file

DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813 ● (808) 523-4432

FRANK F. FASI
MAYOR

JOHN P. WHALEN
DIRECTOR

(BWM)

February 6, 1986

Ms. Letitia N. Uyehara, Director
Office of Environmental Quality Control
State of Hawaii
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Waikele Development
Amfac Property Development Corporation
Tax Map Keys: 9-4-02: 3, 10, 11, 12 (portion), 31 and 42;
9-4-07: 1-, 12, 13 and 32

We are notifying you that the above is an acceptable Environmental Impact Statement (EIS) document, pursuant to Chapter 343, HRS, and the EIS Regulations.

The Acceptance Report identifies the following unresolved issues:

1. Highway Improvements

2. Water Commitment

Several land use approvals will be required in order to implement the proposed project. These are listed in Part IX of the EIS.

A copy of our Acceptance Report is attached. If there are any questions, please contact Bennett Mark of our staff at 527-5038.

Very truly yours,

JOHN P. WHALEN
Director of Land Utilization

JPW:sl
2656A
attach.

cc: Fred Rodrigues, Environmental Communications
Amfac Property Development Corp.

FINAL

WAIKELE

ENVIRONMENTAL IMPACT STATEMENT

JANUARY 1986

FINAL ENVIRONMENTAL IMPACT STATEMENT FOR WAIKELE

AUALII, WAIKELE, EWA DISTRICT, OAHU, HAWAII

JANUARY 1986

SUBMITTED PURSUANT TO CHAPTER 343, HAWAII REVISED STATUTES,
ENVIRONMENTAL IMPACT STATEMENT REGULATIONS

F.J. RODRIGUEZ, PRESIDENT
ENVIRONMENTAL COMMUNICATIONS, INC.
ENVIRONMENTAL CONSULTANTS FOR
AMFAC PROPERTY DEVELOPMENT CORP.

TABLE OF CONTENTS

Table of Contents (continued)

Table of Contents (continued)

Table of Contents (continued)

LIST OF FIGURES

LIST OF TABLES

I SUMMARY

I. SUMMARY

CHAPTER 343, HRS
ENVIRONMENTAL IMPACT STATEMENT (EIS)

Action:	Applicant
Project Name:	Waikele Development
Project Description:	A rezoning proposal for a 577.2 acre site has been prepared and submitted for the Waikele Development planned community. The project, as proposed, would comprise of: approximately 2700 residential units; a 150,000 square foot commercial center; an office/business park; a recreation center; an 18 hole golf course; neighborhood parks; Fire Station site; and an elementary school site. Requested rezoning is from existing AG-1 to R-[illegible] Residential, A-1 Low Density Apartment, P-1 Golf course, Parks, and B-2 Commercial Center/and Office/Business Park.
Project Location:	The site is located mauka of Interstate Route H-1 between Kamehameha Highway and Waikele Stream/Kipapa Gulch. Lands to be rezoned are vacant except for the Amfac nursery operation and some Oahu Sugar Company management personnel residences.
Tax Map Key:	9-4-2: 3, 10, 11, portion of 12, 31, and 41 9-4-7: 10, 12, 13 and 32
Zoning:	AG-1
Proposing Applicant:	Amfac Property Development Corp
Environmental Consultant:	Environmental Communications, Inc.
Accepting Authority:	Department of Land Utilization 650 South King Street Honolulu, Hawaii 96813
Summary:	The project site is currently planted with 200± acres of ratoon sugar cane which serves to control dust and erosion. A major portion of the land has been withdrawn from active sugar cultivation with the implementation of the Oahu Sugar Company's survival plan designed to increase efficiency through reduction of the size of its operation, and the elimination of high cost fields. The site also presently harbors a nursery and housing for a few Oahu Sugar Company supervisory employees.

The proposed project is based upon the Waikele Master Plan which is a development concept for a total, planned community. This plan would include approximately 2,700 residential units. A commercial center including a supermarket, drug store and small retail spaces, financial institutions, professional offices, restaurants and convenience stores, will be one of the major activity centers within the development. An office/business park will provide a major employment center for clean, technical service industries. Recreational facilities will include a regulation-sized golf course, a central recreation center and neighborhood parks. The total project area will be master planned and fully landscaped.

The affected environment consist of well drained lands in a temperate climate. The area currently drains naturally into the Waikele Gulch and stream which lie to the west of the project. The site is not known to be a permanent habitation site of any rare or endangered species. Flora and fauna primarily consists of common exotic species. Archaeological survey of the site indicates that there are no known archaeological sites within the immediate project area. Traffic within the site is presently limited to an access road used by military personnel and Oahu Sugar Company management housing. Air and noise conditions are typically good for former agricultural useage. Infrastructure, utilities and public facilities are currently limited on the site, however access and availability for such services are good. Urban use of the site will result in significant changes in the environment, however, these changes are supported by the Hawaii State Plan, the General Plan of the City and County of Honolulu and the Central Oahu Development Plan.

Impacts on the natural environment will be significant but not necessarily adverse. Physical alterations in changing the open fallowed field to a developed area will include some impact in and out of the project site such as: changes in traffic, air and noise conditions; utilities and service requirements; and impacts on the social environment. The Waipahu 2000 Master Plan is a key element for the transition of Waikele into the Waipahu community.

Environmental effects which cannot be avoided consist primarily of short-term construction impacts. Project alternatives and other considerations of project compliance are outlined in later sections of this document.

II PROJECT DESCRIPTION

II. PROJECT DESCRIPTION AND STATEMENT OF OBJECTIVES

A. Location of Proposed Project

The 577.2 acre site consists of low, gently sloping lands cut by three gulches and is located mauka of Interstate Route H-1 between Kamehameha Highway and Waikele Stream/Kipapa Gulch (Figure 1 & 2). More specfically, the project area is defined as follows:

	TMK NOs.	FEE OWNER	ACREAGE
a)	9-4-02:3	Amfac Property Investment Corp.	158.953
b)	9-4-02:10	Amfac Property Investment Corp.	1.576
c)	9-4-02:11	Amfac Property Investment Corp.	26.728
d)	9-4-02:31	Amfac Property Investment Corp.	9.080
e)	9-4-02:41 *	Amfac Property Investment Corp.	0.845
f)	9-4-07:12	Amfac Property Investment Corp.	151.999
g)	9-4-07:13	Amfac Property Investment Corp.	220.448
h)	9-4-07:32	Amfac Property Investment Corp.	2.599
i)	9-4-02:12 (por.)	U.S.A.	1.077
j)	9-4-07:10	U.S.A.	3.905
		TOTAL ACREAGE	577.210

* Does not include existing Board of Water Supply site

The lands to be rezoned are vacant except for the Amfac nursery operation and some residences for Oahu Sugar Company management personnel. Several existing residential communities are located adjacent to the project site, including Village Park, Crestview, Seaview, Waipio-Gentry, and Waipahu Town. Castle & Cooke's pineapple fields are located directly mauka of the project site while greater Waipahu lies to the south and Waiawa Interchange of H-1 and H-2 freeways directly to the southeast. To the west of the project site is the Waikele-Kipapa Gulch where the Naval Magazine (NAVMAG) Lualualei (Waikele Branch)

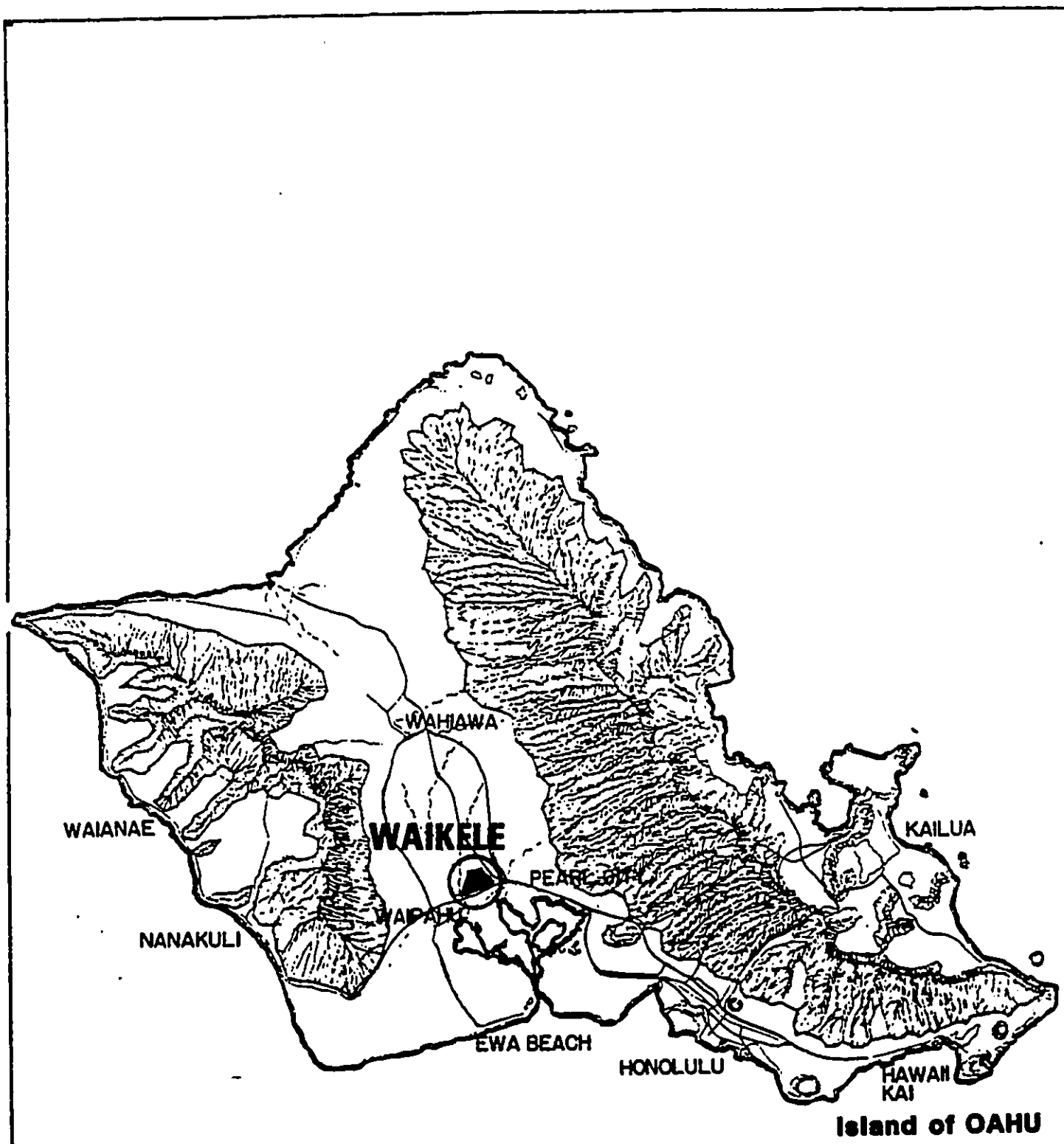


Figure 1
LOCATION MAP

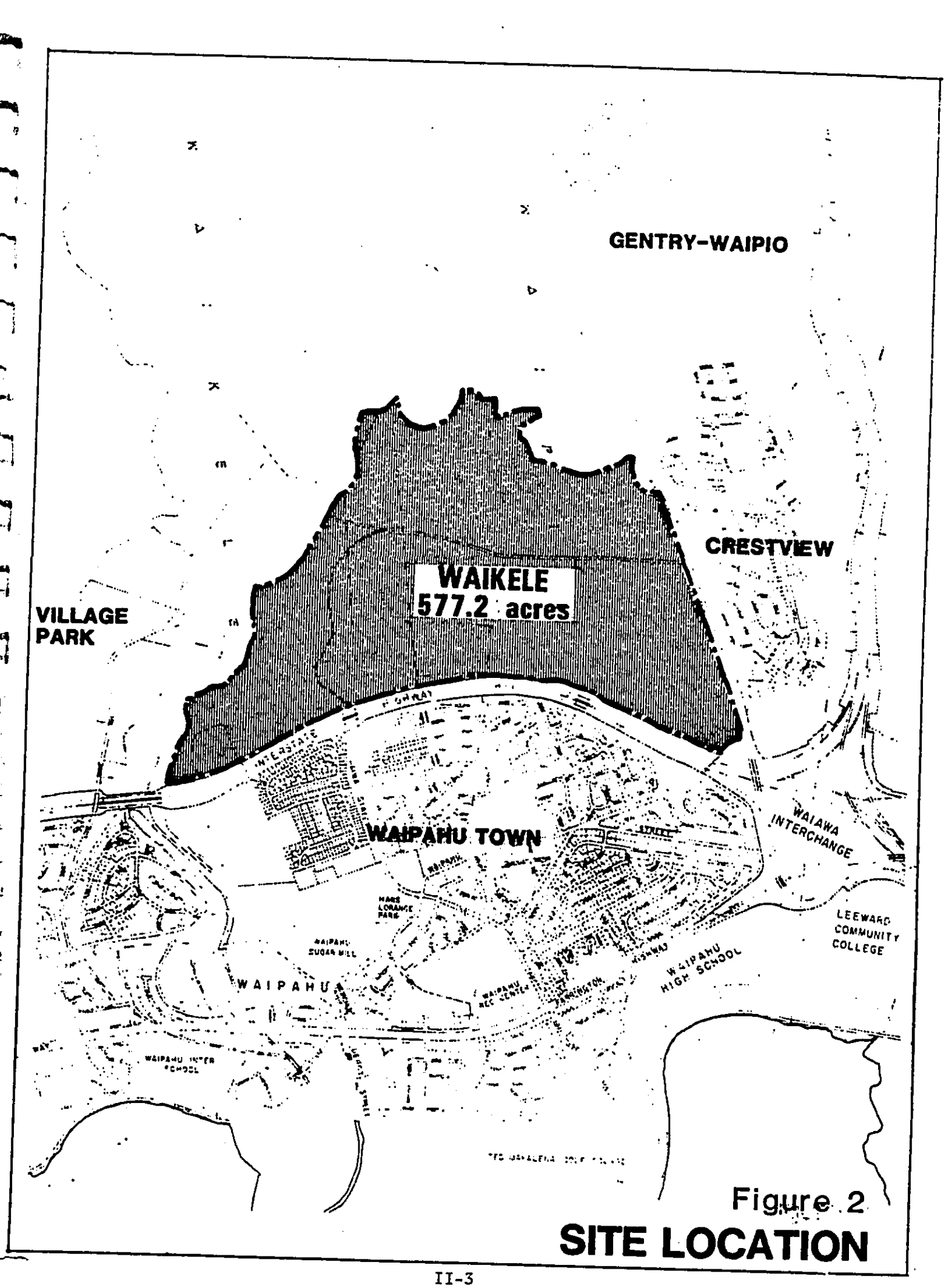


Figure 2

SITE LOCATION

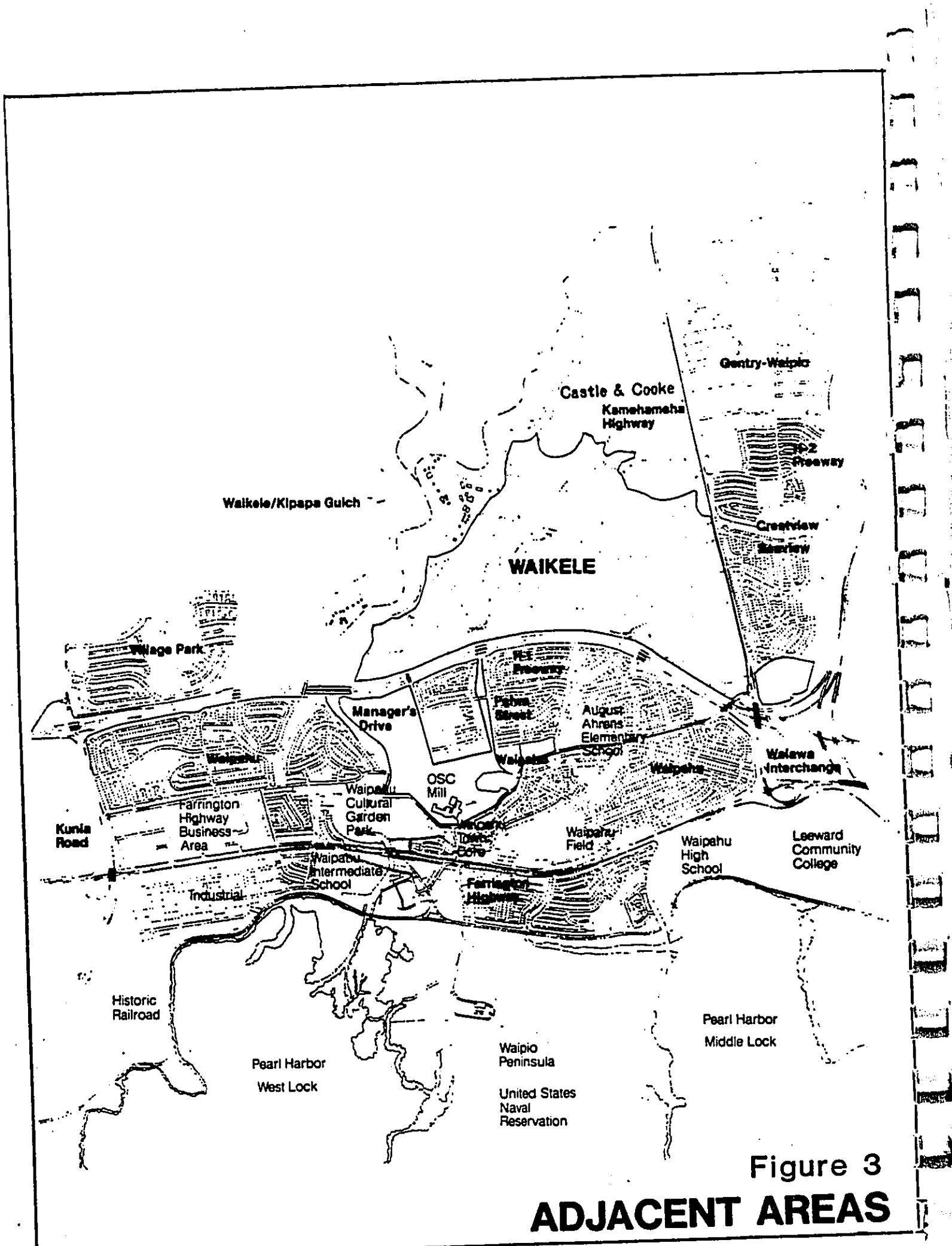


Figure 3

ADJACENT AREAS

is located. A Navy owned access road traverses the project site at the present time, and negotiations between Amfac and the Navy are being conducted to relocate or realign this access road. Farther to the west, is the Village Park residential community. The communities of Crestview, Seaview, and Waipio Gentry are immediately to the east (Figure 3).

B. Project Description

The Waikele Master Plan is based upon a development concept which is designed to create a master planned community which offers residential uses, neighborhood scale commercial retail uses, an Office/ Business Park, and an 18-hole golf course extending throughout the site (Figure 4). Waikele will provide a substantial mix of residential dwelling unit types with a significant portion targeted for the middle income or affordable housing market and the subsidized housing market. It would also contain a high ratio of open space and recreation uses to developed lands, with the open space taking the forms of a regulation length golf course, recreation center and neighborhood parks.

The chief constraints to development are the natural gulches which run mauka/makai through the project site. These gulches mark not only the path of storm water flow over the site, but also the location of the steeper slopes on the property. Under the development concept these gulches will not be developed, but will become part of a continuous green belt system which will form a major open space on the site. The major gulch will be used as an integral element of the golf course and also function as a drainage course to accommodate major surface runoff.

The variety of land uses and activities called for under the development concept would be linked together by a road system, which would provide both regional access to surrounding major highways and to the existing Waipahu Town and immediate access to the various activity centers and residential neighborhoods in the site.

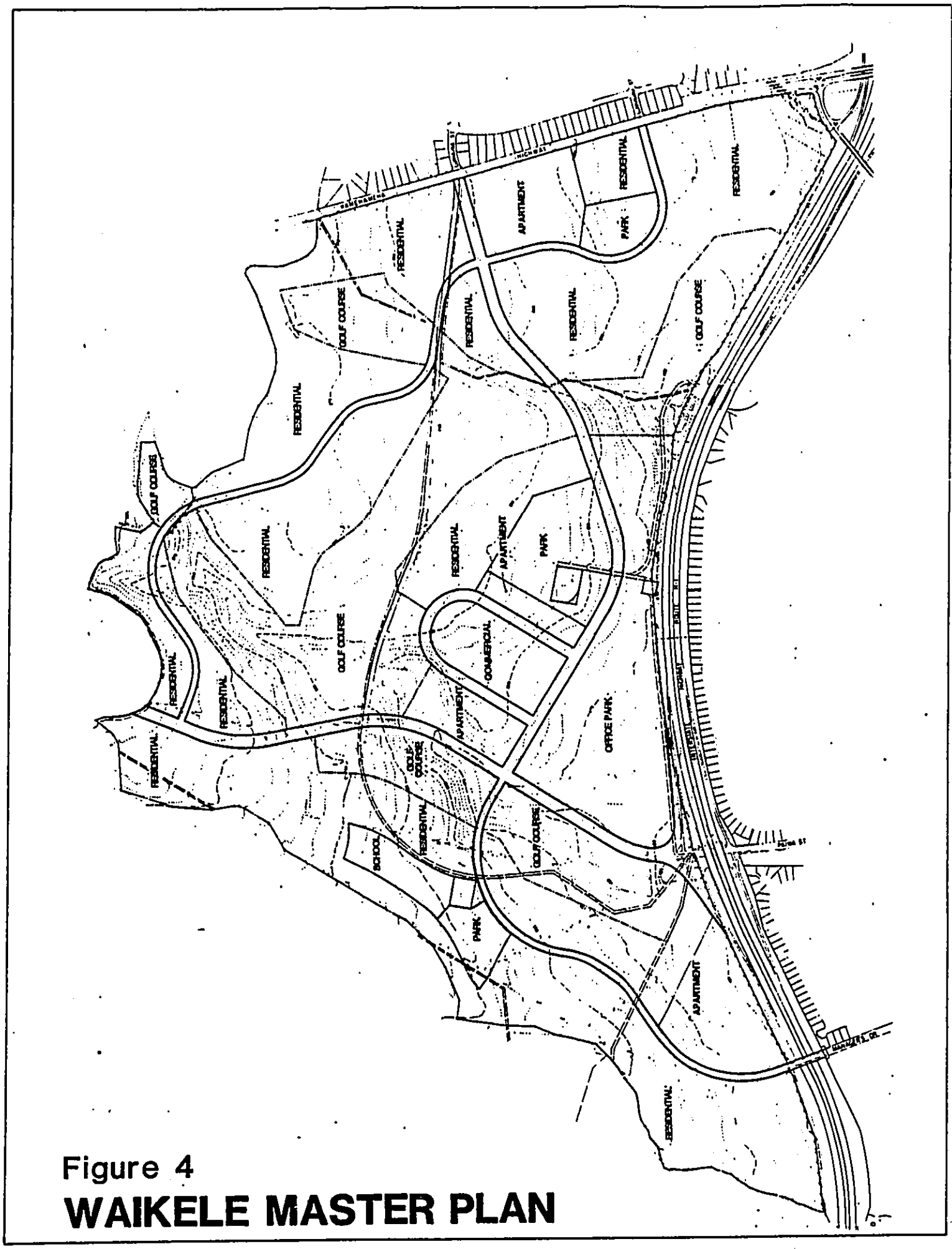


Figure 4

WAIKELE MASTER PLAN

The project involves rezoning approximately 577.2 acres of vacant or underutilized agricultural lands to appropriate urban usages that would be consistent for urban designated lands. The uses in the Master Plan for the development of Waikele would consist of:

1. Residential - Approximately 338 Acres.

   A total of approximately 2,700 residential and apartment units are planned at R-6 and A-1 Residential densities (Table 1). The Central Oahu Development Plan provides for a maximum of 3,000 units.

   The R-6 Residential density category would consist of a variety of unit types, including single-family detached, zero lot-line, townhouses, duplexes and fourplexes. The A-1 Low Density Apartment density category will include garden type apartments with buildings not exceeding three stories.

2. Commercial Center - Approximately 15 Acres.

   The Waikele Village Commercial Center on 14.5 acres will accommodate approximately 150,000 square feet of retail space which will be designed and planned to primarily serve the Waikele residents. The anticipated anchor for the center would be a supermarket and a drug store. Small retail spaces would make up the remainder of the commercial floor space, and may include financial services, professional offices, restaurants and convenience stores. Commercial buildings are anticipated to be two to three stories high with office uses on the upper floors. Unlike most shopping centers, the commercial center would be organized along a street which would be extensively landscaped and wide enough to provide on-street parking. This "main street" will connect with a loop road system connecting all uses in the village center to the office/business park and to the surrounding residential neighborhood.

TABLE 1

PROPOSED LAND USE AND ZONING DESIGNATIONS

PROPOSED ZONING DISTRICT	PROPOSED USE	APPROXIMATE ACRES* BY USE	BY DISTRICT
P-1	Golf Course	142.2	167.5
	Park/Recreation Center	25.3	
AG-1	Public Facility	.8	6.8
	Public School	6.0	
R-6	Residential	294.2	294.2
A-1	Low Density Apartment	43.4	43.4
B-2	Commercial Center	14.5	65.3
	Office/Business Park	50.8	
	Total	577.2	577.2

*Gross acres, including roads.

3. Office/Business Park - Approximately 51 Acres.

The Office/Business Park will be designed as an office center in a campus-like setting. The center will provide space for uses such as offices, research activities, telecommunications/data processing, office support service businesses and corporate headquarters. There is an established market at the present time for the proposed uses. High technology businesses which are compatible with the Office Park setting can also be accommodated, but are not being relied upon to comprise a high percentage of the Office Park space due to their unproven market potential in Hawaii at this time. Buildings in the Office Park are planned for six stories. Structures would be clustered around a central plaza to provide visual prominence, identity and increased pedestrian connections to the commercial center. Parking for the Office Park would be at grade.

4. Recreational - Approximately 164 Total.

a. Golf Course - Approximately 142 Acres. The golf course will be a par 72, regulation size, privately-owned course, open to the public for play. The course will be designed to accommodate tournament play on an islandwide basis. The golf course will occupy the gulch areas of Waikele, allowing bordering residential land uses view amenities and to overlook the fairways, greens and tees. The fairways situated on the higher elevations will be aligned to provide views of Diamond Head, Honolulu and Pearl Harbor. The golf clubhouse will be located on a high point of the site to provide views. The clubhouse will be designed to serve the needs of the golfers as well as to provide meeting rooms and food service facilities for community functions, service organizations, and private celebrations such as weddings, high school activities and other special events.

b. Recreational Center Parks- Approximately 22 Acres. Approximately 22 acres are included to meet the recreation and parks open space needs of Waikele residents. A central recreation center of 13 acres is located adjacent to the Village Commercial Center and Office/Business Park. It will provide major sports facilities including athletic fields. In addition, neighborhood parks totalling about 9 acres will provide open space for use by Waikele residents.

5. Public Services and Facilities

a. Schools - Approximately 6 Acres. A six acre site will be set aside for an elementary school.

b. Fire Station. A fire station site will be located on the property at a location to be determined later. Discussions with the Honolulu Fire Department indicated a need for this facility.

c. Infrastructure Roadways. Roads will comprise the remaining portion of the site. The roadway system will include connection to the existing highway system. The developer with whatever governmental assistance is available will participate in the construction of the following: a new interchange for the H-1 Freeway at Paiwa Street; improvements to Kamehameha Highway; and improvement of the existing Manager's Drive Bridge. A central loop road will link the Waikele Village Commercial Center and accommodate on-street parking. All roads will be extensively landscaped.

C. Statement of Objectives

To guide the development of Waikele, goals were established to ensure that the proposed action will accommodate those land uses which are mutually supportive to the Waipahu community at large, the City of Honolulu and State of Hawaii, Oahu Sugar Company and Amfac Property Development Corp. The Waipahu 2000 Master Plan prepared by representatives of Waipahu's community, business and labor groups establishes Waikele as an integral part of the redevelopment of Waipahu. The project recognizes that the impact of removing this parcel permanently from agricultural use must be offset by providing other uses which will clearly benefit the community beyond the present use of the site. The Waikele development has and will provide support to Oahu Sugar Company, by providing additional income to offset the cyclical losses common to the sugar industry. The objectives of the Waikele Master Plan are as follows:

To Meet State and City Policies. For the City and State, the Waikele Master Plan recognizes that the impact of amending the land use classification of the Petition Area from Agriculture to Urban must take into consideration the provisions of alternative uses which will clearly benefit the community above and beyond the present use of the site. These uses include housing, employment and recreation.

To Provide More Middle Income Residential Uses. Waikele will be a middle income community in which approximately 40 percent of the housing is planned to be sold at prices affordable to the middle-income market. Ten percent of all housing to be provided will be subsidized and offered at price levels consistent with existing City and County unilateral agreement requirements.

