 m deep. No portable artifacts or cultural deposits were present at the feature. Dozer marks (cut marks left by a bulldozer) were present on the outcrop.

SIHP NO: 12985
PHRI TEMP. SITE NO: T-25
SITE TYPE: Cairn
ELEVATION: 233 ft AMSL
VEGETATION: Various grasses, kiawe
CONDITION: Fair-Poor (eroded)
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric or 19th century
FUNCTIONAL INTERPRETATION: Possible marker
APPROXIMATE DIMENSIONS: 0.6 m by 0.5 m by 0.5 m high
DESCRIPTION: The cairn is situated on a gentle slope, at the base of an outcrop, in an area of silty loam. The cairn consists of small boulders and large cobbles stacked 2-3 courses high to form a structure oval in plan view. No portable remains or cultural deposits were found at the site.

SIHP NO: 12986
PHRI TEMP. SITE NO: T-26
SITE TYPE: Complex (2)
ELEVATION: 232 ft AMSL
VEGETATION: Fountain grass, koa-haole
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Possible marker
APPROXIMATE SITE AREA: c. 10.0 m N-S
DESCRIPTION: This site consists of two cairns, about ten meters apart from each other, situated on a slightly sloping pahoehoe flow. No portable artifacts or cultural deposits were found at the complex.

Feature A is located about 148 degrees Az of Feature B. It is generally rectangular in plan view and consists of stacked cobbles and boulders. The feature measures c. 1.4 meters in diameter by 0.3 m high.

Feature B is located 328 degrees Az of Feature A. It is triangular in plan view and consists of four boulders.

SIHP NO: 12987
PHRI TEMP. SITE NO: T-27
SITE TYPE: Complex (23)
ELEVATION: 255 ft AMSL
VEGETATION: Bunch grass, koa-haole; unidentified shrubs
CONDITION: Poor-Good
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric-Historic
FUNCTIONAL INTERPRETATION: Quarry, temporary habitation, possible marker, agriculture, indeterminate
APPROXIMATE SITE AREA: 57.0 m E-W by 26.0 m N-S
DESCRIPTION: This site consists of a cairn (Feature A), a rock alignment (Feature B), two enclosures (Features C and D), and 19 pahoehoe excavations. The site is situated on a gentle southwest slope, in the vicinity of a ridge, in an area of fine brown silt. No portable artifacts or cultural deposits were found at the site.

The Feature A cairn is situated 261 degrees Az of Datum 1 and 248 degrees Az of Datum 2. The cairn measures 0.8 m E-W by 0.6 m N-S by 0.37-0.50 m high and consists of a single course of large (25-35 cm in diameter) pahoehoe blocks. Atop the single course is one block 27 cm in diameter. Several blocks are scattered loosely about the feature.

The Feature B rock alignment is situated 268 degrees Az of Datum 1 and 218 degrees Az of Datum 2, next to a pahoehoe excavation. The alignment measures 3.25 m by 0.80 m by 0.5-0.8 m high and consists of two courses of loosely piled pahoehoe blocks.

Feature C is situated 4.6 m at 49 degrees Az from Datum 2. The feature measures 3.85 m by 3.25 m by 0.5-0.9 m high and consists of pahoehoe blocks which have been stacked to form a semi-circular enclosure. The enclosure abuts a ridge. The walls of the enclosure are two to three courses high; clinkers have been used to fill portions of the wall. The NW face of the enclosure is slightly faced. Feature C shares a wall with Feature D.

Feature D is situated 6.9 meters from and 336 degrees Az of Datum 2. The feature measures 6.0 m by 4.1 m by 0.7 m high and consists of pahoehoe blocks (10-90 cm in diameter) stacked two to three courses high to form a semi-circular wall which abuts a ridge. The wall is filled in places with clinkers. The NW portion of the wall is slightly faced. Feature D shares a wall with Feature C.

The 19 pahoehoe excavations at the site vary in size; most of them, however, are 1-2.0 sq m in area. One excavation covers over 6.0 sq m; the smallest excavation covers about half a square meter. Scattered within and about the excavations are excavated pahoehoe cobbles and boulders.

SIHP NO: 12988 *(Figures A-4 and A-5)*
PHRI TEMP. SITE NO: T-31
SITE TYPE: Complex (5)
ELEVATION: 251 ft AMSL
VEGETATION: Koa-haole, uhaloa, 'ilima, pua pilo, and various grasses.
CONDITION: Fair-Poor
INTEGRITY: Unaltered.
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Agriculture
APPROXIMATE SITE AREA: 15.0 m N-S by 20.0 m E-W
DESCRIPTION: Site 12988 is situated in the inland zone on undulating pahoehoe. The site consists of a C-shape (Feature A), two terraces (Features B and D), a cleared area (Feature C), and a cobble concentration (Feature E). No portable artifacts or cultural deposits were present at the site.

The Feature A C-shape is situated in the NE portion of the site, on undulating pahoehoe. The feature measures 2.7 m by 3.0 m by 0.6 m high. It consists of boulders and cobbles stacked into a C-shape which abuts an outcrop and Feature B. Feature A may have functioned as a planting pit, or it may have been a temporary shelter.

The Feature B terrace is situated in the southern portion of the site, on undulating pahoehoe. The feature measures 6.0 m E-W by 0.2-0.5 m N-S by 0.4-0.7 m high. It consists of pahoehoe cobbles and boulders which may or may not have been intentionally aligned to form a terrace (whether the feature is natural or man-made is not clear). Like Feature A, Feature B abuts an outcrop. The feature shares a wall with Feature A.

Feature C is situated 1.0 m east of Feature A, on undulating pahoehoe. The feature measures c. 1.7 m in diameter and consists of an area which has been cleared of boulders and cobbles. The feature may have functioned as a planting area.

Feature D is situated in the western portion of the site, on undulating pahoehoe. The feature measures 2.1 m E-W by 1.3 m N-S by 0.25 m high and consists of an area of levelled stone cobbles. Whether the feature is natural or man-made is not clear.

Feature E is situated 11.0 m west of Feature B. It measures c. 0.7 m in diameter and consists of scattered cobbles. The cobbles may have been cleared to create a planting area.

SIHP NO: 12989
PHRI TEMP. SITE NO: T-32
SITE TYPE: Cairn
ELEVATION: 259 ft AMSL
VEGETATION: Fountain grass, koa-haole, 'ilima
CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric-Early Historic
FUNCTIONAL INTERPRETATION: Marker
APPROXIMATE DIMENSIONS: 1.0 m in diameter by 0.8 m high
DESCRIPTION: Site 12989 is situated in the inland zone, on a southwest slope overlooking Honokohau Harbor, in an area of pahoehoe outcrops. The site consists of about 15 small pahoehoe boulders loosely stacked on a pahoehoe outcrop. No cultural remains were found at the site.

SIHP NO: 12990 *(Figure A-6)*
PHRI TEMP. SITE NO: T-33
SITE TYPE: Complex (3)
ELEVATION: 255 ft AMSL
VEGETATION: Koa-haole, fountain grass
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Possibly Agricultural
APPROXIMATE SITE AREA: 18.0 m E-W by 12.0 m N-S
DESCRIPTION: Site 12990 is situated on a sloping aa flow. The site consists of a terrace (Feature A), a wall (Feature B), and a cairn (Feature C). No cultural remains were found at the site.

The Feature A terrace is situated on a sloping pahoehoe flow. The terrace measures 8.0 m E-W by 3.5 m N-S by 0.25-0.60 m high and consists of pahoehoe boulders and cobbles stacked to form a structure irregular in plan view. The walls of the terrace are faced.

Feature B is situated about 1.0 m from Feature A. The feature measures 5.0 m NW-SE by 1.0 m NE-SW by c. 0.2 m high and consists of cobbles stacked generally three courses wide and high.

Feature C is situated 16.0 m from Feature A. The feature measures c. 1.0 m by 0.5 m by 0.2 m high and

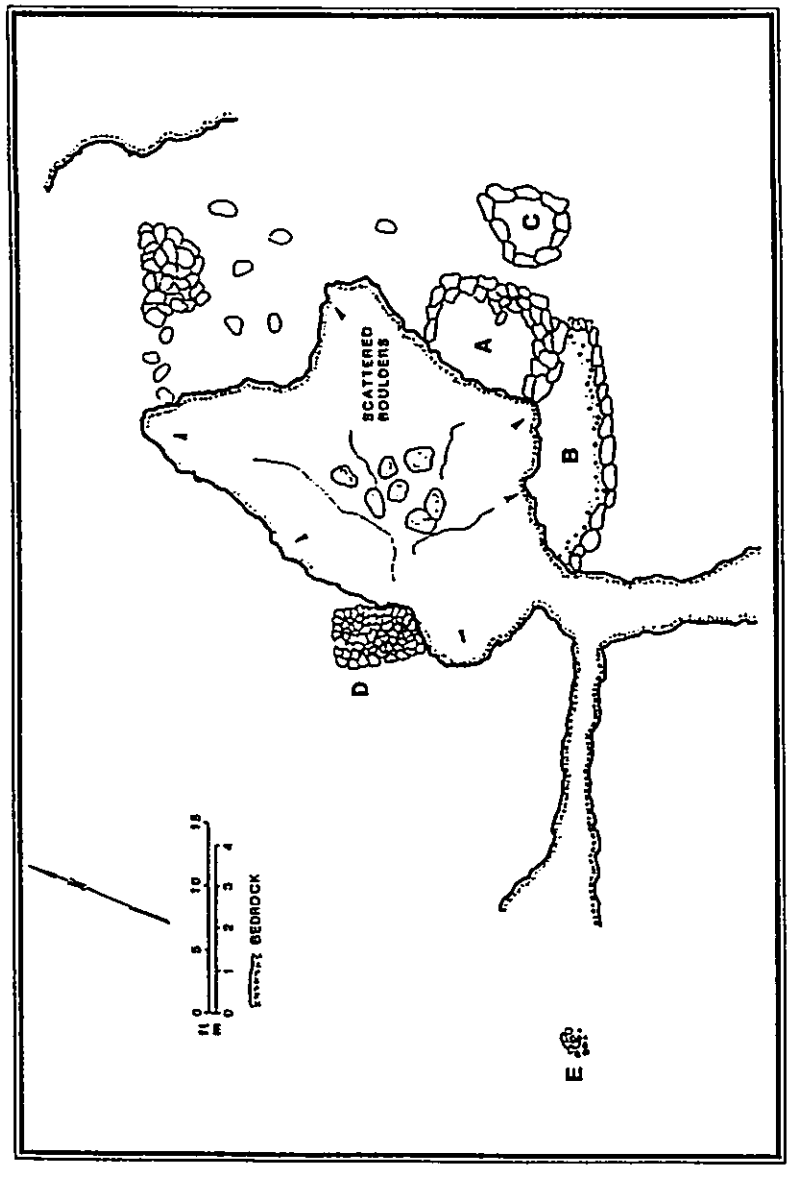

Figure A-4. SITE 12988

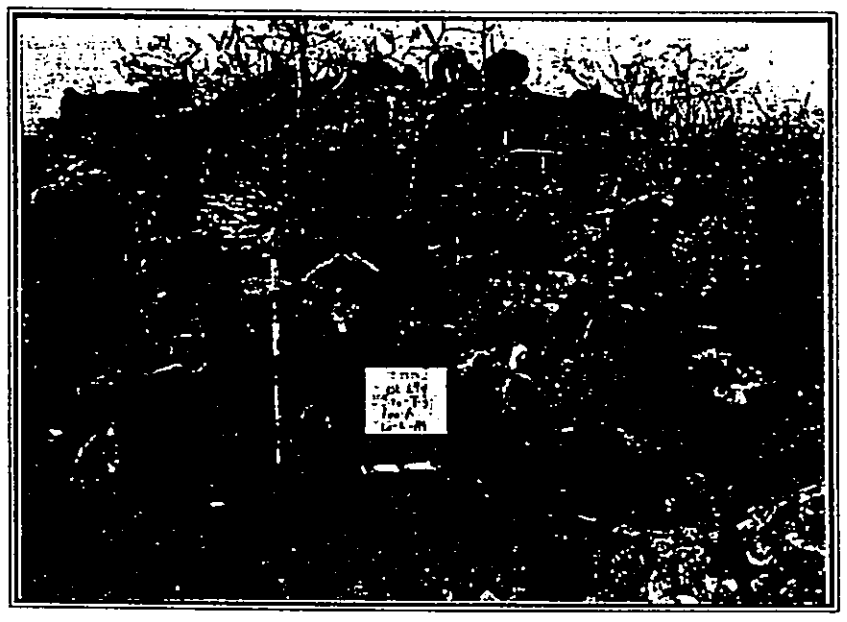

Figure A-5. SITE 12988, FEATURE A. VIEW TO WEST. (PHRI Neg.1321-7)

consists of three medium-sized boulders and about six cobbles piled to form a cairn irregular in plan view. The cairn may be the product of agricultural clearing.

SIHP NO: 12991 *(Figure A-7)*
PHRI TEMP. SITE NO: T-34
SITE TYPE: Mound
ELEVATION: 267 ft AMSL
VEGETATION: Koa-haole, various grasses
CONDITION: Excellent
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric-Contact
FUNCTIONAL INTERPRETATION: Temporary habitation
APPROXIMATE DIMENSIONS: 2.0 m E-W by 1.24 m N-S by 0.8 m high
DESCRIPTION: Site 12991 is situated in the inland zone, on a gentle southwesterly slope, in an area of pahoehoe outcrops. The perimeter of the mound consists of large pahoehoe slabs stacked three courses high. The mound's interior is filled with cobbles and pebbles and is mounded seven to eight courses high. The mound is faced and is somewhat rectangular in plan view.

Because it was originally thought the mound may be a burial, a 1.0 sq m test unit was placed at the site. The unit yielded kukui and a piece of old red flagging tape. No burial was found.

SIHP NO: 12992 *(Figure A-8)*
PHRI TEMP. SITE NO: T-35
SITE TYPE: Terrace
ELEVATION: 256 ft AMSL
VEGETATION: Various grasses, kiawe
CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric-Early Historic
FUNCTIONAL INTERPRETATION: Agriculture
APPROXIMATE DIMENSIONS: 3.5 m by 2.8 m by 0.1 m high

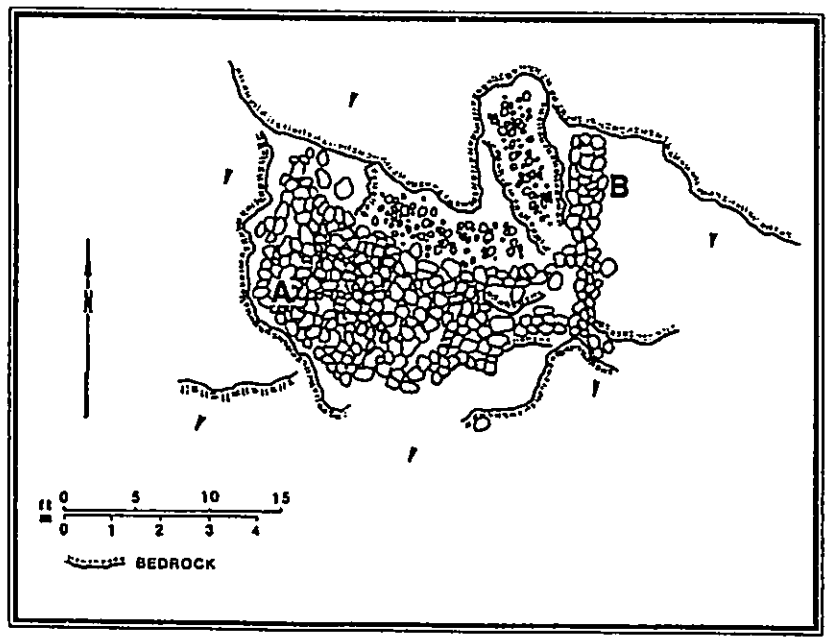

Figure A-6. SITE 12990

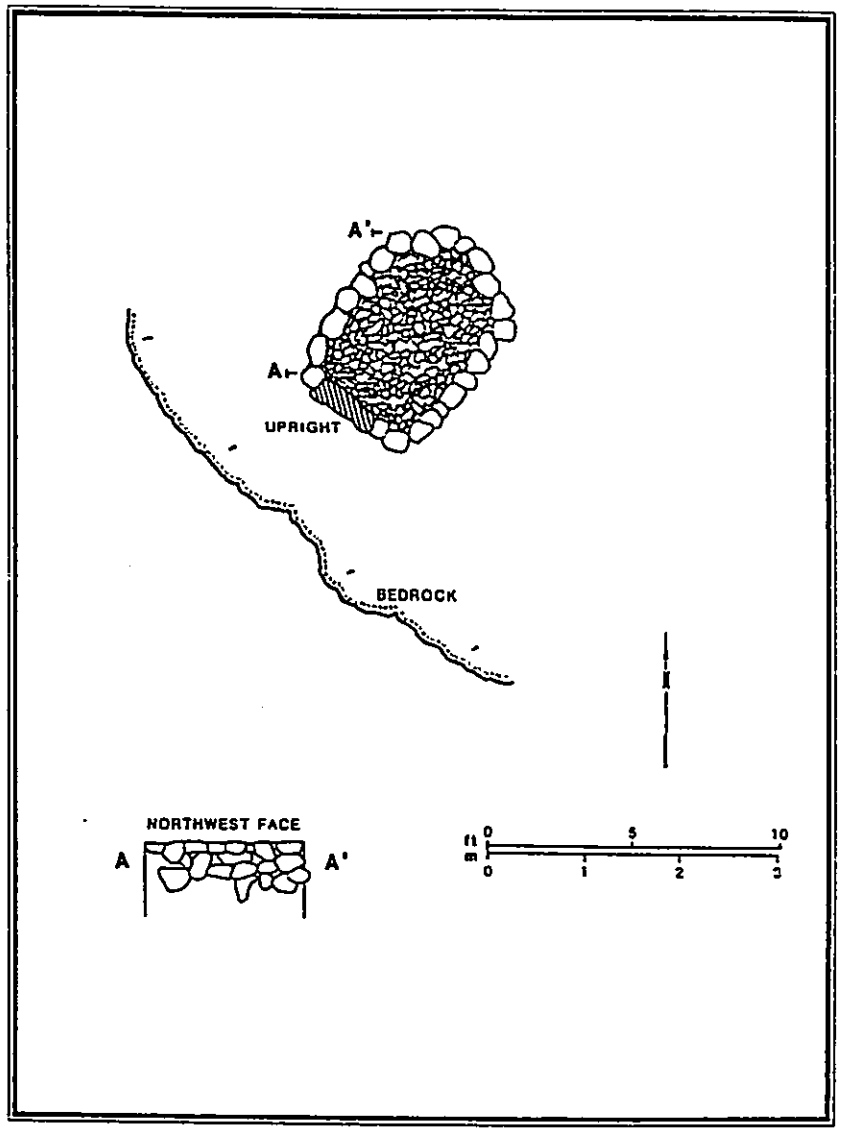

Figure A-7. SITE 12991

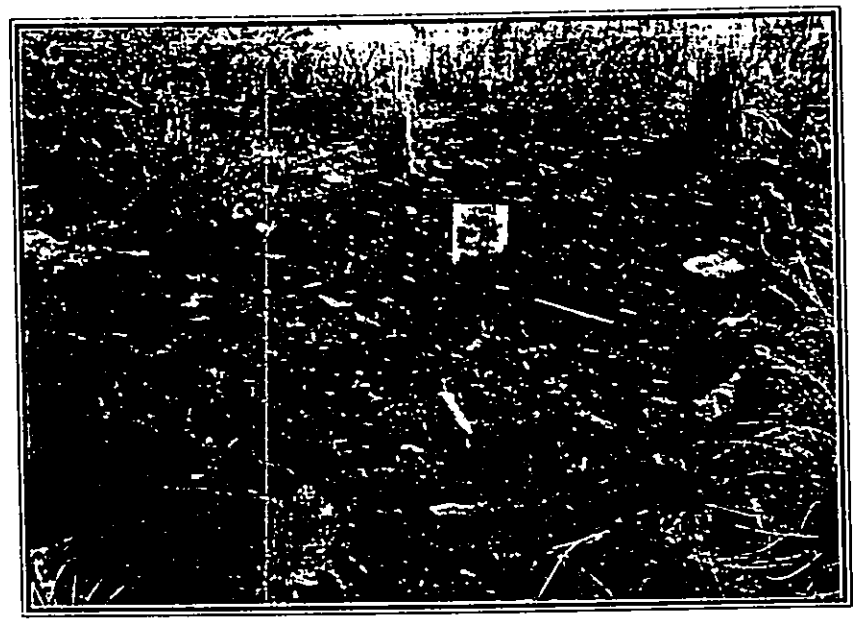

Figure A-8. SITE 12992. VIEW TO SOUTHEAST. (PHRI Neg.1319-32)

DESCRIPTION: Site 12992 is situated on a gentle slope in the vicinity of numerous outcrops. The site consists of a natural terrace filled and levelled with cobbles. The terrace may have formed naturally. No cultural remains were found at the site.

SIHP NO: 12993
PHRI TEMP. SITE NO: T-36
SITE TYPE: Terrace
ELEVATION: 271 ft AMSL
VEGETATION: Fountain grass, koa-haole
CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Possibly agricultural/indeterminate
APPROXIMATE DIMENSIONS: 12.59 m by 6.50 m
DESCRIPTION: Site 12993 is situated on a combination of undulating and smooth pahoehoe lavas. The site consists of an outcrop, and pahoehoe cobbles and boulders stacked to form a semi-circular structure. This structure abuts the outcrop. The outcrop has two levels. On the upper level is a mound of pahoehoe cobbles rectangular in plan view. The lower level of the outcrop slopes till it meets a linear excavated area 3.35 m long by 1.29 m wide. Present on the lower level is a c. 3 cm layer of silty loam. Numerous koa-haole shrubs are present at the site.

SIHP NO: 12994 *(Figure A-9)*
PHRI TEMP. SITE NO: T-37
SITE TYPE: Cave
ELEVATION: 265 ft AMSL
VEGETATION: Koa-haole, kiawe, fountain grass, lichen
CONDITION: Fair
INTEGRITY: Partially altered
PROBABLE AGE: Prehistoric-Historic
FUNCTIONAL INTERPRETATION: Temporary habitation, indeterminate
APPROXIMATE DIMENSIONS: 32.0 m by 8.3 m by 2.35 m high
DESCRIPTION: Site 12994 is situated in the inland zone, on a gentle southwest slope. The site consists of a natural lava tube. Present within the tube is a deposit of ashy soil mixed with charcoal and shell midden. Also present were kukui, shell midden, worked and unworked wood, a bird bone pick, waterworn pebbles, an echinoid abrader, and a coral abrader.

TU-1, a 0.25 by 0.25 sq m test unit, was placed in the cave's cultural deposit. The purpose of the unit was to determine the depth of the deposit and to recover datable charcoal. Excavation was by arbitrary 5 cm levels. Layer I extended from 0-7 cmbs, and bedrock was encountered at 4-7 cmbs. Layer I consisted of fine gray-brown silt. Present in the silt were charcoal and kukui fragments.

SIHP NO: 12995
PHRI TEMP. SITE NO: T-38
SITE TYPE: Modified outcrop
ELEVATION: 270 ft AMSL
VEGETATION: Various grasses, kiawe
CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Possible burial
APPROXIMATE SITE AREA: About 1.0 m in diameter
DESCRIPTION: This site is situated on a gentle slope and consists of a depression filled with cobbles. The assessed function of this site is highly uncertain. It is possible the site has been naturally formed.

SIHP NO: 12996
PHRI TEMP. SITE NO: T-40
SITE TYPE: Complex (2)
ELEVATION: 315 ft AMSL
VEGETATION: Koa-haole, fountain grass
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Temporary habitation
APPROXIMATE SITE AREA: 14.0 m N-S by 14.0 m E-W
DESCRIPTION: This complex consists of a terrace (Feature A) and a cave (Feature B) situated on a sloping pahoehoe flow. Portable remains found at the site include kukui, wood fragments, and bird bone.

Feature A is situated 5.0 m southwest of Feature B, on a pahoehoe flow. The feature measures 4.5 m by 1.5 m by 0.7 m and consists of a bed of boulders and cobbles which abuts an outcrop. A small portion of the southwesterly side of the terrace is faced with flat boulders. Part of the terrace is collapsed. No cultural remains were found at the feature.

The Feature B cave consists of a pahoehoe lava tube. The tube is generally triangular in plan view and measures 8.0 m N-E by 14 m S-E. Present in the tube are three rock alignments consisting of loosely arranged cobbles. Also present is a soil deposit about 3 cm thick. The deposit yielded kukui, shell, bird bone, and charcoal.

