

1993-11-23-KA-FEA-Kauai Agricultural Park at Kekaha NOV 23 1993

FINAL ENVIRONMENTAL ASSESSMENT for the

## KAUAI AGRICULTURAL PARK

Waimea, Island of Kauai

Tax Map Key: 1-2-02:01 (por.)

NOVEMBER 1993

PREPARED FOR:

Department of Agriculture  
State of Hawaii

### **RMTC**

R. M. Towill Corporation

420 Waiakamilo Rd., Suite 411  
Honolulu, Hawaii 96817-4941  
(808) 842-1133 • Fax: (808) 842-1937

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**SECTION 1**  
**BACKGROUND AND PURPOSE**

**1.1 BACKGROUND (STATE OF HAWAII AGRICULTURAL PARK PROGRAM)**

The State of Hawaii's Agricultural Park Program was established by the State Legislature in 1972 (Act 110, SLH) for the purpose of relieving some of the shortage of affordable farm land by allowing for acquisition of private agricultural lands for continuing agricultural uses. Due to protracted and cumbersome acquisition issues, this legislation was amended in 1974 to include the use of State lands in order to accelerate the implementation of the program. The stated purpose of the program is preservation of important agricultural lands for productive use and to provide public agricultural subdivisions secure from urban encroachment with irrigation water and other necessary improvements. This land would be provided at reasonable rental costs with secure long term leases. Lessees would have the benefits of common facilities and activities to encourage farm production and distribution economies.

The responsibility of program administration was assigned to the State Department of Land and Natural Resources (DLNR).

In 1980 the Legislature funded an evaluation/directions study for the Agricultural Park Program. This resulted in the Statewide Agricultural Park Action Plan - Phase I (1982) and Phase II (1984), referred to as the "Mogi Reports." The purpose of the reports was to evaluate the progress and recommend future directions for the program. As a result of these reports the Department of Agriculture (DOA) and the DLNR were requested by the Legislature to evaluate the program and park law again and recommend management alternatives. The resultant Department of Agriculture conclusions were incorporated into Act 222 passed by the 1986 Legislature which established Chapter 166, Hawaii Revised Statutes (HRS).

This Act transferred the Agricultural Park Program from the DLNR to the DOA.



According to the Act, DOA was assigned the responsibility to plan, develop, and manage agricultural parks on public lands set aside for that purpose. This allowed for smoother implementation of the entire program, with the inclusion of specific administrative rules necessary for the proper operation of the park program. In 1989, administration of agricultural park lease functions and operation of the State irrigation systems, were assumed by the new Division of Agricultural Resource Management within the DOA.

Based on the findings in the "Mogi Reports" and "Priorities for Future State Agricultural Parks-July 1991," the estimated economic returns from the park system to the State are not expected to offset the anticipated development costs. Even though the park program was not established to generate "profits" for the State, using State lands is clearly more economical than purchase or lease of private lands. In view of declining sugarcane/pineapple acreage, conversion of these prime lands has been suggested in previous reports as an alternative to locating agricultural parks on vacant but marginally productive State lands.

Both the "Mogi" and the "Priorities" reports have established site and commodity identification processes that are intended to set standards by which suitable properties and appropriate crops can be evaluated.

Thus far, Act 222 has resulted in the establishment of three agricultural parks on Hawaii (Pahoa, Panaewa, and Keahole), and three on Oahu (Waimanalo, Waianae, and Kahuku). Funding has been appropriated for the park on Kauai, and a site selection report, completed in 1993, recommended sites in the Waimea-Kekaha region as having the most appropriate development potential.

A task force was formed to evaluate two specific sites in the Waimea-Kekaha region, and to enable proper coordination in the development of the recommended sites. Further, a preliminary engineering report was prepared to determine infrastructure and engineering design requirements, consider and evaluate the possible alternatives, and to recommend a

priority site and development strategy.

The sites identified for analysis in the Kauai Agricultural Park - Site Selection Analysis report were selected from a preliminary list of sites proposed by the Ad Hoc Agricultural Park Site Selection Committee and Department of Agriculture staff.

## 1.2 PURPOSE

This Environmental Assessment (EA) has been prepared in accordance with Chapter 343, Hawaii Revised Statutes (HRS), as amended, Chapter 200 of Title 11, Department of Health Administrative Rules, and Act 241, Session Laws of Hawaii 1992. The need for the preparation of an EA for the proposed project was prompted by criterion number (1) Use of State or County lands or funds for the proposed project, as contained in Chapter 343-5, HRS.

The purpose of the EA is to provide information to public officials and members of the community about the nature of the project; to describe the existing environmental conditions of the properties and surrounding areas; to evaluate potential impacts of the proposed action; to present appropriate mitigating actions for those impacts; and to discuss alternatives to the subject action.

**SECTION 2**  
**INTRODUCTION**

**2.1 PROJECT SUMMARY**

**Project:** Kauai Agricultural Park

**Proposing Agency:** Department of Agriculture  
State of Hawaii

**Approving Authority:** Governor, State of Hawaii

**Tax Map Key No.:** 1-2-02:01 (por.)

**Areas:** Mauka site (Site "4B") = 255 acres  
Makai site (Site "3") = 157.5 acres

**Location:** Kekaha District, Island of Kauai

**Owner:** State of Hawaii  
Department of Land and Natural Resources  
Leased to Kekaha Sugar Company (G.L. No. S4222)

**Existing Land Uses:** Mauka site: sugarcane crop production  
Makai site: used intermittently for grazing

**State Land Use Designation:** Agriculture

**County General Plan:** Agriculture

**County Zoning:** Agriculture

**2.1.1 Permits and Variances Required**

Chapter 9A of the Kauai County Revised Ordinance provides guidelines for agricultural park subdivision. This ordinance exempts agricultural subdivisions from the normal subdivision standards regarding roads, drains, sewer and water supply as set forth in the

comprehensive zoning ordinance and the subdivision ordinance. However, two key provisions limit agricultural leasehold lots to a minimum of 10 acres and agricultural subdivisions to not less than 350 acres. Because a survey of farmers indicate desired lot sizes of 5 to 10 acres, variances from these provisions will be required for development of farm lots less than 10 acres, and subdivisions of less than 350 acres.

National Pollutant Discharge Elimination System (NPDES) permits are normally required if grading of a site exceeds 5 acres. However, according to the County of Kauai Department of Public Works (Section 11 Comment Letters- DPW letter dated September 15, 1993), the County grading ordinance exempts grading work in self contained Government controlled areas. Although no grading permit will probably be required, the developer will minimize dust and erosion problems during and after construction. Lease documents prepared for future lessees will require that each lessee will provide a Conservation Plan in compliance with the Food, Agriculture, Conservation and Trade Act and non-point source water pollution (Clean Water Act Section 319) program guidelines.

## 2.2 STATE AGRICULTURAL PARK PROJECT

The State Department of Agriculture proposes to develop its first Kauai Agricultural Park in the Waimea-Kekaha district in southwest Kauai. Since the enactment of Chapter 166, HRS in 1986, six agricultural parks have been transferred to the Department of Agriculture for administration. Three agricultural parks were established on the island of Hawaii - in Pahoa, Panaewa, and Keahole; and three on Oahu - in Waimanalo, Waianae, and Kahuku.

Since then, a site selection analysis was conducted for an agricultural park on Kauai between summer 1992 and early 1993. Subsequently, the Waimea-Kekaha sites, the subjects of this environmental assessment, were selected as the first sites proposed for development as the State's Kauai Agricultural Park.

Kauai County contains 140,959 acres within the State Agricultural District, third highest in the State after Hawaii County and Maui County. By far, the largest users of these lands are

Kauai's sugar plantations which in 1991 had 34,000 acres in cultivation. The other large acreage crops on Kauai are coffee (2,600 acres) and fruits (700 acres, excluding pineapple). As of 1987 Kauai County had 224,153 acres of land in farms (Hawaii State Data Book, 1991).

**SECTION 3**  
**PROJECT DESCRIPTION**

**3.1 LOCATION**

The property is located on the Island of Kauai in the southwestern region near the village of Waimea and Kekaha Sugar Company (TMK: 1-2-02:1). Total acres of the entire property are 7,381 acres. The entire property consists of State lands leased to Kekaha Sugar Company (G.L. S-4222) through December 31, 1993. Most of the State lands leased to Kekaha Sugar Company (KSCO) are being used for active sugar production, including the mauka portions. Some of the gulches and lowlands are being subleased for livestock grazing. The State and County land use designation for the entire Waimea-Kekaha site is Agricultural.

The project consists of two possible sites (mauka and makai, or Site 4B and Site 3, respectively) within the Kekaha property boundaries. The Makai site is located in the Mana coastal plain, between Bonham Military Landing Field and Kekaha Village. It consists of 157.5 (gross) acres of level terrain. The Mauka site is located on the Kaleinamanu Ridge - fields 601 and 602 (mauka of Waimea) and adjoins Waimea Canyon Drive, from about 480 feet to 960 feet above sea level. It consists of 200 (gross) acres, much of which includes marginal lands with partially sloping terrain. The site is presently in active sugar production by Kekaha Sugar Company (approximately 129 acres). (Figures 1 and 2)

Based on surveyed farmer preferences, the average lot size within the Agricultural Park will be between five and ten acres. Some lots may be over ten acres in size to accommodate a wider variety of agricultural uses. There will be no on-site housing within the Agricultural Park. The necessary infrastructure, such as a paved access road to the lots, irrigation water system, electricity and telephone service, will be developed by the State. Individual farmers will be responsible for any on-site improvements to their farm lot.

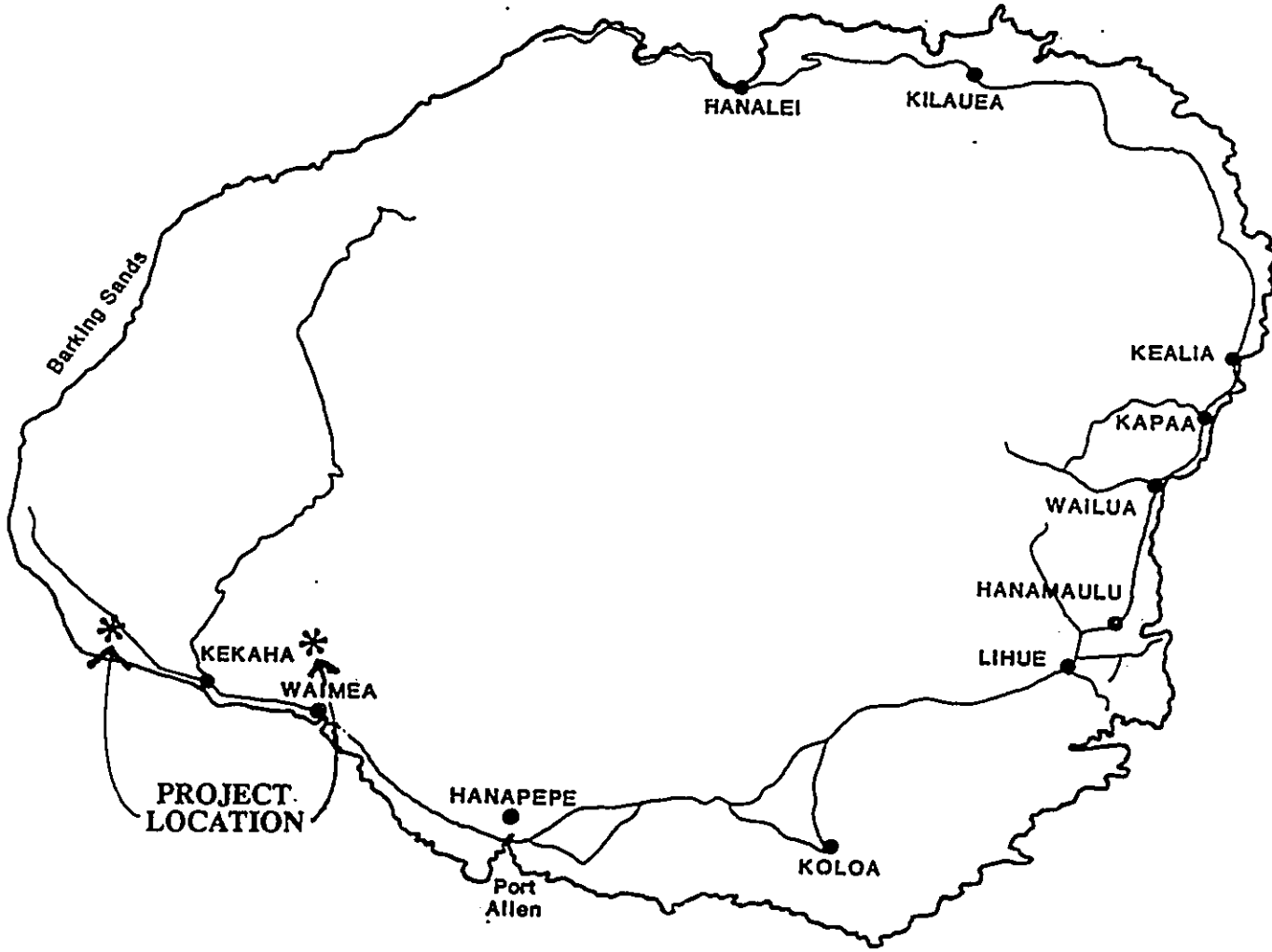
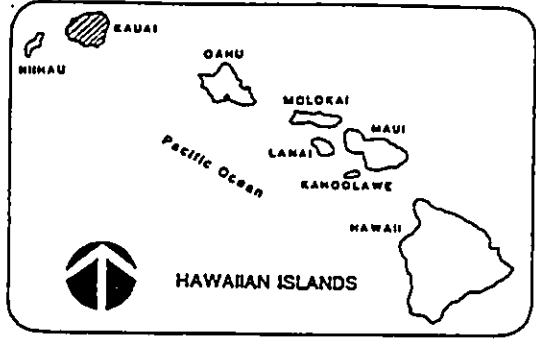
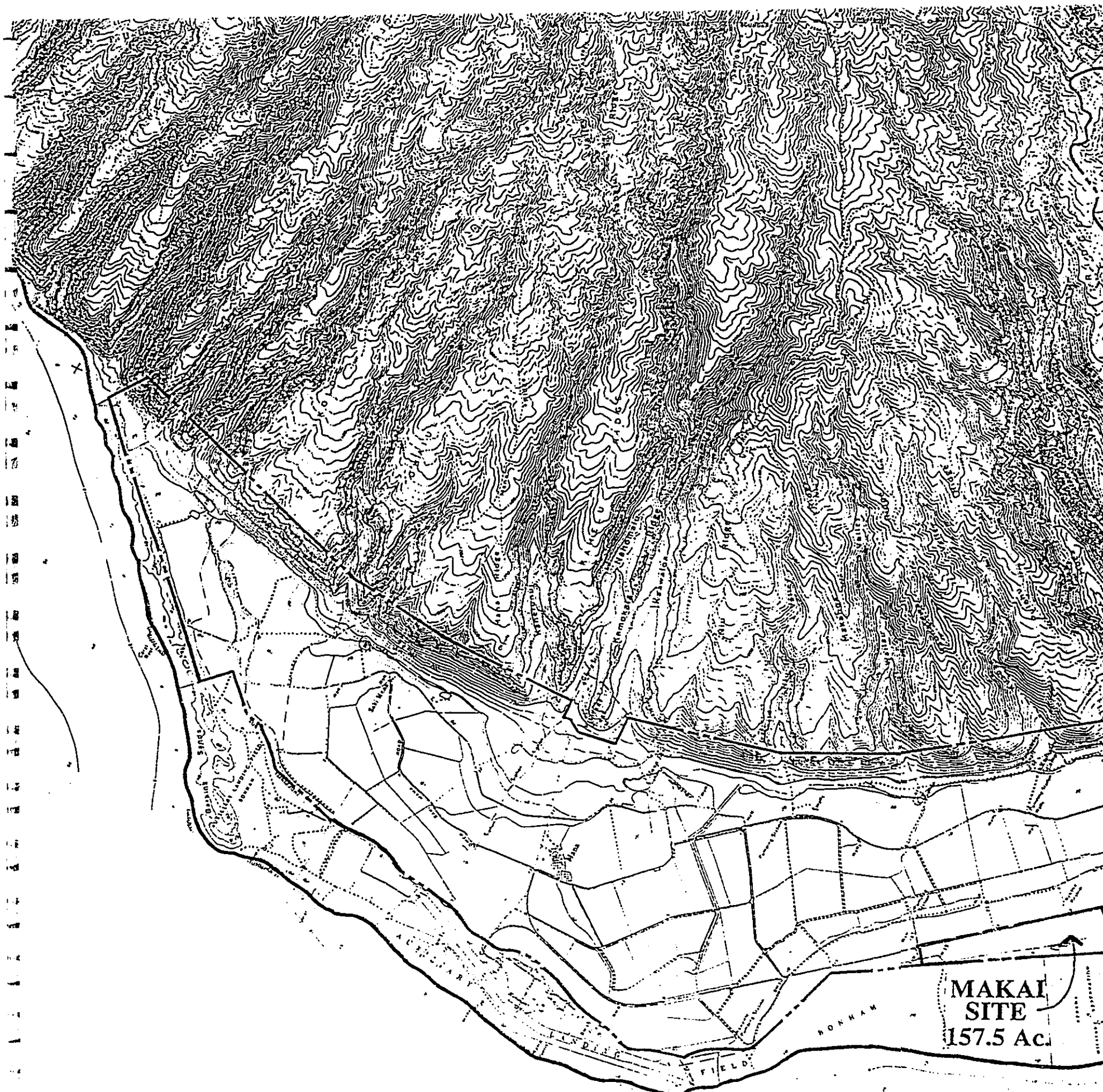


Figure 1  
**PROJECT LOCATION**  
 KAUAI AGRICULTURAL PARK  
 Prepared for the State of Hawaii  
 Department of Agriculture



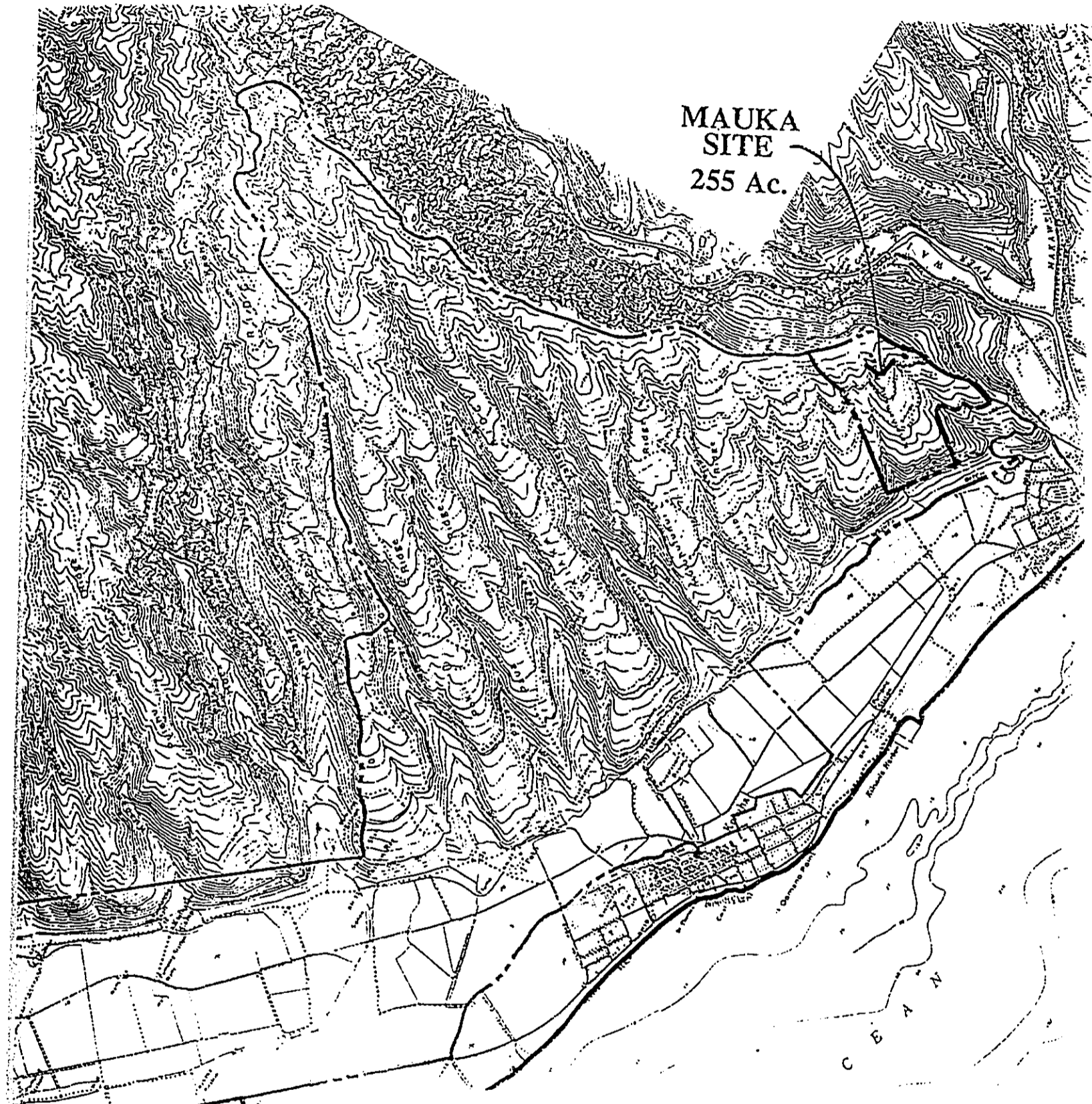


MAKAI  
SITE  
157.5 Ac.

HONHAM

FIELD





MAUKA  
SITE  
255 Ac.

MAKAI  
SITE  
157.5 Ac.

Figure 2  
LOCATION MAP  
KAUAI AGRICULTURAL PARK  
Prepared for the State of Hawaii  
Department of Agriculture

A north arrow pointing towards the top-left of the map. Below it is a graphic scale bar with markings at 0, 3500, and 7000 feet.

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### 3.1.1 Agricultural Commodities Development

Crops being considered for inclusion in the Kauai Agricultural Park include orchard, vegetable and melon, taro, floriculture, and aquaculture. Livestock production is not currently being considered as a Park activity.

- \* Floriculture/Nursery: Most of the floriculture commodities (particularly the orchids, potted flowering plants, and lei flower trees/plants) would be well suited for the Waimea-Kekaha site because of the drier, sunnier climatic regime. This could mean higher yields with less chemical usage and lower unit production costs.
  
- \* Orchard Crops: Two growers (one full-time grower located at Moloaa, and another mauka Wailua area part-time grower with many years of experience) noted that high temperatures such as those at Waimea-Kekaha are not suitable for papaya. They contend that yields would be reduced by high temperature-induced sterility in trees. However, this problem was not confirmed by a University of Hawaii horticulturist nor Kauai extension agents. The likely cause of any such infertility is insufficient water, a problem easily ameliorated by irrigation.

Waimea-Kekaha would likely prove the best site for bananas and other orchard crops given its relatively high solar insolation and gentle winds. One possible constraint to orchard crop development at the makai Waimea-Kekaha site is the high water table in the makai portion of the site. Additional research would have to be undertaken to determine if this is a limiting factor to orchard crop development at Waimea-Kekaha.

- \* Vegetable and Melons: Waimea-Kekaha's class "A" soils (on the coastal plain) and slightly better climatic regime (drier and sunnier) make it conducive to these crops. The higher elevation mauka site area of Waimea-Kekaha has a distinct climatic advantage for selected commodities over other sites due to cooler temperatures. Although not high enough for head lettuce, celery or broccoli, the higher elevations

are suitable for leafy lettuce, Maui onion, cabbage, and some other selected crops (including certain floriculture commodities) currently not produced (or not produced in significant volume) on Kauai.

- \* Dryland Taro: Higher crop yields could be expected in the drier, sunnier climate of these sites, in part through shorter crop cycles. However, greater irrigation requirements could offset, in part, the yield advantage of the drier sites. Taro requires a relatively large amount of water during dry period conditions, and depending on cost of water, this could be a significant production cost factor. Control of diseases and weeds is likely to be less costly in drier conditions.
  
- \* Aquaculture: Aquaculture operations utilizing pond culture systems can locate on a wide variety of lands. However, development and production costs usually dictate the use of flatter lands with access to large volumes of inexpensive water. Marine shrimp and other saltwater species must have access to seawater. Prawns can be grown in brackish water. The Waimea-Kekaha site has areas near the shoreline which could be used for culturing saltwater species. The Waimea-Kekaha site also has excess fresh water currently pumped into the ocean which could be used for aquaculture. Aquaculture operators will be required to acquire all necessary Department of Land and Natural Resources and Department of Health clearances prior to initiation of such activity.

### 3.1.2 Commodity Acreage Allocations

Agricultural Park acreage allocations are made in light of commodity market considerations. The allocations are summarized in the following Acreage Allocation Summary (Table 3-1).

**Table 3-1**  
**ACREAGE ALLOCATION SUMMARY TABLE**  
 (Source : Kauai Agricultural Park Site Selection Analysis - 1993)

<u>Acreage Allocation</u>			
<u>Agricultural Use</u>	<u>Low</u>	<u>High</u>	<u>Distribution</u>
Floriculture/Nursery	70	110	30%
Orchard Crops: Papaya Banana	100	150	42%
Truck Crops: Vegetables Melons Dryland Taro	50	75	21%
Aquaculture	15	25	7%
<b>Total Land Requirement</b>	<b>235</b>	<b>360</b>	<b>100%</b>
Other Tropicals	50	75	
<b>Grand Total Land Requirement</b>	<b>285</b>	<b>435</b>	
<b>Suggested Additional Acreage:</b>			
Floriculture/Nursery	100	100	
Orchard Crops	200	300	
<b>Suggested New Total Acreage</b> (For the Island of Kauai)	<b>585</b>	<b>835</b>	

### 3.1.3 Agricultural Water Requirements

The sites should have sufficient water available, which can be supplied to farm lots at reasonable rates. To provide a guide to maximum daily water demand at the proposed Agricultural Park, the following approximate commodity requirements are given:

Approximate Maximum Daily Water Consumption

Papaya	5,000 gal. per acre
Nursery	6,000 gal. per acre
Vegetables	4,000 gal. per acre
Dryland Taro	15,000 gal. per acre (utilizing drip irrigation)
Aquaculture	145,000 per acre of pond

-----  
(Sugar production requires approximately 10,000 gal./acre/day)

NOTE: Site location (and for aquaculture), the intensity of production technology used, would more precisely determine water requirements.

It should be noted that certified nurseries - those exporting plants in potted soils - may require nematode free water such as potable water provided by the County.

**3.2 SURROUNDING USES AND ENCUMBRANCES**

**3.2.1 Surrounding Uses**

The makai property adjoins the urban areas of Kekaha and Waimea along the south. DHHL lands adjoin the mauka portions of the property and the upper half of the mauka site is also claimed by DHHL. The Pacific Missile Range Military Reservation runs along the entire coastal edge, and Military Launching Hazard Areas (LHA) exist at the far western boundary. Polihale State Park adjoins the northwest corner of the property. To the southeast of the property there are plans for a private golf course development (Kikiaola), a future County landfill and a State Bird Refuge along the south perimeter.

Mauka paved State roads follow the perimeter of the property with Waimea Canyon Drive on the east, and Kokee Ridge Road on the west. Cane haul roads in the mauka portion are steep and impassable in wet conditions. Kaunualii Highway and many other private paved roads cross the makai portion of the property.

The makai site is directly adjacent and north of the Kekaha Military reservation and Bonham Landing Field. The access road to Kokole Point Coast Guard Reservation and Hawaii National Guard Rifle Range adjoins the east perimeter of the site. To the east of the site is a 65-acre landfill site and other State-owned lands. Kaunualii Highway runs along the north perimeter of the site. Lands to the north of the site are in sugar production by Kekaha Sugar Company.

The mauka site is located on the Kaleinamanu Ridge, including Kekaha Sugar Company fields 601 and 602 (mauka of Waimea) and adjoins the Waimea Canyon Drive. Lands west and makai of the site are presently in active sugar production by Kekaha Sugar Company. Waimea Canyon abuts the eastern side of the ridge road.

### 3.2.2 Encumbrances

#### 3.2.2.1 Lands and Water License Agreements (with Kekaha Sugar Company)

The property is State-owned and under lease (S-4222) to Kekaha Sugar Company. The lease terms run through December 31, 1993. A major concern of both the State and sugar companies is how conversion of these lands for an agricultural park will impact ongoing sugar production. Sugar is still a vital sector in Hawaii's economy and is actively supported by the State, notwithstanding the need to increase opportunities for diversified agriculture.

Use of the mauka site may have varying degrees of impact since Kekaha Sugar Company has larger overall acreages in production. It may be more an issue of the Company wanting to consolidate all of their prime production lands in conjunction with the sugar mill location. This is a potential issue with the mauka site since it is in active sugar production. The makai site is presently not in agricultural production.

The Department of Agriculture has requested withdrawal of Site 3 and set aside Executive Order from the Department of Land and Natural Resources (June 7, 1993 memorandum to DLNR).

Availability of water resources for irrigation is a crucial factor for the sites. Irrigation water is presently available in some form and the Department of Agriculture has received acknowledgement from the Commission on Water Resource Management (see Section 11, comment letters, memorandum dated August 31, 1993 from DLNR). No permits are required from the Commission on Water Resource Management to withdraw water from the irrigation ditch.

LICENSE #S-4222 (Expires With the Land Lease December 1, 1993)

Kekaha Sugar Company has a land and water lease on the Kokee and Kekaha Ditches for "storage, taking and use of all State waters" in these areas, including "groundwater, wells, shafts, etc., within and out of the watershed or its connections" (Kokee ditch intake - fifty five (55) mgd, Kekaha ditch intake - fifty (50) mgd). Waimea ditch waters are covered under a separate license #S-4256 (ditch intake - 2.93 mgd). Kekaha Sugar must provide water "in excess of the companies' needs," to other users at a reasonable cost. At present Kekaha Sugar Company has determined there is "no excess water" available for other users.

These agreements will require detailed legal interpretation by the State in order to determine the exact terms of water volume or supply diversions, or modification of these terms, as they relate to proposed Agricultural Park water requirements. In the agreements between the State and the present lessees there is language to the effect that the State has the right to change the terms of the lease/license, including the "amount of water deemed necessary" for the lessee or other users. The State will retain all rights to any improvements made to water transmission areas by the lessee upon termination of the leases.

The State DOA is coordinating the proper transfer of lands from General Lease S-4222 with the State DLNR, Office of Hawaiian Affairs (OHA) and Department of Hawaiian Home Lands (DHHL) for use as an agricultural park (see correspondence from DHHL October 15, 1993, and OHA October 8, 1993, in Section 11, Comment Letters).

3.2.2.2 Department of Hawaiian Home Lands

The Waimea-Kekaha property adjoins Hawaiian Home lands (at the upper mauka portion) and involves boundary and water rights or land claims to portions of the property. In the case of the two sites there is land separation between DHHL lands and the areas in question, so the principal issue will be resolution of water rights disputes.

In the Hawaiian Homes Commission Act (Section 221) all the licenses are subject upon demand "to grant, free of charge, any water the department (DHHL) deems necessary to supply" the needs of DHHL lands. The following provisions of Section 221, taken directly from the Hawaiian Homes Commission Act (Act of July 9, 1921, c 42, 42 Stat 108), may apply:

"Section 221. Water (a) When used in this section:

(1) The term "water license" means any license issued by the board of land and natural resources granting to any person the right to the use of government-owned water; and

(2) The term "surplus water" means so much of any government-owned water covered by a water license or so much of any privately owned water as is in excess of the quantity required for the use of the license or owner, respectively.

(b) All water licenses issued after the passage of this Act shall be deemed subject to the condition, whether or not stipulated in the license, that the licensee shall, upon the demand of the department, grant to it the right to use, free of all charge, any water which the department deems necessary adequately to supply the livestock, aquaculture operations, or domestic needs of individuals upon any tract.

(c) In order adequately to supply livestock, the aquaculture operations, or the domestic needs of individuals upon any tract, the department is authorized (1) to use, free of all charge, government-owned water not covered by any water license or covered by a water license issued after the passage of this Act or covered by a water license issued previous to the passage of this Act by containing a reservation of such water for the benefit of the public, and (2) to contract with any person for the right to use or to acquire, under eminent domain proceedings similar, as near as may be, to the proceedings provided in respect to land by sections 101-10 to 101-34, Hawaii Revised



Statutes, the right to use any privately owned surplus water or any government-owned surplus water covered by a water license issued previous to the passage of this Act, by not containing a reservation of such water for the benefit of the public. Any such requirement shall be held to be for a public use and purpose. The department may institute the eminent domain proceedings in its own name.

(d) The department is authorized, for the additional purpose of adequately irrigating any tract, to use, free of all charge, government-owned surplus water tributary to the Waimea river upon the island of Kauai, not covered by a water license or covered by a water license issued after July 9, 1921. Any water license issued after that date and covering any such government-owned water shall be deemed subject to the condition, whether or not stipulated therein, that the licensee shall, upon the demand of the department, grant to it the right to use, free of all charge, any of the surplus water tributary to the Waimea river upon the island of Kauai, which is covered by the license and which the department deems necessary for the additional purpose of adequately irrigating any tract.

Any funds which may be appropriated by Congress as a grant-in-aid for the construction of an irrigation and water utilization system on the island of Molokai designed to serve Hawaiian home lands, and which are not required to be reimbursed to the federal government, shall be deemed to be payment in advance by the department and lessees of the department of charges to be made to them for the construction of such system and shall be credited against such charges when made."

At present this claim has not been exercised due to existing water license terms with Kekaha Sugar Company. Upon expiration of the license/leases, DHHL may claim all or whatever portion of the water supply they determine is necessary to meet their water demands. This may not exclude future provision of water to an agricultural park, but it will involve negotiations between DHHL and the State for an apportionment of the total water supply from these sources. This will have a direct impact on the water sources to the mauka site.

According to preliminary figures from the Draft Water Shortage Study - Upland Kekaha, by Keith Co. for DLNR/DHHL (June 1992) the Kokee ditch system provides the only water currently utilized within DHHL Kekaha lands. The Kokee Ditch long term average flow

(1926-1979) of 15.7 mgd is 3 mgd above the estimated 12.7 mgd of current demand for irrigation water (DHHL needs - 5.5 mgd, others - 7.2 mgd). This flow is not evenly distributed throughout the year, but if adequate storage facilities were available to store excess winter flows for use during the summer (or drier years) the Kokee ditch system would be capable of providing sufficient water to meet all current irrigation needs of DHHL and the mauka areas of Kekaha Sugar Company.

Depending upon how DHHL chooses to develop its lands, future projected water needs could range from a high of 21 mgd (intensive agricultural/ranching) to 8.5 mgd (agricultural homesteads). These volumes would match or exceed the existing flows from the Kokee ditch system, therefore alternative water sources would have to be developed to meet all of the regional requirements (See Section 7.7 - Alternatives Regional Water Sources).

### 3.2.3 Ceded Lands

The project site is categorized as "B" ceded lands. This means that according to the 1978 State of Hawaii Constitutional amendment, 30 percent of the revenues generated from the project site are required to go to the Department of Hawaiian Home Lands. The following provisions are cited directly from the State Constitution, Article XII-Section 1, of which any or all may apply:

"Section 1. Anything in this constitution to the contrary notwithstanding, the Hawaiian Homes Commission Act, 1920, enacted by the Congress, as the same has been or may be amended prior to the admission of the State, is hereby provided that if and to the extent that the United States shall so require, such law shall be subject to amendment or repeal by the legislature; provided that if and to the extent that the United States shall so require, such law shall be subject to amendment or repeal only with the consent of the United States and in no other manner; provided further that if the United States shall have been provided or shall provide that particular provisions of such Act may be amended in the manner required for ordinary state legislation, such provisions or types of provisions may be so amended. The proceeds and income from Hawaiian home lands shall be used only in

accordance with the terms and spirit of such Act. The legislature shall make sufficient sums available for the following purposes: (1) development of home, agriculture, farm and ranch lots; (2) home, agriculture, aquaculture, farm and ranch loans; (3) rehabilitation projects to include, but not limited to, educational, economic, political, social and cultural processes by which the general welfare and conditions of native Hawaiians are thereby improved; (4) the administration and operating budget of the department of Hawaiian home lands; in furtherance of (1), (2), (3), and (4) herein, by appropriating the same in the manner provided by law.

Thirty percent of the state receipts derived from the leasing of cultivated sugarcane lands under any provision of law or from water licenses shall be transferred to the native Hawaiian rehabilitation fund, section 213 of the Hawaiian Homes Commission Act, 1920, for the purposes enumerated in that section. Thirty percent of the state receipts derived from the leasing of lands cultivated as sugarcane lands on the effective date of this section shall continue to be so transferred to the native rehabilitation fund whenever such lands are sold, developed, leased, utilized, transferred, set aside or otherwise disposed of for purposes other than the cultivation of sugarcane. There shall be no ceiling established for the aggregate amount transferred into the native Hawaiian rehabilitation fund. [Ren and am Const Con 1978 and election Nov 7, 1978]"

Title 1, Chapter 10, Office of Hawaiian Affairs, sections 10-3 and 10-13.5 regarding the Public Land Trust, also may apply:

"[Section 10-3] Purpose of the office. The purposes of the office of Hawaiian affairs include:

- (1) The betterment of conditions of native Hawaiians. A pro rata portion of all the funds derived from the public land trust shall be funded in an amount to be determined by the legislature for this purpose, and shall be held and used solely as a public trust for the betterment of the conditions of native Hawaiians. For the purpose of this chapter, the public land trust shall be all proceeds and income from the sale, lease, or other disposition of lands ceded to the United States by the Republic of Hawaii under the joint resolution of annexation, approved July 7, 1898 (30 Stat. 750), or acquired in exchange for lands so ceded, and conveyed to the State of Hawaii by virtue of section 5(b) of the Act of March 18, 1959 (73 Stat. 4, the Admissions Act), (excluding

therefrom lands and all proceeds and income from the sale, lease, or disposition of lands defined as "available lands" by section 203 of the Hawaiian Homes Commission Act, 1920, as amended), and all proceeds and income from the sale, lease, or other disposition of lands retained by the United States under sections 5(c) and 5(d) of the Act of March 18, 1959, later conveyed to the State under section 5(e);

- (2) The betterment of conditions of Hawaiians;
- (3) Serving as the principal public agency in this State responsible for the performance, development, and coordination of programs and activities relating to native Hawaiians and Hawaiians; except that the Hawaiian Homes Commission Act, 1920, as amended, shall be administered by the Hawaiian homes commission;
- (4) Assessing the policies and practices of other agencies impacting on native Hawaiians and Hawaiians, and conducting advocacy efforts for native Hawaiians and Hawaiians;
- (5) Applying for, receiving, and disbursing, grants and donations from all sources for native Hawaiian and Hawaiian programs and services; and
- (6) Serving as a receptacle for reparations. [L 1979, c 196, pt of section 2]"

"[Section 10-13.5 Use of public land trust proceeds.] Twenty percent of all funds derived from the public land trust, described in section 10-3, shall be expended by the office, as defined in section 10-2, for the purposes of this chapter. [L 1980, c 273, section 1]"

### 3.3 SITE SELECTION PROCESS

The purpose of the State Agricultural Park program is for preservation of important agricultural lands for productive use, and also to provide public agricultural subdivisions secure from urban encroachment with irrigation water and other necessary improvements. This land is to be provided at reasonable rental costs with secure long term leases, where lessees would have the benefits of common facilities and activities to encourage farm production and distribution economics.