To Provide Employment Opportunities. Waikele's major employment areas, including the Waikele Village Commercial Center and Waikele Office Park, are proposed to support a range of business and office uses. The Village Center could provide space for 2000 jobs, an

amount equivalent to 40 percent of the anticipated labor force generated by Waikele's resident population.

To Provide Recreation Opportunities. At least 25 percent of the total site would be used for open space and recreation. This would include the following major elements: a par 72, 18-hole regulation golf course, a major community recreation center featuring athletic fields, a swimming pool, tennis courts and neighborhood parks with a combined area of nine acres.

To Support the Oahu Sugar Company Survival Plan. The development of the Waikele project site has and will provide support for Oahu Sugar Company operations. Urbanization of the site will justify the capital expenditures by the company in order for it to increase its viability.

To Provide Community Services. General areas and sites will be set aside for an elementary school, neighborhood parks and a community recreation center. The developer is investigating a security system with a two-way cable communication system which is designed to monitor traffic at intersections, streets and parking lots to ensure safety and improve traffic flow.

To Provide Neighborhood Shopping For Residents. Convenience/retail commercial uses would be provided in the Village Commercial Center to meet the basic day-to-day needs for the residents of Waikele. It is anticipated that major retail purchases by Waikele residents would be made at established businesses in Waipahu Town and other surrounding shopping establishments.

To Establish A Reasonable Completion Date For Full Development of Waikeke. The Waikele Master Plan is designed to be fully developed and completed within an 8-year time frame.

To Promote Energy Conservation. In order to minimize the use of

the automobile, the Plan is designed to allow for pedestrian and bicycle circulation within the project site. Other energy conservation techniques would encourage the use of solar energy for hot water heating and utilize tradewinds for natural ventilation.

To Create A Rural Character For the Community. Development will be low scale with residential and commercial areas planned for three stories and the Office Park planned for six stories. The buildings would be designed to conserve energy and blend in with an environment of extensive landscaping and green spaces.

To Create A High Quality Community for the Future. Consistent with the Waikele Master Plan objectives and the market demand analysis, the Waikele Master Plan would provide a competitively priced, quality residential living environment. The basic goal is to create a new community which simultaneously meets the needs of its residents while upgrading the community at large.

D. Phasing

The Waikele project is planned for implementation over an eight-year period. A schedule of development by phase is summarized in Table 2 and illustrated in Figure 5, followed by a general description of the development sequence.

The overall phasing begins at the east edge of the property along Kamehameha Highway, proceeds westerly across the site, and terminates with the later phases bordering Waikele Gulch. This sequence is based on establishing access to the site from Kamehameha Highway. The golf course, which is spread across the site, would all be developed in the initial two years.

TABLE 2

DEVELOPMENT PHASING

YEARS	RESIDENTIAL R-6 D. U.*	R-6 Acres**	RESIDENTIAL A-1 D. U.*	A-1 Acres**	COMMERCIAL Office/Park Acres**	Commercial Center Acres**	OTHER Acres**	OTHER Use
1-2	478	75.7	262	13.9	20	--	142.2 5.7	Golf Course Neighborhood Park
3-4	482	68.7	80	4.9	20	--	9.3	Recreation Center/ Neighborhood Park
5-6	529	83.7	148	9.5	10.8	14.5	6.0 4.1 6.2	School Neighborhood Park Recreation Center
7-8	432	65.1	310	15.1	--	--	--	
	1,921	294.2	800	43.4	50.8	14.5	173.5	576.4 SUBTOTAL 0.8 OUTPARCELS 577.2 TOTAL

*Acreage and unit counts are approximate and intended to illustrate the development phasing concept. The precise phasing may vary to reflect detailed design development and market absorption.

**Area includes adjoining roadways for zoning purposes.

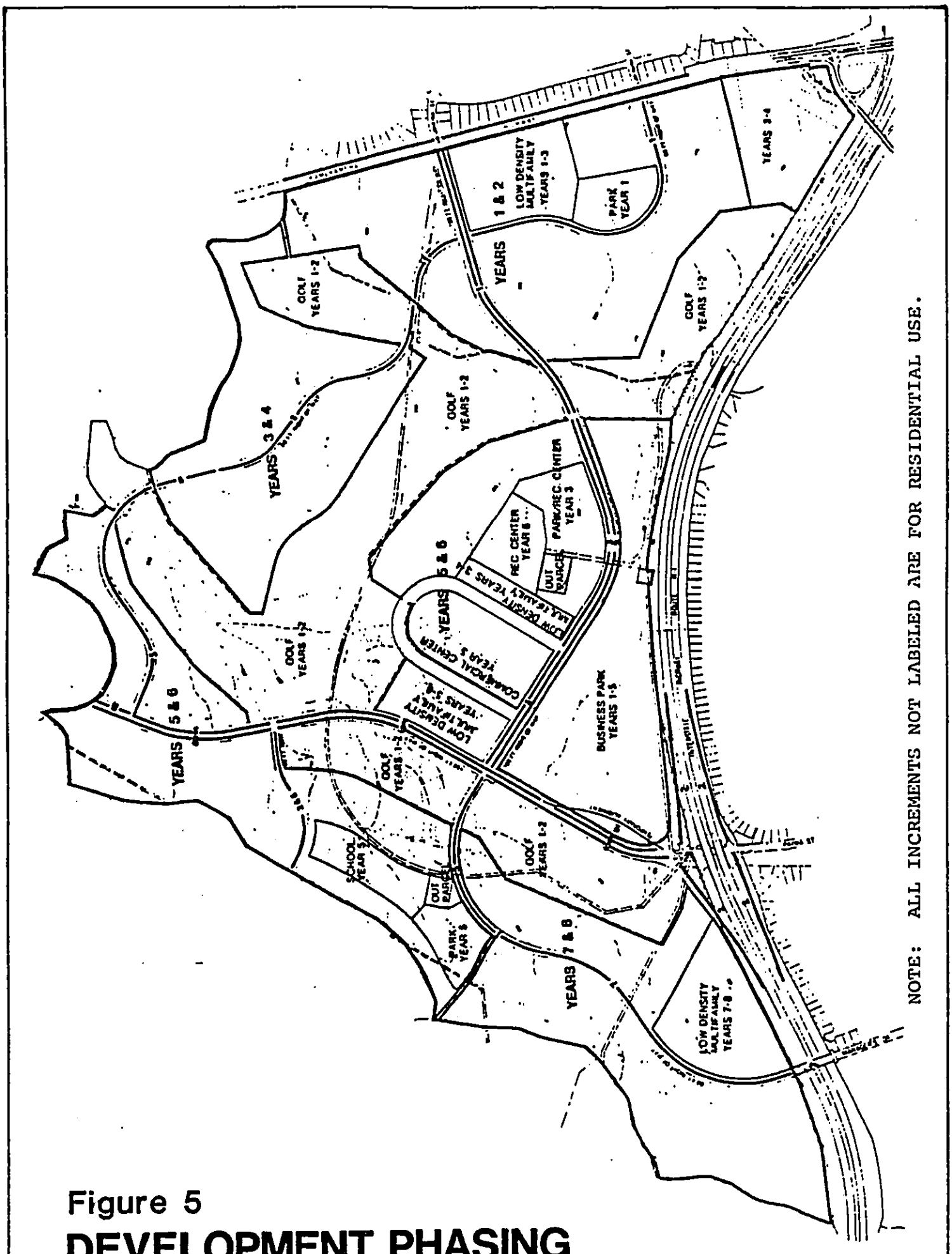


Figure 5

DEVELOPMENT PHASING

Year 1. Initial emphasis is planned on improving Kamehameha Highway and establishing two entrances to the site with an internal loop road. A neighborhood park site fronts on this road as do the first residential increments. The golf course is also begun, and the first increment of the Office Park is established. Connections to existing off-site drainage facilities are also completed. The Paiwa Street interchange is started, and Manager's Drive Extension is developed from Kamehameha Highway to the golf course. Water system improvements in this phase include a 1.0 million gallon reservoir, transmission main, water treatment facility for existing wells and pump station. Sewer system improvements include connections to the existing off-site sewer main.

Year 2. Residential development extends north and south from the first increments, completing residential development along most of the Kamehameha Highway frontage. Golf course construction is completed and the second increment of the Office Park is established. A new Navy access road is also provided by developing one-half of the 60-foot right-of-way from Paiwa Street Extension to the western project boundary, and the Paiwa Interchange is completed. The north loop road is constructed up to the golf clubhouse entrance. Manager's Drive Extension is continued to its intersection with Paiwa Street Extension by constructing one-half of the right-of-way. Additionally, one-half of the Paiwa Street Extension right-of-way is constructed from Paiwa Interchange to the Navy Access Road.

Year 3. Residential development proceeds along Kamehameha Highway and a low density neighborhood is established along the golf course. Low density apartment use is also developed adjacent to the commercial center. The "first phase" of the Community Recreation Center is built and the third increment of the Office Park. The Manager's Drive extension is widened to its full 100-foot right-of-way to serve the apartment site and community recreation center.

Year 4. Residential development continues at several locations, fronting the golf course on the north and south, along the northern boundary, and the low density apartment neighborhood continues to be developed adjacent to the commercial center. The fourth increment of the Office Park is established, and drainage improvements are made at Paiwa Street. Water system improvements include a second 1.0 million gallon reservoir and an additional well and water treatment facility.

Year 5. Residential increments proceed along the golf course to the north and west, a low density apartment neighborhood continues to be developed adjacent to the Commercial Center, which is also developed at this time. The last increment of the Office Park is available during this phase. The neighborhood park and school at the west side of the project is also developed, and residential development is begun along the Waikele Gulch boundary. The Navy access road is improved to its full 60-foot right-of-way. Off-site drainage improvements at Paiwa Street are also completed and the existing reservoir reconfigured to accommodate the Paiwa Street extension right-of-way. Both halves of Paiwa Street are completed between the H-1 Interchange and Manager's Drive Extension. Manager's Drive Extension is also extended west of Paiwa Street Extension to the school/park site. The north loop road is completed and one-half of Paiwa Street Extension is developed from the north loop road to the Navy access road. Sewer system improvements include connections to the existing 15-inch and 30-inch City and County sewer mains.

Year 6. Residential increments are established along the northern portion of the Waikele Gulch boundary, and the Community Recreation Center is completed in this phase. Paiwa Street is widened to its full 100-foot right-of-way between Manager's Drive Extension and the Navy access road.

Year 7. Residential development proceeds in the southwest portion of the site, on both sides of the Manager's Drive extension and

adjacent to the school site. Manager's Drive bridge over the H-1 is widened, and Manager's Drive Extension is completed from the school/park site to the H-1 Freeway.

Year 8. The final residential increments are developed along the Waikele Gulch perimeter at the southwest corner of the site. Paiwa Street is widened to its full 100-foot right-of-way between the Navy access road and the north property boundary.

E. Funding

Total projected land development cost for the Waikele development is in excess of $60 million. This figure reflects the cost for general planning and engineering, and on and off site infrastructure improvements. The cost projection does not include land values, anticipated financing costs, general corporate overhead costs or property and income taxes. The project will be primarily developed at the land owner's expense. Public funds and land may be utilized in development of traffic improvements and a Navy access road crossing the project site.

F. Historical Perspective

The project site is currently owned by Oahu Sugar Company which is a subsidary of Amfac. Prior to its' existing fallowed state, the property was actively used for sugarcane cultivation. This cultivation use originated in the late 1800's when Benjamin F. Dillingham began to consolidate leeward lands for sugarcane cultivation. Following this consolidation of lands, H. Hackfeld and Co. ventured into what would become the Oahu Sugar Company. The Waikele site remained in active sugarcane cultivation use until 1982 when the site was allowed to go fallow. The site is still classified agriculture under the State Land Use Boundaries and is zoned AG-1.

III AFFECTED ENVIRONMENT

III. THE AFFECTED ENVIRONMENT

A. Geographical Characteristics

1. Topography

The land surface adjacent to the Interstate Highway H-1 side of project site is relatively flat. A short distance north of that road, the land surface rises gently at a gradient of 4 to 6 percent. The gently sloping terrain is crossed by three gulches. One of these gulches is significant in size, bisecting the entire property and crossing under the Interstate Highway near Paiwa Street. Two other gulches, though smaller in size and not as significant, do contribute prominent surface characteristics to the gently rolling hillside. The gulch areas comprise all slopes above 8 percent, including some areas above 25 percent.

2. Geology

The proposed project area is located on the southern slope of the Schofield Plateau. This plateau was built up by many successive lava flows originating from the Koolau shield volcano. This rock unit is made up of firm to very hard volcanic rocks which form bedrock in the proposed project area and vicinity. Logs of deep borings and artesian wells indicate the volcanic rocks become harder with depth. The soils in this area are typically residual, derived from the weathering of basic igneous rock.

3. Soils

The project area is underlain by soils consisting of silts and

clays of the Molokai Soil Series. The U.S. Soil Conservation Service, "Soil Survey of Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii," August 1972, classifies the soils as Molokai silty clay loam (MuB to MuD). They consist of well-drained soils and are formed in material weathered from basic igneous rock. This type of soil is generally found in nearly level to moderately steep lands with elevations ranging mainly from near sea level to 1,000 feet. The mean annual soil temperature is 73° F. Molokai soils are geographically associated with Holomua, Keahua, Lahaina, and Uwala soils. They are reddish-brown to brown, stiff to hard, silty clays and clayey silts. Based on the Unified Soil Classification System, they can be classed as CL, MH and ML groups. The entire project area is underlain by these groups of soils.

The soil mantle at the site varies randomly from 5 to 23 feet in thickness and is underlain by reddish-brown, severely weathered basaltic rock which grades downward to the underlying hard rock. The soil thickness reduces along the gulch areas and along steeper slopes. At higher elevations and along the relatively steep banks of the gulches boulders of basaltic rock are either exposed or can be encountered at shallow depths. A number of these boulders can be observed along the cane haul roads.

The upper soil zones are expected to range in thickness from 5 to 14 feet, whereas the soft weathered rock may extend up to 14 to 40 feet in some locations.

In terms of agricultural suitability, the soils are rated II to IV, if irrigated, and II and III, if non-irrigated, according to the Conservation Service. The ratings of the service range from I, which means few limitations, to VIII, which indicates very severe limitations and precludes use of the land for agriculture.

Reference to the report entitled "Preliminary Geotechnical Engineering Investigation: Proposed Development Waipahu-Waipio Master Plan," prepared by PSC Associates, Inc., in October, 1983 will provide further detail of the soils found at the project area.

4. Climate

The mean rainfall at Waipahu is approximately 30.5 inches per year. The months of May through October are normally dry. The median monthly rainfall during these months is less than 1.4 inches.

The predominant wind direction and higher wind speeds are from a northeast to east direction. Other predominant wind come from the north-northeast and east-northeast.

The median annual temperature is 82.6° F.

B. Hydrological Characteristics

1. Groundwater

PSC Associates, Inc., when conducting their geotechnical engineering investigation, encountered no groundwater. Groundwater, in general, should not be a problem in the project area, since water in the basalt aquifer is 50 to 180 feet below the land surface.

The Waikele Stream flows by the western edge of the project site. The stream is a continuously flowing stream found at the base of the Waikele Gulch. This stream flows through Waipahu Town into West Loch of Pearl Harbor.

2. Flood Insurance Study Designation

According to the Flood Insurance Study for the City and County of Honolulu prepared by the Federal Insurance Administration (FIA) in September 1980, flood-prone areas have not been identified for these areas. Most of the development will occur in a designated Zone D, an area of undetermined, but possible flood hazard. There are no improvements planned for the Waikele Gulch portion of the site.

3. Drainage

The project site is well drained and should not be susceptible to flooding. The Waikele/Kipapa gulch is a major drainage way which collects surface run-off from a major portion of the Central Oahu Plain. These gulches cut anywhere from 100 to 150 feet below the surface of the surrounding areas, and do not pose any threat of overflowing onto the project site in the event of major rain storms. Waikele Stream is a perennial stream found at the base of the gulch. This stream flows through the Waipahu Town area into West Loch of Pearl Harbor. A large portion of the site drains into the large gulch which bisects the site and crosses under the H-1 Freeway to Waipahu Town.

Most of the project site lies within a drainage basin which is tributary to existing improved drainage facilities in Waipahu. Based on the natural topography, storm runoff from most of the site as well as other lands mauka of the site (Castle and Cooke) flow to three existing drainage facilities at the H-1 Defense Highway above Waipahu Town. These public facilities include the following:

1. Forty-eight-inch storm drainage pipe system in Paiwa

Street presently terminated on the makai side of the H-1 Defense Highway Underpass Structure.

2. Concrete rectangular channel which terminates at the mauka side of the Haul Cane Road Underpass of the H-1 Defense Highway.

3. Two 84-inch corrugated metal culverts, which terminate at grade on the mauka side of the H-1 Defense Highway and on the makai side, connect to a concrete rectangular channel.

All three drainage systems are connected to the Kahu Drainage Channel which discharges the collected runoff into Middle Loch of Pearl Harbor. The Kahu Drainage Channel is adequate to accommodate additional storm runoff from the mauka unimproved drainage basin; therefore, a portion of the increased storm runoff from the project will be diverted to this channel.

C. Biological Characteristics

1. Flora

A field inspection was made of the project site on October 23, 1982, by Winona Char, Botanical Consultant. Char found that the development site occupies land which was under agricultural use for the cultivation of sugar cane (Saccharum officinarum). Since that time, the area has been fallowed. 184 acres of the site is currently in ratoon sugar cane in order to reduce erosion and provide dust control.

Cane lands can be classified as man-modified ecosystems, that is, the environment is modified and more or less controlled by man. Once economic plant species, sugar cane, forms the

monodominant cover. A number of weedy (or ruderal) plant species characteristic of agricultural lands can also be found associated with the cane fields. The great majority of the weedy species are found alongside the roads and accompanying network of irrigation ditches that transect and border the fields. Most of these weedy species are annuals and are adapted to the frequent disturbances which accompany cultivation practices. These weedy species generally form a low-growing herbaceous cover which may become 1 to 3 feet high in places where there is more available moisture such as along irrigation ditches. Along the peripheries of the H-1 Freeway boundary a number of ornamental tree species such as monkeypod (Samanea saman), royal poinciana (Delonix regia), and African tulip tree (Spathodea campanulata) can be found. Koa-haole (Leucaena leucocephala) scrub is the dominant vegetation type along the H-1 Freeway boundary and in the small gulches found in the project area. Koa-haole forms a more or less dense scrub, 6 to 10 feet high, with Guinea grass (Panicum maximum) forming the most abundant understory cover. A few scattered shrubs of klu (Acacia farnesiana) can be found in the koa-haole scrub.

An inventory of the plant species found within the proposed development site is presented in Table 3. The plants are arranged alphabetically by scientific name. Common names and/or Hawaiian names are given when known. No endangered or threatened flora species exist on the project site.

2. Fauna

Due to the existing agricultural use of the project site insects, avifauna, and mammals populating the site are largely exotic in nature, and not considered rare or endangered species. Various common bird species, such as the barred dove (Gopelia striata), lace-necked dove (Streptopelia chirensis chirensis), common

TABLE 3

PLANT SURVEY - PROPOSED AMFAC WAIKELE HOUSING SITE

Scientific Name	Common Name
Acacia farnesiana (L.) Willd.	Klu
Achyranthes indica (L.) Mill.	
Alternanthera repens (L.) Ktze.	Khaki weed
Amaranthus spinosus L.	Spiny amaranth, pakai-kuku
Amaranthus viridis L.	Slender amaranth, pakai
Bidens pilosa L.	Spanish needle, ko'oko'olau
Boerhavia coccinea Mill.	
Bougainvillea sp.	Bougainvillea
Brachiaria reptans (L.) Gard. & C. E. Hubb.	
Buddleja asiatica Lour.	Asiatic butterfly bush
Cassia surattensis Burm. f..	Kolomona
Cenchrus echinatus L.	Common sandbur, 'ume'alu
Chloris inflata Link	Swollen fingergrass, mau'ulei
Crotolaria incana L.	Fuzzy rattle-pod, kukae-hoki
Cynodon dactylon (L.) Pers.	Bermuda grass, manienie
Delonix regia (Boj.) Raf.	Royal poinciana
Desmanthus virgatus (L.) Willd.	Virgate mimosa

Scientific Name	Common Name
Echinochloa colona (L.) Link	Jungle rice
Eleusine indica (L.) Gaertn.	Wiregrass, manienie-ali'i
Emilia javanica (Burm. f.) C. B. Robins	Red pua-lele
Erigeron canadensis L.	Canada fleabane, ilioha
Eugenia cuminii (L.) Druce	Java plum, palama
Euphorbia glomerifera (Millsp.) L. C. Wheeler	
Euphorbia hirta L.	Hairy spurge, koko-kahiki
Euphorbia prostrata Ait.	Prostrate spurge
Ficus microcarpa L. f.	Chinese banyan
Gossypium barbadense L.	Cotton, pulupulu-haole
Ipomoea triloba L.	Little bell
Leucaena leucocephala (Lam.) de Wit	Koa-haole
Lycopersicon pimpinellifolium Mill.	Currant tomato
Malvastrum coromandelianum (L.) Garcke	False mallow
Momordica charantia var. pavel Crantz	Wild bitter melon, ku kua
Panicum maximum Jacq.	Guinea grass
Pennisetum setosum (Sw.) L. C. Rich.	Feathery pennisetum
Phaseolus lathyroides L.	Cow pea, papapa
Phyllanthus debilis Klein ex Willd.	Phyllanthus weed

Scientific Name	Common Name
Rhynchelytrum repens (Willd.) C. E. Hubb.	Natal redtop
Saccharum officinarum L.	Sugar cane, ko
Samanea saman (Jacq.) Merr.	Monkeypod
Schinus terebinthifolius Raddi	Christmas berry, wilelaiki
Sida spinosa L.	Prickly sida
Sonchus oleraceus L.	Sow thistle, pua-lele
Spathodea campanulata Beauv.	African tulip tree
Synedrella sp.	Prostrate synedrella
Thunbergia grandiflora Roxb.	Large-flowered thunbergia
Tribulus terrestris L.	Puncture vine
Tridax procumbens L.	Coat buttons
Verbena litoralis HBK.	Weed verbena, ha'uowi
Waltheria americana L.	Hi'a-loa, uhaloa

mynah (Actidotheres t. tristis), Japanese White-eye (Zosterops Japonica Japonica) and red-crested cardinals (Paroaria coronata) may frequent the site. Three Hawaiian Coots, Alae keokeo, have been observed at an irrigation reservoir on the north end of the project site. The Alae keokeo is considered an endangered species however, the site is not considered a habitation area but may serve as a transient resting area.

Butterflies, of common variety, may also be abundant. Finally, pests, such as the house mouse (Mus musculus), Polynesian rat (Rattus exulans hawaiiensis), and Indian mongoose (Herpestes auropunctatus auropunctatus) are likely to be at the project site.

Waikele Stream which lies west of the project site contains native species of o'opu nakea (Awaous stamineus) and a native prawn (Macrobrachium grandimanus). Other stream inhabitants are common exotic fish and crustaceans.

D. Historical and Archaeological Characteristics

The project site was used for agricultural purposes in the cultivation of sugar cane from the late 1890's to mid-1982. Since late 1982 a substantial portion of the site has been fallowed, though, approximately 200 acres of the site is currently planted in ratoon sugar cane as an eroison, flood, and dust control measure. The site also contains several supervisory plantation homes, the plantation manager's residence, and an Amfac nursery operation.

An archaeological reconnaissance was conducted by Chiniago, Inc. for the project site with a preceeding literature search. No information could be found regarding the use of the land prior to the late 1890s when sugar production first commenced.

1. Literature Search

The literature search included inspection of Handy's The Hawaiian Planter (1940), McAllister's Archaeology of Oahu (1933), Sterling and Summers' Sites of Oahu (1978), Cox and Stasack's Hawaiian Petroglyphs (1970), maps on file at the State of Hawaii Survey Office, site maps on file at the State Historic Preservation Office, and reports and publications in the Hawaiian collection of the University of Hawaii.

Handy mentions terraces for growing taro along Waikele Stream, immediately outside of the survey area on the west:

> "Waikele. In the flatland, where the Kamehameha Highway crosses the lower valley of Waikele Stream, there are the remains of terraces on both sides of the road, now planted to bananas, beans, cane, and small gardens. For at least 2 miles upstream there were small terrace areas" (Handy 1940:82).

The present status of these small terraces is not known, but extensive construction activities in the valley since the time of Handy's visit have probably resulted in their destruction. These sites lie outside of the project area.

McAllister discusses three sites to the south of the survey area, all of which have been destroyed:

> "Site 127. Mokoula heiau, southwest of the main road in the village of Waipahu.
>
> "The heiau has been completely destroyed for building purposes of the neighborhood. The site is at the edge of a 50-foot elevation which projects out into the present rice fields and was pointed

out by Kaluawai, a kamaaina undoubtedly more than 100 years old.

"Site 128. Waipahu spring, famous in tradition as the place at which the tapa mallet appeared after having been lost in Kahuku. A pump has been placed over the site.

"Site 129. Heiau, Waipahu, said to have been named Hapupu.

"The Waipahu plantation stables on the mountain side of the road across from the schoolhouse west of the town now occupy the site of the former heiau. According to Thrum, it was a 'Heiau pookanaka, where the chief Hao was surprised during temple worship and slain with his priest and attendant chiefs by direction of the moi of Oahu, about 1650.' The site was pointed out by Kapano" (McAllister 1933:106).

Also to the south of the survey area, on the ocean side of the H-1 Freeway, is a small petroglyph site:

> "On the cliff boulders, north side of Waikele Stream, west edge of Waipahu town. Human figures, triangular (arms curved downward), dogs. ± 12 units" (Cox and Stasack 1970:97).

The only additional information provided in Summers and Sterling's Sites of Oahu is that the project area is located in an area known as Kanoenoe Plain, but they associate no legendary or historical happenings with the place.

As all of the remains revealed in the literature search are (or were, in the case of those which have been destroyed)

located outside of the project area, the proposed development represents no threat to them.

2. Field Inspection

Fieldwork consisted of a two-day pedestrian inspection of the property. Structural remains (platforms, terraces, shelters, etc.) would have been destroyed by sugarcane production long ago, so the only evidence of past human utilization which was expected were unearthed fragments of food remains (bones and shells) and artifacts. No evidence of past utilization of any kind was observed either in the open fields or in the exposed earthen faces of irrigation ditches.

E. Existing Population and Growth Characteristics

As described in Analysis of Market Potential for the Amfac Properties Waipahu-Waipio Area prepared by Williams-Kuebelbeck and Associates, Inc., July 1984, the population base for Waikele property encompasses the area of Oahu delineated in Hawaii State law as the Ewa Judicial District. It includes the residential communities of Aiea, Pearl City, Waipahu, Ewa, Makakilo, Waipio, and Mililani. Geographically, it extends east to the District of Honolulu, west to Waianae, and north to Waihiawa. The Districts is coterminous with census tracts 73 to 89.03 and encompasses all the planning area of Ewa, three-forths of Central Oahu and a small portion of the Primary Urban Center as defined by the City and County of Honolulu's Department of General Planning.

The Waipahu-Waipio area has been undergoing gradual urbanization during the past 20 years. During the 1960s development was concentrated primarily in the areas closer to Honolulu such as Aiea, Pearl City, and Waipahu. As these communities have approached saturation in the 1970s, new communities have been developed at more distant locations such as Mililani, Makakilo, and Village Park.

Given the limited availability of development opportunities in Hawaii Kai and Kailua-Kaneohe, the Waipahu-Waipio area is considered the logical area for continued major growth on Oahu during the 1980s and 1990s.

Table 4 shows the 1970 to 1980 growth in resident population and housing units in the Waipahu-Waipio area. The 1980 population was estimated at 191.0 thousand persons, 44 percent above the 1970 population of 132.3 thousand persons. The number of housing units, meanwhile, increased 71.7 percent, going from 29.5 thousand units in 1970 inventory base, high rates of household formation, as well as greater than average replacement of obsolete units explain the exceptionally large percentage increase in housing units.

The area's large share of Oahu's growth in resident population and housing units reflect its prominance as a location for new development. Table III-4 shows that between 1970 and 1980 45.1 percent of Oahu's resident population growth and 27.5 percent of the new increase in housing units occurred in the area.

Given the emergence of the Waipahu-Waipio area as one of the few urbanizing areas on the island, its share of County population growth should increase over the next two decades, particularly in view of local government policies which target the area for major growth.

F. Existing Traffic Conditions

The traffic report for the project area, prepared by Austin, Tsutsumi and Associates, Inc., is attached as Appendix A.