SIHP NO: 12997
PHRI TEMP. SITE NO: T-41

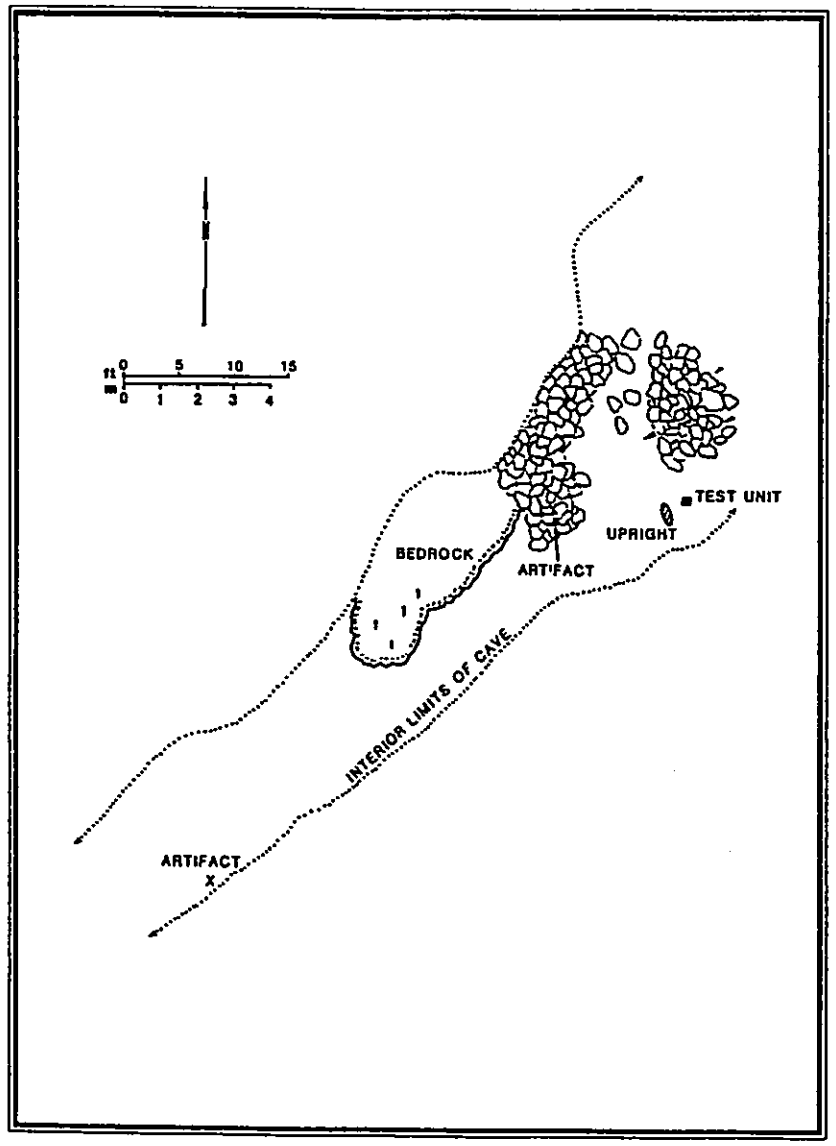

Figure A-9. SITE 12994

SITE TYPE: Terrace
ELEVATION: 300 ft AMSL
VEGETATION: Koa-haole
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Agriculture
DIMENSIONS: 3.0 m N-E by 1.5 m S-E
DESCRIPTION: The Site 12997 terrace is situated on the north side of the project area, 250 degrees Az of and 10 meters away from Site 12998. The terrace consists of a bedrock outcrop crevice filled with boulders and cobbles; in plan view, the terrace is an elongated oval. No cultural remains were noted at the site.

SIHP NO: 12998
PHRI TEMP. SITE NO: T-42
SITE TYPE: Pahoehoe excavation
ELEVATION: 292 ft AMSL
VEGETATION: Koa-haole, fountain grass
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Possible quarry, agriculture
DIMENSIONS: 3.0 m by 5.0 m
DESCRIPTION: Site 12998 is situated in the inland zone, on a sloping pahoehoe flow. The site consists of a lava blister oval in plan view. Within and near the perimeter of the blister are numerous pahoehoe boulders.

SIHP NO: 12999
PHRI TEMP. SITE NO: T-43
SITE TYPE: Complex (3)
ELEVATION: 312 ft AMSL
VEGETATION: Various grasses and kiawe
CONDITION: Poor-good
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Agriculture, boundary, possible temporary habitation
APPROXIMATE SITE AREA: 12.0 m by 12.0 m
DESCRIPTION: Site 12999 is situated on a gentle slope in an area of bedrock outcrops. The site consists of a rock mound (Feature A), a terrace (Feature B), and a rock alignment (Feature C). No cultural remains were found at the site.

The Feature A rock mound measures 3.3 m by 1.0 m by 0.8 m high and consists of angular cobbles and small boulders. The mound may consist of rocks cleared from an area that was used for agriculture.

The Feature B terrace is situated on a gentle slope in an area of bedrock outcrops. The feature measures 3.7 m by 2.7 m by 0.5-0.6 m high. The perimeter of the feature is roughly faced and consists of cobbles stacked two to three courses high; the interior of the feature is filled with cobbles and pebbles. The terrace is rectangular in plan view.

The Feature C rock alignment is situated about 1.0 m west of Feature B. It consists of a 4.0-m-long single course of rocks; the rocks do not touch each other.

SIHP NO: 13000 ***(Figure A-10)***
PHRI TEMP. SITE NO: T-44
SITE TYPE: Complex (2)
ELEVATION: 291 ft AMSL
VEGETATION: Koa-haole, fountain grass
CONDITION: Fair-good
INTEGRITY: Altered/unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Agriculture
APPROXIMATE SITE AREA: 21.00 m by 6.75 m
DESCRIPTION: Site 13000 is situated in the inland portion of the project area, on undulating pahoehoe, in an area of pahoehoe outcrops. The site consists of a modified outcrop (Feature A) and a filled crevice (Feature B). No cultural remains were found at the site.

Feature A is situated 10.2 m at 280 degrees Az from Feature B in an area of pahoehoe outcrops. The feature measures 7.5 m by 5.2 m and consists of a semi-circular wall of cobbles and boulders which abuts a curved bedrock outcrop. The wall encloses a 2.0 m in diameter depression filled with boulders. Present on the outcrop is a pahoehoe excavation that measures about 1.0 m in diameter.

The Feature B crevice is situated 10.2 m at 100 degrees Az from Feature A, among pahoehoe outcrops. The crevice measures 4.2 m by 1.2 m by 1.12 m deep and is filled with clinkers and cobbles on the north side. The clinkers and cobbles appear faced. The south side of the crevice contains scattered clinkers and naturally broken bedrock.

SIHP NO: 13001
PHRI TEMP. SITE NO: T-45
SITE TYPE: Complex (2)
ELEVATION: 278 ft AMSL
VEGETATION: Kiawe, various grasses
CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Possible quarry, temporary habitation

Figure A-10. SITE 13000, FEATURE B, VIEW TO NORTH. (PHRI Neg.1319-11)

APPROXIMATE SITE AREA: 100.0 sq m
DESCRIPTION: Site 13001 is situated on a gentle slope, among outcrops. The site consists of a pahoehoe excavation (Feature A) and paving (Feature B). No cultural remains were found at the site.

The Feature A pahoehoe excavation measures 2.3 m by 1.7 m by 0.6 m deep. It consists of a pahoehoe blister within which are cobbles and a boulder alignment. The cobbles lie evenly to form a bed triangular in plan view. The boulder alignment is on the south side of the feature.

The Feature B paving is situated in a slight depression; the paving measures c. 4.4 m in diameter by 0.1 m high and consists of a bed of cobbles.

SIHP NO: 13002
PHRI TEMP. SITE NO: T-46
SITE TYPE: Cairn
ELEVATION: 298 ft AMSL
VEGETATION: Kiawe, grasses
CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Historic
FUNCTIONAL INTERPRETATION: Possible marker/ indeterminate
DIMENSIONS: 0.8 m in diameter by 0.5 m high
DESCRIPTION: This cairn is situated on a gentle slope, among outcrops. The cairn is roughly rectangular in plan view. The western portion of the cairn consists of boulders and cobbles loosely stacked to form what resembles a short wall segment. The eastern portion of the cairn consists of a circular construction; this construction consists of a circle of boulders and cobbles stacked three courses high, the circle enclosing an area about 0.2 m in diameter.

SIHP NO: 13003 *(Figure A-11)*
PHRI TEMP. SITE NO: T-47
SITE TYPE: Enclosure
ELEVATION: 279 ft AMSL
VEGETATION: Various grasses, kiawe
CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Temporary habitation
DIMENSIONS: 3.5 m in diameter by 0.5 m high (max.)
DESCRIPTION: Site 13003 is situated atop an outcrop which forms a natural platform. It consists of boulders and cobbles stacked to form a structure doughnut-shaped in plan view. The wall of the enclosure is generally 0.5-1.0 m thick; in the western portion of the enclosure is an opening.

SIHP NO: 13004 *(Figure A-12)*
PHRI TEMP. SITE NO: T-50
SITE TYPE: Complex (3)
ELEVATION: 282 ft AMSL
VEGETATION: Kiawe, grasses
CONDITION: Poor
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Agriculture
APPROXIMATE SITE AREA: 400.0 sq m
DESCRIPTION: Site 13004 is situated on a lava outcrop; the site consists of a wall (Feature A) and two pahoehoe excavations (Features B and C). No cultural remains were found at the site.

Feature A measures 3.0 m long by about 0.5 m wide by 0.6 m high and consists of stacked cobbles. The feature extends between two outcrops and also runs parallel to a third outcrop.

The Feature B excavation measures about 2.1 m in diameter and consists of a depression in pahoehoe, and boulders and cobbles which line the depression. On the southwest portion of the excavation the boulders and cobbles are roughly faced. Within the excavated hole are two small cupboards 0.4 and 0.7 m in width.

The Feature C excavation is situated about 5.0 meters from Feature B. Feature C measures about 2.0 m in diameter by 1.5 m deep. The feature consists of an excavated blister which is circular in plan view. Within the blister are numerous cobbles.

SIHP NO: 13005 *(Figure A-13)*
PHRI TEMP. SITE NO: T-51
SITE TYPE: Complex (7)
ELEVATION: 311-317 ft AMSL
VEGETATION: Koa-haole, fountain grass
CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Quarry/ indeterminate
APPROXIMATE SITE AREA: 39.0 m S-E by 22.0 m N-W
DESCRIPTION: Site 13005 is situated in the inland portion of the project area, on a sloping pahoehoe flow. The site consists of a modified outcrop (Feature A), two terraces (Features B and F), two rock alignments (Features C and G), and two pahoehoe excavations (Features D and E). No cultural remains were found at the site.

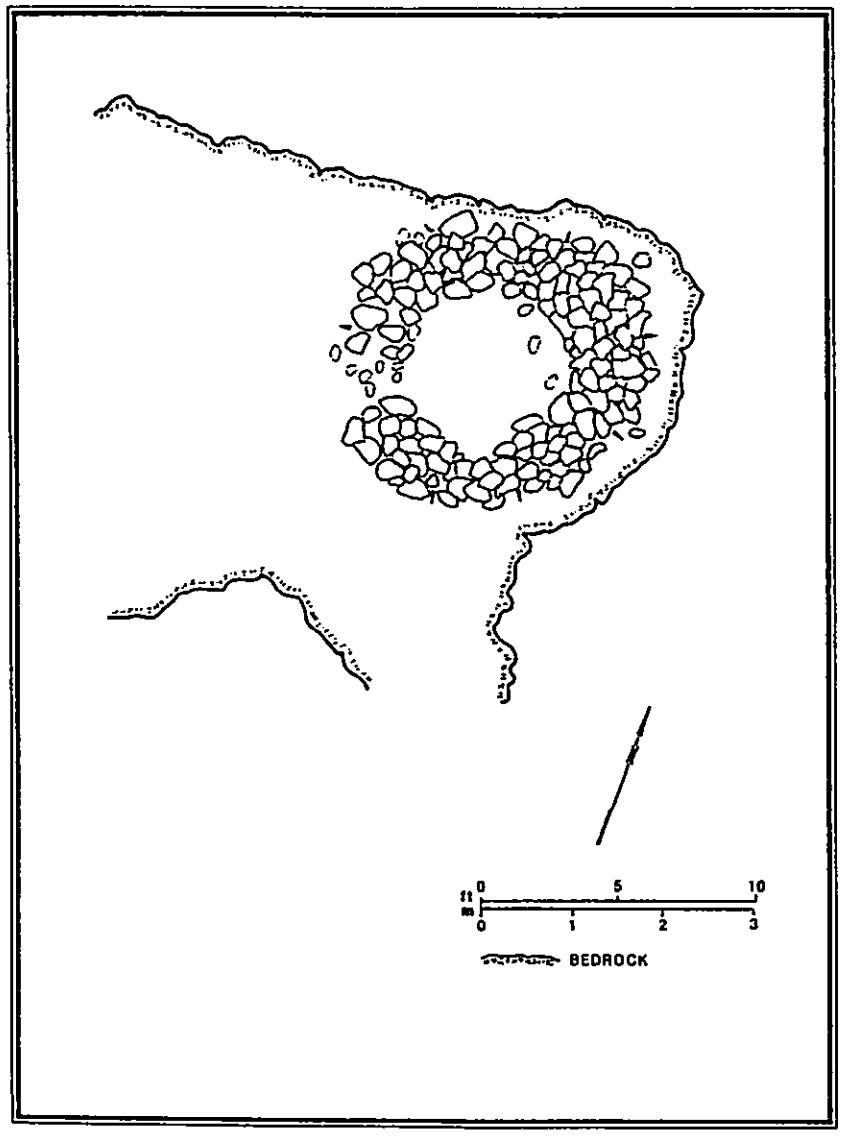

Figure A-11. SITE 13003

Figure A-12. SITE 13004, FEATURE A. (PHRI Neg.1318-31)

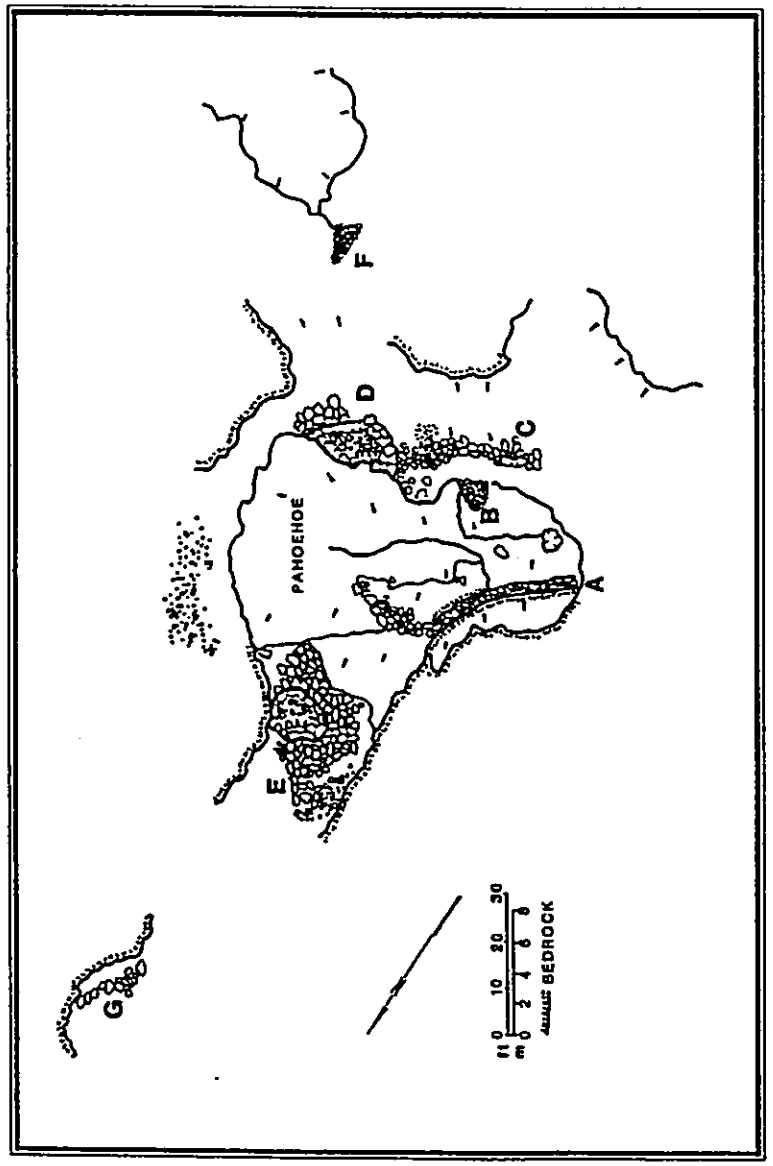

Figure A-13. SITE 13005

The Feature A modified outcrop measures about 12.0 m by 0.7 m. It consists of a pahoehoe crevice filled with boulders and cobbles, and an adjoining crude rock alignment which follows the edge of a pahoehoe outcrop.

Feature B is a terrace that measures 2.0 m N-S by 2.0 m E-W. The terrace, oval in plan view, consists of a bed of boulders and cobbles which abuts an outcrop.

Feature C is situated 2.0 m south of Feature B; it measures 8.0 m by 0.9 m by 0.2-0.4 m high. The feature consists of small to large boulders stacked one to two courses high.

Feature D is situated 2.0 m northeast of Feature C. The feature measures 6.0 m N-E by 2.5 m S-E and consists of an excavated pahoehoe blister, and pahoehoe boulders and cobbles piled around the blister. The feature is circular in plan view.

Feature E is situated 4.0 m north of Feature A. The feature measures 10.0 m N-W by 4.0 m E-W by 0.5-0.7 m deep and consists of an excavated pahoehoe blister. Excavated rocks form a crude alignment around the blister.

Feature F is situated 4.0 m southeast of Feature D. Feature F measures 2.0 m by 1.0 m by 0.3 m high and consists of a roughly rectangular bed of pahoehoe cobbles.

Feature G is a rock alignment situated 8.0 m from Feature A. The alignment measures 2.80 m by 0.60 m by 0.25-0.40 m high and consists of boulders stacked one to two courses high.

SIHP NO: 13006 *(Figure A-14)*
PHRI TEMP. SITE NO: T-52
SITE TYPE: Trail
ELEVATION: 307-349 ft AMSL
VEGETATION: Kiawe, fountain grass
CONDITION: Fair
INTEGRITY: Altered
PROBABLE AGE: Prehistoric/Historic
FUNCTIONAL INTERPRETATION: Transportation
APPROXIMATE SITE AREA: About 2.0 m wide
DESCRIPTION: This trail is lined with boulders—sometimes single boulders and sometimes grouped boulders. Some sections of the trail are paved with cobbles.

SIHP NO: 13007
PHRI TEMP. SITE NO: T-53
SITE TYPE: Complex (3)
ELEVATION: 319-325 ft AMSL
VEGETATION: Koa-haole, grasses, kiawe, fountain grass
CONDITION: Poor; overgrown
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric/Historic
FUNCTIONAL INTERPRETATION: Agriculture
APPROXIMATE SITE AREA: 144.0 sq m
DESCRIPTION: Site 13007 consists of a terrace (Feature A), a rock concentration (Feature B), and a rock mound (Feature C). No cultural remains were found at the site.

The Feature A terrace measures 4.5 m by 4.0-5.0 m by 0.1-0.6 m high. The feature is roughly circular in plan view and consists of stacked cobbles and boulders. The eastern half of the feature interior is paved with boulders and cobbles, and the western half consists of level soil.

The Feature B rock concentration is situated 153 degrees from midpoint of Feature A, 15-20 m from Feature A. The feature measures 2.3 m by 1.0 m by 0.1 m high and consists of a concentration of pebbles and small angular cobbles.

The Feature C rock mound is situated 133 degrees from midpoint of Feature A, 15-20 meters away from Feature A. The feature measures 1.8 m by 1.0 m by 0.4 m high and consists of small boulders and large cobbles. The feature looks very recent.

SIHP NO: 13008
PHRI TEMP. SITE NO: T-54
SITE TYPE: Complex (2)
ELEVATION: 323 ft AMSL
VEGETATION: Fountain grass, kiawe
CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric/Early Historic
FUNCTIONAL INTERPRETATION: Agriculture/quarry
APPROXIMATE SITE AREA: 100.0 sq m
DESCRIPTION: Site 13008 is situated in an open area, on a gentle slope with ropy pahoehoe outcrops. The site consists of two pahoehoe excavations (Features A and B). No cultural remains were found at the site.

Feature A measures 5.0 m by 3.0 m by 0.9 m deep (max.) and consists of a partially collapsed blister from which stones have been excavated. The blister is oval in plan view; within the blister is an empty cache.

Feature B measures about 6.0 m by 3.5 m and consists of a collapsed blister, and an excavation within the blister. The excavation is within the southern portion of the blister and measures about 0.7 m in diameter.

Figure A-14. SITE 13006, VIEW TO NORTHEAST. (PHRI Neg.1318-13)

SIHP NO: 13009
PHRI TEMP. SITE NO: T-55
SITE TYPE: Complex (16)
ELEVATION: 325-350 ft AMSL
VEGETATION: Kiawe, koa-haole, fountain grass
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Agriculture
APPROXIMATE SITE AREA: 90.0 m by 40.0 m
DESCRIPTION: Site 13009 is situated in the inland portion of the project area, on a gentle slope. The site consists of a C-shaped mound (Feature A) and 15 mounds (undesignated).

Feature A is located adjacent to a level area of soil. The feature measures 4.5 m by 1.8 m by 0.5 m (max.) and consists of roughly stacked angular cobbles and a few boulders. Present to the east of the feature is a rock concentration about 1.8 m in diameter. The concentration consists of a single layer of angular cobbles.

The 15 mounds are scattered over the site; the mounds measure an average of 1.5 m in diameter by 0.5 m high. Some mounds are collapsed; others are up to four courses high.

SIHP NO: 13010
PHRI TEMP. SITE NO: T-56
SITE TYPE: Blister
ELEVATION: 340 ft AMSL
VEGETATION: Fountain grass, kiawe
CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Possible agriculture
DIMENSIONS: 1.5 m at opening
DESCRIPTION: Site 13010 is situated downslope of a long rock wall. The site consists of a lava blister circular in plan view. Present in and along the perimeter of the blister are a few cobbles and boulders. No cultural remains were found at the site.

SIHP NO: 13011
PHRI TEMP. SITE NO: T-57
SITE TYPE: Complex (2)
ELEVATION: 343 ft AMSL
VEGETATION: Fountain grass, kiawe
CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Possibly historic
FUNCTIONAL INTERPRETATION: Possible burial
APPROXIMATE SITE AREA: 6.5 m by 3.0 m
DESCRIPTION: Site 13011 is situated on a pahoehoe outcrop southwest of a rock wall. The site consists of two terraces (Features A and B), one built atop the other. No cultural remains were found at the site.

Feature A, the larger basal terrace, measures about 7.0 m by 3.5 m by 0.35-0.45 m high. The terrace consists of stacked large pahoehoe cobbles and small boulders, some upright. Present about 4.0 m north of Feature A is an upright stone about 0.6 m in height.

Feature B is located in the southeast quarter of Feature A. The feature measures about 1.0 m by 2.0 m and consists of a compartment defined by several upright boulders. The floor of this compartment is paved with relatively small cobbles.

SIHP NO: 13012 *(Figure A-15)*
PHRI TEMP. SITE NO: T-58
SITE TYPE: Cave
ELEVATION: 352 ft AMSL
VEGETATION: Koa-haole, noni, air plant, fountain grass, kiawe, 'ilima
CONDITION: Fair-poor
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Temp. habitation
APPROXIMATE SITE AREA: 6.6 N-S by 12.7 E-W by 0.5-1.7 m high.
DESCRIPTION: The site 13012 cave is situated on a gentle slope facing northwest. The cave opening forms a horizontal plane; i.e., one descends into the cave. The main chamber of the cave is irregular in plan view; the cave continues to the east, but the east portion is narrow and was not explored. Within the cave, below the entrance, are several roughly aligned boulders. Almost abutting the boulders, to the east, is a platform consisting of a perimeter of loose boulders which retain an interior of cobbles. The platform measures about 5.0 m by 3.0 m by 0.8 m high. On the platform and near it are goat remains. East of the platform is a soil deposit that contains scattered shell midden, and farther east, toward the unexplored portion of the cave, a dog tooth was found.

SIHP NO: 13013 *(Figure A-16)*
PHRI TEMP. SITE NO: T-59
SITE TYPE: Complex (4)
ELEVATION: 340-350 ft AMSL

VEGETATION: Koa-haole, kiawe, Christmas-berry, fountain grass, air plant, lantana
CONDITION: Fair
INTEGRITY: Altered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Agriculture/habitation/storage/indeterminate
APPROXIMATE SITE AREA: 8.6 m E-W by 10.3 m N-S
DESCRIPTION: Site 13013 is situated in the inland portion of the project area, on a gently sloping pahoehoe flow. The site consists of an enclosure with a rock mound (Feature A), a terrace (Feature B), a pahoehoe excavation (Feature C), and a rock alignment (Feature D). No cultural remains were found at the site.

Feature A measures about 10.0 by 6.0 meters by 0.5-0.7 m high. The rock mound portion of the feature is on the east and measures about three meters in diameter by 0.5 m high. The mound consists of stacked cobbles and small boulders. The enclosure portion of the feature measures about 8.0 m by 4.0 m and consists of cobbles and boulders very roughly stacked around a cleared area measuring about 9.0 sq m. The floor of the cleared area is very rough.

The Feature B terrace is situated about 2.0 m northeast of Feature A. The terrace measures about 3.0 m by 3.0 m and consists of cobbles and small boulders stacked about the base of a pahoehoe outcrop. The upper surface of the terrace is level with the base of the outcrop.

The Feature C pahoehoe excavation is situated about 4.0 m north of Feature A. The feature consists of a c. 1.50 m in diameter by 0.85 m deep hole surrounded by pahoehoe cobbles and boulders; the cobbles and boulders have apparently been cleared from the hole.

