

*PROPOSED KAPOLEI HARBORSIDE CENTER:  
IMPACT ON AGRICULTURE*

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*DECISION ANALYSTS HAWAII, INC.*

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IMPACT ON AGRICULTURE*

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*PREPARED FOR:*

**Kapolei Property Development**

*PREPARED BY:*

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**July 2006**

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## EXECUTIVE SUMMARY

### 1. PROPOSED DEVELOPMENT

Kapolei Property Development proposes to develop Kapolei Harborside Center ("the Project"), an industrial park on 344.519 acres in Kapolei, City and County of Honolulu. The entire Project Area is currently within the State Agricultural District and is zoned "Agricultural." However, the Project site is designated for Industrial development in the City's 'Ewa Development Plan. The Project will require a State Land Use District Boundary Amendment to Urban, and a change in zoning to Industrial.

### 2. AGRICULTURAL CONDITIONS

About 54 to 171 acres (16 to 50%) in the Project Area are good or suitable for growing low-elevation crops; the higher figure reflects the fill material that was added in the past to allow cultivation of sugarcane. The remaining land is poorly suited for farming, largely because most of it is coral outcrop.

### 3. LOCATIONAL ADVANTAGES AND DISADVANTAGES FOR CROP PRODUCTION

The Project Area is well-located for serving the Honolulu consumer market and export markets. This is due to the short trucking distance to the Honolulu markets, the Honolulu International Airport, and Honolulu Harbor.

### 4. SURROUNDING LAND USES

All of the current and planned land uses surrounding the Project Area are urban, with no adjacent or nearby agricultural activities. Thus, the Project Area is an agricultural remnant.

## 5. IMPACT ON EXISTING AGRICULTURAL OPERATIONS

### a. Milo Nursery & Landscape Maintenance

Milo Nursery leases about 32.1 acres within the Project area. The company is a wholesale nursery that sells to various landowners, companies, landscapers, and contractors. Services include landscaping of building grounds, landscape maintenance, and street sweeping. Milo Nursery is a family operation that has about 10 employees.

The impact of the Project on Milo Nursery will depend on whether suitable land with water can be obtained. If it can, then Milo Nursery will relocate with no significant impact on revenues, employment, or payroll.

If suitable land with water cannot be obtained, then Milo Nursery will close. In turn, other nurseries, landscapers, and yard-maintenance companies will increase their operations to compensate for the loss. Thus, there will likely be a shift in operations, but no significant island-wide loss of revenues, employment, or payroll.

### b. Menehune Green

Menehune Green is a new company that purchased the State's largest composting operation in late 2005. It is affiliated with other Hawai'i companies involved in commercial waste disposal, and with a mainland company that operates the largest yard-waste composting site in the United States.

Its current volume of green waste is about 60,000 tons per year which is composted at two locations: the leeward location on about 52 acres of leased land within the Project Area and a windward location near Kailua. The volume of green waste is high because the City bans truckloads of waste containing more than 10% yard trimmings from its landfill and H-Power. The windward location eventually will be converted to a transfer station, with all of the green waste composted at the leeward location. Also, the City's new policy of curb-side collection of green waste will double the volume of green waste delivered to Menehune Green, with the pace of growth determined by the City's implementation of curb-side collection. Thus, the volume composted at the leeward location will increase from about 36,000 tons per year to more than 120,000 tons per year. The current operation employs about 35 workers, of whom about 30 are located at the leeward facility.

In addition to centralizing operations at a single location, Menehune Green plans a number of related technical improvements that will reduce composting time from about 12 weeks to about 8 weeks, eliminate the need for some equipment, reduce water requirements per ton of green waste processed, and

increase labor productivity. Even though the volume of green waste is expected to more than double, little change is expected in employment.

Menehune Green purchased Hawaiian Earth Products in November 2005 with plans to move the composting operation from the Project Area to some undetermined new location where the changes in composting technology would be introduced. Assuming that Menehune Green will be successful in finding a suitable new site for its composting operation, the Project will have no significant impact on the future volume of green waste processed by Menehune Green, or its revenues, employment, or payroll.

About 30 to 50 acres will be required in a centrally located and dry area. Also, the site should offer level or gently sloping terrain, good road access, and access to water. However, the composting site does not have to be located near the City's H-Power facility or the City's landfill.

The new location for composting is likely to be on land zoned Agricultural since it is less expensive than Urban land, and composting is categorized by the City as an agricultural use. A major composting operation and related activities (e.g., packaging) are allowed on land zoned Agricultural (Ag-1 Restricted or Ag-2 General), subject to a conditional use permit that specifies the standards for composting.

Lease rents for the existing composting operation indicate that Menehune Green should be able to outbid most other uses for leased agricultural land at a new location. Or, if the company purchases agricultural land outside the City's Urban Growth Boundary, it should be able to service a mortgage.

## 6. GROWTH OF DIVERSIFIED CROPS

### a. Potential Acreage Requirements for Diversified Crops

#### Crops to Replace Imports of Fruits and Vegetables

For low-elevation fruits and vegetables that have a history of profitable production in Hawai'i, potential land requirements in 2010 for 100% import substitution for the Hawai'i and O'ahu markets are estimated at 12,700 acres and 8,600 acres, respectively, plus additional acreage for fallowing land between crop plantings. When allowing for competition from imports, these estimates drop to about half.

#### Export Crops

The many entrepreneurial agricultural efforts being undertaken on former plantation lands may lead to one or more major new export crops over the next 20+ years. However, the history of agricultural efforts in Hawai'i reveals that

developing major new export crops that are successful in overseas markets is difficult. For example, over the past 50 years in Hawai'i, farmers have explored numerous possibilities for export crops, but they have developed overseas markets for just one diversified crop that requires more than 10,000 acres (macadamia nuts at 18,000 acres in 2003); one additional crop that requires more than 5,000 acres (coffee at 7,300 acres); and only five additional crops or crop categories that require more than 1,000 acres each.

### Feed Crops

If feed crops could be grown in Hawai'i and priced competitively against mainland imports, they could replace a portion of the large volumes of grains and hay that are now being imported to the State. Unfortunately, a number of commercial attempts in Hawai'i to grow grains and alfalfa have been unsuccessful.

### Biofuel Crops

Crops can be grown to produce biomass to fuel a boiler, or as feedstock to produce fuels. In Hawai'i, the common practice is to produce biomass as a by-product of some principal crop. However, O'ahu Ethanol Corporation plans to build an ethanol plant at Campbell Industrial Park using conventional technology but, at least initially, using imported molasses as the feedstock. For the longer term, this company is exploring the economics of growing sweet sorghum on O'ahu to supply feedstock to its ethanol plant. Acreage requirements for a new sorghum biofuel plantation on O'ahu would range from about 6,000 acres for viability to 15,000 to replace all imported molasses.

However, a number of substantial difficulties must be overcome to develop a sorghum biofuel plantation on O'ahu. For example, it will be difficult to lease the 6,000+ acres required for economic viability. Most major landowners will be reluctant to lease their land at comparatively low rents for the approximately 30-year period desired by O'ahu Ethanol. Also, emerging technology that is in its early stage of commercialization promises a more plentiful and cheaper source of feedstock for ethanol. Instead of producing ethanol using sugars from conventional sources, the sugar would come from "cellulosic" sources. This would include green waste for which there would be no land rent and no growing costs, but there could be a disposal fee paid to the processor. In the long term, this less expensive source of feedstock could result in an unprofitable biofuel plantation.

These and other difficulties and risks suggest that the probability of successfully developing and sustaining a sorghum biofuel plantation on Oahu is low.



### Recent Crop-acreage Trends

For all diversified crops—i.e., all crops other than sugarcane and pineapple, including crops to replace imports and crops for export—Statewide land requirements grew by an average of less than 300 acres per year from 1983 through 2003, or less than 3,000 acres per decade.

#### **b. Land Availability for Diversified Crops**

A vast amount of land has been released from plantation agriculture on O'ahu and the Neighbor Islands, and most of this land remains available for diversified crops. By 2009, about 15,300 acres of farm land will be available on O'ahu. This includes about 9,600 acres on the North Shore plus about 5,700 acres in Kunia that will be available following the closure of the Del Monte pineapple plantation, but it excludes any adjustment for the farm land in 'Ewa and Kunia land that is already leased for diversified crops but is not farmed intensively. Statewide, an estimated 160,000+ acres remain available for diversified crops. Cultivating crops on the Neighbor Islands for the Honolulu market, and vice versa, will become more economically feasible once the Superferry begins its scheduled operations in 2007.

The above information indicates that ample land is available in Hawai'i to accommodate the growth of diversified crops, whether demand is based on potential or recent trends. In other words, the limiting factor to the growth of diversified crops is *not* the *land supply*, but rather the *size of the market* for crops that can be grown *profitably* in Hawai'i.

#### **c. Impact on the Growth of Diversified Crops**

The Project will commit 344.5 acres of agricultural land to a non-agricultural use, of which about 54 to 171 acres are good or suitable for farming. If this much land were used to grow a typical vegetable or fruit crop, it could support about 21 jobs.

More realistically, the development of this agricultural land—combined with other developments in Hawai'i—involves the loss of too little good agricultural land to affect (1) the availability of land to farmers in Hawai'i, (2) agricultural land rents, (3) the growth of diversified crops, or (4) potential agricultural employment. This conclusion is based on the finding that ample land is available for diversified crops, with the available supply far exceeding likely or potential demand.

More to the point, the Project Area has already been lost to farming because it is an agricultural remnant surrounded by existing and planned urban development.

## 7. OFFSETTING BENEFITS

The loss of 344.5 acres of agricultural land, of which about 54 to 171 acres are good or suitable for farming, will be offset by the following benefits of the Project:

- jobs supported by development activity, including (1) direct construction jobs and other jobs involved with development, and (2) indirect jobs supported by purchases of goods and services by construction companies and their employees;
- over 3,800 jobs at full development of the Project, or over 90 times as many as the 40 jobs currently provided by agricultural activities;
- jobs supported by purchases of goods and services by the companies that locate within the Project Area, and by the families of their employees; and
- tax revenues (excise taxes, personal income taxes, corporate income taxes, property taxes, etc.) paid by companies and employees directly and indirectly supported by development activities and by on-going operations of companies that locate within the Project Area.

## 8. CONSISTENCY WITH STATE AND CITY POLICIES

### a. Availability of Lands for Agriculture

The *Hawaii State Constitution*, the *Hawaii State Plan*, the *State Agriculture Functional Plan*, and the *General Plan of the City and County of Honolulu* call directly or implicitly for preserving the economic viability of plantation agriculture and promoting the growth of diversified crops. To accomplish this, an adequate supply of agriculturally suitable lands and water must be assured.

With regard to plantation agriculture, the Project Area is no longer part of a sugar plantation since the plantation closed in 1995 for reasons unrelated to the Project.

With regard to diversified crops, development of the Project Area will result in a small loss of good farm land, but this loss will not limit the growth of diversified crops since ample agricultural land is available on O'ahu and on other islands. This is due to the enormous supply of agricultural land that is now available due to the contraction of plantation agriculture.

### b. Conservation of Agricultural Lands

In addition to the above, State policies call for conserving and protecting prime agricultural lands, including protecting agricultural lands from urban development.

However, these policies—which were written before the major contraction of plantation agriculture in the 1990s—assume implicitly that profitable agricultural activities eventually will be available to utilize all available agricultural lands. This has proven to be a questionable assumption in view of the enormity of the contraction of plantation agriculture, the abundant supply of land that came available for diversified agriculture, and the slow growth in the amount of land being utilized for diversified agriculture.