1. Roadways

The existing roadways within the proposed project site are primarily haul cane roads leading to the Oahu Sugar Mill via

Table 4

POPULATION AND HOUSING CENSUS TRACTS,
WAIPAHU-WAIPIO MARKET AREA
(CENSUS TRACTS 73-89.03)
1970-1980

	1970	1980	Net change, 1970-1980 Number	Percent	Annual Percent
Area					
Resident Population	132,299	191,052	58,753	44.4%	3.74%
Housing Units	29,456	50,579	21,123	71.7%	5.56%

EWA SUBMARKET AREA AS A PERCENT
SHARE OF HONOLULU CITY AND COUNTY

	1970	1980	1970-1980	
Area				
Resident Population	21.0%	25%	45.1%	--
Housing Units	16.9%	20%	27.5%	--

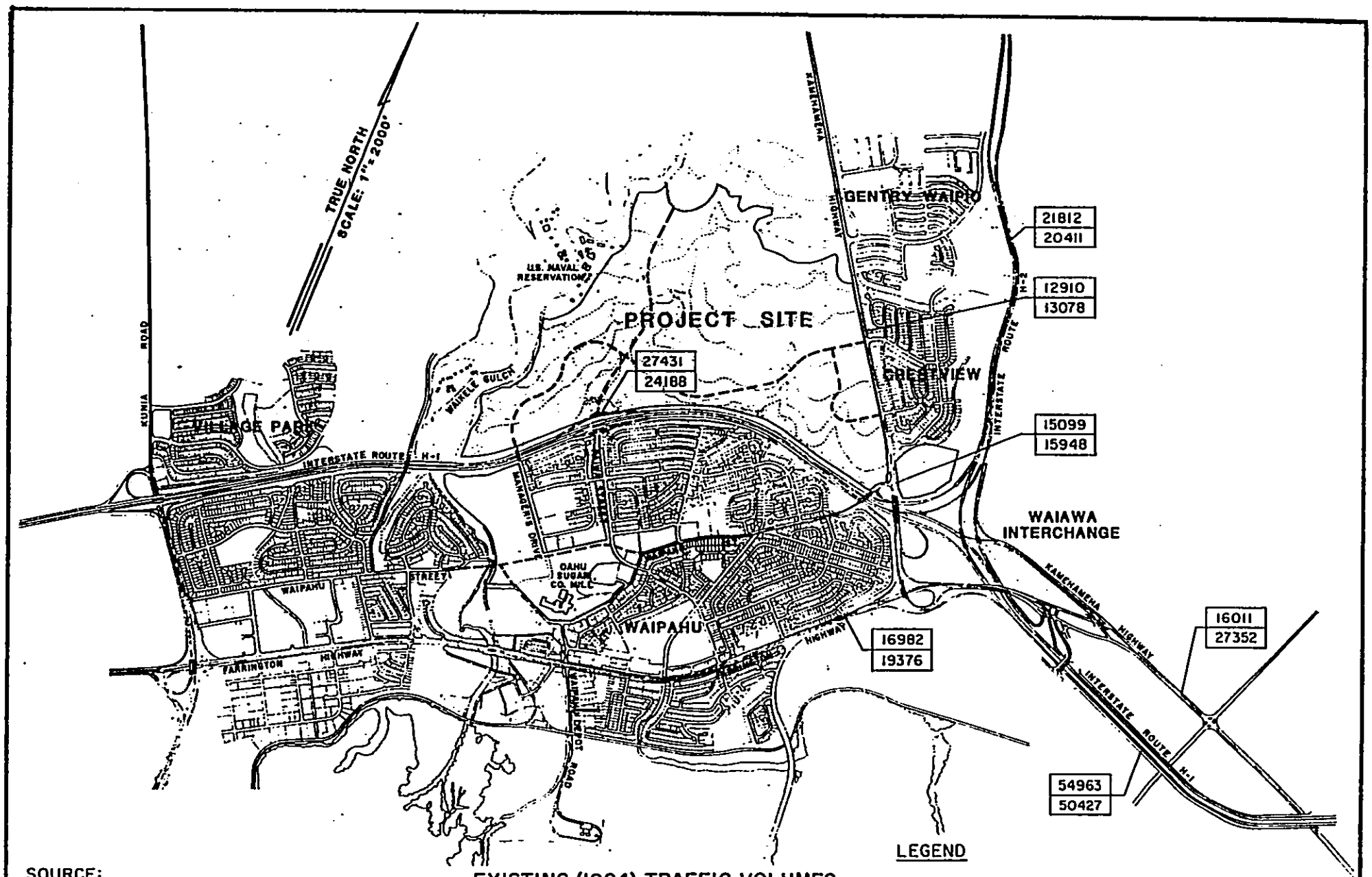
Source: Hawaii Data Book 1981; 1980 Census Summary Tape File 1, Volumes 1 and 2, Honolulu Department of General Planning; Williams-Kuebelbeck and Associates, Inc.

the existing Paiwa Street Undercrossing on Interstate Route H-1. Manager's Drive provides another existing H-1 crossing for access to the project site. The only other roadway is the Naval Access Road, running east-west across the site from Kamehameha Highway to the U.S. Naval Reservation along Kipapa Gulch. These access connections at existing public roadways are expected to be utilized by the Waikele Development.

At the present time site accessibility from a major arterial is provided only along Kamehameha Highway, with the only other transportation facility fronting the project site being Interstate Route H-1, a fully-controlled-access freeway facility (Figure 6).

Kamehameha Highway is a three lane arterial highway providing one lane in each direction with the third lane providing a passing lane or exclusive turning lane at key intersections. At Waipahu Street Kamehameha Highway becomes a four lane, divided highway facility as it connects to the Waiawa Interchange. Southbound past Waipahu Street Kamehameha Highway splits with one lane continuing eastbound on Kamehameha Highway through the Pearl City area and one lane merging with on ramp traffic from Farrington Highway to eastbound Interstate Route H-1. There is also an auxiliary lane south of Waipahu Street formed by the eastbound H-1 off ramp and connection from southbound Kamehameha Highway to westbound Farrington Highway. There is no direct connection from southbound Kamehameha Highway to westbound Interstate Route H-1.

The off ramp from westbound Interstate Route H-1 to Waipahu is a single lane diverging ramp which merges with westbound Kamehameha Highway and then splits to Farrington Highway to



EXISTING (1984) TRAFFIC VOLUMES

SOURCE:

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

Figure 6

1984 TRAFFIC VOLUMES

Waipahu Town. A connection is made by another single lane connector to northbound Kamehameha Highway to Crestview and Waipio-Gentry.

Fronting the makai side of the project site Interstate Route H-1 is an eight-lane freeway providing access to Waipahu at Waiawa Interchange and at Kunia Interchange. Interstate Route H-1 is the primary arterial between Central Honolulu and West Oahu. Other roadway facilities directly affected by the proposed interchange facility at Paiwa Street are Paiwa Street itself and Waipahu Street.

Paiwa Street is a 60-foot right-of-way, fully improved roadway between the Freeway undercrossing and Farrington Highway, with the exception of a short 44-foot right-of-way segment just makai of Waipahu Street. Paiwa Street terminates at the Freeway undercrossing. The existing H-1 bridge structure provides twin 60-foot span openings aligned with Paiwa Street and the haul cane road running parallel to Paiwa Street, from the Freeway to the Sugar Mill. Paiwa Street proceeds in the makai direction past Waipahu Street and connects to Farrington Highway.

Waipahu Street varies from a 60-foot right-of-way, fully improved collector street to a variable right-of-way roadway through "Old Waipahu Town" fronting the Sugar Mill. Several geometric alignment problems restrict Waipahu Street's function as a collector roadway. The Waipahu Street alignment at Waikele Stream crossing consists of a "switchback", that is, the roadway turns at an acute angle in one direction, followed by another sharp turn in the reverse direction. Another severe alignment problem occurs just east of Paiwa Street where Waipahu Street makes a sharp turn as it continues eastward to Kamehameha Highway. Some operational and

alignment problems occur in the Sugar Mill area, where left turn traffic and driveway traffic interfere with the through traffic flow and where curvilinear alignment further restricts operational speeds.

2. Traffic

Twenty-four hour traffic count data were obtained from the State Department of Transportation on all major highways in the affected area. Additional count data were obtained from the City and County Department of Transportation Services on city streets in the Waipahu area.

Finally, manual traffic counts were conducted for the purpose of this study at key intersections during the morning and afternoon peak periods.

Interstate Route H-1 between Kunia Interchange and Waiawa Interchange carries about 52,000 vehicles per day total for both directions. East of Waiawa Interchange, Interstate Route H-1 carries 105,000 vehicles per day total for both directions. The freeway facility, during peak hours of traffic eastbound in the morning and westbound in the afternoon operates at Level of Service "A" between Kunia Interchange and Waiawa Interchange, and at Level of Service "D" between Waiawa Interchange and Moanalua Road Interchange for both peak periods. (Level of Service definitions can be found in the Appendix.)

The on ramp from and off ramp to Kamehameha Highway and Farrington Highway at the Waiawa Interchange operate at Level of Service "E" during the morning and afternoon peak hours, respectively. Traffic count data show 1800 vph on the H-1 on ramp eastbound during the morning peak hour and 1900 vph on the H-1 off ramp westbound during the afternoon peak hour.

Under these conditions, the right lane of the freeway facility is dominated by merging and diverging traffic.

Kamehameha Highway north of Waipahu Street carries over 31,000 vehicles per day. Kamehameha Highway/Waipahu Street intersection operates at Level of Service "E" during the morning peak period and Level of Service "D" during the afternoon peak period. Traffic flow is generally southbound during the morning peak, including a heavy right turn movement from Waipahu Street onto Kamehameha Highway. During the afternoon peak, the northbound flow is the dominant movement, including a heavy left turn movement into Waipahu Street.

The Waipahu Street/Paiwa Street intersection operates at Level of Service "B" during the morning peak period and at Level of Service "C" during the afternoon peak period, with 1400 vph and 1700 vph entering the intersection, respectively. However, traffic operations during the peak periods are typified by stoppages on Waipahu Street resulting from left turning vehicles queued in the through lanes and buses stopping in the traveled way to load and unload passengers.

G. Ambient Air Quality

The air quality study prepared for the proposed project was conducted by Barry D. Root and is included in its entirety in Appendix B.

A summary of air pollutant measurements from State of Hawaii long term monitoring stations located nearest to the project is presented in Table 5. Data from several different sampling stations are included in the tabulation.

The sampling station for particulates and carbon monoxide is located in Pearl City, less than two miles east southeast of the

TABLE 5

SUMMARY OF AIR POLLUTANT MEASUREMENTS AT NEAREST MONITORING STATIONS

POLLUTANT	1978	1979	1980	1981	1982	1983	1984
PARTICULATE MATTER							
No. of Samples	60	58	60	59	53	55	56
Range of Values	20-81	20-48	22-93	19-71	19-54	17-57	16-45
Average Value	37	33	36	34	31	30	28
No. of Times State AQS Exceeded	0	0	0	0	0	0	0
SULFUR DIOXIDE							
No. of Samples	58	56	52	56	43	49	42
Range of Values	5-74	5-63	5-15	5- 5	5-10	5- 5	5- 5
Average Value	15	10	5	5	5	5	5
No. of Times State AQS Exceeded	0	0	0	0	0	0	0
CARBON MONOXIDE							
No. of Samples	365	207		286	311	173	318
Range of Values	0-20.7	0-17.3		1.2-13.8	0-4.6	0-8.6	.6-10.9
Average Value	3.1	2.9		5.1	1.2	2.3	2.4
No. of Times State AQS Exceeded	19	10		13	0	0	1
OXIDANT (OZONE)							
No. of Samples	284	338	295	314	335	349	296
Range of Values	10-84	10-80	10-84	10-104	0-151	0-123	0-104
Average Value	33	39	48	37	32	46	44
No. of Times State AQS Exceeded	0	0	0	1	2	2	1
OTHERS:				NITROGEN DIOXIDE			LEAD
No. of Samples				46			52
Range of Values				6-77			.5-.8
Average Value				25			0.6
No. of Times State AQS Exceeded				0			0

NOTES: See text for locations of monitoring stations. Carbon monoxide reported in milligrams per cubic meter; other pollutants in micrograms per cubic meter. Carbon monoxide and ozone are daily peak one hour values; lead is quarterly; other pollutant values are for a 24 hour sampling period.

SOURCE: State of Hawaii Department of Health

project area. Until September 1979, and after June 1983, carbon monoxide monitoring was conducted at the Department of Health building at Punchbowl and Beretania Streets in urban Honolulu. This site is about 12 miles southeast of the project. During 1981, carbon monoxide was measured at Fort DeRussy in Waikiki (13 miles southeast of the project), and in 1982 carbon monoxide was monitored at Leahi Hospital in Kaimuki, about 15 miles southeast of the project.

Ozone levels were also measured at the Department of Health building in urban Honolulu until December 1980, when the monitor was relocated to Sand Island (about 10 miles southeast of the project site). During 1981 nitrogen dioxide was also monitored at the Sand Island location, but all nitrogen dioxide monitoring has since been discontinued. Lead measurements for 1984 are from Liliha Street in Kalihi, about 11 miles southeast of the project site.

From the data presented in Table 5, it appears that State of Hawaii ambient air quality standards for particulates, sulfur dioxide, nitrogen dioxide, and lead are currently being met at nearest monitoring stations to the project area. On the other hand, carbon monoxide and ozone readings from urban Honolulu indicate that allowable State of Hawaii standards for these vehicle-related air pollutants are being violated at a rate of about once or twice a year. Ozone is an indicator of the formation of photochemical pollutants in the air, a condition which tends to develop if the air mass over the islands has been fairly stable with little wind flow for a period stretching over several days.

Concentrations of carbon monoxide are more directly related to vehicular emissions and tend to be highest during periods of rush hour traffic. Carbon monoxide would thus be the pollutant most likely to cause difficulty in meeting allowable State of Hawaii AQS as a result of new residential development on Oahu.

There are power plants and other potential sources of industrial pollutants along the central portion of the leeward coast to the south of the project site, but the generally low readings of particulates and sulfur dioxide at the Pearl City monitoring station just to the south of the project indicate that these sources are not likely to cause any air pollution problems at Waikele. Likewise, pineapple cultivation to the north could generate some particulates and carbon monoxide when fields are burned after harvest (about once every three years for any given field), but the consistent low readings for particulates at Pearl City indicate that this source is not likely to present any significant air pollution problems, either. Since the pineapple fields are to the north and the H-1 Freeway to the south, it is relatively unlikely that carbon monoxide from both these source could be carried over the Waikele site at the same time.

Finally, natural air pollutant producers which could affect air quality in the Waikele project area include the ocean (sea spray), plants (aero-allergens), dust, and perhaps a distant volcanic eruption on the Island of Hawaii. Concentrations of air pollutants from these kinds of sources should be fairly uniform for most Oahu locations.

H. Ambient Traffic Noise Conditions

The traffic noise study for the proposed project was prepared by Y. Ebisu & Associates and is attached as Appendix C.

The existing traffic noise environment along H-1 Freeway in the area of the project is in the "Significant Exposure, Normally Unacceptable" category, with traffic noise at 70 Ldn along the north (or mauka) Right-of-Way. On the opposite (or makai) side of the freeway, traffic noise levels are higher due to the directional characteristics of the traffic, and the noise levels are 71 Ldn along the makai Right-of-Way. Behind man-made or natural shielding

features where line-of-sight to the freeway is completely or partially blocked, the traffic noise levels diminish rapidly with increasing distance from the freeway centerline. Because the Right-of-Way width of the freeway is in the order of 260 to 300 FT, the first row of any residential development on either side of the freeway is in the "Significant Exposure, Normally Unacceptable" category. Exceptions would occur only if terrain shielding features or buffer lands exist between the development and the freeway.

Along Kamehameha Highway existing traffic noise levels are also in the "significant Exposure, Normally Unacceptable" category along the highway Right-of-Way. Existing setback distances to the 65 Ldn contour line vary from 72 to 81 FT from the centerline of the highway, while the distances to the Right-of-Way vary from approximately 35 to 65 FT.

The results of the May 19, 1985 traffic noise measurements are summarized in Table 6. In general, the agreement between measured and calculated (predicted) noise levels was good. The large discrepancy between measured and predicted levels at Location #5 was probably attributable to excess attenuation caused by plant nursery structures in the area. Figures depicting the noise measurement locations are included in Appendix D.

I. Infrastructure and Utilities

1. Water System

- Presently, water facilities on the site include one 1.5 million gallon reservoir, several deepwells and 12-, 20- and 36-inch water transmission mains. The existing municipal reservoir and deepwells serve Waipahu Town and subdivisions makai of the H-1 Highway through a 20-inch transmission water main up to the 128-foot elevation. The existing 12-inch water main, which is supplied by the present Crestview water source (1.0

TABLE 6

MAY 19, 1984 TRAFFIC NOISE MEASUREMENTS

Location	Time of Day (HRS)	Ave.Speed (MPH)	Equivalent ---Hourly Traffic Volume--- Auto	Med.Truck	Heavy Truck	Measured Leq (dB)	Predicted Leq (dB)
1. 15 FT from fenceline of H-1 Freeway at Waipahu Gardens.	1157 TO 1207	55	2,716	70	0	66.8	65.8
2. 115 FT from fenceline of H-1 Freeway at Waipahu Gardens.	1208 TO 1216	55	2,716	70	0	62.7	62.5
3. 195 FT from center of H-1 Freeway at Manager's Drive near residence; partially shielded by top of roadway cut.	1111 TO 1122	55	2,716	70	0	59.0	60.0
4. Near Location #3, but 245 FT from center of H-1 Freeway.	1123 TO 1131	55	2,716	70	0	54.9	54.0
5. Near Location #3 & #4, but 295 FT from center of H-1 Freeway.	1135 TO 1148	55	2,716	70	0	49.0*	53.0
6. 85 FT from centerline of Kamehameha Highway at Lumiaina St.	1226 TO 1241	40	1,871	38	0	62.1	61.1

*Lower than predicted measured level may be due to shielding from plant nursery.

million gallon reservoir), transports water to existing subdivision areas below the H-1 Highway above the 128-foot elevation. Under construction on-site by Amfac Property Development Corp. is a 1.0 million gallon reservoir and 16-inch water transmission main to serve a nearly completed development makai of the H-1 Defense Highway up to the 128-foot elevation (Figure 7).

Figure 7 reflects preliminary plans for water source and transmission. A Water Master Plan, including sources, reservoirs, wells and phased demand for the Waikele project is currently being developed by Community Planning, Inc., consultants for the development. The Master Plan is expected to be submitted to the Board of Water Supply for approval sometime in January, 1986.

The Department of Land and Natural Resources is to determine the amount of water which will be allocated to the development from the Pearl Harbor Ground Water Control Area. The Board of Water Supply has requested for a permitted use of 2.1 mgd for Wells 2400-05 and 06 for the Waikele project from the Department of Land and Natural Resources. These Wells are located at the new Waipahu "228" reservoir site. The request from the Board of Water Supply to the Department of Land and Natural Resources is to be drawn from the balance available of the 11.274 million gallons per day.

Wells No. 2400-05 and 06 have been identified as contaminated well water sources. Amfac is considering a number of alternatives such as exploration for new uncontaminated sources, an activated carbon filtration systems to treat on-site well waters, and the use of off-site wells. Should the use of any wells which are designated as contaminated be necessary, purification of the water and subsequent approval by the Department of Health, Department of Land and Natural Resources and the Board of Water Supply to approved potable water standards will

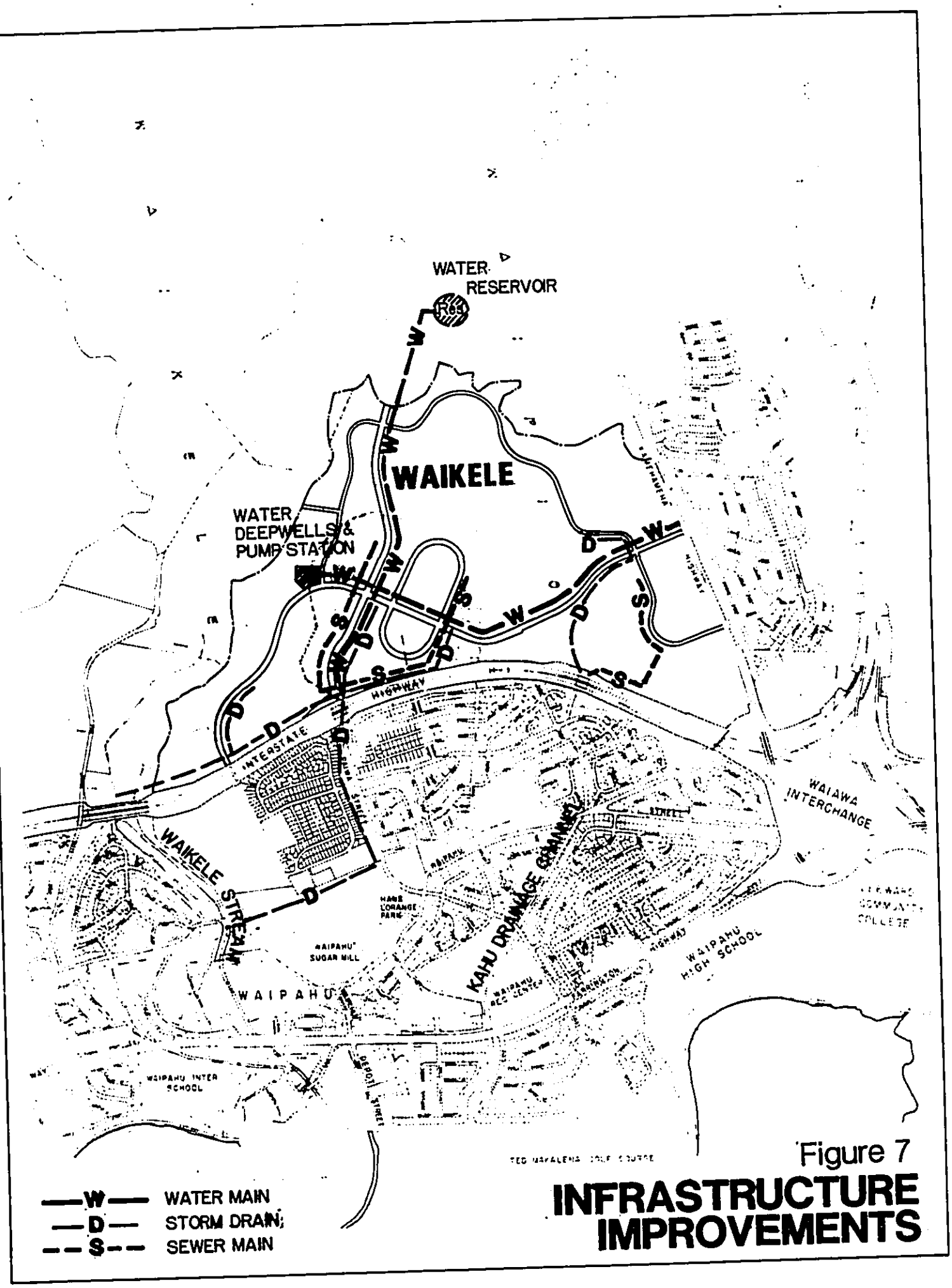


Figure 7

INFRASTRUCTURE IMPROVEMENTS

be required and obtained. Should purification be necessary, an activated carbon filtration system will be utilized.

2. Sewage Treatment and Disposal

The project area is considered a part of the tributary of the regional wastewater treatment facility at Honouliuli. Two existing municipal sanitary sewer trunk lines traverse the project site and serve to transport wastewater to the existing Waipahu Sewage Pump Station on Depot Road. Wastewater is then pumped to the regional plant at Honouliuli for treatment and discharged into the Pacific Ocean off the Ewa Coast.

3. Electrical and Telephone Service

Electrical and telephone systems facilities can be found at residential communities adjacent to the project site. These facilities do not currently service the project site.

4. Solid Waste Collection and Disposal

Solid waste generated at the adjacent residential communities are collected and disposed of by the Department of Public Works, Division of Refuse Collection and Disposal. The Pearl City Refuse Yard collects the refuse and disposes it at the Waipahu Incinerator.

J. Public Facilities and Service

1. Police Protection

Present police facilities are located at a substation in Pearl

City on Waimano Home Road. Waikele residents will be part of the Waipahu police "beat" and could expect a nominal (4± minute) response time to calls. The average response time within the entire Waipahu District is 6.09 minutes. The Honolulu Police Department considers protection in the area adequate. The existing crime rate in the immediate area is low, consisting mainly of nuisance calls for dumping solid waste materials and related refuse, motorcycle noise, children, and pet problems.

2. Fire Protection

The project area receives fire protection from the City Fire Department. The proposed development site is currently served by a fire station located at 94-121 Leonui Street. This fire station houses an engine company of 18 personnel (6 per platoon), and headquarters for a battalion chief and his aide. This fire station serves the entire Waipahu area and furnishes supportive services to Ewa-Makakilo and Ewa Beach.

3. Health Care Facilities

Health care for the Waipahu residents is available at the Waipahu Clinic and the Punawai Clinic. The latter is a Kaiser Foundation clinic and as such offers specific local services with access to the larger Kaiser Medical Center. The Waipahu Clinic has a staff adequate for serving the basic health needs of residents from Waipahu to Waianae. The Waipahu Clinic offers a variety of services such as physical, occupational and speech therapy; public health nursing; children's health services; leprosy clinics; and complete mental health services. The nearest hospital services for residents are available at Wahiawa General Hospital. The newly opened Kaiser Permanente Medical Center in Moanalua will also provide services to area residents. The proposed St. Francis Hospital

on the Ewa end of Waipahu is currently under City Council review and may provide additional services to area residents.

Services provided by govermental social services agencies in such categories as child care, adult assistance, and family services are available from the State Department of Social Services/Housing. In Waipahu there is a welfare unit which offers only emergency financial aid for food, shelter, and utility payments. Other public resource groups, such as Child and Family Service and religious groups also offer various types of aid to those in need.

4. Educational Facilities

The Waipahu area is served by several schools found in the region. Grades K-6 are housed in three facilities: Ahrens, Honowai, and Waipahu Elementary Schools. The intermediate school students, grades 7 and 8, attend Waipahu Intermediate. Grades 9-12 attend the Waipahu High School.

5. Recreational Facilities

There are at present a developed district park in Waipahu as well as Honowai Park serving as a neighborhood facility. Various beach facilities have been developed by the Parks and Recreation Department at appropriate locations along the ocean front and are reasonably accessible to the project.

K. Related Projects and Social Characteristics

The Waikele site is defined by distinct physical boundaries delineating its edges. The makai edge of Waikele borders the H-1 Freeway and Waipahu Community. Waikele Gulch separates Waikele from Village Park, a growing new residential community. Kamehameha Highway and the Gentry-Waipio development and Crestview and Seaview developments are directly east of the Waikele site.

Waikele border existing urban developments on three sides. These development provide a mixture of single-family detached and attached houses, townhouses and garden apartments. Village Park and Gentry-Waipio developments both plan to include small neighborhood shopping centers as part of their community-serving facilities.

Waipahu, the oldest and largest adjacent community, offers a full range of services and facilities. These include the old Waipahu town core, the commercial strip along Farrington Highway, Waipahu Cultural Garden Park, the Oahu Sugar Mill, and a light industrial subdivision development makai of Farrington Highway.

Waikele matches these surrounding conditions with planned housing types that are similar in density and character to that in Waipio-Gentry, Village Park, Crestview and Seaview as well as compatible and harmonious with older housing areas within the Waipahu community.

The overall density and form of housing will be similar: Waikele's residential uses include a total of approximately 2,700 residential and apartment units at R-6 and A-1 Residential densities. The R-6 Residential density category would consist of a variety of unit types, including single-family detached, zero lot-line, townhouses, duplexes and fourplexes. The A-1 Density Apartment density category will include garden type apartments. The provision of this range of housing types, at prices aimed at the full spectrum of income groups, will add to the desirability and livability of the Waipahu region as a well-rounded community. It will provide opportunities for upward mobility housing purchases for areas residents as well as for young families making their first purchase of a home. Waikele will provide affordable housing.

Waikele's recreational amenities will also provide benefits to the greater Waipahu community. Its golf course and clubhouse facilities will provide meeting places and space for social gatherings as well

as a conveniently located regional recreational resource. The planned Waikele Recreation Center and two, strategically located neighborhood parks will also contribute greatly to meeting longstanding need for upgraded recreational facilities on the part of Waipahu residents.

Positive interactions will also occur between Waipahu and Waikele in regard to commercial services and shopping opportunities. The revitalization of Waipahu's town core will be greatly enhanced by increased market demands emanating from Waikele residents.

Community participants in the formulation of the Waipahu 2000 Plan indicated support for the project.

L. Agricultural Significance of Project Lands

The economic and social impacts of the proposed land use change were assessed by Evaluation Research Consultants in Economic Impact of the Proposed Waikele Development, Appendix D.

The agricultural significance of the subject lands can be evaluated by examining the past and present use of the lands and their physical characteristics, climate, and location. In brief, the majority of the subject lands are designated "Prime Agricultural Lands" by State of Hawaii Department of Agriculture and consist of fairly flat to gently and moderately sloping terrain; the prevailing winds are gentle, averaging about 5 mph; the area is exposed to long hours of direct sunlight for the greater portion of the year, and receives and average of 26 inches of rain per year. The remainder of the subject lands, classified as "Other Important Agricultural Lands," are gullies.