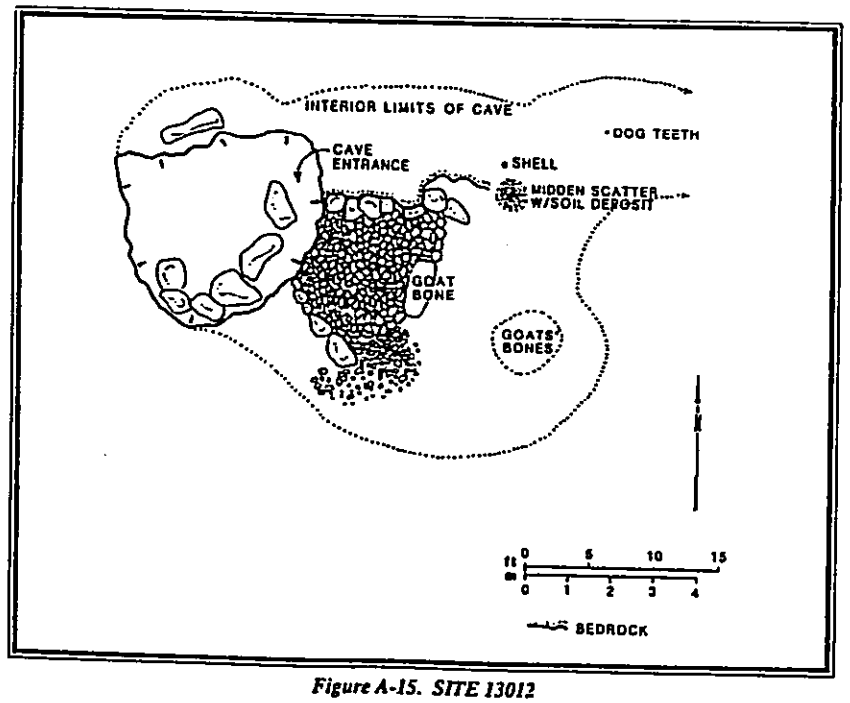

Figure A-15. SITE 13012

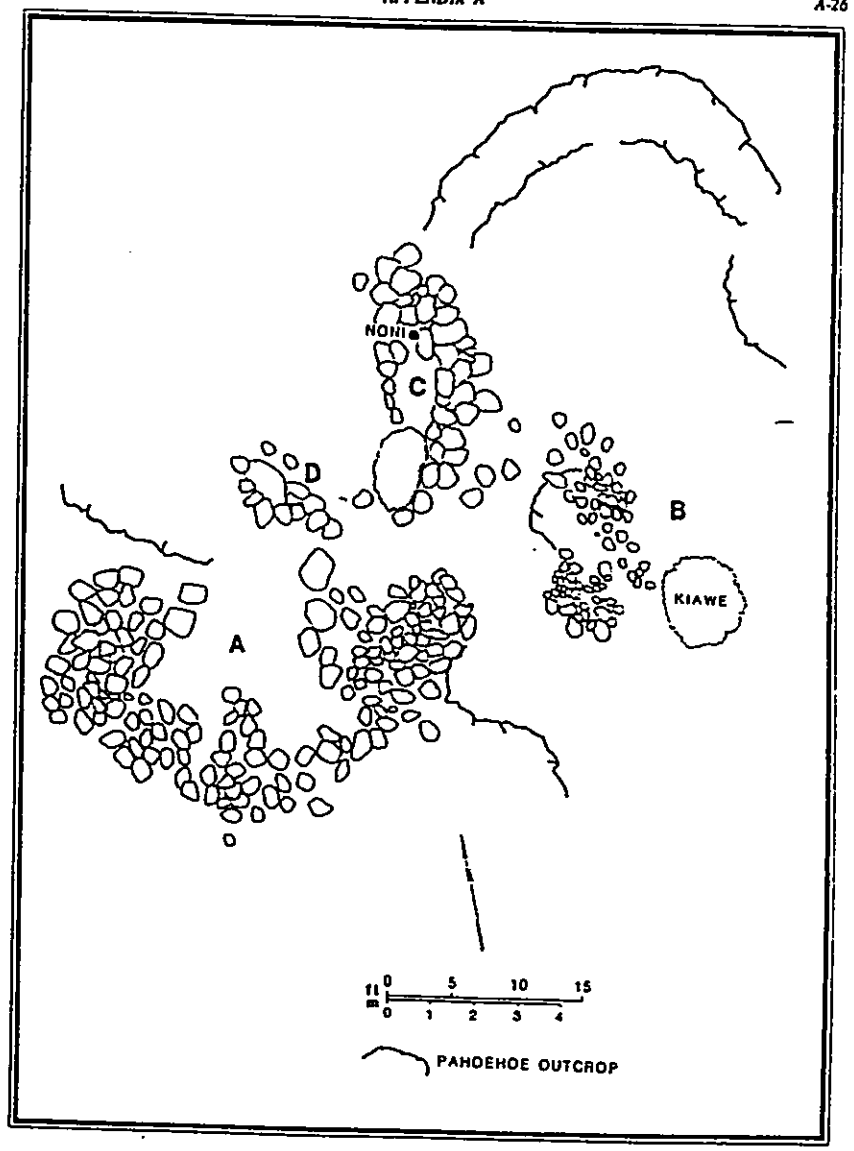

Figure A-16. SITE 13013

Feature D is situated about 1.0 m north of Feature A. It measures about 2.5 m long by 1.0 m wide. The feature consists of a single course of aligned angular small boulders. The boulders touch each other loosely. Feature D may constitute the northern extent of Feature A.

SIHP NO: 13014
PHRI TEMP. SITE NO: T-60
SITE TYPE: Complex (7)
ELEVATION: 341-353 ft AMSL
VEGETATION: Fountain grass, air plant, koa-haole
CONDITION: Poor-Good
INTEGRITY: Altered/Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Agricultural, possible burial, possible marker
APPROXIMATE SITE AREA: 30.8 m NW-SE by 23.0 m SW-NE
DESCRIPTION: Site 13014 is a complex situated in an area of pahoehoe outcrops and undulating sloping land. Excavated blocks are strewn throughout the site. The site consists of three terraces (Features A,D, and E), a filled crevice (Feature B), a paved area (Feature C), a cairn (Feature F), and a modified outcrop (Feature G). The only cultural remains from the site were found at Feature B (crevice).

Feature A occupies an area that covers about 11.0 m by 5.0 m. The feature consists of a terrace; the terrace consists partly of groups of stones and partly of bedrock. The principal group of stones is located in the northern portion of the terrace and occupies an area measuring about 3.0 by 3.0 m. In the southern portion of the terrace are two smaller groups of stones, one consisting of a short alignment and a few loose pahoehoe slabs, and the other consisting of four stones placed together. Near the central portion of the terrace is an area consisting of bedrock which has been partly levelled with cobbles.

Feature B is situated about 20.8 m at 184 degrees Az from Feature A. The feature measures 7.7 m by 0.5 m and consists of a linear crevice oriented SE-NW. Pahoehoe clinkers are present about the northwest end of the crevice. At the southeast end are excavated pahoehoe boulders. Cobbles, and clinkers fill the crevice.

Feature C is situated immediately north of Feature B. The feature measures about 1.65 m by 1.81 m by 0.30 m high and consists of an area of well-paved cobbles and clinkers. The area is semi-circular in plan view. The feature may represent a burial.

Feature D is situated about 3.5 m north of Feature C. It measures about 4.7 m by 3.0 m and consists of a fairly flat bed of pahoehoe clinkers and cobbles. The feature is generally rectangular in plan view. Haphazardly strewn pahoehoe blocks are present west of feature.

Feature E is situated about 11.5 m from Feature F. The feature is generally rectangular in plan view; it measures about 4.0 m by 3.0 m and consists of a bed of pahoehoe boulders and cobbles placed between two pahoehoe outcrops. A portion of the southwest side of the terrace is faced.

The Feature F cairn is situated about 11.5 m southwest of Feature E. The cairn measures about 1.2 m by 1.1 m by 0.7 m high and consists of pahoehoe boulders and cobbles stacked four to five courses high on a pahoehoe outcrop. The northwest face of the cairn is collapsed. Feature F may have functioned as a trail marker.

The Feature G modified outcrop is situated 180 degrees Az of Feature D. The feature measures 10.0 m N-S by 10.0 m E-W and consists of an outcrop and an associated mound. The mound is C-shaped and consists of pahoehoe cobbles stacked one to four courses high. The mound joins two ends of a curved pahoehoe outcrop, and along with the outcrop forms a circular structure which encloses a partially paved area. In the southern portion of the feature is a small paved area that measures 2.5 m by 1.5 m. Some edges of the outcrop have been excavated.

SIHP NO: 13015
PHRI TEMP. SITE NO: T-61
SITE TYPE: Complex (2)
ELEVATION: 321 ft AMSL
VEGETATION: Koa-haole, fountain grass, kiawe
CONDITION: Fair to poor
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Agriculture/ possible burial
APPROXIMATE SITE DIMENSIONS: 9.0 m N-S by 6.0 m E-W
DESCRIPTION: This site is located inland on a sloping pahoehoe flow, and consists of two features. One is a mound of pahoehoe boulders and cobbles on a pahoehoe outcrop, and the other is a modified outcrop that has a crevice filled with pahoehoe cobbles and boulders. No cultural remains were found at the site.

Feature A is a mound of cobbles and boulders about 10.0 m NE of a bulldozed road. It is located about 2.0 m at 100 degrees Az from Feature B. The dimensions are 5.5 m N-S by 3.8 m E-W. It is built on pahoehoe bedrock, and it is roughly semi-circular or pie-shaped. Feature A may be an agricultural mound, a collapsed platform, or possible burial.

Feature B is a crevice filled with cobbles and boulders located about 2.0 m at 0 degrees Az from Feature A. Its dimensions are 2.5 m N-S by 2.3 m E-W. Its function may be related to agriculture, and it is also a possible burial.

SIHP NO: 13016
PHRI TEMP. SITE NO: T-62
SITE TYPE: Paving
ELEVATION: 327 ft AMSL
VEGETATION: Fountain grass, kiawe
CONDITION: Poor
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Possible burial
DIMENSIONS: 3.0 m by 1.5-2.0 m
DESCRIPTION: This paved area is located directly south of a kerbstone trail. It is built of angular basalt cobbles, with an edging of small boulders. This is possibly a natural crevice in the pahoehoe, refilled with cobbles to form a loosely paved surface level with the surrounding ground. No cultural remains were found.

SIHP NO: 13017
PHRI TEMP. SITE NO: T-63
SITE TYPE: Terrace
ELEVATION: 342 ft AMSL
VEGETATION: Kiawe, koa-haole, 'ilima, bunch grasses, noni
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric/Historic
FUNCTIONAL INTERPRETATION: Possibly agricultural; temporary habitation, burial
DIMENSIONS: 7.3 m E-W by 6.5 m N-S
DESCRIPTION: This terrace is situated inland on a natural pahoehoe outcrop that has been modified. It is on a gentle slope, with the ocean to the southwest. The outcrop is 12.0 m long and 5.8 m wide. Two possible pahoehoe excavations were made in the bedrock, one of which was a 1.58 m semi-circular excavation at the edge, and the other a circular 1.55 m by 1.00 m excavation about 3.5 m from the north edge of bedrock. The later excavation is filled with soil and cobbles. On both the east and west sides of the outcrop are collapsed terraces consisting of pahoehoe cobbles. No cultural remains were observed at the site.

SIHP NO: 13018
PHRI TEMP. SITE NO: T-64
SITE TYPE: Complex (24)
ELEVATION: 328 ft AMSL
VEGETATION: Bunch grasses, noni, koa-haole, lichens
CONDITION: Poor
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric/Historic
FUNCTIONAL INTERPRETATION: Agricultural, indeterminate
APPROXIMATE SITE DIMENSIONS: 35.0 m by 35.0 m
DESCRIPTION: This site is located inland on an old pahoehoe flow, on a gentle mountain slope trending southwest, in a depression. It is a complex made up of 15 areas on modified outcrops and nine pahoehoe excavations. The feature morphology suggests a functional interpretation of agriculture, but this has not been determined with certainty. A large, cobble-sized hammerstone of waterworn basalt was found within this site.

SIHP NO: 13019 *(Figures A-17 and A-18)*
PHRI TEMP. SITE NO: T-65
SITE TYPE: Lava tube
ELEVATION: 323 ft AMSL
VEGETATION: Koa-haole, lichens, bunch grasses
CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric/Historic
FUNCTIONAL INTERPRETATION: Temporary habitation
DIMENSIONS: 12.4 m by 27.7 m
DESCRIPTION: This natural lava tube is located inland on an old pahoehoe flow, on mountain terrain that slopes gently to the south and southwest. It has at least two entrances, both of which look natural, but they may have been extended by pahoehoe excavations. Inside one of the entrances is a circular pit 37-54 cm in diameter, and 5 cm deep. Three additional openings were found that are too small for entrances; one is a modified outcrop, and the other two are pahoehoe excavations (subsequently, a fourth opening was found, but its origin is from modern heavy equipment). The functional interpretation of the lava tube as a habitation is based on the presence of volcanic glass debitage and kitchen midden. In addition to the volcanic glass, cultural remains included several gourd fragments, kukui nut shells, marine shells, charcoal, faunal bone, waterworn vesicular basalt stones, and a coral abrader.

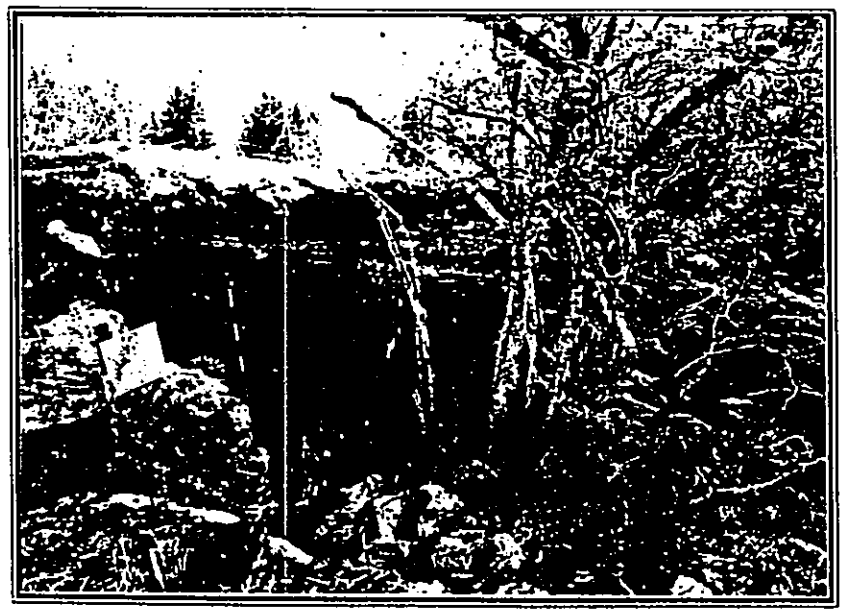

Figure A-17. SITE 13019. VIEW TO EAST. (PHRI Neg.1317-19)

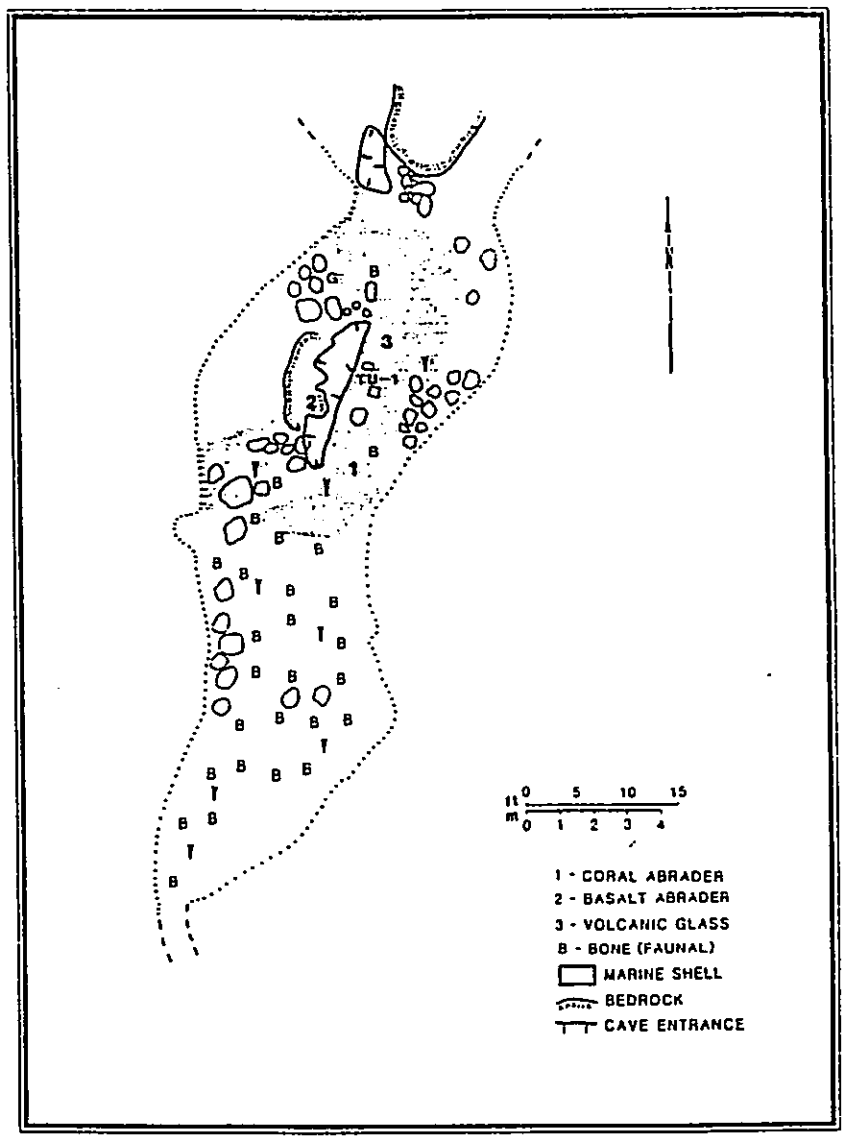

Figure A-18. SITE 13019

SIHP NO: 13020
PHRI TEMP. SITE NO: T-66
SITE TYPE: Complex (17)
ELEVATION: 320 ft AMSL
VEGETATION: Noni, bunch grass, koa-haole, lichens, 'ilima, opuntia
CONDITION: Poor
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric/Historic
FUNCTIONAL INTERPRETATION: Agriculture/quarry/ indeterminate
APPROXIMATE SITE DIMENSIONS: 42.6 m by 37.0 m
DESCRIPTION: This site is located inland on pahoehoe and aa lavas, on a gentle southwest mountain slope. It is a complex consisting of 14 pahoehoe excavations, two areas of rock-filled crevices, and a rock pile. Other areas of loosely piled pahoehoe blocks are apparently associated with excavations. There are also four areas that are possibly paved. No cultural remains were found at the site.

SIHP NO: 13021
PHRI TEMP. SITE NO: T-69
SITE TYPE: Complex (5)
ELEVATION: 337 ft AMSL
VEGETATION: Koa-haole, bunch grasses, lichens
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric/historic
FUNCTIONAL INTERPRETATION: Agriculture
APPROXIMATE SITE DIMENSIONS: 18.1 m by 10.5 m
DESCRIPTION: This site is located inland on pahoehoe that slopes gently to the southwest. It is situated 20 m southwest of the bifaced wall on the mauka boundary of the project. The site is a complex consisting of three small modified outcrops and two probable terraces. One of the terraces is constructed of 7-60 cm pahoehoe blocks loosely piled on the south slope of an outcrop. The second terrace consists of 5-50 cm in diameter pahoehoe cobbles loosely piled on an outcrop, making a small, somewhat even surface. The three modified outcrops each have 10-35 cm in diameter pahoehoe cobbles, piled loosely in cracks of the pahoehoe bedrock. None of these is large enough for a burial. No cultural remains were observed at the site.

SIHP NO: 13022
PHRI TEMP. SITE NO: T-70
SITE TYPE: Complex (2)
ELEVATION: 340 ft AMSL
VEGETATION: Bunch grass, koa-haole, lichens
CONDITION: Poor
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric/Historic
FUNCTIONAL INTERPRETATION: Markers
APPROXIMATE SITE DIMENSIONS: 24.0 m by 10.0 m
DESCRIPTION: Located inland on a gently sloping pahoehoe flow, south of Site T-64; This complex consists of two collapsed cairns, each constructed of 20-50 cm in diameter pahoehoe blocks. One cairn is atop a pahoehoe excavation. No cultural remains were observed at the site.

SIHP NO: 13023
PHRI TEMP. SITE NO: T-73
SITE TYPE: Complex (8)
ELEVATION: 348 ft AMSL
VEGETATION: Bunch grass, koa-haole, lichens, noni, kiawe
CONDITION: Poor
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric/Historic
FUNCTIONAL INTERPRETATION: Agriculture
APPROXIMATE SITE DIMENSIONS: 25.5 m by 25.0 m
DESCRIPTION: Located inland on a gently sloping pahoehoe flow. This complex is about 50 m southeast of the bifaced wall that cuts through the project area, and the wall on the northeast boundary of the project area runs across the complex. The complex consists of an agricultural terrace, six possible pahoehoe excavations, and a rock pile made up of blocks of pahoehoe. The possible terrace is set in a bedrock depression, the floor of which is covered with 7-70 cm in diameter cobbles and boulders, making a somewhat uneven surface. No cultural remains were found at the site.

SIHP NO: 13024 *(Figure A-19)*
PHRI TEMP. SITE NO: T-74
SITE TYPE: Complex (2)
ELEVATION: 193 ft AMSL
VEGETATION: Bunch grass, bougainvillea, koa-haole, 'ilima
CONDITION: Poor to good
INTEGRITY: Mostly unaltered; portions bulldozed
PROBABLE AGE: Prehistoric/Historic
FUNCTIONAL INTERPRETATION: Quarry-marker/ indeterminate
APPROXIMATE SITE AREA: 22.0 m by 16.0 m by 1.0 m
DESCRIPTION: This complex is made up of two features located inland on a gently sloping pahoehoe flow. One is a cairn, and the other a pahoehoe excavation.

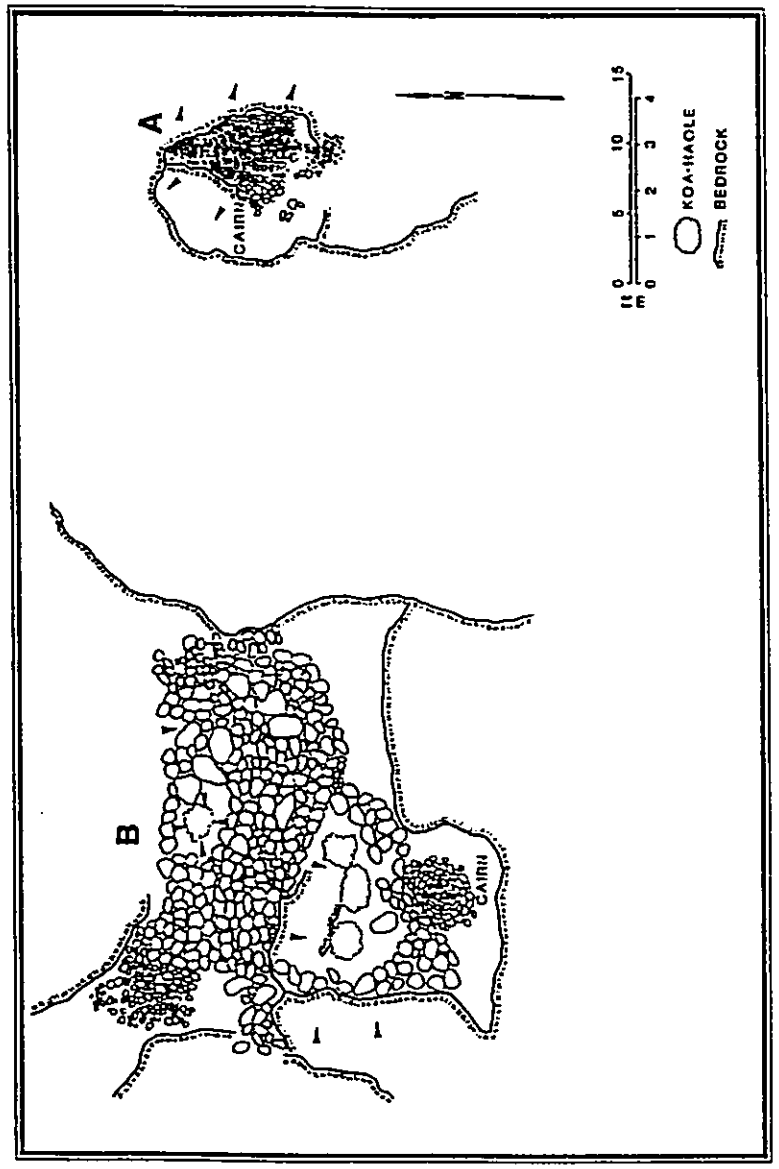

Figure A-19. SITE 13024

Figure A-19. SITE 13024

Feature A is a cairn constructed of pahoehoe cobbles and boulders loosely piled. A bulldozer has flattened the cairn on the east end. There is a scatter of marine shell (bivalve, gastropod), and some soil accumulated in folds of the pahoehoe about the cairn.

Feature B is a pahoehoe excavation. Pahoehoe blocks are piled in a line (ll.0 m long) around it. Nearby is a curved alignment of rocks which may be related to the feature. No cultural remains were observed at the feature.

SIHP NO: 13025
PHRI TEMP. SITE NO: T-75
SITE TYPE: Pahoehoe excavation
ELEVATION: 171 ft AMSL
VEGETATION: Koa-haole, lichens, bunch grass, opuntia
CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric/Historic
FUNCTIONAL INTERPRETATION: Agriculture
APPROXIMATE SITE DIMENSIONS: 20.0 m by 25.0 m
DESCRIPTION: This site is located inland on a southwest-sloping pahoehoe flow, 20 m south of a road. The excavation has blocks piled around it on all sides. No cultural remains were found at the site.