To that end, the objective of the Site Selection Analysis Report was to establish which of seven sites (Wailua, Kealia, Moloaa, Hanapepe, Waimea-Kekaha, Hanamaulu, Wailua-Mauka) had the best development potential and agricultural suitability for the proposed agricultural park on Kauai. All of the sites were evaluated relative to these primary factors: (1) general land suitability; (2) developability (for agricultural uses); and (3) development

costs (basic infrastructure/other factors).

After preliminary site reconnaissance, a cumulative analysis of the site factors for each property and objective rating of this data against specific selection criteria was made, determining which sites were best suited for agricultural park development. From this, a final site recommendation was determined based on commodity acreage requirements (per the Agricultural Feasibility Report), overall suitability, and other pertinent factors.

Most of the Kekaha site has good soils and conditions for the identified crops and about two-thirds of the site (out of 7,381 acres) has very level topography. The mauka portion of the site may even have potential for cool weather crops, which is not feasible on any of the other sites. Because of the large size of the site, the adjoining residential uses can easily be buffered from agricultural functions. There are ample irrigation resources available in the lower areas which could be used for aquaculture, subject to the conditions of the Kekaha Sugar Company's land lease and water license. Because the site covers such a large area, there is the opportunity for selection of multiple smaller sites within the property boundaries, thus utilizing the acreage least impacted by the various site concerns and best suited for specific agricultural uses. Because of its size and diversity in land area conditions, the property has good development potential as the prime agricultural park site.

Based on the evaluation of all available information combined with the results of the site selection scores from the criteria ratings system, the Waimea-Kekaha site was determined to be the most suitable for the agricultural park and therefore the number one ranked site.

The alternative to recommendation of a single site was the simultaneous or incremental development of multiple (and smaller) sites. This is the development concept for implementation of the Agricultural Park program on Kauai. Partial use of one of the windward sites in the future (Hanamaulu, Moloaa or Kealia) may accommodate some farmer preferences and the need for additional agricultural lands.

### 3.4 DEVELOPMENT COSTS

#### 3.4.1 Infrastructure Costs and Considerations

The primary off-site cost involved in the project is the development of irrigation and potable water sources and storage. Well development costs cannot be easily estimated because of numerous uncertainties associated with this task. Yields are unknown until drilling is completed and pump tested. Drilling cost may range from \$500 to \$700 per foot. Wells are generally drilled to sea level or lower. Storage reservoirs cost approximately \$3.00 per gallon to construct. Source and storage developments are usually feasible only for very large scale developments or with several projects investing in the venture.

On-site costs are primarily related to the linear feet of road in the development. Water, power and telephone lines are usually located within the roadway rights-of-way. Depending on road sections and water line size, approximate cost of a road with infrastructure may vary from \$300 to \$500 per linear foot. Major intersection costs are separate and depend on where the intersection is located.

#### 3.4.2 Preliminary Cost Estimates

Cost estimates are budgetary and based on empirical methods using correlated cost data from other projects, recent bid results, cost figures from Kauai County, and Department of Water.

#### **MAKAI SITE**

The gross site area is 157.5 acres. Preliminary site plan alternatives indicate a total of 13 - 19 farm lots ranging in size from 5 - 10 acres with one 50-acre site. Table 3-4 indicates preliminary costs for development of on-site roads, irrigation system, electrical and associated improvements. Total on-site costs are estimated to be in the range of \$2.674 million to \$7.108 million dependent upon the water source, use of above/underground electrical and road surfacing selection. Based on these figures, site development costs will range from \$16,978 to \$45,130 per acre. Estimates do not include land or easement costs or offsite electrical costs.

### MAUKA SITE

The gross site area is 255 acres. Preliminary site plan alternatives indicate a total of 22 farm lots ranging in size from 5.6 - 20.7 acres. Because of the steep terrain, some of this acreage includes marginal lands. Table 3-5 indicates preliminary costs for on-site roads, irrigation system, electrical and associated improvements. Total on-site costs are estimated to be in the range of \$1.253 million to \$10.282 million dependent upon the water source, use of above/underground electrical and road surfacing selection. Based on these figures, site development costs will be range from \$6,335 to \$51,982 per acre. Estimates do not include land or easement costs or offsite electrical costs.

### 3.5 DEVELOPMENT PLAN

Conceptual land use plans and associated preliminary engineering design for the makai site (site 3) and mauka site (site 4B) are contained in this section (Figures 3 and 4). The concept for site 3 proposes that the source of irrigation water will be the existing ditch near Limaloa Pump and the use of a ground level steel reservoir for storage and pumping to the site. Kekaha Ditch is the proposed source for site 4B. The development plan is based on the following factors:

1. Infrastructure requirements for development of the site are feasible from the standpoint of overall cost.
2. Given the engineering requirements, development timeframe would be efficient and relatively simple.
3. Topography of the makai site is very favorable since the area is flat with no unusable area. The level site is also conducive to development of aquaculture.
4. The makai site can be developed into 5 to 10-acre sized farm lots that are desired by independent farmers.
5. The makai site does not displace active sugarcane cultivation.
6. For the makai and mauka sites, endangered or threatened native species of

215

215 315

326.327  
LIMALOA PUMP

WELL No 28  
PUMP 224

PUMP  
PUMP DITCH

PUMP

6.3 AC

5.0 AC

5.0 AC

5.6 AC

7.5 AC

9.8 AC

10" W

6.3 AC

5.2 AC

5.9 AC

7.8 AC

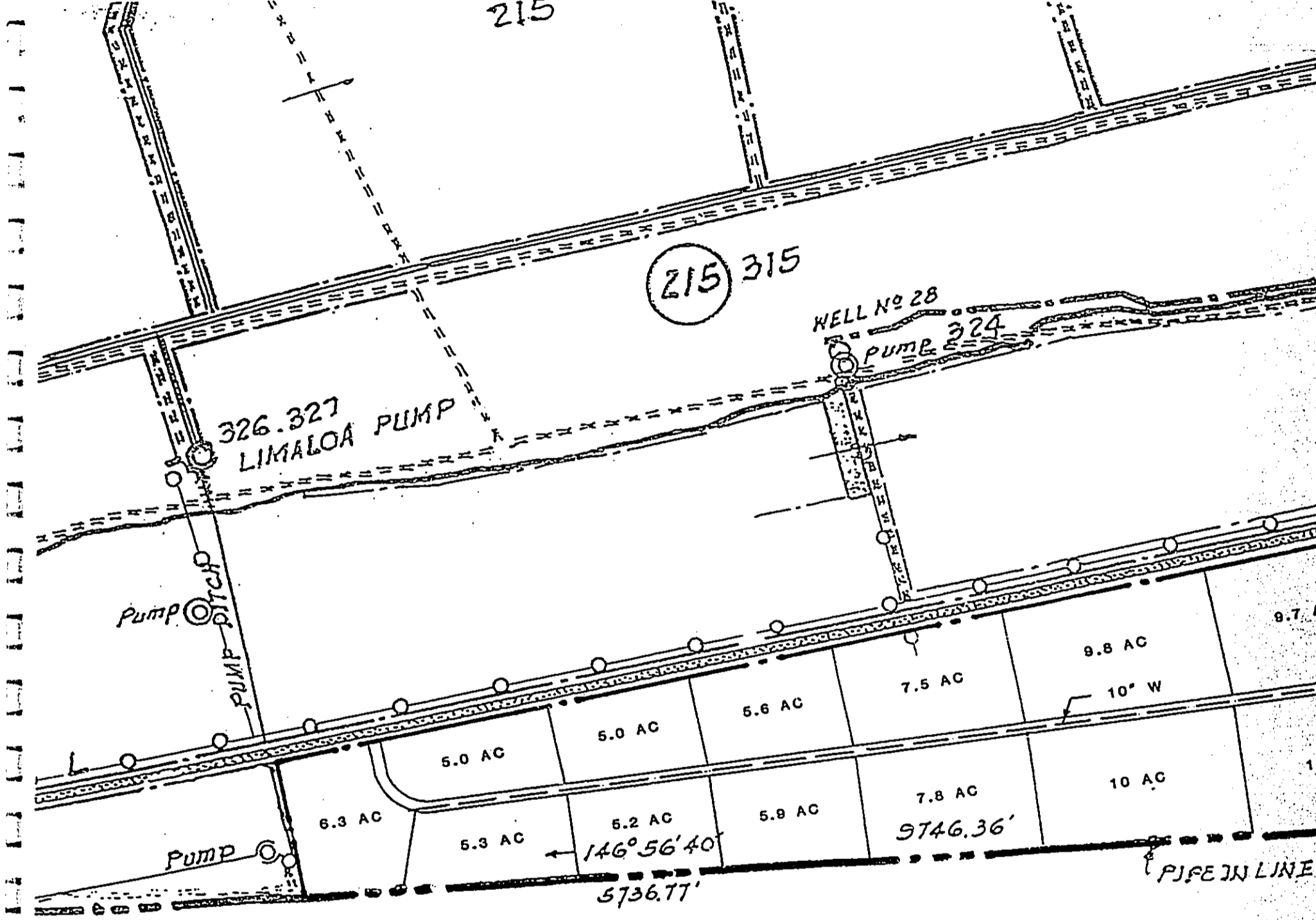
10 AC

← 146° 56' 40"

5736.77'

9746.36'

PIPE IN LINE





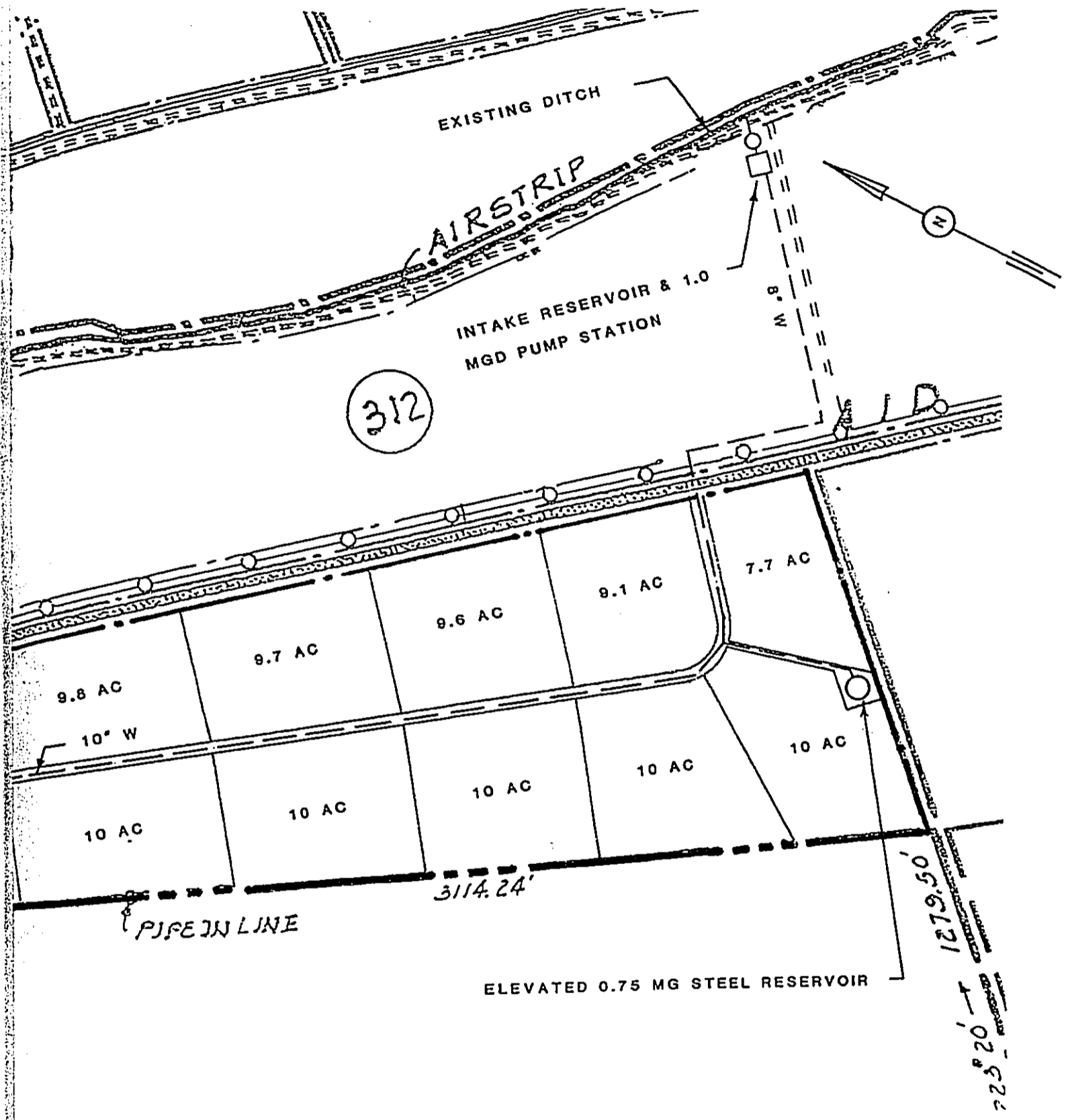
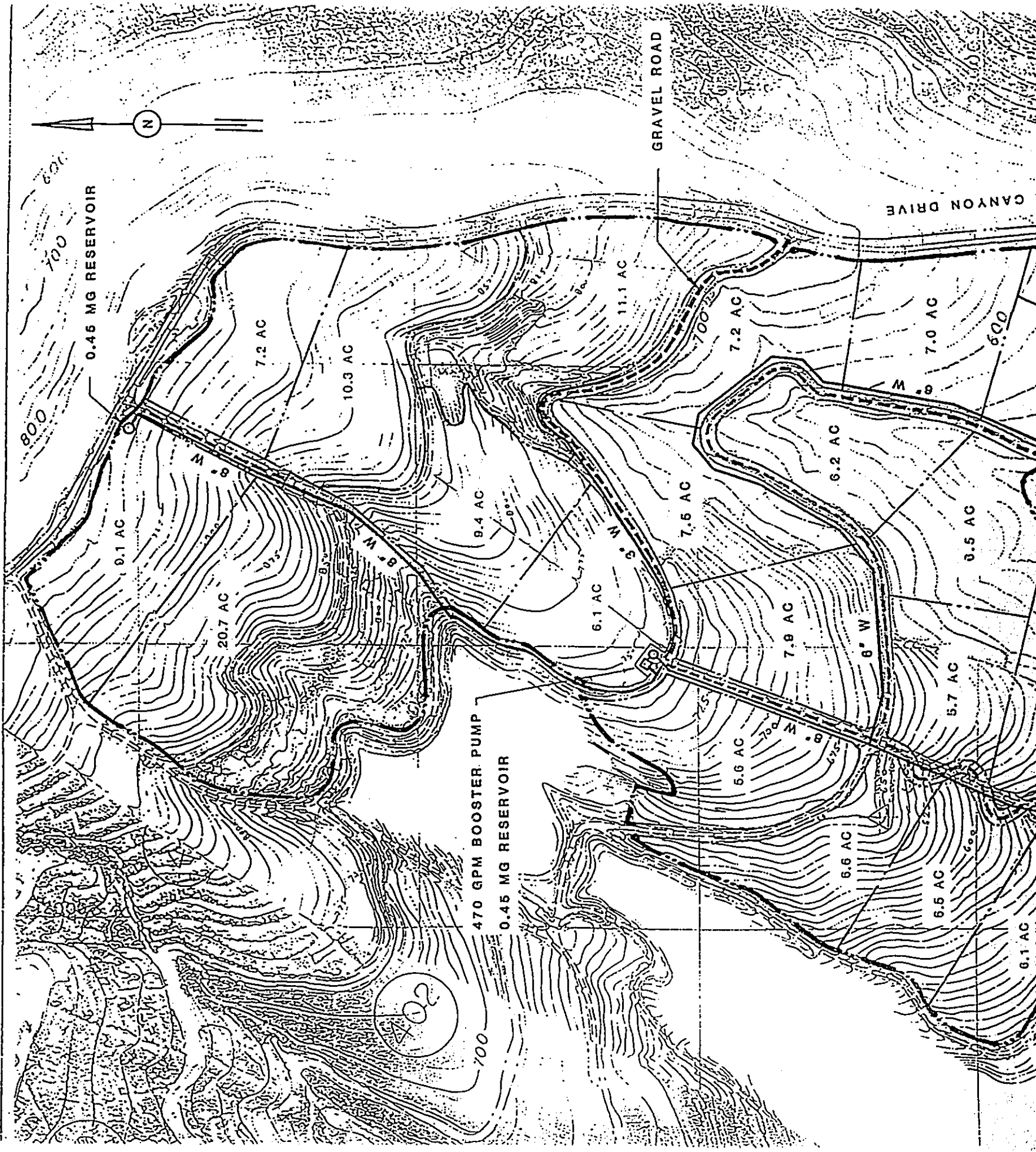
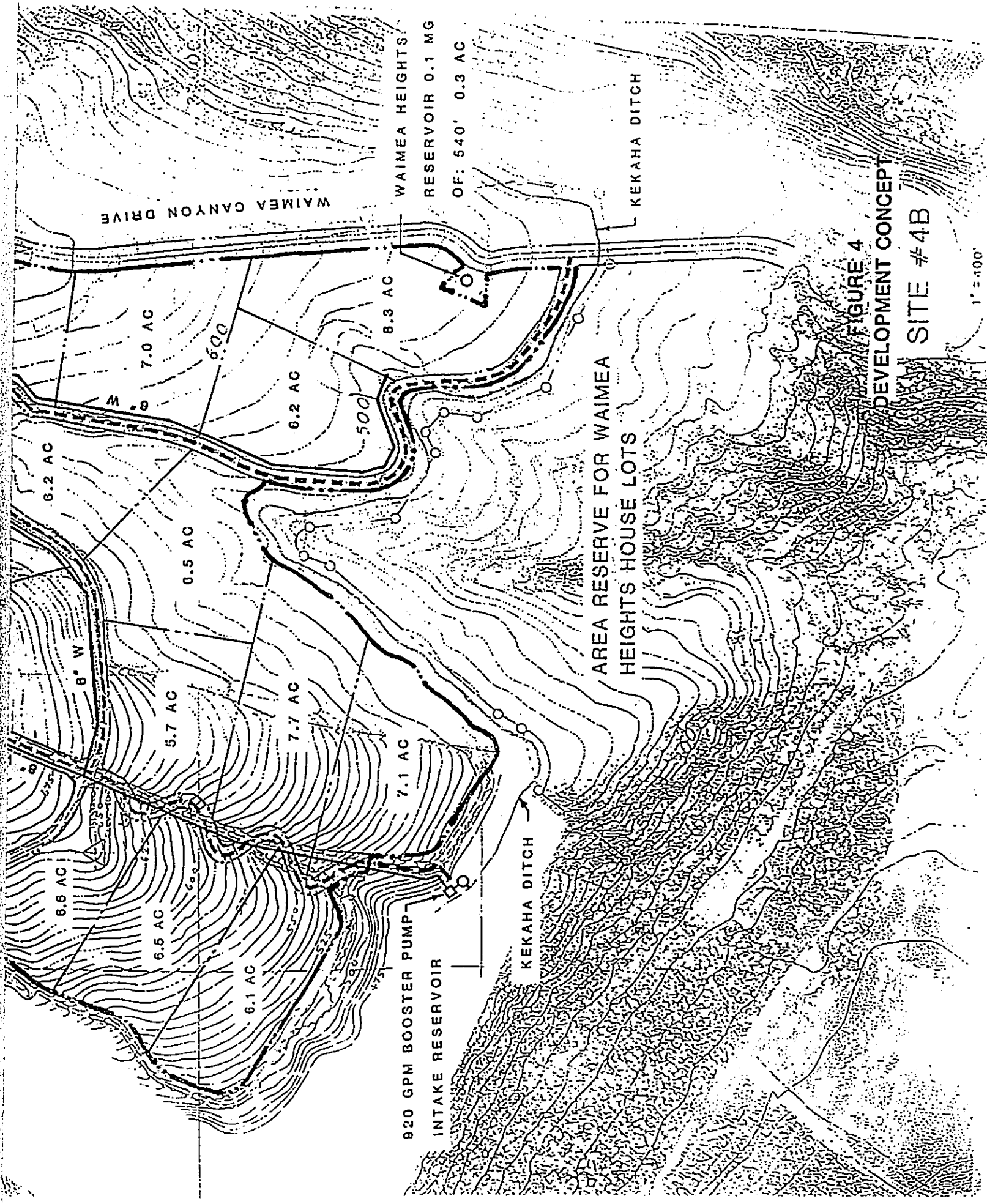


FIGURE 3  
 DEVELOPMENT CONCEPT  
 SITE #3

1" = 500'

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





flora or fauna will not be adversely affected. Archaeological or historical sites are not known to exist on either site.

### 3.5.1 Salinity of Irrigation Water

Suitability of irrigation water for agricultural use depends on the salinity of the water. Salts in the irrigation water tends to become concentrated in the soil by evaporation and transpiration by the plants and may be several times greater in the soil at the root zone of the plants. Salinity of the soil/water mixture at the root zone of the plant can affect the crop yield if too high.

Salinity is commonly measured indirectly by electrical conductivity of the saturated extract of the soil reported in mmhos/cm (milli-mhos per centimeter) at 25 degrees C. Conductivity is the inverse of the resistance to passage of electricity through the soil/water mixture. Unit of conductance is the mho (unit of resistance ohm spelled backwards). A soil/water mixture with a resistivity of 100 ohms/cm would have an equivalent conductivity of one divided by 100 ohms/cm or 0.01 mhos/cm or 10 mmhos/cm.

Salinity of Kekaha Sugar Company irrigation water at various locations is given in Table 3-2. At the Limaloa Pump, salinity averages about 1.8 mmhos/cm as measured by the electrical conductivity method.

**TABLE 3-2**  
**Salinity of KSCO Irrigation Water at Various Locations**  
**(in mmhos/cm)**

Location	5/29/89	9/3/89	9/11/89	9/13/90	9/30/91
116 Reservoir	1.7	1.3	1.1	1.2	0.6
117 Reservoir	0.6	0.5	1.2	1.2	1.4
123 Reservoir	0.4	0.2	0.6	1.4	1.0
125 Reservoir	1.1	1.0	1.5	1.6	1.4
127 Reservoir	0.7	0.6	1.2	1.4	1.2
130 Reservoir	0.6	0.5	1.2	1.4	1.2
Mana Reservoir	0.8	0.6	0.9	0.9	1.0
Mana Wells	0.9	0.9	1.0	0.7	NA
Mana Main Ditch	0.7	0.7	0.5	1.2	1.2
Waiawa Reservoir	-	0.2	0.9	1.0	1.4
Waiawa Shaft	0.9	0.9	0.9	1.0	1.0
Main Ditch-Waiawa	1.0	0.4	0.1	0.1	1.0
Kaunalewa Mix	0.9	NA	1.1	1.8	0.6
Kaunalewa Shaft	1.4	NA	3.0	3.0	1.2
Saki Mana Shaft	1.2	NA	1.6	1.6	1.6
Camp 3 Pump	1.2	0.6	1.1	1.8	1.4
Huluhunui Sump	1.4	1.5	1.4	1.6	1.2
102 Relay Pump	1.7	1.4	1.2	1.6	1.4
Sandland Pump	0.5	1.1	0.7	1.4	1.4
Hog Farm	2.0	1.7	2.2	0.9	1.6
Limaloa	1.6	2.2	1.5	1.8	1.8
Kawaiiele	15.0	8.8	9.4	19.5	6.0
Nohili	14.4	15.2	18.0	17.6	10.8
409	3.2	1.1	1.4	1.2	NA

Typical crop yield reduction related to soil salinity for some common crops is shown in the following table:

**TABLE 3-3****Typical Crop Yield Reduction by Salinity**

Crop	Percentage Yield Reduction		
	10%	25%	50%
	Salinity (mmhos/cm)		
Soy Bean	5.5	6.2	7.5
Beets	5.1	6.8	9.6
Broccoli	3.9	5.5	8.2
Tomato	3.5	5.0	7.6
Cucumber	3.3	4.4	6.3
Spinach	3.3	5.7	9.1
Irish Potato	2.5	5.3	8.6
Sweet Corn	2.5	3.8	5.9
Dent Corn	2.5	3.8	5.9
Sweet Potato	2.4	3.8	6.0
Bell Pepper	2.2	3.3	5.1
Lettuce	2.1	3.2	5.2
Round Onion	1.8	2.8	4.3
Carrot	1.7	2.8	4.6
Beans	1.5	2.3	3.6

Salinity of irrigation water at the Limaloa Pump averages about 1.8 mmhos/cm (using the electrical conductivity method). The Kekaha ditch water salinity meets crop salinity requirements for use at the proposed State agricultural park on the Makai site.

### 3.5.2 Proposed Development Standards

The following standards were used for development of estimated costs for the various alternative concepts:

\* Roads

A minimum cost all-weather road of 18 feet width with 2 feet shoulders on each side is proposed. Maximum road grade is limited to 12 percent. The County of Kauai grading ordinance exempts grading work in self contained

government controlled areas. However, although no grading permit is required, the State will minimize dust and erosion impacts during and after construction through the use of standard dust and erosion control methods. Additional cost for a 1-1/2 inch asphaltic concrete wearing surface is provided.

\* Irrigation System

Approximately 750,000 gallons per day (gpd) of irrigation water are expected as the average demand at the Makai site; and about 1.3 million gpd of irrigation water are expected as the average demand at the Mauka site. Water demand (i.e., reservoir and well source capacities) is based on an average of 5,000 gallons per acre per day (gpac). Pump station capacities are based on 16-hour operation of the pumps to allow downtime for routine preventive maintenance. Pipe sizes are based on possibility of all lots irrigating at the same time over an 8-hour period.

The system is divided into service zones by breaks or pressure reducing valves to limit maximum pressure to approximately 125 psi. Minimum pressure is 10 psi. Tenants will be responsible for pumping if higher pressures are required for sprinkler systems or to reach all parts of their lot. For agricultural use, salinity of the water, as discussed earlier, is an important factor. Proposed well sources are located inland to avoid the high salinity of the flat coastal plain. A steel reservoir is used in lieu of standard reinforced concrete for cost savings purposes.

As earlier stated, (Section 3.2.2.1) no permits are required from the Commission on Water Resource Management to withdraw water from the irrigation ditch.

\* Electrical System

Electrical and telephone service is provided to each lot. The on-site system is based on an overhead distribution system with no street lights except possibly where the agricultural park access road intersects the main road. Overhead off-site electrical lines are required to bring electricity to the site or to off-site pump stations.

\* Drainage System

Drainage improvements may be required to pass storm flowage across the roadway and provide access during the periods when storm waters run through natural swales. The roadway will also serve as a collector drainageway and drainage control may be necessary to stabilize the roadway and minimize erosion and flooding resulting from concentration of storm flows.

\* Potable Water and Sewer System

No dwellings are permitted on agricultural lots and no potable water or sewer systems are proposed. However, portable sanitary facilities may be required as a condition in the lease documents for future agricultural park lessees.

\* Mill Wastewater Disposal Site and Ranch Stable

Relocation of these facilities is proposed to be done by Kekaha Sugar Company.

### 3.5.3 Kekaha Micro-Site Selection

Six sites were proposed by Kekaha Sugar Company and evaluated by the Department of Agriculture and the Kauai Agricultural Park Task Force to determine the preferred 100 acre site within the Kekaha property. The soils in this area are very good for diversified farming and the upwind location of the fields lessen the potential impacts from KCSO spraying and harvesting operations. Proposed site #3 was the only site not in active sugar production and not subject to flood zone impacts. There are adequate water resources available to the site



and the sandy soils provide for good drainage. It is also immediately adjacent to paved roads and powerlines.

### 3.6 DEVELOPMENT SCHEDULE

Kekaha Sugar Companies lease agreements expire at the end of 1993, so site work is not expected to begin before resolution of the land and water agreements. In addition, the DOA has requested a right of entry and executive order from the DLNR to set aside the property for DOA development and administration as an agricultural park. Federal funds (U.S. Economic Development Administration economic adjustment assistance grant) have been requested for the construction phase.

### 3.7 PRELIMINARY ENGINEERING

Infrastructure requirements consist of an irrigation system, a potable water system, drainage improvements, roadways, and electrical/telephone utilities. Preliminary discussions with the State Department of Health (DOH) indicate that the use of individual on-site systems such as septic tanks and leaching fields or seepage pits will be allowed. However no residential units are to be constructed on site.

#### 3.7.1 Proposed Development Standards

The Kauai Ordinance No. 234 governing agricultural subdivision exempts agricultural parks from all road standards and improvement requirements for pavement, pavement width, drainage, sewer and water supply set forth in the Comprehensive Zoning Ordinance or the Subdivision Ordinance. However, each lot must be provided access to a government road. No dwelling may be placed on any lot in an agricultural park. Minimum lot size is 10 acres and minimum size of agriculture subdivision is 350 acres. The project will require variances from these provisions.

Lease documents prepared for future Agricultural Park lessees will require that each lessee provide a Conservation Plan as required for compliance with the Food, Agriculture, Conservation and Trade Act (highly erodible soils) and Clean Water Act Section 319 (non-

point source water pollution). Requirements of the Department of Health for wastewater treatment and disposal plans will also be a condition included in the lease documents. In addition, lessees will be encouraged to consider composting as a means of handling greenwaste generated in the agricultural park.

TABLE 3-4

COST ESTIMATES SITE NO. 3

Alternate	Roads	Irrigation System	Electrical	Topsoil	Misc.	Total Cost	Cost/Acre	Total Cost w/AC Road	Cost/Acre w/AC Road
1	\$0.157M	\$2.058M	OH 0.205M UG 0.555M	\$0.600M	AC Surface \$0.103M	OH 3.020M UG 3.370M	OH 19,175 UG 21,397	OH 3.123M UG 3.473M	OH \$19,529 UG \$22,051
2	\$0.157M	\$6.200M	\$0.205M	\$0.600M	AC Surface \$0.103M	\$7.005M	\$44,476	\$7.108M	\$45,130
3	\$0.157M	\$1.790M	\$0.205M	\$0.600M	AC Surface \$0.103M	\$2.752M	\$17,473	\$2.855M	\$18,227
4	\$0.107M	\$1.859M	\$0.205M	\$0.610M	AC Surface \$0.069M	\$2.674M	\$16,978	\$2.743M	\$17,416
5	\$0.090M	\$1.491M	\$0.140M	\$0.413M	AC Surface \$0.060M	\$2.134M	\$19,851	\$2.194M	\$20,409

ALTERNATIVES

- 1 ELEVATED STEEL RESERVOIR ON SITE
- 2 OFFSITE DRILLED WELLS, COUNTY STANDARDS
- 3 OFFSITE GROUND LEVEL STEEL RESERVOIR
- 4 PROVIDING LARGE 50-ACRE LOT
- 5 LARGE 50-ACRE LOT DEVELOPED BY OTHERS

TABLE 3-5

COST ESTIMATES SITE NO. 4B

Alternate	Roads	Irrigation System	Electrical	Topsoil	Misc.	Total Cost	Cost/Acre	Total Cost w/AC Road	Cost/Acre w/AC Road
6	\$0.254M	\$1.843M	\$0.243M		AC Surface \$0.151M	\$2.340M	\$11,830	\$2.491	\$12,594
7	\$0.241M	\$0.554M	\$0.554M		AC Surface \$0.143M Liner \$0.135M	\$1.253M w/Liner \$1.388M	\$6,335 \$7,017	\$1.396M w/Liner \$1.531M	\$7,058 \$7,740
8	\$0.241M	\$9.681M	\$0.458M		AC Surface \$0.143M	\$10.139M	\$51,259	\$10.282M	\$51,982
9	\$0.241M	\$6.969M	0243M		AC Surface \$0.143M	\$7.453M	\$37,679	\$7.596M	\$38,402
10	\$0.241M	\$4.143M	\$0.243M		AC Surface \$0.143M	\$4.386M	\$22,174	\$4.529M	\$22,896

ALTERNATIVES

- 6 KEKAHA DITCH
- 7 KOKEE DITCH, EARTH RESERVOIR
- 8 ONSITE WELLS COUNTY STANDARDS
- 9 OFFSITE WELLS COUNTY STANDARDS
- 10 OFFSITE WELLS NOT COUNTY STANDARDS

SECTION 4  
PHYSICAL ENVIRONMENT, IMPACTS AND MITIGATION

4.1 CLIMATE

(Kekaha Entire): Mean annual rainfall ranges from about 20 to 24 inches, with very dry conditions during the June - September period, when average monthly rainfall is less than 1.0 inch for most of the site area. With less cloud cover, solar radiation and temperature maximums are higher than for windward Kauai. However, night time minimum temperatures are frequently lower in the mauka Waimea-Kekaha area because of the lower cloud cover and elevation (Lucas, 1992).

Mauka Site: Receives about 25 inches of rainfall per year. The average temperature is 71 , with a minimum of 64 and a maximum of 77 .

Makai Site: Receives about 20 inches of rainfall per year, mostly in the winter. The average temperature is 75 , with a low of 66 and a high of 81 .

Kauai lies just south of the Tropic of Cancer and has a mild semitropical climate, dominated by the northeast tradewinds that blow approximately 80 percent of the time. The tradewinds are sometimes interrupted by cyclonic disturbances, usually during the winter months, commonly known as Kona storms. The proposed agricultural park is not expected to be impacted by the existing wind conditions.

Surf spray, however, can be a potential problem for either site during high wind conditions. Surf spray can affect the leaves of truck crops in that the by settling on leaf surfaces, may discolor the plants. To mitigate these occurrences, wind breaks and other appropriate protective barriers should be utilized at the agricultural park.

4.1.1 Impacts and Mitigation

No impacts to the climatic conditions are expected.

## 4.2 TOPOGRAPHY

(Kekaha Entire): Waimea-Kekaha site includes two distinct subareas, the flat coastal plain and a mauka or upland area above Kekaha town. Elevations on the site range from 10 feet to 2,000 feet. Approximately two-thirds of the site is in this level coastal plain at 2 to 6 percent slopes, with lowland areas subject to flooding. Groundwater is pumped out by Kekaha Sugar Company to keep the area dry for farming. The mauka portion of the site is separated via a 200-foot high bluff. This area is comprised of a series of ridges rising to an elevation of about 2,000 feet, with slopes of 10 to 20 percent separated by very wide deep gulches. The largest contiguous ridge area (Waiaka Ridge) includes several hundred acres, but slopes in much of this area range from 12 to 20 percent.

Mauka Site: The entire site is located on the Kaleinamanu Ridge and isolated by deep gulches and bluffs (elevations ranging from more than 400 feet to more than 950 feet). Existing field areas range from approximately 6 percent to 20 percent in slope. The erosion hazard in this area is moderate to severe (potential HEL (Highly Erodible Lands) designation by the Soil Conservation Service).

Makai Site: The site is generally level with an elevation of more than 15 feet.

### 4.2.1 Impacts and Mitigation

Limited grading of the mauka site is expected in order to accommodate infrastructure requirements (roads and water supply systems). Lot grading will be restricted to approved Soil Conservation Service plans to be implemented by individual farmers for crop terracing or other approved methods. Implementation of these approved SCS plans is expected to mitigate potential erosion impacts on existing topographic conditions.

The makai site will also receive limited grading in order to accommodate infrastructure requirements (roads and water supply systems) and to maintain positive drainage. No significant impacts are expected to existing topographic conditions.

### 4.3 HYDROLOGY

A draft Water Shortage Study of Upland Kekaha was prepared by Keith Company for DLNR/DHHL in early 1992. The following description of the project area's hydrological conditions is found in part in this recent study.

The sites are located within the Kekaha Aquifer System which is the driest on Kauai. This aquifer system consists of a clearly defined basal lens protected by a thick sedimentary caprock at the coast. Napali basalt, a member of the Waimea Canyon volcanic series, forms the basement rock which is exposed above 100' in elevation. A weak rift zone strikes from the caldera area to the head of the Waimea River Drainage. The coastal plain includes poorly permeable interbedded marine and terrestrial sediments with thickness ranging from 0 to 400 feet. The basaltic aquifer of the Napali formation yields large quantities of water from wells and shafts with very little drawdown. Very little data is available on the aquifer characteristics of the sedimentary caprock of the coastal plain, although it is considered likely that the water would be brackish if utilized. The basaltic aquifer is recharged in the upland area above the coastal plain while wells pumping water from the caprock induce recharge mainly from nearby ditches and drains.

#### 4.3.1 Groundwater Sustainable Yields

Based on estimated groundwater sustainable yields of 12 mgd for the Kekaha Hydrological Unit and estimated groundwater withdrawals of 19.52 mgd, the system is overdrawn by 7.52 mgd. This discrepancy between sustainable yield estimates and actual field experience may be due to the need to pump groundwater for drainage purposes.

#### 4.3.2 Existing Water Systems

Three ditch systems divert water from the Waimea Hydrologic Unit into the Kekaha Unit. Approximately 2,650 acres of upland sugar and 5,600 acres of sugar on the coastal plain are irrigated by this network of lateral ditches. Groundwater is pumped from wells and shafts on the coastal plain to supplement imported ditch water and for domestic use. The lateral ditches distribute water by gravity flow directly from the ditches (a) by pumpage to fields

above the ditches, (b) by a mixing of imported surface water with pumped groundwater for distribution on the coastal plain, (c) by pumpage from drains back into ditches for redistribution on the coastal plain.

1. Kokee Ditch (constructed by Kekaha Sugar Co. - 1926)

The Kokee ditch diverts water from the headwaters of the Waimea River in the Alakai Swamp at an altitude of approximately 3,400 feet to the Puu Lua Reservoir, an off-stream reservoir with a capacity of 260 mg, located in Waimea Canyon State Park. The ditch diverts, via low concrete diversions dams, flows from the Mohihi, Waiakoali, Kawaikoi, Kauaikinana and Kokee Streams and other minor tributaries of the Poomau Stream, a tributary of the Waimea River. The combined diversion capacity of the system is approximately 70 mgd.

From the Puu Lua reservoir an open, unlined ditch carries water to a junction near the 3,000 foot elevation line. At this junction 70 percent of the flow continues along the Kokee ditch to Kitano reservoir located on Puehu Ridge east of Kokee Road (capacity - 36 mg.) The remaining 30 percent of the flow is diverted south along a 6 mile ditch to the Puu Opae reservoir on Niu Ridge (DHHL lands).

2. Kekaha Ditch (constructed by Kekaha Sugar Co. - 1906)

This system begins at the diversions on Koaie and Waihulu streams, which are tributaries of the Waimea River, at an elevation of about 800 feet. It runs through tunnels along the west side of the Waimea River for 2.8 miles, crosses the river at the Mauka Powerhouse and continues by tunnels and open ditches along the east side of the River for 4.4 miles. The system crosses the River by steel siphon and continues in a southerly direction by open ditches and tunnels for 2.4 miles. The ditch then winds in a westerly direction for several miles through the lower ridges of Kekaha Sugar lands. Several small reservoirs used for temporary storage are distributed along the system. This ditch system supplies surface irrigation water to the makai sugar fields by gravity flow with a portion of the flows pumped to meet the



needs of the mauka fields (ditch capacity is 83 cfs).

3. Waimea Ditch System (constructed by Kekaha Sugar Co. - 1903)

This ditch system diverts a portion of the flow of the Waimea River at an elevation of 200 feet and then travels through open ditches and tunnels along the west side of the River for approximately 3 miles to the coastal plain mauka of Waimea Town. The system then continues westerly along the coastal plain immediately below the upland ridge for about 2 miles.