Currently the majority of the site is fallow except for the 186 acres of the subject lands which were planted with ratoon sugarcane as a soil erosion and flood control measure. Previous to 1982 the subject lands were used for sugarcane production by the Oahu Sugar Company.

The site contains 456 acres of Prime agriculture lands and 120 acres of Other Important Lands. The "Prime designation means that the property has all the physical and climatic conditions which permit sustained high yields under economically advantageous operating conditions. Such lands are characterized by high yields with relatively low costs and little risk of damage to the physical environment. The category of "Other Important Lands" exhibits production problems such as flooding, erosion, etc. that require greater production costs, such as more drainage, more fertilizers, etc., and result in reduced yields.

The agricultural significance of the subject lands can be examined in terms of the total amount of existing lands of similar quality. As shown in Table 7, the subject lands constitute a very small percentage of such lands. The "Prime" lands are about 0.3 percent of the "Prime" lands on Oahu and the "Other Important Lands" are about 0.4 percent of the lands in this category on Oahu.

Table 7

Agricultural Land Designations Related to the Subject Lands

Agricultural Land Designations	Statewide	Oahu	Subject Lands
Prime	304,310	55,563	456
Uniqūe	31,320	9,006	0
Other Important	642,544	29,990	120
TOTAL	978,174	94,559	576

The approximate 600 acres in question appears slightly more significant when viewed as a percentage of the lands currently being used for crop production. The acreage currently being used for crop production on Oahu would increase by 0.9 percent if the lands currently fallow were put back into production, and the sugarcane acreage on Oahu would increase by 3.3 percent. The lands currently planted to cane on the subject parcel represent less than one percent (0.7) of the sugarcane lands on Oahu.

In terms of the importance of the subject parcels relative to the total acreages in the State, the percentages become very small. If the fallow lands were returned to sugarcane production the total land in sugarcane would increase 0.2 percent and total land in crops would increase 0.15 percent. Removing the 186 acres currently planted to sugarcane would reduce sugarcane land and total land in crops by less than 0.1 percent.

Finally, three factors in the determination of economic feasibility for raising alternative crops on Waikele lands are cited. These factors were duly considered by Amfac in their preliminary study of using Waikele as agricultural revenue producing lands. These factors as listed are as follows:

1. Cost and supply of water - under existing conditions, the most readily available supply of water is from Oahu Sugar Company. This water would have to be pumped up to the Waikele fields and the pumping cost is substantial, exceeding $100/acre afoot. Most crops require about 5 acre feet per year, although some, such as daikon and perennial crops, require more. Thus, water pumping costs could cost over $500/acre.

2. Domestic wells/reservoirs location - In the Waikele area, wells and reservoirs would be competing with modern agricultural practices normally used in truck crops. Extensive uses of pesticides and fertilizers (exceeding that used for Sugar in

quantity and toxicity) combined with public hysteria relating to pesticide contamination of domestic water supplies severely limit the feasibility of producing several crops.

3. Close proximity of residential lands - Existing residential lands to the south and northeast of Waikele create conflicts that are normally associated with competing land uses (Diversified Agriculture and Residential). Diversified agriculture requires extensive uses of pesticides and heavy farm equipment, all near residential housing; this is a hazard to children, and resulting noise and dust are obnoxious to existing residents.

M. State Plan, Land Use and Regulatory Characteristics

1. Hawaii Revised Statutes, Chapter 205 Land Use Commission

Hawaii Revised Statutes Chapter 205 sets forth the requirements for the classification of lands in the State of Hawaii.

Section 205-2 provides that the Land Use Commission shall set the standards for determining the boundaries of each district provided that in the establishment of boundaries for urban districts a sufficient reserve area for foreseeable urban growth shall be included, and that in the establishment of the boundaries of agricultural districts the greatest possible protection shall be given to those lands with the high capacity for intensive cultivation and consideration shall be given to the General Plan of the county (Figure 8).

2. Hawaii Revised Statutes, Chapter 226, Hawaii State Plan

The Hawaii State Plan is a guide for the future long-range development of the State which identifies goals, objectives, policies and priorities for the State. The overall theme of the Hawaii State Plan is:

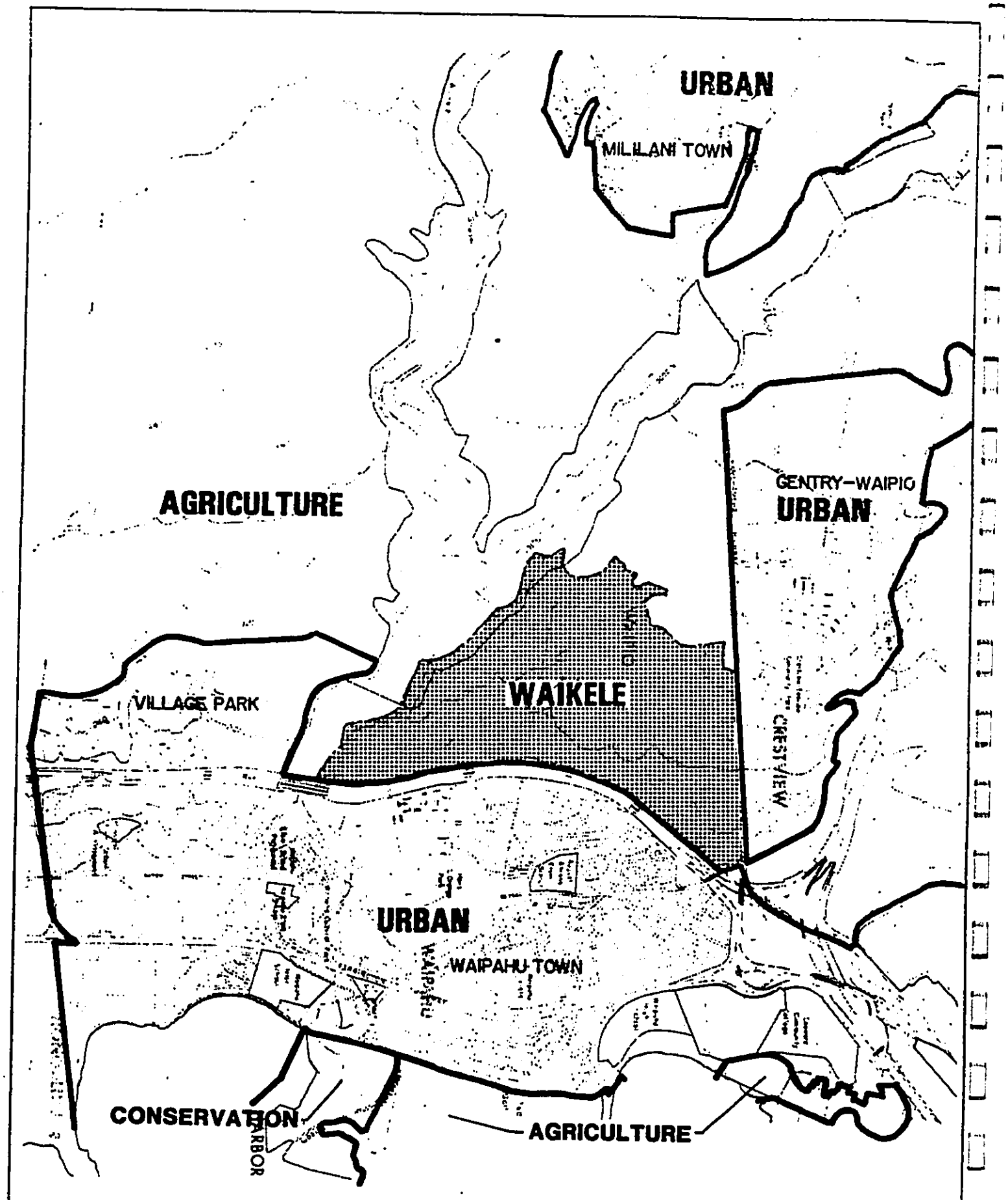


Figure 8

STATE LAND USE DISTRICTS

- Individual and family self-sufficiency
- Social and economic mobility
- Community or social well-being

Specifically, the Hawaii State Plan details objectives and policies in the various areas such as population, the economy, physical environment, facility systems, socio-cultural advancement and fiscal management. The Waikele Project is consistent with many of the goals and policies of the Hawaii State Plan and has been designed to facilitate its objectives.

Population, H.R.S. Section 226-5

The Waikele project, as a totally planned community concept, accommodates population growth, and provides increased housing, employment and recreational opportunities for Hawaii's people. Waikele will provide commercial and retail employment centers and diverse residential alternatives. The project is in reasonable accord with the General Plan of the City and County of Hawaii which sets forth the City's desired population densities and circulation pattern. Additionally, as a planned community Waikele ensures that adequate support services and facilities will be provided for its residents.

Economy H.R.S. Section 226-6

The Waikele Project will promote these policies by providing new construction activity over a period of years consistent with the desired planned growth. Furthermore, in addition to the employment generated by the construction activity the commercial retail and office space developed in the property will provide locations for increased jobs in the area.

Agriculture H.R.S. Section 226-7

While the Waikele Project, would use 577.210 acres of land which has been withdrawn from sugar cultivation, it is nevertheless part of Oahu Sugar's overall strategy to maintain its long-term viability by increasing efficiency and reducing operational losses. Amfac has sought to maintain the viability of sugar and agriculture as a major sector in the State's economy by consolidating the agriculture and property activities and developing the Waikele Project as part of an overall strategy to support the sugar industry. The Waikele concept is a positive approach to the State's sugar problems and encourages the continued viability of sugar and agriculture.

Scenic, Natural Beauty and Historic Resources H.R.S. Section 226-13

The Waikele Project accomplishes these objectives by providing scenic mountain and ocean view areas of open space, limited building heights and extensive landscaping. The project concept maintains the rural and historic character of the Waipahu community.

Land, Air, and Water Quality H.R.S. Section 226-13

The Waikele Project recognizes the historical and heritage attributes of Waipahu and the physical qualities of Hawaii. Consistent with this, a plantation theme is being suggested in the design of the residential areas of the project. This design theme is harmonious with the surrounding areas and Waipahu's low profile scale and character.

Additionally, the proposed development would urbanize lands which are in close proximity to existing services and facilities. The project site is bounded by Crestview, Waipahu town and

Village Park, and the existing infrastructure of major highways, drainage system and sewer and water lines are adequate or capable of expanding to meet the projected demand from Waikele. Schools, police, fire and other public services which already serve the Waipahu area are also available.

Water H.R.S. Section 226-16

The Waikele Project will provide for the development and construction of two off-site 1.0 million gallon capacity reservoirs and a 16-inch water transmission main.

The Waikele Project projects an average daily use of 2.1 million gallons, which will be requested from the Board of Water Supply. The 2.1 million gallons is less than the amount that was used to irrigate the subject property when it was in sugar cane production. It is not anticipated that the water demand generated by the project will prevent the attainment or maintenance of a "substantive yield capacity" in the amount of ground water in the Pearl Harbor Basin.

Transportation H.R.S. Section 226-17

The Waikele Project proposes several improvements to alleviate the impacts of the project and future developments in the Central Oahu/Ewa area. Plans call for construction of an H-1 interchange at Paiwa Street, improvement of Kamehameha Highway, and extension and improvement of Manager's Drive. Other proposed improvements requested by other parties will facilitate traffic circulation in the area.

Housing H.R.S. Section 226-19

The Waikele Project is intended to be a middle income community, with approximately 40 percent of the housing targeted

to be sold at prices affordable to middle-income earners. 10 percent of the housing will be priced consistent with City unilateral agreement requirements. There are varied density areas, a planned range of single-family attached and detached dwellings, townhouses, duplexes, quadraplexes and apartment units to facilitate a mix of diverse lifestyles and income groups.

The project is designed to take into account the physical setting, including visual and aesthetic amenities. Its location provides easy access to public facilities and services.

Additionally, in the planning of this project, extreme care and effort has been made to obtain the participation of the existing Waipahu businesses and residential community.

Education H.R.S. Section 226-21

The Waikele Project is located in close proximity to existing public school facilities. Additionally, a 6-acre site is to be provided for an elementary school.

Leisure H.R.S. Section 226-23

The Waikele Project is designed to provide leisure and recreational facilities to the community and the public. The regulation par 72 golf course with a clubhouse for community and social functions is a central open space feature of Waikele. There will also be a 13-acre recreation center with athletic fields, a swimming pool and tennis courts. Additionally, there will be neighborhood parks totalling 9 acres.

3. Hawaii State Functional Plans

In furtherance of the Hawaii State Plan, Hawaii Revised

Statutes, Chapter 226, the 1984 State Legislature by concurrent resolution adopted ten Functional Plans to serve as guidelines for the State of Hawaii. The Waikele Project conforms to and facilitates many of the objectives and policies of these Functional Plans.

State Housing Plan

The Waikele Project is designed to accommodate the diverse housing needs of the residents of Waipahu and Oahu.

Representatives from various organizations indicated that there exists a sufficient share of low-income and subsidized housing and that more middle-income housing is needed in the Waipahu area. Waikele will offer to Waipahu residents a certain upward mobility in their future housing purchases. While the Waikele project is primarily a middle-income housing project, it is also designed to satisfy the desire for low density housing in a golf course setting. There will be approximately 2,700 dwelling units, with a mix of single-family detached homes, townhouses, duplexes, quadruplexes and garden apartments.

State Recreation Plan

The Waikele Project, as a total, planned community, supports the achievement of these objectives and policies. The project is designed to retain the heritage as well as the scenic, physical and recreational resources of Waipahu. Waikele provides a variety of recreational facilities for both its immediate residents and residents of surrounding areas, including a 142 acre golf course, neighborhood parks, athletic fields, swimming pool and tennis courts.

State Transportation Plan

The Waikele Project proposes improvements to the H-1 Freeway which will facilitate and redistribute traffic now entering the congested Waiawa Interchange. The generation of 2000 jobs in Waikele will indirectly benefit traffic conditions on the H-1 Freeway by reducing the amount of traffic directed towards urban Honolulu. Improvements to Kamehameha Highway are also contemplated. Additionally, the project is designed to promote pedestrian and bicycle use as an alternative to vehicular traffic.

State Water Resources Development Plan

The Waikele Project will request a water allocation from the State Department of Land and Natural Resources and/or the Board of Water Supply at the necessary time. The planned level of development on the site will generate an average daily water consumption of 2.1 million gallons which is less than the amount that was previously used to irrigate the property when it was in sugar cane production.

The project will have little impact on the availability of fresh water supplies for other uses. It is not expected that the project will prevent the attainment or maintenance of a "sustainable yield capacity" in the amount of ground water in the Pearl Harbor basin.

Planned for construction are two 1.0 million gallon capacity reservoir and a 16-inch water transmission main. Drainage in the area will be handled by existing facilities and a new box culvert system.

State Energy Plan

The Waikele Project attempts to achieve these objectives. The

project is located in an easily serviceable and concentrated area which is next to existing urban developments. The community is designed to encourage the use of walkways and bicycles as an alternative to the private automobile. Moreover, solar energy use will be promoted for residents.

State Health Plan

Residents of Waikele will have adequate health care facilities available at the Waipahu Clinic and Punawai Clinic. Punawai Clinic is associated with Kaiser Foundation and offers specific local services with access to the larger Kaiser Medical Center. Waipahu Clinic is designed to serve the basic health needs of residents from Waipahu to Waianae and offers a variety of services such as physical, occupational speech therapy; public health nursing; children's health services, leprosy clinics; and complete mental health services. Additionally, Wahiawa General Hospital offers a full range of hospital services.

4. General Plan of the City and County of Honolulu

The General Plan of the City and County of Honolulu was adopted in 1977. Its growth objectives are based on a concept which directs urban growth on the island by distributing future population expansion to specific geographic areas. Two of its basic aims are to prevent "urban sprawl" and "scatteration," terms which connote the seemingly endless and undefined extensionof urban areas and inappropriate urban "pockets" in otherwise undeveloped areas. Other objectives of the Plan are to enable the sugar and pineapple industries to remain viable, to minimize the public sector cost of urbanization by directing growth to appropriate areas where infrastructure and utilities are or can be made available at a reasonable cost, and to retain and enhance the distinctive character of the various living environments.

The proposed urbanization of Waikele is in accord with the General Plan policies relating to Population and Physical Development and Urban Design. These policies reflect the gradual development of a Secondary Urban Center development (SUC) in the West Beach/Makakilo area and encourage development of a major residential, commercial, and employment center within the SUC. The Waikele Development is consistent with this policy in that it is complementary to the commercial, industrial, and resort elements of the SUC.

The proposed urbanization of Waikele is fully consistent with the Oahu General Plan's (GP) present distribution policy[1]; therefore, no amendment to this or any other GP policy is needed in order to permit Waikele urbanization under the City's planning program. The GP's projected population distribution percentage range for Central Oahu is set at 12.8 - 14.2% of the total projected population for Oahu.

The official DPED update of the projected Oahu Population from 917,400 to 954,500 (year 2005) established once more a 20-year time horizon for the GP as required by the Plan itself and removed population allocation as an issue. With this extension Central Oahu's GP population capacity became large enough to accommodate Waikele's 8,100 persons without a need to increase the planned population allocation for that area. This allocation is now set at 12.8 - 14.2% of Oahu's, total year-2005 projected population (954,500 persons) by the GP. Using the year-2005 projected Oahu population of 954,500 persons, Central Oahu's population capacity increases to 135,500 persons by the year 2005.

---

1. (Objective C, Policy 4, Dec. 1982).

   Prior to the official update by the State Department of Planning and Economic Development (DPED) of the projected total population for Oahu from a year-2000 population projection of 917,400 persons to a year-2005 projection of 954,500 persons, the Waikele project's proposed addition of

The present land development capacity for Central Oahu, established by the Central Oahu Development Plan (DP), allows for approximately 127,900 persons in that area. The difference between GP population capacity (135,500) and DP development capacity (127,900) represents the amount of future population growth permissible (67,600). Wherever GP population capacity exceeds DP development capacity, more growth is permissible. If the situation is reversed, or if capacities match each other, no more additional growth for the area in question is permissible. After the GP's population projection for Oahu was updated to reflect the State's year-2005 projections, Central Oahu's population capacity exceeded its development capacity by about 7,600 persons (135,500 - 127,900 = 7,600). Waikele's proposed 8,100 basically can be accommodated under the new GP population capcity for Central Oahu without any need to increase the area's population distribution percentage range of 12.8 - 14.2% set by the GP.

Because Waikele's 8,100 persons can be accommodated under the GP without any need to alter the population distribution percentage range for any Development Plan area, including the Ewa DP area, which includes the planned "Secondary Urban Center", Waikele is also not in conflict with continued City pursuit of major new growth within the Secondary Urban Center. Waikele is a new growth within the Secondary Urban Center. Waikele is a surburban development which is also consistent in intensity, scale, character and tenor with those Urban Fringe areas in Central Oahu (i.e. Waipahu, Village Park, Wapio-Gentry, etc.) now

---

8,100 persons to Central Oahu's population would have exceeded by 0.9% the upper limits (14.2%) of the population planned for that area by the GP. This excess was said by the City Department of General Planning (DGP) to present a GP amendment issue applicable to Waikele; all other aspects of Waikele raising land use and urban design considerations relagated by City law and practice to Development Plan review.

set in the GP. As an Urban Fringe development, Waikele will not detract from any City effort to direct major new growth to the Secondary Urban Center as called for in the GP.

The Waikele Project will also contribute to the general welfare and prosperity of the people in the following ways:

1. Provide needed housing to low, moderate, middle and high income households in a desirable living environment.

2. Provide a needed revenue source to Oahu Sugar Company to assist in its survival effort by providing: a) a reasonable return on its investment which, in turn, assists all residents of Oahu by improving the viability of the sugar industry and diversified agriculture endeavors; b) retaining direct and indirect job opportunities and benefits to the economy generated by Oahu Sugar Company, and c) maintaining a 14,200 acre open space system.

3. Provide approximately 2,000 jobs in the Village Center and Office/Business Park.

4. Provide needed recreational and community facilities and services, primarily to meet the needs of Waipahu and Waikele residents and, to some degree, West Oahu residents.

5. Provide needed public infrastructure such as street and highway improvements to the surrounding community.

6. Provide open space vistas to the Waianae mountain range, the Koolaus, Pearl Harbor and Diamond Head within, as well as when viewed from outside Waikele.

Finally, the Waikele Project is consistent with the Population Guidelines found in the General Plan and all pending amendments.

5. Central Oahu Development Plan

The proposed project is situated within the Central Development Plan District and was designated "Agriculture". The applicant had requested a development plan amendment from the City and County of Honolulu, which was approved.

6. Zoning

The Waikele site is currently zoned "AG-1". At the appropriate time the applicant will apply for a zoning district change with the City and County of Honolulu (Figure 9).

7. H.R.S. Chapter 205-A Coastal Zone Management

The Waikele Project Site is not designated as a special management area for which a permit is required pursuant to H.R.S. Chapter 205-A. However, the Project Site is within an area controlled by the CZMA and is, therefore, subject to H.R.S. Chapter 205-A's objectives and policies.

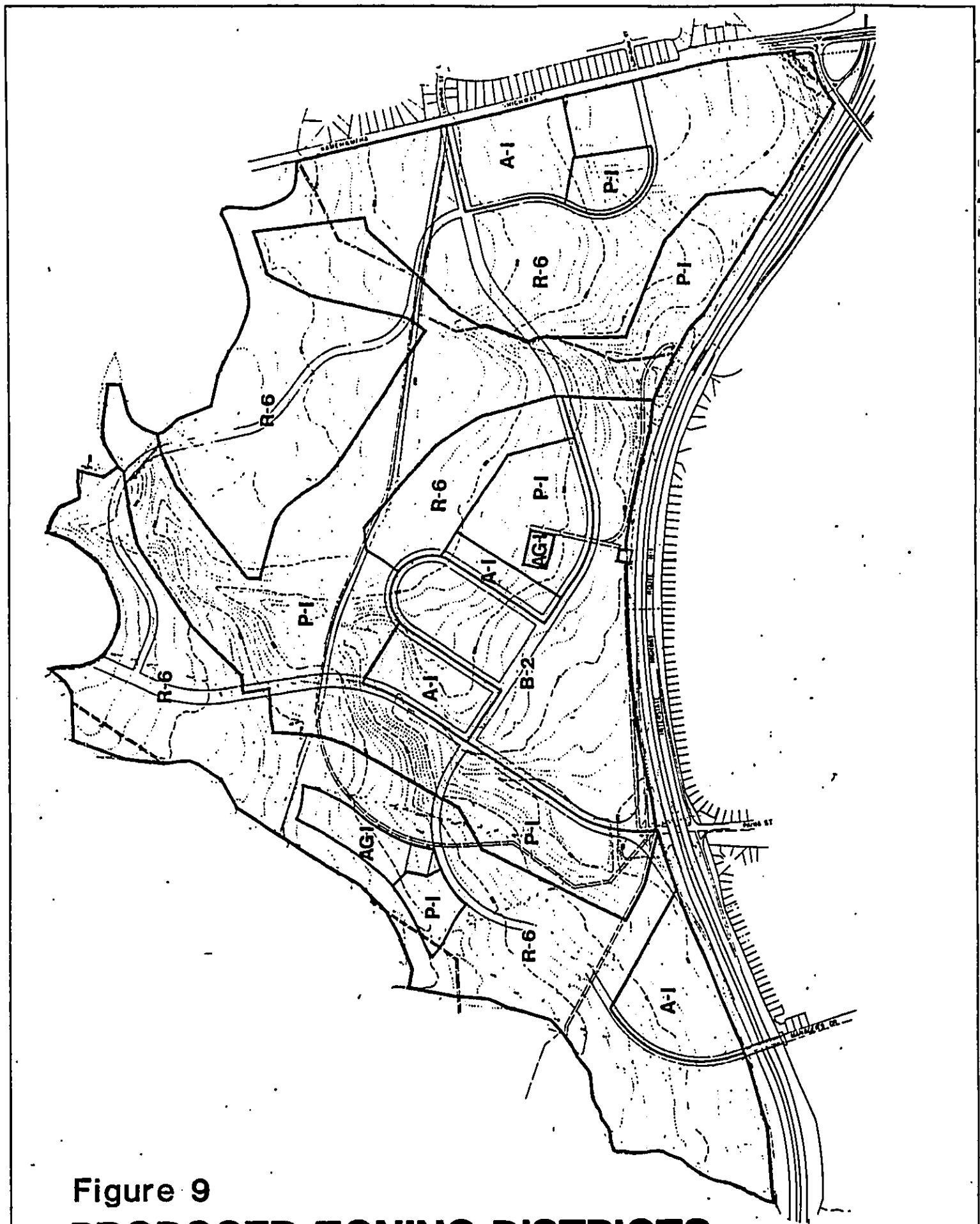


Figure 9

PROPOSED ZONING DISTRICTS

IV ANTICIPATED IMPACTS AND MITIGATIVE MEASURES

IV. ANTICIPATED IMPACTS AND MITIGATIVE MEASURES

A. Impacts on Geographical Characteristics

1. Topography

In general, the on-site soils are suitable as engineered fill material. The U.S. Soil Conservation Service, "Soil Survey of Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii," August 1972, indicates that throughout the site, hard basaltic rocks/boulders four feet in diameter may be encountered during grading activities. These boulders or rock units should be broken down to size or be used elsewhere in the development where it does not affect any proposed building areas. A number of irrigation flumes and ditches cross the site at various locations. Some features, including abandoned pipelines, may now be buried and could present obstacles to site grading.

Prior to beginning of any grading operation it will be necessary to strip all existing vegetation from areas to be developed, including removal of all the sugar cane and their root systems. The material exposed after the stripping operation may be used for engineered fill. After stripping, slab and pavement subgrades and areas to receive engineered fill should be excavated of any and all loose soils.

To minimize the occurrence of soil erosion, temporary soil erosion and sediment control measures will be designed and implemented during the construction phase in accordance with Chapter 23, Grading, Soil Erosion, and Sediment Control, Revised Ordinances of Honolulu, 1978, as amended; the City & County of Honolulu's Grading, Grubbing, and Stockpiling Ordinance No. 3968, 1972; and the USDA Soil Conservation

Services Erosion and Sediment Control Guide for Hawaii, 1981. Approval by the City & County of Honolulu Department of Public Works will be required to ensure proper grading and erosion control.

2. Geology

No impacts are expected on the geology of the area therefore, no mitigative measures should be required.

3. Soils

Impact on the soil will result from introduction of soil conditioners and EPA approved fertilizers, pesticides, and herbicides. These conditioners will enhance the grassing and landscaping of the project site. The introduction of such chemicals, however, will not adversely affect the soil.

Subsurface soils are capable of supporting conventional building foundations. For heavy, concentrated loads deeper foundation footings into weathered rock or bedrock formation may be considered. Along steep slopes or in soft soils foundation footings may have to be deepened or modified accordingly. No mitigative measures should be required for soils impact.

4. Climate

No impacts are expected on the climate of the area.

B. <u>Impact on Hydrological Characteristics</u>

1. Surface Runoff

During construction potental incidences of erosion and sedimentation may impact the water quality of the Waikele Stream

during a significant storm, resulting in increased constituent loads, nitrogen, phosphorus, and suspended solids. However, impacts to these waters are not anticipated to be significant, since erosion and sedimentation problems would arise only during heavy storms and secondly, since on-site efforts will be made to minimize erosion problems.

The proposed project will increase the amount of stormwater runoff, as the ultimate development will create impervious surfaces that will reduce soil absorption activity. The increased runoff will also affect the water quality of the stream. Drs. Gordon Dugan and Michael Chun prepared the report entitled "Surface Water Runoff and Water Considerations for the Gentry-Waipio Project," in 1977. The report evaluated the environmental impact of the then proposed Gentry-Waipio Project as it related to surface water runoff. From an assemblage of available baseline hydrologic and water quality data, an estimate of the quality characteristics of surface water runoff from that project site was made. The Gentry-Waipio site is located just north and across the Kamehameha Highway from the Waikele Development site. Estimates provided in the study may be utilized for this project since the Waikele Development is in close proximity to the Gentry-Waipio site and is similar in scope. Further, Gentry-Waipio is comprised of an almost equal amount of acreage (510 acres) as that of Waikele (577 acres). The following summarizes findings from the Surface Water Runoff Report.

"The calculated incremental change in nitrogen, phosphorus, and suspended solids output, due to project construction for the various storm intensities and durations under review ranged from an increase of 32 to 322 lbs/event and 63 to 630 lbs/event, respectively, for nitrogen and phosphorus to a decrease in suspended solids is a direct result of stabilization and covering of the soil. However, the output from the

approximately 40 percent of the property which presently drains toward Kipapa and Waikele Streams and into West Loch Pearl Harbor would decrease by 26 to 258 lbs/event, 3 to 27 lbs/event, and 15 to 155 lbs/event for nitrogen, phosphorus, and suspended solids, respectively.

Based on the extreme incremental change situation per storm event for 510 acres of the proposed development, (the 100 yr storm with a 24 hr duration) in comparison to the constituent yield, from the entire 4,400 acre Panakauahi Gulch drainage area, the nitrogen and phosphorus would theoretically increase by 2.5 and 48%, respectively, and suspended solids would decrease by 0.6%. While the incremental change, even for the 100-year event, is relatively insignificant for nitrogen and suspended solids, the phosphorus is significant."