SIHP NO: 13026 *(Figure A-20)*
PHRI TEMP. SITE NO: T-76
SITE TYPE: Terrace
ELEVATION: 143 ft AMSL
VEGETATION: Koa-haole, 'ilima, bunch grass
CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric/Historic
FUNCTIONAL INTERPRETATION: Agriculture
APPROXIMATE SITE DIMENSIONS: 3.0 m by 2.8 m
DESCRIPTION: This site is located on a gently sloping pahoehoe flow, 50 m northeast of Site T-77. The terrace consists of 0.1-0.5 m blocks stacked one to three courses high; the northwest side of the terrace is faced. On the west side of the terrace is what may be a pahoehoe excavation in bedrock. The south and west sides have slightly faced edges. No cultural remains were observed at the site.

SIHP NO: 13027
PHRI TEMP. SITE NO: T-77
SITE TYPE: Pahoehoe excavation
ELEVATION: 106 ft AMSL
VEGETATION: Koa-haole, bunch grass, 'ilima, lichens, bougainvillea
CONDITION: Fair
INTEGRITY: Mostly unaltered; portions bulldozed
PROBABLE AGE: Prehistoric/Historic
FUNCTIONAL INTERPRETATION: Quarry/ indeterminate
APPROXIMATE SITE DIMENSIONS: 55.0 m by 40.0 m
DESCRIPTION: This site is located on a pahoehoe flow that slopes gently to the southwest. The excavation consists of one long and two short areas. One of the short areas opens into a small 3.0 by 3.0 m lava tube; this tube has a c. 0.55 m high ceiling and a c. 14 inch deposit of fine brown silt. No charcoal or cultural debris was noted in the silt.

SIHP NO: 13028 *(Figure A-21)*
PHRI TEMP. SITE NO: T-78
SITE TYPE: Complex (4)
ELEVATION: 198 ft AMSL
VEGETATION: Koa-haole, bunch grass, 'ilima, bougainvillea, lichens
CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric/Historic
FUNCTIONAL INTERPRETATION: Marker-agriculture/ quarry
APPROXIMATE SITE AREA: 1.0 m N-S by 1.0 m E-W
DESCRIPTION: This site is located on a gently sloping pahoehoe flow; the site consists of one cairn and three pahoehoe excavations. The cairn consists of six to nine courses of pahoehoe cobbles and boulders; the cairn is taller than wide, and one flat slab sits atop it. No cultural remains were found at the site.

SIHP NO: 13029 *(Figure A-22)*
PHRI TEMP. SITE NO: T-79
SITE TYPE: Enclosure
ELEVATION: 197 ft AMSL
VEGETATION: Koa-haole, bunch grass, lichens
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric/Historic
FUNCTIONAL INTERPRETATION: Temp. habitation
APPROXIMATE SITE DIMENSIONS: 6.0 m by 11.4 m by 0.10 m to 0.70 m
DESCRIPTION: This enclosure is located inland on a southwest-sloping pahoehoe flow. Its walls measure 0.10 to 0.70 m high on the inside. Where not collapsed, the inside walls are faced and vertical. The corners are rounded. The central portion of the floor consists of pahoehoe bedrock. Many slabs are scattered across the floor. The east wall is 0.80 to 0.90 m wide, two to five courses high, and set against a pahoehoe cliff. The north wall slopes to ground level on its exterior edge. On the interior, it is four to six courses

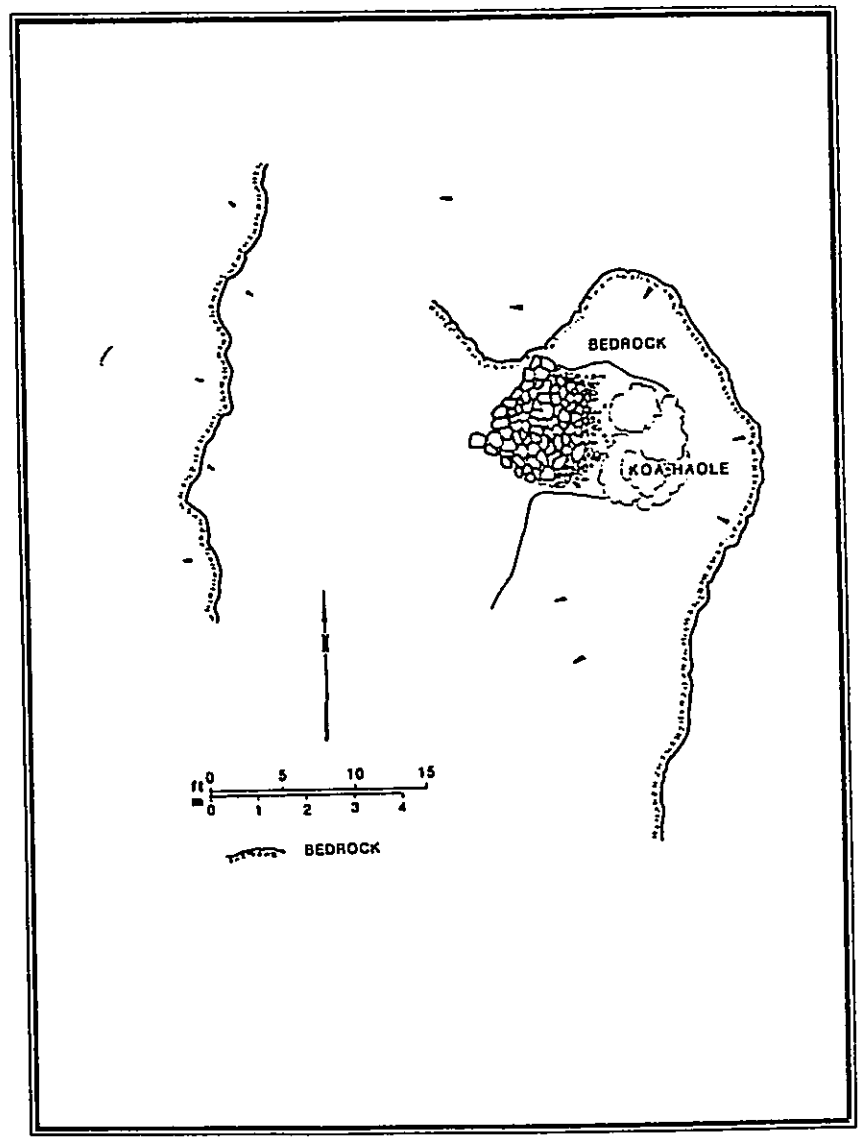

Figure A-20. SITE 13026

Figure A-21. SITE 13028. VIEW TO SOUTH. (PHRI Neg.1320-5)

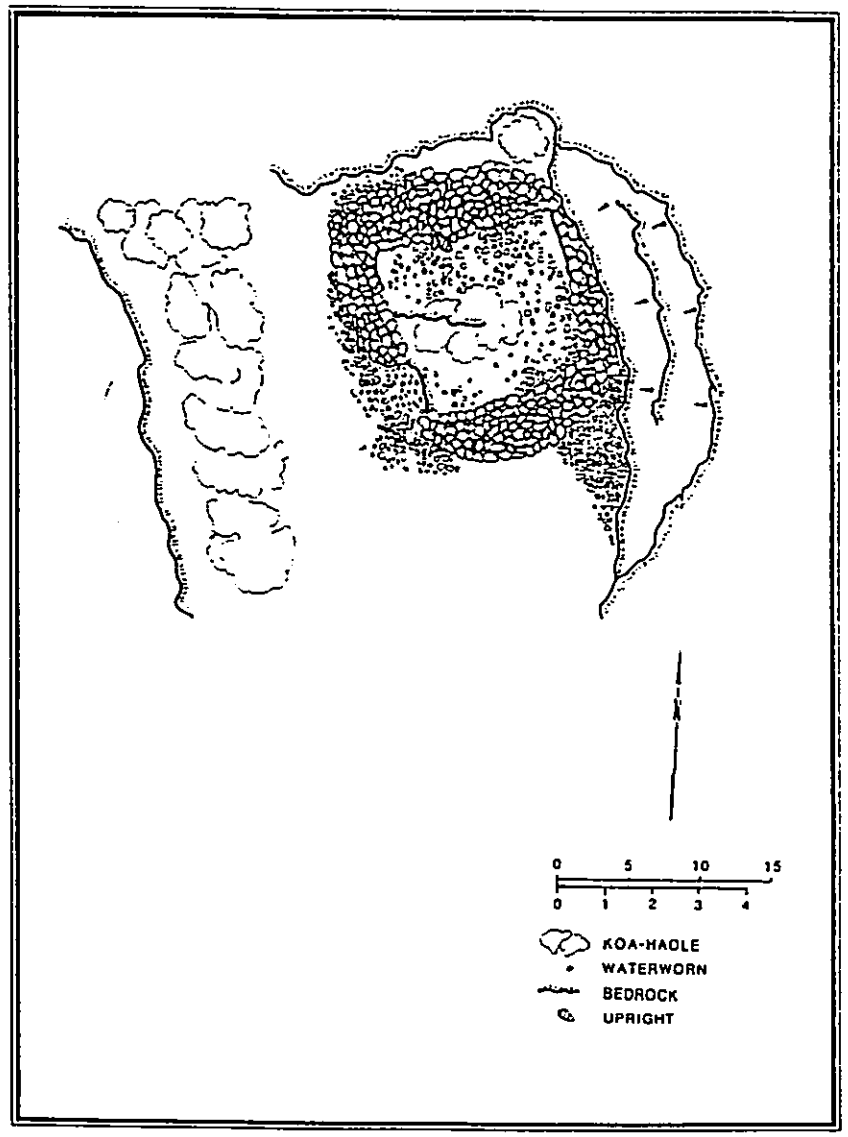

Figure A-22. Site 13029

high. On the west interior corner is a 1.20 m opening in the wall. The opening is 0.75 m deep. The west wall is c. 1.50 m wide and is one to five courses high with a possible entrance 0.86 m wide on the south edge. The entrance base is pahoehoe bedrock with a natural step down. A small waterworn pebble was found at the entrance. The south wall is four to five courses high, 0.70 to 1.10 m wide, and may also have been faced on the exterior. There is a pahoehoe excavation c. 1.0 m from the northwest corner, and possibly another c. 1.0 m below the entrance. Cultural remains at the site include the 0.03 m waterworn basalt pebble, and a 0.14 by 0.22 m waterworn vesicular basalt cobble found in the enclosure, in an almost upright position.

SIHP NO: 13030
PHRI TEMP. SITE NO: T-80
SITE TYPE: Pahoehoe excavation (2)
ELEVATION: 198 ft AMSL
VEGETATION: Koa-haole, bunch grass, lichens
CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric/Historic
FUNCTIONAL INTERPRETATION: Quarry/agriculture
APPROXIMATE SITE DIMENSIONS: 20.0 m by 10.0 m
DESCRIPTION: This site is located on a pahoehoe flow that slopes gently to the southwest. Site T-79 is c. 30 m SSE of this site. Site 13030 consists of two pahoehoe excavations, each measuring c. 1.5 by 2.0 m, and each having pahoehoe blocks piled around the edges. No cultural remains were observed at the site.

SIHP NO: 13031
PHRI TEMP. SITE NO: T-81
SITE TYPE: Wall
ELEVATION: 100 ft AMSL
VEGETATION: Koa-haole, fountain grass, vines
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric/Historic
FUNCTIONAL INTERPRETATION: Indeterminate
APPROXIMATE SITE AREA: 17.0 m long
DESCRIPTION: This site is located on a section of relatively steeply sloping pahoehoe flow. The site consists of a wall that runs north-south for 10.0 m, then turns northeast and continues for another 7.0 m. The wall is C-shaped, built with a mounding effect. It is possibly an old faced wall that has collapsed. Built with large boulders on the lower side, it is in-filled with smaller cobbles. It may have been built to retain soil on the side of the hill, but its function is indeterminate. No cultural remains were observed at the site.

SIHP NO: 13032 *(Figure A-23)*
PHRI TEMP. SITE NO: T-82
SITE TYPE: Overhang
ELEVATION: 117 ft AMSL
VEGETATION: Koa-haole, fountain grass, kiawe
CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric/Historic
FUNCTIONAL INTERPRETATION: Temp. habitation
APPROXIMATE SITE DIMENSIONS: 2.80 m by 2.00 m by 1.36 m high
DESCRIPTION: Located on an inland pahoehoe flow that slopes to the southwest. The site consists of a small rock overhang on the side of a slope. The overhang is built in a pahoehoe outcrop, and has a gradual slope to the back of it. A raised rock outcrop on the floor yielded kukui nut, charcoal, and marine shell remains. Elsewhere within the overhang, a golf ball was found.

SIHP NO: 13033
PHRI TEMP. SITE NO: T-83
SITE TYPE: Cairn
ELEVATION: 237 ft AMSL
VEGETATION: Koa-haole, kiawe, akia, morning glory
CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric/Historic
FUNCTIONAL INTERPRETATION: Marker
APPROXIMATE SITE DIMENSIONS: 0.28 cm by 0.23 cm by 0.37 cm high
DESCRIPTION: Located inland on a southwest slope. This cairn is situated in a 5 degree line about 200 m from the most prominent kiawe tree in the area. It consists of small, angular basalt boulders. No cultural remains were observed at the site.

SIHP NO: 13181
PHRI TEMP. SITE NO.: T-7
SITE TYPE: Complex (4 Features)
ELEVATION: 175 ft AMSL
VEGETATION: Kiawe, koa-haole, and fountain grass
CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Possible burial
APPROXIMATE SITE DIMENSIONS: 40.0 m N-S by 15.0 E-W
DESCRIPTION: The site consists of four platforms. There are two platforms in Feature A and one each in Features B and C. Two marine shell fragments were observed on Feature A.

Feature A consists of two adjacent platforms measuring 14.00 m by 7.00 m by 2.50 m maximum height. They are located on top of a linear outcrop oriented north/south and consist of small basalt boulders and medium to large cobbles. The north platform is roughly rectangular with a fairly flat and level surface, and is faced on the NE, NW, and SE sides. The faces are three to six courses high (0.40 m to 1.25 m). The south and southwest sides are built against the central portion of the outcrop. The dimensions are 3.5 m N-S by 3.5 m E-W. The south platform is also roughly rectangular and is about 0.50 m lower on the outcrop than the north platform. The surface is also paved and leveled with large pahoehoe cobble fill. The structure is faced on the SW, NW, and east sides with small boulders from two to four courses high (0.50 m to 0.75 m high) The dimensions are 3.0 m N-S by 3.0 m E-W. Two pices of marine shall were found on this feature.

Feature B measures 6.80 m by 4.00 m by 1.50 m maximum height. This D-shaped platform is located c. 30 m from Feature A at 351 degrees Az. It consists of pahoehoe boulders and cobbles. The south and west sides of the platform are faced, and range in height from 1.5 m at the west end to 0.5 m at the south end. The north side abuts a relatively vertical bedrock face and has an average height of 0.90 m.

Feature C is 5.80 m by 5.50 m by 1.50 m maximum height. This D-shaped platform is located 12.0 m from Feature A at 225 degrees Az. It consists of pahoehoe boulders to cobbles. The north, south, and east sides of the platform are faced, and the western, straight side abuts a nearly vertical bedrock face. The faced sides range in height from 1.5 m to 0.7m, and the west side averages 0.5 m. A small rectangular depression 0.60 m by 0.45 m is located at the eastern end of the platform.

Figure A-23. SITE 13032. VIEW TO EAST. (PHRI Neg.1320-10)

APPENDIX B

LIMITED HISTORICAL DOCUMENTARY RESEARCH

ARCHAEOLOGICAL INVENTORY SURVEY, HONOKOHAU INDUSTRIAL PARK (PARCEL VII)

by Helen Wong Smith, B.A.

Honokohau (literally, "bay drawing dew") 2nd is also known as Honokohau Iki to distinguish it from the much larger Honokohau 1st, or Honokohau Nui. Although many archaeological surveys have been conducted in Honokohau, most have been limited to Honokohau Nui. For this reason, an extensive reporting on these surveys is not given here. Some of the results of these surveys are presented to reflect possible similarities with Honokohau Iki.

Legendary references specific to Honokohau Iki are lacking. Of the Kona area in general, Handy and Handy offer the following:

> The most interesting mythological and legendary materials relating to Kona have to do directly or indirectly with Lono....The story of the origin of the Makahiki rain and harvest festival...bring Lono from Kahiki, whither he returns....From Kona we have the written record of a myth of Kumuhonua, whose writer says that Lono was a fisherman and yet ends his story by stating that the events related occurred before men peopled the earth....Disregarding the inconsistencies in orally transmitted lore, the point of interest with respect to Lono is that he is plainly identified with Kona, Hawaii, and is said to have introduced the main food plants, taro, sweet potato, yams, sugar cane and bananas to Hawaii, and also 'awa. Hogs were likewise identified with Lono, but there is no mention of his having brought them to Hawaii (Handy and Handy 1972:522).

Native historian Samuel Kamakau tells of a ritual practiced by kahuna 'ana'ana (sorcerers who practiced black magic and counter-sorcery, such as praying a person to death), and relates that it was last performed at Honokohau, Kona:

> ...when there was a dead king or a high chief whose cause of death he (kahuna 'ana'ana) was to divine, an audience would gather to listen to the kahuna's words of prophecy and divination ('olelo wanana a me na 'olelo hoakaka). Before making his divination, he prayed and threw in the maunu, the personal "bait," of the dead chief into the fire, and as he continued praying, he fought with the "devil" (diabolo, the spirit of the person who had caused the death). It was the spirit of the living person, his kahoaka, that was fighting with the kahuna. He fell on the ground and rose again, still praying; fell down again, and rose up—and so on it went. If it was the kahoaka of a high chief, the crowd would see gashes on the head of the kahuna, and blood flowing. There are perhaps some still living who witnessed the kuni ceremony of Kalawai'amilu for Ka'oleioku at Napuoko's fireplace at Honokohau, Hawaii [Ka'oleioku died in 1818] (Kamakau 1964:121-122).

There are few references that describe the land in this area. The inhospitable conditions of much of the terrain forced most travel among foreigners—between Kawaihae and Kailua—to be conducted by ship or by canoe, with short stops along the coast as needed (Silva 1987:7). On his famous tour of the island in 1823, Reverend William Ellis wrote of the North Kona district:

> The northern part, including Kairua, Kearake'kua and Honaunau, contains a dense population, and the sides of the mountain are cultivated to a considerable extent; but the south part presents a most inhospitable aspect. Its population is thin, consisting principally of fishermen, who cultivate but little land, and that at the distance of from five to seven miles from the shore (Ellis 1963:126).

Of the North Kona district in general, Handy and Handy offer this description:

> In North Kona dry taro flourishes only in the uplands, which are now largely given over to ranching, though some Hawaiians still have taro plantations above Kalaoa....
>
> The walls (pa aina), seen today in Kona lowlands running across old boundary lines, were built to keep cattle out of the planting areas after they became a pest early in the 19th century.
>
> Kona, like eastern Maui, with its decomposing lava mixed with humus and with intermittent rainfall which soaks away quickly in the porous soil and rock, is ideal for sweet potato cultivation...

> Today sweet potatoes are planted by many Hawaiians living along the coast of Kona, either in the sandy soil near the shore at places like Hookena, Kealia, and Honaunau, or in spots where there is sufficient soil in the midst of the dry lava. Two sizable plantations were visited in 1935 on the dry slopes half to a mile inland in the Kailua section. Sweet potato flourished at the government experiment station at Kainaliu, at an altitude of 1,500 feet in North Kona; and patches were seen at various points both above and below the "Belt Road," in North and South Kona at altitudes of 1,800 feet. On the plantation zone up to altitudes of more than 2,000 feet, no sweet potatoes were seen (Handy and Handy 1972:523-4, 526-8).

In his survey of beaches of the Big Island, Clark writes this about the Honokohau coast:

> The shoreline of Honokohau once supported a sizeable Hawaiian settlement, as evidenced by the remains of numerous archaeological features. Archaeologists from the Bishop Museum in Honolulu have identified over 200 sites that include almost every known type of precontact structure, indicating a population of several hundred people. The most significant sites include temples, images used to attract fish, house platforms, trails, stone planters, canoe landings and shelters, assembly grounds, salt pans, petroglyphs, burial sites, and three fishponds—'Ai'opio, 'Aimakapa, and Kaloko. The Honokohau settlement demonstrates the close relationship between the early Hawaiians and their environment and is regarded as an important historical and archaeological complex. The National Parks and Recreation Act of 1978 provided for the establishment of the Kaloko-Honokohau National Cultural Park to preserve the integrity of the entire area, but to date, no further progress has been made.
>
> The three fishponds were at the heart of the Honokohau settlement's activity. One of them, 'Aimakapa, is the largest on the entire Kona coast. In addition to its historical significance, 'Aimakapa, with 20 acres of open water and 15 acres of marsh, today provides an important habitat for native and migratory waterbirds, two of which, the ae'o (stilt) and the koloa (Hawaiian duck), are on the endangered species list. Although the Big Island's land area is larger than the rest of the Hawaiian islands combined, the island has very few wetland areas suitable for native waterbirds; the two most important are 'Aimakapa and 'Opae'ula, located a scant 10 miles north at Makalawea...(Clark 1985:112).

In their report on the Honokohau area, Emory and Soehren write:

> The Honokohau coastal area, because of its ideal landing place for canoes and its fishponds, was important to the early Hawaiians. Its fifty ancient house sites, four heiau, and bolua slide, constructed for the use of chiefs, would reveal this to an archaeologist. But we know that in the Great Mahele, the Hawaiian chiefs reserved for themselves the important ahupua'a....Honokohau 1 (Honokohau Nui), with its large fishpond, went to Kekauonohi,...granddaughter of Kamehameha I. Honokohau 2 (Honokohau Iki), with its small fishpond, went to Leleioholu, the husband of Princess Ruth Keelikolani, great-granddaughter of Kamehameha I.
>
> The Hawaiian settlement continued into the first quarter of this century, but its isolation due to the inaccessibility by sea except for small boats and by land except by foot or horseback, until jeep roads were recently introduced, has resulted in its desertation by the Hawaiians (Emory and Soehren 1961:1-2).
>
> Until the 1920's several frame houses stood about the bay and an abandoned schoolhouse and chapel. As little use has been made or is being made of the land other than for stock raising, the sites left by the former inhabitants remain (ibid:4).

In the Hawaiian newspaper, Ka Hoku o Hawaii (June 12, 1924), a native of Honokohau recalls a time when the area was more populated:

> I went about with the boys and girls of those days, lived, ate and slept together in their beloved homes. Honokohau was a well-inhabited land in those days, filled with women and children going about happily in the days of youth. Today the families are gone; loneliness abides, no people, just lava beds, a few coconut trees, and only one man and his children (Anonymous 1924 - translation by Mary K. Pukui).

The Reverend A.A. Baker visited a petroglyph field in the early part of the century. He writes:

> An entirely new group, or rather several groups, of very unusual petroglyphs was found on a recent visit to Honokohau makai, some three or four miles by trail from Kailua. These were found just west of a cement salt pan, on either side of a stone fence leading to the sea, and not far east of the heiau at the side of the fishpond. Here were a number of the Kahaluu type of human figures again, and guns in excellent imitation. There were also three konane stones, as there are also three more in front of the village houses, a circle or so, some English letters, and various unknown figures. Again a stone's throw south of the chapel are a few human figures, one elongated in a very peculiar manner, and a single figure twice as far from the chapel in a line toward the tombs' northeast. Then there are also a half dozen guns and a human figure nearly at the tombs, in the same line from the chapel (Baker 1919:134).

Archaeological sites provide clues about the lifestyle of the people of past times in Honokohau. Most sites are located in Honokohau Nui. The conclusions from the surveys are included here since the physical proximity may provide inferences to Honokohau Iki. In his survey of Big Island sites, Reinecke describes the following in the Honokohau vicinity:

> *Site 34.* A small shallow bay with an excellent canoe landing on the sand. At the west side is a platform with a great pile of boulders. There are a number of sites in the sand at the head of the bay, ending at the east in a platform; exact number cannot be told, [but it] is about six.
>
> *Site 35.* A heiau, name unknown, situated between the bay and a group of brackish pools. It is remarkable for the size of the stones used in its facing and for two great stone slabs, - kuula - fixed in the west or makai side. One slab is 7 x 3 1/4' x 12-15", the other 8' x 4 3/4' x 12-15". But one of the larger stones in the wall is no less than 5 x 4 x 1. The heiau is very carefully constructed the stones being joined with care, and only the S.E. corner being broken down.
>
> The length north and south is 53' with a slight slope to the south. It is built against the lava slope at the north. The width at the north is 25 1/2 x 9', there being a drop of 2 1/2' on the east; the width at the south is 35' - the identity being planned at 6', tho it is slightly less on the makai side. On the N.E. it is 4-2 1/2', the terrace being only about 16' long and merging into the main platform.
>
> At the north end is a house site or more probably a grave, marked by lava and coral pebbles, c. 13 x 10.
>
> Stretching back of the heiau in two directions are pools of brackish water, which have been rather carefully walled into compartments. Between the two arms is a house site, or platform resembling one. A well-built pen about 50 x 50 cuts across the southern arm. There is an entrance, and it must have been used as a stock pen close to a water supply (Reinecke 1930:10).