4. Wells and Shafts (1890 to the present)

Around 60 wells and shafts are known to have been drilled within the Kekaha Hydrologic Unit. Most of these are located within 1/2 mile of the bluffs of the upland ridges and many are lost or unused. Most of the wells and shafts penetrate basaltic rock and have casings that shut out caprock water. Their depth ranges from 60 feet near the bluffs, where the total depth of the shaft is in basaltic rock, to 490 feet on the plain where wells penetrate 160 feet of sediments.

The majority of wells and shafts are owned and used by Kekaha Sugar Co. with water being used primarily for irrigation. The County Department of Water utilizes four wells and one shaft (inactive) in the Kekaha Hydrologic Unit and one shaft in the Waimea Unit to meet the domestic water needs of the towns of Waimea and Kekaha with some water provided to the military installation. The State of Hawaii operates one well at Polihale State Park. A 1976 report by the U.S. Geological Survey indicated problems with reduced flows and saltwater intrusion in some wells as a result of irregular pumping patterns in excess of recharge.

(Note: Informal talks with Kekaha Sugar Company indicated less saltwater intrusion as a result of reduced water withdrawals from the wells. They believe the introduction of drip irrigation in the majority of the fields is the primary reason for the gradual reductions in salinity.)

The closest Navy potable water well is approximately 2 to 3 miles away from the project site (O. Moe, Kekaha Sugar Co., telecon 11/93).

According to preliminary figures from the Draft Water Shortage Study - Upland Kekaha, by Keith Company for DLNR/DHHL (June 1992) the Kokee ditch system provides the only water currently utilized within DHHL's Kekaha lands. The preliminary estimated water requirement for existing DHHL uses is 5.5 mgd, and 7.2 mgd for other lands served by this ditch system (total of 12.7 mgd). The average flow of the Kokee ditch (1926-1979) was 15.7 mgd. This long term average flow is 3 mgd above the estimated 12.7 mgd of current demand for irrigation water. The average flow is not evenly distributed throughout the year and average daily flows vary with the rainy and dry periods. It would appear that if adequate storage facilities were available to store excess winter flows for use during the summer (or dryer years) the Kokee ditch system would be capable of providing sufficient water to meet all current irrigation needs of DHHL and the mauka areas of KSCO.

Depending upon how DHHL chooses to develop its lands, future projected water needs could range from a high of 21 mgd (intensive agriculture/ranching) to 8.5 mgd (agricultural homesteads). These volumes would match or exceed the existing flows from the Kokee ditch system, therefore alternative water sources would have to be developed to meet these requirements.

Kekaha Sugar Company reports use of the following water resources:

Kokee Ditch	15 mgd
Kekaha Ditch	35 mgd
Well	<u>30 mgd</u>
TOTAL	80 mgd

(for 8,000 acres of sugar = 1 mgd/100 acres)

The average ditch flows beyond the Waiawa station are 15-20 mgd. Mill water irrigates around 1,000 acres of sugar land.

**Mauka Site:** This area has an existing KSCO drip irrigation system. An arrangement could be made for irrigation services provided by KSCO or a separate outfield system could be developed. A dual water source exists from the Kekaha ditch (used only in drought conditions).

**Makai Site:** Irrigation water is presently available from ditches or drainage canals north of the site. The proposed State agricultural park would have to develop its own irrigation system since the area is presently flood irrigated with mill water from KSCO.

#### 4.3.3 Impacts and Mitigation

The existing ditch near Limaloa Pump will be tapped as the source for the necessary irrigation water. Because this is excess water, use of it for the proposed Agricultural Park at a demand rate of 750,000 gallons per day (gpd) by the Makai site will not adversely impact the current supply. According to KSCO, there is sufficient source water at the ditch for the proposed project. The Mauka site will require approximately 1.3 million gpd (at 255 gross acres) for irrigation purposes, from a different source. The DOA has requested withdrawal of the Makai site (about 158 acres) from the DLNR lease for priority development as an agricultural park due to the fact that irrigation water demand for ag park use will not be a problem.

#### 4.4 SOILS

(Kekaha Entire): Within the coastal plain, large areas of Kekaha Series soils exist which are well suited to most crop production. The Kekaha soils are well-drained, and flat to slightly sloping. Situated on flood plains and alluvial fans, Kekaha silty clay (KoA) soils are more than 60 inches thick, mildly alkaline to neutral, have moderate permeability, slow runoff, and no erosion hazard. These soils rate Class I if irrigated. Gently sloping KoB soils (2-6 percent slopes) also belong to this series and comprise considerable acreage in the coastal plain. KoB soils rate in Class II if irrigated. Kekaha Clay (KobA) soils with 0-2 percent slopes, also make up much of the better soils within the coastal site area. Although difficult to work, KobA soils rate Class I if irrigated.

At least two separate potential site areas on the coastal plain contain contiguous areas of 400 or more acres of the Kekaha Series soils. The makai site contains Jaucas loamy fine sand. This soil type has excellent drainage. In the upland area, the lower reaches (from about 200-1,000 feet) consist mainly of the Makaweli soils (MgC and MgD mapping units) having slopes of from 6 to 20 percent (Figure 5). In the upper reaches of the ridges now planted in sugarcane, the soils belong mainly to the Niu Series. These soils are thick, well-drained soils with moderate permeability. Niu silty clay loam (NcC) has slopes of 6-12 percent, medium runoff, and moderate erosion hazard. Steeper Niu silty clay loam (NcD) soils (slopes of 12-20 percent) also are prevalent in the upper elevations (from about 1,000 to 1,800 feet) of the mauka Waimea (Kekaha) site area. These steeper areas have rapid runoff and severe erosion hazard. The NcC soils are designated Class III (irrigated or non-irrigated), and the NcD soils class IV (with or without irrigation). Areas above 1,000 feet elevation may have contiguous acreage limits of less than 100 acres.

The Land Survey Bureau has designated most of the coastal lands as class A and B soils. The lower reaches of the mauka site area are predominantly designated class B soils, with much of the upper half being class C and D soils. Under the ALISH (Agricultural Lands of Importance to the State of Hawaii) system, approximately 70 percent of the coastal plain rates Prime, but in the mauka site area only about 10 percent of the site has the Prime designation.

**Mauka Site:** Mostly Makaweli silty clay loams and with some Makaweli stony soils. Well drained with moderate permeability. Good farmland, generally easy to work.

**Makai Site:** Jaucas loamy fine sand makes drainage excellent but mill pond soil may be needed to improve moisture holding capacity and fertility.

#### 4.4.1 Herbicide Soil Residues

KSCO has indicated usage of a number of herbicides over the last two years as part of their farming practices in sugar production. Since the mauka site has been in active sugar

## SOIL LEGEND

### HIGH & MEDIUM INTENSITY

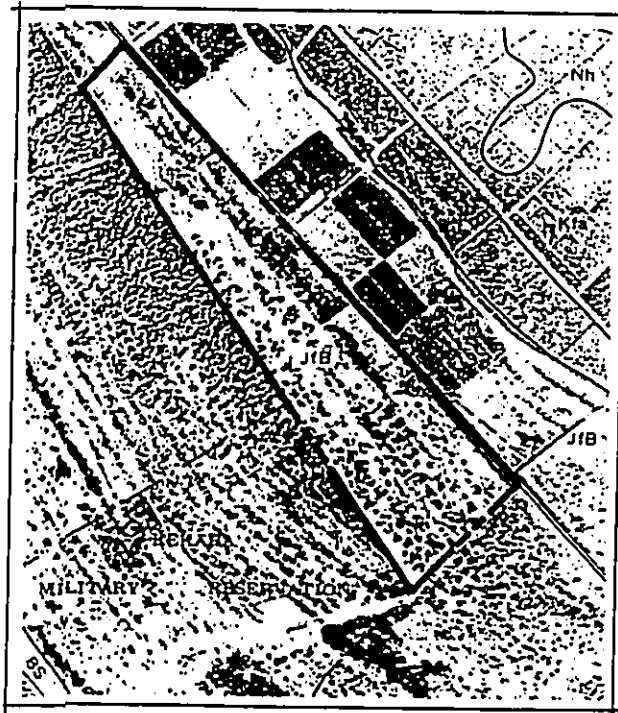
JfB	Jaucas loamy fine sand, 0 to 8% slopes
MgC	Makaweli silty clay loam, 6 to 12% slopes
MgD	Makaweli silty clay loam, 12 to 20% slopes
MhC	Makaweli stony silty clay loam, 6 to 12% slopes
MgE2	Makaweli silty clay loam, 20 to 35% eroded
MhD	Makaweli stony clay loam, 12 to 20% slopes
MhE	Makaweli stony clay loam, 20 to 35% slopes

### RECONNAISSANCE

rRR	Rough broken land
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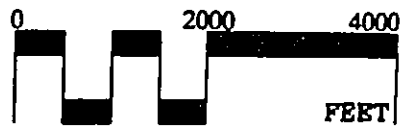


**MAUKA SITE**



**MAKAI SITE**

Figure 5  
**SOIL CLASSIFICATION MAP**  
 KAUAI AGRICULTURAL PARK  
 Prepared for the State of Hawaii  
 Department of Agriculture



production, previous herbicide usage may impact the site. If there is a reason to analyze hauled soils for herbicides the following are the herbicides that will most likely be present. The Federal Resource Conservation and Recovery Act 1976 (RCRA) stipulates handling and/or mitigation of certain pesticide residues when they are present in contaminated soil, water and other debris. These chemicals must meet specific definitions for toxicity and volume under RCRA before these regulations can be applied (see Table 4-1).

(Data Sources: Farm Chemicals Handbook '93 - Meister Publishing Co. and Guide to Occupation Exposure Values - 1992)

TABLE 4-1

HERBICIDE USAGE BY KEKAHA SUGAR COMPANY  
(1 TO 5 - HIGH TO LOW QUANTITY USES)

<p>1) <u>Trifluralin</u></p> <p>* Subject to SARA Sect. 313</p>	<p>Group A (FIFRA) - Toxicity class 1,2,3 (NFA) - PNT to birds/MT to fish. Description: Preemergence herbicide. Insoluble in water, soluble in xylene, acetone, and ethanol. Toxic by ingestion.</p>						
<p>2) <u>Diuron</u></p> <p>* Subject to SARA Sect. 304 if over 100 lbs.</p>	<p>Group A (FIFRA) - Toxicity class 3 (NFA) - PNT to wildlife (Max. Exposure values) 10 mg/m<sup>3</sup>. Description: Preemergence herbicide and flower suppressant. Water soluble.</p>						
<p>3) <u>Ametryn</u></p>	<p>Group B (FIFRA) - Toxicity class 3 (NFA) - MT to fish, S(absorption) M(leaching) Description: Selective broadleaf herbicide for broadcast or interline spray. Water soluble.</p>						
<p>4) <u>Atrazine</u></p>	<p>Group A (FIFRA) - Toxicity class 3 (NFA) - ST to fish/birds, L(leaching) M(absorption). (Max. Exposure values) 5 mg/m<sup>3</sup>, Max. containment level in water .003 part/m. Description: Herbicide, plant growth regulator, weed control. Water soluble.</p>						
<p>5) <u>Hexazinone</u></p>	<p>Group A (FIFRA) - Toxicity class 4 (NFA) - (Max. Exposure values) 20 mg/m<sup>3</sup> to skin. Description: Contact and residual herbicide, selective weed control. Water soluble.</p>						
<p>NOTES:</p> <p>A. Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) established registration standards for pesticide uses based on potential health risks. In conjunction with this the EPA has established Carcinogenicity Categorizations which rate "weight of the evidence" risk assignments to groups of herbicides.</p> <p>Group A - Human carcinogen. Group B - Probable human carcinogen based on laboratory animal studies. (NFA Toxic Classes)</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">0 - normal material</td> <td style="width: 50%;">3 - extremely hazardous</td> </tr> <tr> <td>1 - slightly hazardous</td> <td>4 - deadly</td> </tr> <tr> <td>2 - hazardous</td> <td></td> </tr> </table>		0 - normal material	3 - extremely hazardous	1 - slightly hazardous	4 - deadly	2 - hazardous	
0 - normal material	3 - extremely hazardous						
1 - slightly hazardous	4 - deadly						
2 - hazardous							

TABLE 4-1 - Continued

HERBICIDE USAGE BY KEKAHA SUGAR COMPANY  
(1 TO 5 - HIGH TO LOW QUANTITY USES)

B. Some of these herbicides are subject to the regulations of Title III of the Superfund Amendments and Reauthorization Act 1986 (SARA).

- \* Section 304 - Listed quantities by CERCLA Hazardous Substances - RQ (Reportable Quantities) that are subject to reporting (to EPA) annually.
- \* Section 313 Toxic Chemicals - all releases must be reported (to EPA) annually.

General Note: The State of Hawaii does require some form of pesticide use reporting in addition to Federal regulations. Records filed by KSCO can probably indicate levels of herbicide on the site.

C. Codes for soil leaching and absorption potentials. (Source: Soil Pesticide Interaction Ratings/Toxicity Characteristics - Farm Chemicals Handbook 1993.)

- S - Small soil leaching or soil absorption potential.
- M - Medium soil leaching or soil absorption potential.
- L - Large soil leaching or soil absorption potential.
- MT - Moderately Toxic    ST - Slightly Toxic
- PNT - Practically nontoxic



#### 4.4.2 Impacts and Mitigation

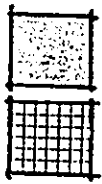
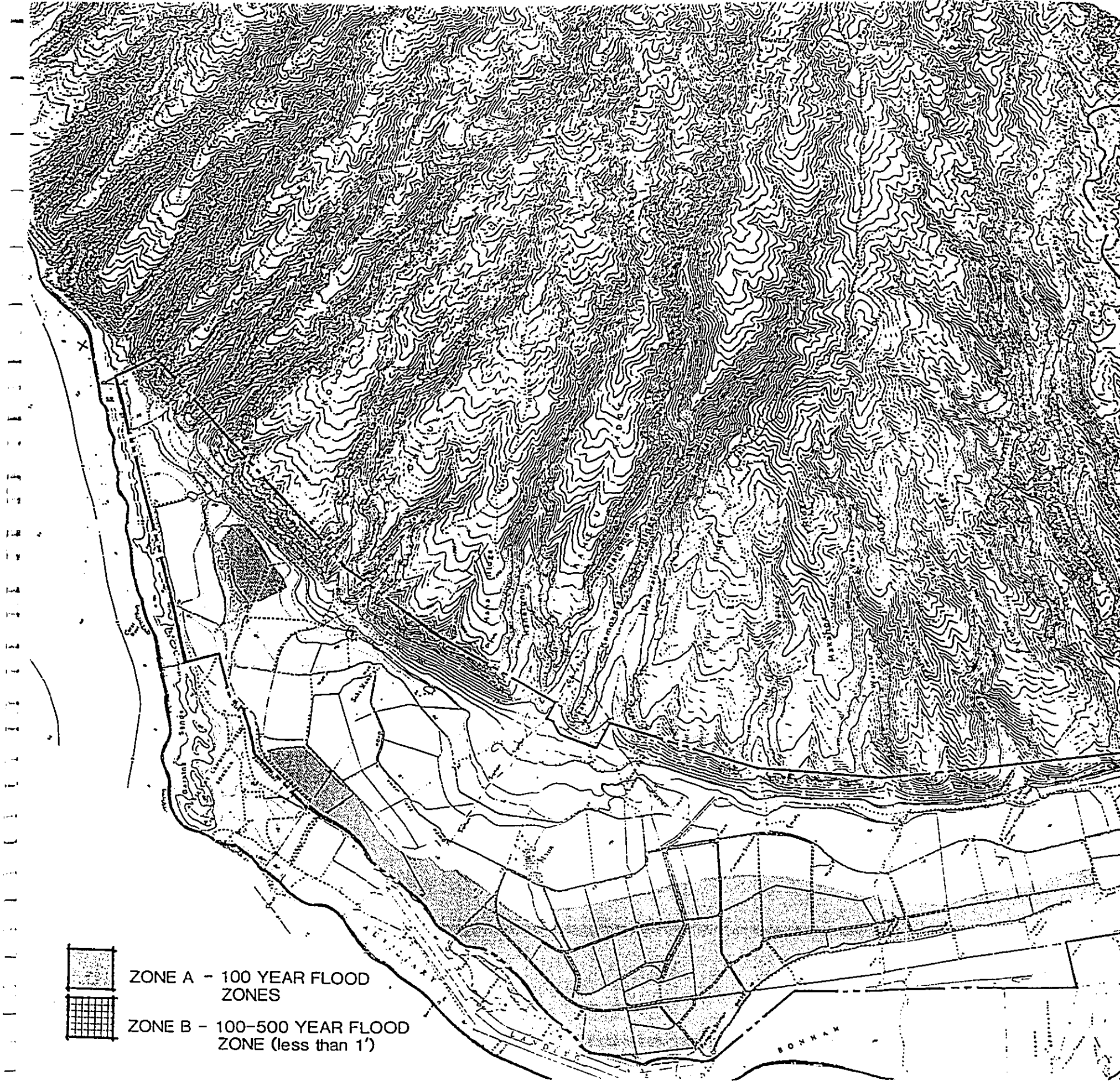
On both sites, soil amendments are expected to be added to existing soils to improve fertility, and permeability. In addition there will be implementation of farming practices which control erosion of top soils (as per SCS - HEL (highly erodible lands) requirements). There is little concern regarding erosion impacts on the makai site, since these sandy soils are well drained. This site is not susceptible to soil erosion. Some of the agricultural production areas may need soil amendments to increase fertility. If soil is removed from the sites, refuse soils may be subject to Federal RCRA regulations since some of the herbicides previously used on the fields have toxic leaching/absorption potential.

Future lessees will be required as a condition of their leases to use only registered pesticides in accordance with label restrictions and Federal and State laws, and will also be required to be applicators certified by the Department of Agriculture.

#### 4.5 DRAINAGE

(Kekaha Entire): The most significant concern is drainage of the low-lying areas. The groundwater in these areas is maintained at a low level by continuous pumping by the Kekaha Sugar Company. Discontinuing this may result in a rise of the groundwater table to an unacceptable level. Portions of the coastal plain are subject to flooding despite the pumping operations (see Federal Emergency Management Agency (FEMA) - Flood Zones Figure 6). Neither of the project sites are within these flood zones. Excess brackish ground water is pumped to two outfalls at the western end of the Kekaha area (Kawaile drain and Nohili drain). Additional storm water is discharged by KSCO as needed from several cocksdrains located near Kekaha Town and the Mill.

Mauka Site: This site has very good drainage; however, the erosion hazard in this area is moderate to severe. Based on preliminary calculations generated by the Soil Conservation Service, Field 601 of the mauka site is not highly erodible land (HEL), Field 602 of the mauka site is HEL. These designations are highly dependent on the type of crops to be farmed on the lands and the time of year they will be planted.



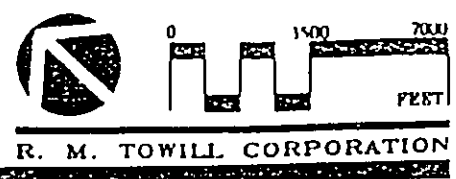
ZONE A - 100 YEAR FLOOD ZONES

ZONE B - 100-500 YEAR FLOOD ZONE (less than 1')

BONHAM



Figure 6  
**FLOOD ZONES**  
KAUAI AGRICULTURAL PARK  
Prepared for the State of Hawaii  
Department of Agriculture



Makai Site: Drainage is good in this area because of the sandy soils and the land does not get flooded out in storms. Mill water is not supposed to go into the ocean so Kekaha Sugar Company over-irrigates this sandy land to absorb excess mill water.

#### 4.5.1 Erosion Control

According to the 1985 Food Security Act and subsequent 1990 Food, Agriculture, Conservation and Trade Act, farmers who utilize areas defined as Highly Erodible Lands (HEL) are required to obtain approved conservation plans, and actively apply these plans in order to stay eligible for many USDA programs. This Act ties soil conservation practices with the USDA farm subsidy income programs, and is intended to eliminate subsidy incomes generated from the abuse of marginal lands which may be highly erodible.

The HEL designation is determined by calculation of a Universal Soil Loss Equation (USLE) which considers rainfall intensity, soil erodibility, length and steepness of slope, cropping management, and farming practices. Numbers generated from these factors gives the average annual soil loss (tons/acre/year) for the given site. If this number is over 5 tons/acre/year, the site is designated HEL.

Based on preliminary calculations generated by the Soil Conservation Service, Field 601 of the mauka site is not HEL, while Field 602 of the mauka site is HEL. These designations are highly dependent on the type of crops to be farmed on the lands and the time of year they will be planted. Annually tilled crops such as leafy vegetables will have a much greater impact on the USLE than orchard or nursery crops which do not require regular tilling of soils. Farmers on HEL sites must implement an approved soil conservation plan based on standards set forth by the Soil Conservation Services "Technical Guide - Section Four - Standards and Specifications" for farming practices. This includes practices such as contour farming, filter strip crops, terraces and other types of diversions.

#### 4.5.2 Impacts and Mitigation

Annually tilled crops such as leafy vegetables will have a much greater impact on the USLE

(universal soil loss equation) used to calculate HEL than orchard or nursery crops which do not require regular tilling of soils. Farmers on HEL sites must implement an approved soil conservation plan based on standards set forth by the Soil Conservation Service's "Technical Guide - Section Four - Standards and Specifications" for farming practices. This includes practices such as contour farming, filter strip crops, terraces and other types of diversions, which are expected to mitigate erosion potential from surface drainage.

The Mauka site contains lands currently cropped in sugarcane and classified as Highly Erodible Lands. The site will require an extensive resource management system if the land is cropped as anticipated. In addition, the site would require supplemental irrigation with the proposed development. This site, however, would be suitable for orchard type crops with a less extensive conservation program. Onsite lot grading and drainage, will be restricted to approved Soil Conservation Service plans to be implemented by individual farmers. Implementation of the approved SCS plans is expected to mitigate potential impacts from excessive erosion and improve existing surface drainage conditions.

The makai site is not susceptible to soil erosion. The site despite its high water table (3 to 5 feet below ground surface) is highly suitable for intensive cropping. The existing seed corn operation and sugarcane cultivation is successful, in part, because of the drainage system currently employed by Kekaha Sugar Company. Shallow rooted crops can be successfully grown in this site. This site will receive limited grading in order to accommodate infrastructure requirements (roads, drainage and water supply systems) and to maintain positive surface drainage. KSCO will discontinue disposal of Mill water at this site.

According to the County of Kauai Public Works Department, drainage improvements may be required to pass storm flowage across the roadway and provide access during the periods that storm waters run down the natural swales. The roadway will also serve as a collector drainageway and measures may be necessary to stabilize the roadway and minimize erosion and flooding resulting from concentration of storm flows. No adverse impacts are expected with regard to existing drainage conditions. Lease documents prepared for future lessees

will require that each lessee will provide a Conservation Plan in compliance with U.S. Food, Agriculture, Conservation and Trade Act and non-point source water pollution (Clean Water Act Section 319) program guidelines. To minimize erosion and siltation during construction:

1. Site work should be scheduled for periods of minimal rainfall; and
2. Construction materials, petroleum products, and debris should be prevented from falling, blowing or leaching into the aquatic environment.

Further, appropriate erosion control practices, such as replanting of lands denuded of vegetation, should be implemented.

#### 4.6 BOTANICAL RESOURCES

Field studies of the two sites were conducted on February 12, 1993 by Char and Associates and the results of the field reconnaissance and literature research are documented and included as Appendix A in this report. A total of four botanists, working in teams of two each, was used. The primary objectives of the survey were to: (1) provide a general description of the major vegetation types; (2) search for threatened and endangered species, as well as rare and vulnerable plants; and (3) identify areas of potential environmental problems or concerns and discuss appropriate mitigation measures.

A walk-through survey method was used. Notes were made on items including plant associations and distribution, substrate types, moisture gradients, and topography. Plant identifications were made in the field. If a plant could not be positively determined in field, it was collected for later identification in the herbarium (University of Hawaii at Manoa), and for comparison with the most recent treatment of the taxon.

The scientific names used in the botanical assessment follow Wagner *et al.* 1990 for the flowering plants and Lamoureux (1984) for the ferns.

On the mauka site, the survey focused on the uncultivated areas, that is, the margins of fields and the adjoining gulch areas, as native plants are more likely to occur in such areas.

A Category 1 candidate endangered species, the pololei fern (Ophioglossum concinnum), is known to exist within the Navy's Pacific Missile Range Facility (PMRF) (Traverse Group 1988; U. S. Fish and Wildlife Service 1990). The fern is seasonal, that is, it appears only during the wetter months (about the end of November to April) and then is dormant during the drier months. During its dormant stage, the leaves die back and only the thick, enlarged rhizomes (underground stems) remain alive in the soil. An assumption of the field survey of the makai site, therefore, was that there was a potential of finding the pololei fern.

#### 4.6.1 Existing Vegetation

##### 4.6.1.1 Mauka Site

The vegetation consists of actively cultivated fields of sugar cane (Saccharum officinarum) on gently rolling slopes. Weedy species are largely confined to the roadsides and along the margins of the fields where they abut the gulch areas. However, newly planted fields, because they are more open, tend to support more weedy plants among the cane. The majority of the weedy plants encountered are those commonly associated with agricultural lands and activities. These include swollen finger (Chloris barbata), nutgrass (Cyperus rotundus), Natal redtop (Rhynchelytrum repens), little bell or pink bindweed (Ipomoea triloba), and fuzzy rattlepod (Crotalaria incana).

The adjoining gulch areas support a scrub composed primarily of koa-haole shrubs (Leucaena leucocephala) and green panicgrass (Panicum maximum var. trichoglume). Locally common are patches of sour grass (Digitaria insularis). The koa-haole shrubs vary from 5 to 12 feet in height and are denser on the bottom of the gulches where there is more moisture. Also found in these areas are scattered trees of Java plum (Syzygium cumini), silver oak (Grevillea robusta), and castor bean (Ricinus communis). California grass (Brachiaria mutica) is abundant in some places along the gulch bottom. Eroded areas within the gulches support a sparse vegetation usually of Natal redtop, 'uhaloa (Waltheria

*indica*), and fuzzy rattlepod.

#### 4.6.1.2 Makai Site

The vegetation consists of low scrub; i.e., scattered patches of shrubs and a few trees with a variety of grasses and herbs filling in the matrix between the woody components. The mauka half of the property is more well-maintained and there are fewer shrubs, mostly klu (*Acacia farnesiana*). Bermuda grass (*Cynodon dactylon*) is the primary pasture grass, although in one section there are rows of Napier or elephant grass (*Pennisetum purpureum*) planted; also found in this area are scattered mats of California grass. The sandy soil on the mauka half has been augmented with organic waste and soil from the sugar mill. As a result, the sand/soil mix is blackish in color and the local relief is rolling with many small mounds now overgrown with grasses and weedy herbs.

The makai half of the property is sandy with little soil and not well-maintained. The vegetation is composed of scattered patches of pluchea (*Pluchea symphytifolia*), lantana (*Lantana camara*), and klu shrubs, 3 to 7 feet tall; some patches are extensive and dense. Small stands of kiawe trees (*Prosopis pallida*), 10 to 18 feet tall, are also common, especially along the boundary adjacent to the Pacific Missile Range Facility (PMRF).

The ground cover is a weedy mixture of grasses such as Bermuda grass, lovegrass (*Eragrostis tenella*), sour grass, swollen finger grass; and herbs and small shrubs such as spiny amaranth (*Amaranthus spinosus*), coat buttons (*Tridax procumbens*), *Portulaca pilosa*, hairy spurge (*Chamaesyce hirta*), and coffee senna (*Senna occidentalis*).

#### 4.6.2 Potential Impacts and Mitigation Measures

The proposed Agricultural Park is not expected to have adverse impacts on existing botanical resources of the sites. The vegetation on both of the sites is dominated by introduced plants. The mauka site is actively cultivated sugar cane fields with the adjacent gulch areas supporting a koa-haole scrub. The makai site is used actively for grazing cattle and horses. It supports a weedy mixture of grasses, shrubs, herbs, and a few kiawe trees.



Only three native species were found during the survey; they are 'ilima (*Sida fallax*), 'uhaloa, and koali (*Ipomoea indica*). These three native species can be found throughout the Hawaiian Islands in similar environmental habitats. None of the plants observed on the two sites are listed, proposed, or candidate threatened and endangered species (U. S. Fish and Wildlife Service 1989, 1990); nor are any of them considered rare and vulnerable (Wagner et al. 1990).

An intensive search was made for the pololei fern (*Ophioglossum concinnum*), a category 1 candidate endangered species. No plants were found on the makai site during the survey. It was concluded in the survey report that this site is probably too disturbed by the grazing animals, and the competition from the weedy species is intense.

#### 4.7 AVIFAUNA AND FERAL ANIMALS

A study of the Bird and Mammal resources of the two sites was conducted by Phil Bruner, Environmental Consultant in conjunction with this environmental review. His complete report is contained as Appendix B in this document.

The objectives of the two-day survey were to:

1. Document what bird and mammal species occur on the two project sites, or may likely be found there given the habitats available.
2. Provide some baseline data on the relative abundance of each species.
3. Determine the presence or likely occurrence of any native fauna particularly any that are considered "endangered" or "threatened." If such occur on or near the property identify what features of the habitat may be important for these species.
4. Determine if these sites contain any special or unique habitats that if lost or altered by development might result in a significant negative impact on the fauna in this

region of the island.

A walk-through of each site was conducted in order to view a representative sample of the available habitats. Field observations were made with binoculars and by listening for vocalizations. These observations were concentrated during the peak bird activity periods of early morning and late afternoon. Attention was also paid to the presence of tracks and scats as indicators of bird and mammal activity.

At various locations, during the walk-through, census (count) stations were established where all birds seen or heard over a period of eight minutes were tallied. Any unusual observations of birds made between these census stations were also recorded. These data provide the basis for the relative abundance estimates. Published and unpublished reports of birds known from similar habitat elsewhere on PMRF and on Kauai were also consulted in order to acquire a more complete picture of the possible species that might occur in the area (Pratt et al. 1987; TGI 1988; Bruner 1990a, 1990b, 1991; Hawaii Audubon Society 1989). Observations of feral mammals were limited to visual sightings and evidence in the form of scats and tracks. No attempts were made to trap mammals in order to obtain data on their relative abundance and distribution.

Scientific names used follow those given in Hawaii's Birds (Hawaii Audubon Society, 1989); a Field Guide to the Birds of Hawaii and Tropical Pacific (Pratt et al. 1987); Mammal Species of the World (Honacki et al. 1982) and Hawaiian Coastal Plants (Merline, 1980).

#### 4.7.1 Existing Conditions and Resources

Both sites contain the typical array of exotic species of birds found at this elevation and in these habitats on Kauai. The native birds recorded on the survey were those species commonly associated with lowland habitats. No endemic land birds were recorded, however, W. Char during her botanical survey of the mauka site saw two Pueo or Short-eared Owl (*Asio flammeus sandwichensis*). This native owl is listed as endangered by the State of Hawaii on the island of Oahu. On Kauai, Pueo are fairly common (Hawaii Audubon

Society 1989).

Two Common Moorhen (Gallinula chloropus sandvicensis) were seen in the ditch which bisects the makai site. Moorhen are listed as endangered in Hawaii. They are, however, reasonably common on Kauai, particularly in agricultural wetlands, and irrigation ditches. Four Hawaiian Duck (Koloa) (Anas wyvilliana) were recorded in the ditch on the makai site. Koloa are also endangered but more common on Kauai than elsewhere in the State. No American Coot (Fulica americana alai) were found nor Black-necked Stilt (Himantopus mexicanus knudseni). Both of these endangered species could also be expected to use the ditch habitat in the makai site.

#### 4.7.1.1 Migratory Indigenous (Native) Birds

Twenty-six Pacific Golden Plover (Pluvialis fulva) were counted in the pasture habitat of the makai site and eight were recorded along cane roads in the mauka site. Plover prefer open areas such as mud flats, fields and lawns. Johnson et al. (1981), Bruner (1983) and Johnson et al. (1989) have shown plover are extremely site-faithful (returning each year to the same spot and maintaining this behavior throughout their life time). Plover also establish foraging territories which they defend vigorously. Such behavior makes it possible to acquire a fairly good estimate of the abundance of plover in any one area. The populations likewise remain relatively stable over many years (Johnson et al. 1989).

Fifty-seven Ruddy Turnstone (Arenaria interpres) were tallied in the pasture habitat of the makai site. This species is not known to be territorial but often occur in flocks on the wintering grounds.

#### 4.7.1.2 Resident Indigenous (Native) Waterbirds

The Black-crowned Night Heron (Nycticorax nycticorax) is the only species in this category. No night heron were recorded on either project site. Night heron are the only waterbirds not listed in Hawaii as endangered. This species undoubtedly utilizes the ditch habitat on the makai site.

#### 4.7.1.3 Resident Indigenous (Native) Seabirds

Wedge-tailed Shearwater (Puffinus pacificus) are known to nest at PMRF but not at this particular location. Laysan Albatross (Diomedea immutabilis) also occur at PMRF during the winter months. No seabirds were recorded during this survey. Newell's Shearwater (Puffinus Newli) may fly over these sites as it goes back and forth between its nesting burrows in the mountains and the open sea where it forages.

#### 4.7.1.4 Exotic (Introduced) Birds

A total of 15 exotic species was recorded on the makai site. Fourteen species were found on the mauka site. Data from surveys in similar habitat elsewhere on Kauai (Bruner 1990a, 1990b, 1991) and information provided in Pratt et al. (1987); TGI (1988); Hawaii Audubon Society (1989) suggest the following birds may also occur on or near these sites: Western Meadowlark (Sturnella neglecta), White-rumped Shama (Copsychus malabaricus), Japanese Bush-warbler (Cettia diphone) and Eurasian Skylark (Alauda arvensis). Java Sparrow (Padda oryzivora) has also recently become established in the Princeville area (Hawaii Audubon Society 1989) and may eventually spread to other lowland and urban habitats on the island.

#### 4.7.1.5 Feral Mammals

While no evidence of rats or mice were noted, these ubiquitous mammals likely do occur on both properties. No trapping was conducted in order to assess the relative abundance of mammals at this site. Tracks of feral cats were seen. Black-tailed Deer (Odocoileus henionus) are "rarely found at PMRF" (TGI, 1988). Deer tracks were found on the mauka site.

#### 4.7.2 Impacts and Mitigation Measures

No unique or special habitat was found on either property. The ditch at the makai site attracts waterbirds. Ditches of this type are abundant throughout Kauai. Water levels appear to fluctuate in this ditch making it a somewhat ephemeral resource.

The proposed project is not expected to have any adverse impact on the existing faunal resources of the two sites.

Any aquatic operation near the shoreline with water exchange or discharge will be required to adhere to the agricultural park lease provisions and details contained on their conservation plan, specifying practices that require compliance with USDA standards and Clean Water Act Section 319 guidelines that focus on protection of aquatic resources.

#### 4.8 HISTORICAL/ARCHAEOLOGICAL RESOURCES

An archaeological assessment was conducted by Cultural Surveys Hawaii for the project. A complete copy of the report is included as Appendix C in this document.

The scope of this study was designed to be an environmental assessment to describe potential impact to any archeological resources. The tasks involved a walk-through reconnaissance of the two parcels to determine the potential for archaeological resources, and review of archaeological and historical literature.

##### 4.8.1 Existing Conditions

The Kekaha area may be one of the most dramatically altered landscapes on the island of Kauai. The sloping table lands and ridges overlooking the coastal plain have been deeply plowed and planted in sugar and terraced for irrigation. The Kekaha Ditch taps water from the Waimea River at the Koaie Canyon junction and transports it out of the valley westward along the cliff edge to irrigate the Kekaha Plain. The valleys have been modified with roads and other sugar-related facilities.

The former wetlands between the cliffs and the sand plain have been drained and supplied with gravity fed water with a vast geometric network of drainage and irrigation ditches.

The sand plain itself, which once had a rolling dune topography at its mauka end, has undergone many phases of modification through levelling, grading, sand mining, pasture improvement, cultivation improvement (seed corn), and residential development.

In only a few places do remnants of the original dune topography survive. Even the shoreline has been impacted by sand removal, road construction, and many years of military use.

#### 4.8.2 Archaeological Research

There are no previously recorded sites in either of the two project areas. Bennett's 1930 survey was the only general survey of the Kekaha area and the majority of sites recorded by him were found in the valleys above the coastal plain. These sites include *heiau* on ridges and in valleys and house sites and terraces in larger valleys, such as Waiawa. No archaeological sites were recorded by Bennett near this parcel.

Most relevant to the makai parcel (Parcel 3) is the recent study by Cultural Surveys Hawaii, of an expanded County of Kauai landfill site bordering Parcel 3 to the southeast. Because of the extensive modern land modifications the excavation of over 40 backhoe trenches showed no cultural remains. The landfill property is considered as being similar in terms of extensive land modification and archaeological potential to Parcel 3 in this initial assessment. Based on the results of the landfill survey it is predicted that little of the original surface sand deposits would remain and that lithified dune would be encountered within a few feet of the surface.

The majority of the prehistoric archaeological sites recorded in the Kekaha area by Bennett, including *heiau*, were located on ridges and valleys at the base of ridges. The closest site to Parcel 4B described by Bennett is his Site 18 - a 40 by 60 foot *heiau* - which is by the Kokee Road but far mauka of the project area at elevation 1,700 feet above sea level. The land planted in cane is not of archaeological concern since all remnants of Hawaiian sites would almost certainly have been destroyed by many years of deep plowing.

#### 4.8.3 Project Impacts and Mitigation Measures

##### 4.8.3.1 Parcel #3 - Makai Site

Apparent modern alteration of the landscape as well as the negative results of the recent

surface and subsurface investigations adjacent to the property would appear to indicate little possibility of finding archaeological remains. However, it has been preliminarily concluded that the location near the shore and the sandy environment are conducive to the likelihood of encountering cultural layer or human burials if undisturbed portions of the parcel remain. An inventory survey that would include oral history documentation, surface and subsurface testing has been recommended to be conducted prior to construction. The scope of the survey will be reviewed and approved by the State Historic Preservation Division of DLNR. If significant historic sites are discovered, then an acceptable mitigation plan will be reviewed and approved by SHPD under Chapter 6E, HRS.

#### 4.8.3.2 Parcel #4B - Mauka Site

Because of the possibility of encountering archaeological remains in the uncultivated portions of this site, this site should be subject to inventory survey to adequately assess the impact of Agricultural Park development on potential archaeological resources. Cultural Surveys Hawaii recommended in its report (see Appendix C) that cultivated lands should not be included in the survey area. If archaeological sites are present, they would probably occur in the steeper uncultivated land that is unsuitable for modern agriculture.

In general, this archaeological assessment indicates that in the case of both parcels, archaeological concerns are not a major factor in the long term development of these sites for agricultural purposes.

## SECTION 5

### SOCIO-ECONOMIC ENVIRONMENT, IMPACTS AND MITIGATION MEASURES

#### 5.1 POPULATION

Kauai's population increased from 39,082 in 1980 to 51,177 in 1990, an increase of 30.9 percent (U. S. Bureau of the Census, 1991). The County seat is Lihue, with a census population of 5,536. Table 5-1 lists 1980 and 1990 census populations for the island of Kauai and the Waimea and Kekaha communities.