The impact of construction activities could be mitigated by conforming to strict erosion control measures, in addition to the State Department of Health's Water Quality Standards, Chapter 37-A, Public Health Regulations, 1968.

Impacts to water quality resulting from operations of the project are anticipated to be minimal, because biocides currently in use that may potentially adversely affect water quality tend to break down more readily in comparison to the more lasting types of a few years ago. Lead concentrations originating from automobiles should be steadily decreasing, since new automobiles have been designed to only utilize unleaded gasoline. Therefore, though the amount of runoff would increase, adverse water quality impacts resulting from increased constituents should not be significant.

2. Storm Drainage

The current drainage proposal is to construct a new culvert

system to accommodate the storm runoff from the tributary area of the western portion of the site which terminates at the Paiwa Street underpass of the H-1 Freeway. From that point, the runoff from the tributary area would be conveyed by a new culvert system to Waikele Stream along an alignment of the H-1 Freeway or follow the present haul cane road either mauka to the Waipahu Mill and discharge the runoff makai of the Waipahu Street Bridge. The remaining, which is the eastern portion of the site presently being served by the two existing public facilities described previously, would continue to be served by the existing concrete channels.

The increased flow to Waikele Stream should have an insiginificant impact on that system which serves an existing drainage area of 29,248 acres. The increase in area and, therefore, storm runoff, is only 1.7 percent. Also, the increase in flow will have an insignificant effect on the Waipahu Culture Garden Park.

All proposed improvements will be designed to meet appropriate government standards for public health and safety requirements.

C. Impact on Biological Characteristics

1. Flora

A field survey conducted by Winona Char, Biological Consultant, indicated that no endangered or threatened species exist on the project site. While all existing vegetation will be cleared during the course of construction, these plants primarily consist of cane and weedy species. As the project is developed, extensive landscaping will be implemented with several ornamental plants and trees.

2. Fauna

Three endangered Hawaiian Coots, Alae keokeo, have been observed at the cane irrigation reservoir on the northern end of the project site during a field inspection by the biological consultant. Although the birds were observed within the reservoir, it is not expected that the reservoir is a habitation site, but probably served as a resting area for the birds in transit. The reservoir is proposed for golfcourse use in the Master plan.

Other fauna observed were considered pests or potential pests to the existing agricultural practices and will continue to be to the proposed action. Impacts, therefore, can not be considered significant.

Stream life and receiving waters in Pearl Harbor should not be significantly affected by the implementation of the Waikele Project since constituent values of urban runoff will be less severe in terms of loading and value than previous agricultural runoff.

Grading and grubbing activities will undoubtedly force certain wildlife to relocate to adjacent areas. However, in some instances they will return to the project site for food and shelter, thereby further minimizing any adverse impacts to them.

D. Impact on Archaeological Sites

The archaeological reconnaisance report conducted by Chiniago Inc. indicated that because no evidence of past utilization of the subject property in the form of structural or midden remains was found, and because there have been no archaeological or historical sites previously recorded on the property, the archaeological consultants

recommend that development be allowed to proceed without any further archaeological work. Should any archaeological or historic remains be uncovered during construction, construction will stop and the State Historic Preservation Office will be notified immediately.

E. Waipahu-Wapio Area Population Forecast

As indicated in the Williams-Kuebelbeck and Associates, Inc. study Analysis of Market Potential for the Amfac Properties Waipahu-Wapio Area, the Waipahu-Waipio market area can be expected to capture a larger share of Oahu's future population and housing growth than it has historically. Several factors would contribute to this:

- Oahu is experiencing a growing scarcity of urban areas, and the Ewa District offers the relative advantages of close proximity to Honolulu and major transportation networks as well as large tracts of developable land.

- Further increases to the industrial inventory must necessarily occur at industrial parks within the Waipahu-Waipo area. The employment generated by the development of these parks, together with the employment created by the new facilities at the Barbers Point deep draft harbor, will further encourage population growth at Waipahu-Wapio.

- City and County government policies which target the Ewa District for major growth can only increase its pre-eminence as a location for new population and housing development.

Given these considerations, the area's share of Oahu's population growth has been projected at 55.7 percent for the period from 1980 to 2000, substantially above its 45 percent share of the Island's 1970 to 1980 population increase. The derivation of this projection is also found in a component-by component analysis of projected

growth for the Development Plan Areas which comprise the Waipahu-Waipio area. The Waipahu-Waipio area, as noted previously, contains all of the Ewa Development Plan Area and substantial portions of the Primary Urban Center and Central Oahu DP Areas. As noted below, analysis based upon the 1982 revision of the City General Plan indicates that population in the Waipahu-Wapio market area should increase over the next 20 years as noted in Table 8. Population within the market area is thus projected to increase by 85.0 thousand persons between 1980 - 2000, reaching a total of 276.1 thousand persons by the end of the century. The proposed Waikele project when fully developed, is expected to be responsible for the contribution of approximately 8000 residents of the previously projected population figures.

F. Impact on Traffic Conditions

Traffic studies have been prepared by Austin, Tsutsumi and Associates (see Appendix A). The study identifies and assesses the impacts of traffic which would be generated by the Waikele project development and assessed existing conditions; trip generation characteristics of the proposed development; and projected conditions on the highway network. It also evaluated traffic conditions which would result when the proposed development is superimposed over these projected conditions.

Because of the magnitude of the proposed development and the nature of a planned development, a certain amount of trip interaction among land use activities within the development is assumed; that is, a proportion of the total trips generated is assumed to remain within the study area and not impact the external highway system. However, the proposed Kamehameha Highway expansion and the new Paiwa Street Interchange will, improve existing traffic conditions within the immediate area. The commercial-retail center is expected to be a neighborhood-oriented shopping center and is not expected to attract a significant number of external trips. Finally,

TABLE 8

Waipahu-Waipio Market Area Component	Resident Population		
	Actual 1980[1]	Projected 2000	Projected Growth 1980-2000
Ewa DP Area (Census Tracts 83-86)	36,255[2]	87,153	50,898[3]
Central Oahu DP Area (Census Tracts 87-89.03)	59,391[4]	79,996	20,606[5]
Primary Urban Center DP Area (Census Tracts 73-82)	95,405[6]	108,907	13,502[7]
Total, Waipahu-Waipio Market Area	191,051	276,056[8]	85,006

1/ From Census of Population and Housing, 1980, U.S. Bureau of the Census.

2/ 100% of total Ewa DP area 1980 population.

3/ 100% of total Ewa DP area 2000 population utilizing mid-point of population percentage range indicated for the area under the City General Plan 1982 revision.

4/ 58.8% of total Central Oahu DP area 1980 population.

5/ 90% of Central Oahu 1980-2000 growth anticipated under the 1982 General Plan revision, utilizing the midpoint of the projected range. (It should be noted that the upper limit of the projected growth in this DP area has been increased by 5 percent in more recent projections.)

6/ 22.8% of total PUC DP area 1980 population.

7/ 20% of 1980-2000 PUC growth under the 1982 General Plan revision.

8/ The Amfac market analysis by Williams-Kuebelbeck and Associates, Inc., originally envisioned a population in the market area of 267,300 persons; recent trends indicate that this projection is low, and has been revised here accordingly.

employment opportunities are expected to attract trips from within Waikele itself and nearby residential areas in Leeward and Central Oahu.

Development of the proposed Waikele project is expected to be a continuous process. However, for traffic generation discussion purposes the total development is divided into two phases, each representing about one-half of the overall master plan.

The trip generation characteristics for Phases I and II are shown in Table 9.

1. Phase I - Trip Generation

   Phase I consists of the development of the eastern half of the project site, which includes 370 single family (low density) dwelling units 436 townhouse and clustered (medium density) dwelling units and 375 garden apartment type (high density) dwelling units, for a total of 1181 dwelling units; a 135 acre golf course, and a 30 acre office park.

   The construction of the proposed Paiwa Interchange, along with improvements to the existing feeder street systems makai of the freeway, and the widening of Kamehameha Highway, are included in Phase I to accommodate the increased traffic demand.

2. Phase II - Trip Generation

   Phase II consists of the development of the remainder of the 577± acre site, which includes 486 single family (low density) dwelling units, 535 townhouse and clustered (medium density) dwelling units, and 507 garden apartment type (high density) dwelling units, for a total of 1528 dwelling units; a commercial center consisting of 150,000 square feet of floor space; a 9 acre recreation center; and the remainder of the office park.

TABLE 9 - TRIP GENERATION TABLE

LAND USE	IND. VAR.	UNITS	AVG. TRIP RATE	AVG. DAILY TRIPS	AM PEAK HOUR RATE IN	AM PEAK HOUR RATE OUT	AM PEAK HOUR TRIPS IN	AM PEAK HOUR TRIPS OUT	PM PEAK HOUR RATE IN	PM PEAK HOUR RATE OUT	PM PEAK HOUR TRIPS IN	PM PEAK HOUR TRIPS OUT
PHASE I EAST												
SINGLE FAMILY	DU	370	10.0	3700	0.21	0.55	78	203	0.63	0.37	233	137
TOWN-HOUSE	DU	436	5.2	2267	0.07	0.34	31	148	0.34	0.17	148	74
GARDEN APT.	DU	288	5.2	1498	0.07	0.34	20	98	0.34	0.17	98	49
PHASE I CENTRAL												
GARDEN APT.	DU	87	5.2	452	0.07	0.34	6	30	0.34	0.17	30	15
OFFICE	1000 SF	223	14.0	3122	2.48	0.25	553	56	0.31	2.31	69	515
SUBTOTAL-PHASE I				11039			688	535			578	790
PHASE II EAST												
SINGLE FAMILY	DU	88	10.0	880	0.21	0.55	18	48	0.63	0.37	55	33
PHASE II CENTRAL												
TOWN-HOUSE	DU	182	5.2	946	0.07	0.34	13	62	0.34	0.17	62	31
GARDEN APT.	DU	162	5.2	842	0.07	0.34	11	55	0.34	0.17	55	28
OFFICE	1000 SF	94	14.0	1316	2.48	0.25	233	24	0.31	2.31	29	217
RETAIL	1000 SF	150	67	10005	0.90	0.80	135	120	2.85	3.05	427	457
PHASE II WEST												
SINGLE FAMILY	DU	398	10.0	3980	0.21	0.55	84	219	0.63	0.37	251	147
TOWN-HOUSE	DU	353	5.2	1836	0.07	0.34	25	120	0.34	0.17	120	60
GARDEN APT.	DU	345	5.2	1794	0.07	0.34	24	117	0.34	0.17	117	59
SUBTOTAL-PHASE II				21599			543	765			1116	1032
PROJECT TOTAL				32638			1231	1300			1694	1822

The construction of the community-proposed Bypass Road for Waipahu Street is assumed, completing the street collector system for Waipahu Town.

3. Traffic Assignment

Phase I and Phase II traffic generation are superimposed over the Year 1990 and the Year 1995 travel demand forecasts derived from the State Department of Transportation along the major highway corridors in the vicinity. The projected traffic demand is discussed in terms of peak hour characteristics by converting the projected average daily traffic volumes to peak hour volumes using peak hour and directional distribution factors developed from existing travel patterns. Finally, these projections are distributed over the individual facilities on each corridor. Table 10 shows the background traffic demand for the existing conditions, the Year 1990 and the Year 1995.

4. Phase I - Traffic Assignment

The proposed Waikele Development is expected to have a negligible impact on the 1990 traffic conditions on Kamehameha Highway at Waipahu Street. The increased traffic from the proposed development is partially offset by the decrease in turning demand on Kamehameha Highway to and from Waipahu Street. The proposed Paiwa Interchange is expected to attract these Waipahu trips since it provides more direct access to and from the Freeway.

Similarly, the diverted traffic, from Waipahu Town to the Paiwa Interchange, should partially offset the increased demand on the Eastbound H-1 on ramp at Waiawa Interchange during the AM peak hour and on the westbound H-1 off ramp at Waiawa Interchange during the PM peak hour resulting from the development of East Waikele.

TABLE 10- TRAFFIC PROJECTIONS WITHOUT PROJECT

FACILITY	EXISTING ADT	EXISTING AM PEAK	EXISTING PM PEAK	1990 ADT	1990 AM PEAK	1990 PM PEAK	1995 ADT	1995 AM PEAK	1995 PM PEAK
WAIPAHU SCREENLINE (EAST-WEST DIRECTION)									
INTERSTATE ROUTE H-1									
INBND	27431	3146	2186	34200	3920	2720	42500	4870	3390
OUTBND	24188	1644	2395	30100	2050	2980	37500	2550	3710
WAIPAHU STREET									
INBND	8859	826	628	8900	830	640	9000	840	640
OUTBND	6893	492	700	7000	500	710	7000	500	710
FARRINGTON HIGHWAY									
INBND	16982	1036	1188	17200	1050	1200	17400	1060	1220
OUTBND	19376	1361	1704	19600	1380	1730	19800	1390	1740
TOTAL									
INBND	53272	5008	4002	60300	5800	4560	68900	6770	5250
OUTBND	50457	3497	4799	56700	3930	5420	64300	4440	6160
CENTRAL OAHU SCREENLINE (NORTH-SOUTH DIRECTION)									
INTERSTATE ROUTE H-2									
INBND	21812	2660	1629	28600	3490	1920	32900	4020	2220
OUTBND	20411	1093	2403	27400	1200	3110	31700	1390	3600
KAM HIGHWAY									
INBND	12910	1579	706	11600	1420	780	13400	1630	900
OUTBND	13078	376	1400	11600	510	1320	13500	590	1530
KUNIA RD									
INBND	3155	205	421	3300	220	440	3400	230	460
OUTBND	3443	500	240	3600	520	250	3800	540	260
TOTAL									
INBND	37877	4444	2756	43500	5130	3140	49700	5880	3580
OUTBND	36932	1969	4043	42600	2230	4680	49000	2520	5390
PEARL CITY SCREENLINE (KALAUAO STREAM)									
INTERSTATE ROUTE H-1									
INBND	57449	7372	3279	63200	8100	3610	69353	8900	3960
OUTBND	54518	2640	6278	61000	2960	7020	68153	3300	7850
MOANALUA RD									
INBND	11706	1359	691	14100	1640	830	16897	1970	1000
OUTBND	13580	972	1678	15600	1110	1920	17754	1270	2200
KAMEHAMEHA HIGHWAY									
INBND	29534	3453	1598	29900	3490	1620	30175	3530	1640
OUTBND	27310	837	2917	28400	870	3030	29397	900	3140
TOTAL									
INBND	98689	12184	5568	107200	13230	6060	116424	14400	6600
OUTBND	95408	4449	10873	105000	4940	11970	115304	5470	13190

The net increase in traffic, eastbound (inbound) on Interstate Route H-1 during the AM peak hours, is expected to be 6% over the projected 1990 conditions between the proposed Paiwa Interchange and the Waiawa Interchange, of which only about 1% is attributable to site generated traffic from the proposed Waikele Development. The remaining 5% is comprised of Waipahu Town trips diverted from the Waiawa Interchange. In the westbound (outbound) direction on Interstate Route H-1 during the PM peak hour, the expected 17% increase over 1990 traffic conditions is primarily a result of Waipahu Town traffic (15%) diverted from Waiawa Interchange.

Most of the increased traffic demand resulting from Phase I of the the proposed Waikele Development is expected to affect Kamehameha Highway. The State-proposed Waipio Interchange on Interstate Route H-2 is assumed as part of the Phase I traffic assignment network. State DOT planning studies estimate about 1000 vph diverted from Kamehameha Highway to Interstate Route H-1 during AM and PM peak hours in the inbound and outbound directions, respectively. The proposed development is expected to increase traffic on Kamehameha Highway at Waipahu Street by 12% and 6.7%, during the AM and PM peak hours, in the inbound (southbound) and outbound (northbound) directions, respectively. The increase of traffic from the proposed project is expected to be partially offset by decreases in traffic turning on and off Kamehameha Highway at Waipahu Street. These decreases are expected to result from Waipahu traffic diverted to the proposed Paiwa Interchange.

At Kalauao Stream, the Interstate Route H-1-Moanalua Road-Kamehameha Highway corridor is expected to increase by a net 2.4%, eastbound during the AM peak hour, and less than 3.4%, westbound during the PM peak hour over the projected 1990 traffic demands.

During the peak periods, Phase I of the proposed Waikele Development is not expected to have significant increase in demand at the Waiawa Interchange; a small increase can be expected on the Interstate Route H-1/Kamehameha Highway corridor in Pearl City; and a more significant increase in demand on Interstate Route H-1, west of Waiawa Interchange can be expected, primarily due to Waipahu Town traffic diverted by the proposed Paiwa Interchange.

5. Phase II - Traffic Assignment

Most of the increase in peak period traffic resulting from Phase II of the Waikele Development is realized at the proposed Paiwa Interchange due to three reasons: first of all, the remaining area to be developed is on the west half of the site and will utilize the Paiwa Interchange as the primary access; secondly, the expected development in the West Beach area should attract more employment opportunities and, therefore, work trips; and finally, the commercial-retail center should attract the after-work shopping trips made by Waikele residents.

The community-proposed realignment of Waipahu Street to a Bypass Road, mauka of the Sugar Mill, is expected to provide increased access for West Waipahu (west of Waikele Stream) to the proposed Paiwa Interchange. This traffic is diverted from the adjacent interchanges at Waiawa and Kunia. This redistribution is particularly significant during the PM peak hour.

The increase of traffic over the Year 1995 projection on the Interstate Route H-1 west of Waiawa Interchange is expected to be about 8.6% eastbound, and 38.5% westbound during the AM and PM peak periods, respectively. However, only 7.6% in the morning peak hour and 10.5% in the afternoon peak hour are directly attributable to the proposed Waikele Development.

The increase in traffic demand on Kamehameha Highway, resulting from the completed development, is +4% inbound during the AM peak hour and +23.7% outbound during the PM peak hour.

Due to the proposed project, the increase in eastbound traffic during the AM peak hour on the Interstate Route H-1 Moanalua Road- Kamehameha Highway corridor at Kalauao Stream is expected to be about 5.4% over the projected Year 1995 traffic conditions. Due to the Waikele Development the increase in westbound traffic during the PM peak hour at this location is expected to be 9% over the projected Year 1995 traffic conditions.

6. Proposed Improvements

These include the development of the on-site roadway system for Waikele and connections to the surrounding highway system. (See Figure 10, Traffic Circulation). The project roadway system consists of collector roads providing access to the major land use areas within Waikele. These include:

a. A 100-foot right-of-way running east-west from Kamehameha Highway across the project site and connecting to Paiwa Street; and then a 60-foot right-of-way connecting to Manager's Drive.

b. A 100-foot right-of-way running in a north-south direction, extending from Paiwa Street/H-1 Highway to the north edge of the project site; and

c. A 60-foot right-of-way looping generally along the north, west and east perimeters of the project.

Off-site improvements to connect to adjacent highways include:

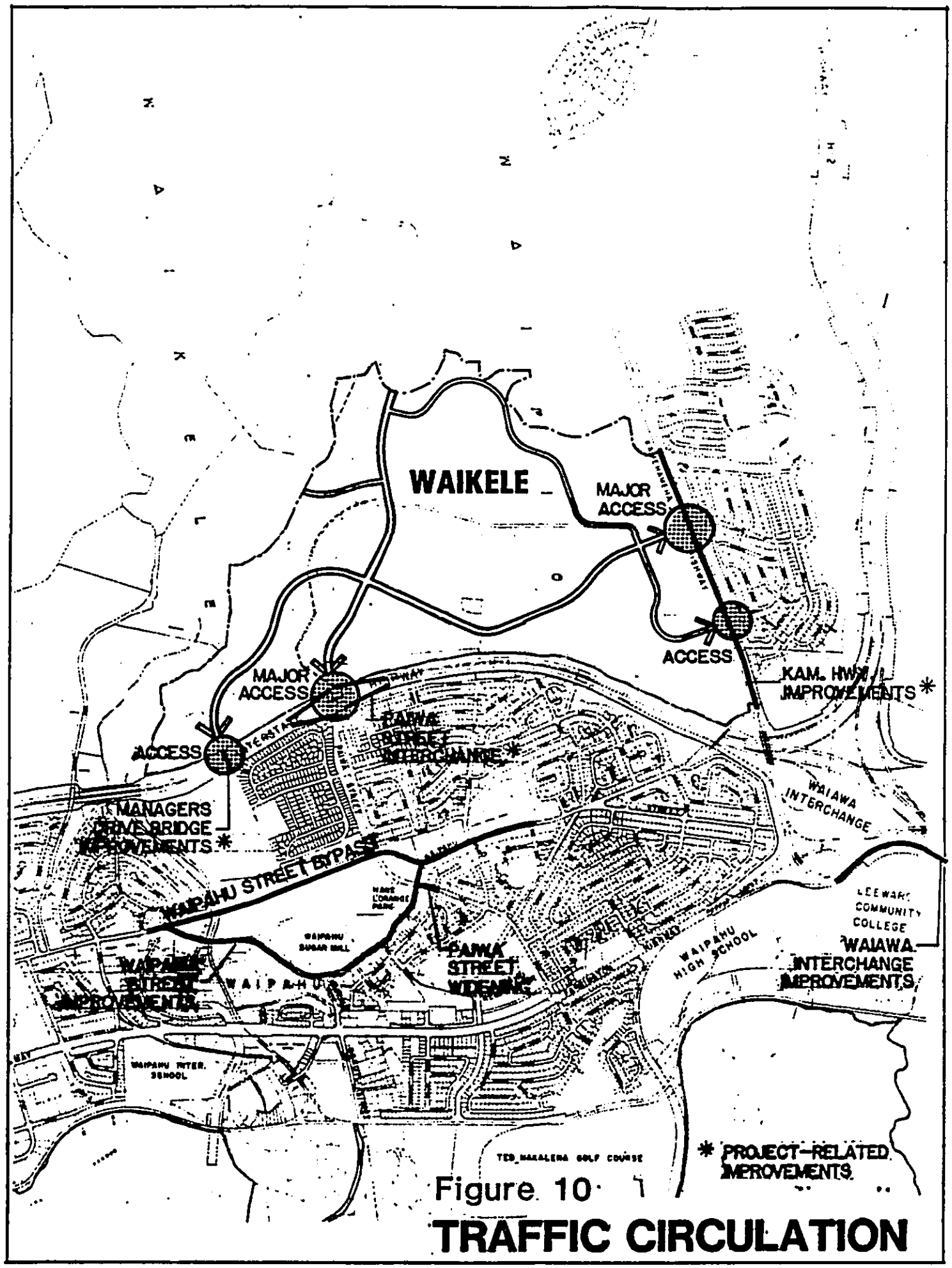


Figure 10

TRAFFIC CIRCULATION

a. Kamehameha Highway widening from a three-lane to five-lane arterial along the extent of the frontage of the Waikele project on the highway, including an exclusive left-turn lane into the project.

b. Manager's Drive bridge overpass widening at H-1 Highway from a 30-foot to 60-foot width to accommodate traffic into and out of the project from the Waipahu area.

c. A full service interchange facility on Interstate Route H-1 at the existing Paiwa Street undercrossing, to service the project site and Waipahu Town.

The above improvements are to be undertaken by the project's developer, together with whatever government assistance that is available. These are proposed within the context of other roadway improvements in the area. These additional improvements include: 1) the Interstate Route H-2 Waipio Interchange proposed by the Department of Transportation; 2) Waipahu Street improvements to relieve congestion in Waipahu Town, proposed by the City and County of Honolulu; and 3) a bypass road between Waipahu Street at Waikele Stream and Waipahu Street east of Paiwa Street, proposed by the Waipahu community. The proposed Paiwa Interchange is expected to have a two-fold effect on traffic circulation in the vicinity. First, it fulfills Central and West Waikele's access requirements to the freeway. Second, it diverts Waipahu Town traffic currently using Waiawa Interchange. This reduction in traffic demand at the Waiawa Interchange ramps, together with the proposed improvements

on Kamehameha Highway, should produce available highway capacity to accommodate the increase in demand resulting from the development of East Waikele.

The Waipio Interchange should reduce traffic demand on Kamehameha Highway, and the Waipahu Street improvements and construction of a bypass road should improve Waipahu's collector-feeder system to the Paiwa Interchange. Some of these proposals have duplicate objectives. For example, the construction of both the Paiwa Interchange and the Waipio Interchange would reduce the demand at Waiawa Interchange, thereby diminishing the need for the proposed ramp widening. The bypass road could provide an east-west collector street for Waipahu in lieu of a four-lane widening and realignment of Waipahu Street as proposed by the City. Waipahu Street would then become a local street within Waipahu Town.

G. Impact on Air Quality

1. Direct Air Quality Impact of Project Construction

The air quality study conducted by Root (Appendix B), indicates that during the site preparation and construction phases of this project it is inevitable that a certain amount of fugitive dust will be generated. Actual emissions of fugitive dust from this project can be expected to vary daily depending upon the amount of activity and the moisture content of exposed soil in work areas.

One major generator of fugitive dust is heavy construction equipment moving over unpaved roadways.

This problem can be substantially mitigated by completing and paving roadways and parking areas as early in the development process as possible. Because some construction will be taking place in close proximity to existing residential areas, dust control will have to be an item of special concern throughout the construction phase of the project.

Heavy equipment at construction sites will also emit some air pollutants in the form of engine exhausts. The largest equipment is usually diesel-powered. The overall impact of pollutant emissions from construction equipment should be minor compared to levels generated on major roadways nearby.

The only direct adverse air quality impact that the proposed project is likely to create is the emission of fugitive dust during construction. State of Hawaii regulations stipulate the control measures that are to be employed to reduce this type of emissions. Primary control consists of wetting down loose soil areas. An effective watering program can reduce particulate emission levels from construction sites by as much as 50 percent. Other control measures include good housekeeping on the job site and pavement or landscaping of bare soils areas as quickly as possible.

2. Indirect Air Quality Impact

Once construction is completed the proposed project will not in itself constitute a major direct source of air pollutants. By serving as an attraction for increased motor vehicle traffic in the area, however, the project must be considered to be a significant indirect air pollution source.

Motor vehicles, especially those with gasoline-powered engines, are prodigious emitters of carbon monoxide. Motor vehicles

also emit some nitrogen dioxide and those burning fuel which contains lead as an additive contribute some lead particles to the atmosphere. The major control measure designed to limit lead emissions is a Federal law requiring the use of unleaded fuel in most new automobiles. As older cars are removed from the vehicle fleet lead emissions should continue to fall.

By 1995 carbon monoxide emissions from the vehicle fleet then operating are mandated to be little more than half the amounts now emitted.

Once completed, the proposed Waikele Development is expected to have little direct impact on the air quality of the surrounding region. Indirect long term impacts in the form of increased air pollutant emissions from power plants serving new residences in the project area can be mitigated somewhat by planning and implementing solar energy design features to the maximum extent possible.

Other indirect long term air quality impacts are expected in those areas where traffic congestion can potentially be worsened by the addition of vehicles traveling to and from the proposed project. Project planners can do very little to reduce the emission levels of individual vehicles, but the Traffic Impact Report for the project describes several proposed or planned roadway improvements that could significantly increase highway traffic capacity and facilitate entry and exit from the proposed development with a minimum of increased traffic congestion. Proper planning can also promote pedestrian and bicycle useage which would decrease emission impacts.

Carbon monoxide modeling conducted indicates that the roadway improvements described in the Traffic Impact Report for the project will be adequate to ensure compliance with State and National air quality standards even under worst case traffic and meteorological dispersion conditions.

H. Impact on Noise Environment

1. Construction Impacts

During construction, there is likely to be noise generated from excavation, foundation, erection of structures, and finishing activity. However, adverse noise impacts resulting from the proposed project are expected to be rather limited.

The long-term impact on ambient noise levels is expected to increase due to the increased development scale of the project. The proposed project will indirectly generate more noise, since more automobiles are going to and from the site.

Methods for minimizing noise may be undertaken during construction. These include the: placing of mufflers on construction machinery, equipment, etc.; instructing of workers to avoid unnecessary "gunning" of construction equipment and to turn off equipment when not in use; creating of earth berms which would absorb some of the noise; and limiting construction activity during daylight hours, between 8:00 a.m. to 5:00 p.m. In addition, construction activities must comply with the provisions of Title 11, Administrative Rules, Chapter 43, Community Noise Control for Oahu. Equipment noise must be attenuated to meet allowable noise levels defined in the regulations, based on zoning districts. A noise permit for the proposed project will be required from the Noise and Radiation Branch of the Department of Health. The contractor shall ensure that all construction equipment is in proper condition, will attempt to enforce the methods mentioned, and will comply with required State and Occupational Safety and Health Administration (OSHA) Standards. Traffic noise from heavy vehicles traveling to and from the construction site must be minimized in residential areas and must comply with

the provisions of Title 11, Administrative Rules, Chapter 42, Vehicular Noise Control for Oahu.

The noise that would be created on-site, due to the proposed project, is similar to the noise currently being generated in the vicinity of the site. Therefore, it is expected that generated noise would blend into the surrounding background vehicular noise and would not constitute an adverse effect on the adjacent land uses.