Furthermore, discussions in the Agriculture portion of the *State Functional Plan* recognize that redesignation of lands from Agricultural to Urban should be allowed "... upon a demonstrated change in economic or social conditions, and where the requested redesignation will provide greater benefits to the general public than its retention in ...agriculture;" that is, when an "overriding public interest exists." The enormous contraction in plantation agriculture, resulting in the supply of agricultural land far exceeding demand, constitutes a major change in economic conditions. Moreover, development in the Project Area will provide community benefits (over 3,800 jobs at full development) that far exceed that provided by diversified agriculture (about 40 jobs with current nursery and composting operations, and about 21 jobs if farmed). In practice, however, development of the Project Area is expected to have no significant impact on existing or potential agricultural employment.

**c. 'Ewa Development Plan**

The Project Area is within the City's designated Urban Growth Boundary of the 'Ewa Development Plan in an area designated Industrial. Thus, the Project—along with the change in use from Agricultural to Industrial—is consistent with the 'Ewa Development Plan.

# PROPOSED KAPOLEI HARBORSIDE CENTER: IMPACT ON AGRICULTURE

## 1. INTRODUCTION

Kapolei Property Development proposes to develop Kapolei Harborside Center ("the Project"), an industrial park on 344.519 acres in Kapolei, City and County of Honolulu (see Figure 1 at the end of this report for the location of the Project, Figure 2 for the Tax Map Keys (TMKs), and Figure 3 for the proposed development).<sup>[1]</sup>

The entire Project Area is currently within the State Agricultural District and is zoned "Agricultural" (Figures 4 and 5). However, the Project site is designated for Industrial development in the City's 'Ewa Development Plan (Figure 6). The Project will require a State Land Use District Boundary Amendment to Urban, and a change in zoning to Industrial.

This report addresses the impacts on agriculture of developing the Project. The material below gives the following information on the Project: its location; a description of the Project; the agricultural conditions of the Project Area, along with supporting Figures 7, 8 and 9; potential crops; locational advantages and disadvantages for crop production; surrounding land uses; past and current agricultural land uses; the impact of the Project on existing agricultural operations; the impact the Project on the growth of diversified crops, along with supporting Figure 10 that shows the release of land from plantation agriculture and the increase in acreage in diversified crops; benefits of the Project that will offset adverse agricultural impacts; and consistency of the Project with State and City agricultural policies. Following the ten figures at the end of the report, an Appendix provides a summary of State and City goals, objectives, policies, and guidelines related to agricultural lands.

## 2. LOCATION OF THE PROJECT <sup>[1]</sup>

As shown in Figure 1, Kapolei Harborside Center is located in Kapolei near the southwest corner of O'ahu.

As shown in Figure 2, the Project Area is also defined by four TMK parcels:

- TMK 9-1-014-033 (por), 137.529 acres
- TMK 9-1-014-034 (por), 19.947 acres

- TMK 9-1-014-035 (por), 12.845 acres
- TMK 9-1-015-020 (por), 174.198 acres

### 3. PROJECT DESCRIPTION<sup>[1]</sup>

Kapolei Harborside Center will offer about 248 acres for industrial development for companies engaged in light manufacturing, warehousing, and industrial services. The remaining acreage will be used for roads, drainage, and a wastewater pumping station (WWPS). In addition, a preservation area will protect sinkholes having scientific value.

### 4. AGRICULTURAL CONDITIONS

#### a. Soil Types<sup>[2]</sup>

As shown in Figure 7, the Project Area contains three soil types. Their acreages are listed in Table 1 by their quality as rated by the Natural Resources Conservation Service (NRCS), formerly known as the Soil Conservation Service.

For each of the three soil types, the complete name, range of slopes, and soil descriptions are:

- EmA: 'Ewa silty clay loam, moderately shallow, 0 to 2% slopes

These are well-drained soils derived from basic igneous rock and, in 'Ewa, deposited on alluvial fans.

- MnC: Mamala stony silty clay loam, 0 to 2% slopes

These soils consist of shallow, well-drained soils along the coastal plains. They formed in alluvium deposited over coral limestone and consolidated calcareous sand. Stones, mostly coral rock fragments, are common in the surface layer and in the profile.

- CR: Coral Outcrop

Coral outcrop consists of coral or cemented calcareous sand.

As indicated in Table 1, CR (coral outcrop) is the predominant soil type, comprising 82.6% of the Project Area. Although this soil is poorly suited for agriculture, portions of the land were covered with fill to allow for the cultivation of sugarcane.

**Table 1. Kapolei Harborside Center Project Area:  
Soil Types and NRCS Ratings**

<u>Soil Types</u>	<u>Acres</u>		<u>NRCS Ratings</u>
Higher-quality EmA	6.0	1.7%	IIs
Moderate-quality MnC	54.0	15.7%	IIIs
Lower-quality CR	285.0	82.6%	VIIIs
Adjustment	-0.5	-	
Total	344.5	100.0%	

#### b. Soil Ratings

Three classification systems are commonly used to rate Hawai'i soils: (1) Land Capability Grouping, (2) Agricultural Lands of Importance to the State of Hawai'i, and (3) Overall Productivity Rating.

##### Land Capability Grouping (NRCS Rating)<sup>[2]</sup>

The 1972 Land Capability Grouping by the U.S. Department of Agriculture, NRCS rates soils according to eight levels, ranging from the highest classification level "I" to the lowest "VIII."

As shown in Table 2, about 6 acres (1.7%) of the Project Area have soils that are rated IIs. Class II soils have moderate limitations that reduce the choice of plants or require moderate conservation practices. The subclassification "s" indicates that the limitation is due to stoniness.

About 54 acres (15.7%) have soils rated IIIs. Class III soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.

About 285 acres (82.6%) have soils rated VIIIs. Class VIII soils have very severe limitations that preclude commercial crop production.

### Agricultural Lands of Importance in the State of Hawai'i (ALISH)<sup>[3]</sup>

ALISH ratings were developed in 1977 by the NRCS, the UH College of Tropical Agriculture and Human Resources, and the State of Hawai'i, Department of Agriculture. This system classifies land into three broad categories: (a) "Prime" agricultural land which is land that is best suited for the production of crops because of its ability to sustain high yields with relatively little input and with the least damage to the environment; (b) "Unique" agricultural land which is non-Prime agricultural land used for the production of specific high-value crops; and (c) "Other" agricultural land which is non-Prime and non-Unique agricultural land that is important to the production of crops.

About 4 acres (1.2%) of the Project Area have soils that are rated Prime; about 50.3 acres (14.6%) are rated Other; and about 290.7 acres (84.3%) are unclassified (Figure 8). The Other rating was ascribed to MnC soils which, in 1977, were used for growing sugarcane.

### Overall Productivity Rating (LSB Rating)<sup>[4]</sup>

In 1972, the University of Hawai'i (UH) Land Study Bureau (LSB) developed the Overall Productivity Rating, which classifies soils according to five levels, with "A" representing the class of highest productivity and "E" the lowest.

When irrigated, about 65.7 acres (19%) of the Project Area have soils rated B, about 105.6 acres (30.6%) of the Project Area are rated C, and about 173.7 acres (50.3%) are rated E (see Figure 9). The B and C ratings reflect the addition of fill material and areas where sugarcane was grown in 1972.

### Summary Evaluation of Soil Quality

The NRCS and ALISH soil-rating systems indicate that about 4 to 6 acres of the Project Area are good for cultivating crops (II or better under the NRCS rating, and Prime under the ALISH rating). Another 50 to 54 acres are suitable for farming (III under the NRCS rating, and Other under the ALISH rating). When fill material is taken into account, the LSB ratings indicated that about 66 acres of the Project Area are good for cultivating crops (B rating), and another 106 acres are suitable for farming (C rating).

#### **c. Soil Characteristics<sup>[2,4]</sup>**

Consistent with the above soil ratings, the small amount of land in the Project Area that could be used for farming exhibits a number of favorable characteristics: the soils are moderately deep to deep (over 30 inches), the texture is moderately fine although stony, the soils have moderate tillability, soils

are well drained, the slopes are gentle (see below), the erosion hazard is slight, and the soil pH is neutral to mildly alkaline.

**d. Elevation<sup>[1]</sup>**

The ground elevation of the Project Area ranges from about 5 feet near the intersection of Kalaeloa Boulevard and Malakole Road to about 70 feet near the northeast corner of the site.

**e. Topography<sup>[1]</sup>**

The Project Area is relatively flat to gently sloping, with slopes generally ranging from 0 to 2%. Mounds and depressions are scattered across the site, and a large stockpile of coralline material from the excavation of Kalaeloa/Barbers Point Harbor occupies approximately 50 acres in the southwestern corner of the Project Area.

**f. Climatic Conditions**

Like other areas in Hawai'i, the 'Ewa plain has a mild *semitropical* climate which is due primarily to three factors: (1) Hawai'i's mid-Pacific location near the Tropic of Cancer, (2) the surrounding warm ocean waters that vary little in temperature between the winter and summer seasons, and (3) the prevailing northeasterly tradewinds that bring air having temperatures that are close to those of the surrounding waters.

Solar Radiation<sup>[5]</sup>

The Ewa region of O'ahu is one of the sunniest areas on the island. It is semi-arid, with a relatively warm and dry climate, and an average daily insolation of 500 calories per square centimeter.

Rainfall<sup>[6]</sup>

Rainfall in the Project Area is low: an average of about 20 inches per year. Most of this rainfall occurs during the winter rainy season (October through April), while the summer months (May through September) are hot and dry.

Temperatures<sup>[6]</sup>

Average low temperatures range from about 61° Fahrenheit in the winter to about 70° in the summer. Average high temperatures range from about 80° in the winter to 88° in the summer.



### Winds and Storms<sup>[6]</sup>

The prevailing surface winds are tradewinds that blow from a northeasterly direction, with occasional southerly winds. Low-velocity surface winds of less than 10 miles per hour occur frequently. The tradewinds tend to break down during the fall, giving way to lighter, more variable wind conditions through the winter and into the early spring. Storms are infrequent, occurring mostly from the south in the winter months.

### **g. Irrigation Water**<sup>[7]</sup>

Historically, the sugarcane fields within the Project Area were irrigated with groundwater.

### **h. Road Access**

Fields in the Project Area are reached via plantation roads that connect to Malakole Road and Kalaeloa Boulevard. In turn, Kalaeloa Boulevard connects to the H-1 Freeway.

### **i. Summary**

About 54 to 171 acres (16 to 50%) in the Project Area are good or suitable for growing low-elevation crops; the higher figure reflects the fill material that was added in the past to allow cultivation of sugarcane. The remaining land is poorly suited for farming, largely because most of it is coral outcrop.

## **5. POTENTIAL CROPS**<sup>[8]</sup>

Based on the above agronomic conditions, the Project Area is suitable for low-elevation crops commercially grown in Hawai'i, including but not limited to: asparagus, beans (green, bush, and snap), bell peppers, bittermelon, cantaloupe, Chinese peas, cucumbers, daikon, dry onions, eggplant, flowers/nursery products, ginger root, green onions, green peppers, head and semi-head lettuces, herbs, honeydew melons, limes, lotus root, lychee, Manoa lettuce, mango, mustard cabbage, Oriental squash, parsley, pumpkins, seed crops, sweet corn, sweet potatoes, tangerines and watermelons.

## **6. LOCATIONAL ADVANTAGES AND DISADVANTAGES FOR CROP PRODUCTION**

The Project Area is well-located for serving the Honolulu consumer market and export markets. This is due to the short trucking distance to the Honolulu markets, the Honolulu International Airport, and Honolulu Harbor.