TABLE 5-1

1980 and 1990 Census Populations  
for Kauai and Selected Areas

<u>Jurisdiction</u>	<u>1980 Population</u>	<u>1990 Population</u>	<u>Percent Change</u>
Kauai	39,082	51,177	30.9
Kekaha	2,404	3,506	45.8
Waimea	1,569	1,840	17.3

Waimea and Kekaha can be characterized as rural communities with a stable population growth. Historically, Waimea's principal economic resource had been agriculture.

#### 5.1.1 Socio-Economic Park Locational Factors

While farmers recognize the importance of soils and climatic suitability for a given site, area of current residence can also be expected to affect the demand for agricultural lots at the given park site. According to 1990 Census data, the Kawaihau and Lihue Districts (26,290) include 51 percent of total population. The Koloa and Waimea Districts (20,256) include 40 percent of the population. Based on these data, it is probable that more farmers would currently reside closer to the windward than the southwestern area. To the extent lessees of lots in the proposed Agricultural Park must commute long distances from their place of



residence to the Agricultural Park, several adverse factors become readily apparent. These factors include increased commuting time which correspondingly cuts into time which would have been spent in farming or other productive/personal activities, increased commuting cost (fuel and vehicle maintenance), and diminished security of crop and farm assets because of less capacity to personally maintain oversight of the farm lot.

Further, tight labor market conditions currently exist in Kauai. This exacerbates the difficulty of finding and hiring farm labor. The Kapaa/Wailua and Lihue urban areas represent the largest labor markets. On average, available labor from these markets resides closer to the windward area. This suggests a labor market advantage for windward area over the southwestern area. However, current and future Kauai residential development distribution (e.g. large developments near Hanapepe) and quality (i.e. affordable versus high cost housing) could alter this situation over the next decade.

#### 5.1.2 Farm Service and Supply Centers

Transportation facilities, services and farm suppliers are mainly located within the Lihue area. The greater the distance the greater the inconvenience and cost of accessing these service and factor markets, all other variables being constant. All other variables are not constant, however, as windward transportation corridors exhibit more traffic congestion than southwestern traffic corridors. This could mitigate any distance advantages enjoyed by windward areas, making convenience and cost differentials marginal if they exist at all.

#### 5.1.3 Impacts and Mitigation

Short term impacts: increased commuting time for farmers on the windward side, which may cut into time which would have been spent in farming, increased commuting cost and diminished security of crop and farm assets because of less oversight of farm lots.

Long Term Impacts: current and future Kauai residential development distribution include developments of quality affordable housing near Hanapepe and the southwestern regions of Kauai, which could alter the population distribution over the next decade. The windward

transportation corridors exhibit more traffic congestion than southwestern traffic corridors. This combined with population increases in the southwest areas could mitigate any distance advantages enjoyed by windward areas.

## 5.2 ECONOMY

An economy once dominated by the sugar industry is being replaced by tourism and Federally-supported defense and scientific activities. The State and Federal governments own nearly all of the Mana Plain west of Waimea. Some of the State-owned lands, including the two project sites, are under long-term lease to the Kekaha Sugar Company. The balance of the State lands is owned by the Department of Hawaiian Home Lands (DHHL).

Total employment on the island was estimated at approximately 26,900 in 1990 (First Hawaiian Bank, 1990). Because of the low wage rates in some industries, a substantial portion of the workforce consists of multiple job holders. The 1990 unemployment rate was 3.7 percent (First Hawaiian Bank, 1990).

The tourism industry and associated travel-related services employ approximately 16,000 people on the island. Average earnings per job in this industry was approximately \$17,900 in 1990. The Hawaii Visitors Bureau (1991) estimated that 1.3 million people visited Kauai in 1990. Visitor expenditures for 1990 were approximately \$945 million (Hawaii Visitors Bureau, 1991). Kauai had an inventory of approximately 7,300 hotel rooms, with occupancy rates averaging between 65 and 75 percent for the 1985 to 1989 period (First Hawaiian Bank, 1990).

Kauai's economy, like the rest of the State, is influenced by external events. While growth in the tourism industry has been steady, it has been affected by downturns in the economy, labor strikes, or other events that curtailed tourist travel. For example, Hurricane Iwa struck the Hawaiian Islands in November 1982, resulting in extensive damage to buildings, property, and crops. This natural disaster led to a 41-percent decline (from the previous

year's monthly total) in visitors to the island in December 1982 (State of Hawaii, 1983). During Operation Desert Storm, visitor travel during January, February, and March of 1991 was down 6, 21, and 8 percent, respectively from the previous year's monthly totals (Hawaii Visitors Bureau, 1990).

As a result of Hurricane Iniki damage in 1992, economic activities in all sectors of the Kauai economy have been severely impacted. Informal estimates from the Kauai Office of Economic Development (OED) indicate that as many as 1,800 jobs relating to the hotel sector alone (approximately 5 percent of the total job market on Kauai) may have been lost for as far into the future as 1994. Depending on the level of reconstruction on the larger hotel sites, some of these jobs may not reopen. Some sectors of the construction industry are doing well as part of the reconstruction efforts, but most of these jobs are in the smaller residential sector.

The Kauai OED also indicated most agricultural commodities were significantly reduced for the 1992/early 1993 seasons. In the case of macadamia nuts, the trees were completely destroyed and the industry may not recover anytime in the near future. Coffee production will be down approximately 50 percent, as a result of storm damage and combined financial issues; sugar production decreased by 30 percent; taro - down 10-20 percent; cut tropicals - temporarily destroyed; orchard crops - completely destroyed with no production into the near future (except guava for which there will be no production this season, with an anticipated bumper crop next season); truck farming - temporarily destroyed, with some production expected back by mid 1993.

#### 5.2.1 Agricultural Market Considerations

A special commodities study was prepared by Lucas Associates in conjunction with the 1992 Kauai Agricultural Park site selection project. The study effort was focused on assessing the potential for specific commodity categories. The following is a summary of the Lucas report that was completed in 1992, prior to the damage caused by Hurricane Iniki.

The Department of Agriculture designated the respective commodity categories for inclusion in the Agricultural Park.

1. Floriculture and Nursery Commodities

Within the Kauai agricultural sector, floriculture has grown substantially. In 1979 total revenues for all segments (25 farms) of the floriculture industry amounted to only \$153,000. By 1991, sales had increased nearly 17-fold to \$2,536,000 (50 farms). Cut tropicals, potted flowering plants, orchids, lei flowers, and landscape and potted foliage nurseries, make up the main segments of the floriculture sector. Growth was particularly vigorous in the 1987 to 1989 period, but has slowed or even declined for some of these segments in 1990 and 1992. The orchids market segment continued to show strength through 1991. Export sales represented a substantial share of total sales for some segments, such as cut tropicals, in which many firms ship to the Mainland. Orchid and potted flowering plant growers also export out of State (but in much smaller quantities), and lei growers ship some products to Oahu.

Even though growth has been rapid in this industry, growth among commodity segments has been uneven, and Kauai production still lags far behind Oahu and the island of Hawaii. Nursery crop production has been constrained in particular by lack of land with reasonable tenure terms. A beginning full-time commercial grower operating a nursery requires a minimum of 5 acres. The minimum needed for cut tropicals, landscape, lei flower and some foliage nurseries, depending on plants grown and stock plant requirements equals 10-15 acres. Export volume growth has been constrained by the lack of a certified nursery in Kauai. Certified potted plant nurseries may require nematode-free water. The County would be the likely source of such water. As an alternate strategy, a University of Hawaii/Manoa Agricultural and Plant Industries Program Professor Don Schmitt indicates that existing water source (irrigation

water) may be utilized initially. A trial crop of flowers that are known to be highly susceptible to burrowing nematodes (example: anthuriums) would be planted as the subject of this University test.

The University would then monitor the water supply to the growing plant crops by taking catchment samples out of the pump at a rate of 1 hour per month for a 12-month period. This University staff would conduct the necessary monitoring into an existing experimental program thereby enabling a free diagnostic service to the proposed Kauai Agricultural Park.

None of the constraints to floriculture crops seem insurmountable as the proposed Agricultural Park addresses the most serious factor of providing the land. Thus, consideration for floriculture and nursery commodities should move forward.

## 2. Orchard Crops

On Kauai the principal commercial orchard crops are banana, guava, papaya and macadamia. The larger corporate growers dominate guava and macadamia nut production.

Papaya: During the late 1970's and early 1980's, papaya growers, mainly based at the Moloaa site, produced over 5 million pounds of the Sunrise papaya variety, mainly for export markets. Hurricane Iwa, disease, and marketing problems caused harvested acreage and output (245 acres and 7.2 million pounds output in 1981) to decline to less than 0.7 million pounds on about 40 harvested acres in 1991. Changes in fruit fly treatment processes required by USDA-Animal and Plant Health Inspection Service (APHIS) to prevent fruit fly infestation in California was the single most important cause of the decline. The double-dip hot water treatment, adopted after the Environmental Protection Agency (EPA) banned EDB, adversely affects Sunrise variety

quality. Thus, it did not forestall the decline of the Kauai papaya market. More recently, the USDA approved a more effective papaya treatment process called the forced air heat treatment. This process is effective on the Sunrise variety. Kauai presently does not have a plant to administer this forced air treatment, and therefore cannot ship papaya to the Mainland.

The State has appropriated funding to establish a forced air treatment plant in Kauai. This plant is scheduled to become operational in 1993. Plant capacity and treatment cost per pound of papaya are still being evaluated, but the plant is expected to handle up to 9 million pounds of fruit by incremental additions of treatment chambers.

Provided treatment costs are not excessive, Kauai papaya growers will likely re-establish the Mainland export market. This implies significant growth potential in papaya output and consequently acreage requirements.

Banana: Banana production in Kauai peaked in the mid-1980's with production amounting to just over 2 million pounds, nearly a quarter of the Statewide total. Most of the output was exported to the Oahu market where it competed with other island production and foreign imports. From 1986 to 1991 farms have declined from 40 to 17, and harvested acreage from a peak of 145 acres (1985) to 50 acres (0.47 million pounds). Foreign imports account for about 40 to 45 percent of the Hawaii market. This suggests significant expansion potential for the Kauai banana industry if locally grown bananas can substitute for imported. In the past, lack of effective marketing channels to the Oahu market and coordination of production were problems which discouraged sustained production. The industry would have to solve these problems for local banana import substitution to become a reality.

Other Orchard Crop Markets: Some growers have planted tropical fruits

popular in Southeast Asia (e.g., mangosteen, rambouton) as well as mango with the intent of supplying the Oahu and Canadian markets which do not prohibit entry of the fruits. A USDA-funded program for eradicating fruit flies in Kauai has been started, but success is at best a long-term proposition. Elimination of fruit flies or the possible utilization of the new treatment plant could open U.S. West Coast markets (particularly the ethnic markets) to some of these tropical fruits.

It should be noted that Sharwil avocado growers can market their fruit to the U.S. mainland without any fruit fly treatment. In fact, Big Island producers have already commenced mainland shipments (although this program has been temporarily suspended). Only commercial producers can export (i.e. no backyard production) and the avocado stem must be intact. Growers who export must sign a compliance agreement with APHIS of the USDA and allow periodic unannounced inspections of their packing houses. In spite of the restrictions, allowing the exportation of an untreated Sharwil avocado from Hawaii to the U.S. mainland suggests significant market possibilities for Hawaii avocado growers.

3. Vegetables and Melons

Production: In 1991, 20 vegetable and melon growers harvested about 100 acres, producing about 0.6 million pounds. This level of output is substantially below levels produced in 1979 when 51 Kauai growers produced about 2.0 million pounds of vegetables and melons. University of Hawaii Cooperative Extension Service personnel believe production is under-reported due to *Sunshine* market activity not included in the 1989 values reported by the State. Annual *Sunshine* market sales reported to the County by sellers, currently run about \$200,000 per annum based on reported second quarter 1991 sales. This compares with commercial farm sales of \$216,000 in 1989 (Hawaii Agricultural Statistics Service). Thus, total vegetable and melon production

may in fact be under-reported by the State. However, most growers participating in the *Sunshine* markets are not commercial growers, but part-time farmers and back yard gardeners. *Sunshine* market regulations stipulate that produce sold (both fruits and vegetables) must be grown on Kauai.

Reasons for Decline: Farmers and other industry participants interviewed believe that the decline in commercial vegetable and melon output results from several factors. These include: (1) the older generation of full-time farmers is now retiring and their children do not want to farm, especially on a full-time basis; (2) youth in general desire occupations other than farming, negatively associating farming with the plantation jobs formerly held by many of their parents; (3) job opportunities abound in tourism and other industries which individuals perceive as easier and more glamorous than farming; and (4) persons desiring to farm and grow nursery crops cannot find affordable land on longer-term leases. Numerous growers and other industry participants expressed the view that many of those seeking land for farming/nursery use were persons who migrated to Kauai, not persons born and raised there.

Potential for Import Substitution: Kauai produce wholesalers estimate that 85 to 90 percent of all marketed vegetables and fruits are imported from outside suppliers in the Mainland, foreign countries, and other Hawaii islands. This would include commodities not grown in Hawaii, e.g. apples, peaches, Irish potatoes. Counting only fresh vegetable and melon commodities currently grown in Kauai (including commodities grown by backyard gardeners) for 1991, mainland and foreign shipments amounted to 1.2 million pounds. Data are unavailable for imports from other islands.

It is evident that a large potential market exists for full-time vegetable and melon farmers in Kauai. Utilizing total market supply data (from HASS; unpublished 1990 data), including both domestic and import supplies, per



capita (1990 de facto population figures were used) consumption was calculated for each of the commodities currently grown commercially in Kauai. These commodities include: snap beans, cucumber, eggplant, watermelon, sweet potato, green pepper, Italian squash, sweet corn, and tomatoes. Applying statewide average yields and assuming Kauai growers supplied 90 percent of the Kauai market, the total acreage requirement for the above listed commodities would amount to about 180 acres (harvested).

4. Taro

While it may be considered a vegetable, taro in Hawaii and other Pacific islands is an important traditional food, consumed as a staple by the indigenous peoples. Still a popular food consumed by the local population, and visitors interested in the traditional food of Hawaii, taro is considered a significant specialty crop.

Among the Counties, Kauai is the leading producer of taro destined for the traditional processed poi market, the dominant market segment statewide for taro. Poi taro is produced predominantly utilizing wetlands for cultivation. Hanalei Valley on the north shore of Kauai is the largest poi taro production area in the state. In contrast to the taro produced under wetlands conditions (typically referred to as poi taro), Kauai produces very little taro utilizing dryland cultivation methods. Dryland produced taro, usually referred to as "Chinese" taro after the common name given the dominant plant variety commercially grown in Hawaii, is largely destined for the fresh market and "chipping" market segments. These two market segments, while significant, only account for about 10-15 percent of total taro production statewide. The chipping market consists of poi used for snack chips and other specialty processed products.

### Wetland Taro

In 1991, total statewide marketed taro production amounted to 7.0 million pounds, the processed market (mainly poi) accounting for 6.4 million pounds and the fresh market (mainly Chinese taro) accounting for the remainder, about 0.6 million pounds, or 8.6 percent of total marketed production. Of the total acreage devoted to poi taro production statewide (310 acres in crop in 1991), Kauai accounts for 64.5 percent (200 acres). In the period 1982-1991, poi taro acreage in Kauai has ranged from a high of 225 acres in 1984 to a low of 165 acres in 1990. In 1991, acreage allocated to poi taro in Kauai increased to 200 acres, as noted earlier. In recent years, additional acreage in irrigated wetlands have been made available in Hanalei Valley, through the completion of a U.S. Fish and Wildlife Service project. Additional wetland areas in Waioli (through DLNR repair of the water system) and Waipa also have become available for poi taro production. In view of the present situation with respect to available wetlands acreage suitable for poi taro production, the proposed Agricultural Park would not need to accommodate poi taro growers.

### Dryland Taro

As previously noted, very little taro is produced in Kauai utilizing dryland cultivation methods. It is estimated that there were less than 15 acres of dryland taro in crop in Kauai in 1991. On Oahu, Kauai, Maui and Molokai, there are few commercial growers of dryland taro, and therefore to avoid disclosure of individual operations, the Hawaii Agricultural Statistics Service (HASS) aggregates the data for these islands. In 1990, total acreage in crop for dryland taro (Chinese taro) was only 10 acres for Oahu, Kauai, Maui, and Molokai combined. In 1991, however, there was a dramatic rise in dryland taro acreage, the total acreage for these islands increasing to 120 acres in crop. Based on informal information, it is understood that the large increase in acreage occurred mainly on Molokai. If this information is accurate,

Molokai would join the Island of Hawaii as a major producer of dryland taro. In 1991, Hawaii County growers of Chinese taro had 170 acres in crop, with the Hamakua coast area constituting the single largest production area.

The present market for dryland, or Chinese, taro on Kauai is based mainly on the sale of fresh taro corms. As previously noted, this is a small market, with virtually all sales being on-island. With the exception of two or three local cottage-industry size chip processors, there are no sales of Kauai grown Chinese taro to the processing market. Outside of Kauai, a processing market has developed for Chinese taro, mainly for snack chips. There also is a substantial demand for Chinese taro among Asian and Pacific islander immigrants in California and other U.S. urban areas. Some research and development also has been undertaken with respect to other specialty products based on the processing of dryland cultivated taro, including taro plant varieties other than the Chinese taro now commercially grown. In the snack chip market, major processors are located in Honolulu and California. Any significant growth in the production of dryland taro in Kauai would almost certainly entail export sales to Honolulu and the mainland. To compete with Hawaii island and Molokai growers, a Kauai producer would have to be fairly large to achieve the economies of scale and thus sufficiently low commodity price to successfully sell to fresh and processing export markets. Short of a potential larger-scale producer/exporter, the demand for acreage to produce dryland taro is not expected to increase significantly on Kauai in the midterm. Expected marginal increases in dryland taro production have been taken into account in estimating the vegetable acreage requirement for the proposed Agricultural Park.

5. Aquaculture

Production: Kauai has the least developed aquaculture industry among the Counties. Several large operations, including two promoted by large Hawaii

corporations, failed in Kauai. Currently, the industry is comprised of small, part-time producers. The main species cultured include freshwater prawns, tilapia, and Chinese catfish. Production data are not available, but industry participants interviewed feel production is insignificant. One small-scale producer plans to establish a marine shrimp operation on five acres of land to be leased from the State in Kekaha. If successful, this operation would utilize the capital intensive round-pond culture technology recently developed by Oceanic Institute (see Honolulu Advertiser, October 9, 1991).

Market: Local Kauai potential market demand is considered quite strong, particularly for marine shrimp, an already established product. Consumers include restaurants catering to the tourist and resident populations, and marine products purchased for home consumption. This market is presently not supplied by any local aquaculture producers, at least any utilizing conventional marketing channels. Local sales of cultured prawns, fish and other shellfish is sporadic and generally made directly by producer to final consumer, typically through word of mouth.

The State Aquaculture Development Program (ADP) has identified ethnic markets as the principal consumers of aquaculture products in the Hawaii domestic market (DLNR, 1990: 20). It has estimated that Chinese and Filipinos account for about 80 percent of local market demand. On Kauai, the Filipino community is quite large, comprising 26 percent of the population according to 1980 Census figures (DPED, 1982, SR 152: Table 1). Tilapia, Chinese catfish and carp are the species popular with these population segments throughout the State as well as on Kauai.

In sum, aquaculture commodities appear to have a substantial potential market, but for the near term, will principally supply local markets. The reasons are that no established commercial (full-time) producers and markets

# CORRECTION

THE PRECEDING DOCUMENT(S) HAS  
BEEN REPHOTOGRAPHED TO ASSURE  
LEGIBILITY  
SEE FRAME(S)  
IMMEDIATELY FOLLOWING

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In sum, aquaculture commodities appear to have a substantial potential market, but for the near term, will principally supply local markets. The reasons are that no established commercial (full-time) producers and markets

exist, and there is a dearth of potential producers with the technical expertise and capital to establish a commercial operation. These facts posit a small demand for Agricultural Park land for aquaculture. These facts further suggest employing a full-time aquaculture specialist to perform basic production and market research to tap any market potential. Depending on technology adopted and species for most production scales, a single species producer may also require off-island markets to absorb part of his/her production.

### 5.2.2 Labor and Factor Markets

The following summary points can be made about labor on Kauai. First, general labor market conditions on Kauai are tight. Unless the current recession persists for an extended period, this situation is unlikely to change. And second, relative to other sectors of the economy, agricultural labor market opportunities are less attractive and offer no wage premium (see DLIR, Selected Wage Information for Hawaii - 1990).

The same conclusion can be reached with respect to factor (i.e. farm service and supply) markets. That is, windward sites may have a proximity-to-market advantage over southwestern sites, but it is marginal at best and likely mitigated by other factors.

### 5.2.3 Farmer Labor Market

The farmer labor market refers to the population of individuals with skills and/or experience that could potentially lease Agricultural Park lands. Several summary points can be made with respect to this labor market. First the farm(er) population is decreasing due to general economy-wide changes. Related to this phenomenon which is especially true in Hawaii, is the fact the younger generation is not interested in farming. Second, many of the persons interested in farming in Hawaii are recent immigrants to the State. And finally, results of an informal Hawaii Farm Bureau Federation survey indicate that potential farmers prefer windward locations for an Kauai Agricultural Park over southwestern locations. The likely reason for this outcome is the fact that these individuals reside closer to windward sites than to southwestern sites.

#### 5.2.4 Impacts and Mitigation

The proposed project is expected to have positive impacts on the Kauai economy by increasing the amount of agricultural lands for diversified income producing crops. This would eventually result in increased job opportunities in agriculture, and spinoff businesses from increased activities in farming and crop production.

### 5.3 COUNTY OF KAUAI USER SURVEY

#### 5.3.1 Potential Farmer/Lessee Site Location Preferences

The Kauai Chapter of the Hawaii Farm Bureau Federation interviewed farmers and potential new farmers to obtain their preferences for the agricultural park location (1987/1988). Results may not represent all farmer and potential farmer views due to the informal nature of the survey. The following results were reported:

<u>Preferred/Indicated Site Area</u>	<u>Percent</u>
Haena to Kilauea	7.9
Moloaa to Hanamaulu	37.8
Lihue to Kalaheo	22.8
Eleele to Mana	26.0
Other	0.8
No Preference	4.7
	<hr/>
	100.0

N = 89

Note: Two different forms were used in eliciting farmer interest, and some forms required respondents to write in the preferred site area. The survey was taken in 1987-1988.

The results indicate a farmer/potential farmer preference for windward or eastern areas for the Agricultural Park location. Windward sites may have a proximity to market advantage over southwestern sites, but it is marginal at best and likely mitigated by other factors.



An updated survey was conducted in 1992 jointly by the Cooperative Extension Service on Kauai and the Kauai Chapter of the Hawaii Farm Bureau Federation. Farmers were asked to respond to a written form with five questions relating to their preferences for the five sites identified in the Draft Agricultural Park Site Selection report (Kekaha, Moloaa, Kealia, Wailua, Hanapepe). Results represent the preferences of 61 members of the existing farm community. The following results were reported:

**AG PARK INTEREST SURVEY**  
 February 1993  
 (Total number of Respondents - 61)

Preferred Site Location	%
Kekaha	32.3
Moloaa	14.0
Kealia	24.7
Wailua	17.2
Hanapepe	11.8
	100.0

Preferred Lot Size	%
-5 ac.	19.3
5 ac.	17.6
5-10 ac.	52.6
+10 ac.	10.5
	100.0

Number of lots Desired	
one lot	35
two lots	12
three lots	7
+ four lots	3

Total Lots Desired            93

93 lots x (average of 7.5 ac.) = 697.5 ac. (total desired acreage).

Based on these results Kekaha is the preferred site; however, the Kealia site is a strong secondary preference because of its windward location. Informal response to the question of a mauka or makai site within Kekaha indicated a preference for a mauka site.

#### 5.4 PUBLIC INFRASTRUCTURE SYSTEMS

##### 5.4.1 Traffic/Transportation Systems

Paved State roads follow the perimeters of the mauka portion of the Kekaha property with Waimea Canyon Ridge Road on the east, and Kokee Ridge Road on the west. At present, cane haul roads in the mauka portion are very steep and impassable in wet conditions. Kaunualii Highway and many other private paved roads cross the makai portion of the site. The roadway system in the coastal Kekaha area appears to adequately meet the needs of the area. There is good road access to the region, but it is somewhat removed from primary service areas (Lihue).

The mauka site will be accessed from Waimea Canyon Drive, a two lane paved road, (operating at 500 vpd as estimated by Kauai County Highway Planning Study - October 1990) which adjoins the site on the east. The makai site will be accessed from Kaunualii Highway, a two lane paved road (operating at 1,700 vpd estimated by Kauai County Highway Planning Study - October 1990) which adjoins the north perimeter of the site. The Coast Guard Station access road adjoins the east side of the site; however, no access is proposed from the site onto this road.

##### 5.4.1.1 Impacts and Mitigation

Public paved roads are adequate for access to both sites at this time. Development of the sites is not expected to have significant traffic impacts on the existing public roads. Intersection improvements at the entry to each site will have to be made (by the Agricultural Park); however, traffic volumes are not expected to be significant enough to warrant signalization at the intersections. Both roads will accommodate up to level C service at 12,000 vpd. Each site will only be generating light agricultural traffic from approximately 20 lots. The average agricultural traffic generation is 2.1 trips/day per

employee (Source: Kauai County Highway Planning Study - October 1990). This will not begin to approach levels that will impact service levels on these two roads.

Any access intersections to the proposed development should provide adequate sight distances for all traffic movements and conform to applicable State highway design standards. Plans for construction work within the State highway right-of-way will be submitted for State Department of Transportation review and approval.

#### 5.4.2 Potable Water

There will be no on-site residential proposed within the sites, so there will no development of a potable water system on site. Both sites will develop private irrigation water sources, from wells or adjoining private ditch systems (See discussion of DHHL water encumbrances (Section - 3.2.2.2) and Hydrology (Section - 4.3)).

##### 5.4.2.1 Impacts and Mitigation

Since there will be no residential uses within the Agricultural Park, a potable water system will not be developed on either site. There will be no impacts on the County potable water system.

#### 5.4.3 Sewer

There will be no residential development within the proposed Agricultural Park site. Therefore sewer system development will not be necessary.

##### 5.4.3.2 Impacts and Mitigation

There will be no impacts to public sewer systems.

#### 5.4.4 Electrical/Communications

The Waimea Hydro-Electric Plant (owned/operated by Kekaha Sugar Co.) located within the Waimea Canyon supplies about 10 million kilowatts to Kekaha Sugar powerlines that run down Waimea Canyon Road to the Kitano reservoir and then down the Waiaka Ridge.

These lines provide electrical service to the Pacific Missile Range Facility on the Makaha Ridge, Kokee State Park Cabins and Kekaha Sugar Company. The KSCO Mill Steam Plant also generates at 30 million kilowatt hours per year. KSCO sells back to Kauai Electric approximately one third of its excess electric supply. The Waiawa Hydro-Plant (owned and operated by KSCO) is not operational at this time, but once served the Mana coastal area.

The makai site has existing Kauai Electric three-phase power lines along the Kaumualii Highway. At the mauka site, the nearest KSCO powerline is over 6,000 feet away (mauka) and the nearest Kauai Electric Company lines are about 4,000 feet away (makai) near the Waimea Heights Subdivision along the Waimea Canyon State Highway. Electric service for the mauka site will be contracted from Kauai Electric Company, therefore offsite electrical lines will have to be developed to the site to service individual lots and the pump stations. (This excludes any public or private street lights except where the Agricultural Park access roads intersect the main public roads.)

Telephone service lines will be provided to each lot by GTE Hawaiian Tel.

#### 5.4.4.1 Impacts and Mitigation

According to Citizens Utilities Kauai Electric Division (letter dated Sept. 28, 1993) development of the makai site will require a line extension into the project depending on the power requirements for the agricultural lots. The mauka site will require a substantial three-phase line extension from the entrance of Waimea Heights subdivision to the project site. Line extensions will depend on the power requirements for the lots. Although Kekaha Sugar Company's power line is also available, Kauai Electric would not permit attachment since it is their private system.

**SECTION 6**  
**LAND USE PLANS, POLICIES, PROGRAMS**

**6.1 HAWAII STATE PLANS**

The 1991 State Agriculture Functional Plan states as its primary objectives: 1) continued viability of Hawaii's sugar and pineapple industries and 2) continued growth in diversified agriculture throughout the State. The mission is to ultimately increase the overall levels of agricultural development in Hawaii in accordance with these two objectives. Agricultural development may be broadly defined as the organization of production and distribution of agricultural commodities to supply the demand within a market territory.

The sites are within the State Agricultural Land Use District, and will not require any land use amendments (Figure 7). The development program for an Agricultural Park on Kauai is consistent with and supportive of the agricultural objectives and policies of the Hawaii State Plan.

**6.2 HAWAII COASTAL ZONE MANAGEMENT PROGRAM (CZM)**

Chapter 205A, and Act 258, the State's CZM law, as amended, outlines objectives, policies, standards and procedures to guide and regulate the use of the State's coastal resources. The proposed development of the agricultural park is consistent with the existing on site and surrounding agricultural activity (makai site is being used as grazing grounds and corn is being grown nearby). Therefore, the proposed project will result in minimal impact on ongoing uses.

Areas of particular interest in the State's CZM review are the project's potential impacts on recreational, historic, scenic and open space resources, coastal ecosystems, economic uses, coastal hazards, managing development, public participation and beach protection. The proposed development will not result in adverse impacts on these resources.

### 6.3 COUNTY GENERAL PLAN AND COUNTY ZONING

The proposed project is consistent with the Kauai County General Plan, which was adopted by resolution in 1971, and updated and adopted as Section 7 of the Kauai County Code in 1985.

The development program for an Agricultural Park on Kauai is consistent with and supportive of the goals of the County's General Plan for agriculture. Continued encouragement of agricultural production through all available avenues including State and Federal assistance is part of that goal. In addition, subdivision of agricultural lands for residential purposes is discouraged by the General Plan.

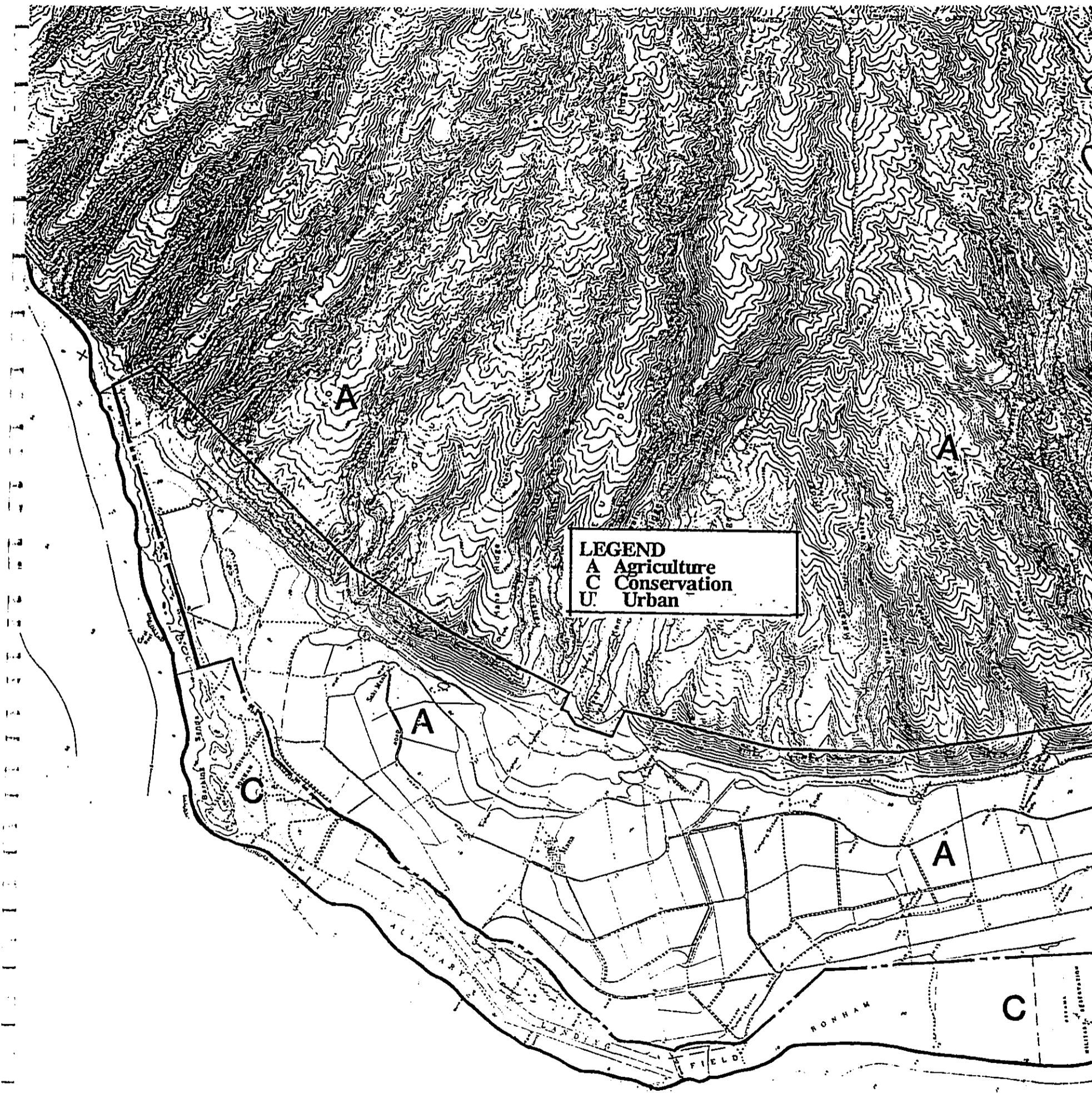
The sites are within the County Agricultural District, and will not require any land use amendments or rezoning applications. This will result in significant savings in time during the permitting process and was considered a major factor in selection of the Kekaha sites.

### 6.4 COUNTY RESPONSE TO PROPOSED AGRICULTURAL PARK

In general the proposal for developing an Agricultural Park on Kauai has met with very favorable response from local government officials and the agricultural community on the island. They are enthusiastic about the future of the Agricultural Park Program on Kauai and have indicated a cooperative spirit with regard to development and implementation of the park(s) and associated uses. As indicated by the surveys many farmers presently live on the windward side of the island and may naturally have a preference for land in that area. Other issues, such as traffic impacts and land developability, however, may mitigate this preference.

### 6.5 PERMITS AND APPROVALS

Chapter 9A of the Kauai County Revised Ordinance provides guidelines for agricultural park subdivisions. This ordinance exempts agricultural subdivisions from the normal subdivision standards regarding roads, drains, sewer and water supply as set forth in the



**LEGEND**  
A Agriculture  
C Conservation  
U Urban

A

A

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FIELD

X

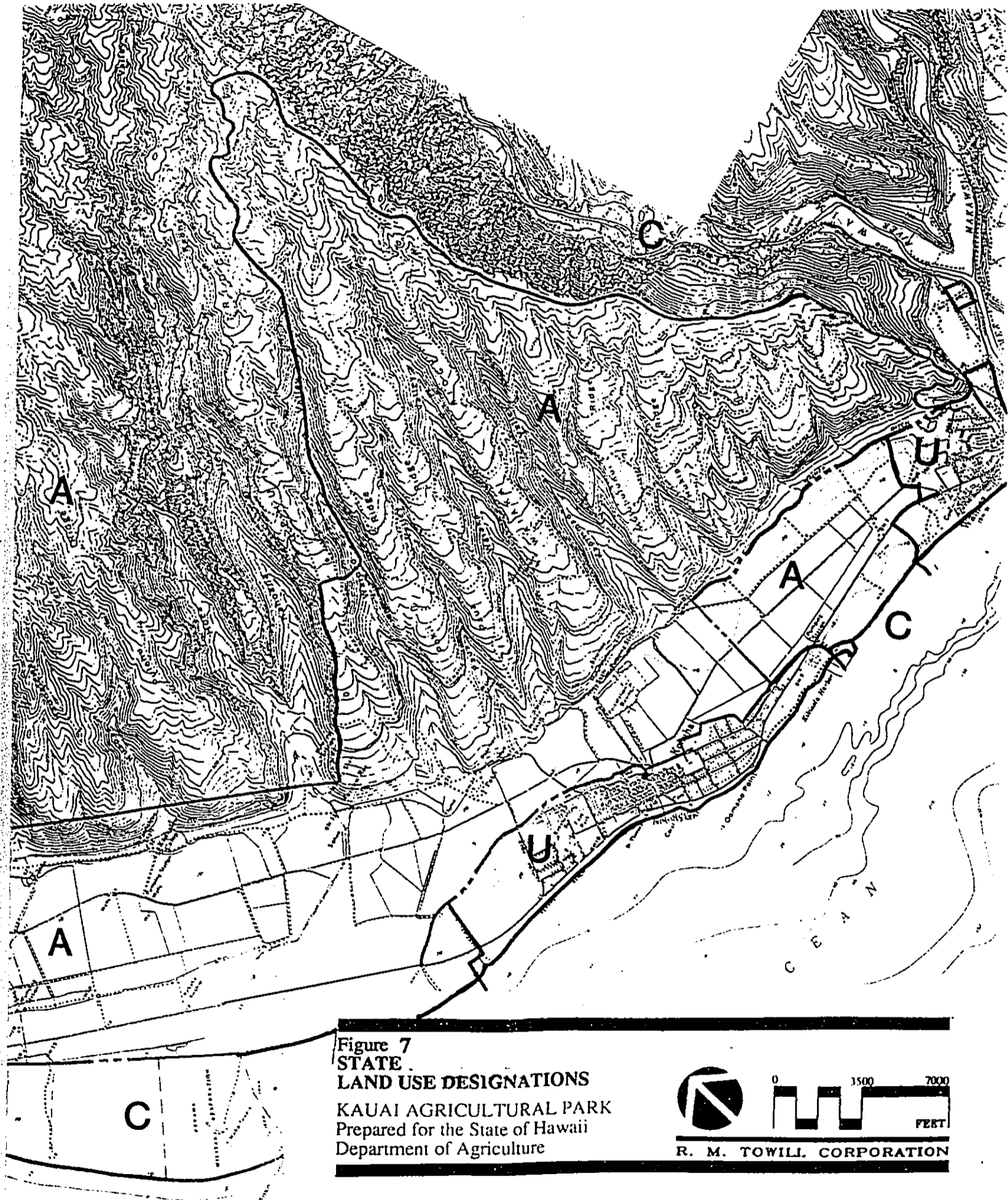


Figure 7  
**STATE**  
**LAND USE DESIGNATIONS**  
**KAUAI AGRICULTURAL PARK**  
 Prepared for the State of Hawaii  
 Department of Agriculture

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comprehensive zoning ordinance and the subdivision ordinance. However, two key provisions limit agricultural leasehold lots to a minimum of 10 acres and agricultural subdivisions to not less than 350 acres. Because a survey of farmers indicate desired lot sizes of 5 to 10 acres, variances from these provisions will be required for development of farm lots less than 10 acres, and a subdivision of less than 350 acres.

The Agricultural Park will be developed under the Agricultural Park Subdivision Ordinance. The primary differences between the Agricultural Park Subdivision Ordinance and the Agricultural District Zoning Ordinance are that the Agricultural Park Subdivision Ordinance (a) does not allow for any on-site housing; (b) the minimum parcel size is 10 acres; (c) it waives the minimum standards for subdivision improvements and construction plans; (d) it consolidates filing of preliminary and final subdivision mapping, and (e) it limits future subdivisions of the site. The potential difficulty in developing the State Agricultural Park under the Subdivision Ordinance lies in the desire for as much flexibility as possible on parcel sizes and lot totals. In order to maintain this flexibility the State intends to exercise its right to waive the conditions requiring: (1) minimum project size of 350 acres; and (2) minimum lot size of 10 acres.