2. Traffic Noise

Predictions of future traffic noise levels were made in the traffic noise study conducted by Y. Ebisu & Associates, (Appendix C), using the traffic volume predictions for the Phase I and II development increments contained in the traffic study. Future traffic noise levels were calculated for total (project plus non-project) traffic. Using traffic study figures, project traffic on H-1 Freeway and Kamehameha Highway will be in the order of 10 percent greater than non-project traffic. Traffic noise level increases attributable to the project traffic are anticipated to be less than 0.5 dB for a 10 percent increase in traffic volume.

The predicted increases in traffic noise levels from the present to the completion of Phase II development are shown in Table 11. Because the total width of the H-1 Freeway lanes is greater than 100 FT, a reference distance of 100 FT, rather than 50 FT, from the center of the freeway was used. The predicted noise level increases along the freeway and Kamehameha Highway are in the order of 0.5 to 1.1 dB (or Ldn unit). This degree of increase will be difficult to measure.

Future traffic noise levels along the two major interior streets of the proposed development are expected to be in the "Acceptable" noise exposure category. As long as as the

TABLE 11

COMPARISONS OF EXISTING AND FUTURE TRAFFIC NOISE LEVELS IN PROJECT ENVIRONS

LOCATION	SPEED (MPH)	VPH	*** HOURLY LEQ IN DB @ 50'*** AUTO	MT	HT	ALL VEH	DB INCREASE
EXISTING PEAK HR. TRAFFIC:							
H-1 Freeway (Mauka Side)*	55	5,118	69.0	64.0	65.8	71.5	-
H-1 Freeway (Makai Side)*	55	5,118	71.3	66.3	68.1	73.8	-
Kamehameha Hwy. @ Lumiaina	40	2,116	63.9	58.4	60.7	66.4	-
Kamehameha Hwy. @ Waipahu	40	2,546	64.7	59.2	61.5	67.2	-
Manager's Dr. @ Lumiaina		(None)					
Paiwa St. @ H-1 Fwry.		(None)					
FUTURE (PHASE II) PEAK HR.TRAFFIC:							
H-1 Freeway (Mauka Side)*	52	7,840	69.9	65.0	67.1	72.6	1.1
H-1 Freeway (Makai Side)*	52	7,840	72.2	67.3	69.3	74.9	1.1
Kamehameha Hwy. @ Lumiaina	40	2,740	65.0	59.5	61.8	67.5	1.1
Kamehameha Hwy. @ Waipahu	37	3,730	65.1	59.7	62.3	67.7	0.5
Manager's Dr. @ Lumiaina	40	1,010	60.7	55.2	57.5	63.1	63.1
Paiwa St. @ H-1 Fwry.	40	1,310	61.8	56.3	58.6	64.3	64.3

*Noise levels are at 100 FT from center (Baseline) of H-1 Freeway.

Assumed traffic mix of 96% Autos, 2.5% Medium Trucks, and 1.5% Heavy Vehicles on H-1 Fwry., and 97% Autos, 2% Medium Trucks, and 1% Heavy Vehicles on internal streets and Kamehameha Hwy.

total number of heavy vehicles (diesel trucks and buses) are not greater than 1 percent of the total traffic volume, future traffic noise levels are predicted to be below 65 Ldn at 55 FT setback distances from the centerlines of the internal roadways.

As indicated previously, differential traffic noise impacts along Kamehameha Highway and H-1 Freeway attributable to the proposed Waikele Master Plan are predicted to be in the order of 0.5 Ldn (or dB), and will be difficult to measure. Total increases in traffic noise along these two roadways following completion of the project as proposed will be in the order of 1 Ldn.

Although traffic noise increases associated with the overall increases in traffic volumes are expected to be small, secondary noise impacts associated with improvements to the highway system are possible. These improvements are the widening of Kamehameha Highway between Waipahu Street and the future Manager's Drive, and the construction of the Paiwa Interchange.

Traffic noise impacts on future Waikele residents can be minimized by location of residential and apartment units beyond the future 65 Ldn contour line, and, if possible, beyond the 60 Ldn contour line. It is anticipated that the majority of the Waikele residential/apartment units will be in the "Acceptable" and "Unconditionally Acceptable" noise exposure categories.

Possible noise mitigation measures which would minimize noise impacts from roadway traffic noise include measures such as: the use of buffer zones of sufficient depth; construction of sound attenuation berms or walls where adequate setbacks cannot be achieved; incorporating sound attenuating window design features in upper-story homes which cannot be shielded

by sound attenuating barriers; and air conditioning affected spaces. The applicability of each mitigation measure depends upon other considerations besides noise, such as economic cost, aesthetics, and technical feasibility.

I. Impact on Infrastructure and Utilities

1. Potable Water

The existing water facilities in the Waipahu area are inadequate to accommodate the Waikele Project and, therefore, require construction and installation of new water source, storage facility, and transmission and distribution pipeline systems. Anticipated average daily consumption for the Waikele Project, including the proposed golf course, is approximately 2.1 million gallons per day.

For water source allocation, the owner proposes to secure approval from the City and County's Board of Water Supply for use of a portion of the recently transferred excess water source of 11.81 mgd. Subsequently, the owner will either pay for use of existing excess Board of Water Supply water source or construct a new source at the developer's expense in accordance with the prevailing plan of the Board of Water Supply.

For water storage, two off-site 1.0 million gallon capacity reservoirs (for incremental phasing) with 16-inch transmission main extended to the project site are proposed.

2. Sewage Treatment and Disposal

Total wastewater to be generated from the proposed ultimate project will be approximately 1.49 million gallons per day.

Approximately 0.71 million gallons per day will be collected on-site and discharged into an existing 18-inch sewer trunk main located within the eastern portion of the site. Sewage from the western portion, approximately 0.78 million gallons per day, will be discharged into an existing on-site city 30-inch main and an existing 15-inch line on Paiwa Street makai of the H-1 Highway.

3. Electrical and Telephone Service

Hawaiian Electric Company can provide electric power service to the project from its existing nearby facilities. The project will require installation of a switching station in addition to the normal installation of transformers. The owners is coordinating with Hawaiian Electric Company construction of the switching station on-site along an existing 46 KV pole line and easement located near the Waikele Gulch boundary. The owner is presently working with Hawaiian Telephone Company to provide an on-site location adjacent to Kamehameha Highway for a substation to service the communication requirements of the project.

4. Solid Wastes Collection and Disposal

The Waikele project site will be served by both public and private collection services. The disposal site will be at the Waipahu Incinerator or other facilities operable at that time.

J. Impact on Public Facilities and Services

1. Police Protection

Additional police officers will be required to service the project's population.

Possible methods of increasing on-site security may include the

provision of fencing, alarms, and other safety devices; and the supplementing of public protective services with private services or community volunteer groups. Security services may be provided in the Village Commercial Center.

Since the development will be phased over several years, impact on police services and facilities will be gradual, thus, providing time for governmental services to budget and acquire the needed personnel and facilities.

2. Fire Protection

A population increase in the Waipahu area resulting from construction of the proposed project will result in increased emergencies handled by the Fire Department. The City will be committed to provide continued fire protective services. These services will require additional personnel, capital expenditures, and operating funds.

It is anticipated that upon completion of the project, fire protection services will be adequate to accomodate the proposed project. Emergency fire systems may be located in Commercial Center. A fire station site of approximately 25,000 square feet will be reserved for future aquisition by the City and County of Honolulu within the Business Park.

Since the development will be phased over several years, impact on fire protection and facilities will be gradual, thus providing time for governmental services to budget and acquire the needed personnel and facilities.

3. Health Care Facilities

The project will result in a greater demand on existing health care facilities serving the community.

Though demands would increase, it is anticipated that existing facilities are adequate to satisfy all medical needs.

4. Educational Facilities

As the project will result in a greater demand on existing public educational facilities servicing the community, a 6-acre site for an elementary school will be provided. It will be located adjacent to a neighborhood park site. Since the development will be phased over several years, demand on public educational facilities will be gradual, thus, providing time for governmental services to budget and acquire the needed personnel and facilities.

5. Recreational Facilities

Implementation of the project will create a demand for additional park and recreational facilities in the area and community.

Dedication of park areas within the project will be required by the City's Park Dedication Ordinance No. 4621.

The proposed action will provide a golf course and other recreational amenities, including a community recreation center and neighborhood parks which the proposed residents would be encouraged to utilize. Park areas and their improvements to be dedicated to the City would comply with standards established by the Department of Parks and Recreation.

6. Public Transportation Facilities

Existing city bus and express transit routes are provided on Kamehameha and Farrington Highways and Waipahu Street.

Scheduling of more buses and rerouting of the existing system can be requested to service the proposed development as the need arises. The planned roadway system at Waikele will accommodate mass transit service with routes which are connected to the existing highway and street system.

K. Impact on Social and Economic Characteristics

1. Social Impacts

As a result of the developer's master planning efforts for the Waikele Project, representatives from 14 of Waipahu's community, business and labor groups began working in the spring of 1983 on their own long-range plans for Waipahu. This group, the Waipahu-Waipio Development Advisory Committee, and now known as the Waipahu 2000 Community Council, prepared the Waipahu 2000 Master Plan which views the development of Waikele as an integral element in the overall revitalization of Waipahu. Waikele is expected to provide the catalyst in rejuvenating and modernizing Waipahu in the Waipahu 2000 Master Plan.

The Proposed Waikele Project is seen as providing many benefits. These benefits can be summarized as follows:

a. Economic stability for Waipahu by supporting the economic viability of Oahu Sugar Company;

b. Approximately 2,000 new jobs which would bolster Waipahu's economy;

c. Meeting rooms and recreational facilities, including a golf course, which are not now adequately available;

d. A banquet hall at the golf course country club which could be used for weddings, socials and other community and business functions;

e. Acceleration of the schedule for the construction of the proposed Paiwa Interchange; and

f. Needed middle-income housing in a highly upgraded community which will enhance the entire Waipahu community.

Waikele borders existing urban developments on three sides. These development provide a mixture of single-family detached and attached houses, townhouses and garden apartments. The Village Park development plans to include a small neighborhood shopping center as part of it's community facilities. Gentry-Wapio has recently completed a small shopping center to service it's community needs.

Waipahu, the oldest and largest adjacent community, offers a full range of services and facilities. These include the old Waipahu town core, the commercial strip along Farrington Highway, Waipahu Cultural Garden Park, the Oahu Sugar Mill, and a light industrial subdivision development makai of Farrington Highway.

Waikele matches these surrounding conditions with planned housing types that are similar in density and character to that in Waipio-Gentry, Village Park, Crestview and Seaview as well as being compatible with older housing areas within the Waipahu community.

The overall density and form of housing will be similar to the surrounding areas. The diverse range of housing types offered at prices covering the full spectrum of income groups will add to the desirability and livability of the Waipahu

region as a well-rounded community. It will provide opportunities for new housing purchases by upwardly mobile area residents as well as by young families making their first purchase of a home.

Waikele's recreational amenities will also provide benefits to the greater Waipahu community. Golf course and clubhouse facilities will provide meeting places and space for social gatherings as well as a conveniently located regional recreational resource. The planned Waikele Recreation Center and two strategically located neighborhood parks will also contribute greatly to meeting the need for upgraded recreational facilities on the part of Waipahu residents.

Positive interactions will also occur between Waipahu and Waikele in regard to commercial services and shopping opportunities. The revitalization of Waipahu's town core will be greatly enhanced by increased market demands emanating from Waikele residents. On the other hand, a modern convenience shopping center in Waikele will offer Waipahu residents close and direct access to shopping experiences which would otherwise require significant travel.

2. Employment

The Waikele Project is close to a number of readily accessible employment centers situated within and outside the Primary Urban Center. These include the Pearl Harbor Naval Base and Hickam Air force Base, the commercial and industrial areas in Pearl City and Halawa, and the center of the Oahu Sugar Company operations in Waipahu Town.

The Waikele Project will allocate sufficient amounts of land to accommodate business and office uses such that, employment opportunities in the community should be equivalent in numbers

to 40 percent of the available resident labor force of Waikele. Demographic and economic data can be found in Appendix D.

3. Economic Impact

The Waikele Project will significantly impact the local economy and create considerable employment opportunities. It will provide the following primary sources of economic activity: (1) A 150,000 square foot Village Commercial Center containing retail uses primarily serving the residents of Waikele and featuring a major supermarket, drug store, convenience retail shops, and service establishments such as banks, restaurants, and dental and medical offices; and (2) a 51 acre Office Park which will be occupied largely by labor-intensive offices servicing a range of businesses.

The Waikele Project will also contribute to saving a substantial number of existing sugar related jobs (i.e., approximately 600 jobs) by improving the viability of Oahu Sugar Company. Additionally, Waikele's construction phases would offer a stable number of jobs for Oahu's cyclical construction industry. These jobs would be expected to continue over an 8-year time period.

Finally, a public revenue-cost analysis conducted by Environmental Capital Managers, Inc. has determined a revenue-cost ratio of 2.0 to 1.0 for the Waikele Project. This ratio indicates that for every dollar of public cost caused by the development, an additional $2.00 in public revenue benefits would accrue to the State or County. The cummulative discounted revenue estimates for the fully developed project totalled $61.2 million in constant 1983 dollars.

V PROBABLE ADVERSE EFFECTS

V. ANY PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

The following adverse environmental effects (both short- and long-term) cannot be avoided.

(1) Agricultural use of the land will be lost.

(2) The site-clearing and construction work will result in temporary fugitive dust, some disruption to traffic, and noise.

(3) Traffic will increase from the number of additional cars utilized by residents of the proposed development. Additional impacts associated with increased traffic include potential air and noise quality deterioration. The traffic consultant's findings indicate that roadway modifications will adequately accommodate the traffic to be created by the proposed development.

(4) The need for utility services will increase.

(5) The need for public services for fire and police protection, schools, and public recreational facilities will increase slightly.

(6) Solid waste and sewage generated by the project will increase the need for disposal and treatment and will increase total local waste output.

Countervailing policies are thoroughly described in Chapter III, Section K, State Plan, Land Use and Regulatory Characteristics. Rationale for proceeding with the proposed action are outlined in the sections describing Hawaii State Plan and General Plan of the City and County of Honolulu compliance-points.

VI ALTERNATIVES

VI. ALTERNATIVES TO THE PROPOSED ACTION

For the purpose of this EIS, three alternatives to the proposed development were considered. These alternatives were: (1) no action alternative, (2) active agricultural use, and (3) residential use only.

A. No Action Alternative

This alternative would result in no action being implemented. The impact of this alternative would be that the project site would remain as is. Eventually, the weeds and grasses would cover the entire site and create visually undesirable and hazardous areas which would *not* be consistent with surrounding residential development.

This alternative was not found to be viable because its non-use would render the properties useless to the landowner and the tremendous waste of valuable land would not provide any benefit to the surrounding communities or the State at large. In addition, No-Action would represent a blow to rational long-term land planning. City and State governments would also suffer from opportunity costs associated with losses of potential employment, tax revenues, and housing supply.

Conversely, development of the site would constitute an irretrievable use of land and would preclude any other uses for the site.

B. Active Agricultural Use Alternative

Appendix D, "Economic Impact of the Proposed Waikele Development" September 25, 1984 by Evaluation Research Consultants, cites three factors in the determination of economic feasibility for raising alternative crops on Waikele lands. These factors were duly considered by Amfac in their preliminary study of using Waikele as agricultural revenue producing lands. These factors as listed are as follows:

1. Cost and supply of water - Under existing conditions, the most readily available supply of water is from Oahu Sugar Company. This water would have to be pumped up to the Waikele fields and the pumping cost is substantial, exceeding $100/acre afoot. Most crops require about 5 acre feet per year, although some, such as daikon and perennial crops, require more. Thus, water pumping costs could cost over $500/acre.

2. Domestic wells/reservoirs location - In the Waikele area, wells and reservoirs would be competing with modern agricultural practices normally used in truck crops. Extensive uses of pesticides and fertilizers (exceeding that used for Sugar in quantity and toxicity) combined with public hysteria relating to pesticide contamination of domestic water supplies severely limit the feasibility of producing several crops.

3. Close proximity of residential lands - Existing residential lands to the south and northeast of Waikele create conflicts that are normally associated with competing land uses (Diversified Agriculture and Residential). Diversified agriculture requires extensive uses of pesticides and heavy farm equipment, all near residential housing; this is a hazard to children, and resulting noise and dust are obnoxious to existing residents.

This alternative was determined to be economically infeasible by the landowner which is the primary reason for the site remaining in its current fallow state. As stated previously in the discussion on agricultural significance, alternative crops were also determined to be inappropriate for the site due to economic constraints and environmental impacts on surrounding residential areas.

C. Single Family Residential Alternative

This alternative, which would consist entirely of detached single

family dwellings is not considered a desirable alternative. This would preclude the development of a balanced community which offers employment centers, recreational facilities, and commercial areas as well as housing. Without this mix extensive travel for residents would also be required for employment, shopping and recreation needs. Finally, development at a lower density would result in fewer units per developed acre, thus resulting in a less efficient land use pattern.

VII
ENVIRONMENTAL RELATIONSHIPS

VII. THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY AND IRREVERSIBLE/IRRETRIEVABLE COMMITMENTS OF RESOURCES

It is anticipated that the construction of the proposed project will commit the necessary construction materials and human resources (in the form of planning, designing, engineering, construction labor, landscaping, and personnel for the sales, management, services, offices, and maintenance functions). Some of the construction materials could be reused if and when the structures are demolished; however, at the present time and state of our economy, it is felt that the reuse of much of these materials is not practical. Labor expended for this development is not retrievable. However, labor will be compensated during the various stages of the project by the developer, commercial businesses, and the building's management.

The appearance of the project site will be altered from its present open vacant appearance to that of a completed master planned residential community. The development will be highly visible but visually integrated with the surrounding areas.

Air and noise quality will be adversely affected by this proposed project, but will remain in compliance with State standards. While ambient air and noise quality in the area is relatively good, however, the proposed development will result in greater number of vehicles going to and from the project areas, resulting in vehicular pollution emissions.

The project development will result in a commitment of land for a long-term period. Once low and medium density residential, office and commercial uses are established, it is unlikely that the land will be reverted to a lower usage in the long-term future. Commitment of land

for these purposes will likely foreclose certain future use options of the land such as open space and agricultural activities.

The project development will, in the short- and long-term result in residential uses which will likely benefit future homeowners, the landowner and private businesses.

VIII
GOVERNMENTAL POLICIES AND OFFSETTING INTERESTS

VIII. AN INDICATION OF WHAT OTHER INTERESTS AND CONSIDERATIONS OF GOVERNMENTAL POLICIES ARE THOUGHT TO OFFSET THE ADVERSE ENVIRONMENTAL EFFECTS OF THE PROPOSED ACTION

The proposed project was considered the most productive and benefical alternative for the project site. Impacts occurring from the proposed action are considered small compared to the benefits derived from implementation of the project.

From an economic standpoint, studies conducted by Environment Capital Managers Inc., indicate that a significant cost benefit ratio will result from this plan.

For the Waikele Project, a revenue-cost ratio of 2.0 to 1.0 was attained. This indicates that an additional $2.00 in public revenue benefits would accrue to the State of Hawaii and/or the City and County of Honolulu for every dollar of public cost caused by the proposed development. This would be a definite financial gain to the State and to the City and County of Honolulu, should this project be implemented. As a standard for comparison, in its civil projects the U.S. Army Corps of Engineers recommends proceeding with a project if there is unity (1.0 to 1.0) or greater. This analysis is conducted from a pure economic standpoint. Environmental cost have not been reflected in this analysis.

Population changes occurring from the development of the Waikele project are in line with the General Plan's population projections for the areas and will not require a General Plan amendment.

Conformance with the Hawaii State Plan HRS Chapter 226, is described in detail in Chapter III Section K. Areas of compliance with the Plan include:

Population, H.R.S. Section 226-5; Economy H.R.S. Section 226-6; Agriculture H.R.S. Section 226-7; Scenic, Natural Beauty and Historic Resources H.R.S. Section 226-13; Land, Air, and Water Quality H.R.S. Section 226-13; Water H.R.S. Section 226-16; Transportation H.R.S. Section 226-17; Housing H.R.S. Section 226-19; Education H.R.S. Section 226-21; and Leisure H.R.S. Section 226-23.

The three alternatives discussed in Section VI may also achieve some countervailing policies which are applicable to this section. However, these alternative uses were outweighed by the merits and conformance of the proposed use.

Although it is considered economically unviable, agricultural use of the site would be fully supportive of the State Agriculture and Land, Air and Water Quality Plans. The single family residential alternative would share many of the merits of the proposed project; however, this would preclude the benefits of a comprehensive, planned community.

IX LIST OF NECESSARY APPROVALS

IX. LIST OF NECESSARY APPROVALS

The proposed project must obtain the following approvals and permits prior to its implementation:

(1) Rezoning Approval - Department of Land Utilization, City Council, Mayor

(2) Grading Permit - Department of Public Works

(3) Building Permit - Building Department

It is also noted that in obtaining these permits (i.e. Grading and Building) the following agencies must provide certification which indicates that the plans are acceptable from the standpoint of meeting the applicable codes, standards, and regulations.

Sewage Treatment Plant	-	State Department of Health Department of Public Works, City & County of Honolulu
Roadways	-	State Department of Transportation Department of Transportation Services, City & county of Honolulu
Water Supply	-	Board of Water Supply, City & County of Honolulu
Drainage	-	Department of Public Works, City & County of Honolulu
Fire Protection	-	Fire Department, City & County of Honolulu

Approval of State Land Use District reclassification from Agricultural to Urban by the State Land Use Commission is currently pending. Hearings have been completed and a Decision and Order for this request is expected prior to completion of the Chapter 343, HRS, environmental impact statement process.

X CONSULTED PARTIES

X. ORGANIZATIONS AND AGENCIES CONSULTED FOR THE WAIKELE DEVELOPMENT PROJECT

Organization/Agency	Date of Comment	Date Comment Received	Date of Response
State			
Dept. of Accounting & General Services	-	-	-
Dept. of Agriculture	8/21/85	8/22/85	10/09/85
Dept. of Defense	7/24/85	7/31/85	NRN
Dept. of Education	7/31/85	8/05/85	10/09/85
Dept. of Health	8/19/85	8/22/85	10/09/85
Dept. of Land & Natural Resources	-	-	-
Dept. of Planning & Economic Development	8/15/85	8/21/85	10/09/85
Dept. of Social Services	7/23/85	7/26/85	10/09/85
Dept. of Transportation	8/20/85	8/22/85	10/09/85
OEQC	-	-	-
Environmental Center	-	-	-
Water Resources Research Center	8/20/85	8/22/85	10/09/85
City & County			
Board of Water Supply	8/06/85	8/12/85	10/09/85
Building Department	-	-	-
Dept. of Housing & Community Development	8/08/85	8/13/85	10/09/85
Dept. of General Planning	-	-	-
Fire Department	8/21/85	8/23/85	10/09/85
Dept of Land Utilization	-	-	-
Dept. of Parks & Recreation	7/29/85	8/01/85	10/09/85
Police Department	7/24/85	7/26/85	10/09/85
Dept of Public Works	8/01/85	8/07/85	10/09/85
Dept. of Transportation Services	7/30/85	7/30/85	10/09/85
Federal			
U.S. Dept. of Transportation, FHWA	9/05/85	9/06/85	10/09/85
U.S. Dept. of Agriculture	-	-	-
Soil Conservation Services	8/05/85	8/12/85	10/09/85
U.S. Dept. of the Interior	-	-	-
U.S. Navy	8/06/85	8/08/85	10/09/85
U.S. Corp of Engineers	7/31/85	8/05/85	10/09/85
U.S. Fish & Wildlife Services	8/22/85	8/23/85	10/09/85

Organizations/Agencies Consulted (continued)

Private Organizations/Agencies	Date of Comment	Date Comment Received	Date of Response
American Lung Association	-	-	-
Castle & Cooke, Inc.	7/30/85	8/01/85	10/09/85
GASCO	-	-	-
Hawaiian Electric Company, Inc.	8/21/85	8/22/85	10/09/85
Hawaiian Railway Society	-	-	-
Hawaiian Telephone Company	-	-	-
Hongwanji Mission	-	-	-
Leeward Oahu Jaycees	-	-	-
Oahu Sugar Company	-	-	-
Outdoor Circle	-	-	-
Pearl City Neighborhood Board	-	-	-
Waipahu Business Association	-	-	-
Waipahu Cosmopolitan Club	-	-	-
Waipahu Cultural Garden Park	-	-	-
Waipahu Neighborhood Board #22	-	-	-
Waipahu Neighborhood Improvement Association	-	-	-
Waipahu 2000 Community Council	-	-	-

XI DEIS COMMENTS

XI. AGENCIES, AND ORGANIZATIONS, CONSULTED FOR THE WAIKELE DRAFT ENVIRONMENTAL IMPACT STATEMENT

State	Date of Comment	Date of Response	Page
Office of Environmental Quality Control	11/26/85	01/07/86	1
Department of Agriculture	12/17/85	01/07/86	7
Department of Accounting and General Services	11/14/85	-	23
Department of Defense	11/14/85	-	24
Department of Education	11/26/85	-	25
Department of Hawaiian Home Lands	-	-	-
Department of Health	12/10/85	01/07/86	26
Department of Land and Natural Resources *	12/23/85	-	31
Department of Planning and Economic Development	12/19/85	01/07/86	32
Department of Social Services and Housing	11/14/85	-	34
Department of Transportation	12/06/85	01/07/86	35
State Energy Office	12/02/85	-	38
Environmental Center	12/23/85	01/07/86	39
Water Resources Research Center	12/09/85	01/07/86	56
City & County			
Board of Water Supply	12/11/85	01/07/86	59
Building Department	11/21/85	-	61
Department of Housing and Community Development	12/10/85	01/07/86	62
Department of General Planning	12/13/85	01/07/86	64
Department of Land Utilization	12/20/85	01/07/86	67
Department of Parks and Recreation	11/22/85	-	85
Department of Public Works	12/04/85	01/07/86	86
Department of Transportation Services *	12/27/85	-	89
Honolulu Fire Department *	12/27/85	-	91
Honolulu Police Department	12/19/85	-	92
Federal			
Army-DAFE (Facilities Eng.-USASCH)	-	-	-
Navy	-	-	-
Soil Conservation Service	11/25/85	-	93
U.S. Army Corps of Engineers	11/20/85	01/07/86	94
U.S. Coast Guard	11/13/85	-	96
U.S. Fish and Wildlife Service	12/06/85	01/07/86	97

Private Agencies	Date of Comments	Date of Response	Page
American Lung Association	-	-	-
Hawaiian Electric Company	12/03/85	01/07/86	100
Office of Hawaiian Affairs	-	-	-
Mililani/Waipio/Melemanu Neighborhood Board No. 25	-	-	-
Waipahu Neighborhood Board #22	-	-	-
Mr. George Yim, President, Castle & Cooke, Inc.	-	-	-
Commanding Office, Naval Magazine	-	-	-

* Received after Deadline

APPENDIX A

and about 320 acres of various forage crops are being produced on the Ewa plains near Campbell Industrial Park. The current market for the green chop is the dairy industry on Oahu. Lands such as Waikele are well suited for the production of forage crops if adequate low-cost water is available. However, the production of forage for green chop on Waikele is not likely to be an economically viable activity because of its location. Because forage for green chop is a very bulky product and thus expensive to transport, most commercial forage operations are on lands adjacent to the place where it will be used. The current and potential users of greenchop are the feedlot at Barber's Point and the dairies in Waianae and on the North Shore. Both the dairies and the feedlot are located too far from Waikele to make Waikele a good location for forage production.

CONCLUSIONS

1. Waipahu is a unique community with a unique history. Statistics confirm that the population is fairly homogeneous in terms of socio-economic characteristics. Taken as a whole, the population of this area is composed of young households with a higher proportion of children than average. Employment tends to be more "blue collar" than average. The finding with respect to income are consistent with this profile. Typical incomes in this are comparable with the Island average, but there are relatively fewer high incomes. The percentage of employable persons in lower in Waipahu than on Oahu as a whole. This again is consistent with the age distribution of the population, i.e, the larger proportion of children.

2. The nature and degree of social impact and social change in the community depends on the magnitude and timing of the development as well as the communities ability to adapt and adjust to change.

The proposed development involves not only housing, but also a

commercial district to serve the development and some light industry. The additional 2,700 housing units will mean an eventual 27 percent increase in the population of the Waipahu CDP. While this is a rather large increase, there are at least three mitigating factors. One, the increase will be gradual, as the development is scheduled to take at least 5 years to complete and is attuned to the needs and demands of the marketplace. Two, the development is more or less self-contained. Retail services as well as locations for fire and school services will be provided for within the development. Three, this area is a logical extension of existing urban development and the development is a continuation of existing trends taking place in the community.

3. the most important variables in a social impact assessment are the communities lifestyle and the quality of life. Of great concern is what effect a particular development will have on them.