In the U.S. mainland market, farmers in Hawai'i must compete against farmers on the mainland and in Mexico, Central and South America, the Caribbean, Australia, New Zealand, Southeast Asia, etc. Most of the competing farm areas have lower production and delivery costs than Hawai'i does. Competing against Mexico is particularly difficult given the North America Free Trade Agreement (NAFTA) and Mexico's proximity to major U.S. markets.

## 7. SURROUNDING LAND USES

Existing and planned land uses surrounding the Project Area are shown in Figures 1 through 6, and include: (1) to the north, the vacant lands of the planned Kapolei West project; (2) to the east, vacant industrial land and Kapolei Business Park; (3) to the south, Campbell Industrial Park; and (4) to the west, Kalaeloa/Barbers Point Harbor and its related activities.

As indicated, all of the current and planned land uses surrounding the Project Area are urban, with no adjacent or nearby agricultural activities. Thus, the Project Area is an agricultural remnant.

## 8. PAST AND CURRENT AGRICULTURAL LAND USES

### a. Historic Agricultural Uses<sup>[4,7,9-11]</sup>

Following the Mahele of 1848, the Project Area was part of a 43,250-acre grant which, from 1871 to 1877, was leased for cattle grazing. In 1877, James Campbell purchased most of the property (including the Project Area) for cattle ranching—an activity that lasted until 1899.

Campbell then leased the property to Benjamin Dillingham in 1889 who, in turn, subleased the land to the 'Ewa Plantation Company to cultivate sugarcane. The 'Ewa Plantation Company grew quickly and continued operating until 1970 when the O'ahu Sugar Company (OSCo) took over operations. Sugarcane cultivation was continued until 1995 when OSCo closed.

About 167 acres (49%) of the Project Area were used for growing sugarcane. The remaining acreage was unsuitable for cultivation.

### b. Recent Agricultural Uses<sup>[11,12]</sup>

Until the end of May 2006, Aloun Farms held a lease to about 261 acres within the Project Area. The lease expired at the end of 2007 but the land was returned early. Because of the poor quality of the land, the annual rent was only \$50 per acre.

On this land, Aloun Farms occasionally grew corn interspersed with watermelon. The last such crop was grown in the fall of 2004. In recent years, the land was not farmed actively because of its poor quality and because it is an agricultural remnant surrounded by urban activities that make operations more difficult. Also, Aloun Farms has access to about 2,500 acres of higher quality farm lands that it leases in the central portion of the 'Ewa plain and in Central O'ahu. Averaged over time, about one-third of these fields are in crop.

c. **Current Agricultural Uses<sup>[11]</sup>**

Currently, two agricultural operations lease land within the Project Area: (1) Milo Nursery & Landscape Maintenance, Inc. (Milo Nursery) leases about 32 acres for its nursery operations and (3) Menehune Green, LLC (Menehune Green) leases about 52 acres for composting green waste.

**9. IMPACT ON EXISTING AGRICULTURAL OPERATIONS**

a. **Milo Nursery & Landscape Maintenance**

Milo Nursery Operations

Milo Nursery leases about 32.1 acres at the corner of Malakole Street and Kalaeloa Boulevard. The company has been in the Kapolei area for about 30 years and at its current location for about 17 years. The current rent is about \$419 per acre per year, and the lease expires in 2009, subject to early termination with 90-days notice.

The company is a wholesale nursery that sells to various landowners, companies, landscapers, and contractors. Services include landscaping of building grounds, landscape maintenance, and street sweeping. On-site improvements include an open shop, an office, and facilities for employees.

Milo Nursery is a family operation owned and managed by a retired fireman. The company has about 10 employees with an annual payroll of about \$300,000.

Impact on Milo Nursery

The impact of the Project on Milo Nursery will depend on whether suitable land with water can be obtained. If it can, then Milo Nursery will relocate with no significant impact on revenues, employment, or payroll. Continued operations will be possible because of its existing contacts and contracts, equipment, and good reputation. In the long-term, the nursery will be operated by the owner's sons who also work at the nursery.

If suitable land with water cannot be obtained, then Milo Nursery will close. In turn, other nurseries, landscapers, and yard-maintenance companies will increase their operations to compensate for the loss. Thus, there will likely be a shift in operations, but no significant island-wide loss of revenues, employment, or payroll.

## b. Menehune Green

### Menehune Green Operations

Menehune Green operates a composting business on about 52 acres within the Project Area, recently increased from about 39.3 acres.<sup>[11]</sup> About 14.3 acres front Makakole Street, while the remaining 37.7 acres are located *mauka*. Most of the equipment and facilities are located on the 14.3-acre site where rents are higher than they are for the larger area. For the 39.3-acre area, the recent base-plus-percentage rent was nearly \$2,700 per acre per year, which is high compared to most other agricultural activities on O'ahu. The lease expires in 2009, subject to early termination with 90-days notice.

Menehune Green is a new Hawai'i company organized in June 2005, and affiliated with Honolulu Disposal Services, Alii Refuse, Horizon Waste Services, and Reynolds Recycling.<sup>[13]</sup> These affiliates control a large share of the commercial waste disposal business on O'ahu. Menehune Green is also affiliated with Cedar Grove Composting, Inc. near Seattle, Washington.<sup>[14]</sup> This company operates the largest yard-waste composting site in the United States.<sup>[15]</sup>

The composting operation in the Project Area was started in 1992 by Hawaiian Earth Products.<sup>[14]</sup> Menehune Green took over the operation when it purchased Hawaiian Earth Products in November 2005.

Green waste is delivered to Menehune Green by the City, the State, commercial refuse collectors, tree trimmers, yard services, and homeowners.<sup>[14]</sup> The volume of green waste is high because the City bans truckloads of waste containing more than 10% yard trimmings from its landfill and H-Power. In effect, organizations that generate or haul waste must sort out the green waste and deliver it for composting.

The Menehune Green composting operation is the largest in the State.<sup>[14]</sup> Its current volume of green waste is about 60,000 tons per year which is composted at two locations: the leeward location within the Project Area and a windward location near Kailua. The leeward volume is about 36,000 tons per year (about 60% of the total). The windward location eventually will be converted to a transfer station, with all of the green waste composted at the leeward location. Also, the City's new policy of curb-side collection of green waste will double the volume of green waste delivered to Menehune Green, with the pace of growth

determined by the City's implementation of curb-side collection. Thus, the volume composted at the leeward location will increase from about 36,000 tons per year to more than 120,000 tons per year.

Menehune Green accepts yard trimmings, fruit and vegetable waste, wood waste (unless it is treated or painted with lead paints), and borate-treated lumber.<sup>[14]</sup> After the loads are weighed and sorted to remove plastics and other items, the green waste is shredded into mulch, placed in windrows (piles about 8 feet wide, 10 feet high, and 400 to 800 feet long), and allowed to decompose. The piles are kept moist and turned every 3 to 7 days, depending on the temperature. The maximum daily water requirement is about 100,000 gallons per day, or about 2,500 gallons per acre per day; this is as much water as is used to irrigate some diversified crops. The composting process takes about 12 weeks. The high temperatures generated by composting kills weed seeds and pathogens.

The resulting compost may be blended with other materials, including manure, topsoil, black cinders, and silica sand.<sup>[14]</sup> The products are sold in bulk and bags, and distributed throughout the State under the brand-name "Menehune Magic." Buyers include homeowners, gardeners, landscapers, farmers, and building contractors. Since the volume of green waste composted by Menehune Green is projected to more than double, the volume of compost sold will increase by a proportional amount. This will require marketing to sell more local compost in place of imports, and to sell more compost to farmers and other buyers.

Revenues are derived from tipping fees (\$37 per ton for green waste) and from selling the compost soil conditioner (\$30 per cubic yard in bulk, unblended, course 1/2" screen).<sup>[14]</sup>

The current operation employs about 35 workers, of whom about 30 are located at the leeward facility.<sup>[14]</sup> Payroll for the entire workforce amounts to about \$1 million per year.

Facilities and equipment include trailers used for offices, grinders, a windrow turner, screens for sorting compost by size, and a bagging shed.<sup>[14]</sup>

In addition to centralizing operations at a single location, Menehune Green plans a number of related changes that will allow better control of the composting process.<sup>[14]</sup> First, composting will be done on concrete pads studded with air holes that allow better aeration than composting done on the ground. Second, compost piles will be covered with Gore-Tex to protect the piles from wind and rain, and reduce the volume of water lost to evaporation. Third, high-efficiency blowers will provide aeration when computerized monitoring indicates that temperatures are too hot, thereby eliminating the need to turn the compost mechanically. These changes will reduce composting time from about 12 weeks

to about 8 weeks, eliminate the need for equipment to turn the compost, reduce water requirements per ton of green waste processed, and increase labor productivity. Even though the volume of green waste is expected to more than double, little change is expected in employment.

#### Impact on Menehune Green

Menehune Green purchased Hawaiian Earth Products in November 2005 with plans to move the composting operation from the Project Area to some undetermined new location where the changes in composting technology would be introduced.<sup>[14]</sup> Assuming that Menehune Green will be successful in finding a suitable new site for its composting operation, the Project will have no significant impact on the future volume of green waste processed by Menehune Green, or its revenues, employment, or payroll.

About 30 to 50 acres will be required in a centrally located and dry area.<sup>[14]</sup> Also, the site should offer level or gently sloping terrain, good road access, and access to water. However, the composting site does not have to be located near the City's H-Power facility or the City's landfill.

The new location for composting is likely to be on land zoned Agricultural since it is less expensive than Urban land, and composting is categorized by the City as an agricultural use. A major composting operation and related activities (e.g., packaging) are allowed on land zoned Agricultural (Ag-1 Restricted or Ag-2 General), subject to a conditional use permit that specifies the standards for composting: deliveries to and from the site are allowed only between 7 a.m. and 5 p.m.; trucks entering and leaving the site must be covered to prevent material from falling onto the ground and to mitigate odors; composting areas must be at least 50 feet from surface-water sources; major composting facilities must be at least 1,500 feet from lots zoned for homes or resort use, subject to a reduction to no less than 500 feet with proper mitigation; green waste and compost must be covered to prevent fugitive material from leaving the site; odors and vectors must be controlled; and contamination of surface and groundwater must be prevented.<sup>[16]</sup> Land used for composting is eligible for an agricultural dedication which lowers the property-tax assessment and resulting property taxes. And if City water is used to keep the compost wet, the Honolulu Board of Water Supply charges the low agricultural rate for the water.

Lease rents for the existing composting operation (nearly \$2,700 per acre per year) indicate that Menehune Green should be able to outbid most other uses for leased agricultural land at a new location (major farmers on O'ahu pay about \$200 per acre per year).<sup>[17]</sup> Or, if the company purchases agricultural land outside the City's Urban Growth Boundary, it should be able to service a mortgage. A mortgage payment of \$2,700 per acre per year would finance land cost-

ing about \$43,700 per acre, assuming a 30-year loan at 6% interest and 15% down. Most large parcels of agricultural land on O'ahu outside the City's Urban Growth Boundary sell at per-acre values of about half this amount.

## 10. GROWTH OF DIVERSIFIED CROPS

The Project will commit agricultural land to a non-agricultural use. The impact of this commitment on the growth of diversified crops is addressed below. The material covers the (1) amount of land required for the future growth of diversified crops, (2) availability of land for diversified crops, and (3) impact of the Project on the growth of diversified crops.