The heiau described as Site 35 is located near the survey station named Puuoina, noted in Territorial survey records of about 1883. Emory and Soehren describe it as:

> ...situated just inland from Malio Point on the boundary between Kealakehe and Honokohau and at the south side of Aiopio Pond. Stokes (ms) "described as in Honokohau 2, near the shore"...[It] is the finest example of a platform type of heiau in Kona. It stands with its original divisions almost intact in a commanding position on the south shore of Honokohau bay. The great water-worn boulders neatly laid up in the facing of its walls give an impressive appearance to this heiau (Emory and Soehren 1961:36).

The same writers describe other sites of the area as follows:

> Around the point to the west of Puuoina heiau at Alula cove is a fishermen's heiau, remarkable for two great upright stone slabs which rise above the height of the pavement in its seaward retaining wall. These slabs served as fishermen's gods. It lies in the most picturesque setting of clear, emerald-green bathing pools at the rear, is surrounded by ancient house sites, and is adjacent to a coral-sand beach at the head of a protected cove (ibid).

In their survey of North Kona, Ching and Rosendahl note these two features in the general vicinity of the project area:

> *T3* ...part of a trail that appears to run mauka-makai, and crosses the Mamalahoa Trail and the highway centerline at this point...(Ching and Rosendahl 1968:9)
>
> *T2* Apparently an undisturbed monument burial (Bowen 1961:129) of the platform type (Buck 1957:572), this feature is located in a wrinkle on an a'a lava flow just 7 feet NW of the highway centerline. This grave site is roughly rectangular, with a side length of 9 feet (ibid:10).

Soehren conducted a reconnaissance of Honokohau Iki 14 years after his initial one with Emory, and found that "...13 of the 19 features recorded are graves, and only one is a permanent habitation." His survey of parcel 26 partially overlaps the present project area. In parcel 26, he identified the two following sites, one of which is no doubt T3 in the preceding quote:

> 1. An ancient foot trail crosses the S.W. corner of parcel 9 (parcel 33), leading from the ponds at Honokohau toward mauka Kealakehe. Stepping stones of thin lava slabs are used where the trail crosses the rough a'a flow. While this type A trail (Apple 1965) is typical of those connecting the upland gardens and communities with the shore, it apparently terminates at the edge of the a'a flow, and seems to lead only to the series of burials at the base of the flow. It is interesting to note that it crosses the ahupua'a boundary.
>
> 2. The old "Mamalahoa trail,"...traverses the western side of parcel 9...This trail was originally built in the 19th century as a two-horse trail (type C) and subsequently converted to a jeep trail (type D), at least between Kailua and Kaloko. Unlike the ancient foot trails, horse trails were laid out in long, straight lines, and were edged with kerbstones (Apple 1965). Low spots were spanned by built-up causeways (kipapae)...(Soehren 1975).

In summing up the archaeological work in Honokohau, the following assessment by Emory and Soehren is noteworthy:

> It is possible, therefore, to locate the ruins of heiau, house sites, enclosures, and burial grounds, and to see from their location the pattern of ancient settlement. The extension of automobile roads into the area, the creation of a small boat harbor anywhere within it, or any type of modern improvement, is certain to obliterate many traces of the Hawaiian occupation. Unless a record of them is available, sites of archaeological, historical, and "visitor" value are likely to be destroyed where they might otherwise have been preserved (Emory and Soehren 1961:4).

In the Great Mahele, Honokohau Iki was awarded to William Pitt Leleiohoku. He had originally married Nahienaena, the sister of Liholiho (Kamehameha II) and Kauikeaouli (Kamehameha III). Nahienaena died on Dec. 30, 1836; he afterwards married Ruth Keelikolani (Board of Commissioners). Ali'i seldom were required to give testimony for their claims, and thus we are left without any indication of land use at the time of the Mahele. A search at the Hawaii State Archives for references to Honokohau Iki produced two entries from the Land File:

> *Interior Dept., April 25 1866*
> J.H. Kalaiheana...[that the land of Honokohau Iki]...belongs to Keelikolani.
>
> *Public Instruction, March 5, 1912*
> Showing sketch of the above school lot & school building in South & North Kona, Hawaii &c.

It is possible to gain insight on Honokohau Iki by looking at Kealakehe, the ahupua'a that borders Honokohau Iki to the south. From Land Commission Award testimonies, Silva (1987) notes:

> ...claimants listed numerous cultivated parcels (kihapai) planted in taro and sweet potatoes. At least 10 houses, some enclosed with fencing, others not...A fair-sized banana patch was situated in the uplands; two claimants mention this patch (Kaeamai'a) as mauka boundaries.
>
> Eight of these natives trace their use and occupancy of the land from their grandparents during the time of Kamehameha I, making them at least third-generation residents and farmers. Only three claimants acquired their lands since—all three receiving parcels in the early 1840s.
>
> Thus it can be said that Kealakehe supported a fairly stable native population that extended back in time to the late 1700s and possibly earlier.

Land use in Honokohau Iki is briefly summarized in Soehren's report on the ahupua'a. Soehren quotes Handy and Handy (1972):

...predominantly old pahoehoe lava...Such land was marginal to the aboriginal Hawaiian economy, which was based upon horticulture and fishing....It was not until after the introduction of grazing animals, especially goats, that such land became economically productive; until then it served primarily as a source of wild plants having utilitarian value, to be gathered as needed (Handy and Handy IN Soehren 1975).

Considering the small amount of information produced in this limited study, a more intensive study on Honokohau 2nd should include further research into legendary accounts, interviews with residents, and a title search.

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Table 2.

SUMMARY OF IDENTIFIED SITES AND FEATURES

*SIHP Site No.	Formal Site/Feature Type	Tentative Functional Interpretation	#CRM Value Mode Assess. R	I	C	+Field Work Tasks DR	SC	EX
12975	Pahoehoe excavation (Phh exc.)	Quarry/ agriculture	L	L	L	-	-	-
12976	Complex (8)**	Agriculture/ quarry-habitation	M	L	L	+	-	+
A	Phh exc.							
B	Overhang							
C	Rock alignment							
D	Phh. exc.							
-	Phh. exc. (4)							
12977	Complex (2)	Possible marker	L	L	L	-	-	-
A	Rock concentration							
B	Cairn							
12978	Complex (5)	Agriculture/ indeterminate	M	L	L/H	+	-	+
A-1	Wall							
A-2	Alignment							
A-3	Terrace							
B	Terrace							
C	Filled crevice							

* State Inventory of Historic Places (SIHP) numbers. SIHP numbers are five- digit numbers prefixed by 50-10-27 (50=State of Hawaii; 10=Island of Hawaii; 27=USGS 7.5' series quad map ["Keahole Pt., Hawaii"]).

Cultural Resource Management Value Mode Assessment —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; EX = limited excavations

**Number of component features within complex.

Table 2. (cont.)

SIHP Site No.	Formal Site/Feature Type	Tentative Functional Interpretation	CRM Value Mode Assess. R	I	C	Field Work Tasks DR	SC	EX
12979	Cairn	Marker	L	L	L	-	-	-
12980	Complex (2)	Possible burial	M	L	L/H	+	-	+
A	Paved compartment							
B	Upright							
12981	Cave	Habitation	M	L	L	+	+	+
12982	Phh. exc.	Possible quarry/ agriculture	L	L	L	-	-	-
12983	Rock mound (3)	Agriculture	L	L	L	-	-	-
12984	Complex (4)	Habitation/ agriculture	M	L	L	+	+	+
A	Cave							
B	Terrace							
C	Modified outcrop							
D	Phh. exc.							
12985	Cairn	Possible marker	L	L	L	-	-	-
12986	Complex (2)	Possible marker	L	L	L	-	-	-
A	Cairn							
B	Cairn							
12987	Complex (23)	Habitation-quarry/agriculture-indeterminate	M	L	L	+	-	+
A	Cairn							
B	Rock alignment							
C	Enclosure							
D	Enclosure							
-	Phh. exc. (19)							
12988	Complex (5)	Agriculture-habitation	M	L	L	+	-	+
A	C-shape							
B	Terrace							
C	Cleared area							
D	Terrace							
E	Cobble concentration							
12989	Cairn	Marker	L	L	L	-	-	-
12990	Complex (3)	Possible agriculture	M	L	L	-	-	+
A	Terrace							
B	Wall							
C	Cairn							

Table 2. (cont.)

SIHP Site No.	Formal Site/Feature Type	Tentative Functional Interpretation	CRM Value Mode Assess. R	I	C	Field Work Tasks DR	SC	EX
12991	Faced mound	Temp. hab.	L	L	L	-	-	-
12992	Terrace	Agriculture	M	L	L	+	-	+
12993	Terrace	Possible agriculture	M	L	L	+	-	+
12994	Cave	Habitation	M	L	L	+	+	+
12995	Modified outcrop	Possible burial	M	L	L/H	+	-	+
12996 A B	Complex (2) Terrace Cave	Temporary habitation	M	L	L	+	+	+
12997	Terrace	Agriculture	M	L	L	+	-	+
12998	Phh. exc.	Possible quarry/ agriculture	L	L	L	-	-	-
12999 A B C	Complex (3) Rock mound Terrace Rock alignment	Poss.temp.hab./ agriculture	M	L	L	+	-	+
13000 A B	Complex (2) Modified outcrop Filled crevice	Agriculture	M	L	L	+	-	+
13001 A B	Complex (2) Phh. exc. Paving	Possible quarry/ temp.habitation	M	L	L	+	-	+
13002	Cairn	Indeterminate/ possible marker	L	L	L	-	-	-
13003	Enclosure	Temp.habitation	M	L	L	+	-	+
13004 A B C	Complex (3) Wall Phh. exc. Phh. exc.	Agriculture	L	L	L	-	-	-

Table 2. (cont.)

SIHP Site No.	Formal Site/Feature Type	Tentative Functional Interpretation	CRM Value Mode Assess. R	I	C	Field Work Tasks DR	SC	EX
13005 A B C D E F G	Complex (7) Modified outcrop Terrace Rock alignment Phh. exc. Phh. exc. Terrace Rock alignment	Quarry/ indeterminate	M	L	L	+	-	+
13006	Trail	Transportation	M	L	M/H	+	-	+
13007 A B C	Complex (3) Terrace Rock concentration Rock mound	Agriculture	M	L	L	+	-	+
13008 A B	Complex (2) Phh. exc. Phh. exc.	Agriculture/ quarry	M	L	L	+	-	-
13009 A -	Mound complex (16) C-shape mound Mounds (15)	Agriculture	M	L	L	+	-	+
13010	Blister	Possible agriculture	L	L	L	-	-	-
13011 A B	Complex (2) Terrace Terrace	Possible burial	M	L	L/H	+	-	+
13012	Cave	Habitation	M	L	L	+	+	+
13013 A B C D	Complex (4) Enclosure with rock mound Terrace Phh exc. Rock alignment	Agriculture-hab.-storage-indeterminate	M	L	L	+	-	+
13014 A B C D E F G	Complex (7) Terrace Filled crevice Paved area Terrace Terrace Cairn Mod.outcrop	Possible burial-possible marker-agriculture	M	L	L/H	+	-	+

Table 2. (cont.)

SIHP Site No.	Formal Site/Feature Type	Tentative Functional Interpretation	CRM Value Mode Assess. R	I	C	Field Work Tasks DR	SC	EX
13015 A B	Complex (2) Mound Modified outcrop	Agriculture/ Possible burial	M	L	L/H	+	-	+
13016	Paving	Possible burial	M	L	L/H	+	-	+
13017	Terrace	Poss. habitation/ agriculture/burial	M	L	L/H	+	-	+
13018 - -	Complex (24) Mod. outcrop (15) Phh. exc. (9)	Agriculture/ indeterminate	M	L	L	+	-	+
13019	Lava tube	Habitation	M/H	L	L	+	+	+
13020 - - - -	Complex (17) Phh. exc. (14) Filled crevice Filled crevice Rock pile	Agriculture/ quarry/indet.	M	L	L	+	-	+
13021 - -	Complex (5) Mod.outcrop (3) Terrace (2)	Agriculture	M	L	L	+	-	+
13022 -	Complex (2) Cairn	Marker	L	L	L	-	-	-
13023 - - -	Complex (8) Terrace Phh. exc. (6) Rock pile	Agriculture	M	L	L	+	-	-
13024 A B	Complex (2) Modified outcrop Phh. exc.	Quarry-marker/ indeterminate	L	L	L	-	-	-
13025	Phh. exc.	Agriculture	M	L	L	+	-	-
13026	Terrace	Agriculture	M	L	L	+	-	+
13027	Phh. exc.	Agriculture	M	L	L	+	-	-

Table 2. (cont.)

SIHP Site No.	Formal Site/Feature Type	Tentative Functional Interpretation	CRM Value Mode Assess. R	I	C	Field Work Tasks DR	SC	EX
13028 - -	Complex (4) Cairn Phh. exc. (3)	Marker- agriculture/quarry	M	L	L	+	-	-
13029	Enclosure	Habitation	M	L	L	+	-	+
13030	Phh. exc. (2)	Quarry/ agriculture	M	L	L	+	-	-
13031	Wall	Indeterminate	M	L	L	+	-	-
13032	Overhang	Habitation	M	L	L	+	+	+
13033	Cairn	Marker	L	L	L	-	-	-
13181 A B C	Complex (4) Platform (2) Platform Platform	Possible burial	M/H	M	M/H	+	-	+

APPENDIX C

TRAFFIC IMPACT ASSESSMENT
WILBUR SMITH ASSOCIATES

HONOKOHAU INDUSTRIAL PARK

TRAFFIC IMPACT STUDY

Honokohau, North Kona, Island of Hawaii

Prepared for:

HELBER, HASTERT & KIMURA PLANNERS

By:

WILBUR SMITH ASSOCIATES

January 1990

TABLE OF CONTENTS

ILLUSTRATIONS

* * *

TABULATIONS

SUMMARY

The Honokohau Industrial Park is proposed for development on the 89.5 acre Robert S. McLean Trust Property located approximately 2.25 miles north of Kailua, in the North Kona district of Hawaii County. The property is located approximately 1,000 feet mauka of Queen Kaahumanu Highway.

Development of the property is proposed in two increments:

- Increment I is the makai 45.5-acre portion of the project site and is proposed for development with various industrial and service uses over the next five years, and
- Increment II is the mauka 44-acre portion, which is proposed for development with general light industrial and service uses over a longer time frame of 10 years or more beyond Increment I.

Existing Conditions

About 19.5 acres of the project site is occupied by a quarry operation, concrete plant, and storage areas. A two-lane paved roadway provides access from Queen Kaahumanu Highway to these activities, with the access road approach to Queen Kaahumanu Highway controlled by a stop sign. This intersection is located approximately 800 feet north of the Kealakahe Parkway intersection with Queen Kaahumanu Highway.

Queen Kaahumanu Highway is a two-lane State arterial roadway. It is a limited access roadway, with all cross street and driveway approaches between Kailua and Keahole Airport currently controlled by stop signs.

The most recent State Department of Transportation machine count on Queen Kaahumanu Highway made at Kealakahe Parkway on May 9-10, 1988, recorded about 11,000 vehicles per day. Current peak hour volumes, based on a count made by Wilbur Smith Associates on January 11, 1990, total about 1,000 vehicles in the 7:00 to 8:00 AM morning commute period and 1,300 vehicles in the 3:15 to 4:15 PM afternoon peak period.

At present, an estimated 150 vehicles use the project site access road on a weekday. Approximately 40 to 45 vehicles use the access road during the morning and afternoon peak hours.

The traffic volumes and 45 miles per hour speed limit along Queen Kaahumanu Highway limit the number of gaps available for traffic turning left out of the project site access road, which

results in delays for these vehicles. An analysis was made of the conditions for vehicles turning left from the access road using the methodology in the Highway Capacity Manual, which rates the expected delays for vehicles exiting from a stop sign-controlled roadway between Level of Service "A" (little delay) to "F" (extreme delay meriting mitigative actions). This analysis indicates that the traffic exiting the access road experiences Level of Service "D" (long delays) during morning and evening peak hours.

1995 Conditions Without the Project

Traffic volumes are expected to significantly increase in the area without the Honokohau Industrial Park project. Peak hour volumes for 1995 were estimated to include:

- Traffic volumes along Queen Kaahumanu Highway and Kealakahe Parkway were increased from 11.2 and 12 percent per year, respectively, to reflect a continuation of these roadways general traffic growth rates in recent years;

- Traffic from the Isemoto/SJA/Taylor project, planned for the 10-acre property between the Honokohau Industrial Park site and Queen Kaahumanu Highway, was added to the project site access road and to Queen Kaahumanu Highway; and

- Traffic from the initial 350-house increment of the State's Kealakahe housing project was added to area roadways.

The following assumptions were made for area roadways:

- No changes would be made to the project access road.

- The Kealakahe Parkway extension mauka to the State housing project would be built as a two-lane road by 1995.

- Separate left-turn and right-turn lanes would be added to all approaches of the intersection of Queen Kaahumanu Highway and Kealakahe Parkway.

- The State plans to widen Queen Kaahumanu Highway to four lanes with a divider median area, which could occur by 1995. The analysis considered conditions both with the existing two lanes and with planned four lanes.

The principal findings from the traffic analysis of 1995 conditions without the proposed project are as follows:

1. Peak hour traffic volumes on Queen Kaahumanu Highway would increase by about 78 percent above existing volumes at the project site access road, with an estimated two-way total

volume of 1,765 and 2,335 vehicles in the morning and afternoon peak hours respectively.

2. Volumes on the project access road would increase to 76 and 81 vehicles during the morning and afternoon peak hours, respectively.

3. Vehicles turning left from the project access road would experience increased delays, with Level of Service "E" and "F" conditions in the morning and afternoon peak hours, respectively.

4. Vehicles turning left from Kealakahe Parkway would experience Level of Service "F" conditions in both peak periods.

5. Traffic conditions on cross streets along this section of Queen Kaahumanu Highway would warrant installation of traffic signals or construction of a grade separation at Kealakahe Parkway.

6. If a traffic signal is installed at the intersection of Queen Kaahumanu Highway and Kealakahe Parkway, the estimated ratio of traffic volumes to the intersection capacity is as follows:

	Volume-to-Capacity Ratio	
Width of Queen Kaahumanu Highway	Morning Pear Hour	Afternoon Peak Hour
2 lanes	.79	1.18
4 lanes	.51	.72

Afternoon peak hour volumes would exceed the intersection capacity if Queen Kaahumanu Highway remains two lanes.

1995 Conditions with Increment I

The makai 45.5-acre initial increment of the Honokohau Industrial Park is estimated to generate a total of 2,285 weekday vehicle trips to or from the planned uses, when fully developed in 1995. The development would increase traffic volumes entering/exiting the project access road by 234 and 246 vehicles during the morning and afternoon peak hours, respectively.

Approximately 70 percent of the project traffic estimated to travel to/from the Kailua direction, with the remainder travelling to/from the Keahole direction. The resultant

increases in peak hour traffic on Queen Kaahumanu Highway at the project access road would be:

	North of Site	South of Site
Morning Peak Hour	4.2%	9.1%
Afternoon Peak Hour	3.3%	7.3%

Traffic turning left from the project access road would experience delays equivalent to Level of Service "F" conditions during both peak periods, which would warrant mitigative actions.

If the State installs a traffic signal at the Kealakahe Parkway intersection, it would likely increase gaps in traffic flow on Queen Kaahumanu Highway at the project site access road and temporarily improve exiting conditions. The State would be expected to deny any installation of a traffic signal at the project access road intersection due to its closeness to the Kealakahe Parkway intersection.

In 1995, the traffic turning left to travel south from the project site on Queen Kaahumanu Highway would likely have to be accommodated through a road connection to Kealakahe Parkway, and the use of the traffic signal or grade-separation at its intersection with Queen Kaahumanu Highway. Therefore, the following measures are proposed:

1. Initially, permit left-turns to be made both into and out of the project access roadway at Queen Kaahumanu Highway. Construct a left-turn storage lane on Queen Kaahumanu Highway for southbound vehicles turning into the project access road.

2. When the mauka extension of Kealakahe Parkway is constructed, construct a frontage road or direct roadway connection from the project access road to Kealakahe Parkway for use by exiting southbound project traffic.

3. Upon completion of item 2, provide signing and channelize the access road intersection with Queen Kaahumanu Highway to prohibit left turns from the access road. Continue to permit left turns into the access road, and both right turns into and out of the access road.

Impact of the project on the volume-to-capacity ratios for a signal-controlled intersection of Queen Kaahumanu Highway and Kealakahe Parkway is as follows:

	Volume-to-Capacity Ratio	
	Morning Pear Hour	Afternoon Peak Hour
A. Without New Project Access Road to Kealakahe Parkway:		
2-Lane Queen Kaahumanu Hwy	.81	1.26
4-Lane Queen Kaahumanu Hwy	.52	.76
B. With New Project Access Road to Kealakahe Parkway:		
2-Lane Queen Kaahumanu Hwy	.80	1.26
4-Lane Queen Kaahumanu Hwy	.54	.82

Assessment of Increment II

Development of the 44-acre Increment II area as a light industrial park would generate about 2,760 vehicle trips to or from the project on a typical weekday. Approximately 500 vehicle trips would be generated in the morning and afternoon peak hours. Development of a large portion of the area with retail-type uses, such as home improvement centers, could significantly increase vehicle traffic above these levels.

The location of the Increment II area, and the volume of trips generated, indicate that this area should be directly connected by access road to Kealakahe Parkway and/or to future north-south roadways mauka of Queen Kaahumanu Highway.

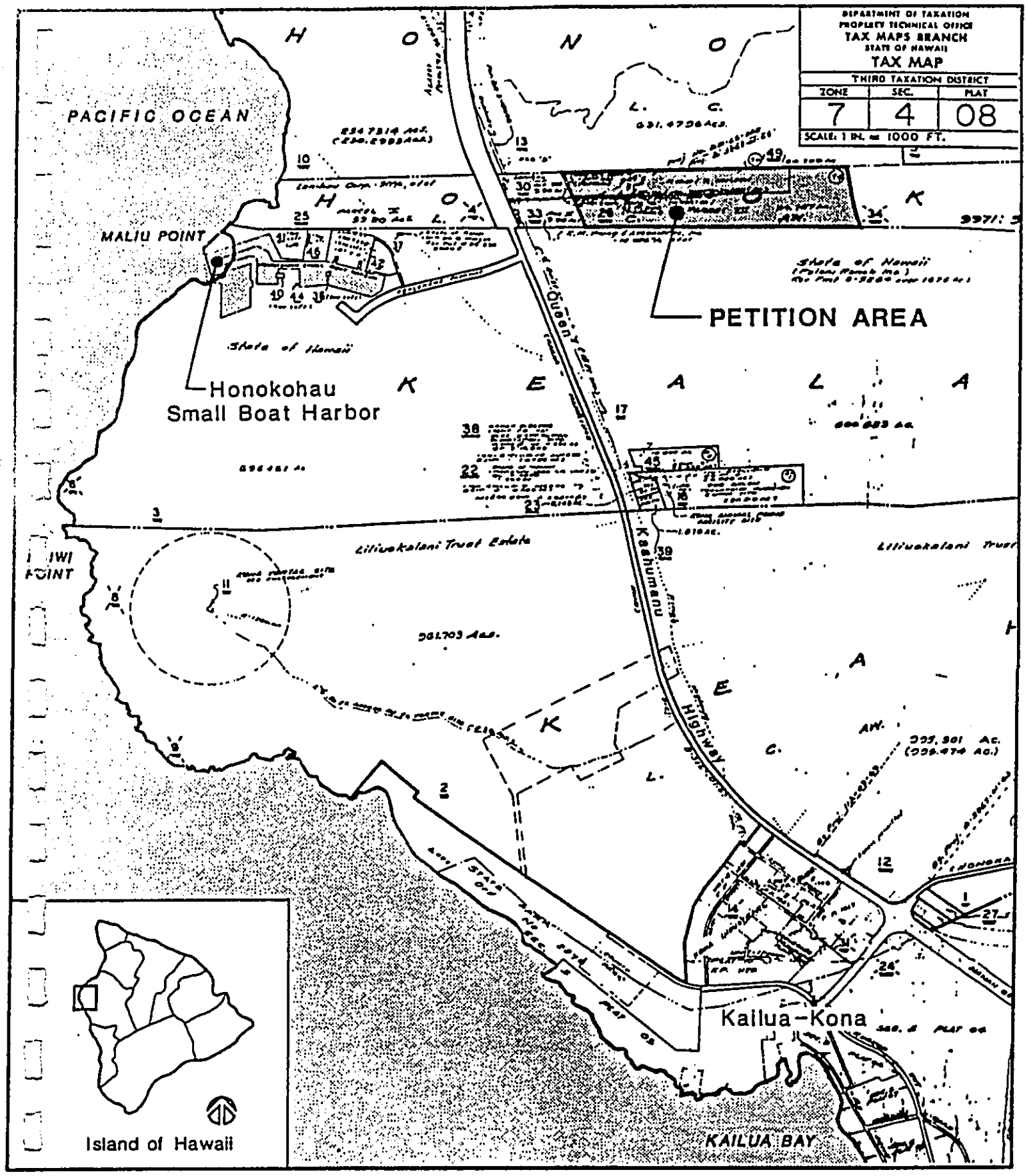
INTRODUCTION

The Honokohau Industrial Park is proposed for development on an 89.5-acre site in the North Kona District of Hawaii County. The site, owned by the Robert S. McLean Trust, is located mauka of the Queen Kaahumanu Highway approximately 2.25 miles north of Kailua (Figure 1). At present, a quarry operation, concrete batch plant, and storage areas are located within the project site.

The project area is proposed for development in two increments:

> Increment I: This 45.5-acre makai portion of the site is proposed for initial development, which will likely extend over a five-year period. A mix of construction-related, storage, and automotive sales/repair uses have been identified for this 45.5-acre portion.
>
> Increment II: This 44-acre mauka portion would be developed following completion of the Increment I area, with development extending an additional 10 or more years into the future. This area will likely be developed with light industrial uses, and may include services and retail activities.