Most of the people who live in Waipahu made a conscious decision to do so because of the advantages the areas offers and the availability of housing commensurate with their incomes, professions, and expectations. The high rate of home-ownership in the rapidly growing areas of Waipahu indicate that people have made and are making financial and emotional commitments and are strongly motivated to maintain and enhance the existing lifestyle.

As the majority of the housing in the proposed development is planned to be in the low and middle income real estate market (812 and 1029 units, respectively), it is expected that the new residents will possess socio-economic characteristics similar to those of the existing residents. They would have similar social values and goals, and behavior norms that will be consistent with those of the existing populations.

There will be change, however, as any development produces some change. One source of change will be the provision of 868 low density (high priced)

N/A Data not available

The potential for watermelons was reduced because of the seasonal nature of demand and mainland supplies, and because of the expanded production on Molokai. The potential acreage for taro was also reduced. The apparent market demand is for wetland types and only the dryland types are feasible on the Waikele lands.

From the viewpoint of the market, there is definitely a potential for increased production of bananas in the State. However, there are better places to produce bananas than Waikele. Banana production in areas such as Waikele would require irrigation. Production costs would be substantially less in areas such as Waianalo (Oahu), the Puna and Hilo regions of the Big Island, and on parts of Kauai. Excluding bananas, the total potential demand for new planting of crops suitable for lands similar to those in Waikele is 195 acres.

Prime lands similar to Waikele are not scarce. All of the major islands except Lanai have such lands. On Oahu, over 4,000 acres of such lands near Waikele are currently fallow and there is land available near Kahuku.

It is not the availability of land that is limiting the expansion of crops listed in Tables 2 and 3, but rather the size of the market for locally produced crops. The de facto population of the entire State is only slightly more than a million persons and in the principal market area (Oahu), the de facto population is only 825,000 persons. This is a very small market and it does not require substantial acreage to supply such a market, particularly when many popular foods either require temperate climatic conditions not found in Hawaii or can be produced elsewhere and imported for less than it costs to produce them locally.

Lands such as Waikele, however, are not only suitable for the

production of fruits and vegetables, they also could be used for the production of floral and nursery products, the production of seed, and the production of forage crops. Livestock uses with the exception of pasture are probably not feasible because of the proximity to residential housing.

Floral and Nursery Products

The floral and nursery industry in Hawaii has been expanding rapidly during the recent years. This industry, however, does not require large acreages, producing a large volume of high valued products from a very small land area. The average size of all floral and nursery operations in the State is under 3 acres. For these crops, climate is typically more important in choosing a site than land quality. Current expansion of this industry is limited only by market availability and management capability, not by the availability of land. Also, several of the Ag Parks being developed make specific provisions for nurseries.

Seed Production.

Lands such as Waikele are suitable for the production of seed for crops such as corn if adequate irrigation water is available. The demand for land for the production of seed corn and other seeds tends to fluctuate depending on climatic conditions elsewhere in the world. For example, as a result of the adverse weather conditions on the mainland, Oahu Sugar last year leased land to a mainland seed corn company. It is difficult, however, to plan on a long term demand for such a use and it appears as if sufficient lands are available to meet current levels of demand.

Forage Crop Production.

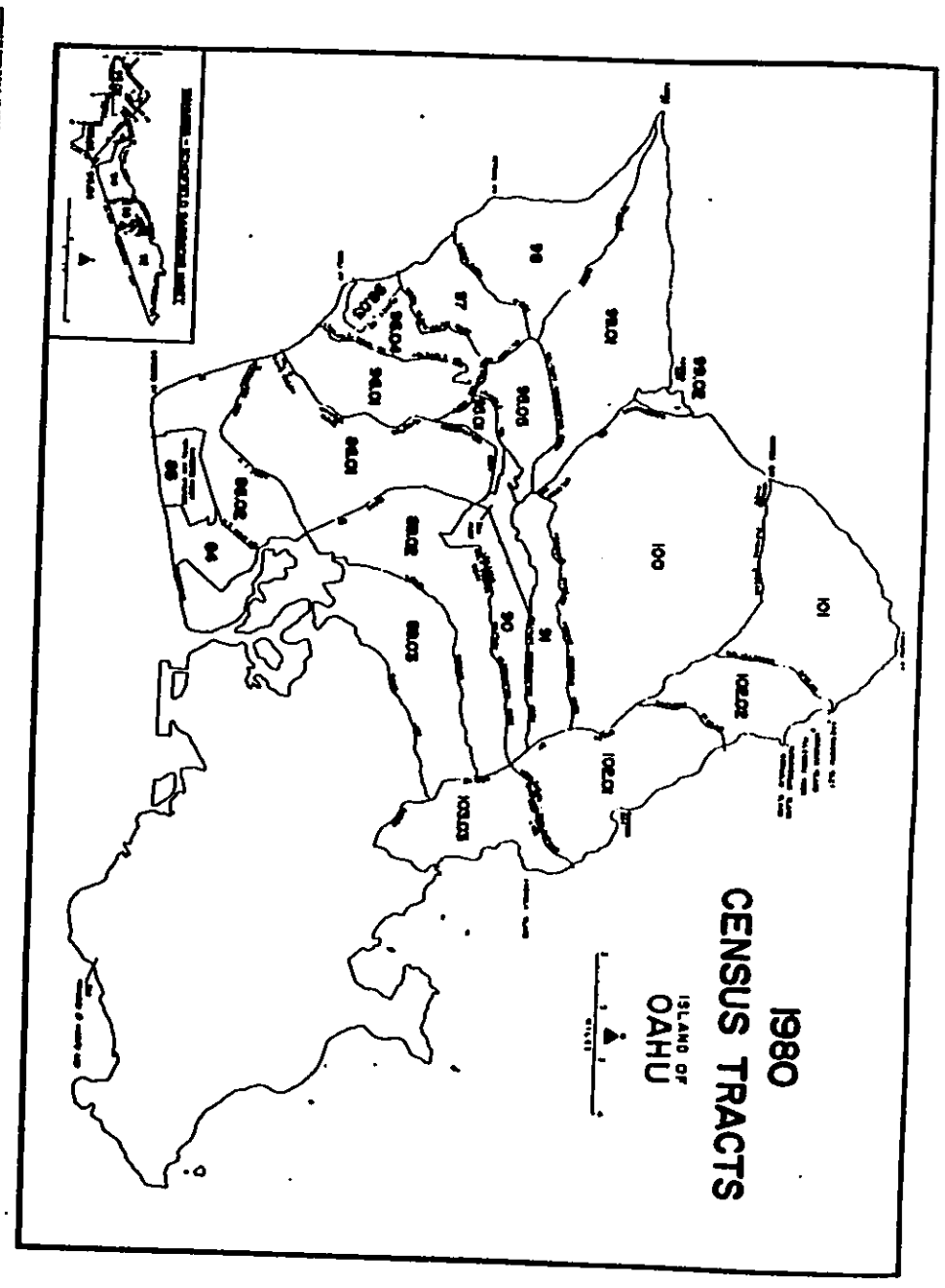
Large amounts of grains are imported into the State as livestock feeds. The production of feed grains has not proven to be economically viable in Hawaii. However, the production of forage crops for green chop has potential. Corn for green chop has been produced on the North Shore of Oahu

Appendix Table 2, Continued.

	87.01	87.02	87.03	88	89.01	89.03	Waipahu	Honolulu
Worked In:								
Honolulu Bus D.	3	3	2	8	5	2	4	7
Honolulu Remain	40	42	27	45	36	34	38	55
Waipahu	16	17	15	19	11	16	15	1
Pearl City	7	8	11	4	6	9	6	2
Aiea	3	3	2	2	3	6	3	2
LABOR FORCE								
Person ≥ 16 Yrs								
Total Labor Force	66	65	63	68	70	70	67	69
Civilian **	95	95	71	97	80	95	89	85
Employed	94	90	91	97	93	92	94	95
Unemployed	6	10	9	2	7	8	6	5
Private Workers **	73	78	75	74	70	76	74	71
Government Workers	24	18	21	24	27	23	24	23
Local Governmen	3	2	4	3	3	1	3	3
Self-employed ***	3	4	4	2	3	1	3	5

* Percentages on this line are of persons ≥ 16 yrs.
** Percentages on this line are of total labor force.
*** Percentages on these lines are of employed civilians.

OCCUPATION								
Mgr., Prof. Spec.	11	11	11	15	14	12	12	25
Tech, Sales, Adm S	26	26	17	28	36	32	29	34
Service	23	18	26	17	20	19	20	18
Farm, Fish, Forest	4	2	2	4	1	1	3	2
Craft, Repair	17	20	25	15	15	17	17	11
Laborers	20	23	19	21	14	19	19	11
Manuf.	15	18	11	14	10	12	13	6
Wholesale & Retail	22	27	27	25	30	25	26	25
Professional	11	9	8	13	13	10	11	18
1979 INCOME								
Households								
< $5,000	3	13	25	7	6	4	9	8
$5,000 - $9,999	8	16	30	5	18	9	15	13
$10,000 - $19,999	19	22	29	20	28	8	23	26
$20,000 - $24,999	11	10	5	13	10	18	10	12
$25,000 - $34,999	22	18	8	19	20	22	18	18
$35,000 - $49,999	24	18	1	29	15	26	18	14
≥$50,000	13	4	1	8	2	13	6	9
Owner-Occup. House	64	52	3	77	43	80	50	50



Appendix Table 1, continued

	Census Tracts 87.01	87.02	87.03	88	89.01	89.03	Waipahu	Honolulu
Worked In:								
Honolulu Bus Dist	83	47	18	157	181	23	509	26633
Honolulu Remain.	1262	661	310	941	1185	363	4722	202082
Waipahu	491	268	172	391	350	175	1847	5398
Pearl City	224	44	124	85	201	93	771	5806
Aiea	100	53	25	37	102	67	384	6433
LABOR FORCE								
Person ≥ 16 Yrs	5291	2778	2103	3283	5162	1692	20309	574903
Total Labor Force	3490	1796	1333	2225	3589	1190	13623	397889
Civilian	3329	1704	945	2157	2884	1132	12151	339863
Employed	3138	1539	860	2103	2693	1037	11373	324113
Unemployed	191	165	85	51	191	95	778	15750
Private Workers	2278	1206	643	1557	1892	786	8362	231719
Government Workers	755	270	182	504	732	240	2683	75058
Local Governmen	106	35	33	54	84	8	320	10583
Self-employed	99	55	35	45	69	11	314	16312
OCCUPATION								
Mgr., Prof. Spec.	330	173	94	315	369	128	1409	79934
Tech, Sales, Adm S	817	404	148	586	972	328	3255	109521
Service	716	275	227	353	540	193	2304	56939
Farm, Fish, Forest	135	27	20	86	28	11	307	5838
Craft, Repair	522	307	211	318	415	181	1954	36546
Laborers	618	353	160	448	369	196	2144	35335
Manuf.	467	284	98	297	257	120	1523	24982
Wholesale & Retail	695	409	232	520	810	264	2930	79644
Professional	338	132	65	280	354	107	1276	59927
1979 INCOME								
Households	1510	917	1094	958	2003	463	6945	230931
< $5,000	43	120	278	63	129	19	652	17631
$5,000 - $9,999	122	143	330	48	367	43	1056	30434
$10,000 - $19,999	288	198	313	190	560	36	1585	61153
$20,000 - $24,999	159	96	59	127	198	85	724	26768
$25,000 - $34,999	336	161	86	180	406	100	1269	41728
$35,000 - $49,999	367	163	14	274	296	120	1234	33443
≥$50,000	195	36	14	76	47	60	428	19774
Median	28981	19858	8561	27679	18231	29139	21220	21077
Mean	39874	22385	11746	29285	21024	32319	23559	25180
Owner-Occup. Hlds.	973	476	37	736	866	370	3458	115290
Median Income	34633	30388	30227	30957	31165	32282	31974	30248
Mean Income	34327	30008	28398	32920	31300	34379	32592	33693
Renter-Occup Hlds	537	441	1057	222	1137	93	3487	115641
Median Income	19453	11370	8267	14083	11720	20903	11721	13912
Mean Income	21970	14156	11163	17236	13198	24125	14602	16693
Per Capita Income	6329	5491	3904	6618	5466	6520	5771	7912

Appendix Table 2. Demographic Characteristic of the Waipahu CDP by Census Tracts - 1980 Percentage Distributions.

	87.01	87.02	87.03	88	89.01	89.03	Waipahu	Honolulu
AGE								
Under 5 Years	8	9	20	7	12	8	10	8
5 - 9 Years	8	9	10	8	11	9	9	7
10 - 14 Years	10	8	5	9	10	11	9	8
15 - 19 Years	10	10	9	10	11	10	10	9
20 - 24 Years	9	11	23	9	14	8	12	12
25 - 34 Years	14	15	18	14	16	14	15	19
35 - 44 Years	12	9	6	12	11	14	11	12
45 - 54 Years	11	10	4	13	9	10	10	10
55 - 64 Years	10	9	3	9	5	8	7	9
65 - 74 Years	6	6	1	6	2	5	4	5
75 and Over	3	3	1	3	1	2	2	3
PLACE OF BIRTH								
Hawaii	56	58	61	58	56	53	57	55
Mainland	9	11	26	6	27	6	15	30
Foreign	35	31	13	36	17	41	28	15
SCHOOL ENROLLMENT								
Total Enrolled*	30	28	21	30	32	35	30	28
Nursery**	2	4	8	3	3	1	3	5
Public	29	23	38	26	30	0	28	23
Private	71	77	63	74	70	100	72	77
Kindergarten**	4	5	13	7	5	7	6	5
Public	40	71	100	134	78	57	80	77
Private	10	29	0	25	22	43	20	23
Elementary**	49	55	48	45	53	4 7	50	43
Public	88	92	94	88	93	94	91	82
Private	12	8	6	12	7	6	9	18
High School**	29	22	26	25	27	25	26	24
Public	92	90	100	95	91	94	93	82
Private	8	10	0	5	9	6	7	18
College**	17	13	6	20	13	19	15	22

* Percentage of total population
** Percentage on this line are of total area population enrolled.

SCHOOL COMPLETED								
Population >25 Yrs								
4 Yrs High School	34	31	43	27	49	25	36	36
1-3 Yrs College	12	11	8	18	17	24	15	18
≥4 Yrs College	9	5	5	13	7	13	9	22
JOURNEY TO WORK								
Workers ≥ 16 Yrs								
Private Vehicle	87	76	81	80	85	91	84	76
Drive Alone	57	53	46	57	62	59	57	53
Car Pool	30	23	35	23	23	33	27	23
Public Transport	9	16	12	14	10	5	11	10
Other	2	8	7	6	5	4	5	12

The second limiting factor is the location of residential housing on the south and the northeast sides of the subject lands. Diversified agriculture and residential housing are not compatible land uses for several reasons. One is the required use of pesticides by diversified agriculture. Another is the operation of heavy farm equipment near housing. This is a hazard to children, and the noise and dust are obnoxious to the residents. There is also the potential of residents harvesting some of the crop for their own use. This not only is a cost to the producer, but can be dangerous to the residents if the crop has recently been treated with pesticides. In some cases, the gardens of residents are a source of pests to the commercial operations.

Evaluation of Potential Fruit and Vegetable Crops for Waikele

Crops produced in Hawaii can readily be separated into two groups -- those that are produced for export and those that are produced for local consumption. In terms of crops that can be produced for export, papaya, guava, passion fruit, macadamia nuts, and pineapple can all be produced on lands similar to the subject lands. However, papaya is the only economically feasible export crop and then only if the problems with mosaic virus and EDB can be overcome. Papaya is currently being grown on the Ewa plains near Campbell Industrial Park and on fallowed sugarcane lands in Palehua on a trial basis.

Passion fruit is uneconomical to produce because of the high costs of installing trellises. The market for guava is so undeveloped that it cannot yet be produced profitably on a commercial basis. Macadamia nuts can be produced more profitably elsewhere in the State. Production in Waikele would require irrigation and the nuts would have to be shipped off-island for processing. Because of the location of domestic water

sources on the subject parcel, the production of pineapple would not be advisable.

Several vegetable crops which are imported in great quantities are not climatically suited for production in Waikele because they require cool temperatures for good quality and economic yields. The following crops would be unsuitable for that reason: chinese head cabbage, head cabbage, carrots, cauliflower, celery, head lettuce, romaine lettuce, and during most of the year, potatoes. The good storage, long-day and medium-day length onions are also not suitable because they require longer day lengths for proper growth and curing. The high incidance of insect and disease infestations limit the feasibility of producing summer squashes and melons except for zucchini and watermelons.

The fruit and vegetable crops which show some potential for commercial production in the Waikele area are listed in Table 2. Also given in Table 2 are the quantities of the product or similar products sold in the Honolulu wholesale market in 1982. These quantities provide a crude estimate of the current demand for these products. The estimates are crude because the data for Honolulu are for aggregates of similar products. For example, all types of bulb onions are listed as "dry onions" and both oriental and american types of cucumbers are listed as "cucumbers." These quantities thus will overestimate the demand for local products since local products are not all identical to imports.

The next three columns of Table 2 provide information on market conditions that can be used to estimate the potential demand for increased production of the crops. The third column lists the percentage of the goods sold in the Honolulu market which are supplied from in State sources. When local production already supplies the entire

impact on employment will be on the order of 9 jobs. The loss of sugar production will reduce State GDP directly by about 270,000 dollars. After accounting for the indirect and induced impact on the GDP, the total impact will be a reduction of about 600,000 dollars.

The impacts estimated above, however, relate to the average impact of removing 186 acres from cane production on Oahu. As the land in cane on the subject parcel was planted as a conservation measure rather than as a standard commercial endeavor, and as such are likely to be managed as to minimize costs, these values will overestimate the impact of removing these specific 186 acres from cane production.

The Long Term Impact of Removing the Land From Agriculture.

The significance of the subject lands as part of the agricultural resources of the State can be evaluated by examining the potential uses of the land. These uses are determined by three sets of factors: (1) the physical, agronomic and environmental characteristics of the land; (2) economic variables such as the existence and locations of markets for the products of the land, the cost of inputs, and the supply of similar products from other sources; and (3) the demand of agricultural producers for land having the physical, environmental, agronomic, and economic characteristics of the subject lands.

Base on the physical, agronomic and environmental characteristics of the subject parcel, in combination with the history of crop production in Hawaii, the following 24 vegetable crops and 8 fruit and nut crops can be considered to have agronomic potential in the Waikele area: cucumbers, eggplant, green peppers, tomatoes, lettuce (semi-head types only), sweet potatoes, sweet corn, green or snap beans, green onions, daikon, edible ginger root, red radish, dasheen, taro (upland varieties), edible podded

peas, oriental gourds, bitter melon, pumpkin and winter squashes, summer squash, watermelon, bulb onion, potato, mustard cabbage (Kai Choy), broccoli, papaya, bananas, guava, yellow passion fruit, limes, avocado, macadamia nuts, and pineapple. In addition, forage, horticulture, and seed production are as physically possible. However, agronomic potential (the crpp will grow) and economic potential (the crop can be grown for a profit) are not the same. Some of the crops listed have been tried and found to be unprofitable, either because of high production costs, lack of markets, or the availability of less expensive imports. Also, some of the crops that can be grown in the Waikele area could be grown elsewhere in the State more profitably.

Waikele has some advantages in the production of fruit and vegetables relative to other areas in the State. The primary advantage being that it is close to the principal market in Hawaii and to transportation links to overseas markets.

There are two factors, however, which severely limit the economic potential of Waikele for the production of fruits and vegetables. One is the cost and supply of water. Under existing conditions, the most readily available supply of water is from the Oahu Sugar Company. This water would have to be pumped up to the Waikele fields and this pumping cost is substantial, exceeding 100 dollars per acre foot. Most crops require about 5 acre feet of water per year, although some, such as daikon and perennial crops, require more. Thus, water pumping costs alone could exceed 500 dollars an acre. If water were to be purchased from the Board of Water Supply at agricultural rates, it would be substantially more expensive. At current agricultural rates, five acre feet of water would cost more than twice as much, or $1,126, and this is exclusive of any within field delivery costs.

seventy percent of demand for some months this is an indication that increases in local production will start to depress prices. This price decrease will make the new planting a less attractive enterprise and reduce the earning for all plantings of the crop -- both the existing and new plantings. Crops listed in Table 2 that are currently imported in significant quantities but where increases in plantings would be expected to depress market prices are: sweetpotatoes, green beans, green onions, oriental squashes, pumpkins, and avocados.

The three crops listed in Table 2 with the largest demands in the Honolulu market are tomatoes, dry onions, and potatoes. Most of the demand for these products is currently met by imports. This, however, does not necessarily imply that there exists a substantial potential for expanded local production of these products. Potato production has been tried on Oahu and found to be unprofitable and thus this is not a likely crop for future expansion.

The demand datum listed for dry onions includes several different varieties of onions. Most of the onions currently imported are the medium and long day varieties and are priced below what it would cost to produce bulb onions in Hawaii. The demand for locally produced onions, which have to have a higher price in order to be profitable, is limited. The potential for increased acreages of bulb onions is therefore somewhat limited.

Tomatoes can be a very profitable crop when marketed during the times when imports from the mainland and Mexico are scarce. However, when imports are plentiful and cheap, it is difficult to profitably produce them in Hawaii. Thus, there is some room for expansion in the production of tomatoes. However, the planting would have to be managed so as to produce

during the late fall and winter. This is not the best agronomic time to grow tomatoes and yields will be low.

The crops for which there is a potential demand for increased acreage and which can be produced in a region with the physical, agronomic, and climatic characteristics of Waikele are listed in Table 3. The second column gives the amount of additional acreage required to meet the entire Honolulu demand for the broad product group. However, for the reasons stated above, meeting such demand is not likely to be economically viable. Taking into account the mix of products contained within each product group, the seasonality of local production and demand, and the availability of low-priced competing products from sources outside the State during portions of the year, the figures in the third column were derived. These numbers represent estimates of the number of acres that could be planted to the respective crop without depressing the local market.

TABLE 3
Feasible Crops for Expanded Plantings

Crop	Number of Acres Required to Meet 100 Percent of Honolulu Demand for Product Group	Number of Acres of New Plantings Estimated to be Economically Feasible
Cucumbers	22	0
Peppers, Sweet	68	15
Tomatoes	232	25
Corn, Sweet	18	15
Taro	56	5
Peas, Chinese	23	20
Squash, Italian	46	10
Melons, Water	193	20
Onions, Bulb	N/A	5
Broccoli	87	40
Bananas, Chinese	359	300
Limes	47	40
TOTAL	1151	495
TOTAL (not including bananas)		195

market, any increase in production via additional planting will have two immediate effects: (1) the price of the product will fall, making it less profitable or unprofitable to produce; and (2) production elsewhere in the State will decline. That is, there will be a shift in production patterns from regions currently producing the crop to new regions. The total impact of the new planting would be a decrease in profitability of existing operations and a resulting reduction in scale and a shift in production to the new plantings. The following crops listed in Table 2 fall into this category: eggplant (long), semi-head lettuce, daikon, ginger root (edible), radishes, bitteraelon, and cabbage (kai choy).

For several crops, the impact of new plantings will be similar to the above scenario even if local production is not currently satisfying the local market. For example, crops like tomatoes and some types of cucumbers can only be produced for a profit if they are marketed in the "off-season" when less expensive imports from the mainland and Mexico are not available. Other crops can only be produced during certain seasons. There are times of the year when for agronomic reasons they cannot be economically produced and market demands are satisfied by imports; sweet corn during the winter months would be an example. The demand for some products is seasonal also. One example would be pumpkins. Local production satisfies the market except in the month of October. The orange gourds used for Jack-O-Lanterns are different from the pumpkins produced locally and the demand for these is met almost entirely by imports.

An indication of the seasonality of crops and potential demand for new planting can be obtained by examining the supply of local production relative to imports on a monthly basis. The fourth column of Table 2 gives

TABLE 2

Agronomically Feasible Crops

Crop	Honolulu Demand (1,000 pounds)	Percent of Demand Met by Local Production	Maximum Percent of Monthly Local Demand Met by Local Products	Number of Months When Local Products Exceed 70% of the Market
Cucumbers	3667	62	82	4
Eggplant, Round	282	78	86	11
Eggplant, Long	596	100	100	12
Peppers, Sweet	2440	33	82	3
Tomatoes	12547	28	52	0
Lettuce, Semi-head	1126	100	100	12
Sweetpotatoes	1643	69	88	9
Corn, Sweet	382	53	100	3
Beans, Green	865	94	98	12
Onions, Green	817	77	86	10
Daikon	1427	100	100	12
Ginger Root	1518	100	100	12
Radishes	177	94	100	12
Dasheens	161	96	100	12
Taro	861	21	74	2
Peas, Chinese	327	6	26	0
Oriental Squash	550	93	100	12
Bitteraelon	210	100	100	12
Pumpkins	661	26	100	9
Squash, Italian	1625	36	75	1
Melons, Water	8759	56	91	4
Onions, Dry	13167	8	44	0
Potatoes	20250	.2	1.5	0
Cabbage, Kai Choy	853	100	100	12
Broccoli	3657	5	10	0
Bananas, Chinese	10152	36	48	0
Limes	476	5	16	0
Avocados	1761	56	67	0

Source: Honolulu Unicode, 1984, Hawaii State Department of Agriculture, Market News Service, monthly.

the percentage of supply in Honolulu of the aggregate product group during the month when local production represents the largest percentage of supply, and the fifth column gives the number of months when local supply exceeds 70 percent of total market supply in Honolulu. Whenever local supply is greater than about seventy percent of market demand, any increase in supply from local sources can be expected to affect prices downward. Whenever local production or demand is seasonal and current production provides over

F. J. RODRIGUEZ
PRESIDENT

ENVIRONMENTAL
COMMUNICATIONS
INC.

January 7, 1986

Mr. Wayne J. Yamasaki
Director of Transportation
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Yamasaki:

We are in receipt of your department's comments dated December 6, 1985 and we respond in the following:

1. As stated in your letter, Amfac Property Development Corp. is working closely with the Highways Division to develop an agreement clarifying Amfac's responsibility for the highway improvements.

2. Your recommendation that the highway improvements, particularly the widening of Kamehameha Highway be accomplished during the initial phases of development is also being worked on between Amfac Property Development Corp. and the Highways Division.

3. We note here for the record that the State Land Use Commission approved the Waikele land use boundary amendment from Agriculture to Urban on December 10, 1985. The final Decision & Order will be provided in 30 to 60 days. We would request that your agency commence with the necessary documentation with the Federal Highways Administration for the access to the Interstate H-1 Highway as soon as it is appropriate.

4. Amfac is cognizant of the Highways Division's concerns about the collective downstream effects of large developments on the existing highway system. To the extent possible and practicable, Amfac will cooperate with the Highways Division to find ways to alleviate this condition.

Thank you for your continuing interest and concern.

Very truly yours,

F. J. Rodriguez

FJR:ls

[illegible] 37 [illegible] TELEPHONE [illegible]

2374
STP 8.10988

December 6, 1985

Mr. John P. Whalen, Director
Department of Land Utilization
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Whalen:

Draft EIS for Waikele Development

After reviewing the subject draft EIS, the following comments are submitted for your consideration:

1. The widening of Kamehameha Highway and the proposed Paiwa Interchange should be a condition of the zoning approval. The Highways Division and Amfac are presently working on an agreement to determine Amfac's responsibility for implementing these improvements.

2. In order to mitigate the traffic impacts, we recommend that the improvements be implemented in the initial phases of development before the traffic on Kamehameha Highway materializes.

3. Formal request to FHWA for the access to H-1 will be made when the State Land Use Commission approves the zoning amendment.

4. The developer should also be cognizant of the Highways Division's concern about the collective downstream effects of large developments, such as Waikele, on our highway system and the Division's current studies to find ways to obtain developer assistance in funding the necessary highway improvements.

DEC 11 1985

We appreciate this opportunity to provide comments.