### a. Potential Acreage Requirements for Diversified Crops

#### Crops to Replace Imports of Fruits and Vegetables

For low-elevation fruits and vegetables that have a history of profitable production in Hawai'i, potential land requirements in 2010 for 100% import substitution for the Hawai'i and O'ahu markets are estimated at 12,700 acres and 8,600 acres, respectively, plus additional acreage for fallowing land between crop plantings.<sup>181</sup> When allowing for competition from imports, these estimates drop to about half. These estimates take into account estimated consumption, production trends, seasonal and annual market shares, yields, and the number of crops per year. Also, these figures are for acreage in crop—not harvested acreage as is typically reported in government publications.

Market shares for Hawai'i growers are limited by the following factors: (1) local varieties are not perfect substitutes for all imports (e.g., premium-priced sweet Maui onions versus inexpensive storage onions); (2) some crops cannot be produced profitably in the summer due to competition from low-cost imports of fruits and vegetables from California, other states, and Mexico; and (3) over-production must be avoided in order to maintain profitable price levels.

Since Hawai'i farmers already supply a portion of the Hawai'i market, land requirements for increased import substitution are a fraction of the above estimates.

#### Export Crops

The potential market for export crops is far larger than the Hawai'i market. In 2004, the U.S. population was 293.66 million, compared to Hawai'i's resident-plus-visitor population of 1.38 million.<sup>19,20</sup> To take advantage of this large potential, Hawai'i farmers are exploring various export crops on lands released from plantation agriculture. Over the next 20+ years, one or more of these crops may prove to be successful and may grow into a major export crop.

However, the history of agricultural efforts in Hawai'i reveals that the successful development of major new export crops requiring large amounts of land is infrequent. For example, over the past 50 years in Hawai'i, farmers have explored numerous possibilities for export crops, but they have developed overseas markets for just one diversified crop that requires more than 10,000 acres (macadamia nuts at 18,000 acres in 2003); one additional crop that requires more than 5,000 acres (coffee at 7,300 acres); and only five additional crops or crop categories that require more than 1,000 acres each (papaya at 2,240 acres, bananas at 1,560 acres, tropical specialty fruits at 1,250 acres, flowers/nursery products at 3,373 acres, and seed crops at 4,080 acres).<sup>[8]</sup> Tropical specialty fruits include longan, lychee, mango, rambutan, star-fruit, etc.

### Feed Crops

If feed crops could be grown in Hawai'i and priced competitively against mainland imports, they could replace a portion of the large volumes of grains and hay that are now being imported to the State. Unfortunately, a number of commercial attempts in Hawai'i to grow grains and alfalfa have been unsuccessful. The major problems have been (1) pests, particularly birds that eat the grains before they are harvested; (2) humidity that is too high for drying alfalfa properly; and (3) high production costs compared to those of mainland farms.<sup>[21]</sup>

### Biofuel Crops

Crops can be grown to produce biomass to fuel a boiler, or as feedstock to produce fuels. Examples of the latter include sugarcane, corn or sorghum used to produce ethanol. In turn, the ethanol is used to produce E-10 gasohol (90% gasoline and 10% ethanol).

In Hawai'i, the common practice is to produce biomass as a by-product of some principal crop. For example, at HC&S on Maui and at Gay & Robinson on Kaua'i, the sugarcane by-product bagasse is burned to help fuel their respective power plants. In addition, the biofuel company Maui Ethanol plans to use the sugarcane by-product molasses from the two sugarcane plantations as a feedstock to produce ethanol.<sup>[22,23]</sup> Using conventional technology, the sugar in the molasses will be fermented to produce ethanol, followed by distillation to extract the alcohol.

However, O'ahu Ethanol Corporation plans to build an ethanol plant at Campbell Industrial Park using conventional technology but, at least initially, using imported molasses as the feedstock.<sup>[23]</sup> The rated capacity will be 15 million gallons of ethanol per year. For the longer term, this company is exploring



the economics of growing sweet sorghum to supply feedstock to its ethanol plant. The sorghum would have to be grown on O'ahu because it would be too expensive to ship the sorghum juice from a Neighbor Island to O'ahu. Sorghum juice is mostly water having a low concentration of sugar compared to molasses.

Acreage requirements for a new sorghum biofuel plantation on O'ahu would range from about 6,000 acres for viability to 15,000 to replace all imported molasses.<sup>[24]</sup> This acreage comprises a substantial share of the estimated 15,300 acres of crop land that will be available on O'ahu following the closure of Del Monte in 2008, but a small share of the 160,000+ acres of crop land that will be available Statewide (see Section 10.b.).

Also, substantial investment capital will be required to cover the cost of a mill to extract the juice from the sorghum, a generating plant to provide power, improvements and upgrades to irrigation systems that are in disrepair, trucks and equipment to harvest and haul the sorghum to the mill and haul the sorghum juice to the ethanol plant, etc.

Annual revenues from selling the ethanol plus direct subsidies are estimated by the consultant at about \$2,100 per acre (based on an estimated 900 gallons per acre per year of ethanol at about \$2.35 per gallon). Even with subsidies, this is low compared to revenues from other crops in Hawai'i.

A number of substantial difficulties must be overcome to develop a sorghum biofuel plantation on O'ahu for supplying feedstock for ethanol production. First, it will be difficult to lease the 6,000+ acres required for economic viability. With the possible exception of Kamehameha Schools, major landowners will be reluctant to lease their land at comparatively low rents for the approximately 30-year period desired by O'ahu Ethanol.<sup>[17]</sup> A long lease period is needed to capitalize the substantial investment in a new plantation. Over time, other farmers—including those displaced from areas designated by the City for eventual urban development—and other users of land are likely to make higher offers for lease rents or land purchases. In view of this potential, the current market value of available agricultural lands is likely to be higher if the lands are not committed long-term at rents that would be low enough to be affordable for a biofuel plantation.

A second difficulty will be the cost of growing a sorghum biofuel crop on O'ahu compared to the cost of importing molasses. For similar crops (e.g., feed crops), importing has proven to be less expensive than growing and processing crops locally.

A third difficulty will be attracting the capital investment required to develop a plantation given the long-term risks. For example, the current high subsidies for ethanol could eventually be reduced. When Hawai'i users are

paying about \$3 per gallon for gasoline, Federal and State ethanol subsidies amount to over \$2 per gallon, of which about \$1.46 comes from the State.<sup>[25]</sup> Reduced subsidies could seriously compromise the profitability of a biofuel crop.

Another long-term risk for potential investors in a biofuel plantation arises from emerging technology that promises a cheaper source of feedstock for ethanol. Instead of producing ethanol using sugars from conventional sources (e.g., molasses, sugarcane, grains, fruits, etc.), the sugar would come from "cellulosic" sources. Using new technology that is in its early stage of commercialization, sugar that is locked in complex carbohydrates of plants is separated into fermentable sugars. Feedstock would include agricultural wastes, yard clippings, discarded paper, wood waste, etc.—i.e., the green waste that is now used for composting. This new technology promises (1) much higher ethanol yields per ton of biomass because the entire plant can be used as feedstock, and (2) lower costs, particularly if there are no growing costs when waste product is used, and if the operator is paid a fee to dispose of municipal and agricultural waste. O'ahu's municipal waste could produce an estimated 160 million gallons of ethanol compared to annual consumption of about 400 million gallons of gasoline.<sup>[26]</sup> This would allow far higher use of ethanol in gasohol than is needed in E-10. In Hawai'i, this new technology is being explored by ClearFuels Technology Inc. In the long term, this less expensive source of feedstock could result in an unprofitable sorghum biofuel plantation.

The above difficulties and risks suggest that the probability of successfully developing and sustaining a sorghum biofuel plantation on Oahu is low.

#### Recent Crop-acreage Trends<sup>[8]</sup>

For all diversified crops—i.e., all crops other than sugarcane and pineapple, including crops to replace imports and crops for export—Statewide land requirements grew by an average of less than 300 acres per year from 1983 through 2003, or less than 3,000 acres per decade (see Figure 10).<sup>1</sup>

During the 5-year period from 1999 to 2003, acreage increased for just three of the major export crop categories: tropical specialty fruits up 340 acres, flowers/nursery products up 661 acres, and seed crops up 1,630 acres. During this same period, acreage declined for four of the major export crops: macadamia nuts down 1,900 acres, coffee down 400 acres, papaya down 1,260 acres, and bananas down 200 acres. The net change was a decrease of 1,130 acres.

1. In Figure 10, the temporary bump in diversified-crop acreage that occurred in the late 1990s reflects the fact that some former sugarcane fields were newly planted with grasses for future cattle grazing. After cattle grazing began in 2000, much of this acreage was recategorized from crop land to grazing land.

### Factors Limiting the Growth of Diversified Crops

A great many crops can be grown in Hawai'i's year-round subtropical climate, and a number of them can be grown profitably in volumes that require a few hundred acres. However, the modest growth in land requirements for diversified crops reflects the fact that few crops can be grown profitably on a large scale. The primary factors that have limited the growth of diversified agriculture in Hawai'i are given below.<sup>[7,18]</sup>

- Hawai'i's subtropical climate is not well-suited to the commercial production of major crops that grow better in the temperate mainland climates.
- For certain crops, special hybrids adapted to Hawai'i's subtropical climate are yet to be developed.
- Crop pests are more prevalent and more expensive to control in Hawai'i than they are on the mainland where the cold winters kill many pests.
- Fruit-fly infestations prevent exports of many crops, or require expensive treatment.
- Most soils in Hawai'i have low nutrient levels and therefore require high expenditures for fertilizer.
- Hawai'i suffers from high farm-labor costs, largely because the agriculture industry must compete against the visitor industry and related industries for its labor.
- Compared to many other farm areas that supply U.S. markets, the cost of shipping agricultural supplies and equipment to Hawai'i is high, as is the cost of exporting produce from Hawai'i to mainland markets. High shipping costs are due to Hawai'i's remote location and to Federal regulations that require use of American-built ships and U.S. crews between U.S. ports.
- For a number of crops, consumption volumes in Hawai'i are too small to support large, efficient farms (i.e., the volumes are too small to realize economies of scale).
- Trends towards crops that are certified as safe and towards a single supplier of many food items favor large farms.
- Hawai'i farmers must compete against highly efficient mainland and foreign farms which, in a number of cases, can deliver produce to Hawai'i more cheaply than it can be produced locally. This is due to economies of scale and, in comparison to Hawai'i, low costs for land, labor, supplies, fertilizer, pest control, equipment, etc.

## b. Land Available for Diversified Crops

### State

Statewide, a vast amount of land has been released from plantation agriculture: about 242,100 acres since 1968—an average decrease of over 6,900 acres per year over a period of 35 years (see Figure 10).<sup>[8,27]</sup> The recent announcement of the closure of Del Monte's pineapple plantation in Kunia, O'ahu will increase this acreage by an additional 5,700 acres, resulting in a total release of at least 247,800 acres by plantation agriculture between 1968 and 2009.<sup>[28]</sup>

This release of land from plantation agriculture has far outpaced the demand for land for diversified crops—an increase of about 25,500 acres over this same period, or an average of about 730 acres per year. Since 1983, the growth has slowed to less than 300 acres per year, as previously mentioned.

The net decrease in crop land amounted to 216,600 acres, and will amount to 222,300 acres after adding the land to be followed by Del Monte. While some of the released land has been converted or is scheduled to be converted to urban uses and tree plantations, an estimated 160,000+ acres remain available for diversified crops.<sup>[25]</sup> Cultivating crops on the Neighbor Islands for the Honolulu market, and vice versa, will become more economically feasible once the Superferry begins its scheduled operations in 2007.<sup>[29]</sup> For a full load carried in a large pick-up truck, the one-way fare will be about 2¢ per pound.