This study assesses the access needs for the Increment I development, and analyzes its traffic impacts on the adjacent segment of Queen Kaahumanu Highway. For Increment II, this study estimates potential traffic generation and general access needs.



Honokohau Industrial Park
LOCATION MAP

Honokohau, North Kona, Hawaii

0 2000' Figure: 1

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EXISTING CONDITIONS

The 89.5-acre site for the proposed Honokohau Industrial Park is located approximately 1,000 feet mauka of Queen Kaahumanu Highway in the Honokohau ahupua'a. The project site is approximately 900 feet in width and extends mauka for about 4,000 feet.

Existing uses on the site include a quarry, West Hawaii Concrete batch plant, a boat storage area, and construction-related storage, repair and office areas. These activities occupy approximately 19.5 acres located in the Increment I area of the site, while the remaining area is vacant. A single access road connects these activities to Queen Kaahumanu Highway.

The 10-acre Isemoto/SJA/Taylor property is located along the south side of the access road between the project site and Queen Kaahumanu Highway. This area presently contains several open storage areas for construction equipment and materials. The area north of the access road is a vacant portion of the Lanihau Corporation property.

The Honokohau Small Boat Harbor is located makai of Queen Kaahumanu Highway near the project site.

Existing Roadways

Queen Kaahumanu Highway is the major State highway connecting the Kailua area to the Keahole Airport, South Kohala resort areas, and Kawaihae area, and provides access to the properties along the coastal area of North Kona. It is a limited access highway designed for 70 miles per hour speeds. The highway is located within a 300-foot wide right-of-way through the project vicinity, except for a 80-foot wide segment south of the project access road. The highway provides one travel lane in each direction with a broad 6 to 10-foot wide paved shoulder area on each side.

The project access road is approximately 20-foot wide with unimproved shoulder areas. Along Queen Kaahumanu Highway, a 250-foot long taper section is provided both north and south of the access road to minimize disruption from the deceleration and acceleration of northbound vehicles turning to/from the access road. The access road approach is controlled by a stop sign.

The only nearby intersection along Queen Kaahumanu Highway is at Kealakahe Parkway, which is located about 800 feet south of the project site access road. Kealakahe Parkway is a two-lane roadway which provides access to the Honokohau Small Boat Harbor area. The Kealakahe Parkway approach is stop-sign controlled at its "tee"-type intersection with Queen Kaahumanu Highway.

The speed limit along this section of Queen Kaahumanu Highway is 45 miles per hour.

Existing Traffic Volumes

The State Department of Transportation (State DOT) conducts a 24-hour machine traffic count on a biennial basis at the Queen Kaahumanu Highway - Kealakahe Parkway intersection. The most recent count was made May 9-10, 1988 (Monday - Tuesday).

The 1988 State DOT count recorded a 24-hour volume of 11,135 vehicles, total for both directions, on Queen Kaahumanu Highway just north of Kealakahe Parkway, and 12,249 vehicles south of the Parkway. The two-way volume on the Kealakahe Parkway was 3,092 vehicles. The highest one-hour traffic period on Queen Kaahumanu Highway was 3:15 to 4:15 p.m. with 1,016 vehicles. The highest morning one-hour period occurred from 11:00 a.m. to 12:00 noon, with 922 vehicles. However, this study uses the 7:00 to 8:00 a.m. period as the "morning peak hour" for analysis purposes since the planned project uses would generate much higher volumes during the earlier morning commute hour. The 1988 volume for the 7:00 - 8:00 a.m. period was 781 vehicles, or 93.5 percent of the 11:00 a.m. - noon volume.

Wilbur Smith Associates made manual traffic counts along Queen Kaahumanu Highway near the project site during peak traffic periods on January 11, 1990. The resultant morning and afternoon peak commute hour volumes are depicted in Figure 2.

During the afternoon peak hour, traffic on Queen Kaahumanu Highway approximated 800 vehicles southbound towards Kailua and 500 vehicles northbound towards Keahole Airport. During the 7:00 to 8:00 a.m. period, volumes amounted to about 500 vehicles in each direction.

Current peak hour volumes on the project site access road are very low with total two-way volumes of about 40 to 45 vehicles during each peak hour period.

Current Traffic Conditions

An analysis was made of the project site access road conditions at the intersection with Queen Kaahumanu Highway. The analysis was made in accordance with the methodology prescribed for stop-sign controlled intersections in the Highway Capacity Manual.(1) This procedure assesses the relative ease/difficulty

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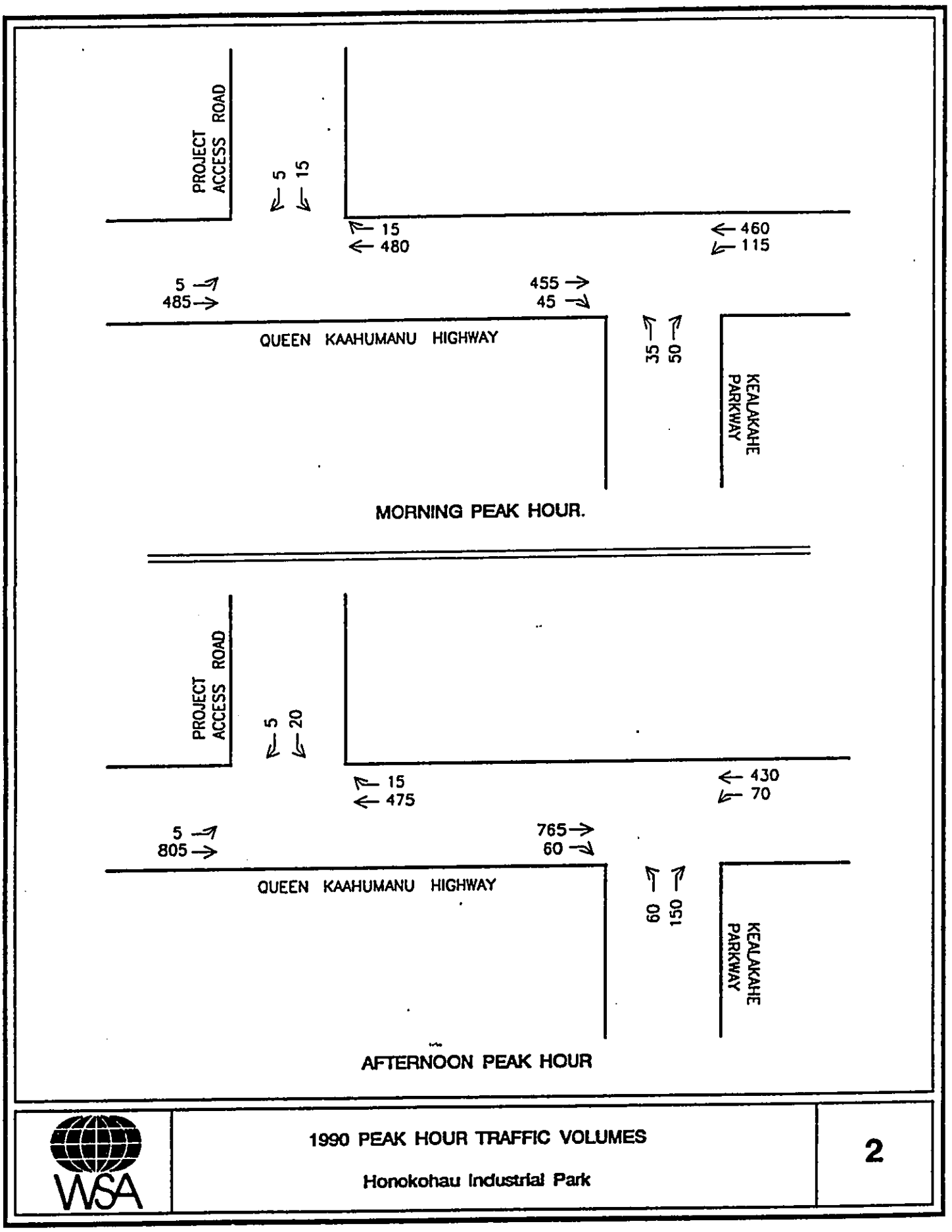
1 Highway Capacity Manual, Special Report 209, Transportation Research Board, 1985.



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1990 PEAK HOUR TRAFFIC VOLUMES

Honokohau Industrial Park

2

or delay involved in making the key left-turn and right-turn movements at an intersection. The relative delays for vehicles making these movements are described as Levels of Service "A" (little delay) to "F" (extreme delay), as described in Appendix A.

For the January 1990 traffic, the analysis indicates that the left-turn movement from the site access road onto Queen Kaahumanu Highway operates at Level of Service "D" (long delays) for both morning and afternoon peak periods. The right-turn movement out of the access road and the left-turn from southbound Queen Kaahumanu Highway into the site access road both operate at Level of Service "A".

1995 TRAFFIC CONDITIONS

WITHOUT HONOKOHAU INDUSTRIAL PARK

Full development of Increment I portion of the project is expected to occur by 1995. Therefore, early 1995 is used as the time point for forecasting future area traffic volumes and conditions both with and without the Increment I development. Future 1995 conditions without Honokohau Industrial Park are presented as a base from which to identify the impacts of the proposed project.

Land Use Assumptions

The effects of additional developments and increased activity levels on 1995 area traffic volumes is reflected by the use of general growth factors, with the exception of traffic generated by two nearby projects: 1) the Isemoto/SJA/Taylor property, and 2) the State's Kealakahe housing project. The traffic forecasts reflect the following level of development by 1995:

1. Isemoto/SJA/Taylor Property - All 10 acres are assumed to be developed by 1995, including general contracting, trucking/hauling, and automotive service uses. Access to this property would continue via the existing shared access road with the McClean property.

2. State Kealakahe Housing Project - The State is currently planning an initial increment of 350 houses and new access road for the area mauka of Queen Kaahumanu Highway, which are included in the 1995 traffic estimates.

Anticipated Roadway Modifications

The State DOT is currently planning to widen Queen Kaahumanu Highway to a four-lane highway with divider median, and would like to have the widening underway before 1995. The timing of the widening of the Kailua-to-Keahole Airport section will largely be dependant upon State Legislature approval of funds for the widening project, as well as the resolution of what type facility and degree of access control should be provided in this developing area. For the purpose of this traffic impact study, conditions are considered both with a two-lane and with a four-lane roadway in 1995.

The State plans to extend the Kealakahe Parkway mauka of Queen Kaahumanu to serve its planned Kealakahe housing project. Eventually, this roadway would be extended mauka beyond the housing project to connect with Palani Road and the Hawaii Belt Road. Kealakahe Parkway would then function as an arterial roadway. For 1995, this study assumes that Kealakahe Parkway extends mauka as far as the housing project as a two-lane roadway.

The State DOT is preparing to add a left-turn storage lane on northbound Queen Kaahumanu Highway at the Kealakahe Parkway intersection. This study assumes that left-turn and right-turn lanes will be available on all four legs of this intersection, once the mauka extension of Kealakahe Parkway is constructed.

The intersection of the project site access road with Queen Kaahumanu Highway is assumed to remain unchanged from the existing layout.

1995 Traffic Without the Project

Queen Kaahumanu Highway has experienced large increases in traffic in recent years. The counts made by the State DOT on Queen Kaahumanu Highway at Kealakahe Parkway indicate an average increase in weekday traffic volumes of 8.2 percent per year from 1978 to 1984, and 11.2 percent per year from 1984 to 1988. Traffic on Kealakahe Parkway has increased by 12.0 percent per year between 1984 and 1988.

For this study, traffic was assumed to continue to increase by 11.2 and 12.0 percent per year on Queen Kaahumanu Highway and Kealakahe Parkway, respectively, from 1990 to 1995 as a result of general growth in the North Kona area. This would result in a 70 and 76 percent increase in traffic on these two roadways by 1995.

Also, traffic estimated for the Isemoto/SJA/Taylor project and the initial 350-house increment of the State Kealakahe housing project was added to the projected traffic volumes. Traffic estimates for the Isemoto project were obtained from the Isemoto/SJA Partnership Subdivision Environmental Impact Statement, dated August, 1988 and prepared by Helber, Hastert & Kimura, Planners. Traffic for the State housing project was estimated using standard trip generation rates(2) for single-family housing. Trips estimated for these two projects are:

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2 "Trip Generation", Institute of Transportation Engineers, Third Edition, 1982.

Project	MORNING PEAK HOUR To Project	MORNING PEAK HOUR From Project	AFTERNOON PEAK HOUR To Project	AFTERNOON PEAK HOUR From Project	DAILY
Isemoto/SJA/ Taylor	23	13	13	23	260
Kealakahe Housing	74	193	220	130	3,500

The resultant estimates of 1995 peak hour traffic in the vicinity of the project site, without the Honokohau Industrial Park development, are depicted in Figure 3. The combined increase from general corridor growth and the two nearby projects results in estimated traffic increases of 77 to 78 percent on Queen Kaahumanu Highway.

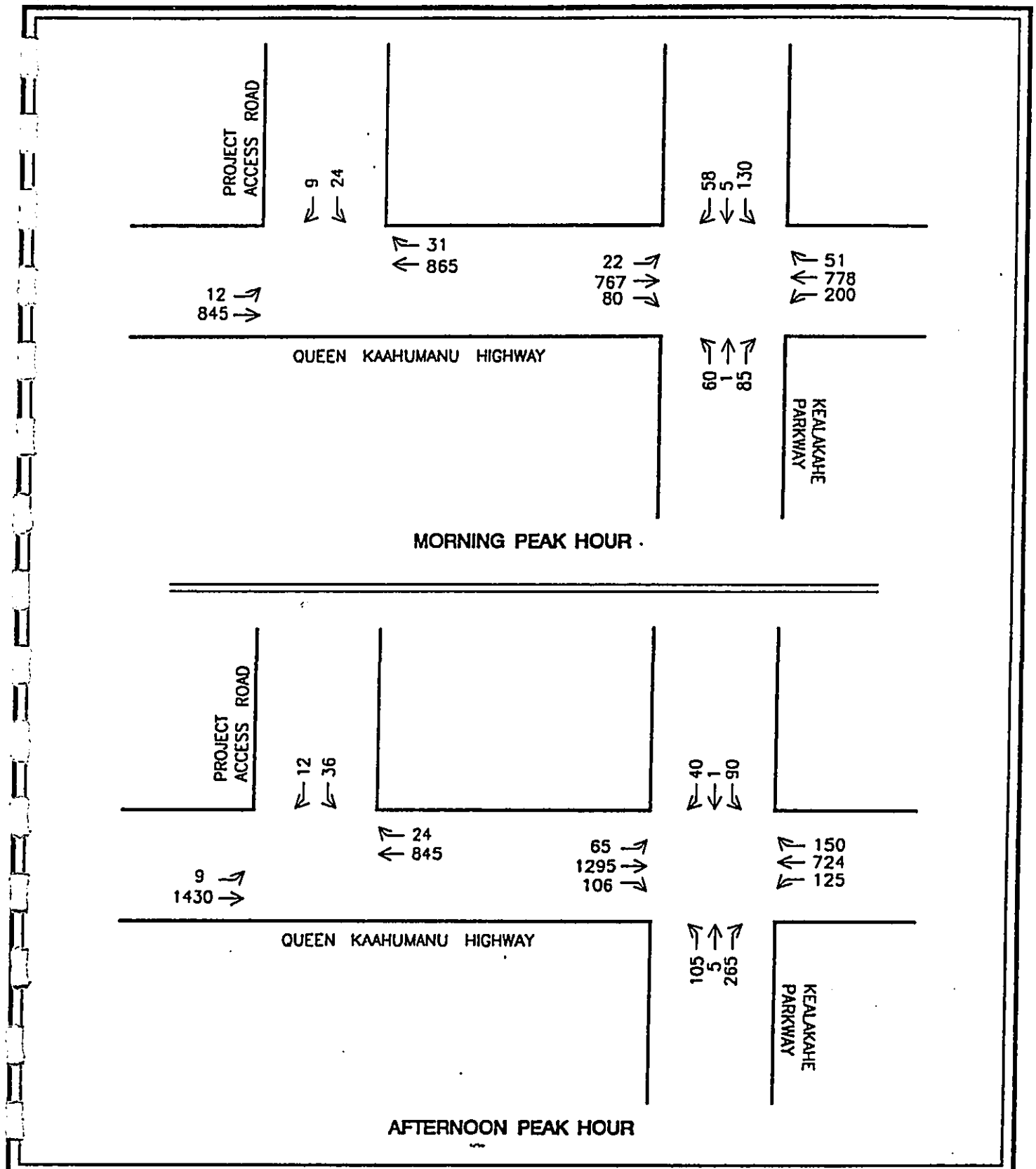
1995 Traffic Conditions Without the Project

The large increase in through traffic on Queen Kaahumanu Highway will reduce the gaps available for traffic turning left from cross streets and driveways in the area. The reduced gaps, plus increases in the number of vehicles turning left, would result in lengthy delays for vehicles turning left onto Queen Kaahumanu Highway. Estimated levels of service for these left-turn movements with existing stop sign controls, are:

LOCATION	MORNING PEAK HOUR	AFTERNOON PEAK HOUR
Project Site Access Road	E	F
Kealakahe Parkway		
Makai Approach	F	F
Mauka Approach	F	F

The severe delays at Kealakahe Parkway would occur whether Queen Kaahumanu Highway remains two lanes or has been widened to four lanes, and would warrant modifications to improve access onto Queen Kaahumanu Highway. Such modifications could include installation of a traffic signal at the intersection, or construction of a grade separation. Within the 1995 time frame, it is likely that installation of a traffic signal would be the method used to improve access onto Queen Kaahumanu Highway.

The quality of service at a traffic signal-controlled intersection is determined by the capacity and conflicting traffic volumes at the intersection. A level of service concept is the standard means of describing traffic conditions associated with various ranges of volume-to-capacity ratios, which indicate the proportion of an intersection's capacity that is being used by observed or estimated traffic volumes. The six levels of service (A through F) used to describe travel conditions at a



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1995 PEAK HOUR TRAFFIC VOLUMES
WITHOUT PROPOSED PROJECT
·· Honokohau Industrial Park

3

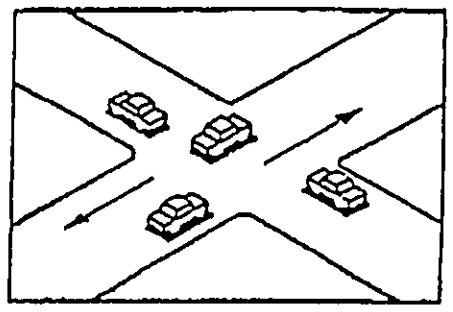
traffic signal-controlled intersection and the range of volume-to-capacity ratios for each are described in Figure 4.

The volume-to-capacity ratios for the Queen Kaahumanu Highway-Kealakahe Street intersection were estimated using the "planning analysis" methodology as described in the 1985 Highway Capacity Manual.(3) The analysis, summarized in the table below, indicates that estimated afternoon peak hour volumes would exceed the intersection capacity if Queen Kaahumanu remains two lanes in 1995.

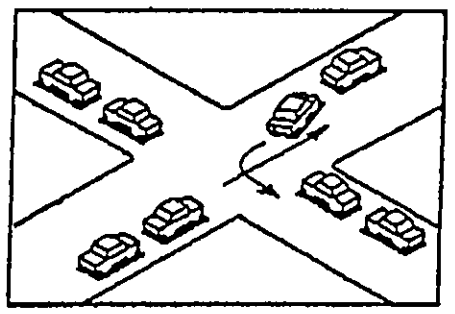
NUMBER THROUGH LANES ON QUEEN KAAHUMANU HIGHWAY	MORNING PEAK HOUR		AFTERNOON PEAK HOUR	
	Volume to Capacity Ratio	Level of Service	Volume to Capacity Ratio	Level of Service
Two Lanes	.79	C	1.18	F
Four Lanes	.51	A	.72	C

3 Highway Capacity Manual, Special Report 209, Transportation Research Board, 1985.

LEVEL OF SERVICE "A" - V/C = 0 TO 0.60
Describes operations with very low delay, i.e., less than 5 seconds per vehicle. This occurs when signal progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all.

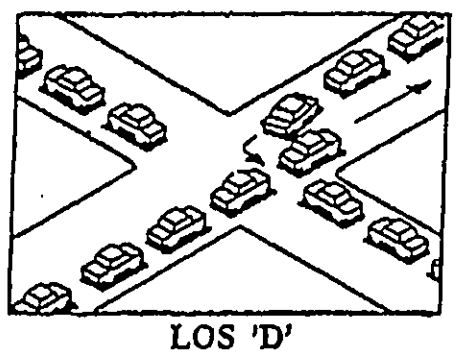

LOS 'A'

LEVEL OF SERVICE "B" - V/C = 0.61 TO 0.70
Describes operations with delays in the range of 5 to 15 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS "A", causing higher levels of average delay.


LOS 'C'

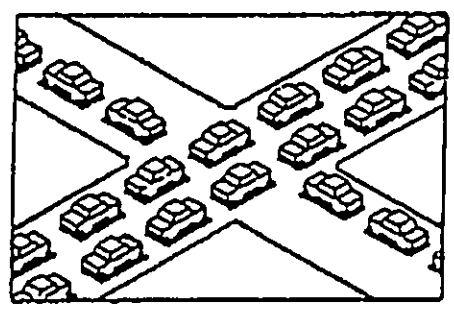
LEVEL OF SERVICE "C" - V/C = 0.71 TO 0.80
Describes operation with delay in the range of 15 to 25 seconds per vehicle. Occasionally vehicles may wait more than one red signal phase. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.

LEVEL OF SERVICE "D" - V/C = 0.81 TO 0.90
Describes operations with delay in the range of 25 to 40 seconds per vehicle. At LOS "D", the influence of congestion becomes more noticeable. Many vehicles stop, and the proportion of vehicles not stopping declines. Noticeable numbers of vehicles fail to clear signal during the first green phase.


LOS 'D'

LEVEL OF SERVICE "E" - V/C = 0.91 TO 1.00
Describes operations with delay in the range of 40 to 60 seconds per vehicle. These high delay values generally indicate poor progression, long cycle lengths, and high V/C ratios. Vehicles frequently fail to clear the signal during the first green phase.

LEVEL OF SERVICE "F" - V/C GREATER THAN 1.00
Describes operations with delay in excess of 60 seconds per vehicle. This condition often occurs with oversaturation, i.e., when arrival flow rates exceed the capacity of the intersection.


LOS 'F'

SOURCE: Highway Capacity Manual, 1985.

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LEVEL OF SERVICE DIAGRAM

Honokohau Industrial Park

1995 TRAFFIC CONDITIONS

WITH HONOKOHAU INDUSTRIAL PARK INCREMENT I

The 45.5-acre Increment I area of the Honokohau Industrial Park is expected to be developed and occupied by 1995. Access to the expanded development area would be provided by extension of the existing access road mauka to serve the new activities. The Increment I area is expected to contain the following uses:

Concrete Plant Area	4.0 Acres
Expanded Quarry	7.0 Acres
Equipment and Vehicle Storage	3.0 Acres
Office and Contractor Storage	3.0 Acres
Boat Storage/Repair	5.0 Acres
Self Storage	2.0 Acres
Nursery	5.0 Acres
Lumber Product Manufacture/Sales	8.5 Acres
Automobile Sales/Repair	6.0 Acres
Roadways	2.0 Acres
	45.5 Acres

These acreages include the existing quarry, concrete plant, and storage activities.

Increment I Trips

Trip generation rates for the Increment I uses were developed from the ITE "Trip Generation" and from San Diego "Trip Generators" handbooks. The trip rates and estimated numbers of weekday trips for the planned land uses are summarized in Table 1.

The planned Increment I uses are estimated to generate 2,285 vehicle trips to or from the project on a typical weekday, for an increase of 2,135 trip ends over the 150 weekday trips at present. Morning peak hour traffic amounts to 274 vehicles entering or exiting the Increment I uses, while afternoon peak hour trips total 294 vehicles. This amounts to a net increase of 234 and 246 vehicles entering/exiting the project area in the morning and afternoon peak hours, respectively.

An estimated 70 percent of the trips are expected to travel to/from the Kailua direction, and 30 percent to/from the Keahole direction. This directional split is based on an afternoon peak period traffic count of traffic entering/exiting the Kaloko Industrial Park.

Table 1

ESTIMATED WEEKDAY VEHICLE TRIPS

Honokohau Industrial Park Increment I

ITEM	ACRES	MORNING PEAK HOUR To Project	MORNING PEAK HOUR From Project	AFTERNOON PEAK HOUR To Project	AFTERNOON PEAK HOUR From Project	DAILY
TRIP RATES PER ACRE:(4)						
Miniwarehouse	-----	2.4	0.5	1.7	3.2	48.6
Marine Storage/ Repair	-----	2.4	0.5	1.7	3.2	48.6
Auto Sales/Service	-----	7.2	3.6	6.0	7.9	162.0
Heavy Industrial	-----	1.6	0.4	0.8	1.4	15.6
General Light Industrial	-----	9.5	1.9	2.2	7.9	52.4
VEHICLE TRIPS:(5)						
Miniwarehouse	2.0	5	1	4	7	98
Marine Storage/ Repair	5.0	12	3	9	16	243
Auto Sales/Service	6.0	43	22	36	47	972
Heavy Industrial (Quarry, Concrete Products, Equipment, Storage, Offices)	17.0	27	7	14	24	265
General Light Industrial (Nursery, Retail Lumber & Lumber Products)	13.5	128	26	30	107	707
TOTALS	43.5	215	59	93	201	2,285

4 Sources for Trip Rates:
"Trip Generation", Institute of Transportation Engineers, Third Edition, 1982;
"Trip Generators", San Diego Association of Governments and California Department of Transportation, July 1988.