County of Kauai grading ordinance exempts grading work in self contained government controlled areas. However, although no grading permit is required, the State will require that the contractor minimize dust and erosion problems during and after construction. The contractor will ensure that all appropriate dust and erosion control measures will be implemented to mitigate any short term construction related impacts.

**SECTION 7**  
**ALTERNATIVES TO PROPOSED ACTION**

**7.1 OVERVIEW**

The alternatives considered for this evaluation include the "no project" alternative, development concept alternatives, and Agricultural Park site location options.

**7.2 NO ACTION**

The "no action" alternative would result in continuation of existing conditions for the two Waimea-Kekaha sites in the short term; i.e., the makai site (Site #3) would remain undeveloped and utilized for intermittent grazing and as a drainage area for excess mill water, and the mauka site (Site #4B) will be kept in sugar cane cultivation until Kekaha Sugar Company's lease expires. Because of this pending lease expiration, "no action" alternative would leave the both sites without plans for re-use.

Advantages of the "no action" alternative are few. The advantages include: no further expenditures by KSCo; and no adverse impacts on the project site generated by development.

The primary disadvantage of the no-project alternative is that the Department of Agriculture will not be achieving its objective of providing an affordable Agricultural Park on Kauai on one or both of these two Waimea-Kekaha sites. Additionally, losses from this alternative would include lost employment opportunities, lot income opportunities, as well as lost tax revenues for County and State governments.

**7.3 DEVELOPMENT UNDER THE COUNTY AGRICULTURAL ZONING ORDINANCE VS AGRICULTURAL PARK SUBDIVISION ORDINANCE**

The County of Kauai has enacted an Agricultural Park Subdivision Ordinance which contains certain provisions for agricultural development, going beyond those of the standard Agricultural District Zoning ordinance. In the Moloaa area there has been a subdivision

developed on private lands (leased to the Moloaa Farmers Cooperative) as a County Agricultural Park under the Agricultural Park Subdivision Ordinance. The two ordinances are detailed as follows:

- **AGRICULTURAL PARK SUBDIVISION**

Purpose: To encourage landowners to provide land for agricultural purposes within Agricultural/Open zones for crops/other agricultural pursuits, with reduction of the strict requirements of the Subdivision Ordinance, thereby eliminating a substantial part of the investment required for subdivision improvements. This will enable farmers to obtain land with less capital investment and remove risks of agricultural lands being converted to residential or non-agricultural uses.

Definition: Minimum 350 acres total (within an Agricultural/Open zone) restricted to agricultural uses by lease for a minimum of 20 years.

Requirements/Standards:

- Minimum lot size of 10 acres.
- Agricultural park subdivision may be canceled by application, upon consent of all lessees in the park; land converts back to single lot status.
- No permanent dwellings permitted.
- Waiver of subdivision and zoning standards for all roads and improvement requirements for pavement widths, drainage, and sewer and water services (on site). May require public access dedication of not less than 10 feet to public lands and waters, and preservation of historic and archaeological sites.

Procedure: Combined filing of preliminary and final subdivision map with waiver of construction plan requirement (for telephone and electric only).

Other: No fee simple conveyance permitted of any lot within the agricultural park.

- **AGRICULTURAL DISTRICT ZONING**

Permitted Uses/Structures: All agricultural uses and accessory structures.

Use Permits: Other uses as determined by the planning director.

Limitations on Subdivision (by parcel size):

- |                |   |
|----------------|---|
| Up to 10 acres | - 1-acre minimum subdivision size.  |
| 10-20 acres    | - 1 to 2-acre minimum   |
| 20-30 acres    | - 1 to 3-acre minimum   |
| 30-50 acres    | - 5-acre minimum  |
| 50-300 acres   | - 5-acre minimum  |
| Over 300 acres | - (a) maximum of 75 acres subdivided into ten lots (5-acre minimum size); (b) in addition, 20 percent of total parcel (or 300-acre maximum) may be subdivided into lots of 25 acres or more; and (c) balance of parcel to remain undivided. |

Residential Densities:

- One unit per parcel with one additional unit allowed per 3 acres overall.
- Maximum of 5 units per parcel.
- Must meet all County development standards for applicable uses.
- Minimum lot width 150 feet - maximum length 4 times lot width.
- Maximum 50 feet building height.

\*\*\*Restrictions of this subsection shall not apply to subdivisions requested by any other government agency.

The primary differences between the Agricultural Park Subdivision Ordinance and the Agricultural District Zoning Ordinance are that the Agricultural Park Subdivision Ordinance (a) does not allow for any on-site housing; (b) the minimum parcel size is 10 acres; (c) it waives the minimum standards for subdivision improvements and construction plans; and (d) it consolidates filing of preliminary and final subdivision mapping. The potential difficulty in developing the State Agricultural Park under the Subdivision Ordinance lies in the desire for as much flexibility as possible on parcel sizes, and lot totals and accommodating on-site housing (if this becomes part of the program).

**7.4 HOUSING CONSIDERATIONS**

The Kauai County General Plan allows for transfer of densities to permit clustering of residential development within agricultural areas, or other similar methods to optimize land utilization consistent with its goals. Section 205-4.5(a)(4), HRS, now also permits clusters of farm dwellings within Agricultural Parks developed by the State. There is a great deal

of popular support from the farming community on Kauai to include on-site housing for the lessees and worker housing, due to site security concerns and affordable housing issues. The State will need to determine if these two issues are a priority in development of the Agricultural Park, since allocation of land area for clustered housing or infrastructure connections to individual units will have a significant impact on permitting and development costs.

## 7.5 ALTERNATIVE SITES

### 7.5.1 Island of Kauai

#### SITE SELECTION PROCESS

The purpose of the State Agricultural Park program is for preservation of important agricultural lands for productive use, and also to provide public agricultural subdivisions that are secure from urban encroachment with irrigation water and other necessary improvements. This land is to be provided at reasonable rental costs with secure long term leases, where lessees would have the benefits of common facilities and activities to encourage farm production and distribution economics.

To that end, the objective of the Site Selection Analysis Report was to establish which of seven sites (Wailua, Kealia, Moloaa, Hanapepe, Waimea-Kekaha, Hanamaulu, Wailua-Mauka) had the best development potential and agricultural suitability for the proposed agricultural park on Kauai. All of the sites were evaluated relative to these primary factors: (1) general land suitability; (2) developability (for agricultural uses); and (3) development costs (basic infrastructure/other factors) (see Figure 8).

After preliminary site reconnaissance, a cumulative analysis of the site factors for each property and objective rating of this data against specific selection criteria was made, determining which sites were best suited for Agricultural Park development. From this, a final site recommendation was determined based on commodity acreage requirements (per the Agricultural Feasibility Report), overall suitability, and other pertinent factors.

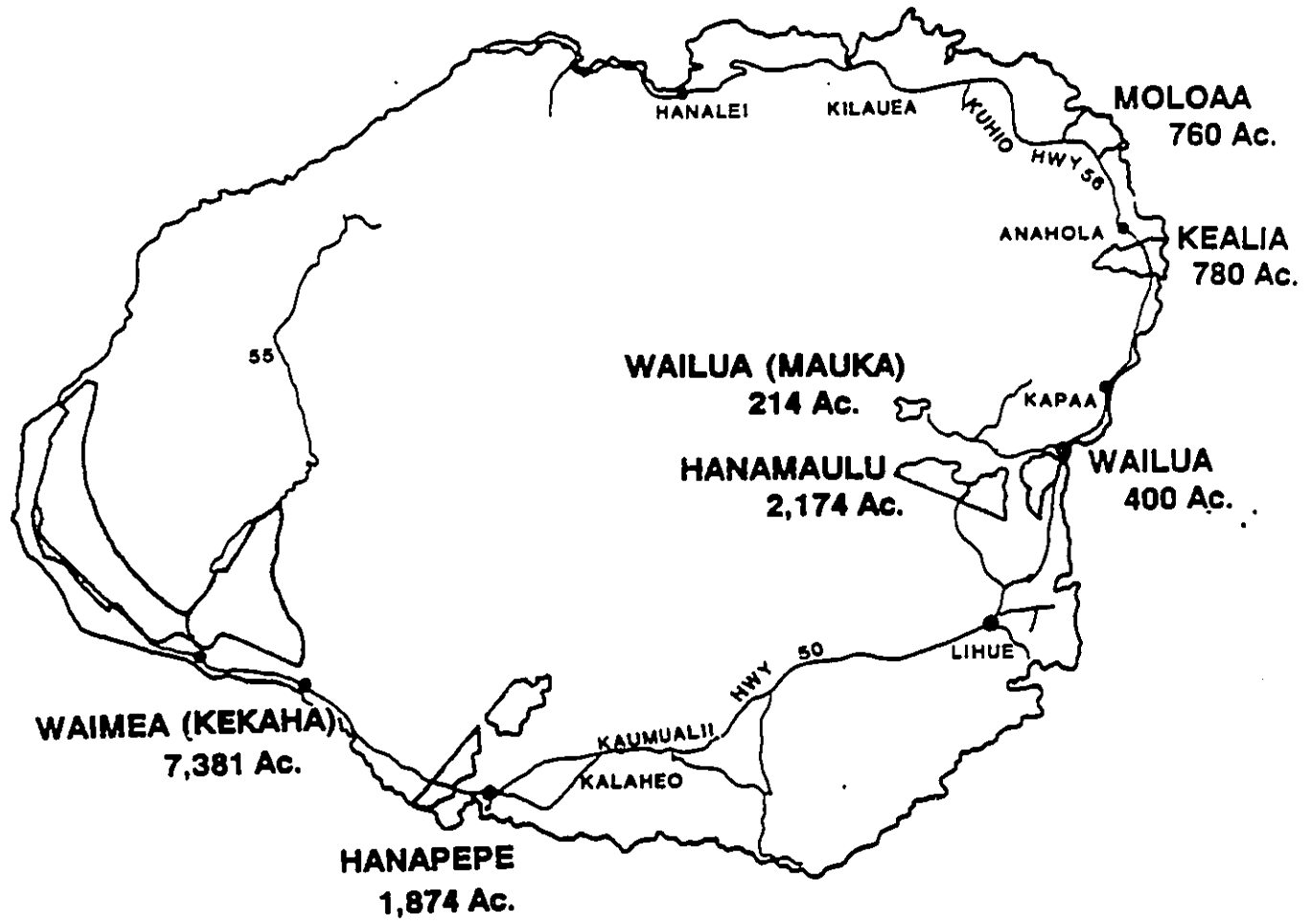
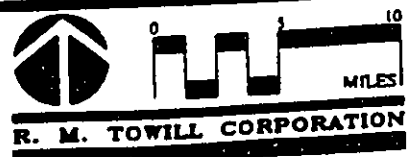


Figure 8 Alternative Sites

SITE SELECTIONS  
 KAUAI AGRICULTURAL PARK  
 Prepared for the State of Hawaii  
 Department of Agriculture



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Most of the Kekaha site has good soils and conditions for the identified crops and about two-thirds of the site (out of 7,381 acres) has very level topography. The mauka portion of the site may even have potential for cool weather crops, which is not feasible on any of the other sites. Because of the large size of the site, the adjoining residential uses can easily be buffered from agricultural functions. There are ample irrigation resources available in the lower areas which could be used for aquaculture, subject to the conditions of the Kekaha Sugar Company's land lease and water license. Because the site covers such a large area, there is the opportunity for selection of multiple smaller sites within the property boundaries, thus utilizing the acreage least impacted by the various site concerns and best suited for specific agricultural uses. Because of its size and diversity in land area conditions, the property has good development potential as the prime Agricultural Park site.

Based on the evaluation of all available information combined with the results of the site selection scores from the criteria ratings system, the Waimea-Kekaha site was determined to be the most suitable for the Agricultural Park and therefore the number one ranked site.

The alternative to recommendation of a single site was the simultaneous or incremental development of multiple (and smaller) sites. This is the alternative development concept for implementation of the Agriculture Park Program on Kauai. Partial use of one of the windward sites in the future (Hanamaulu, Moloaa or Kealia) may accommodate some farmer preferences and the need for additional agricultural lands.

#### 7.5.1.1 Ongoing Process

The objective of the Site Selection Analysis Report was to establish which of seven sites (Wailua, Kealia, Moloaa, Hanapepe, Waimea-Kekaha, Hanamaulu, Wailua-Mauka) had the best development potential and agricultural suitability for the proposed Agricultural Park on Kauai.

All of the sites generally met the primary criteria standards. Each site differed with respect to general planning issues, resources and infrastructure availability, and agricultural

suitability. None of the seven sites received a perfect score (100) per the criteria rating system. The first rated site (Waimea-Kekaha) was fourteen points above the second best site (Hanamaulu), the third (Moloaa), fourth (Kealia), fifth (Wailua), sixth (Wailua-Mauka), and seventh (Hanapepe) site ratings had evenly separated scores. This assumed development of a single Agricultural Park that will meet the immediate objectives of the Agricultural Park Program and accommodate possible future expansion.

Each site was distinguished by a few major issues that seemed to determine its overall suitability for Agricultural Park selection. Wailua is severely impacted by regional planning pressures on the property, making development of the site difficult and comparatively expensive. Kealia has all the physical elements as a prime agricultural site, but resolution of the boundary disputes with the Department of Hawaiian Home Lands (DHHL) may delay its consideration at this time for initial Agricultural Park development. The Moloaa site has good physical development potential for an Agricultural Park; however, the capital expense for land and the time required for negotiations may limit consideration of the property. Hanapepe has so many negative development factors impacting the property that it should be removed from future consideration. Hanamaulu has good selection potential for an Agricultural Park, but prime sugar land would be taken out of production if it was to be developed at this time. Wailua-Mauka has adverse climate and soils for many diversified crops and a State Land Use District boundary amendment (from conservation) would be required prior to development. Waimea (Kekaha), because of its size and diversity in land area conditions, had the best development potential of the seven sites evaluated.

An alternative to recommendation of a single site was the simultaneous or incremental development of multiple (and smaller) sites. There seems to be a preference for the windward lands by potential farmers due to residential proximity and slightly better conditions for selected orchard and floriculture crops. Partial use of one of the windward sites (Hanamaulu, Moloaa or Kealia) would accommodate these preferences. The Waimea (Kekaha) site can be utilized for selected vegetable, flower and aquaculture commodities.



With a multiple-site phased approach to development, many of the issues impacting Hanamaulu, Moloaa or Kealia regarding land acquisition and boundaries could potentially be resolved within the resulting time frame. Development of the first site (Waimea-Kekaha) could proceed concurrently while impacts from development of the secondary sites were evaluated.

#### 7.5.2 Kekaha Micro-Site Selections

Six mini-sites were proposed by Kekaha Sugar Company and evaluated by the Department of Agriculture and the Kauai Agricultural Park Task Force to determine the preferred 100-acre site within the Kekaha property. The determination was made by DOA to proceed with two sites within the Kekaha property. One would be located in the Mauka area and one in the Makai area (see Figure 9).

Of the three mauka sites proposed, site #4B was the least impacted by DHHL and the closest to local services. Priority development of this site would be subject to a prompt resolution of water rights claims by DHHL. If these issues can not be resolved in a timely manner, development of the Makai site as the first Agricultural Park site will be given priority. Of the Makai sites proposed site #3 was the only site not in active sugar production and not subject to flood zone impacts.

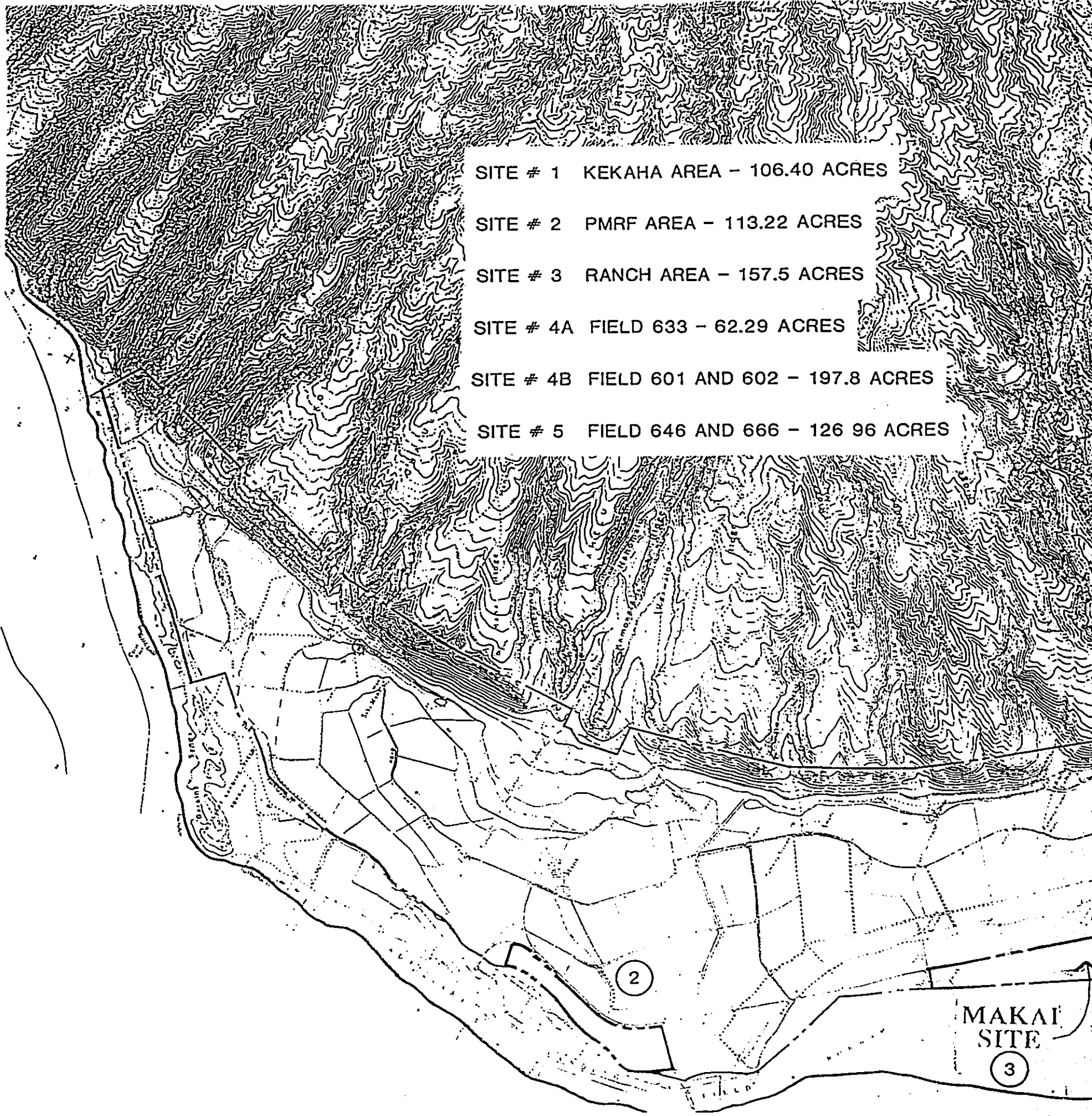
#### SITE # 1 - KEKAHA AREA

##### WATER

Water is available from irrigation ditches or drainage canals. The Agricultural Park would have to develop its own irrigation system.

##### DRAINAGE

Drainage is fairly good in these fields but some of them get flooded during storms, which has happened in three of the last five years.



SITE # 1 KEKAHA AREA - 106.40 ACRES

SITE # 2 PMRF AREA - 113.22 ACRES

SITE # 3 RANCH AREA - 157.5 ACRES

SITE # 4A FIELD 633 - 62.29 ACRES

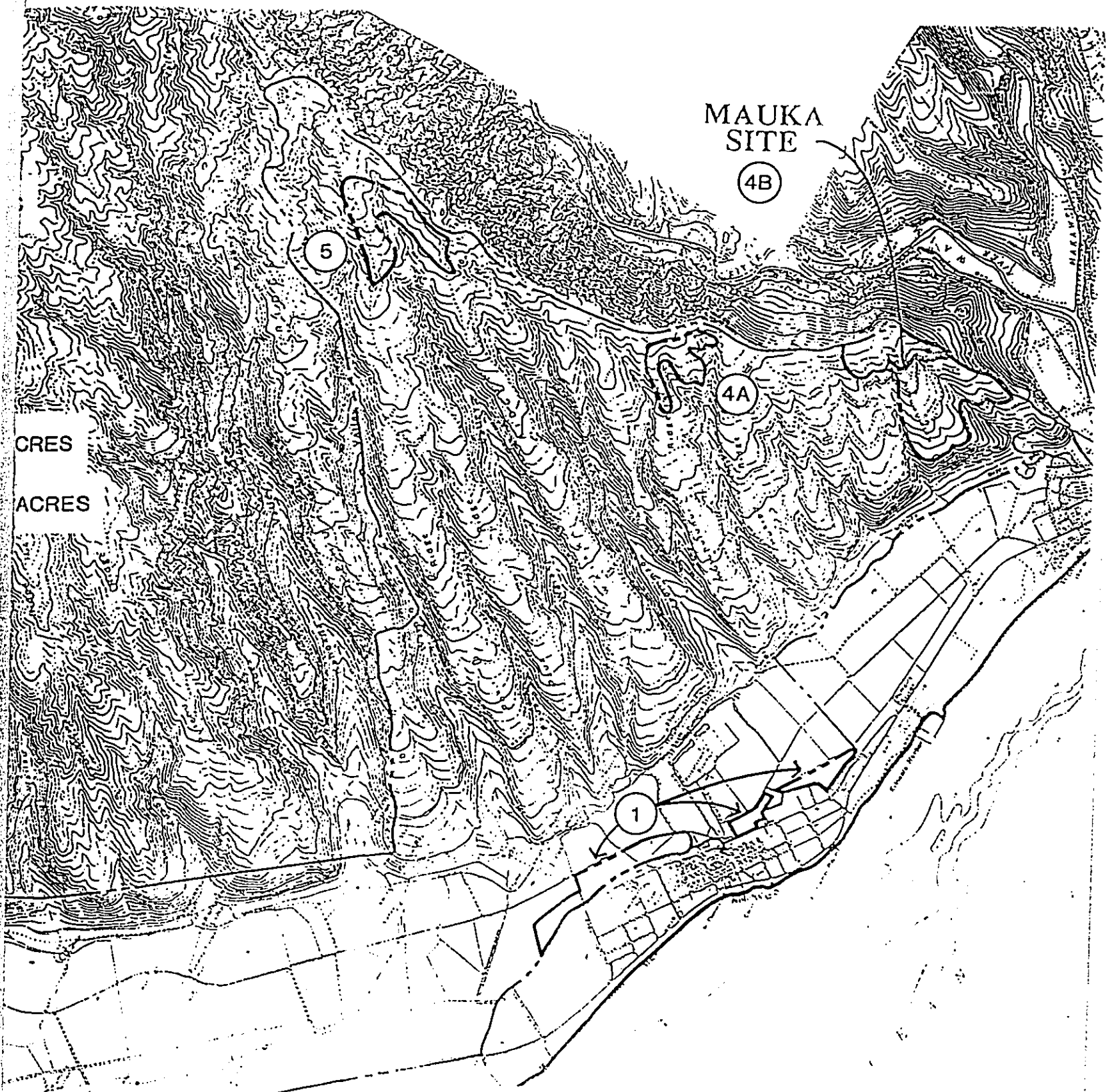
SITE # 4B FIELD 601 AND 602 - 197.8 ACRES

SITE # 5 FIELD 646 AND 666 - 126.96 ACRES

MAKAI  
SITE

2

3



CRES  
ACRES

MAUKA  
SITE

4B

5

4A

1

MAKAI  
SITE

3

**Figure 9**  
**6 Micro-Sites**  
 KAUAI AGRICULTURAL PARK  
 Prepared for the State of Hawaii  
 Department of Agriculture

A north arrow pointing towards the top right of the map. Below it is a graphic scale bar with markings at 0, 1500, and 3000 feet.

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#### ACCESS

The area is closed to the public and plantation roads exist, so access is not a problem.

#### POWER

Powerlines are nearby so electrification would not be too difficult or expensive.

#### RAINFALL

The area receives about 20 inches a year, mostly in the winter.

#### SOIL TYPES

The area soils consist of Kekaha and Nohili series mostly, well drained and poorly drained silty clays and dark gray clay. These soils would yield good farming land, but they are sometimes hard to work when wet.

#### PLANTATION ISSUES

KSCO will have to be careful when applying weed control and ripening agents.

These fields are adjacent to cane haul roads thus creating a safety concern. Maintenance of the drainage canals and ravines related to these fields will have to be worked out.

#### SITE #2: PACIFIC MISSILE RANGE FACILITY AREA

##### WATER

This area has a drip irrigation system. Modifications would need to be made to separate one of the irrigation blocks which will not be part of the park. An arrangement could be made for irrigation services provided by KSCO. Canal water in this area is too salty for irrigation.

#### DRAINAGE

Drainage is very important in this area. Canal levels must be maintained at a low level. Severe flooding occurs in these fields during storms which has happened in three of the last five years.

The area is next to the public highway so access is not a problem.

#### POWER

Powerlines are nearby so electrification would not be too difficult or expensive.

#### RAINFALL

The site receives about 20 inches a year, mostly in the winter.

#### SOIL TYPES

The site consists of Kaloko clay series, most of which are poorly drained with slow permeability.

#### PLANTATION ISSUES

KSCO will have to be careful when applying weed control and ripening agents.

#### SITE #3: RANCH AREA

##### WATER

Water is available from irrigation ditches or drainage canals on the mauka side of the highway. The Agricultural Park would have to develop its own irrigation system since the area is presently flood irrigated.

##### DRAINAGE

Drainage is good in this area because of the sandy soils and the land does not get flooded out in storms.

#### ACCESS

The area is next to the highway, so access is not a problem.

#### POWER

Powerlines are nearby, so electrification would not be too difficult or expensive.

#### RAINFALL

The site receives about 20 inches a year, mostly in the winter.

#### SOIL TYPES

The site contains Jaucas loamy fine sand. This soil type has excellent drainage, but mill pond soil may be needed to improve moisture holding capacity and fertility.

#### PLANTATION ISSUES

Mill water is not supposed to go into the ocean so KSCO over irrigates this sandy land to absorb excess mill water. Without this land it will be more difficult to control and use up 10 mgd of mill water. Ranch operation would be affected by the withdrawal of this land. The stables would have to be moved, fences relocated or the ranch could be closed.

#### SITE #4A: FIELD 633

#### WATER

This area has a drip irrigation system. An arrangement could be made for irrigation services provided by KSCO from the Kokee Ditch or a separate outfield system could be developed.

#### DRAINAGE

Drainage is not a problem in the mauka area but erosion control is a concern.

#### ACCESS

The area is next to the State Highway so it has good access.

#### POWER

The KSCO powerline is located about 6,000 feet away.

#### RAINFALL

The site receives about 30 inches per year.

#### SOIL TYPES

Soils consist of Nui silty clay mostly which is good topsoil, and is well-drained with moderate permeability.

#### PLANTATION ISSUES

This site is up wind of the other fields so weed control, ripener application, cultivation, harvesting and burning operations would impact the site less.

#### OTHER FACTORS

This site is partially within the land area claimed by DHHL. Water sources from the Kokee or Kekaha Ditch would also be subject to DHHL claims.

#### SITE #4B: FIELDS 601 & 602

##### WATER

This area has a drip irrigation system. An arrangement could be made for irrigation services provided by KSCO from the Kokee Ditch or a separate outfield system could be developed. A dual water source exists from the Kekaha ditch (used only in drought conditions).

#### DRAINAGE

Drainage is not a problem in the mauka area but erosion control is a concern.

#### ACCESS

The area is next to the State Highway so it has good access.

#### POWER

The KSCO powerline is over 6,000 feet away (mauka). Kauai Electric lines are about 4,000 feet away (makai) near Waimea Heights Subdivision along the State Highway.

#### RAINFALL

The site receives about 25 inches per year.

#### SOIL TYPES

Soils consist mostly of Makaweli silty clay loams with some Makaweli stony soils. These soils are well-drained with moderate permeability and provide good farmland that is generally easy to work.

#### PLANTATION ISSUES

This site is up wind of the other fields so weed control, ripener application, cultivation, harvesting, and burning operations would impact the site less.

#### OTHER FACTORS

Irrigation water from the Kokee or Kekaha Ditch would be subject to DHHL claims.

#### SITE #5: FIELDS 645 & 666

##### WATER

This site has a drip irrigation system. An arrangement could be made for irrigation services provided by KSCO or a separate outfield system could be developed.



#### **DRAINAGE**

Drainage is not a problem but erosion control is a concern.

#### **ACCESS**

The is accessible as it is located next to the State Highway, but dirt roads will be muddy during rains.

#### **POWER**

The KSCO Powerline is at the filter station for this site.

#### **RAINFALL**

The site receives about 35 inches a year.

#### **SOIL TYPES**

The site consists of good topsoil and is mostly Makaweli silty clay which is well drained with moderate permeability.

#### **PLANTATION ISSUES**

This site is upwind and the furthest mauka of the other fields. Its isolation would cause the least impact on KSCO operations.

#### **OTHER FACTORS**

The entire site is within the land area claimed by DHHL. Irrigation water from the Kokee Ditch would also be subject to DHHL claims.

### **7.6 ALTERNATIVE PLAN CONCEPTS (For Sites #3 and #4B)**

#### **7.6.1 Site No. 3**

##### **7.6.1.1 Alternative No. 1**

This initial concept was based on:

Roads: The gravel road is 18 feet wide with 2-foot shoulders on each side.

Grading: Grading will be limited to minimum roadway construction.

Irrigation System: This is proposed by tapping the existing ditch about 1,000 feet northeast of the site, and pumping into an elevated steel reservoir onsite.

Electrical: The electrical system will be developed by connecting to the existing electrical lines along Kaumualii Highway and overhead system on site. Off-site electrical lines will feed the off-site pump station mauka of the highway.

Topsoil: The estimate is based on a \$4,000 per acre rate.

#### 7.6.1.2 Alternative No. 2

This scheme is based on drilled wells with County standard.

Roads: The gravel road is 18 feet wide with 2-foot shoulders on each side.

Grading: Grading will be limited to minimum roadway construction.

Irrigation System: Wells will be drilled approximately 6,500 feet east of the site in Hoesa Valley. Storage and well capacity are based on a maximum day with an extra standby well, and a ground level reinforced concrete reservoir with gravity flow to the site.

Electrical: The overhead system on site. Off-site line to well sites.

Topsoil: The estimate is based on a \$4,000 per acre rate.

#### 7.6.1.3 Alternative No. 3

This scheme is a revised system based on tapping into the ditch near Limaloa Pump.

**Roads:** There will be a gravel road that is 18 feet wide with 2-foot shoulders on each side.

**Grading:** Grading will be limited to minimum roadway construction.

**Irrigation System:** This will be achieved by tapping an existing ditch near the KSCO Limaloa Pump. There will be a steel ground level reservoir for one-day storage with an inline pressure booster pump.

**Electrical:** The system will be an overhead distribution system on site with off-site lines to off-site pump stations.

**Topsoil:** This estimate is based on a \$4,000 per acre rate.

#### 7.6.1.4 Alternative No. 4

This scheme is a revised Site No. 3 based on providing a large 50-acre lot on the west end of the site.

**Roads:** This gravel road will be 18 feet wide with 2-foot shoulders on each side.

**Grading:** This will be limited to minimum roadway construction.

**Irrigation System:** The system will be achieved by tapping an existing ditch near Limaloa Pump. It will consist of a steel ground level reservoir for average daily demand and an inline pressure booster pump.

Electrical: There will be an overhead distribution system on site with an off-site line to an off-site pump station.

Topsoil: This estimate is based on a \$4,000 per acre rate.

#### 7.6.1.5 Alternative No. 5

This alternative is a revised Site No. 3 based on providing a large 50-acre lot on the west end of the site to be developed by others.

Roads: A gravel road is proposed to be 18 feet wide with 2-foot shoulders on each side.

Grading: This will be limited to minimum roadway construction.

Irrigation System: The system will be built by tapping an existing ditch near Limaloa Pump. There will be a steel ground level reservoir for average daily demand with an inline pressure booster pump.

Electrical: Overhead distribution system on site. Off-site line to off-site pump station.

Topsoil: Estimate based on \$4,000 per acre.

#### 7.6.2 SITE NO. 4B

##### 7.6.2.1 Alternative No. 6

Pumping from Kekaha Ditch to Site No. 4B is assumed for this scheme.

Roads: The gravel road is 18 feet wide with 2-foot shoulders on each side with a maximum road grade limited to 12 percent.

**Grading:** This will be limited to minimum roadway construction.

**Irrigation System:** This will be achieved by tapping the existing Kekaha Ditch and pumping up. Two lifts (service zones) are required. Steel ground level reservoir for one-day storage and pumps are based on a 16-hour operation.

**Electrical:** There will be an overhead distribution system on site and an off-site line is required to bring electricity to the site.

#### 7.6.2.2 Alternative No. 7

This scheme is based on tapping upper Kokee Ditch with an unlined earth reservoir.

**Roads:** This will be a gravel road is 18 feet wide with 2-foot shoulders on each side with a maximum road grade limited to 12 percent.

**Grading:** This will be limited to minimum roadway construction.

**Irrigation System:** This will be achieved by tapping the upper Kokee Ditch and using a 2.0 million gallon earth reservoir for storage and the Parshall Flume for flow measurement. There will be a pressure reducing valve at midpoint to separate system into two service zones. The additional cost for a reservoir liner is provided.

#### 7.6.2.3 Alternative No. 8

This scheme is a revised Site No. 4B using on-site wells and County water standards.

**Roads:** The gravel road is 18 feet wide with 2-foot shoulders on each side with a maximum road grade limited to 12 percent.

**Grading:** This will be limited to minimum roadway construction.

Irrigation System: The well source will be drilled on site at a higher elevation. It includes one extra standby well. Well and storage capacities are based on a maximum day which is 150 percent of the average daily demand. A standard reinforced concrete reservoir will be assumed for maximum day storage. The system is divided into two service zones by pressure reducing valves.

Electrical: There is an overhead distribution system on site. An off-site line is required to bring electricity to the site.

#### 7.6.2.4 Alternative No. 9

This scheme consists of wells drilled at lower elevation and County water standards.

Roads: The gravel road is 18 feet wide with 2-foot shoulders on each side with a maximum road grade limited to 12 percent.

Grading: This will be limited to minimum roadway construction.

Irrigation System: The wells will be drilled off site approximately 500 feet and 2,500 feet west of the site at 300-foot elevation. There will be one extra standby well. A standard reinforced concrete reservoir for maximum-day storage with two lifts to divide the system into two service zones are assumed. An access road is required to the well sites.

Electrical: There will be an overhead distribution system on site with an off-site line required to bring electricity to site and wells.

#### 7.6.2.5 Alternative No. 10

This assumes wells drilled at a lower elevation and not to County water standards.

Roads: A gravel road is assumed to be 18 feet wide with 2-foot shoulders on each side with a maximum road grade limited to 12 percent.

Grading: This will be limited to minimum roadway construction.

Irrigation System: This will be achieved whereby wells will be drilled off site approximately 500 feet and 2,500 feet west of the site at the 300-foot elevation with no standby well. A steel reservoir for average day storage with two lifts to divide the system into two service zones are assumed. An access road is required to the well sites.

Electrical: Overhead distribution system on site. Off-site lines required to bring electricity to site and wells.

#### 7.7 ALTERNATIVE REGIONAL WATER SOURCES

Three separate upper elevation in-stream reservoir projects have been investigated by various government agencies since 1924, in an attempt to develop increased water resources to the Kekaha area. These include: Kokee Irrigation Project, Kokee Water Project and Puu Lua-Kokee Hydropower Project. All of these projects proposed (to a lesser or greater degree) construction of a dam and reservoir on the Kawaikoi stream and associated improvements to the Kokee ditch plus additional penstock hydropower facilities and water storage along its course. None of these projects have received public funding.

An alternative discussed in the Environmental Assessment (EA) for the Puu Lua-Kokee dam project was enlargement of the Kokee Ditch and reservoir capacities, adding additional stream diversions or possible lower elevation dams. Kekaha Sugar Company has informally investigated some of these options but has not pursued any of these to date. Again, no public funding has been made available for this project.

SECTION 8  
UNRESOLVED ISSUES

8.1 WATER RIGHTS

Availability of water resources for irrigation is a crucial factor for the proposed sites. Irrigation water is presently available in some form; however, the source and rights to these waters are either not immediately available to the State or are complicated by the State water licenses already issued with the land leases.

Kekaha Sugar Company has a land and water lease (#S-4222) on the Kokee and Kekaha Ditches for "storage, taking and use of all State waters" in these areas, including "groundwater, wells, shafts, etc., within and out of the watershed or its connections" (Kokee ditch intake - fifty-five (55) mgd, Kekaha ditch intake - fifty (50) mgd). Waimea ditch waters are covered under a separate license #S-4256 (ditch intake - 2.93 mgd). Kekaha Sugar must provide water "in excess of the company's needs," to other users at a reasonable cost.

These agreements will require detailed legal interpretation by the State in order to determine the exact terms of water volume or supply diversions, or modification of these terms, as they relate to proposed agricultural park water requirements. In the agreements between the State and the present lessees there is language to the effect that the State has the right to change the terms of the lease, including the "amount of water deemed necessary" for the lessee or other users. The State will retain all rights to any improvements made to water transmission areas by the lessee upon termination of the leases.

8.2 DEPARTMENT OF HAWAIIAN HOME LANDS

The Waimea-Kekaha property adjoins Hawaiian Home Lands at the upper mauka portion and involves boundary and water rights or land claims to portions of the property. In the case of the two sites there is land separation between DHHL lands and the areas in question, so the prime issue will be resolution of water rights disputes.



In the Hawaiian Homes Commission Act (Section 221) all the licenses are subject upon demand, "to grant, free of charge, any water the department (DHHL) deems necessary to supply" the needs of DHHL lands.

At present, this claim has not been exercised due to existing water license terms with Kekaha Sugar Company. Upon expiration of the license/leases, DHHL may claim all or whatever portion of the water supply they determine is necessary to meet their water demands. This may not exclude future provision of water to an agricultural park, but it will involve negotiations between DHHL and the State for an apportionment of the total water supply from these sources. This will have a direct impact on the sources to the mauka site.

With regard to the makai site irrigation water is presently available from ditches or drainage canals north of the site. The proposed State Agricultural Park would have to develop its own irrigation system since the area is presently flood irrigated with mill water from KSCO. The existing ditch near Limaloa Pump will be tapped as the source for the necessary irrigation water. Because this is excess water, use of it for the agricultural park at a demand rate of 5,000 gallons per acre daily (gpad), or a total of approximately 750,000 gpd, will not adversely affect the current supply.

**SECTION 9**  
**DETERMINATION**

In accordance with the provisions set forth in Chapter 343, Hawaii Revised Statutes, and the significance criteria in Section 11-200-12, Hawaii Administrative Rules, this assessment has determined that the project will have no significant adverse impact to water quality, air quality, existing utilities, noise, archaeological sites, or wildlife habitat, and that an Environmental Impact Statement is not required. However, there will be minor impacts to traffic conditions in the short term while access is being constructed, and phone line hookups and irrigation system being installed. Mitigative measures will be implemented to minimize traffic circulation impacts, congestion, and dust. All other anticipated impacts will be temporary and the environmental quality of the area will return to preconstruction conditions. Therefore, the proposing agency recommends a negative declaration for this project.