Because of the increased availability of agricultural land, a number of land-owners report lower per-acre land rents on O'ahu and the Neighbor Islands compared to rents that were charged before the major contraction in plantation agriculture.<sup>[17]</sup>

The above information indicates that ample land is available in Hawai'i to accommodate the growth of diversified crops, whether demand is based on potential or recent trends. In other words, the limiting factor to the growth of diversified crops is *not* the *land supply*, but rather the *size of the market* for crops that can be grown *profitably* in Hawai'i.

### O'ahu

A similar release of land occurred on O'ahu. Since 1968, about 47,500 acres were released from plantation agriculture due to the contractions of three sugar plantations and their eventual closures, and the contractions of two pineapple plantations.<sup>[8,9]</sup> By 2009, this figure will increase to 52,600 acres after the Del Monte pineapple plantation closes. Using the more recent date of 1990, the release of land from plantation agriculture on O'ahu totaled about 28,300 acres—a figure which will increase to 34,000 acres by 2009 after the Del Monte pineapple plantation closes.

Much of this 34,000 acres released or to be released from sugar and pineapple production since 1990 remains available. Fields in Kunia and 'Ewa are regarded as being among the best farm land in the State, based on the high solar radiation, high-quality soils, and the short trucking distance to the large Honolulu market and, for export markets, to the Honolulu International Airport and Honolulu Harbor.<sup>[21]</sup> Except for the Del Monte fields, these lands have been leased for diversified agriculture. However, on average, only about one-third to one-half of this land is in crop.<sup>[30]</sup> The large amount of fallowing reflects best management practices when farm land is abundant and land rents are low. Fallowing increases soil fertility and helps control unwanted volunteers, weeds, insects and disease. When demand for farm land is strong and rents are high in response to a strong demand for agricultural products, then more intensive farming of the land is warranted even if this increases farmers' costs for pest control and soil additives.

On the North Shore, various crops are being grown, but about 9,600 acres of the former sugarcane and pineapple lands remain fallow or are in a low-value use.<sup>[17,31]</sup> However, portions of the North Shore water systems need repair, and the types of crops on fields irrigated with water from Lake Wilson will be restricted so long as partially-treated waste water is discharged into the lake. Even though the water is disinfected, water from Lake Wilson cannot be used to irrigate certain crops (e.g., vegetable crops) unless they are processed sufficiently to kill pathogens.

By 2009, about 15,300 acres of farm land will be available on O'ahu. This includes the 9,600 acres on the North Shore plus the 5,700 acres that will be available following the closure of the Del Monte pineapple plantation, but it excludes any adjustment for the farm land in 'Ewa and Kunia land that is already leased for diversified crops but is not farmed intensively.

### c. Impact on the Growth of Diversified Crops

The Project will commit 344.5 acres of agricultural land to a non-agricultural use, of which about 54 to 171 acres are good or suitable for farming. If this much land were used to grow a typical vegetable or fruit crop, it could support about 21 jobs (based on 171 acres and about 12.5 jobs per 100 acres).

More realistically, the development of this agricultural land—combined with other developments in Hawai'i—involves the loss of too little good agricultural land to affect (1) the availability of land to farmers in Hawai'i, (2) agricultural land rents, (3) the growth of diversified crops, or (4) potential agricultural employment. This conclusion is based on the above finding that ample land is available for diversified crops, with the available supply far exceeding likely or potential demand.

More to the point, the Project Area has already been lost to farming because it is an agricultural remnant surrounded by existing and planned urban development.

## 11. OFFSETTING BENEFITS

The loss of 344.5 acres of agricultural land, of which about 54 to 171 acres are good or suitable for farming, will be offset by the following benefits of the Project:

- jobs supported by development activity, including (1) direct construction jobs and other jobs involved with development, and (2) indirect jobs supported by purchases of goods and services by construction companies and their employees;
- over 3,800 jobs at full development of the Project, or over 90 times as many as the 40 jobs currently provided by agricultural actives;<sup>[32]</sup>
- jobs supported by purchases of goods and services by the companies that locate within the Project Area, and by the families of their employees; and
- tax revenues (excise taxes, personal income taxes, corporate income taxes, property taxes, etc.) paid by companies and employees directly and indirectly supported by development activities and by on-going operations of companies that locate within the Project Area.

## 12. CONSISTENCY WITH STATE AND CITY POLICIES<sup>[33]</sup>

### a. Availability of Lands for Agriculture

The *Hawaii State Constitution*, the *Hawaii State Plan*, the *State Agriculture Functional Plan*, and the *General Plan of the City and County of Honolulu* call directly or implicitly for preserving the economic viability of plantation agriculture and promoting the growth of diversified crops. To accomplish this, an adequate supply of agriculturally suitable lands and water must be assured.

With regard to plantation agriculture, the Project Area is no longer part of a sugar plantation since the plantation closed in 1995 for reasons unrelated to the Project.

With regard to diversified crops, development of the Project Area will result in a small loss of good farm land, but this loss will not limit the growth of diversified crops since ample agricultural land is available on O'ahu and on other islands. This is due to the enormous supply of agricultural land that is now available due to the contraction of plantation agriculture (see Section 10 and Figure 10).

#### b. Conservation of Agricultural Lands

In addition to the above, State policies call for conserving and protecting prime agricultural lands, including protecting agricultural lands from urban development.

However, these policies—which were written before the major contraction of plantation agriculture in the 1990s—assume implicitly that profitable agricultural activities eventually will be available to utilize all available agricultural lands. This has proven to be a questionable assumption in view of the enormity of the contraction of plantation agriculture, the abundant supply of land that came available for diversified agriculture, and the slow growth in the amount of land being utilized for diversified agriculture (see Section 10 and Figure 10).

Furthermore, discussions in the Agriculture portion of the *State Functional Plan* recognize that redesignation of lands from Agricultural to Urban should be allowed "... upon a demonstrated change in economic or social conditions, and where the requested redesignation will provide greater benefits to the general public than its retention in ...agriculture;" that is, when an "overriding public interest exists." The enormous contraction in plantation agriculture, resulting in the supply of agricultural land far exceeding demand, constitutes a major change in economic conditions. Moreover, development in the Project Area will provide community benefits (over 3,800 jobs at full development) that far exceed that provided by diversified agriculture (about 40 jobs with current nursery and composting operations, and about 21 jobs if farmed). In practice, however, development of the Project Area is expected to have no significant impact on existing or potential agricultural employment.

#### c. 'Ewa Development Plan

As shown in Figure 6, the Project Area is within the City's designated Urban Growth Boundary of the 'Ewa Development Plan in an area designated Industrial. Thus, the Project—along with the change in use from Agricultural to Industrial—is consistent with the 'Ewa Development Plan.

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*FIGURES*



Figure 1. Location Map



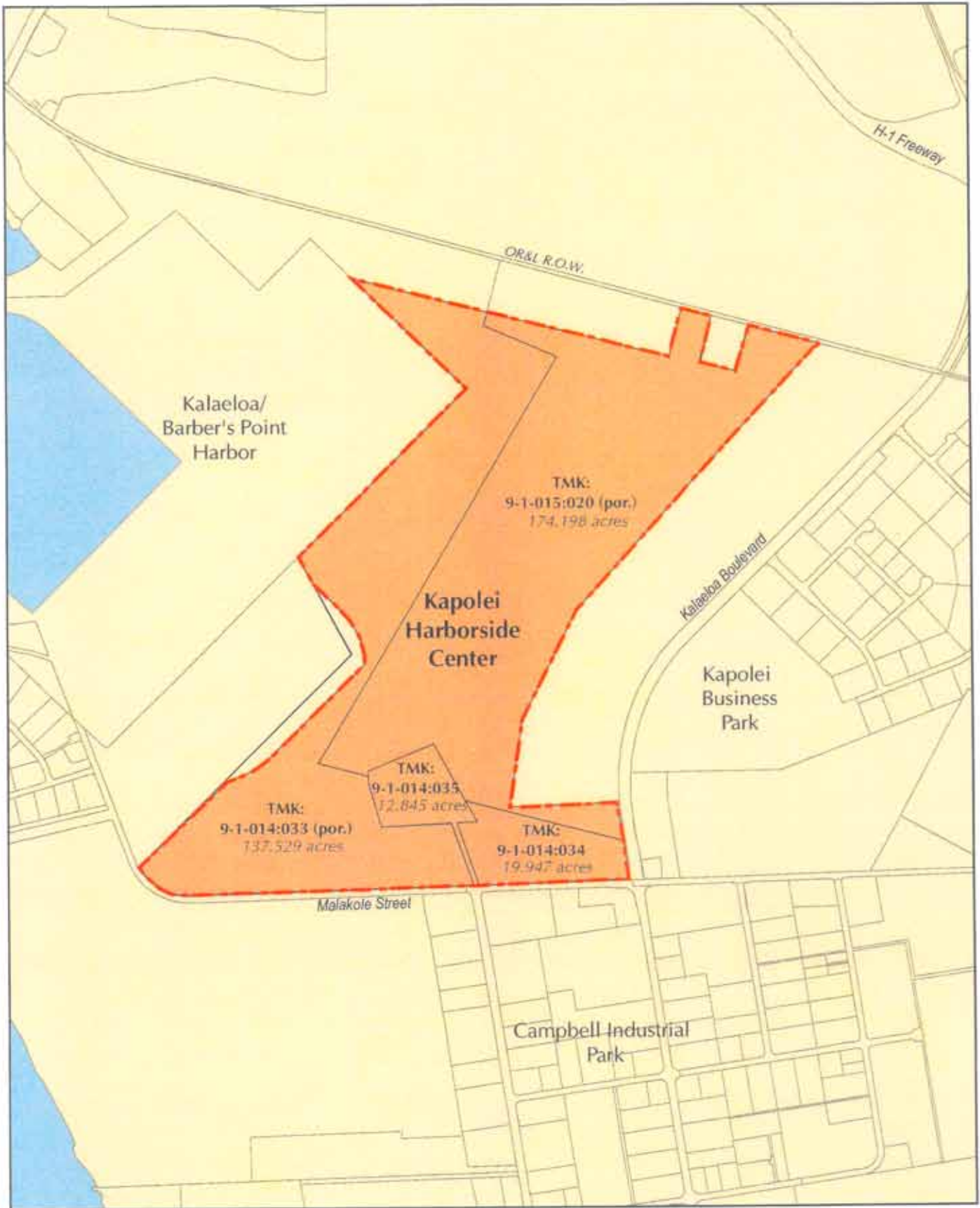
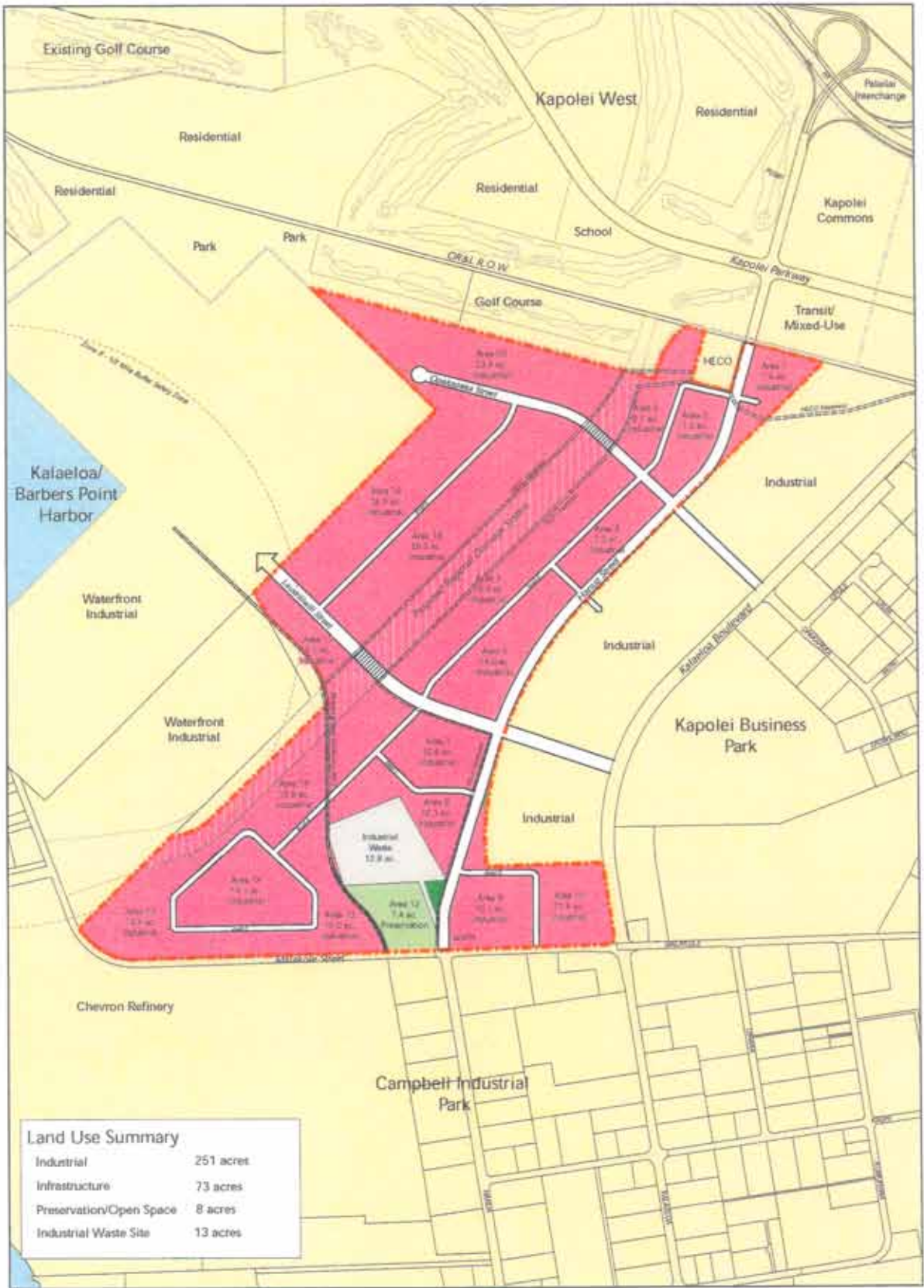