5 Includes trips from continuing uses currently in Increment I area.

Traffic Increases on Area Roadways

Projected 1995 peak hour traffic volumes along Queen Kaahumanu Highway near the project site are depicted in Figure 5. The estimated volumes on the project access road include vehicle trips to/from both the existing and new activities in the Increment I area, and to/from the Isemoto/SJA/Taylor property. The project would increase traffic volumes on the access road to 310 vehicles in the morning peak hour and 327 vehicles in the afternoon peak hour.

The proportional increases in traffic on Queen Kaahumanu Highway at the project access road would be as follows:

	North of Access Road	South of Access Road
Morning Peak Hour	+ 4.2%	+ 9.1%
Afternoon Peak Hour	+ 3.3%	+ 7.3%

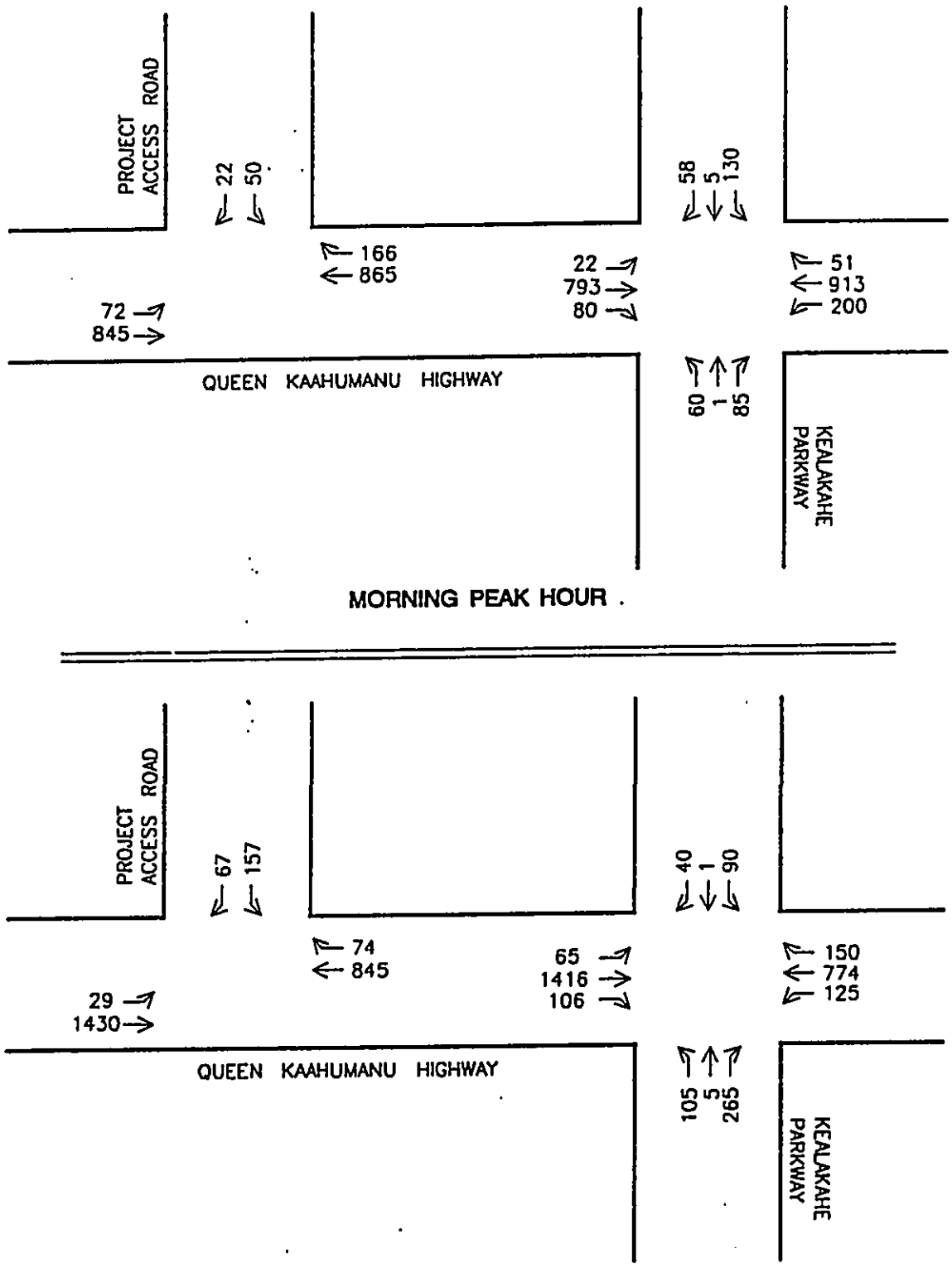
The volume and proportional increases would decrease with increasing distance from the project site.

Traffic Conditions With Increment I

Vehicles turning left from the project access road onto Queen Kaahumanu Highway would experience delays equivalent to Level of Service "F" conditions during both the morning and afternoon peak traffic periods. Future installation of a traffic signal at the Kealakahe Parkway intersection would group northbound traffic into "platoons" and increase the gaps in the traffic flow on Queen Kaahumanu Highway to temporarily improve conditions for traffic exiting the project access road. However, continued future increases in delays to left-turn traffic would eventually warrant mitigative measures.

Vehicles turning left from southbound Queen Kaahumanu Highway into the project access road would experience Level of Service "C" conditions during the peak traffic periods. Although small in number, the vehicles waiting to turn left into the project access road would likely result in significant disruption to the flow of southbound through traffic, particularly if Queen Kaahumanu Highway is not widened to four lanes. Traffic turning right into or from the project access road would experience Level of Service "B" or "C" conditions.

The projected traffic from the Increment I project would not significantly affect conditions at the intersection of Queen Kaahumanu Highway and Kealakahe Parkway.



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1995 PEAK HOUR TRAFFIC VOLUMES
WITH PROPOSED PROJECT
Honokohau Industrial Park

5

Mitigative Measures

Candidate measures to improve conditions for traffic turning left (southbound) from the project access road onto Queen Kaahumanu Highway are as follows:

1. Install a traffic signal at the access road intersection;

2. Provide a refuge/acceleration lane in the center of Queen Kaahumanu Highway (similar to the one at Kaloko Industrial Park) to enable exiting traffic to first cross the northbound traffic, then slow or stop in the refuge lane, and then merge with the southbound traffic flow; or

3. Provide an access road or frontage road connection to Kealakahe Parkway so southbound project traffic can exit onto Queen Kaahumanu Highway using the traffic signal or grade separation which will be provided at this major roadway junction.

The access road connection to Kealakahe (#3) is proposed for the project. The State DOT would be expected to deny a traffic signal (#1) due to the short 800-foot spacing with a future signal or grade separation at Kealakahe Parkway, and to oppose a refuge lane (#2) due to safety concerns.

Therefore, a two-lane, two-way roadway connection is proposed from the project access road to an intersection with the future mauka extension of the Kealakahe Parkway. The roadway connection can be located makai of the project area to function as a "frontage road", or could extend from a point further mauka as an "entrance roadway" to the project site. The location should be coordinated with State DOT and adjacent property owners to most effectively and efficiently serve traffic access to this area.

It is proposed that the project access road intersection remain to serve right-turn movements, and the left-turn into the project site. If the left-turn movement is permitted, then a left-turn storage lane should be constructed on Queen Kaahumanu Highway.

Volume-to-capacity ratios and service levels for the Queen Kaahumanu Highway - Kealakahe Parkway intersection, assuming installation of a traffic signal, are summarized in Table 2 for conditions with and without the project.

Table 2

1995 INTERSECTION VOLUME-TO-CAPACITY RATIOS

QUEEN KAAHUMANU HIGHWAY AND KEALAKAHE PARKWAY

FUTURE SITE ACCESS CONDITION	MORNING PEAK HOUR Volume-to-Capacity Ratio	MORNING PEAK HOUR Level of Service	AFTERNOON PEAK HOUR Volume-to-Capacity Ratio	AFTERNOON PEAK HOUR Level of Service
With Two Through Lanes on Queen Kaahumanu Hwy:				
1. Without Project	.79	C	1.18	F
2. With Project and Existing Project Access Road	.81	D	1.26	F
3. With Project and New Project Access Road to Kealakahe Parkway	.80	D	1.26	F
With Four Through Lanes on Queen Kaahumanu Hwy:				
1. Without Project	.51	A	.72	C
2. With Project and Existing Project Access Road	.52	A	.76	C
3. With Project and New Project Access Road to Kealakahe Parkway	.54	A	.82	D

FUTURE DEVELOPMENT OF INCREMENT II AREA

The 44-acre Increment II area of the Honokohau Industrial Park, located mauka of the Increment I area, is proposed for development with light industrial uses, with possible inclusion of a mix of retail and service uses. This area would likely be developed after completion of the Increment I area, with the development extending for a period of 10 or more years.

An initial assessment was made of the potential traffic generation from this area, and potential access needs.

Potential Traffic for Increment II Area

The amount of traffic generated by future development of Increment II would depend upon the mix of industrial versus retail/service uses to be located in the project site. Each acre of retail/service use typically generates 5 to 10 or more times as much traffic as each acre of industrial use, with the ratio varying dependent upon the particular type of activity. Conversely, the industrial uses would attract "new traffic" into the area, while much of the trips to retail/service uses (restaurants, banks, convenience stores) is by "pass-by" traffic or persons already in the area.

The range of trip generation potential for the Increment II area, assuming 44 acres for development is as follows:

	Peak Hour Vehicle Trips To/From Project		Daily Vehicle Trips
	Morning	Afternoon	
Full Development with Industrial Uses(6)	450	480	2,760
Full Development with Retail/ Service Uses(7)	350	1,800	21,400

6 Based on trip rates for industrial park.

7 Based on trip rates for shopping center, and floor area ratio of 0.3.

Development of the Increment II area with a combination of the two types of uses would result in traffic volumes within this range.

Access Needs for Increment II Area

Future expansion of the area's roadway system is expected to include extension of the Kealakahe Parkway mauka near the south side of the Increment I and II areas. Several north-south arterial roadways will likely be constructed parallel to Queen Kaahumanu Highway, with one of these roadways being located along the mauka boundary of the Increment II area, or penetrating the area.

With development as an industrial park, the Increment II traffic could be accommodated by an extension of the access road serving the Increment I development. However, given the linear shape of the Increment I/II site, it would be desirable to establish one or more additional access points from the Increment II area to Kealakahe Parkway and/or any future major north-south arterial roadway adjacent to or through the project area.

If Increment II is developed largely as a retail/services area, the area should have at least two access connections to the arterial roadway system. The type and location of these access points would depend upon the configuration of the future roadway system for the North Kona district, and the type and location of uses within the Increment II area.

APPENDIX A

METHODOLOGY AND LEVEL OF SERVICE CRITERIA
FOR UNSIGNALIZED INTERSECTIONS

This standard procedure provides a comparative measure of delay at stop sign-controlled intersections for those movements which must yield to the conflicting movements at the intersection. Those include:

- Left-turn out of the side street;
- Right-turn out of the side street; and
- Left-turn into the side street.

The general indicator of intersection delay is determined by calculating the one-hour capacity for each key movement, based on the conflicting traffic volumes, and then comparing the number of vehicles making that maneuver to the calculated capacity. The unused or "reserve" capacity for that movement is then used to identify a level of service for that movement. The level of service interior at stop sign-controlled intersections is as follows:

Reserve Capacity (Vehicles per Hour)	Level of Service	Expected Delay to Side Street Traffic
More than 400	A	Little or no delay
300 - 399	B	Short delay
200 - 299	C	Average delay
100 - 199	D	Long delay
0 - 99	E	Very long delay
Negative value	F	Exceeds capacity with extreme delays and warrants improvements

Source: Highway Capacity Manual, Special Report 209, Transportation Research Board, 1985.

APPENDIX D

ENGINEERING REPORT
LEO FLEMING, LTD.

Leo Fleming, Ltd.
P.O. Box 396
Kailua-Kona, Hawaii 96745

Stormwater Drainage Analysis

1. Assumptions

- Estimates based on 10-year storm with a peak rainfall of 2 inches per hour.

- Surface conditions onsite will be paved, graveled, and pre-existing.

- Peak intensity run-off for these surfaces is:
  Paved = 5.1 in./hr.
  Graveled = 4.2 in./hr.
  Pre-existing = 3.3 in./hr.

- Run-off coefficient for surfaces is:
  Paved = .95
  Graveled = .55
  Pre-existing = .18

- Lot coverage for proposed uses is:
  Automotive Operations. Paved = 40% Graveled = 60%
  Boat Storage. Paved = 40% Graveled = 60%
  Equipment/Truck Storage. Paved = 20% Graveled = 80%
  Self Storage. Paved = 20% Graveled = 80%
  Lumber Operations. Paved = 40% Graveled = 60%
  Office Complex. Paved = 50% Graveled = 50%
  West Hawaii Concrete. Paved = 10% Graveled = 90%
  Quarry Expansion. No change
  Nursery. Paved = 10% Graveled = 90%

- Roadway is paved and 60-foot wide.

2. Findings

- Stormwater drainage during a potential 10-year storm is estimated to be:
  Onsite = 88.5 cfs
  Roadway = 14.4 cfs

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Kailua-Kona, Hawaii 96745

Water Demand Analysis

Auto sales, service and repair - 6 acres:
Basic water use of 1,000 gpd, plus an additional 10 gpd per car serviced, for an estimated 30 cars; for a daily total of 1,300 gpd.. Through an eight-hour day this computes to an average rate of 2.7 gpm. The peak-hour rate will be five times this amount, or 13.5 gpm.

Boat storage, construction and repair - 5 acres:
Total daily usage is estimated to be approximately 500 gpd through an eight-hour day, or 0.67 gpm; with a peak-hour rate of 3.33 gpm.

Equipment, truck and bus storage - 3 acres:
Total daily usage is estimated to be approximately 300 gpd through an eight-hour day, or 0.40 gpm; with a peak-hour rate of 2.0 gpm.

Self-storage - 7 acres:
Total daily usage is estimated to be approximately 200 gpd through an eight-hour day, or 0.27 gpm; with a peak-hour rate of 1.35 gpm.

Retail lumber and hardware materials and the manufacture of lumber prod. - 8.5 ac.:
Total daily usage is estimated to be approximately 1,000 gpd through an eight-hour day, or 1.33 gpm; with a peak-hour rate of 6.65 gpm.

Office complex and contractor storage, with office square footage of approximately 20,000 - 3 acres:
Office is estimated to have 12 people using an average 15 gpd per person, for a daily total of 180 gpd through an eight-hour day, or 0.375 gpm. The storage area is estimated to have a usage of 300 gpd through an eight-hour day, or 0.625 gpm. Total daily water usage rate will be 1 gpm with a peak-hour rate of 5 gpm.

West Hawaii Concrete (existing business) - 4 acres:
In their current operation, the concrete company has been using approximately 13,000 gpd, which equates to 27.08 gpm through an eight-hour work day, or a peak-hour rate of 135.41 gpm.

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In summation, it appears that total water useage will fall in the 17,000 gpd range with an average daily rate of approximately 35.4 gpm and an approximate peak-hour rate of 177 gpm.

We recognize that the foregoing does not speak to any requirement for irrigation, and ther are factirs here that need to be considered. Generally, there is a minor area irrigated on any of the industrial lots here in the very rocky Kona condition. In this proposed instance we believe this will also be the general situation. In any case, the subdivison covenents and restrictions can be structured so that all irrigation be during the evening hours so that daily and peak-hour rates not be affected. Irrigation can also be restricted to drip irrigation, and lawns can be forbidden. With these measures taken we estimate irrigation to be less that an additional 2,000 gpd, which will render a total water useage for the project of approximately 19,000 gpd.

Sincerely,

Leo Fleming, C. E.

APPENDIX E

HYDRO-GEOLOGIC IMPACT ASSESSMENT
BELT COLLINS & ASSOCIATES

January 19, 1990
90-100 (054-19)

Mr. David Curry
Helber Hastert & Kimura
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear David:

Probable Hydro-Geologic Impacts of the Proposed
Honokohau Industrial Park, North Kona, Hawaii

Information and analyses in this letter provide a qualitative assessment of potential hydro-geologic impacts of the proposed 89.5-acre Honokohau Industrial Park. The park is to be developed in two increments. A subdivision layout is only available for the first increment. It will consist of eight lots of various sizes on 45.5 acres. Uses for these eight lots are identified in the tally below. Although the 44-acre second increment may have a greater number of smaller-sized lots, it will presumably have similar land use.

Expected Land Use for Increment I

Use	Acres
Quarry	7
Nursery	5
West Hawaii Concrete	4
Equipment Storage	3
Self Storage	2
Boat Storage, Construction, and Repair	5
Lumber Storage and Product Manufacturing	8.5
Office Complex and Storage	3
Automotive Sales, Storage, and Repair	6
Roads	2
Total	45.5

From the perspective of potential hydro-geologic impacts, two aspects of the project need to be evaluated: (1) disposal of sanitary wastewater will occur in one or more cesspools in each of the lots; and (ii) disposal of stormwater and various washdown waters will be in drywells. Ultimately, the liquid fraction of these wastewaters will percolate down to the underlying brackish basal lens and then move laterally to discharge points in Honokohau Harbor and elsewhere along the shoreline. Obviously, the percolating wastewater will contain chemicals which will increase, to at least a limited extent, the concentration of these constituents in the underlying groundwater. Since the quantity of percolating water will be small compared to the quantity of groundwater, and since none of the constituents in the percolating water are considered hazardous in the concentrations that they will occur, a general assessment of possible effects is reasonable. This is the approach taken in the following analysis.

Occurrence of Groundwater Beneath and Downstream of the Project

Specific knowledge of the groundwater environment in this area is derived from results of the several drilled wells in the region (No. 3960–01 on Lilluokalani Trust land, No. 4059–01 near Palani Junction, and No. 4360–01 in Kalaoa), by the existence of anchialine ponds near the shoreline, and by the observable discharge of groundwater into Honokohau Harbor and along the shoreline. Groundwater occurs here as a thin lens of brackish water floating on underlying seawater. This configuration is primarily due to the high permeability of the lava rocks, the modest recharge rate of percolating rainfall, and the absence of a low permeability formation at the shoreline to impede groundwater discharge into nearshore waters. Groundwater beneath the project is likely to have a chloride concentration of 3000 to 6000 milligrams per liter (MGL), an indication that it is comprised of about 15 to 30 percent seawater which has been introduced by mixing from below. The Department of Health's Underground Injection Control (UIC) line is located inland of the project. Its location reflects the groundwater's relatively high salinity and conclusions regarding its negligible potential for potable development.

The quantity of groundwater moving to shoreline discharge cannot be measured directly but it can be approximated. A hydrologic budget approximation, which is based on estimates of the fraction of rainfall which becomes groundwater recharge and the total area contributing this recharge, indicates that the groundwater flowrate may be in the range of 2 to 4 million gallons per day (MGD) per coastal mile. Another method, one which applies the Darcy flow equation to estimated values for permeability and flow gradients, results in a flowrate on the order of 1.5 to 3.0 MGD. These figures, while obviously approximate, establish the order of magnitude of the flow. For the purpose of the illustrative calculations which follow, a groundwater flowrate of 2.5 MGD per mile will be used.

Contaminants Introduced at Cesspools and Disposal Wells

Using projected water consumption figures for the first development increment provided by Leo Fleming, the civil engineering consultant for the project, it is estimated that the average disposal rate in cesspools of the project's first increment will be 10,000 to 15,000 gallons per day (GPD). This amount may ultimately be doubled when the second development increment is completed. Concentrations of nitrogen and phosphorous, the principal "contaminants" in liquid percolating from the cesspools, are anticipated to be on the order of 25 to 40 and 10 to 20 milligrams per liter (MGL), respectively. These concentrations are substantially higher than the normal, "background" concentrations in groundwater in this location which are about 0.5 to 1.0 MGL for nitrogen and 0.0 to 0.1 MGL for phosphorous.

Liquid discharged into and percolated from the project's drywells will consist of washdown water of various industrial users and stormwater runoff. The washdown water, which may amount to 2000 to 4000 GPD for each of the two development increments, would occur on a regular (daily) basis. Where appropriate for the particular industrial user, grease and oil traps would be installed. Stormwater runoff, on the other hand, would obviously occur only during rainfall events. These may occur on the order of 10 to a couple of dozen times in any given year in this relatively arrid environment. If averaged over a year, the estimated runoff would be equivalent to about 30,000 GPD from each of the project's two development increments. This would amount to about two to three times the volume percolating from project cesspools. Concentrations of contaminants in the washdown water and surface runoff are highly variable and difficult to quantify. For nitrogen and phosphorous, the concentrations will probably be of the same order of magnitude as water percolating from cesspools.

In the calculations which follow, it is assumed that the project's discharge to the underlying groundwater will total 90,000 GPD for both development increments. To illustrate the influence that contaminants introduced in this manner may have on groundwater, an average nitrogen concentration of 40 MGL will be assumed for percolating water.

Dilution and Dispersion of Contaminants in Groundwater Flow

Contaminants introduced by water percolating downward from the project would be diluted and dispersed in the flow of groundwater toward shoreline. A cone of 15 to 30 degrees in width moving away from the source of contamination toward the shoreline would generally encompass the maximum aerial extent that the contaminants would travel. The existence of Honokohau Harbor, which is down gradient from the project, will strongly influence, the direction and ultimate point of discharge of most contaminants. Studies done by and for the Corps of Engineers following initial construction of the harbor and after its subsequent expansion demonstrate that the harbor functions as a "point sink" for groundwater discharge. In other words, groundwater flow paths bend toward the harbor, focusing discharge toward this single point.

The enclosed drawing depicts in a qualitative way the likely lateral extent of the movement introduced contaminants as they are carried in the groundwater to ultimate discharge into Honokohau Harbor and the adjacent shoreline. Actually, two cones are shown on the drawing. The inner, "most probable" discharge cone is approximately 3200 feet wide at the shoreline. The concentration of contaminants would be highest in the center of this cone and lower on each side. On an average, however, the nitrogen concentration would be approximately 3.2 MGL. This would be about three to six times greater than the normal "background" level but only eight percent of the concentration of water percolating from the project.

If dilution and dispersion of contaminants occurred over the wider, "maximum" discharge cone shown on the enclosed drawing, the resulting average nitrogen concentration would be lower, possibly as low as 2.5 MGL. It would still be expected that the highest concentration would be in the center of the cone, with concentrations decreasing with distance from the center.

Neither of the cones show that water percolating from the project is likely to reach Almakapa Fishpond. Although such a result cannot be predicted with absolute certainty, it is definitely a reasonable expectation that the fishpond will not be affected. In the unlikely event that some contaminants do disperse that far to the north, their concentration would be far lower than the average figures given in the approximations above.

Summary

In summary, the foregoing discussion and analyses indicate that the project is likely to impact the groundwater body and receiving waters of groundwater discharge in the following ways:

1. Wastewater discharged from project cesspools and disposal wells will influence the receiving groundwater's chemistry, particularly as localized increases in the concentration of certain inorganic constituents.

2. The movement of these contaminants will be along prevailing flow paths of the groundwater body toward shoreline discharge.

3. Lateral movement of these contaminants by mixing and dispersion can be approximated by a cone which widens with distance from their point of introduction toward the shoreline.

4. For the anticipated quantities of wastewater percolating into underlying groundwater, and considering the concentration of contaminants and the effects of dispersion and dilution, the concentrations of contaminants in groundwater near the shoreline will be relatively low. These contaminants will be rapidly dissipated after mixing into nearshore waters.

5. The effect of Honokohau Harbor to concentrate discharge of groundwater into it is a significant factor. It is likely to narrow the width of the discharge cone. In fact, most introduced contaminants are likely to be discharged into the harbor itself.