**SECTION 10**  
**PRE-ASSESSMENT CONSULTED PARTIES**

**10.1 FEDERAL**

**\*U. S. Soil Conservation Service (Honolulu and Kauai offices)**

April-May, 1993: R. M. Towill Corporation (RMTC) Planners held several phone conversations with the Honolulu and Kauai offices of the Soil Conservation Service. The purpose was to verify the erosion hazard rating of the mauka site in this EA. The response from the U.S. Soil Conservation Service was that the erosion hazard is "moderate to severe" (HEL or highly erodible lands category). The information can be found in Section 4.2 of the EA.

**10.2 STATE**

**\*Department of Business, Economic Development and Tourism**

April-May, 1993: 1990 U.S. Census Bureau population data was sought for the Socio-Economic Conditions discussion of the EA. RMTC Planners also attempted to acquire DBEDT analysis of the economic impacts of Hurricane Iniki. We were informed that none (impacts of Iniki) was available, and that the County of Kauai Office of Economic Development should be the source of that information. Subsequently, we discussed our informational needs with the County of Kauai, and information can be found in Section 5.2.

**\*Department of Health**

March-April, 1993: Clean Water Branch was called to discuss NPDES permit requirements with regard to stormwater runoff potential during grading and construction. The Clean Water Branch responded with the latest rules: an NPDES NOI would be required if grading of the site exceeds 5 acres.

**\*Department of Transportation-Highways Division**

March-April, 1993: RMTC Planners needed to verify whether a traffic impact analysis report was needed for the proposed project. Highways Division staff response was that none was needed due to the low volume of traffic on Kaunualii Highway fronting the project site.

**\*University of Hawaii Manoa**

April 1993: Inquiry was made with UH Manoa's Agricultural and Plant Industries Program regarding the monitoring of nematodes in the floriculture and nursery commodities that may impact feasibility of certain crops. Professor Don Schmitt indicated that the UH Plant Industries Program will be able to provide nematode monitoring as a public service to the project once developed (see telecon documentation in Section 5.2.1).

**\*Department of Agriculture**

Staff provided information, advice, referrals and review comments on draft reports throughout the EA preparation process.

**\*Department of Land and Natural Resources**

DLNR Kauai Land Agent provided information and insight into the land and water rights issues regarding the proposed project sites.

**\*Department of Hawaiian Home Lands**

DHHL Planning Office staff provided RMTC several documents and recently completed studies of lands adjacent to the project site. Data and pertinent information relative to the proposed project site were utilized in the development of the Draft EA.

**\*Office of Environmental Quality Control**

Consultation was conducted with the OEQC to confirm fulfillment of the pre-consultation phase by documentation of communications with various agencies and parties in this section of the Draft EA.

**10.3 COUNTY**

**\*Planning Department**

RMTC Planners verified the location of the Special Management Area (SMA) line relative to the proposed project site. The project site is located outside of the SMA, therefore it was concluded with the County Planning Department that an SMA permit was not needed.

**\*Office of Economic Development**

As stated earlier, the County OED provided RMTC with information on the impacts of Hurricane Iniki and the discussion can be found in Section 5.2. The OED also furnished RMTC with information and results of the survey conducted of potential users and tenants of the proposed agricultural park. The discussion can be found in this Draft EA.

**\*Department of Public Works**

DPW provided RMTC with information regarding infrastructure systems relative to the proposed project site.

**\*Water Department**

The County Water Department provided RMTC with information regarding existing water systems in the project vicinity.

10.4 **OTHER**

**\*Kekaha Sugar Company**

Kekaha Sugar Company provided RMTC with water systems information and data regarding herbicide use on the crops. The documentation can be found in Section 4.4.1.

**\*Kauai County Farm Bureau**

Participants in the County OED User Survey, the results of which are documented in this Draft EA.

**\*Cooperative Extension Service (Kauai) College of Tropical Agriculture and Human Resources**

Participant in the Kauai Agricultural Park Task Force.

**SECTION 11**

**DRAFT ENVIRONMENTAL ASSESSMENT COMMENTS**

The Draft Environmental Assessment comment period was September 8 to October 8, 1993.

Parties consulted during this comments period included:

<u>Agency/Organization</u>	<u>Responded</u>
U.S. Department of the Interior National Park Service	
U.S. Department of Commerce National Marine Fisheries Service	
U.S. Department of Transportation Federal Aviation Administration	
U.S. Department of Agriculture Soil Conservation Service	✓
U.S. Army Corps of Engineers	✓
U.S. Department of the Interior Fish and Wildlife Service	
American Lung Association	
Kauai Agricultural Advisory Committee	
County of Kauai Planning Department	
County of Kauai Dept. of Public Works	✓
County of Kauai Dept. of Water Supply	
County of Kauai Office of Economic Development	
AMFAC/JMB Kauai Asset Management	✓
West Kauai Main Street	
Kauai County Farm Bureau	

Hawaii Agricultural Experiment Station	
Kauai Electric Company	✓
State Department of Accounting & General Services	✓
State Department of Business, Economic Development and Tourism	✓
State Energy Office	✓
State Department of Defense	
State Department of Education	
State Department of Hawaiian Home Lands	✓
State Department of Land & Natural Resources	✓
State Historic Preservation Division	✓
State Department of Health	✓
State Department of Transportation	✓
Office of State Planning	✓
Office of Hawaiian Affairs	✓
University of Hawaii Water Resources Research Center	
University of Hawaii Environmental Center	✓

CITIZENS UTILITIES  
KAUAI ELECTRIC DIVISION

P.O. BOX 300 • LĪHŪE, KAUAI, HAWAII 96766-0300

September 28, 1993

In reply refer to:  
File #N-5

R. M. Towill Corporation  
420 Waiakamilo Road, Suite 411  
Honolulu, HI 96817-4941

Attention: Ms. Colette Sakoda

SUBJECT: KAUAI AGRICULTURAL PARK DRAFT ENVIRONMENTAL ASSESSMENT

Dear Ms. Sakoda:

Thank you for allowing us the opportunity to review and comment on the draft Environmental Assessment for the Kauai Agricultural Park project.

Site #3 has existing Kauai Electric three-phase power lines along the Kaunualii Highway, which would require a line extension into the project depending on the power requirements for the agriculture lots. Site #4B will require a substantial three-phase line extension from the entrance of Waimea Heights Subdivision to the project site. Line extensions into the project will depend on the power requirements for the lots. Although Kekaha Sugar Company's power line is also available, Kauai Electric would not permit attachment since it is their private system.

We will be able to provide "Budget Purposes Only" costs upon receipt of the electrical requirements for the Agricultural Park.

If we can be of further assistance, please do not hesitate to call me at 246-4372.

Very truly yours,

*Glen H. Takemochi*

GLEN H. TAKEMOCHI  
Supervisor, Engineering

GHT:fen

cc: Paul J. Schwind

ELECTRIC, TELEPHONE, WATER AND GAS SERVICE TO CUSTOMERS PROVIDED BY COMPANIES OF HAWAII STATE'S AGREES TO HAWAII

R. M. TOWILL CORPORATION

420 Waiakamilo Rd #411 Honolulu HI 96817-4941 MOBILE 808-1133 FAX 808-848-1937

November 1, 1993

Mr. Glen H. Takemochi  
Supervisor, Engineering  
Citizens Utilities  
Kauai Electric Division  
P. O. Box 300  
Līhūe, HI 96766-0300

Dear Mr. Takemochi:

DRAFT ENVIRONMENTAL ASSESSMENT  
KAUAI AGRICULTURAL PARK

We have received your letter of September 28, 1993 regarding the subject project. Your comments have been noted and incorporated into the Final Environmental Assessment.

Thank you for participating in the planning process of this important project.

Sincerely,

*Colette Sakoda*

Colette Sakoda  
Project Planner

cc: Dept. of Agriculture  
Dr. Paul Schwind

Engineers • Planners • Photogrammetrists • Surveyors  
Construction Managers • Hazardous Waste Management

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JOHN WAMBE  
DIRECTOR



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

October 5, 1993

Ms. Colette Sakoda  
R. M. Towill Corporation  
420 Waikamilo Road, Suite 411  
Honolulu, Hawaii 96817-4941

Dear Ms. Sakoda:

Subject: Draft Environmental Assessment  
Kauai Agricultural Park  
TMK: 1-2-02: Por. 01

We have the following comments on the draft environmental assessment for the proposed Kauai Agricultural Park:

1. Access intersections to the proposed agricultural park sites should provide adequate sight distances for all traffic movements and conform to applicable State highway design standards.
2. Required intersection improvements must be provided at no cost to the State Department of Transportation.
3. Surface water runoff from the agricultural park sites should not discharge onto the State highway.
4. Plans for construction work within the State highway right-of-way must be submitted for our review and approval.

We appreciate the opportunity to provide comments.

Sincerely,  
  
Rex D. Johnson  
Director of Transportation

c: Mr. Paul J. Schwind - State Dept. of Agriculture

REX D. JOHNSON  
DIRECTOR  
DEPARTMENT OF  
TRANSPORTATION  
888 PUNCHBOWL STREET  
HONOLULU, HAWAII 96813-5097

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R. M. TOWILL CORPORATION  
420 WAIKAMILLO RD #411 HONOLULU, HI 96817-4941 HONOLULU 848-1133 FAX 808-848-1937

November 1, 1993

Mr. Rex D. Johnson  
Director  
State Department of Transportation  
889 Punchbowl Street  
Honolulu, HI 96813-5097

Dear Mr. Johnson:

DRAFT ENVIRONMENTAL ASSESSMENT  
KAUAI AGRICULTURAL PARK

We have received your letter of October 5, 1993 regarding the subject project. Your comments have been noted and are reflected in the Final Environmental Assessment.

Thank you for your participation in the planning process of this important project.

Sincerely,

Colette Sakoda  
Project Planner

cc: Dept. of Agriculture  
Dr. Paul Schwind

Engineers • Planners • Photogrammetrists • Surveyors  
Construction Managers • Hazardous Waste Management

JOANN A. YUKIMURA  
MAYOR



COUNTY ENGINEER  
TELEPHONE 241-6600  
EDWARD P.R. REVAUD  
DEPT. COUNTY ENGINEER  
TELEPHONE 241-6600

AN EQUAL OPPORTUNITY EMPLOYER  
COUNTY OF KAUAI  
DEPARTMENT OF PUBLIC WORKS  
3071 LINA STREET  
LEAUE, KAUAI, HAWAII 96796

September 15, 1993

R.M. Tovill Corporation  
420 Waiakamilo Rd., Suite 411  
Honolulu, Hawaii 96817

ATTENTION: MS. COLLETTE SAKODA  
Gentlemen:

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR  
KAUAI AGRICULTURAL PARK  
TMK: 1-2-02:POR 01

We have completed our review of the subject draft environmental assessment and offer the following comments:

1. Page 3-14 states "Grading in excess of 5 acres will require a permit". Our grading ordinance exempts grading work in self contained Government controlled area. However, our NPDES permit from the State DOH may be required for grading work in excess of 5 acres. Although no grading permit is required, the State should measure to minimize dust and erosion problems during and after construction.
2. Our page 3-15 a statement is made that "No drainage improvements are proposed in this initial development". Based on figure 4 of the report, the gravels driveways will traverse across several natural valleys. Drainage improvements may be required to pass storm flowage across the roadway and provide access during the times that storm waters run down the valley. The roadway also serve as a collecting drainage channel and drainage measures may be required to stabilize the roadway and minimize erosion and flooding caused by concentration of storm flows.

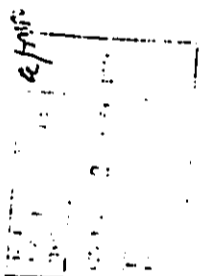
R.M. Tovill Corporation  
September 15, 1993  
Page (2)

Should you have any questions, please feel free to contact Mr. Wallace Kudo of my staff at 241-6616.

Very truly yours,

ED REVAUD  
Deputy County Engineer

HW/KK/cu



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**R. M. TOWILL CORPORATION**  
480 Waiakama Rd #411 Honolulu, HI 96817-4041 (808) 848-1133 Fax (808) 848-1837

November 1, 1993

Mr. Ed Renaud  
Deputy County Engineer  
Department of Public Works  
County of Kauai  
3024 Uni Street  
Lihue, HI 96768

Dear Mr. Renaud:

**DRAFT ENVIRONMENTAL ASSESSMENT  
KAUAI AGRICULTURAL PARK**

We have received your letter of September 15, 1993 regarding the subject project. Your comments have been noted, and appropriate changes have been incorporated into the Final Environmental Assessment.

Thank you for your participation in the planning process of this project.

Sincerely,

*Colette Sakoda*  
Colette Sakoda  
Project Planner

cc: Dept. of Agriculture  
Dr. Paul Schwind

3-20

STV

Engineers • Planners • Photogrammetrists • Surveyors  
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JOHN W. MAHON  
GOVERNOR OF HAWAII



STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES  
STATE HISTORIC PRESERVATION DIVISION  
33 SOUTH KING STREET, 6TH FLOOR  
HONOLULU, HAWAII 96813

September 14, 1993

Ms. Colette Sakoda  
R.M. Towill Corp.  
420 Waiakamilo Road, Ste. 411  
Honolulu, Hawaii 96817-4941

Dear Ms. Sakoda:

**SUBJECT:** Historic Preservation Review - Kasal Agricultural Park  
Draft Environmental Assessment (EA)  
TRMK: 1-2-2: 01 per.  
Kekaha, Waimea, Kauai

Thank you for submitting the above draft EA for our review. As you are aware, we will also be reviewing this Agricultural Park, under the National Historic Preservation Act, since federal funds will be used. Here, we are commenting on the archaeological assessment report.

No known historic sites are in the proposed project area. However, no archaeological surveys has taken place in the area, and significant historic sites could be present, as indicated in the archaeological assessment. In order for the Department of Agriculture to be in compliance with Chapter 6E, H.R.S., and the National Historic Preservation Act, before mitigation measures can be proposed and before any land disturbing activities can occur, an archaeological inventory survey of both project areas (seaward and inland) needs to be completed to determine if significant historic sites are present. The EA needs to state this clearly and correctly. If significant historic sites are present, then an acceptable mitigation plan must be reviewed and approved by the State Historic Preservation Division under Chapter 6E, H.R.S. Under the National Historic Preservation Act, the process is somewhat more complex, depending on the results of the survey.

If you have any questions, please contact Ms. McMahon, our staff archaeologist for the County of Kauai at 587-1006.

Sincerely,

DON HIBBARD, Administrator  
State Historic Preservation Division

NIM:amk

*M/NO*  
*CMS*  
DEPT. LAND, CONSERVATION  
BOARD OF LAND AND NATURAL RESOURCES  
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DONALD L. HANSEN  
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HISTORIC PRESERVATION  
LAND MANAGEMENT  
STATE PARKS  
100 W. KING ST., 9TH FLOOR  
HONOLULU, HI 96813  
DOC NO. 9309NM16

R. M. TOWILL CORPORATION

420 WAIKAMILLO ROAD, 411 HONOLULU, HI 96817-4941 808-948-1123 FAX 808-948-1077

October 30, 1993

Mr. Don Hibbard,  
Administrator  
State Historic Preservation Division  
State Dept. of Land and Natural Resources  
33 So. King Street, 6th Floor  
Honolulu, HI 96813

Dear Mr. Hibbard:

DRAFT ENVIRONMENTAL ASSESSMENT  
KAUAI AGRICULTURAL PARK

We have received your letter of September 14, 1993 regarding the subject project. Your comments have been noted and an inventory survey of the makai site (recommended for development) will be conducted by Cultural Surveys Hawaii prior to construction.

Your participation in the planning process of this project is appreciated.

Sincerely,

Colette Sakoda  
Project Planner

cc: Dept. of Agriculture  
Dr. Paul Schwind

*OKI JTC*

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United States  
Department of  
Agriculture

Soil  
Conservation  
Service

P. O. Box 50004  
Honolulu, HI  
96850-0001

BT  
CNS

September 21, 1993

Ms. Colette Sakoda  
R.M. Towill Corporation  
420 Waiakamilo Road, Ste. 411  
Honolulu, Hawaii 96817-4941

Dear Ms. Sakoda:

Subject: Kauai Agricultural Park  
Draft Environmental Assessment  
Tax Map Key No: 1-2-02-01 (part)

We have completed review of the Draft Environmental Assessment and have these comments to offer:

The mauka site (4B) contains lands currently cropped in sugarcane and classified as Highly Eroible Lands. This site will require a extensive resource management system if the land is cropped as anticipated. In addition, the site would require supplemental irrigation with the proposed development scenario. This site, however, would be suitable for orchard type crops with a less extensive conservation program.

The makai site (3) despite its high water table (3 to 5 feet below ground surface) is highly suitable for intensive cropping. The existing seed corn operation and sugarcane cultivation is successful, in part, because of the drainage system currently employed by Kekaha Sugar Company. Shallow rooted crops can be successfully grown in this land site. This site is not susceptible to soil erosion.

We appreciate the opportunity to provide comment on this noteworthy agricultural project. Should you have any questions, please to contact Michael C. Tutang at 541-2606.

Sincerely,



NATHANIEL R. CONNER  
State Conservationist

cc: Laurie Ho, District Conservationist, Lihue Field Office.  
Paul J. Schwind, Ping Program Admin., Hawaii Dept. of Agriculture.

27/100

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R. M. TOWILL CORPORATION

420 WAIKAMILLO ROAD #411 HONOLULU, HI 96817-4941 PHONE 848-1133 FAX 808-848-1037

October 30, 1993

Mr. Nathaniel R. Conner  
State Conservationist  
U. S. Department of Agriculture  
Soil Conservation Service  
P. O. Box 50004  
Honolulu, Hawaii 96850-0001

Dear Mr. Conner:

DRAFT ENVIRONMENTAL ASSESSMENT  
KAUAI AGRICULTURAL PARK

We have received your letter of September 21, 1993 regarding the subject project. Your comments have been noted and are incorporated, as appropriate, in the text of the Final Environmental Assessment.

Thank you for your participation in the planning process of this important project.

Sincerely,



Colette Sakoda  
Project Planner

6ki  
-JTL

cc: Dept. of Agriculture  
Dr. Paul Schwind

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EXISTING WITHIN



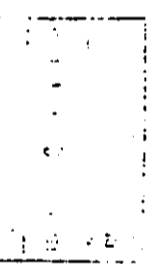
**DEPARTMENT OF BUSINESS,  
ECONOMIC DEVELOPMENT & TOURISM**

State Office: Room 110, 1100 Punch Street, Honolulu, Hawaii 96813  
County Office: P.O. Box 1759, Honolulu, Hawaii 96813 Telephone: (808) 548-2500 Fax: (808) 548-3277

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Deputy Secretary

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GOVERNOR

**STATE OF HAWAII**  
**DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM**  
**LAND USE COMMISSION**  
Room 104, Old Federal Building  
333 Merchant Street  
Honolulu, Hawaii 96813  
Telephone: 587-3023



September 14, 1993

Ms. Colette Sakoda  
R. M. Towill Corporation  
420 Waialae Road, Suite 411  
Honolulu, Hawaii 96817-4941

Dear Ms. Sakoda:

The Department of Business, Economic Development & Tourism is pleased to submit the enclosed comments on the Draft Environmental Assessment for the Kauai Agricultural Park.

The comments were provided by the Land Use Commission. Questions regarding these comments may be directed to Esther Ueda, LUC Executive Officer at 587-3826.

Thank you for the opportunity to comment.  
Sincerely,

*Mufi Hahnemann*  
Mufi Hahnemann

Enclosure

September 14, 1993

**SUBJECT: Director's Referral 93-261-F  
Draft Environmental Assessment (EA) for the Kauai  
Agricultural Park, Waimea, Kauai**

We have reviewed the subject draft EA and have the following comments to offer:

- 1) We confirm that the project sites as shown on figure 2 of the draft EA are located within the State Land Use Agricultural District.
- 2) The State Land Use Designations as provided in figure 7 of the draft EA are inconsistent with the official State Land Use District Boundary map. We suggest that a more accurate representation of the State Land Use District Boundaries be provided in the final EA.
- 3) On July 1, 1993, the State Land Use Commission approved a special use permit (Docket No. SP93-384/County of Kauai, Department of Public Works), for the Phase II expansion of the existing Kekaha Sanitary Landfill on approximately 63.18 acres of land adjacent to the southeastern side of the proposed Makai site.

We have no other comments to offer at this time.

EU:NM:th

R. M. TOWILL CORPORATION

480 Waikamilo Rd #411 Honolulu, HI 96817-4941 (808) 948-1133 FAX (808) 948-1837

October 30, 1993

Mr. Mufi Hannemann,  
Director  
State Department of Business, Economic  
Development and Tourism  
P. O. Box 2359  
Honolulu, HI 96804

Dear Mr. Hannemann:

DRAFT ENVIRONMENTAL ASSESSMENT  
KAUAI AGRICULTURAL PARK

We have received your letter of September 14, 1993 in which comments regarding the subject project were provided by the Land Use Commission. The LUC's comments have been incorporated into the Final Environmental Assessment.

Thank you for your participation in the planning process of this important project.

Sincerely,



Colette Sakoda  
Project Planner

TSV



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES

REC'D	OCT 2 1993	AMTC
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REC'D OCT 2 1993 AMTC

MAIL ROOM  
KITSUNA, HAWAII 96714

MAIL ROOM  
KITSUNA, HAWAII 96714

File No.: 94-137a  
Doc. No.: 3630

Ms. Colette Sakoda  
R.M. Towill Corporation  
420 Waiakamilo Road, Suite 411  
Honolulu, Hawaii 96817-4941

Dear Ms. Sakoda:

Subject: Draft Environmental Assessment (DEA): Kauai Agricultural Park,  
Maunaea District, Kauai, TWK: 1-2-02: par. 1

Thank you for the additional time to review this matter. The following  
are our comments on the subject DEA first transmitted by your letter dated  
August 26, 1993:

Division of Aquatic Resources

The Division of Aquatic Resources (DAR) comments that since the proposed  
project is adjacent to nearshore waters, construction and dredging  
activities could have impacts on aquatic resources such as increased  
turbidity and biota displacement and disturbance. The Final EA should  
describe mitigation measures to prevent the adverse impacts of both  
short-term (e.g. construction and dredging) and long-term (e.g. runoff,  
flooding, introduction of alien species, etc.). Any aquaculture operation  
near the shoreline with water exchange or discharge raises concerns of  
organisms escaping or releasing diseases and parasites into the wild.

DAR suggests the following measures be taken to minimize erosion and  
siltation during construction:

- 1) Site work should be scheduled for periods of minimal rainfall;
- 2) Lands denuded of vegetation should be replanted or covered as quickly  
as possible to control erosion;
- 3) Construction materials, petroleum products, and debris should be  
prevented from falling, blowing, or leaching into the aquatic  
environment.

Ms. Colette Sakoda

-2-

File No.: 92-137a

Commission on Water Resource Management

The Commission on Water Resource Management's (CWRM) staff comments that  
the DEA does not identify specific sources of water to be used for the  
proposed agricultural park.

The EA or subsequent EIS should not be considered adequate until the  
sources and quantities of water from each source for this project are  
either proposed and/or disclosed to the public through the EA/EIS  
process. Permit requirements for each proposed water source should also  
be disclosed in the Final EA.

Division of Land Management

The Division of Land Management (DLM) comments that the park sites are  
currently leased to Kekaha Sugar Co. Withdrawal from the lease will be  
necessary, as will subdivision approval from Kauai County. DLM also  
comments that water availability is also an issue for the proposed park  
which needs to be resolved.

Office of Conservation and Environmental Affairs

The Office of Conservation and Environmental Affairs (OCEA) comments that  
the Hauka Site abuts the Resource "R" subzone of the Conservation District  
at its northeastern boundary. The Hauka Site abuts the Limited "L"  
subzone of the Conservation District at its southwestern boundary. OCEA  
suggests that the Land Use Commission be consulted on the precise location  
of the Conservation District boundaries in these areas.

We will forward our Historic Preservation Division comments as they become  
available.

We have no other comments to offer at this time. Thank you for the  
opportunity to comment on this matter.

Please feel free to call Steve Tagawa at our Office of Conservation and  
Environmental Affairs, at 597-0377, should you have any questions.

Very truly yours,

*Keith W. Anue*  
KEITH W. ANUE

cc: Raul Schwind, DOA



R. M. TOWILL CORPORATION

180 WAIKAMUI RD #411 HONOLULU, HI 00017-4941 (808) 848-1133 FAX (808) 848-1877

October 30, 1993

Mr. Keith W. Ahue  
Chairperson  
State Department of Land and Natural Resources  
P. O. Box 621  
Honolulu, Hawaii 96809

Dear Mr. Ahue:

DRAFT ENVIRONMENTAL ASSESSMENT  
KAUAI AGRICULTURAL PARK

We have received your letter of October 26, 1993 regarding the subject project. Your comments and concerns have been appropriately addressed in the Final Environmental Assessment

Thank you for your participation in the planning process of this important project.

Sincerely,

*Colette Sakoda* 8-1  
370  
Colette Sakoda  
Project Planner

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**OFFICE OF STATE PLANNING**

Office of the Governor  
MAILING ADDRESS: P.O. BOX 3448, HONOLULU, HAWAII 96831-3448  
STREET ADDRESS: 300 SOUTH HOTEL STREET, 6TH FLOOR  
TELEPHONE: (808) 541-3000, (808) 541-3000

Ms. Colette Sakoda  
Page 2  
September 13, 1993

Ref. No. C-234

September 13, 1993

Ms. Colette Sakoda  
R. M. Towill Corporation  
420 Waiakamilo Road, Suite 411  
Honolulu, Hawaii 96817-4941

Dear Ms. Sakoda:

Subject: Review of Draft Environmental Assessment  
for Kauai Agricultural Park

We have reviewed the referenced document and have the following comments:

The "Land Use Plans, Policies, Programs" section in the Final Environmental Assessment should discuss the proposed project relative to Hawaii's Coastal Zone Management objectives and policies. Chapter 205A, the State's CZM law, was also amended (by Act 258) to add two additional sets of objectives and policies. There are now nine objectives and their supporting policies that should be addressed by the project: recreational resources, historic resources, scenic and open space resources, coastal ecosystems, economic uses, coastal hazards, managing development, public participation, and beach protection. Please refer to the actual legislation in preparing your final environmental assessment.


The primary coastal management concerns for this project relate to the impact on coastal ecosystems and coastal hazards (erosion and point and non-point source pollution in particular). Of particular concern is erosion on highly erodible land with 12 percent slope or greater. Final development plans should indicate what mitigation measures will be implemented to minimize run-off and

sediment during and after development of these subdivision lots so that disruption or degradation of coastal water systems will be minimized.

As you note in Section 8, "Unresolved Issues," the availability of water resources is a crucial factor for the proposed sites, and the source and rights to these waters are either not immediately available to the State, or are complicated by the State water licenses already issued with land leases. The eventual water development plan should also demonstrate a minimum disruption or degradation of coastal water ecosystems in accordance with the CZM policies.

We appreciate very much the opportunity to review the proposal. If you have any questions, please contact Terry Hildebrand at 587-2881.

Sincerely,

  
Harold S. Masumoto  
Director

ATTN: SAC  
C-234

SEARCHED	INDEXED
SERIALIZED	FILED
SEP 13 1993	
FBI - HONOLULU	

R. M. TOWILL CORPORATION

180 WAIKAMUI RD #411 HONOLULU, HI 96817-1941 808 848-1133 808 808-848-1037

October 30, 1993

Mr. Harold S. Masumoto  
Director  
Office of State Planning  
P. O. Box 3540  
Honolulu, HI 96811-3540

Dear Mr. Masumoto:

DRAFT ENVIRONMENTAL ASSESSMENT  
KAUAI AGRICULTURAL PARK

We have received your letter of September 13, 1993 regarding the subject project. Your comments and concerns have been appropriately addressed in the Final Environmental Assessment.

Thank you for your participation in the planning process of this important project.

Sincerely,



Colette Sakoda  
Project Planner

✓ JTV

cc: Dept. of Agriculture  
Dr. Paul Schwind

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# University of Hawaii at Manoa

Environmental Center  
A Unit of Water Resources Research Center  
Crawford 317 • 2550 Campus Road • Honolulu, Hawaii 96822  
Telephone: (808) 956-7381

October 8, 1993  
EA-00034

Dr. Paul J. Schwind  
Planning Program Administrator  
Department of Agriculture  
P.O. Box 22159  
Honolulu, HI 96823-2159

Dear Dr. Schwind:

Environmental Assessment  
Kauai Agricultural Park  
Waimea, Kauai

The proposed Agricultural Park consists of two separate sites within the Kekaha property in the Waimea District in southwest Kauai. Based on surveyed farmer preferences, the average lot size within the Agricultural Park will be between five and ten acres. There will be no on-site housing within the Agricultural Park. The necessary infrastructure, such as a paved access road to the lots, irrigation water system, electricity and telephone service, will be developed by the State. Individual farmers will be responsible for any on-site improvements to their farm lot.

We have been assisted in this review by David C. Penn, Geography, and Huijia Dong, Environmental Center.

The Environmental Impact Statement Rules 11-200-12 Significance Criteria (b) provides that "...an action shall be determined to have a significant effect on the environment" if it:

- (2) Involves an irrevocable commitment to loss or destruction of any natural or cultural resource.
- (4) Substantially affects the economic or social welfare of the community or State.
- (6) Involves substantial secondary impacts, such as population changes or effects on public facilities.

An Equal Opportunity/Affirmative Action Institution

Dr. Paul J. Schwind  
October 8, 1993  
Page 2

As the proposed action affects the Hawaiian water rights and ceded lands, generates new employment opportunities, and consequently, affects the social and economic welfare of the community, this EA appears to be inadequate in addressing these issues.

Control and management of ceded lands and waters is an extremely controversial, sensitive, and significant issue. What exactly are the boundary, water rights, and land claims involved?

While the EA correctly identifies "resolution of water rights disputes" as a principal issue, it does little to identify, assess and evaluate the potential impacts of different resolution alternatives.

The discussion of the Hawaiian Homes Commission Act (3.2.2.2.) is confusing and contradictory and requires greater detail and illumination. While the first sentence correctly states that all water licenses are subject to DHHL demands, the second sentence erroneously implies that the first sentence ("this") only "covers any government owned waters not covered by any existing water license...."

There are three separate paragraphs of HHCA Section 221 which address water licenses. Section 221 (b) subjects all water licenses issued after the passage of the Act (9121) to DHHL demands. Since the Kekaha and Waimea licenses were issued after this date, the Department can presently demand any water necessary from the licenses.

HHCA Section 221(c) gives the Department similar authority over non-licensed, pre-1921 licensed, and private water, although all private and some pre-1921 licensed water may not be free of all charge since the required eminent domain proceedings imply just compensation. When the existing water licenses expire, the Department can demand any water necessary under the authority of this section.

HHCA section 221(d) seems to attempt to limit the authority granted in 221(b) by limiting DHHL's demand on Waimea River water to surplus water only. Its applicability is debatable due to its apparent contradiction with Section 221(b)

Water rights are in a state of flux and uncertainty, and it is certainly correct for the EA to classify them as unresolved issues. However, it appears that the EA should at the very least be prepared when more water-related details of this project and others in the area are known.

Regarding the Ceded Lands (8.2), the EA states that "it is not anticipated to have any significant impact on the environment and the community." However, the EA should have noted that 30 percent of the revenues from leasing the project site are required to go to the Department of Hawaiian Home Lands as long as it is leased for sugar cultivation, as

Dr. Paul J. Schwind  
October 8, 1993  
Page 3

well as 30 percent of the revenues from the affiliated water licenses regardless of land use. The economic impact of loss of this revenue, particularly the site lease portion, should also be factored into the assessment.

Thank you for the opportunity to review and comment on the document. Should you have any questions, please contact me at 956-7361.

Sincerely,

*Jacquelin N. Miller*  
Jacquelin N. Miller  
Associate Environmental Coordinator

cc:

OEOC  
R.M. Towill Corp.  
Roger Fujioka  
David C. Penn  
Huilin Dong

R. M. TOWILL CORPORATION

480 Waikeamilo Rd #411 Honolulu, HI 96817-4941 Phone 949-1133 Fax 908-949-1937

October 30, 1993

Ms. Jacquelin N. Miller  
Associate Environmental Coordinator  
University of Hawaii at Manoa  
Environmental Center  
2550 Campus Road, Crawford 317  
Honolulu, HI 96822

Dear Ms. Miller:

Draft Environmental Assessment  
Kauai Agricultural Park

We have received your letter of October 8, 1993 regarding the subject project. Your comments and concerns have been addressed in the Final Environmental Assessment.

Your participation in the planning process of this important project is appreciated.

Sincerely,

*Colette Sakoda*

Colette Sakoda  
Project Planner

cc: Dept. of Agriculture  
Dr. Paul Schwind

3-10, 11

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1688-72-12 18

KAHUNA WAHIKE  
GOVERNOR  
STATE OF HAWAII



STATE OF HAWAII  
DEPARTMENT OF HAWAIIAN HOME LANDS  
P. O. BOX 5075  
HONOLULU, HAWAII 96817

October 25, 1993

Ms. Colette Sakoda  
R. M. Towill Corporation  
420 Waiakemilo Road, Suite 411  
Honolulu, Hawaii 96817-4941

Dear Ms. Sakoda:  
Kaua'i Agriculture Park  
Environmental Assessment

The assessment of environmental impacts of developing an agriculture park at two sites in the Maimea District of Kaua'i appears to have addressed the foremost potential impacts, finding little likelihood of serious adverse effects.

One issue that was overlooked is the 30% revenues that will continue to be due from these lands to the Department of Hawaiian Home Lands. Insofar as one purpose of developing an agriculture park is securing moderate lease rents, generating an acceptable return would complicate matters. The Department has indicated that one solution to this situation would be the joint development of a project that also serves native Hawaiian homestead farmers, not as lessees of the Department of Agriculture, but under the Hawaiian Homes Commission Act.

Another issue begs further attention: the apparent overpumping of groundwater. The report identifies the estimated total sustainable yield of the region from Kokee to Mana as 12 million gallons per day (MGD), while withdrawals from the maui areas are averaging over 19 MGD. This may not be a problem, both in that the estimated sustainable yield was made conservatively, without extensive data, and that irrigation from maui sources may be recharging the areas where groundwater is being withdrawn. But such a gross discrepancy should be examined more closely.

The archaeological report indicates that a systematic inventory of the maui site is desirable prior to development of an agricultural park, as many habitation and religious sites are likely in the non-cultivated areas.

TRST	REPORT	DATE
DK	HAWAIIAN HOME LANDS	
RYK	150K	12
REC'D	OCT 25 1993	RWTC
RF		
UAM		

Ms. Colette Sakoda  
Kaua'i Ag Park  
Page 2  
October 25, 1993

We note with interest that the economic factors seem unfavorable. First, land preparation costs in the conversion from biennial to semi-annual crops may be high, in order to mitigate the potential for erosion. Second, distance from both labor and retail markets seem to disadvantage this location, given the fragility of commercial farming as an occupation and the availability of farm land closer to these markets.

Warmest Aloha,  
*[Signature]*  
Honolulu, HI  
Chairman  
Hawaiian Homes Commission

3-10





STATE OF HAWAII

DEPARTMENT OF HEALTH  
P. O. BOX 3273  
HONOLULU, HAWAII 96817

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

REC'D	001 2	1993	RIMTC
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DK	BYK		

October 22, 1993

93-260/epo

Ms. Coletta Sakoda  
R.M. Towill Corporation  
420 Waiakamilo Road, Ste. 411  
Honolulu, Hawaii 96817-4941

Dear Ms. Sakoda:

Subject: Draft Environmental Statement (DEA)  
Kauai Agricultural Park  
Waimea, Kauai  
TMK: 1-2-2; Por. 1

Thank you for allowing us to review and comment on the subject project. We have the following comments to offer:

Aquaculture Operations

The makai site is situated next to the Kekaha Landfill owned and operated by the County of Kauai. Aquaculture is one of the proposed operations being considered at the makai site. The document does not address the quality of the fresh water, sea water and brackish water to be used for the aquaculture operation. Also, the Food and Drug Branch of the Department of Health (DOH) must be contacted (586-4725) regarding the requirements for the propagation of shellfish for sale.

Wastewater

The mauka site is located in the critical wastewater disposal area with a one (1) acre exception. The makai site is located in the critical wastewater disposal area with no exception, as determined by the Kauai County Wastewater Advisory Committee. No new cesspools will be allowed in the subject areas, except for lots in the mauka site which are greater than one (1) acre.

Ms. Coletta Sakoda  
October 22, 1993  
Page 2

The DEA states that:

1. "No dwellings are permitted on agricultural lots and no potable water or sewer systems are proposed."
2. "There will be no residential development within the proposed Agricultural Park Site. Therefore, sewer system development will not be necessary."
3. "There will be no impacts to public sewer systems."

Because of the above statements, there is no anticipation of wastewater generation, and therefore, wastewater disposal has not been addressed in the document.

However, it is also stated that "Individual farmers will be responsible for any on-site improvements to their farm lots." We feel that even with a minimum amount of people working in the area, there should be some form of approved toilet facilities. Therefore, we would like to review a follow-up document regarding wastewater treatment and disposal. At a minimum, a portable-type toilet facility (comfort station) is suggested, and an operation and maintenance program must also be developed to maintain sanitary conditions.

In addition to the above, the Department is concerned with wastewater generated from other agricultural activities. We will require each farm activity to submit wastewater treatment and disposal plans to the Department for review and approval. All wastewater plans must conform to applicable provisions of the DOH's Administrative Rules, Chapter 11-62, "Wastewater Systems."

Should you have any questions on this matter, please contact Ms. Lori Kajiwara of the Wastewater Branch at 586-4290.

Drinking Water

1. The proposed mauka site (site 48) is located above the Underground Injection Control (UIC) line. Areas above the UIC line are considered to overlying underground sources of drinking water.
2. There are three Kauai Department of Water Supply municipal drinking water sources located near site 48. Waimea Shaft (5939-01) is located Waimea, approximately 1/2 mile from the northerly project site boundary. Waimea Well and Waimea Well B (5840-01 & 02) are located makai, approximately within 1/2 mile from the southeasterly project site boundary.
3. The proposed makai site (site 3) is located below the UIC line. However, there are many Kekaha Sugar Company water wells located mauka of site 3 and two U.S. Navy water wells located makai of site 3.



Ms. Coletta Sakoda  
October 22, 1993  
Page 3

4. The basal groundwater in the vicinity of site 3 exhibits artesian conditions.
5. Please be advised that if injection wells are proposed to be constructed at either site, a UIC permit will be required. There would be specific limitations to the types and depths of any injection wells in these areas.
6. An important area of concern that the document has failed to address is the potential of groundwater contamination from the proposed agricultural activities, including fertilizer and pesticide leachate.

If you have any questions on this matter, please contact Morris Uehara of the Safe Drinking Water Branch at 586-4258.

Nonpoint Source Pollution Concerns

The proposed Agricultural Park is located on land with generally level slopes on the makai site and slopes from 6 to 20 percent on the mauka site. Steps should be taken to minimize onsite erosion and nutrient runoff which may become a source for nonpoint source pollution from these agricultural activities. Section 4 of the subject document should address all of the potential contributors to nonpoint source pollution from the mauka site and the mitigation measures required to minimize the impacts.