Figure 2. TMK Map





Kapolei Harborside Center  
 Figure 3. Project Master Plan

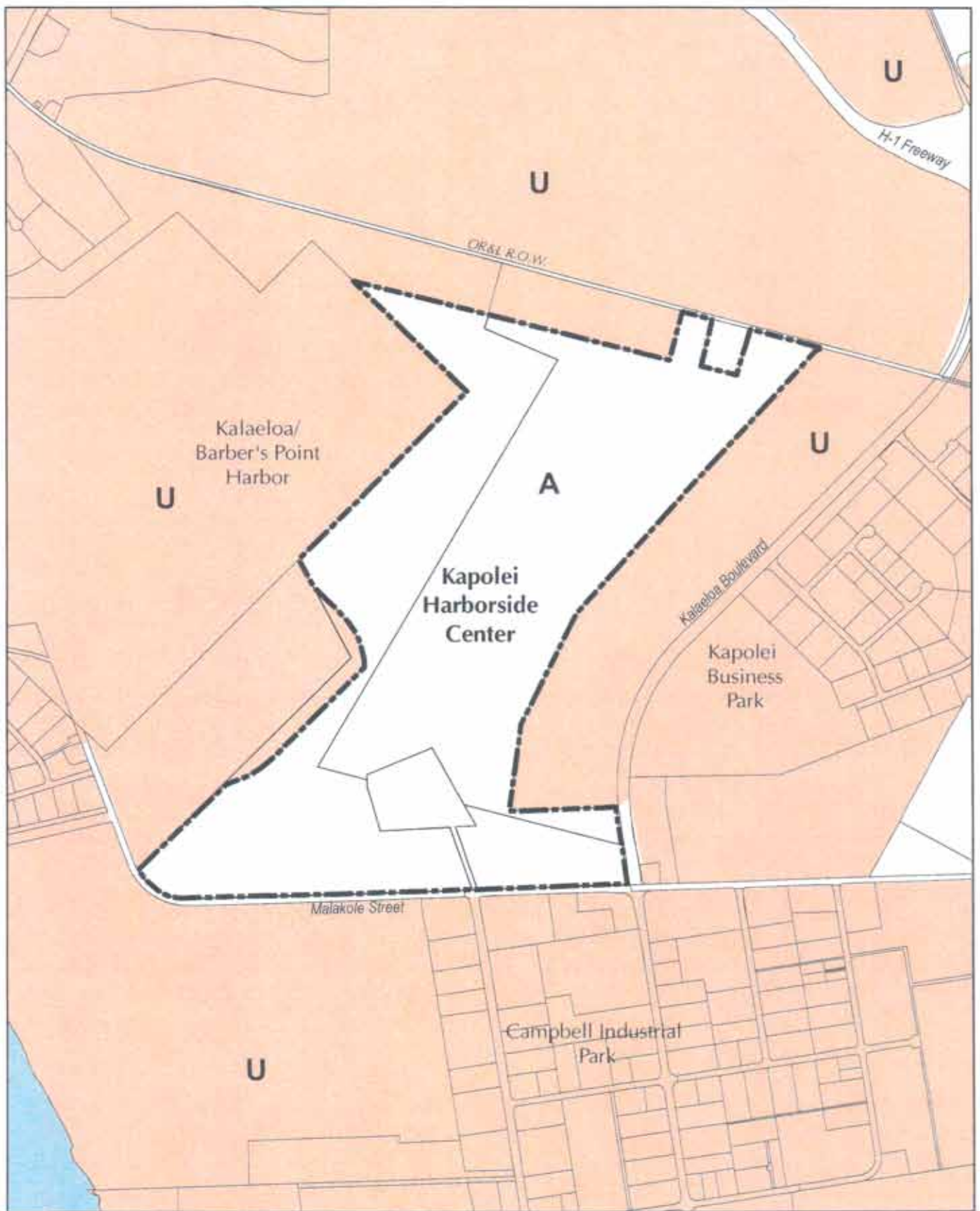


Figure 4. State Land Use District Classifications



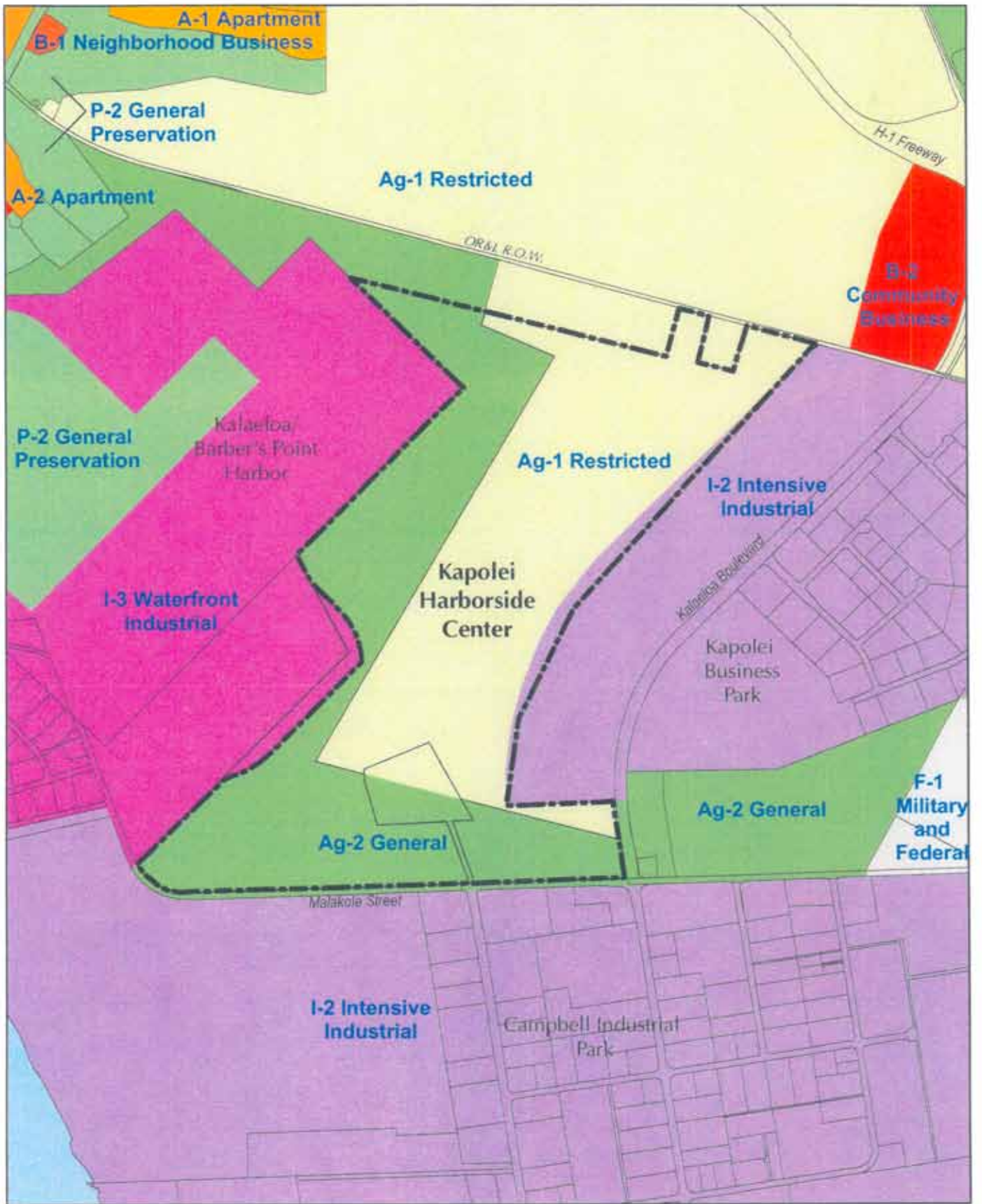
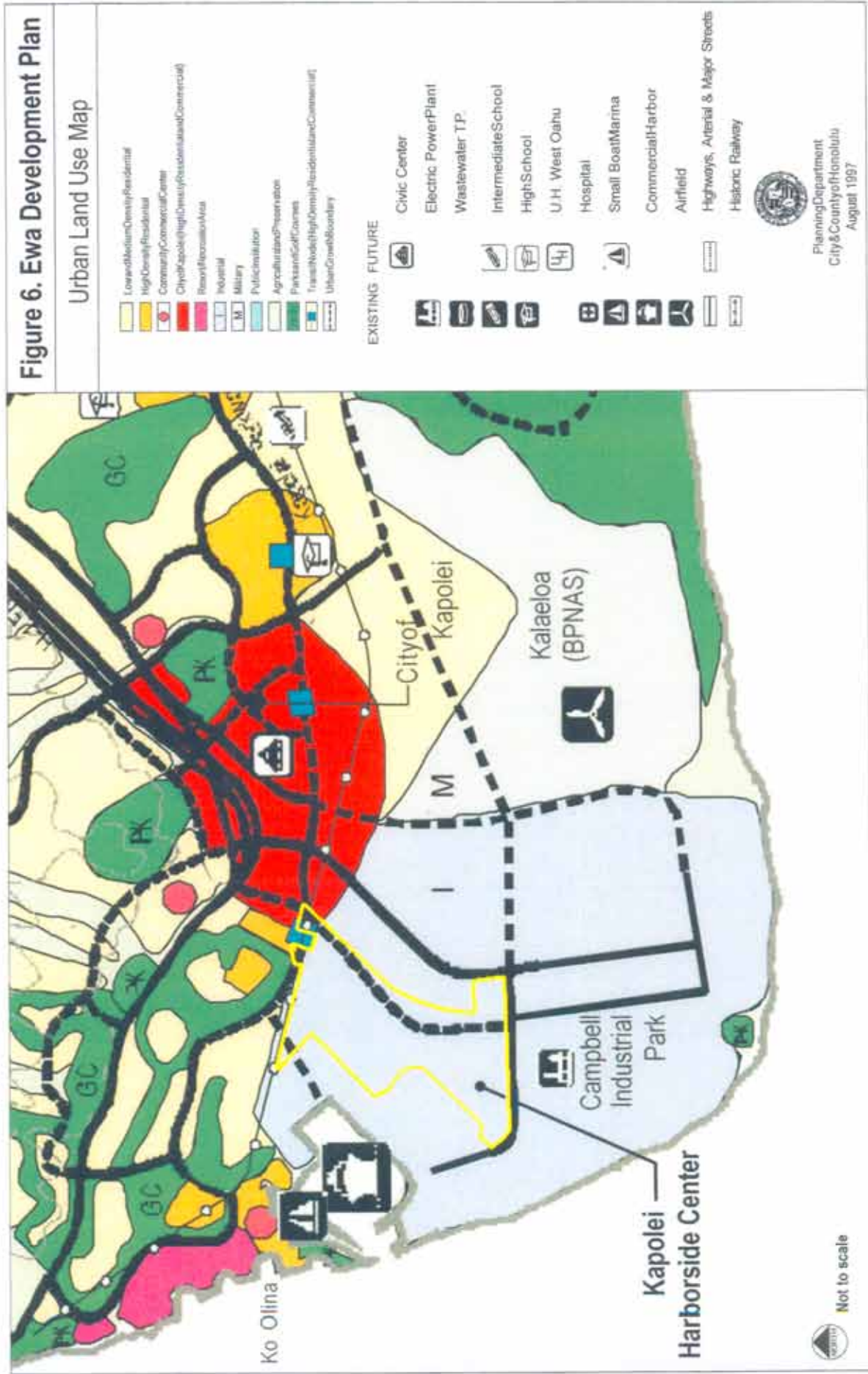