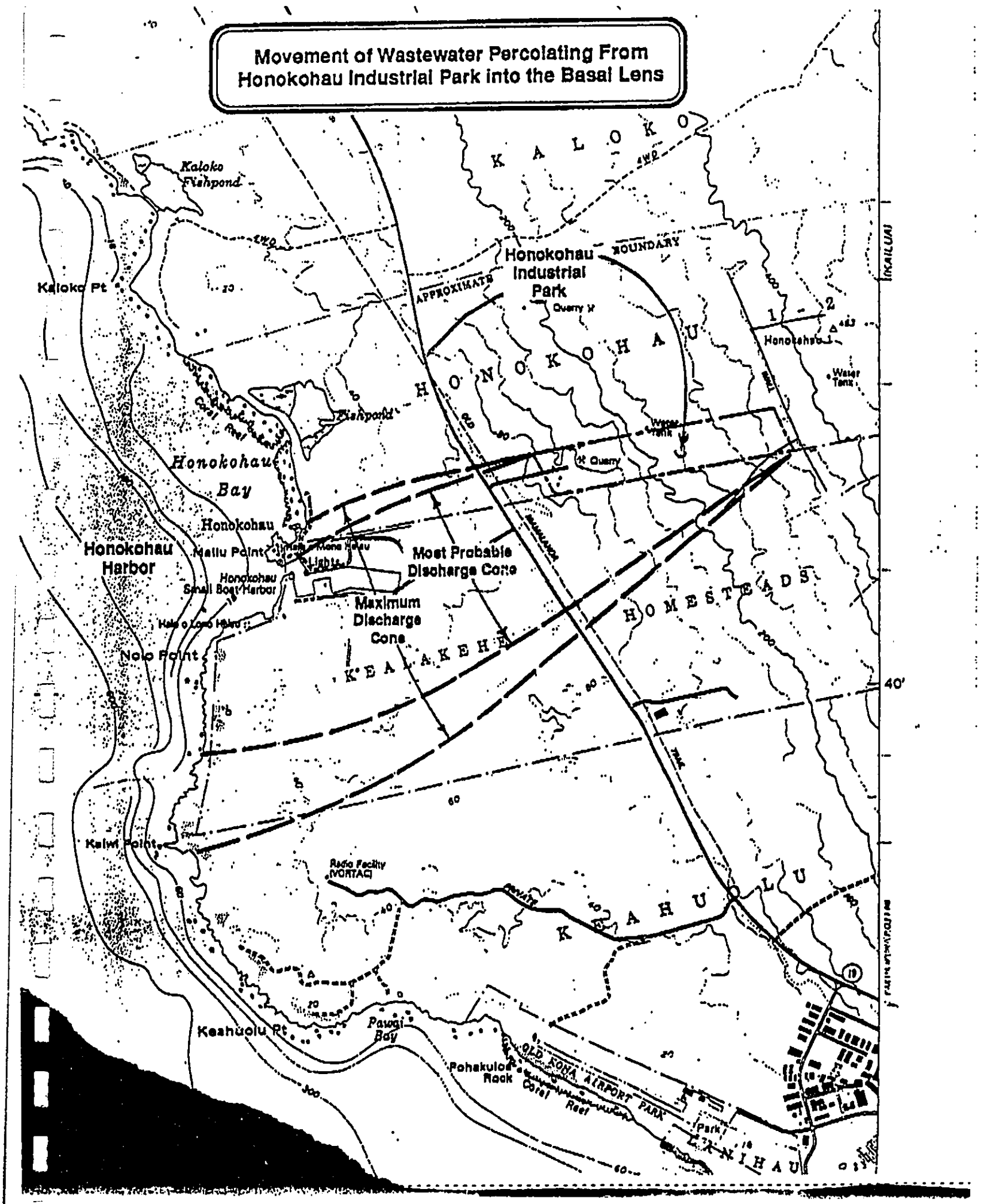
6. It is unlikely that the contaminants will travel as far north to reach Aimakapa Fishpond. In the unlikely event that some of these do enter the pond, it would amount to an extremely small fraction of the total contaminant load at a very low concentration.

Sincerely,

Tom Nance

TN:lt

Enclosure


Movement of Wastewater Percolating From Honokohau Industrial Park into the Basal Lens
Kaloko Fishpond
Kaloko Pt
APPROXIMATE
Honokohau Industrial Park
BOUNDARY
Honokohau Bay
Honokohau
Honokohau Harbor
Mailu Point
Honokohau Small Boat Harbor
Most Probable Discharge Cone
Maximum Discharge Cone
Nolo Point
Kalwi Point
Radio Facility (VORTAC)
Keahuolu Pt
Pawai Bay
Pohakulou Rock
Coral Reef
OLD KONA AIRPORT PARK
Park
Water Tank
Quarry
Honokohau
Water Tank
KALOKO
HONOKOHAU
KEALAKEHE
HOMESTEADS
KAHALULU
KEAHUOLU
INCAILUM

APPENDIX F

ANCHIALINE POND IMPACT ASSESSMENT

DAVID ZIEMANN, Ph.D.
OI CONSULTANTS, INC.

HONOKOHAU INDUSTRIAL PARK

Assessment of Potential Impacts of Light Industrial Development at Honokohau Industrial Park on the Anchialine Pond Resources at Kaloko and Honokohau, Kona, Hawaii.

Proposed Action: The site of the proposed development is located about three miles north of Kailua-Kona, approximately 1,000 feet mauka of the Queen Kaahumanu Highway, northeast of the Honokohau Small Boat Harbor (Figure 1). The proposed action consists of development of the project site for light industrial use, as outlined in the Environmental Assessment (Helbert Hastert & Kimura, 1989) submitted to the Hawaii Land Use Commission. Proposed uses include production and sale of concrete and concrete products; boat storage, sales and repair; lumber and hardware sales; automotive sales, service and repair; storage of trucks, buses and construction equipment; self-storage facilities; offices and storage areas for contractors; and nurseries and other light industrial uses.

Sources of Potential Impact:

The potential for adverse environmental impact of the proposed light industrial development arises from the potential for input of toxic or other materials into the underlying groundwater, and transport of those materials into the existing anchialine ponds located along the shoreline. The magnitude of the potential impact is a function of the location and condition of the anchialine pond resources; the types of materials discharged into the groundwater; the pathways taken by the groundwater; chemical and physical changes to the discharge materials during their passage through the underlying volcanic substrate; rates of dilution and mixing; and the sensitivity of the anchialine pond organisms to the discharge materials.

Anchialine Pond Resources:

Anchialine ponds are found in four major concentrations within areas potentially affected by the proposed development (Fig. 2): an area northwest of Kaloko Fishpond ("Kaloko"); an area just north of the Honokohau Small Boat Harbor at Maliu Point ("Maliu"); and an area just south of the boat harbor ("Kealakehe"). Additional scattered ponds are located in the area north of Aimakapa fishpond ("Honokohau"). While they may be important cultural and wildlife areas, neither Kaloko nor Aimakapa fishponds are anchialine ponds by the strick definition of the term, but rather are former embayments which have been closed off at their mouths by natural or human activities. The closure at the mouth of Kaloko pond is sufficiently porous that the conditions within the fishpond are more nearly marine than brackish; the closure at Aimakapa is fronted by a well-developed sand beach, and water within that fishpond is more nearly fresh.

The biological conditions within the anchialine ponds and the two fishponds were surveyed as part of a larger survey of the ponds of the Kona coast (OI Consultants, 1985); results of this survey are presented in Appendix I and summarized below.

Greatly different biological communities were found within the four pond areas, and significant differences were also seen within areas. At Kaloko, for example, topminnows were found in almost all ponds, and the small red anchialine shrimp, Halocaridina rubra, were found only in ponds which did not contain fish. This same pattern was seen in the other pond areas. Typical anchialine pond organisms (H. rubra, the snails Melania and Theodoxus) were more numerous in the ponds located on either side of the Honokohau small boat harbor that in the ponds to the north. All areas contained examples of well developed anchialine pond communities.

The salinity of water found in the ponds is an indication of the degree of mixing of the fresh groundwater and underlying seawater, and may be taken as an index of the potential of ponds to be affected by changes in groundwater quality due to development. The salinity levels in the ponds of the Kaloko-Honokohau area are also presented in Appendix I. Salinities in the Kaloko and Maliu area were generally higher than in the Kealakehe area, while salinities were lowest in the Honokohau area.

Projected Discharges:

The discharges from the project site will be of two major types: sanitary wastes which will be discharged into cesspools, from which liquid will seep into the groundwater; and surface runoff as the result of rainfall, equipment washdown, nursery watering, landscape maintenance, etc. Some of the runoff water and the solid and dissolved materials which it carries will percolate through the surface, while some other portion, primarily runoff from paved surfaces, will be discharged through dry wells.

The majority of the particulate material contained in the discharges, whether it be organic or inorganic in nature, will be rapidly removed from the discharge flow by filtration and adsorbtion onto soil particles. It is unlikely that any solid wastes generated by the quarry and concrete production plant, for example, would travel any significant distance after discharge.

Organic wastes produced by the sanitary discharges would generally have long residence times after discharge, and would be expected to be broken down into dissolved forms by bacterial action. Recent instances of high bacterial levels in near shore well waters suggest, however, that the possibility of downstream contamination exists. It appears that most, if not all, of such cases of contamination can be attributed to the discharge of wastes into lava tubes which provide a direct connection to lower

lying areas without the opportunity for bacterial breakdown and degradation. Care will have to be taken that any cesspools developed on the project site be designed such that proper breakdown and filtration occurs.

It is likely that some amounts of herbicides and pesticides used in conjunction with the nursery operation or local landscaping may be introduced into the groundwater. In general, much of this material will be adsorbed by the underlying soil particles and slowly broken down. The distance from the project site to the anchialine ponds is sufficiently far that the likelihood of negative impacts from small amounts of such materials is small. No measurable quantities of such pesticide or herbicide materials used in conjunction with resort development or golf course operation have been observed at Waikoloa, an area where such activities are located in close proximity to anchialine ponds (Brock and Norris, 1988), and no evidence of biological impacts of these materials has been observed.

Petroleum products (gasoline, oil, grease) may be introduced to the groundwater during rains and through equipment washdown. The amounts introduced are likely to be small, given the relatively small amount of activity proposed for the project site. Such materials, again, will be filtered and adsorbed by soil particles, and that material not so removed will be diluted by the existing groundwater flow. Petroleum products also appear not to be extremely toxic to some anchialine pond organisms. For example, the pond at Maliu containing the most numbers of Halocaridina rubra was observed to contain numerous empty oil cans, an old motor, assorted trash, and to have a floating scum covering a portion of the surface (OI Consultants, 1985).

In-Situ Changes in Discharge Quality:

Changes in chemical composition due to adsorbtion, filtration and degradation, and the magnitude of the mixing and dilution process for discharges into the groundwater flow are examined in detail in the hydrographic impacts section (Belt Collins & Associates, 1990). In general, organic materials would be broken down to dissolved forms, and solids would be removed by filtration. In addition, one would expect an approximate 1:1000 dilution of any material injected into the groundwater at the project site by the time it reached the shoreline. Such high dilution rates would reduce the concentrations of materials introduced at the project site to levels generally undetectable by current methodology, and lower than the toxic threshold for aquatic organisms.

Sensitivity of Anchialine Pond Organisms:

Data from anchialine ponds located in close proximity to resort development (Brock and Norris, 1988) indicate that little if any change in pond community composition or abundance can be

attributed to such activities. While levels of dissolved nutrients appear to have increased in some such pond areas, there does not appear to have been a systematic biological response to such changes.

Projected Groundwater Pathways:

The envelop of projected pathways for sanitary and runoff discharges at the project site has been estimated (Belt Collins & Associates, 1990; Fig. 3). The envelop includes those areas which lie within the possible pathways of discharge waters added to the existing groundwater flow. The potential for impact due to groundwater quality alteration is highest along the center of the envelop, and lowest near the edges. Thus, ponds located in the Kaloko and Honokohau areas, including both Kaloko and Aimakapa fishpond, are outside the region of potential impact, while ponds within the Maliu and Kealakehe areas are included in the envelop.

Impact Assessment:

Only ponds in the Maliu and Kealakehe areas are located with the envelop of potential impact from the proposed light industrial development project. There is little likelihood, however, of significant environmental impact on the ponds within the envelop. The projected uses for the project site will generate discharges containing few toxic materials; most materials in the discharge will be removed from the groundwater stream by adsorbtion, filtration or bacteriological degradation long before the flow reaches the ponds. The predominant chemical addition to the groundwater flow will be dissolved nutrients (nitrogen and phosphorus). These chemicals are already found in high concentration in undisturbed groundwave, so the relatively small additions from the project site will have no effect on the aquatic ecosystems. In addition, the point discharges will be mixed and diluted by the receiving groundwater to levels at least 1000 times lower than at the discharge point. All these factors combine to make any measurable environmental impact unlikely.

References

Belt Collins & Associates. 1990. Hydro-Geologic Impacts of the Honokohau Industrial Park. Letter Report. Honolulu.

Brock, R.E. and J.E. Norris. 1988. The Waikoloa Anchialine Pond Program; Second Status Report. HIMB/SeaGeant, University of Hawaii. 65 p.

Helbert, Hastert & Kimura Planners. 1989. Environmental Assessment, Honokohau Industrial Park. Honolulu. 32 p. + Exhibits A-B.

OI Consultants, Inc. 1985. Anchialine pond survey of the northwest coast of Hawaii island. Final Report. Prep. for Transcontinental Development Co., Honolulu. 39 p. + Appendices A-E.

Appendix I.

Relative abundance of organisms found in anchialine ponds and fishponds in the Kaloko-Honokohau area, Kona, Hawaii, during 1985. From OI Consultants, 1985.

Key to species

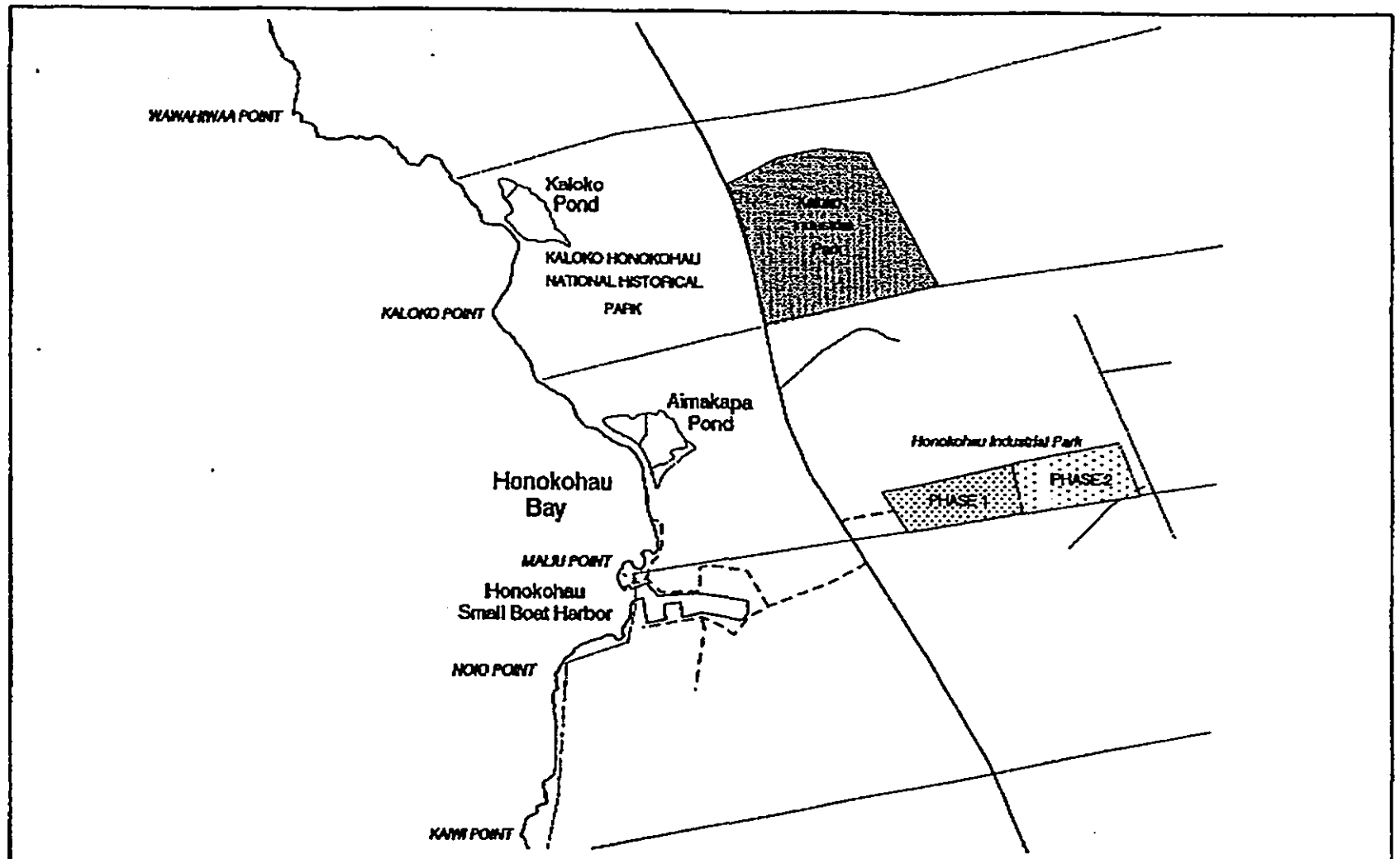
Schi	Schizothrix sp.	algae
Rupp	Ruppia maritima	algae
Entr	Enteromorpha sp.	algae
Mela	Melania sp.	snail
Theo	Theodoxus cariosa	snail
Metb	Metabetaeus lohena	shrimp
Halo	Halocaridina rubra	shrimp
Pale	Palaemon debilis	shrimp
Metp	Metopograpsus thukuhar	crab
Mugl	Mugil cephalus	mullet
Kuhl	Kuhlia sandvicensis	aholehole
Tilp	Oreochromis mozambicus	tilapia
Poec	Poecilia sp.	topminnow
SAL	SALINITY (ppt)	

Key to abundance scale

1 present
2 common
3 abundant

Pond #	Schi	Rupp	Entr	Mela	Theo	Matb	Halo	Pale	Metp	Mugl	Kuhl	Tilp	Poec	Sal
Kaloko														
1			2										2	5
2			3										3	10
3		2	3										3	15
4														17
5									1				1	15
6													2	15
7													1	18
8														14
9							3			3				18
10								3						15
11								2					2	7
12								3	1					8
13							1							11
14								2	1				1	10
15		2		1					1				3	9
16		3	3	2									2	10
17													2	10
18					2					1			2	28
fishpond										1	1			31
Honokohau														
1														9
10														7
11														7
12							2							7
13							1							7
14									1					7
15														7
16														9
17												3		11
18		1		1	3					1	2			9
19									1					7
20														7
21	1			1										7
22							1							4
fishpond			3									3		6
Maliu														
1	3					1	3							14
2	1						3							15
3														15
4	1					1	2	3						20
5	1							1			2			18
6		1					1		1					22

Pond #	Schi	Rupp	Entr	Mela	Theo	Metb	Halo	Pale	Metp	Mugl	Kuhl	Tilp	Poec	Sal
Kealakehe														
1								1	1			2	1	10
2			2											14
3				2	2						2		1	13
4												2	1	10
5				2	1		2							9
6														8
7				2	2								1	11
8	2			2	2							2		14
9				2			1							11
10				1			3							7
11							3							8
12				3			1							8



OI Consultants, Inc.
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Honolulu, Hawaii 96825

Figure 1.

SITE MAP
HONOKOHAU INDUSTRIAL PARK

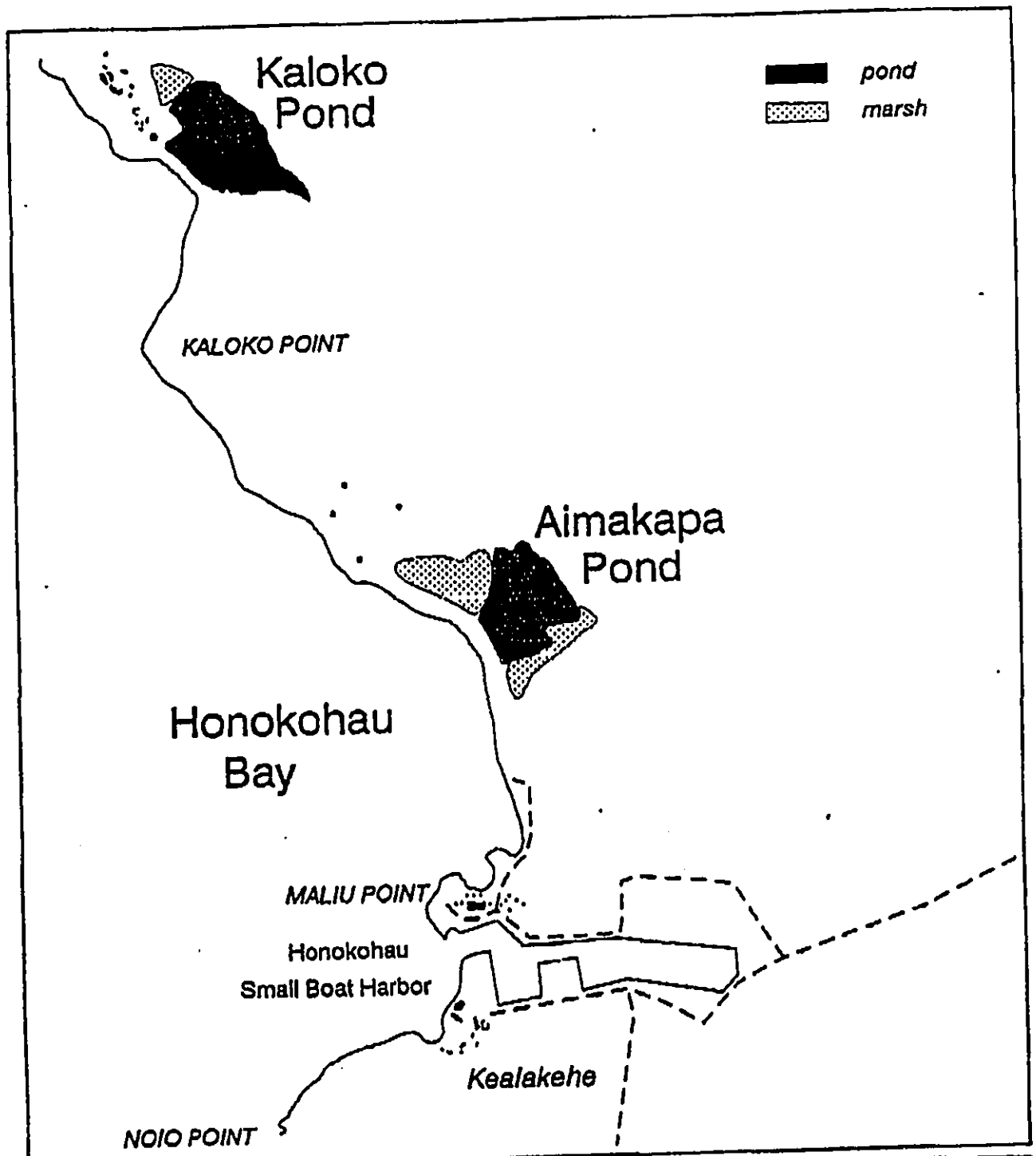

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Figure 2.
POND LOCATION MAP
HONOKOHAU INDUSTRIAL PARK

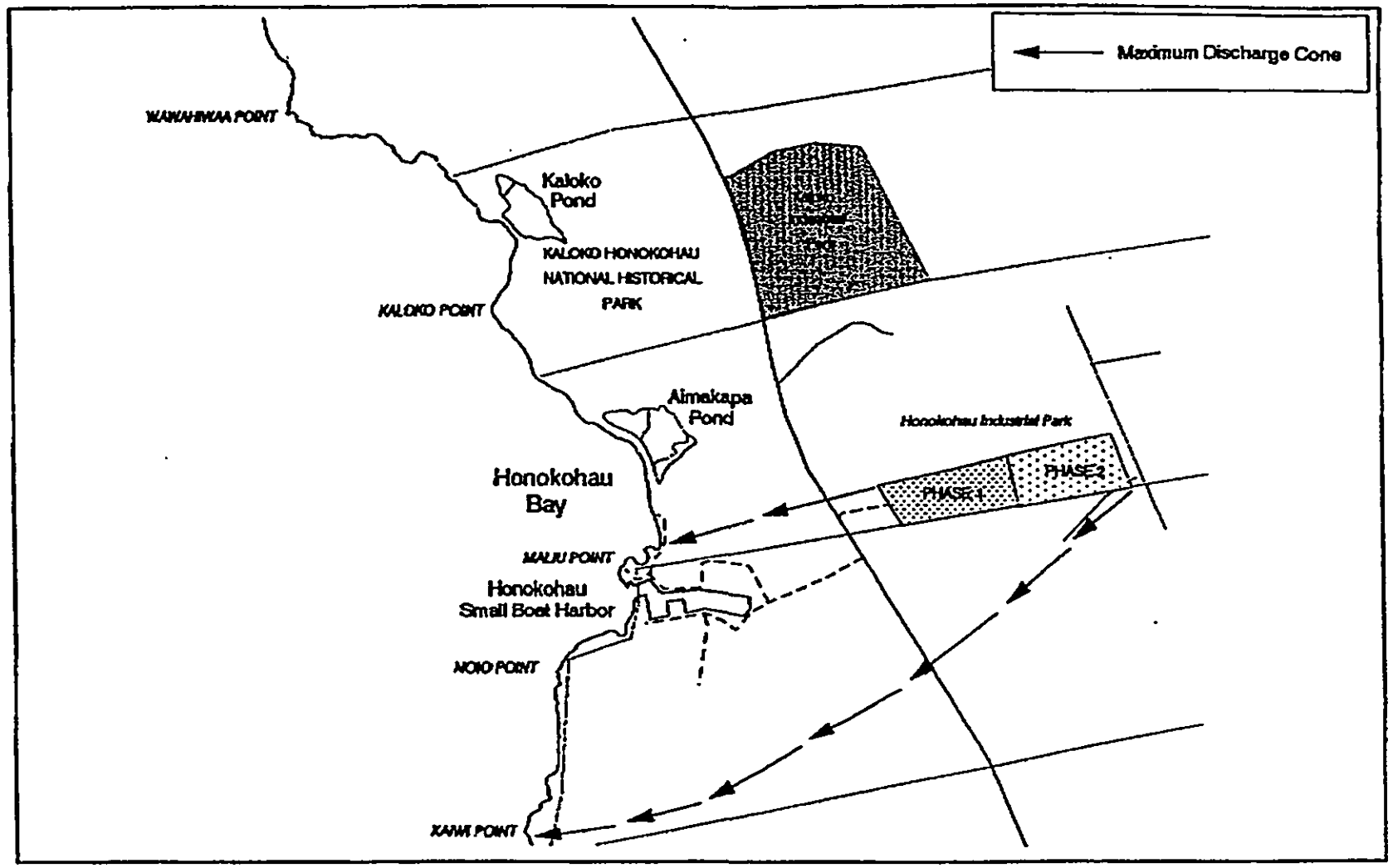

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Figure 3.
IMPACT ENVELOPE
HONOKOHAU INDUSTRIAL PARK