Proper planning, design and use of erosion control measures and management practices substantially reduces the total volume of runoff generated, thereby decreasing sediment, nutrient and pesticide loads. Agricultural Parks are exempted from National Pollutant Discharge Elimination System (NPDES) permit requirements for grading. However, with planning assistance from the U.S. Department of Agriculture Soil Conservation Service, we encourage developing an overall conservation plan for the 255 acre mauka site and the 157.5 acre makai site that will address natural resources management.

If you should have any questions on this matter, please contact Ms. Shirley Hakamura of the Environmental Planning Office at 586-4337.

Solid Waste

The DOH promotes composting as a waste management alternative for greenwaste generated through agricultural activities. The State of Hawaii, in Act 281-93, recently recognized composting as an agricultural activity. The DOH strongly recommends that the Department of Agriculture consider composting as a means for handling greenwaste generated both on and off-site at the Kaula Agricultural Park.

Please contact Ms. Carrie McCabe of the Office of Solid Waste Management at 586-4243 for further information.

Ms. Coletta Sakoda  
October 22, 1993  
Page 4

General Comments

1. The Department of Health recommends that the developer and/or contractor be required to hold a public informational meeting in the surrounding community to describe the project and potential environmental impacts and to respond to concerns relating to the project.
2. We hope that the final environmental assessment will address in more detail the Department's concerns expressed above.

Very truly yours,



JOHN C. LEWIN, M.D.  
Director of Health

c: Mr. Paul Schwind  
Safe Drinking Water Branch  
Wastewater Branch  
Office of Solid Waste Management  
Kauai District Health Office  
Environmental Planning Office  
Clean Water Branch

R. M. TOWILL CORPORATION

480 WAIKAMUI RD #411 HONOLULU, HI 96817-4941 (808) 848-1133 FAX (808) 848-1937

November 10, 1993

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

Dear Mr. Lewin:

DRAFT ENVIRONMENTAL ASSESSMENT  
KAUAI AGRICULTURAL PARK

We have received your letter of October 22, 1993 regarding the subject project. Your comments have been noted, and appropriate changes have been incorporated into the Final Environmental Assessment.

Thank you for your participation in the planning process of this important project.

Sincerely,



Colette Sakoda  
Project Planner

cc: Dept. of Agriculture  
Dr. Paul Schwind

---

Engineers • Planners • Photogrammetrists • Surveyors  
Construction Managers • Hazardous Waste Management



**DEPARTMENT OF BUSINESS,  
ECONOMIC DEVELOPMENT & TOURISM**

INVEST DIVISION, 335 BERNARDINI, PMB 110, HONOLULU, HAWAII 96813 PHONE (808) 517-3600 FAX (808) 547-3609

JOHN WAIKES  
Governor  
MATT HARRIS  
Director  
JEANNE SCHULTZ  
Deputy Director  
RICK EGGER  
Deputy Director  
DAISIE YOSHIZAWA  
Deputy Director

SEARCHED	INDEXED
SERIALIZED	FILED
AUG 11 1993	
FBI - HONOLULU	

September 3, 1993

Ms. Colette Sakoda  
R.M. Towill Corporation  
420 Waiakamilo Road, Suite 411  
Honolulu, Hawaii 96817-4941

Dear Ms. Sakoda:

Subject: Kaula Agricultural Park Draft Environmental Assessment (EA)  
Waiea, Island of Kauai  
Tax Map Key: 1-2-02:01 (por.)

This is to inform you that we have no comments regarding the  
subject Draft Environmental Assessment (EA).

Thank you for the opportunity to review the EA.

Sincerely,

*H. Kaya*  
Maurice H. Kaya  
Energy Program Administrator

MHK/hk94

cc: Mr. Paul J. Schwind



**STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
COMMISSION ON WATER RESOURCE MANAGEMENT**

P. O. BOX 471  
HONOLULU, HAWAII 96808

August 31, 1993

93 SEP 2 7 1: 52

*Rae Loui*  
KEITH W. ABUS  
Commissioner  
JOHN C. LEWIS, M.D.  
ROBERT S. HANATA  
RICHARD A. GUNDEL, P.E.  
J. DOUGLAS WELLS, D.D.  
KIM M. LONN, P.E.  
SECRET

**MEMORANDUM**

**TO:** Honorable Yukio Kiiagawa, Chairperson  
Board of Agriculture  
**FROM:** Keith W. Abus, Chairperson *KA*  
**SUBJECT:** Permission to Take Irrigation Water for Kekaha Agricultural Park  
TMK: IV 1-2-02:01 (portion)  
Area Approximately 158 Acres

This is in reply to your letter dated July 9, 1993.

As we understand the project, no permits are required from the Commission on Water Resource Management to withdraw water from the irrigation ditch. As discussed with your staff, a well construction and pump installation permit may be necessary if you need to withdraw water from a well.

Please call Rae Loui if you have questions.

**DEPARTMENT OF WATER**

COUNTY OF KAUAI  
P.O. BOX 1706  
LHIUE, HAWAII 96766-1706  
PHONE NO. (808) 245-6486 FAX NO. 245-5813



SENT TO  
ATTENTION OF

Planning Division

DEPARTMENT OF THE ARMY  
U.S. ARMY ENGINEER DISTRICT, HONOLULU  
FORT SHAFTER, HAWAII 96824-6440

September 17, 1993



September 16, 1993

Ms. Colette Sakoda  
R.M. Towill Corporation  
420 Waiakamilo Road, Suite 411  
Honolulu, HI 96817-4941

Re: Kauai Agricultural Park, Draft Environmental Assessment (EA),  
Tax Map Key No. 1-2-02:01 (por.)

We reviewed the Draft EA for the subject project and have no  
comments to offer.

Thank you for the opportunity to comment.

Jeremiah M. Kaluna  
Acting Manager and Chief Engineer

WJ:et

Ms. Colette Sakoda  
R. M. Towill Corporation  
420 Waiakamilo Road, Room 411  
Honolulu, Hawaii 96817-4941

Dear Ms. Sakoda:

Thank you for the opportunity to review and comment  
on the Draft Environmental Assessment for the Kauai  
Agricultural Park, Waimea, Kauai (THK 1-2-2: por. 1).  
The following comments are provided pursuant to Corps of  
Engineers authorities to disseminate flood hazard  
information under the Flood Control Act of 1960 and to  
issue Department of the Army (DA) permits under the  
Clean Water Act; the Rivers and Harbors Act of 1899; and  
the Marine Protection, Research and Sanctuaries Act.

- a. The project does not involve waters of the U.S.;  
therefore, a DA permit will not be required.
- b. The flood hazard information provided on page 4-  
11 of the report is correct.

Sincerely,

Kishuk Cheung, P.E.  
Director of Engineering

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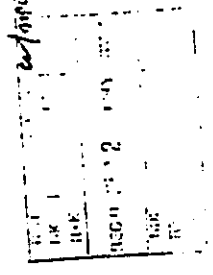
JOHN WILKIE  
GOVERNOR



ROBERT P. TANUSH  
COMPTROLLER  
ILOLOI UREBASAM  
DEPUTY COMPTROLLER  
LETTER NO. (P)1669.3

STATE OF HAWAII  
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES  
P O BOX 113, HONOLULU, HAWAII 96849

SEP 20 1993



Ms. Colette Sakoda  
R.M. Towill Corporation  
420 Waiakamilo Road, Suite 411  
Honolulu, Hawaii 96817-4941

Dear Ms. Sakoda:

Subject: Kauai Agricultural Park  
Waimea, Kauai, Hawaii  
Draft Environmental Assessment

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

If there are any questions, please have your staff contact Mr. Ralph Yukumoto of the Planning Branch at 586-0488.

Very truly yours,  
*Gordon Matsuo*  
GORDON MATSUOKA  
State Public Works Engineer

RY:jj  
cc: Mr. Paul J. Schwind

If you have any questions or concerns regarding this letter, please do not hesitate to call me or OHA Land Officer Linda Delaney.

ʻO Iu no me ka hāhāʻi,  
*W. Hee*  
Clayton W. Hee, Chairman  
Board of Justices

cc: BOT  
DHHL  
OHA ADM



STATE OF HAWAII  
OFFICE OF HAWAIIAN AFFAIRS  
111 KAPOLANI BULWARK, SUITE 900  
HONOLULU, HAWAII 96813-4004  
PHONE (808) 586-3177  
FAX (808) 586-3796

8 October 1993

The Honorable Yukio Kingawa, Chairman  
Board of Agriculture  
Department of Agriculture  
P.O. Box 22159  
Honolulu, Hawaii 97682-2159

TRANSMITTED BY FAX (973-9613)

Dear Yuki:

The Office of Hawaiian Affairs (OHA) has discussed and reviewed with staff of the Department of Agriculture (DOA) your anticipated request to the Board of Land and Natural Resources to:

**WITHDRAW "SUGAR LANDS" NOW UNDER LEASE TO  
AMFAC/MB AT KEKAHA, KAUAI FOR THE PURPOSE  
OF CREATING A STATE AGRICULTURAL PARK.**

OHA supports this request based on our understanding that this withdrawal will include provision by DOA and BLNR to honor native Hawaiian trusts entitlements and to:

1. Continue payment to the Office of Hawaiian Affairs the equivalent of the 20 percent trust share of the existing lease proportionate to the acreage being withdrawn during the anticipated two-year period required to establish the agricultural park; and
2. Continue payment to the Department of Hawaiian Home Lands the equivalent of the 30 percent trust share of the existing lease proportionate to the acreage being withdrawn during the anticipated two-year period required to establish the agricultural park.

If these conditions are not formalized in the approval of the withdrawal, OHA would need to review and would likely alter our position of support. However, the sincerity of DOA and the sensitivity of BLNR to the entitlements of the two native Hawaiian trusts encourage us in the belief that such review would not be necessary.

JOHN WAIKANE  
Governor



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

YUKIO KITAGAWA  
Chairperson, Board of Agriculture  
ELMA A. PELUJUA  
Deputy to the Chairperson

FAX: (808) 973-9613

Mailing Address:  
P. O. Box 22159  
Honolulu, Hawaii 96823-2159

Memo to Richard Paglinawan  
9/8/93  
Page 2

Copies of the title page, Summary of Salient Facts, and Pasture Land (income approach to land rent) are enclosed.

Tenants of the ag park will be chosen based on farmers' expression of interest survey conducted recently, their qualification as farmers, and a drawing among qualified prospects. The rent will be based on an independent appraisal of fair market value of agricultural lands in Kekaha.

Based on recent appraisals and awards of ag parks on Oahu, we estimate that the rents for the Kekaha Agricultural Park will be in the range of \$250-\$300 per acre per year. When fully rented, the projected annual rent is estimated at \$40,000 per year. The current rent for the subject 158-acre parcel is around \$400 per year.

DOA respectfully requests that OHA waive their share of the reverse entitlement for the period mentioned above.

Enclosures

c: Mason Young, DLNR  
Linda Delaney

To: Richard Paglinawan, Administrator  
Office of Hawaiian Affairs

From: Yukio Kitagawa, Chairperson  
Board of Agriculture

Subject: Ceded Land Revenue Entitlement for  
Kekaha Agricultural Park  
TMK: IV 1-2-02:01 (portion)  
Area: Approximately 158 Acres

September 8, 1993

The Department of Agriculture (DOA) recently requested the Department of Land and Natural Resources (DLNR) to withdraw approximately 158 acres from General Lease S-4222 and the set aside and issuance of a Governor's executive order (EO) to DOA for the above captioned State lands, pursuant to Section 171-11 and 171-117, Hawaii Revised Statutes, for the purpose of an agricultural park.

It is the intention of DOA to develop an ag park as shown in the attached maps in accordance with Chapter 9A, "Agricultural Park Subdivision," of Kauai Revised County Ordinances.

DLNR suggested we initiate discussions with the Office of Hawaiian Affairs (OHA) and Department of Hawaiian Home Lands (DHHL) on how DOA's proposed ag park would affect their ceded land revenue entitlements. When DOA staff personnel met with Linda Delaney of your office, it was suggested that DOA write OHA to request waiver of revenue entitlement during the period from the Governor's EO to the receipt of land rents from tenants of the ag park, a period of about two to three years.

The subject land is part of the 7,200 plus acres classified as pasture lands. According to the Appraisal Report on General Lease NO. S-4222 prepared for the DLNR, dated May 7, 1984, the fair market annual rent for such lands is \$2.50 per acre per year for the ten-year rental period ending December 31, 1993.



JOHN WAHNEE  
GOVERNOR  
STATE OF HAWAII



STATE OF HAWAII  
DEPARTMENT OF HAWAIIAN HOME LANDS  
P. O. BOX 1074  
HONOLULU, HAWAII 96814

93 OCT 1 1993

HOALIKU L. DRAKE  
CHAIRMAN  
HAWAIIAN HOMES COMMISSION

JOHN WAHNEE  
GOVERNOR



STATE OF HAWAII  
DEPARTMENT OF AGRICULTURE  
1428 So. King Street  
Honolulu, Hawaii 96814-2512

93

YUKIO KITAGAWA  
Chairperson, Board of Agriculture  
KUMA A. FUKUDA  
Deputy to the Chairperson  
FAX: (808) 973-9613  
Mailing Address:  
P. O. Box 22159  
Honolulu, Hawaii 96822-2159

RECEIVED OCT 6 4 1993

September 21, 1993

MEMORANDUM

TO: The Honorable Yukio Kitagawa, Chairman  
Board of Agriculture

FROM: Hoaliku L. Drake, Chairman  
Hawaiian Homes Commission

SUBJECT: Ceded Land Revenue Entitlement for Kekaha Agricultural Park  
TMK: 4th, 1-2-02: 01 (portion)  
Area: Approximately 158 Acres

To: Honorable Hoaliku Drake, Chairman  
Hawaiian Homes Commission

From: Yukio Kitagawa, Chairperson  
Board of Agriculture

Subject: Ceded Land Revenue Entitlement for  
Kekaha Agricultural Park  
TMK: IV 1-2-02:01 (portion)  
Area: Approximately 158 Acres

Attached is a copy of your memorandum of September 21, 1993, which I have signed agreeing to your offer to continue to pay rent for the subject land based on the appraised value of \$2.50 per acre per year during the interim period between execution of the Executive Order assigning the area for agricultural park use and up to the start of rental income from farmers who will occupy the lots after completion of improvements.

My agreement is also based on the understanding that a new independent appraisal of the fair market value of the agricultural park lands will be conducted based upon comparable lands and uses, and the 30% revenue entitlement share due to the Native Hawaiian Rehabilitation Fund will continue to be paid after completion and occupancy of the agricultural park based on the new values established under that appraisal.

If you agree and agree to this understanding of the revenue entitlements, please sign and return a copy of this memorandum.

ACCEPTED:

*Yukio Kitagawa*  
Chairperson, Board of Agriculture

DATE: OCT 2 4 1993  
HLD:RH:jec/3061L  
Attachment  
cc: Honorable Keith Ahue, DLNR

The Department of Agriculture (DOA) recently requested the Department of Land and Natural Resources (DLNR) to withdraw approximately 158 acres from General Lease S-4222 and the set aside and issuance of a Governor's Executive Order (EO) to DOA for the above-captioned State lands, pursuant to Section 171-11 and 171-117, Hawaii Revised Statutes, for the purpose of an agricultural park.

It is the intention of DOA to develop an ag park as shown on the enclosed map in accordance with Chapter 9A, "Agricultural Park Subdivision," of Kamae Revised County Ordinances.

DLNR suggested we initiate discussions with Department of Hawaiian Home Lands (DHHL) and Office of Hawaiian Affairs (OHA) on how DOA's proposed ag park would affect their ceded land revenue entitlements. When DOA met with Ken Henderson of your office, it was suggested we write you of our proposal to pay DHHL directly or through DLNR, DHHL's share of the revenue entitlement, at the current rent of \$2.50 per acre per year, from the date of Governor's EO to the receipt of land rents from tenants of the ag park, a period of about two years, at the current rent of \$2.50 per acre per year.

The subject land is part of the 7,200 plus acres classified as pasture lands. According to the Appraisal Report of General Lease No. S-4222 prepared for the DLNR, dated May 7, 1984, the fair market annual rent for such land is \$2.50 per acre per year for the ten-year rental period ending December 31, 1993.





Memo to Hon. Hoaliku Uruke  
September 21, 1993  
Page 2

Copies of the title page, Summary of Salient Facts, and Pasture Land (Income approach to land rent) are also enclosed.

Tenants of the ag park will be chosen based on farmers' expression of interest survey conducted recently, their qualification as farmers, and a drawing among qualified prospects. The rent will be based on an independent appraisal of a fair market value of agricultural lands in Kelahe.

If our proposal to pay DHHIL's share of the revenue entitlement is acceptable, please sign and return a copy of this memorandum.

ACCEPTED:

*Yolanda S. S. S.*  
Chairperson  
Hawaiian Homes Commission

DATE: 10/25/93

Enclosures (0)

c: Mr. Keith Alue

## REFERENCES

1. Department of Business, Economic Development and Tourism (DBEDT), February 1991. Unpublished 1990 Census Data.
2. DBEDT, 1982. The Geographic Distribution of Hawaii's Racial Groups, 1970 and 1980. Statistical Report 152.
3. College of Tropical Agriculture and Human Resources, University of Hawaii. August 29, 1990, Taro Industry Analysis Number 4.
4. Hawaii Agricultural Statistics Service (HASS), July 1991. Personal Communication with Homer Rowley.
5. Hawaii Agricultural Statistics Service (HASS), December 1992. Statistics of Hawaiian Agriculture 1991.
6. Hawaii Agricultural Statistics Service (HASS), July 1991. Unpublished 1990 Market Supply tabulations.
7. County of Kauai, Sunshine Market Statistics, April-June 1991.
8. Department of Land and Natural Resources (DLNR), 1990. Hawaii Aquaculture Advisory Council Report.
9. DLNR, June 1986. Rainfall Atlas of Hawaii, Report R76.
10. Soil Conservation Service. USDA. In cooperation with the University of Hawaii, August 1972. Soil Survey of Islands of Kauai, Oahu, Molokai, Maui, and Lanai, State of Hawaii.
11. Land Study Bureau, University of Hawaii, December 1967. Detailed Land Classification: Island of Kauai. L.S.B. Bulletin, No. 9.
12. Department of Agriculture, State of Hawaii, November 1977. Agricultural Lands of Importance to the State of Hawaii.
13. Okahara, Shigeoka & Associates, March 1983. Kauai Agricultural Plan.

**APPENDIX A**  
*Botanical Resources Assessment*

# CHAR & ASSOCIATES

Botanical/Environmental Consultants

4471 Puu Paia Ave.  
Honolulu, Hawaii 96816  
(808) 734-7828

March 1993

## BOTANICAL RESOURCES ASSESSMENT KAUA'I AGRICULTURAL PARK WAIHEA DISTRICT, ISLAND OF KAUA'I

### INTRODUCTION

Two sites are being proposed for the Kaun'ī Agricultural Park by the State Department of Agriculture. The two sites are each about 150 acres in size. The Kekaha Mauka site is located on the slopes of Kaleinamanu Ridge; elevation ranges from about 450 ft., just above the Kekaha Ditch, to roughly 960 ft. where it abuts the Waiheea Canyon Drive. This site is presently under active sugar cane cultivation by the Kekaha Sugar Company, Limited. The Kekaha Makai site is located on the Mana coastal plain and elevation is roughly 11 to 15 ft. The site lies between the Navy's Pacific Missile Range Facility (PMRF) and the Kaunua'i Highway (Route 50). It is fenced and used for grazing cattle and horses.

Field studies of the two sites were conducted on 12 February 1993; a total of four botanists, working in teams of two each, was used. The primary objectives of the survey were to: 1) provide a general description of the major vegetation types; 2) search for threatened and endangered species, as well as rare and vulnerable plants; and 3) identify areas of potential environmental problems or concerns and offer appropriate mitigation measures.

The scientific names used in this report follow Wagner et al. (1990) for the flowering plants and Lamoureux (1984) for the ferns.

### DESCRIPTION OF THE VEGETATION

A walk-through survey method was used. Notes were made on plant associations and distribution, substrate types, moisture gradients, topography, etc. Plant identifications were made in the field; plants which could not be positively identified were collected for later determination in the herbarium (University of Hawai'i, Manoa -- HAW) and for comparison with the most recent treatment of the taxon.

On the Kekaha Mauka site, the survey focused on the uncultivated areas, that is, the margins of fields and the adjoining gulch areas as native plants are more likely to occur in such areas.

On the Kekaha Makai site, an intensive search was made of areas likely to support the pololei fern. A category 1 candidate endangered species, the pololei fern (*Ophioglossum concinnum*) is known from PMRF (Traverse Group 1988; U.S. Fish and Wildlife Service 1990). The fern is seasonal, that is, it appears only during the wetter months (about end of November through about April) and then is dormant during the drier months. During its dormant stage, the leaves die back and only the thick, enlarged rhizomes (underground stems) remain alive in the soil or sand. If field studies were conducted during the drier months, the fern would be difficult, if not almost impossible, to detect. Thus, a check was made of the fern on the PMRF station to see what stage of growth it was in. The largest concentration of the fern can be found in the lawn of the Japanese cemetery, located north of Building 384 (hanger building). At the time of this survey, the *Ophioglossum* fern on the PMRF property was up and growing; a number of plants had produced fertile fronds.

#### Kekaha Mauka Site

This site is located on the slopes of Kaleinamanu Ridge, adjacent to Waiheea Canyon Drive (Route 550). The vegetation consists of

they are 'ilima (Sida fallax), 'uhaloa, and koali (Ipomoea indica). These three natives can be found throughout the Hawaiian Islands in similar environmental habitats. None of the plants observed on the two sites are listed, proposed, or candidate threatened and endangered species (U.S. Fish and Wildlife Service 1989, 1990); nor are any of them considered rare and vulnerable (Wagner et al. 1990).

An intensive search was made for the pololei fern (Ophioglossum concinnum), a category 1 candidate endangered species; it is known from the nearby PHRF property. No plants of this fern species were found on the Kekaha Makai site during our survey. This site is probably too disturbed by the grazing animals, and the competition from the weedy species is intense.

Given the findings above, the proposed use of the two sites for agricultural parks should not have a significant negative impact on the botanical resources of the sites, or, on the total island populations of the species involved. No mitigation measures are offered at this time.

#### References

- Lamoureux, C.H. 1984. Checklist of the Hawaiian pteridophytes. Unpublished manuscript, University of Hawai'i, Manoa.
- Traverse Group, Inc. 1988. Natural resources management plan. Pacific Missile Range Facility, Barking Sands, Kauai. Prepared for Pacific Division, Naval Facilities Engineering Command. Contract No. N62742-86-C-0538.
- U.S. Fish and Wildlife Service. 1989. Endangered and threatened wildlife and plants. 50 CFR 17.11 & 17.12.

U.S. Fish and Wildlife Service. 1990. Endangered and threatened wildlife and plants: Review of taxa for listing as Endangered and Threatened Species; Notice of review. Federal Register 55(35): 6184-6229.

Wagner, W.L., D.R. Herbst, and S.H. Sohier. 1990. Manual of the flowering plants of Hawai'i. 2 vols. University of Hawai'i Press and B.P. Bishop Museum Press, Honolulu. B.P. Bishop Museum Special Publication No. 83.

**APPENDIX B**

***Field Survey of the Avifauna  
and Feral Mammals***

# CORRECTION

THE PRECEDING DOCUMENT(S) HAS  
BEEN REPHOTOGRAPHED TO ASSURE  
LEGIBILITY  
SEE FRAME(S)  
IMMEDIATELY FOLLOWING

# CHAR & ASSOCIATES

Botanical/Environmental Consultants

4471 Puu Pahi Ave.  
Honolulu, Hawaii 96816  
(808) 734-7828

March 1993

## BOTANICAL RESOURCES ASSESSMENT KAUA'I AGRICULTURAL PARK MAIMEA DISTRICT, ISLAND OF KAUA'I

### DESCRIPTION OF THE VEGETATION

A walk-through survey method was used. Notes were made on plant associations and distribution, substrate types, moisture gradients, topography, etc. Plant identifications were made in the field; plants which could not be positively identified were collected for later determination in the herbarium (University of Hawai'i, Manoa -- HAW) and for comparison with the most recent treatment of the taxon.

On the Kekaha Mauka site, the survey focused on the uncultivated areas, that is, the margins of fields and the adjoining gulch areas as native plants are more likely to occur in such areas.

On the Kekaha Makai site, an intensive search was made of areas likely to support the pololei fern. A category 1 candidate endangered species, the pololei fern (Ophioglossum concinnum) is known from PHRF (Traverse Group 1988; U.S. Fish and Wildlife Service 1990). The fern is seasonal, that is, it appears only during the wetter months (about end of November through about April) and then is dormant during the drier months. During its dormant stage, the leaves die back and only the thick, enlarged rhizomes (underground stems) remain alive in the soil or sand. If field studies were conducted during the drier months, the fern would be difficult, if not almost impossible, to detect. Thus, a check was made of the fern on the PHRF station to see what stage of growth it was in. The largest concentration of the fern can be found in the lawn of the Japanese cemetery, located north of Building 384 (hanger building). At the time of this survey, the Ophioglossum fern on the PHRF property was up and growing; a number of plants had produced fertile fronds.

#### Kekaha Mauka Site

This site is located on the slopes of Kaleinamau Ridge, adjacent to Maimea Canyon Drive (Route 550). The vegetation consists of

### INTRODUCTION

Two sites are being proposed for the Kaua'i Agricultural Park by the State Department of Agriculture. The two sites are each about 150 acres in size. The Kekaha Mauka site is located on the slopes of Kaleinamau Ridge; elevation ranges from about 450 ft., just above the Kekaha Ditch, to roughly 960 ft. where it abuts the Maimea Canyon Drive. This site is presently under active sugar cane cultivation by the Kekaha Sugar Company, Limited. The Kekaha Makai site is located on the Maimea coastal plain and elevation is roughly 11 to 15 ft. The site lies between the Navy's Pacific Missile Range Facility (PHRF) and the Kaaunali'i Highway (Route 50). It is fenced and used for grazing cattle and horses.

Field studies of the two sites were conducted on 12 February 1993; a total of four botanists, working in teams of two each, was used. The primary objectives of the survey were to: 1) provide a general description of the major vegetation types; 2) search for threatened and endangered species, as well as rare and vulnerable plants; and 3) identify areas of potential environmental problems or concerns and offer appropriate mitigation measures.

The scientific names used in this report follow Wagner et al. (1990) for the flowering plants and Lamoureux (1984) for the ferns.



actively cultivated fields of sugar cane (Saccharum officinarum) on gently rolling slopes. Weedy species are largely confined to the roadsides and along the margins of fields where they abut the gulch areas. However, newly planted fields, because they are more open, tend to support more weedy plants among the cane. The majority of the weedy plants encountered are those commonly associated with agricultural lands and activities. These include swollen finger grass (Chloris barbata), nutgrass (Cyperus rotundus), Natal redtop (Rhynchosyris repens), little bell or pink bindweed (Ipomoea triloba), and fuzzy rattlegod (Crotalaria incana).

The adjoining gulch areas support a scrub composed primarily of koa-haole shrubs (Leucaena leucocephala) and green panicgrass (Panicum maximum var. trichoglume). Locally common are patches of sour grass (Digitaria insularis). The koa-haole shrubs vary from 5 to 12 ft. in height and are denser on the bottom of the gulches where there is more moisture. Also found in these areas are scattered trees of Java plum (Syzygium cumini), silk oak (Grevillea robusta), and castor bean (Ricinus communis). California grass (Bracharia mutica) is abundant in some places along the gulch bottom. Eroded areas within the gulches support a sparse vegetation usually of Natal redtop, 'uhaloa (Waltheria indica), and fuzzy rattlegod.

#### Kekaha Makai Site

This site is located adjacent to PHRF and the County landfill. This more or less level site is used for grazing cattle and horses. Old Kekaha Sugar Company maps show that the site was used for "pastoral land", at least since 1921.

The vegetation consists of low scrub -- scattered patches of shrubs and a few trees with a variety of grasses and herbs filling in the matrix between the woody components. The mauka

half of the property is more well-maintained and there are fewer shrubs, mostly klu (Acacia farnesiana). Bermuda grass (Cynodon dactylon) is the primary pasture grass, although in one section there are rows of Napier or elephant grass (Pennisetum purpureum) planted; also found in this area are scattered mats of California grass. The sandy soil on the mauka half has been augmented with organic waste and soil from the sugar mill. As a result, the sand/soil mix is blackish in color and the local relief is rolling with many small mounds now overgrown with grasses and weedy herbs.

The makai half of the property is sandy with little soil and not well-maintained. The vegetation is composed of scattered patches of pluchea (Pluchea symplytifolia), lantana (Lantana camara), and klu shrubs, 3 to 7 ft. tall; some patches are extensive and dense. Small stands of kiawe trees (Prosopis pallida), 10 to 18 ft. tall, are also common, especially along the boundary adjacent to PHRF.

The ground cover is a weedy mixture of grasses such as Bermuda grass, lovegrass (Eragrostis tenella), sour grass, swollen finger grass; and herbs and small shrubs such as spiny amaranth (Amaranthus spinosus), coat buttons (Tridax procumbens), Portulaca pilosa, hairy spurge (Chamaesyce hirta), and coffee senna (Senna occidentalis).

#### RESULTS AND DISCUSSION

The vegetation on both of the sites is dominated by introduced plants. The Kekaha Hauka site is actively cultivated sugar cane fields with the adjacent gulch areas supporting koa-haole scrub. The Kekaha Makai site is used actively for grazing cattle and horses. It supports a weedy mixture of grasses, shrubs, and a few kiawe trees.

Only three native species were found during the field survey:

they are 'ilima (Sida fallax), 'uhaloa, and koali (Ipomoea indica). These three natives can be found throughout the Hawaiian Islands in similar environmental habitats. None of the plants observed on the two sites are listed, proposed, or candidate threatened and endangered species (U.S. Fish and Wildlife Service 1989, 1990); nor are any of them considered rare and vulnerable (Wagner et al. 1990).

An intensive search was made for the pololei fern (Ophioglossum concinnum), a category 1 candidate endangered species; it is known from the nearby PHRF property. No plants of this fern species were found on the Kekaha Makai site during our survey. This site is probably too disturbed by the grazing animals, and the competition from the weedy species is intense.

Given the findings above, the proposed use of the two sites for agricultural parks should not have a significant negative impact on the botanical resources of the sites, or, on the total island populations of the species involved. No mitigation measures are offered at this time.

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**APPENDIX B**  
*Field Survey of the Avifauna  
and Feral Mammals*

## INTRODUCTION

The purpose of this report is to summarize the findings of a two day (27, 28 February 1993) bird and mammal field survey of two sites, one near the Pacific Missile Range Facility (PMRF), Barking Sands, and the other mauka of Hanalei, Kauai (see Fig. 1 for actual location of properties surveyed). Also included are references to pertinent literature as well as unpublished fauna reports from nearby, similar habitat elsewhere on Kauai.

The objectives of the field survey were to:

- 1- Document what bird and mammal species occur on the property or may likely be found there given the habitats available.
- 2- Provide some baseline data on the relative abundance of each species.
- 3- Determine the presence or likely occurrence of any native fauna particularly any that are considered "Endangered" or "Threatened". If such occur on or near the property identify what features of the habitat may be important for these species.

### FIELD SURVEY OF THE AVIFAUNA AND FERAL MAMMALS FOR A PROPOSED KAUAI AGRICULTURAL PARK (2 SITES) AT KEKAHA, KAUAI

Prepared for

R.M. Towill Corp.

by

Phillip L. Bruner  
Assistant Professor of Biology  
Director, Museum of Natural History  
Environmental Consultant - Fauna (Bird & Mammal) Surveys  
BYU-H  
Laie, Hawaii 96762

3 March 1993

- 4- Determine if these sites contain any special or unique habitats that if lost or altered by development might result in a significant negative impact on the fauna in this region of the island.

GENERAL SITE DESCRIPTION

Site One is a flat, narrow strip of land located between the main highway and PMRF at Barking Sands (Fig. 1). The area is presently used for grazing. Vegetation consists of Kiawe (Prosopis pallida) along with a variety of other weeds and brush with large areas of open pasture. A ditch runs through the middle of the property. At the time of the survey this ditch was mostly dry with scattered small potholes of stagnant water. Site Two, located mauka of Waimea town along highway 550 has a fairly steep topography (Fig. 1). Most of the land is under sugarcane cultivation. Ravines with dense brush also occur on the site. No habitat suitable for waterbirds was discovered.

Weather during the field survey was clear and moderate. Winds were light and from the east.

STUDY METHODS

A walk-through of each site was made in order to view a representative sample of the available habitats. Field observations were made with binoculars and by listening for vocalizations. These observations were concentrated during the peak bird activity periods of early morning and late afternoon. Attention was also paid to the presence of tracks and scats as indicators of bird and mammal activity.

At various locations, during the walk-through, census (count) stations were established where all birds seen or heard over a period of eight minutes were tallied. Any unusual observations of birds made between these census stations were also recorded. These data provide the basis for the relative abundance estimates given in this report. Published and unpublished reports of birds known from similar habitat elsewhere on PMRF and on Kauai were also consulted in order to acquire a more complete picture of the possible species that might occur in the area (Pratt et al. 1987; TGI 1988; Bruner 1990a, 1990b, 1991; Hawaii Audubon Society 1989). Observations of feral mammals were limited to visual sightings and evidence in the form of scats and tracks. No attempts were made to trap mammals in order to obtain data on their relative

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

abundance and distribution.

Scientific names used herein follow those given in Hawaii's Birds (Hawaii Audubon Society 1989); A field guide to the birds of Hawaii and Tropical Pacific (Pratt et al. 1987); Mammals species of the World (Honacki et al. 1982) and Hawaiian Coastal Plants (Merlin 1980).

#### RESULTS AND DISCUSSION

##### Resident Endemic (Native) Land and Waterbirds:

No endemic land birds were recorded, however, M. Char during her botanical survey of Site Two (the mauka cane lands) saw two Pueo or Short-eared Owl (Asio flammeus sandwicensis). This native owl is listed as endangered by the State of Hawaii on the island of Oahu. On Kauai Pueo are fairly common (Hawaii Audubon Society 1989).

Two Common Moorhen (Gallinula chloropus sandwicensis) were seen in the ditch which bisects Site One. Moorhen are listed as endangered in Hawaii. They are, however, reasonably common on Kauai, particularly in agricultural wetlands, and irrigation ditches. Four Hawaiian Duck (Koloa) (Anas wyvilliana) were

recorded in the ditch on Site One. Koloa are also endangered but more common on Kauai than elsewhere in the State. No American Coot (Fulica americana alai) were found nor Black-necked Stilt (Himantopus mexicanus knudseni). Both of these endangered species could also be expected to use the ditch habitat in Site One.

##### Migratory Indigenous (Native) Birds:

Twenty-six Pacific Golden Plover (Pluvialis fulva) were counted in the pasture habitat of Site One and eight were recorded along cane roads in Site Two. Plover prefer open areas such as mud flats, fields and lawns. Johnson et al. (1981), Bruner (1983) and Johnson et al. (1989) have shown plover are extremely site-faithful (returning each year to the same spot and maintaining this behavior throughout their life time). Plover also establish foraging territories which they defend vigorously. Such behavior makes it possible to acquire a fairly good estimate of the abundance of plover in any one area. The populations likewise remain relatively stable over many years (Johnson et al. 1989).

Fifty-seven Ruddy Turnstone (Arenaria interpres) were tallied in the pasture habitat of Site One. This species is not known to be territorial but often occur in flocks on the wintering grounds.

Resident Indigenous (Native) Waterbirds:

The Black-crowned Night Heron (Nycticorax nycticorax) is the only species in this category. No night heron were recorded on either project site. Night heron are the only waterbirds not listed in Hawaii as endangered. This species undoubtedly utilizes the ditch habitat on Site One.

Resident Indigenous (Native) Seabirds:

Wedge-tailed Shearwater (Puffinus pacificus) are known to nest at PHRF but not at this particular location. Laysan Albatross (Diomedea immutabilis) also occur at PHRF during the winter months. No seabirds were recorded during this survey. Newell's Shearwater (Puffinus newelli) may fly over these sites as it goes back and forth between its nesting burrows in the mountains and the open sea where it forages.

Exotic (Introduced) Birds:

Table One lists a total of 15 exotic species recorded on Site One. Fourteen species were found on Site Two (Table One). Data from surveys in similar habitat elsewhere on Kauai (Bruner 1990a, 1990b, 1991) and information provided in Pratt et al.

(1987); TGI (1988); Hawaii Audubon Society (1989) suggest the following birds may also occur on or near these sites: Western Meadowlark (Sturnella neglecta), White-rumped Shama (Copsychus malabaricus), Japanese Bush-warbler (Cettia diphone) and Eurasian Skylark (Alauda arvensis). Java Sparrow (Padda oryzivora) has also recently become established in the Princeville area (Hawaii Audubon Society 1989) and may eventually spread to other lowland and urban habitats on the island.

Feral Mammals:

No evidence of rats or mice were noted but these ubiquitous mammals likely do occur on both properties. No trapping was conducted in order to assess the relative abundance of mammals at this site. Tracks of feral cats were seen. Black-tailed Deer (Odocoileus hemionus) are "rarely found at PHRF" (TGI 1988). Deer tracks were found on Site Two.

Our knowledge of the endemic and endangered Hawaiian Hoary bat (Lasiurus cinereus semotus) is limited but the species has been regularly reported on Kauai (Tomich 1986; Kepler and Scott 1990). No bats were found on this survey.

CONCLUSIONS

A brief field survey can provide only a limited perspective of the wildlife present in any given area. Not all species will necessarily be observed and information on their use of the site must be drawn from brief observations, available literature and unpublished reports. The number of species and the relative abundance of each species may vary throughout the year due to changing food resources and reproductive success. Species sometimes prosper for a time only to later disappear or become a less significant part of the ecosystem (Williams 1987; Moulton et al. 1990). Thus only long term studies can provide a comprehensive view of the bird and mammal populations in a particular area. Despite these constraints some general conclusions related to birds and mammals at these sites are offered below:

1- Both sites contain the typical array of exotic species of birds one would expect at this elevation and in these habitats on Kauai. However, some species were not recorded. This could have been due to: the survey was too brief, their numbers are so low that they went undetected or simply they do not at present occur on these lands.

- 2- The native birds recorded on the survey were those species commonly associated with lowland habitats. The ditch which bisects Site One, is utilized by at least two endangered waterbird species (Koloa and Common Moorhen) and possibly also Black-necked Stilt and American Coot. The native Pueo or Short-eared Owl also likely occurs on Site One and was recorded recently by W. Char on Site Two.
- 3- Two migratory shorebirds, Pacific Golden Plover and Ruddy Turnstone were abundant on Site One. Only plover were noted on Site Two.
- 4- Tracks of cats and deer were seen on Site Two and cat tracks were also evident on Site One. The endangered Hawaiian Hoary Bat was not recorded but may occur in the area.
- 5- No particularly unique or special habitat was found on either property. The ditch on Site One attracts waterbirds. Ditches of this sort are abundant throughout Kauai. Water levels appear to fluctuate in this ditch making it a somewhat ephemeral resource.