Figure 5. City & County Zoning



**Figure 6. Ewa Development Plan**



Not to scale



Planning Department  
City & County of Honolulu  
August 1997



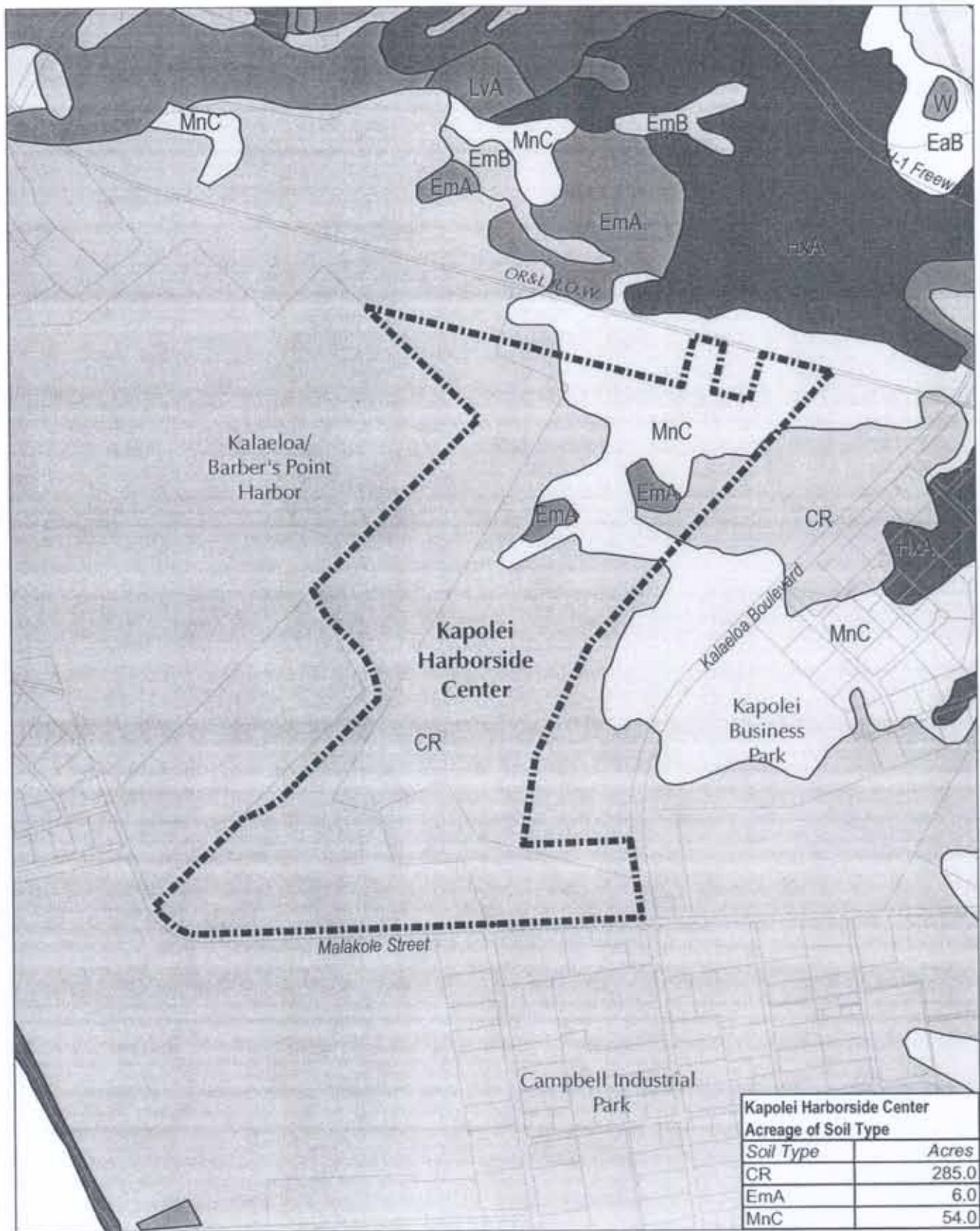


Figure 7. Soils Map



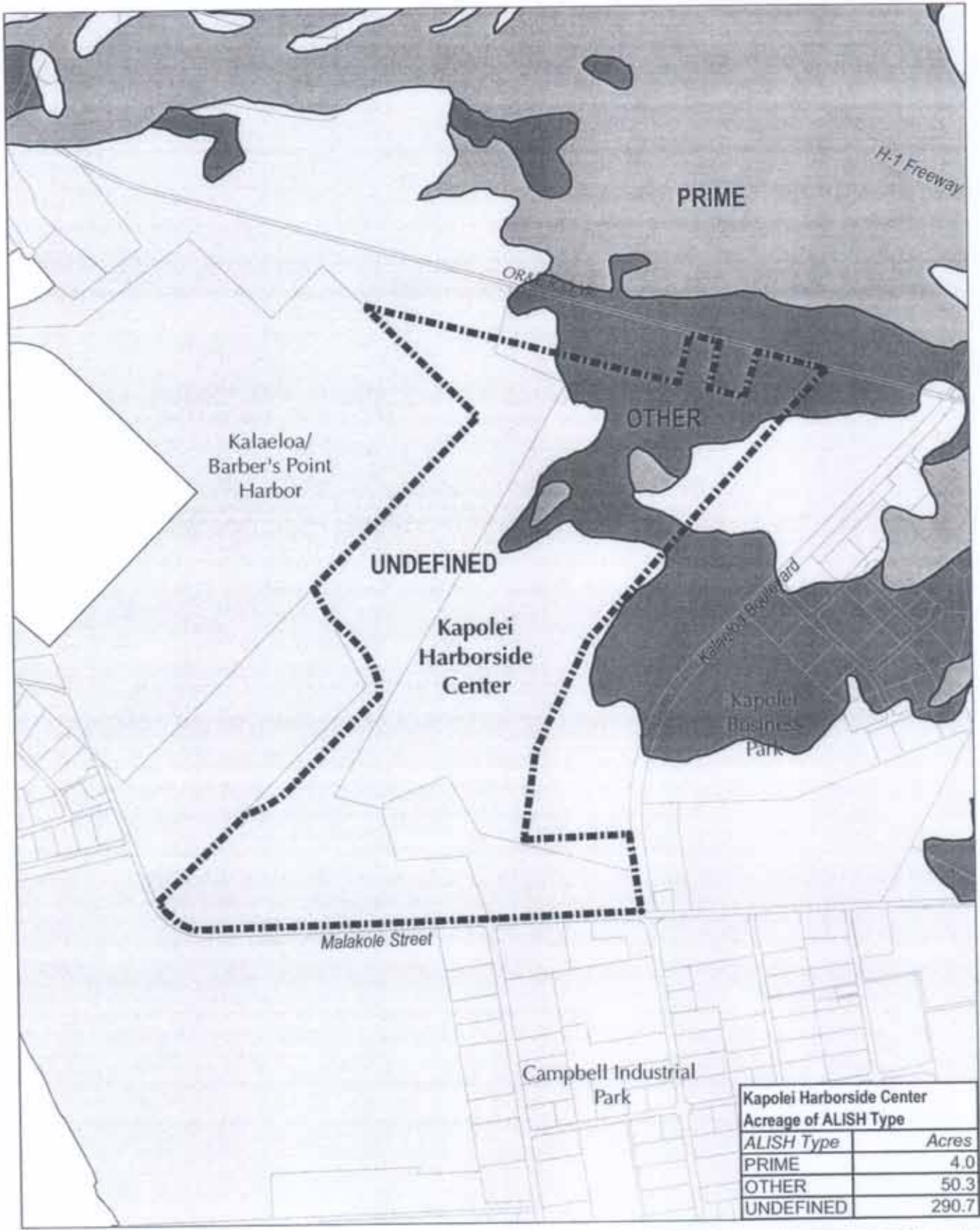


Figure 8. ALISH Map



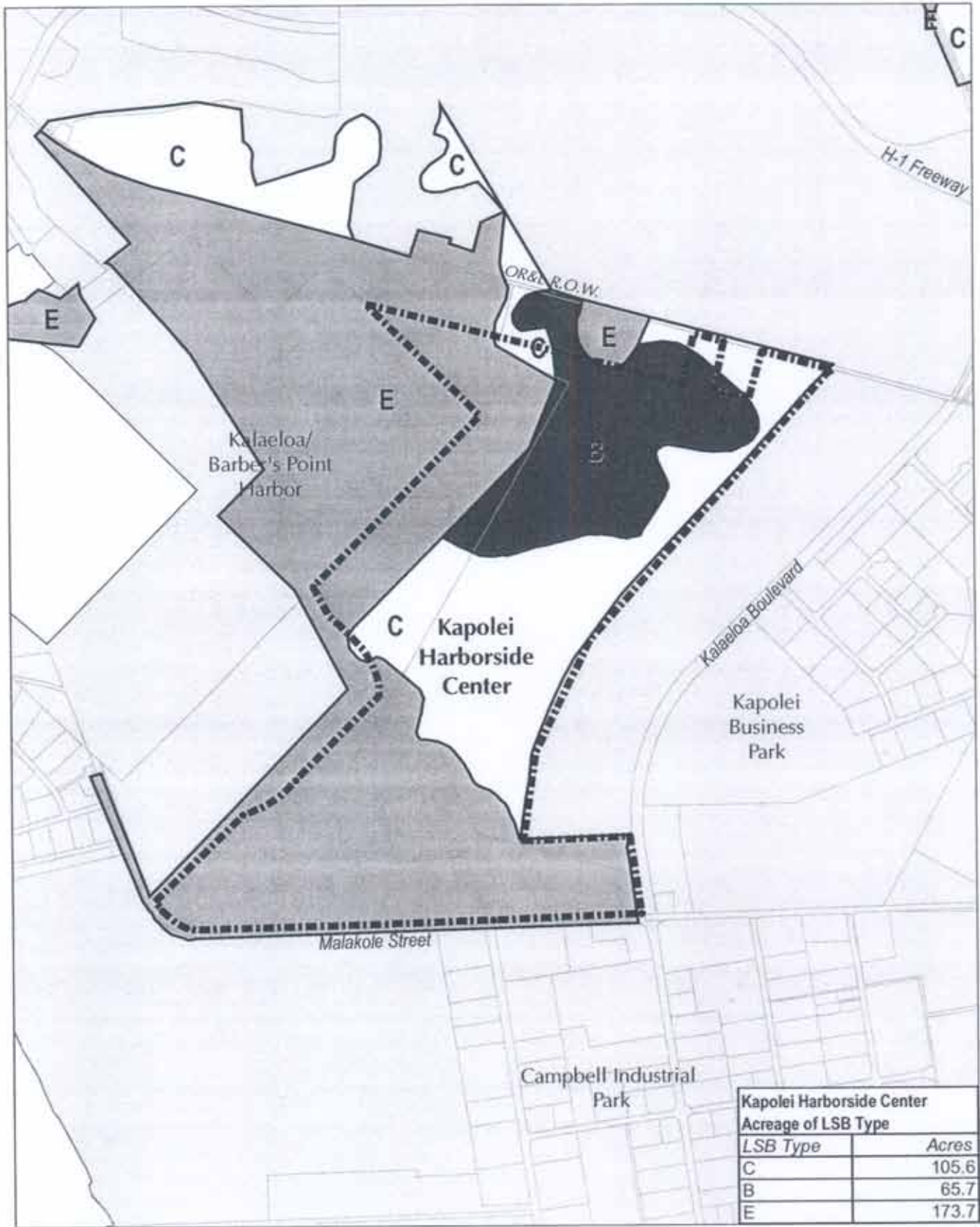
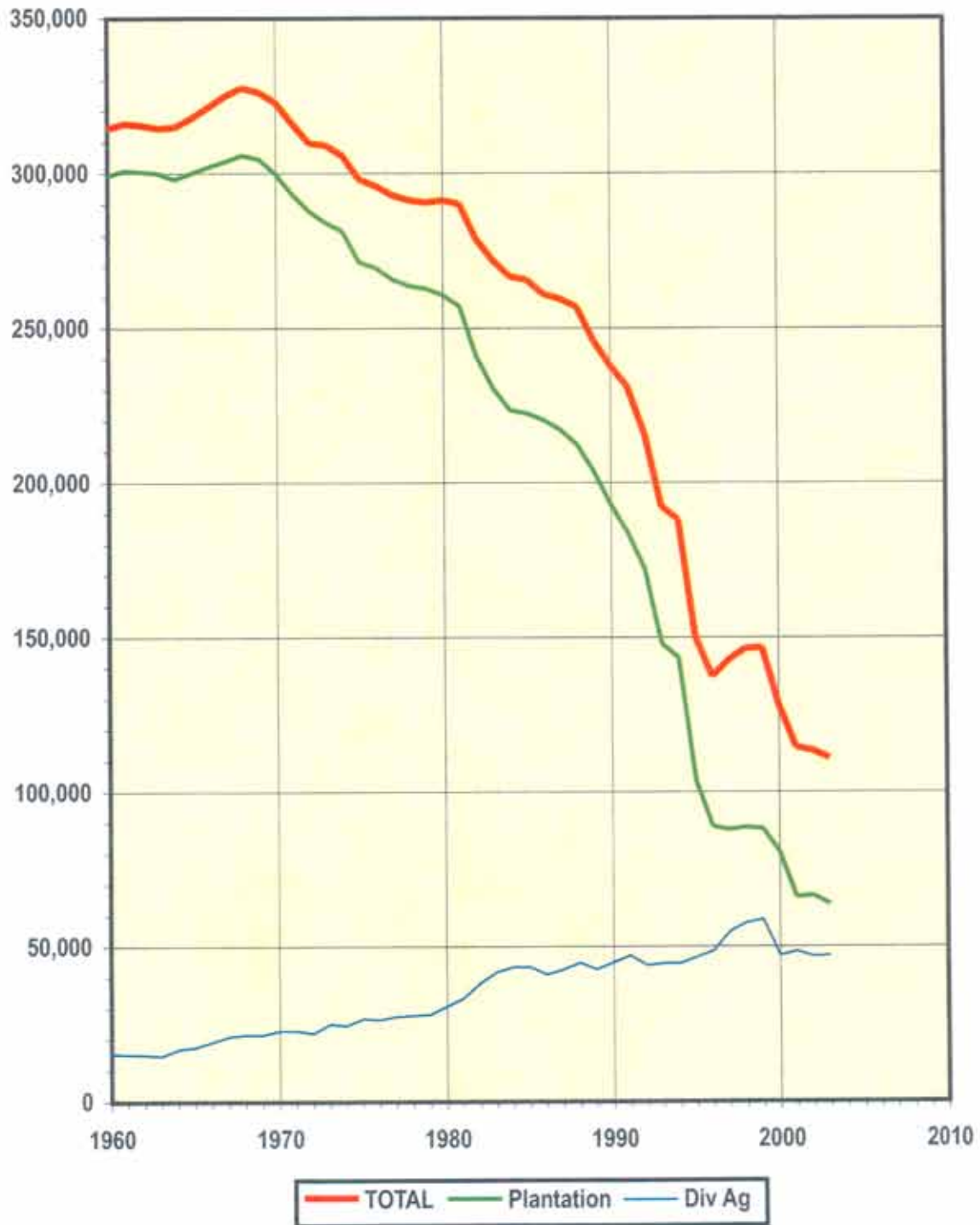


Figure 9. LSB Map



Figure 10. Statewide Acreage in Crop: 1960 to 2003



*APPENDIX*

**APPENDIX A:**  
**SELECTED STATE AND CITY GOALS,**  
**OBJECTIVES, POLICIES AND GUIDELINES**  
**RELATED TO AGRICULTURAL LANDS**

**1. HAWAII'S STATE CONSTITUTION (Article XI, Section 3):**

...to conserve and protect agricultural lands, promote diversified agriculture, increase agricultural self-sufficiency and assure the availability of agriculturally suitable lands...

**2. HAWAII'S STATE PLAN (Chapter 226, Hawaii Revised Statutes, as amended):<sup>[1,2]</sup>**

**Section 226-7 Objectives and policies for the economy--agriculture.**

- (a) Planning for the State's economy with regard to agriculture shall be directed towards achievement of the following objectives:
  - (1) Viability in Hawaii's sugar and pineapple industries.
  - (2) Growth and development of diversified agriculture throughout the State.
  - (3) An agriculture industry that continues to constitute a dynamic and essential component of Hawaii's strategic, economic, and social well-being.
- (b) To achieve the agricultural objectives, it shall be the policy of the State to:
  - (2) Encourage agriculture by making best use of natural resources.
  - (10) Assure the availability of agriculturally suitable lands with adequate water to accommodate present and future needs.
  - (16) Facilitate the transition of agricultural lands in economically nonfeasible agricultural production to economically viable agricultural uses.

**Section 226-103 Economic priority guidelines.**

- (c) Priority guidelines to promote the continued viability of the sugar and pineapple industries:
  - (1) Provide adequate agricultural lands to support the economic viability of the sugar and pineapple industries.

- (d) Priority guidelines to promote the growth and development of diversified agriculture and aquaculture:
  - (1) Identify, conserve, and protect agricultural and aquacultural lands of importance and initiate affirmative and comprehensive programs to promote economically productive agricultural and aquacultural uses of such lands.
  - (10) Support the continuation of land currently in use for diversified agriculture.

**Section 226-104 Population growth and land resources priority guidelines.**

- (b) Priority guidelines for regional growth distribution and land resource utilization:
  - (2) Make available marginal or non-essential agricultural lands for appropriate urban uses while maintaining agricultural lands of importance in the agricultural district.

**Section 226-106 Affordable Housing**

Priority guidelines for the provision of affordable housing:

- (1) Seek to use marginal or nonessential agricultural land and public land to meet housing needs of low- and moderate-income and gap-group households.

**3. AGRICULTURAL STATE FUNCTIONAL PLAN (1991)<sup>31</sup>**

(Functional plans are guidelines for implementing the State Plan. They are approved by the Governor, but not adopted by the State Legislature.)

Objective H: Achievement of Productive Agricultural Use of Lands Most Suitable and Needed for Agriculture.

Policy H(2): Conserve and protect important agricultural lands in accordance with the Hawaii State Constitution.

Action H(2)(a): Propose enactment of standards and criteria to identify, conserve, and protect important agricultural lands and lands in agricultural use.

Action H(2)(c): Administer land use district boundary amendments, permitted land uses, infrastructure standards, and other planning and regulatory functions on important agricultural lands and lands in agricultural use, so as to ensure the availability of agriculturally suitable lands and promote diversified agriculture.

**4. CITY AND COUNTY OF HONOLULU  
GENERAL PLAN, Objectives and Policies (Resolution No. 87-211)<sup>[4]</sup>**

**Economic Activity**

Objective C. To maintain the viability of agriculture on Oahu.

- Policy 1. Assist the agricultural industry to ensure the continuation of agriculture as an important source of income and employment.
- Policy 2. Support agricultural diversification in all agricultural areas on Oahu.
- Policy 3. Support the development of markets for local products, particularly those with the potential for economic growth.
- Policy 4. Provide sufficient agricultural land in Ewa, Central Oahu, and the North Shore to encourage the continuation of sugar and pineapple as viable industries.
- Policy 5. Maintain agricultural land along the Windward, North Shore, and Waianae coasts for truck farming, flower growing, aquaculture, livestock production, and other types of diversified agriculture.
- Policy 6. Encourage the more intensive use of productive agricultural land.
- Policy 7. Encourage the use of more efficient production practices by agriculture, including the efficient use of water.
- Policy 8. Encourage the more efficient use of nonpotable water for agricultural use.

**5. CITY AND COUNTY OF HONOLULU  
'EWA DEVELOPMENT PLAN<sup>[5]</sup>**

**3.1. Open Space Preservation and Development**

**3.1.1 General Policies**

Open space will be used to:

- Provide long range protection for diversified agriculture on lands outside the Urban Growth Boundary.

**6. REFERENCES**

- [1] State of Hawaii, Office of State Planning, Office of the Governor. *The Hawaii State Plan, 1991*. Honolulu, Hawaii. 1991.
- [2] Act 25, S.B. No. 1158, April 15, 1993.



- [3] Hawaii Department of Agriculture. *The Hawaii State Plan: Agriculture, State Functional Plan*. Honolulu, Hawaii. 1991.
- [4] City and County of Honolulu, Department of General Planning. *General Plan Objectives and Policies*. Honolulu, Hawaii. 1992.
- [5] City and County of Honolulu, Planning Department. *'Ewa Development Plan*. Honolulu, Hawaii. August 1997 (Revised May 2000).