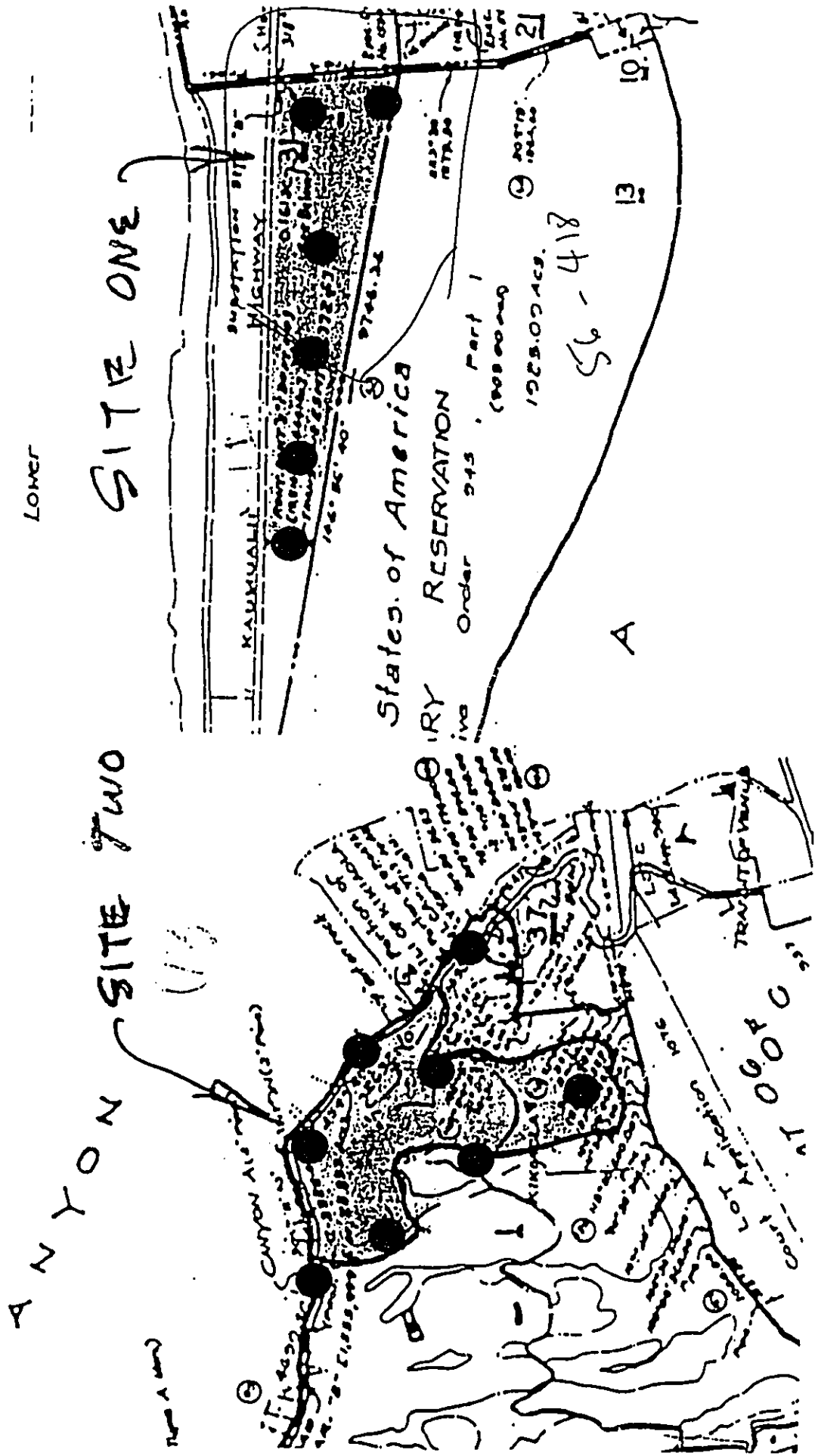


Fig. 1. Location of two sites covered by the faunal survey. Solid circles indicate faunal census stations.

U S G E O L O G I C A L S U R V E Y

TABLE 1

Introduced (exotic) birds recorded on Site One and Two of the proposed Kauai Agricultural Park, Kauai

COMMON NAME	SCIENTIFIC NAME	RELATIVE ABUNDANCE*	
		Site 1	Site 2
Cattle Egret	<u>Bubulcus ibis</u>	C= 9	R= 2
Feral Chicken	<u>Gallus gallus</u>	A=12	U= 2
Ring-necked Pheasant	<u>Phasianus colchicus</u>	C= 6	C= 7
Black Francolin	<u>Francolinus francolinus</u>	U= 4	U= 3
Spotted Dove	<u>Streptopelia chinensis</u>	C= 7	C= 9
Zebra Dove	<u>Geopelia striata</u>	A=14	A=13
Common Myna	<u>Acridotheres tristis</u>	U= 2	R= 3
Northern Cardinal	<u>Cardinalis cardinalis</u>	C= 8	C= 9
Red-crested Cardinal	<u>Paroaria coronata</u>	C= 9	U= 4
Northern Mockingbird	<u>Mimus polyglottos</u>	C= 6	----
Hwamei	<u>Garrulax canorus</u>	R= 1	R= 5
Japanese White-eye	<u>Zosterops japonicus</u>	A=16	A=11
Nutmeg Mannikin	<u>Lonchura punctulata</u>	A=10	A=13
Chestnut Mannikin	<u>Lonchura malacca</u>	R=18	C= 7
House Finch	<u>Carpodacus mexicanus</u>	C= 8	U= 3

\*(see page 12 for key to symbols) -11-

-12-

## KEY TO TABLE 1

Relative abundance = number of times observed during survey or average number on eight minute counts.

A= abundant (ave. 10+)

C= common (ave. 5-10)

U= uncommon (ave. less than 5)

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

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**APPENDIX C**  
*Archaeological Assessment*

**Archaeological Assessment of Two Locations  
For a Proposed State Agricultural Park  
Waimea, Kaua'i**

by

Hallett H. Hammatt, Ph.D.  
and  
Gerald K. Ida, B.A.

Prepared for

R.M. Towill, Inc.

Cultural Surveys Hawaii  
June 1993

#### ABSTRACT

An archaeological assessment of two separate parcels in Kekaha was conducted in conjunction with development of an agricultural park on the west side of Kauai. The *makai* parcel (Parcel 3) of 157.5 acres is located *makai* of Kaunualii Highway. This level property is on the Kekaha sandy plain and shows clear evidence of modern-era grading. It was probably originally dune topography. It has recently been used for grazing and has an in-place irrigation system, probably for drainage of water from *mauka* fields. According to an interpretation of traditional Hawaiian use of the 4 major zones, this parcel would have contained evidence of Hawaiian shoreline habitation as well as human burials. However, the extensive grading and sand removal may have destroyed all remnants of these sites. The *mauka* parcel is located on Kaleinamanu Ridges between elevation 480 and 960 feet above sea level. In accordance with traditional land use pattern, this land should contain evidence of permanent habitations associated with ridges and valleys overlooking the Kekaha Plain. The west, northwest, and northern portions of the property are in active cane cultivation and any traditional Hawaiian sites would have been destroyed by many years of plowing. The southeastern portion of the property, comprising slightly less than one half of the parcel, is not in cane cultivation although a portion appears to have contoured terraces originating from commercial cultivation. This non-cultivated portion could contain evidence of ancient Hawaiian occupation, particularly in the gully areas. If archaeological sites are present in either of these parcels they are expected to be isolated occurrences. Archaeological inventory survey is recommended for Parcel 3 to include sub-surface testing. The scope should be designed to consider recent negative findings in the adjacent landfall property to the southeast. Only the non-cane portion of Parcel 4B should be subjected to inventory survey to provide 100% ground coverage of likely site areas. The scope of both surveys should be reviewed and approved by Historic Sites Division of DLNR.

#### ACKNOWLEDGEMENTS

Mr. William Folk, Mr. Gerald Ida and Dr. Hal Hammatt participated in the fieldwork for this project. Historical research was conducted by Mr. Gerald Ida on Kauai using the facilities of the Kauai Museum, Kauai Community college and the Garden Isle Publishing Co. We would like to thank Ms. Colette Sakoda for providing useful maps and aerial photos of both project areas, and for providing coordination of this project. Mr. Kaipo Akana of Kauai was very helpful in providing information on the modern land use of Parcel 3. Typing and editing was performed by Dr. Vicki Creed of Cultural Surveys Hawaii.

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## INTRODUCTION

This archaeological assessment was performed at the request of R.M. Towill, Inc. for the purpose of initial selection of a site for a State Agricultural Park on the Island of Kauai. Two separate parcels were studied: one in the sandy plain west of Kekaha Town (157.5 acres), and the other in cane lands on Kaleinamanu Ridge (approximately 130 acres) on the west side of Waiimea Canyon overlooking Waiimea Town. In the selection process the Kekaha parcel was designated Site 3 and the Kaleinamanu Ridge parcel was designated Site 4B (Figs 1-4).

## Scope of Work

The scope of this investigation was designed to be an environmental assessment to assess potential impact to any archaeological resources and was not intended to provide a full inventory survey of either or both parcels. The tasks included:

1. A walk-through reconnaissance of the two parcels to determine the potential for archaeological resources. Emphasis was to be placed on determining existing conditions and extent of historic-era and modern disturbance;
2. The reconnaissance was to be accompanied by a brief review of archaeological and historical literature to determine if archaeological sites have been previously recorded and to assess potential for sites considering past land use and settlement patterns;
3. Preparation of a report on the results of fieldwork, and archaeological and historical research to include a summary on assessment of possible archaeological impact as well as recommendations for further investigation to mitigate impact at each of these two study areas.

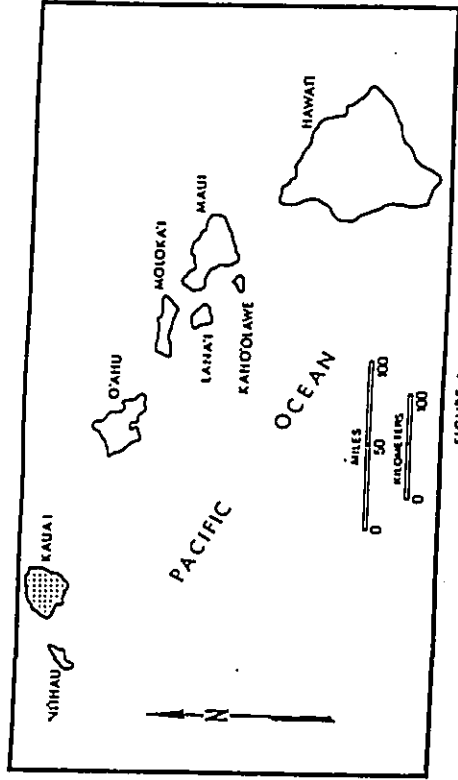


FIGURE 1  
State of Hawaii

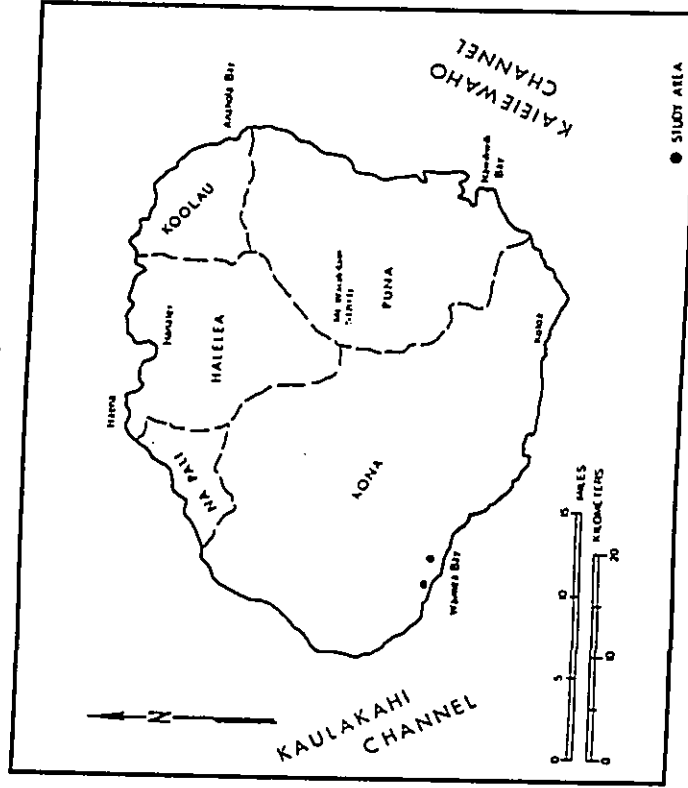


FIGURE 2  
General Location Map, Kauai Island



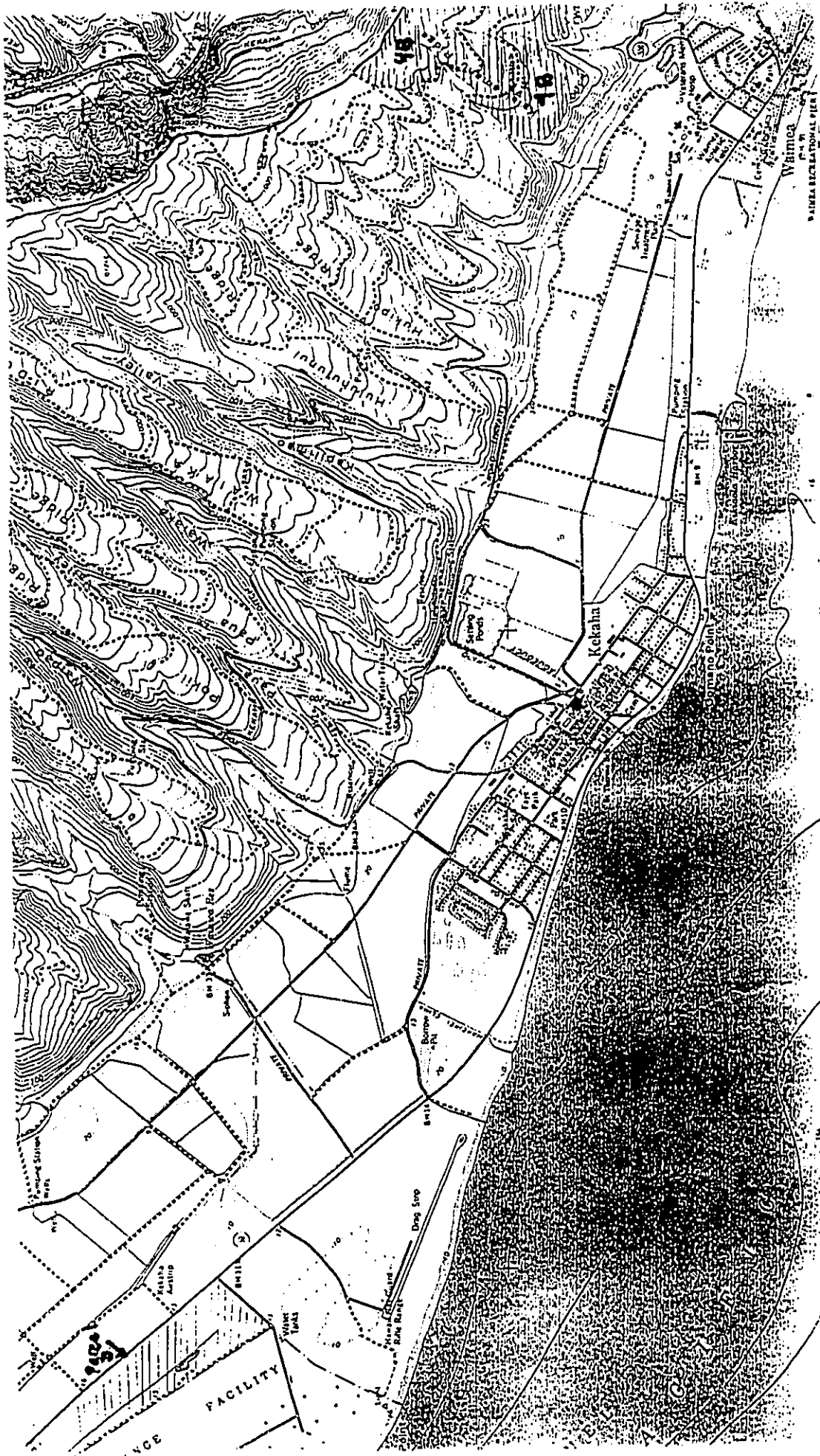


Fig. 3 USGS Map, Waimaea Quad (and Western Portion of Hanalei Quad) Showing  
Parcels 3 and 4B

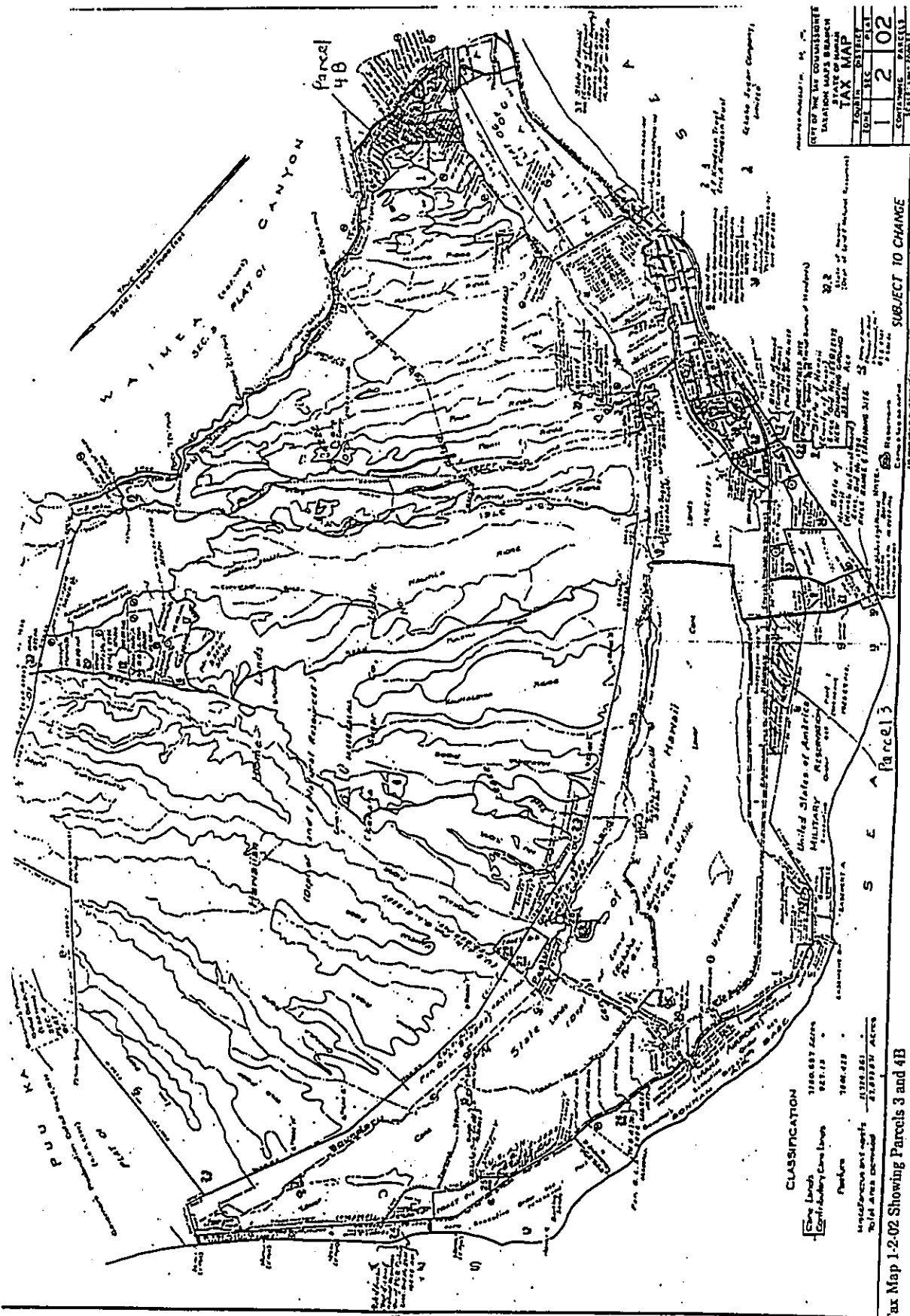


Fig. 4 Tax Map 1-2-02 Showing Parcels 3 and 4B

1 1 2 2 0 2

### Work Accomplished and Methods

Fieldwork was accomplished in one day with 3 archaeologists. Approximately one half day was spent at each of the study areas.

The low-lying parcel west of Kekaha (Site 3) was examined on foot at the southeastern end, the western end along a road paralleling the *makai* boundary, and the northern end. Generally, the vegetation was thin enough to allow excellent visibility. As an inventory survey level of effort was not intended no attempt was made to systematically survey the entire parcel. However, enough of the study area was observed (10-20%) to characterize the terrain, soils and vegetation to clearly define the boundaries.

Site 4B, on Kaleinamānu Ridge, overlooking Waimea Town, was inspected in the *makai* and central area to determine which portion was in cane cultivation. This parcel was re-examined following the initial fieldwork to confirm the exact boundaries of the parcel in relation to the edge of the cane fields. If it could be shown that the entire parcel was either present or former cane fields, then archaeological concerns could largely be eliminated. Because of the easy road access through the property the reconnaissance was accomplished mostly by vehicle.

Background research was conducted by consulting archaeological and historical studies which would shed light on previous land use and settlement patterns as well as the location of known archaeological sites. Fortunately, there have been some recent archaeological projects performed in the Waimea - Kekaha area which are useful for comparative information, particularly in relation to settlement patterns and predictions for archaeological sensitivity in certain portions of the landscape (Ida and Hammatt 1993a, Ida and Hammatt 1993b, and Folk, et al, 2 reports in preparation). It is of interest to note that more archaeological investigation has occurred in the last 6 months

in the Kekaha area than in the last 15 years. The present report does not present an exhaustive treatment of Kekaha area history but only generalities which are directly relevant to the two study areas and an assessment of their archaeological resources.

### Description of the Study Areas

#### Parcel 3

The 157.5-acre parcel (Fig. 5) to the northwest of Kekaha Town is a triangular shaped property (TMK 1-2-0231 portion) which is bounded on the northeast (*mauka*) side by Kaunualii Highway and on the southeast side by a dirt road running perpendicular to the Highway and adjacent to the Kekaha landfill. The southwestern (*makai*) boundary is marked a dirt road which is closed in the middle and northwest section of the property because of heavy vegetation. The northwest boundary is marked by a dirt road perpendicular to Kaunualii Highway.

The property is flat and level except for man-made soil berms at intervals oriented *mauka/makai* and lies between 10 and 15 feet above sea level. The soil consists of loose sandy loam composed mostly of coralline sand. Vegetation varies from thin stands of bench grass to occasional thick clumps of *koaue* (*Prosopis pallida*) and *kū* (*Acacia farnesiana*). In general, the land is open enough to traverse with excellent visibility of the ground surface. The land surface has definite evidence of large-scale modification, as indicated by geometric patterns of parallel sand berms and a network of ditches. In the recent past the land has been in use for cattle and horse grazing.

#### Parcel 4B

This approximately 130-acre *mauka* parcel is located on Kaleinamānu Ridge above

the west side of Lower Waimea Canyon. Access to the parcel is on the west side of the Waimea to Kōke'e Ridge Road. The southeastern boundary is near a water tank and runs westward slightly mauka of the Kekaha Ditch along the top of the steep ridge which defines the mauka edge of the cultivated fields. The western boundary also runs along the edge of the cane fields of Kaleinamanu Ridge where it joins the Wāwea - Kōke'e Ridge Road. The entire east and northeastern boundary is along the edge of this road.

The project area ranges from 480 to 960 feet above sea level and slopes generally to the southwest. The west, north and northwestern portions of the parcel are planted in cane which during the field inspection were at a mature growth stage. The southeastern portion to the east of Kaleinamanu Ridge is not in cane cultivation, presumably because of its steeper terrain. These extreme southeastern portion of the non-cultivated section has furrows following the contour which possibly indicates its former use for cane. The non-cane lands support secondary growth of *koo haole (kīauae)*, a variety of grasses and mature trees in the gulch bottom. The mauka end of the non-cane lands support particularly thick stands of vegetation which extend upslope to nearly 800 feet elevation in the gulch bottom and steep slopes.

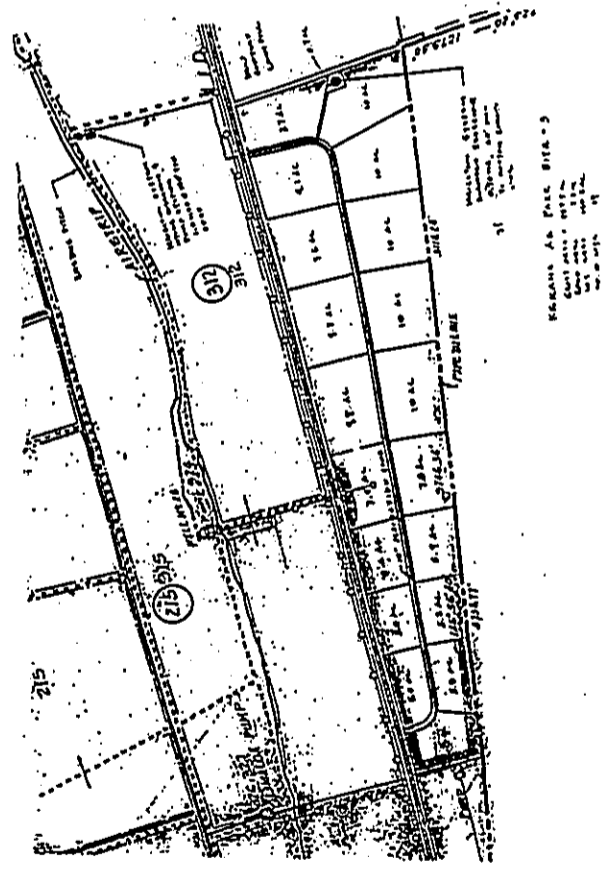


Fig. 5 Map of Parcel 3 Showing Proposed Agricultural Lots

State Ag. Park - Site 4B

☐ = non-concessions

— = project boundary



Fig. 6 Aerial Photograph of Parcel 4B with Unconcessated Pattern in Lower Flight Section of Project Area

### HISTORIC AND ARCHAEOLOGICAL BACKGROUND

Most relevant to predicting the archaeological potential of each of the properties is an overview of the main environmental zones of the Kekaha portion of Waimea ahupua'a and the traditional Hawaiian uses of these zones. At the outset it is important to be aware of the dramatic changes in landscape which have taken place on the Kekaha Plain due to development of the sugar industry. Although the form and topography of these zones have changed in the historic era their interrelationship and relative position still remains.

#### Environmental Zones and Human Settlement

As described in Ida and Hammatt (1993a) there are four (4) major zones from the ridge land to the sea and each of these zones had a special place in the traditional subsistence pattern.

#### Ridge Land and Valleys

The lower ridges and valley slopes which rise fairly uniformly and steeply above the Kekaha plain provided fertile soil for dryland agriculture and sheltered environment for habitation. At the base of these slopes, particularly in the deeper valley mouths, was the most intensive permanent occupation for Hawaiians. This is reinforced by 19th-century accounts which relate that the houses along this line were almost continuous.

A row of grass houses extended all the way along the foothills from Waimea to Mana. Every house site had a name. To find a many you had to find his house name. The natives seemed to know every name and would keep sending you along until you finally came to the spot you were looking for (E.A. Knudsen 1991:100).

### Marshlands

Numerous springs at the base of these ridges and valley slopes were the source of water for habitation and agriculture. On the flat plain directly fronting these slopes were marshes whose fringes were used for wetland taro cultivation.

The natural wetlands extended shoreward to the edge of the immense sand bar and dune covered plain. There are accounts that

This swamp extended all the way from Kekaha to Mana and when we had heavy winter rains all the Hawaiians would paddle their canoes from mana to Waimea on the inland sea and tie their canoes to the coconut trees in the Waiawa Garden (Knudsen 1991:99).

### Backshore Dunes

A very clear eco-tone even in today's altered landscape is visible in Kekaha between the marshland and the coralline sand dune topography. These dunes have a long geological past as shown by the layers of lithified sand underlying the modern unconsolidated sand. Before modern alteration of the landscape, mostly for commercial sugar cultivation, dunes were visible paralleling the shoreline for long stretches and reached heights 10-15 feet in height.

Traditional uses of these dunes would include intermittent or temporary habitation and human burial, clearly the arid hot environment in combination with the infertile sandy soil would not be conducive for gardening although this land would have supported plentiful coconuts.

### Shoreline Zone

The seaward edge of this sand plain, although a similar environment to the backshore dune lands - by virtue of its proximity to the shore would have supported

fishing camps and in protected or watered places, clusters of permanent settlements.

These would survive today as buried cultural layers containing charcoal lenses, soil and rock features, midden and artifacts. Associated with these layers would be human burials.

### Modern Modification of the Landscape

The Kekaha area may be one of the most dramatically altered landscapes on the island of Kaua'i. The sloping table lands and ridges overlooking the coastal plain have been deeply plowed and planted in sugar and terraced for irrigation. The Kekaha Ditch taps water from the Waimea River at the Koaie Canyon junction and transports it out of the valley westward along the cliff edge to irrigate the Kekaha Plain. The valleys have been modified with roads and other sugar-related facilities.

The former wetlands between the cliffs and the sand plain have been drained and supplied with gravity fed water with a vast geometric network of drainage and irrigation ditches.

The sand plain itself, which once had a rolling dune topography at its mauka end, has undergone many phases of modification through levelling, grading, sand mining, pasture improvement, cultivation improvement (seed corn) and residential development.

In only a few places do remnants of the original dune topography survive. Even the shoreline has been impacted by sand removal, road construction, and many years of military use.

### Previous Archaeological Research

There are no previously recorded sites in either of the two project areas. Bennett's

1930 survey was the only general survey of the Kekaha area and the majority of sites recorded by him were found in the valleys above the coastal plain. These sites include *heiau* on ridges and in valleys and house sites and terraces in larger valleys, such as Waiawa.

Cox has demonstrated the occurrence of human burials in sandy deposits within Waimea Town (Cox 1977) and more recently Folk located burials and buried cultural layers under sand dunes within the sand plain northwest of Kekaha during sub-surface testing for a proposed housing project (Folk, in preparation). Most relevant to Parcel 3 is the recent study of an expanded County landfill site bordering Parcel 3 to the southeast. Because of the extensive modern land modifications the excavation of over 40 backhoe trenches showed no cultural remains.

#### RECONNAISSANCE RESULTS

Since neither of the two study areas was field surveyed with 100 percent coverage the reconnaissance results are concerned more with the potential of each parcel for containing archaeological sites based on present conditions, land use, and the place of each area in the t-aditional settlement pattern.

##### Parcel 3

This parcel consisting of 157.5 acres of level land at the *makai* portion of the Kekaha sand plain is close enough to the coast to contain remnants of Hawaiian habitation in the form of buried cultural layers and features. Also human burials would be expected in this zone because of its proximity to the coastal habitation and its sandy soil

This potential for finding archaeological remains, of course, assumes that the property has not been modified in recent times. This is not the case.

Whatever dunes were present have been levelled, either through grading or sand mining. A series of parallel sand berms run across the property perpendicular to the shoreline and a man-made ditch traverses the center of the property paralleling the coast and the highway.

Although this land was never used for actual cultivated agricultural crops, according to a local informant and long-time resident of the area (Mr. Kaiipo Akana) the land was watered through a ditch system with excess water from the *mauka* cane fields to stimulate growth of pasture grasses for grazing cows and horses.

This appears to be an unusual land use at first thought. However, when one considers 1) that the highly permeable sandy soil renders the land marginal for sugar

production, and 2) that irrigated sugar production has a perennial problem of disposal of excess water, this use of the *makai* lands appears to be a practical solution to a combination of factors. Large amounts of water would drain quickly through the sand without producing marshy conditions but not before it stimulated growth of pasture crops for grazing cattle and horses. This use has probably continued for many years in conjunction with use of the *mauka* sugar fields and the complex irrigation and drainage system which supports it.

#### Previous Archaeological Studies Relevant to Parcel 3

As far as is known by the authors there are no previous archaeological studies of this particular parcel. The most comprehensive survey of the Kekaha area to date is the 1930 study by Bennett. No archaeological sites were recorded by Bennett near this parcel.

Recently (May 1993), Cultural Surveys Hawaii conducted systematic surface survey and sub-surface backhoe testing of the adjacent property to the southeast proposed for use as a County landfill. The land surface showed no archaeological sites and backhoe testing uncovered no buried cultural deposits or remains. The landfill property is considered as being similar in terms of extensive land modification and archaeological potential to Parcel 3 in this initial assessment. Based on the results of the landfill survey it is predicted that little of the original surface sand deposits would remain and that lithified dune would be encountered within a few feet of the surface. The validity of this prediction is limited by the lack of systematic survey coverage of Parcel 3 and it is indeed possible that remnants of the former landscape survive in the parcel and that cultural materials may occur in these areas.

#### Parcel 4B

In the scheme of the traditional land use pattern presented here, Kaleinamunu Ridge and its associated gullies have the potential for containing the remains of permanent Hawaiian habitation sites and associated features. The majority of the prehistoric archaeological sites recorded in the Kekaha area by Bennett, including *heiau*, were located on ridges and valleys at the base of ridges. The closest site to Parcel 4B described by Bennett is his Site 18 - a 40 by 60 foot *heiau* - which is by the Kōkē'e Road but far *mauka* of the project area at elevation 1700 feet above sea level.

It is estimated that between one-half and two-thirds of the parcel is actively planted in sugar. This includes most of the *mauka* and western portions. The southeastern portion is not planted in cane. One segment, the southwest-facing slope fronting the Waimea Canyon Drive, appears to have contoured terracing from former cane cultivation, but clearly the gully area and the slope to the west of the gully have never been cultivated. This uncultivated land stretches *mauka* up the gully nearly to the *mauka* end of the project area.

The land planted in cane is not of archaeological concern since all remnants of Hawaiian sites would almost certainly have been destroyed by many years of deep plowing. However, the non-cane lands within the project area have a definite potential for containing archaeological sites.

The cultivation of sugar cane on parcel 4B probably occurred soon after major water resources were developed by the Kekaha Sugar Co. in 1907 (Thrum 1908:158-159).

A 1921 map (Evans; Fig. 7) shows actually more land within parcel 4B dedicated to cane than is cultivated currently. However, the gullies and slopes are noted as open or "waste" land.



Bennett's recording of sites on the west rim of the canyon leaves open the possibility that habitation and religious sites still exist in these open areas. Also, the proximity of the parcel gives rise to the possibility that inhabitants of the Waimea lowlands traversed the area regularly to take advantage of upland resources, and remnants of these old trail ways may be present.

A systematic survey of all non-cultivated areas in Parcel 4B would seem to be in order.

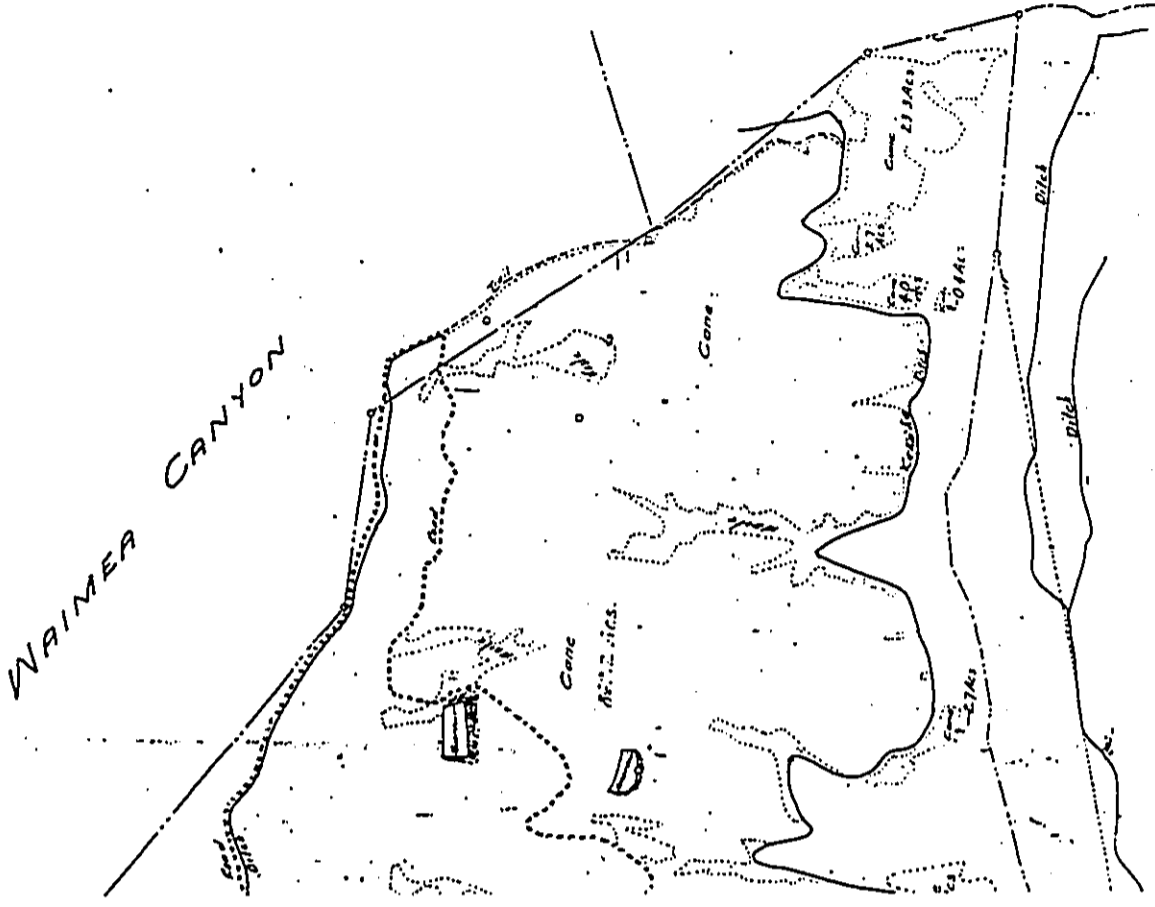


Fig. 7 Evans' 1921 Map, Portion Showing Parcel 4B

### SUMMARY AND RECOMMENDATIONS

#### Parcel 3

Clearly, apparent modern alteration of the landscape, as well as the negative results of the recent surface and sub-surface investigations adjacent to the property would appear to indicate little possibility of finding archaeological remains. However, the location near the shore and the sandy environment are conducive to the likelihood of encountering cultural layer and/or human burials if undisturbed portions of the 157.5 parcel remain. The scope of the present study is not sufficient to define the impact of the development of an agricultural park on archaeological resources in this parcel. For these reasons inventory survey is recommended. This survey should include surface coverage as well as sub-surface testing. A scope similar to that performed at the adjacent landfill would be appropriate with surface survey and broad sub-surface coverage. The final scope of this study, especially subsurface testing, should be designed to take into account the small likelihood of encountering archaeological remains. In parcel 3, if intact archaeological remains are present then distribution would likely be quite limited, given the extent of ground disturbance in the area. This scope should be reviewed and approved by the State Historic Preservation Division of DLNR.

#### Parcel 4B

Because of the possibility of encountering archaeological remains in the uncultivated portions of Parcel 4B, all the non-cane lands of this parcel (60-70 acres) should be subject to inventory survey to adequately assess the impact of agricultural park development on archaeological resources. The cultivated lands should not be included in the survey area. If archaeological sites are present they would probably occur in the steeper uncultivated land which is unsuitable for modern agriculture. The final scope of

this study should be reviewed and approved by the State Historic Preservation Division of DLNR.

In general this assessment indicates that in the case of both parcels, archaeological concerns are not a major factor in the choice of sites for agricultural development.

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