Very truly yours,

Jonathan K. Shimid

Wayne J. Yamasaki
Director of Transportation

DO/DT:ko

cc: DEP-H
HWY
HWY-PA
Mr. P.J. Rodriguez,
Environmental Communication
STP (dt)

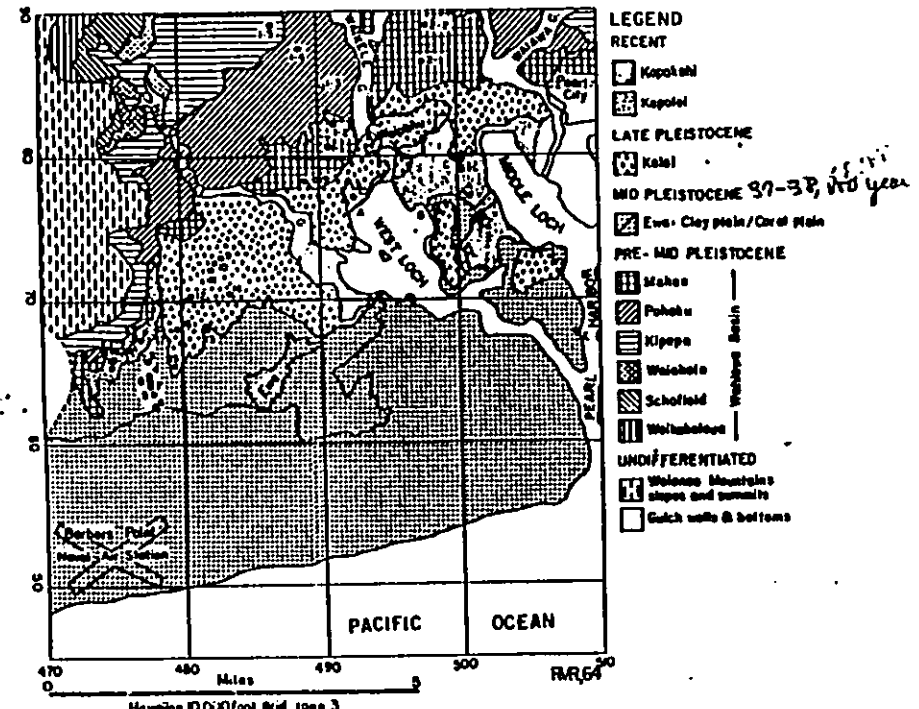


Fig. 1—Geomorphic surfaces and surficial deposits of Ewa-Waipahu area, Oahu, Hawaii. Numbered sites are drill holes. Lettered sites are radiocarbon sections.

1). The bay surfaces rise from sea level to more than 10 feet and generally abut bounding scarps. At 5 feet above sea level in the bay southwest of Waipahu (Fig. 1, A) peaty muck is buried beneath 9 feet of alluvium derived from the bounding scarp. Organic matter from the muck 4 feet below present sea level is 670±100 years old (I-869). Mollusk shells extracted from low organic-carbon content sediments at depths of 18 to 20 and 20 to 22 feet (13 to 15 and 15 to 17 feet below sea level, respectively) are 4,375±210 (I-1080) and 4,445±210 (I-1081) years old. The dated stratigraphic section shows that estuarine sediments derived from the drainage extending northward from site A (Fig. 1) were filling the bay during the past 4,000 years. Until 670 years ago the bay was a protrusion of West Loch. At that time the bay had essentially filled to water level and subsequently alluvium derived from the bounding scarp was deposited on the estuarine muck. The soil, Pearl Harbor clay, is formed on the alluvium and must be < 670 years old. The landscapes within the land bays from sea level to the bounding scarps are the Kapukahi surface.

Correlation of the surfaces is shown in Table 1. Identification of Stearns' (10, p. 7) many ancient shorelines is difficult in this area. The Kaena (+95 feet) shoreline of Yarmouth age is marked by the inner margin of the Ewa coastal plain and is clearly discernible. The Waimanalo (+25 feet) shoreline of Sangamon age is buried by Kaloi alluvium in the Waipahu and Waipio Peninsula area so the shoreline has no surface expression. Other shorelines of Stearns could not be identified and mapped.

PROPERTIES OF SEDIMENTS

Methods

Drill-cutting samples were selected from boreholes 4, 6, 12, 16, 18, 19, 1-1, and 1-3 (Fig. 1) to characterize the sediments. Samples series 4 and 6 are Ewa marine clay; series 12 is Kaloi alluvium; series 16 is Kaloi alluvium over Ewa marine clay; series 18 is Kapolei alluvium over Ewa marine clay; and the other series are the weathering zones of the Wahiawa Basin surfaces.

Mineralogic composition was estimated by X-ray diffraction analysis. Whole samples were ground to < 100 μ, dry packed in

Table 1—Correlation of surfaces in Ewa-Waipahu area, Oahu

Surface	Age
a (youngest)	Recent to 670 years
b (youngest)	Recent
c (oldest)	Late Pleistocene (Tentative) to Sangamon, ca. 25,000–> 37,000 years
Ewa	Mid-Pleistocene (Tentative)
Waianae Basin Surfaces	Pre-mid Pleistocene

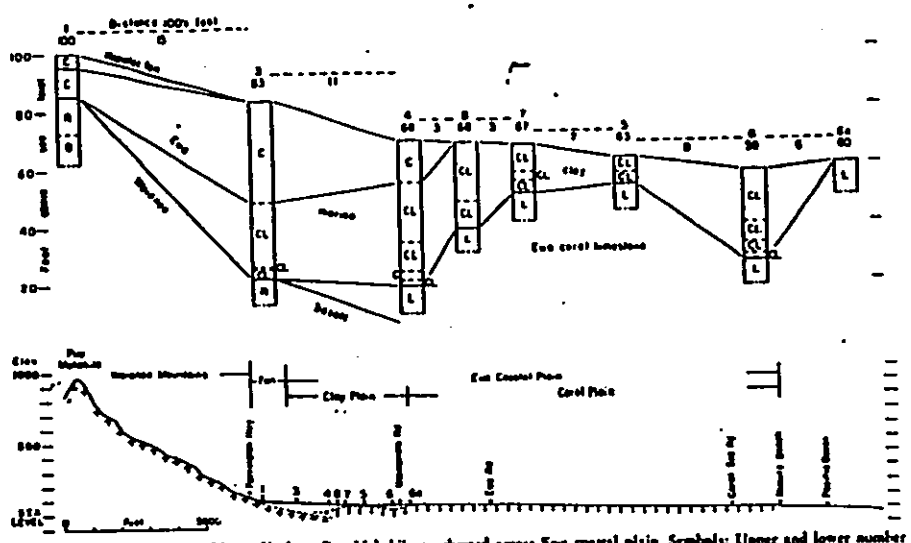


Fig. 2—Geomorphic-stratigraphic profile from Puu Makakilo southward across Ewa coastal plain. Symbols: Upper and lower number above columns are drill holes and elevations above sea level, respectively; C—clay, L—coral limestone, R—weathered debris on basalt, B—basalt; and numbers below broken lines are distances in hundreds of feet. Drill hole sites on Fig. 1.

brass rings at 1,000 psi, and subjected to 44o Ka radiation. Sample series 4, 17, 19, and 1-1 were studied in more detail because of some diffraction peaks in the 14-17A range in whole sample patterns. Iron oxides were removed (1, p. 339-341) and samples were oriented on unglazed tile. Air-dry, glycerol-solvated, and oven-heated (400C) samples were then subjected to Cu Ka radiation. Mineralogic properties of the sediments are given in Table 2.

Chemical properties of the sediments are also given in Table 2. Calcium carbonate equivalent was determined by gravimetric loss of CO_2 (12, p. 101), pH in a 1:1 soil paste, free iron oxides by sodium dithionite method (3, p. 421), free manganese oxides by sodium hydrosulfite method (3, p. 73), and cation-exchange capacity by ammonium acetate method (12, p. 101). Aid in the laboratory by T. E. Fenton, G. F. Hall, and R. Protz is appreciated.

Table 2—Chemical and mineralogic properties of drill samples

Sample	Depth	pH	$CaCO_3$ equiv.	Fe_2O_3*	MnO_2†	CEC	Exchangeable Ca clay
	feet	1:1	%	%	%	me/100 g	
4-1	0-1	7.8	0	10.3	1.00	37	1.30
2	5-10	8.0	0.4	12.2	1.43	38	0.91
3	10-15	8.0	2.0	14.3	0.37	36	0.10
4	15-20	8.0	27.0	8.5	0.05	26	0.01
5	20-25	8.0	11.0	8.5	0.05	28	0.79
6	25-30	8.0	8.2	8.5	0.37	28	0.00
7	30-35	8.0	6.7	8.5	0.37	23	0.75
8	35-38	8.0	2.0	7.6	0.01	23	0.75
6-1	0-5	7.2	0	6.0	1.43		
2	5-10	7.7	2.0	5.0	0.79		
3	10-15	8.0	0.5	5.0	0.00		
4	15-20	7.9	0.5	5.0	0.37		
5	20-25	7.9	1.0	7.0	0.31		
6	30-35	8.0	2.5	7.0	0.17		
12-1	0-5	6.6		2.2	2.50	41	1.00
2	5-10	7.0		0.4	2.00	41	0.00
3	10-15	7.5		0.6	1.11	41	0.75
4	15-20	7.9		0.6	2.34	32	0.00
16-1	0-5	6.9	1.0	7.7	0.23		
2	5-15	7.7	11.0	5.0	0.00		
3	15-20	8.1	0.5	2.0	1.25		
4	20-27	8.0	4.0	0.0	1.11		
5	27-34	7.6	0	0.0	1.66		
6	34-44	7.5	0	0.0	0.56		
7	44-53	7.5	0	0.7	0.13		
8	53-58	7.5	0	0.6	0.11		
18-1	0-5	5.8	1.7	14.1	1.66		
2	5-15	5.8	0	10.4	1.11		
3	15-20	7.4	0.0	0.7	0.23		
4	20-30	7.6	12.7	0.3	0.00		
5	30-38	7.9	30.7	0.5	0.00		
19-1	0-10	6.9		13.3	1.66	35	0.66
2	10-15	8.7		10.6	0.66	35	0.11
3	15-20	8.0		3.0	0.29	40	0.42
4	20-25	8.0		2.6	0.00	41	0.00
5	25-30	7.9		2.5	0.00	39	0.00

* Sodium dithionite extractable. † Sodium hydrosulfite extractable. ‡ Ratio of area of 7.2 Å kaolinite peak to 3.7 Å 2:1 clay peak of air-dry sample with iron oxides removed.

RESULTS

Mineralogic Properties

Diffraction patterns from 2° to 15° (2θ) are similar for whole samples of all sediments with peaks for feldspar, 3.27A; kaolinite, 3.6 and 7.2A; hematite, 2.75A; goethite, 4.25A; and gibbsite, 4.96A (Fig. 4). Patterns for Ewa marine clay with interbedded coral differ only with a pronounced calcite peak at 3.03A (Fig. 4, samples 16:6–15' and 18:18–25–25'). Where Kaloi or Kapolei alluvium overlies marine clay the only difference in patterns is the calcite peak in marine clay (Fig. 4, cf. sample 16:0–6' with 6–15', also 18:5–12' and 12–18' with 18–25'). In profile 19 from the Wahiawa Basin, samples of a lower brown weathering zone differ from those of an upper red weathering zone by having diffraction peaks at 4.03 and 17A indicating low temperature quartz and 2:1 lattice clay, respectively. The red and brown weathering zones conform to Stearns' (9, p. 34) red and "tan at depth" zones of "the residual soils on the Koolau flows."

Diffraction patterns from 2° to 30° (2θ) of whole samples from the weathering zones in profile 1–5 (Fig. 4) in the Wahiawa Basin show the dominance of kaolinite and iron oxide in the mineralogic suites. Kaolinite peaks are

Economic Impact

Page IV-33: The Draft EIS states, "The Waikele project will also contribute to saving a substantial number of existing sugar related jobs (i.e. approximately 600 jobs) by improving the viability of Oahu Sugar Company." What is the basis for this figure of 600 jobs? Regarding the revenue-cost ratio of 2.0 to 1.0, how was this ratio derived? Does this ratio take into consideration the costs associated with the secondary impacts or "externalities"? For example, increased traffic congestion, already intolerable will be exacerbated by multiple developments within the area. What specific costs will be incurred for these public services, facilities, and required infrastructures (water, sewer, utilities)?

We appreciate the opportunity to comment on this Draft EIS and look forward to your response.

Yours truly,

Jacquelin N. Miller

Jacquelin N. Miller
Acting Associate Director

Attachment

cc: OEQC
Environmental Communications
Patrick Takahashi,
Acting Director, Environmental Center
Paul Ekern
Eileen Anthony
Martha Diaz

Ekern

DIVISION S-5—SOIL GENESIS, MORPHOLOGY, AND CLASSIFICATION

Nature of Soil Parent Materials in Ewa-Waipahu Area, Oahu, Hawaii[1]

R. V. Ruhe, J. M. Williams, R. C. Shuman, and E. L. Hill[2] J. 29 (3): 1965

ABSTRACT

Soil parent materials in the Ewa-Waipahu area, Oahu, Hawaii, occur in three landscape groups. Wahiawa Basin has more acid materials with high iron and manganese oxide content dominated by kaolinitic clay. Ewa coastal plain sediments are alkaline with lower oxide amounts but appreciable calcium carbonate and are dominated by 2:1 lattice clay. Between these two areas is the Kaloi surface with associated sediments whose properties are intermediate in composition.

Materials of the groups differ in origin and age. Wahiawa Basin materials are pre mid-Pleistocene products of in situ weathering of basalt or locally derived basaltic detritus. Ewa coastal plain sediments of mid-Pleistocene age are products of terrestrially derived detritus from basaltic terrain that was deposited in a near shore marine environment. Kaloi sediments are late Pleistocene detritus both derived and deposited terrestrially. Soils formed in the materials inherit some of the geomorphically evolved parent material differences.

A number of major landscape components and associated sedimentary bodies bound Pearl Harbor, Oahu, Hawaii, on the west and north in the Ewa–Waipahu area (Fig. 1). This area was mapped and drilled during 1962–1963 in a continuing soil-geomorphology study of Oahu.

The Ewa coastal plain descends from an elevation of approximately 95 feet along the south slope of the Waianae Range to sea level and has two major parts (Fig. 2). An inner clay plain, 1 to 1.5 miles wide, is composed of dark reddish brown (5YR 3/2, moist), dense, compact, sticky, plastic clay a few to > 60 feet thick. Clays are interstratified with thin beds of coral limestone and in places coral sand is dispersed throughout the clay even though the matrix is noncalcareous. At the base of the Waianae slopes the Ewa marine clay buries dark red (2.5YR 3/6, moist), weathered clay that overlies saprolite and basalt, showing that a part of the reddish Latosols rising up the slopes of the Waianaes predates marine clay. In the seaward part of the Ewa coastal plain, 2.5 to 3 miles wide, coral limestone is at or near the surface. Dominant soils are the Honouliuli clay on the clay plain and Mamala silty clay loam and clay on the coral plain.[3]

The inner margin of the Ewa coastal plain marks the Kuna (Yarmouth) shoreline of Stearns (10, p. 11) and also occurs at the base of a scarp that terminates the lowest Mahoe level of stepped surfaces of the Wahiawa Basin (Fig. 1). Consequently, all surfaces of the stepped sequence in the basin are older than the Ewa plain

[1] Contribution in Soil Geomorphology Studies, Soil Survey Investigations, SCS, USDA, Washington DC. Presented before Div. S-5, Soil Science Society of America meeting, Nov. 19, 1964, Denver, Colo. Received May 13, 1965. Approved Jan. 29, 1965.
[2] Geologist and Soil Scientists, SCS, USDA.
[3] See Cline (2) for soils mentioned in text.

The Kaloi surface is a landscape of coalescent fan-shaped sedimentary wedges that debouche from gulches that descend from the Waianae Mountains, Wahiawa Basin, and the Koolau Range (Fig. 1). Kaloi sediments are dark reddish brown (5YR 3/3, moist) silty clays and clays with interstratified beds and lenses of basalt gravel. These sediments descend seaward along Waipio Peninsula and bury oyster beds in scarps at the ends of Awaawa and Maikai Streets, Waipahu (Fig. 1, C, D). The oyster beds, 24 feet above sea level, are radiocarbon dated at: > 38,000 years (7, p. 93, W-886, W-885). The same clays and gravels bury an oyster bed 17 feet above sea level in a scarp on the east shore of West Loch, Pearl Harbor, near the mouth of Kapakahi stream (Fig. 1, B). This oyster bed is ≥ 37,000 years old (I-870).[4] Coral limestones, that overlie the Kapakahi oyster bed and that are in turn buried by Kaloi alluvium, represent Stearns' (8, p. 33) Waimanalo (+25 feet) stand of the sea of Sangamon age (10, p. 9–10). Kaloi alluvium descends farther seaward along Waipio Peninsula to 7 feet above sea level at the Waipio type locality (Fig. 1, E) where shells from a subjacent coral limestone are ≥ 30,000 years (I-1144). Thus Kaloi sediment was deposited on a descending platform that probably represents sea regression from the Sangamon high stand to the following low stand of the Wisconsin maximum (10, p. 8–9), which is the Tazewell of the mid-continent region of North America approximately 17,000 years ago (4, p. 2–3). Kaloi sediments date from that time.

As determined in drilling, Kaloi alluvium overlaps and buries Ewa marine clay 1 mile northwest of Ewa town (Fig. 1, 3). Therefore, Kaloi alluvium is stratigraphically younger than Ewa clay and the two are independent sedimentary bodies. Stearns (9, pl. 2) mapped them as one extensive body of older alluvium around Pearl Harbor. He (9, p. 170) noted, however, that included were older alluvium, ancient talus and landslide deposits, marine noncalcareous sediments, valley fills, and valley mouth fans that change seaward into deltaic deposits. Waipahu silty clay is the dominant soil on the Kaloi sediments.

Small alluvial fans descend from the south slope of the Waianae Range and seaward scarp of the Wahiawa Basin surfaces on to the Ewa plain and Kaloi alluvium respectively. The fans occur in a scalloped pattern along the line of contact and are composed of dark reddish brown (2.5YR 3/4, moist) clayey sediments derived from the Latosols of the adjacent higher terrain. Collectively the landscape of the fans is designated as the Kapolei surface. The Kapolei fans are post-Ewa and post-Kaloi and probably recent in age. Ewa silty clay is the dominant soil on the fans.

Land bays occur around West Loch, Pearl Harbor, near Honouliuli village, 1 mile northeast of Ewa town, 1 mile southwest of Waipahu, and on the Waipio Peninsula (Fig.

[4] Radiocarbon samples W are U. S. Geological Survey and I, are Isotopes, Inc.

TABLE 3. SUNLIGHT RECORDED BY EPPLEY PHYRHELIOMETER AT KUNIA SUBSTATION, HSPA (INDEX 740.4) 1964 THROUGH 1968.

	AVG. LY/DAY												
MONTH	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	ANN.
MAX.	591	660	566	561	639	641	596	599	530	542	429	389	518
MIN.	315	373	348	457	461	496	490	549	468	431	331	290	426
AVG.	564	633	462	509	548	577	565	567	511	461	375	349	462

SOIL. The Molokai soil at the site is residual on the upper part of a cliff cut into Koolau basalt by a 95-foot (Yarmouth) sea stand (Ruhe, *et al.*, 1965, Swindale and Uehara, 1966, Juang and Uehara, 1968). The official soil profile description indicates the well-structured nature of the materials (Appendix A). The large boulders in the subsoil (Fig. 5) presented a formidable barrier to the excavation for the lysimeters. Electrical resistivity, seismic, and direct probings failed to reveal the precise location of these boulders within field I, and the arbitrary site finally chosen for the pit was liberally endowed with such boulders. The subsoil, over-excavated to remove the boulders, was recompacted in the pit bottom to form a firm foundation for the lysimeters.

Desorption moisture release curves for the Molokai soil from Kunia show the effects of the aggregation of this heavy clay soil (Figs. 6a, b, c, and d). The curves resemble those for sand, though the total water retained is great since the aggregates remain near saturation until moisture stress of 100 to 200 bars (Sharma and Uehara, 1968a and Ekern, 1966b).

The response to moisture stress for the gypsum blocks determined in the laboratory for Kunia soil material repeats the abrupt habit of water release with stress by the Molokai soil (Fig. 7). Controlled calibration of a Troxler 104 neutron probe in specially packed samples of Kunia soil indicated a net soil effect equivalent to 7 or 8-percent water (Fig. 8). The slope varied slightly from the factory standard, only the intercept seemed changed (Shirazi, *et al.*, 1967). Field and laboratory calibration of a P 19 Nuclear Chicago probe in the Kunia soil indicated a changed intercept as well as a marked departure from

FIGURE 4. DIAGRAM OF KUNIA SUBSTATION FIELD I SHOWING THE LYSIMETER AREA.

FIGURE 5. ROADSIDE CUT IMMEDIATELY ADJACENT TO THE LYSIMETERS. NOTE THE VERY LARGE BOULDERS EMBEDDED IN THE SUBSOIL.

CONSUMPTIVE USE OF WATER BY SUGARCANE IN HAWAII

by

Paul C. Ekern

Technical Report No. 37

July 1970

Project Completion Report

of

EVAPOTRANSPIRATION BY SUGARCANE

OWRR Project No. A-014-HI, Grant Agreement No. 14-01-0001-1630

Principal Investigator: Paul C. Ekern

Project Period: July 1967 to September 1969

The programs and activities described herein were supported in part by funds provided by the United States Department of the Interior as authorized under the Water Resources Act of 1964, Public Law 88-379.

were
This
e-
allaferro,
of
f
ion was
ugar
ad-

0.2'
ing in
le 1).
inches
d-
lio-

FOR
.*

NOV.	DEC.
12.5	6.7
2.8	2.5
0.0	0.0

SPA

ANN.
70.34

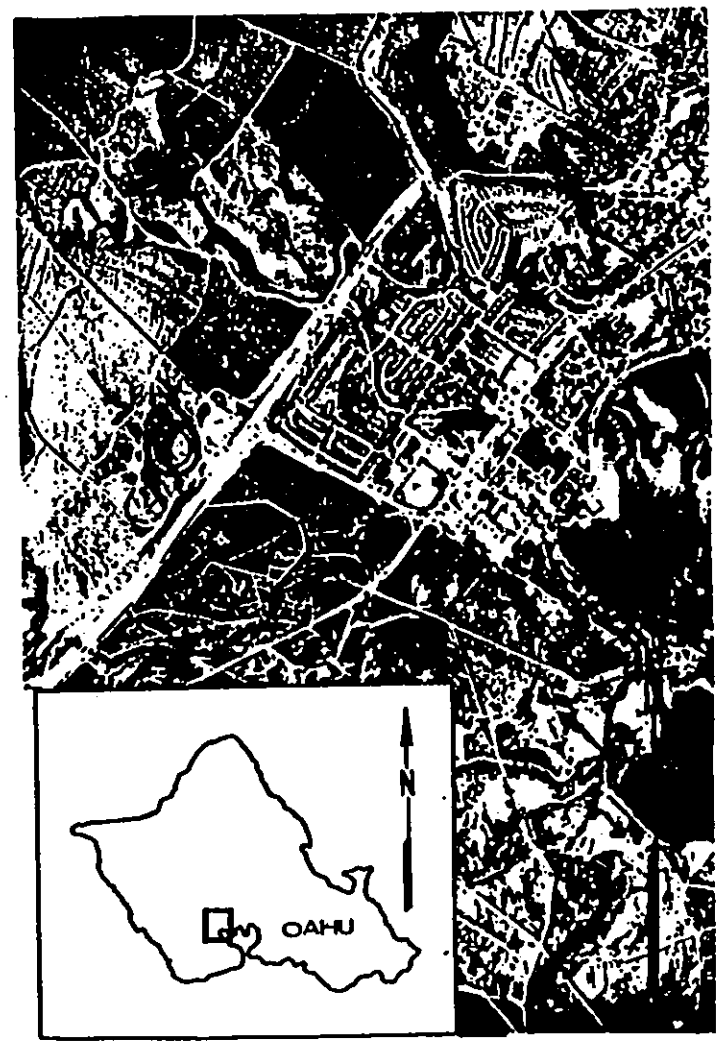


FIGURE 3. AERIAL PHOTOGRAPH OF THE KUNIA SUBSTATION, HSPA. LYSIMETER PITS ENCIRCLED.

APPENDIX B

F. J. RODRIGUEZ
PRESIDENT

ENVIRONMENTAL
COMMUNICATIONS
INC.

January 7, 1986

Ms. Letitia N. Uyehara, Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Ms. Uyehara:

We are in receipt of your office's comments dated November 26, 1985 and we respond in the following:

1. Water - The Board of Water Supply has submitted requests to the Department of Land & Natural Resources dated November 13, 1985 and to Amfac Property Development Corp. dated November 19, 1985 which identifies water availability and attendant mitigation measures. Amfac Property Development Corp. has advised that they will comply with the requirements as set forth by the Board of Water Supply, including the necessary mitigative measures to install an activated carbon water treatment facility if tests confirm the presence of chemicals in the well water.

2. Traffic - The retained Traffic consultant, Austin, Tsutsumi & Associates responded to the comments on Traffic and their statement is provided via attached letter. Finally, we refer your office to the comments provided by the State Department of Transportation dated December 6, 1985 on this subject for further information.

Thank you for your continuing interest and concern.

Very truly yours,

F. J. Rodriguez

FJR:ls

Attachment

1146 FORT STREET MALL SUITE 200 • P O BOX 536 • HAWAII 96809 • TELEPHONE (808) 521-8361

...BOARD OF WATER SUPPLY
...OF HONOLULU

COPY

November 13, 1985

Mr. Susumu Ono, Chairperson
Board of Land and Natural
Resources
State of Hawaii
P. O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Ono:

Subject: Application for 2.1 Million Gallons Daily (mgd)
Permitted Use from Wells 2400-05, 06

We submit the attached application for a permitted use of 2.1 mgd for Wells 2400-05, 06. The water will be used for the proposed Waikele development including a golf course. The proposed development will be located makai of Crestview. Waikele is already on the City's Development Plan and hearings on the reclassification of the lands have already been completed by the State Land Use Commission.

We attach a copy of the development schedule for Waikele.

If you have any questions, please contact Herbert H. Minakami at 527-6183.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

Attachment

cc: Community Planning, Inc.

RECEIVED NOV 19 1985

GEORGE R. ARIYOSHI
GOVERNOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
550 HALEKAUWILA STREET
ROOM 301
HONOLULU, HAWAII 96813

LETITIA R. UYEHARA
DIRECTOR

TELEPHONE NO.
548-6915

November 26, 1985

Mr. John P. Whalen, Director
Department of Land Utilization
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Whalen:

Subject: Draft EIS for Waikele Development, Aulii, Waikele, Ewa District, Oahu

Our comments on the Waikele Development draft EIS are:

1. Water--Several wells in the Waipahu and Mililani area have been found to be contaminated with EDB, DBCP, and TCP. New wells drilled to serve the Waikele development may be contaminated and require treatment before distribution and use. Furthermore, water from the Waipahu Wells, which the EIS indicates will service Waikele, have been found to contain EDB. The EIS should address water availability in light of the groundwater contamination and also address the risks of using that water.

2. Traffic--The traffic study contained in the EIS indicates that many of the roads that will service the Waikele development are presently at their peak capacity. The fact that several large developments such as West Beach, Ewa Marina, and the Mililani expansion projects are being proposed, suggest that major highways and arterials will degrade further. Traffic from these respective developments must be adequately handled before they proceed.

DEC 6 1985

3. Agricultural lands--The proposed project will remove 577 acres from lands zoned agriculture, which is in addition to 1,200 acres that will be removed from agriculture by the Mililani Town expansion. These lands, once rezoned, will be permanently removed from agriculture, and other competing uses.

Thank you for providing us the opportunity to review this draft EIS.

Sincerely,

Letitia N. Uyehara

Letitia N. Uyehara
Director

cc: J. J. Rodgriuez

GEORGE R. ARIYOSHI
GOVERNOR

JACK K. SUWA
CHAIRMAN, BOARD OF AGRICULTURE

SUZANNE D. PETERSON
DEPUTY TO THE CHAIRMAN

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

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

December 17, 1985

MEMORANDUM

To: Mr. John P. Whalen, Director
Department of Land Utilization
City and County of Honolulu

Subject: Draft Environmental Impact Statement (EIS) for
Waikele Development
Amfac Property Development Corp.
TMK: 9-4-02: 3, 10, 11, por. 12, 31, and 41
9-4-07: 10, 12, 13, and 32
Waikele, Ewa, Oahu
Acres: 577.2

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

According to the Draft EIS, the applicant seeks to rezone the subject parcels and develop a planned, multiple-activity community.

We have previously reviewed and submitted comment on a petition by the applicant for an amendment to the State Land Use Agricultural District boundary for the subject project, which has subsequently been approved by the State Land Use Commission. While it appears that the information provided in the Draft EIS differs little from that provided in the boundary amendment petition, we believe that the submittal of an EIS should be required earlier in the development approval process (at the time of General Plan, Development Plan, or Land Use Commission boundary amendments) rather than later (at the time of zoning or Special Management Area permit applications).

COMMITMENT TO OAHU SUGAR COMPANY

The Draft EIS states that the applicant's project "...will contribute to saving a number of existing sugar related jobs ... by improving the viability of Oahu Sugar Company" (Draft EIS, page IV-33). The EIS should clearly explain this relationship and identify specific efforts by the applicant to carry out the proposed commitment to Oahu Sugar Company. Although page II-12 of the Draft EIS refers to the "Oahu Sugar Company Survival

Plan," the plan itself is not attached, as stated in the letter of Mr. F. J. Rodriguez to Mr. Francis C. H. Lum, October 9, 1985.

AGRICULTURAL SIGNIFICANCE OF PROJECT LANDS

Pages III-31 to -34 of the Draft EIS summarize the study entitled "Economic Impact of the Proposed Waikele Development" (prepared by Evaluation Research Consultants, dated September 25, 1985). The study seeks to minimize the significance of losing more than 500 acres of Agricultural Lands of Importance to the State of Hawaii (ALISH) lands to urban uses by comparing the loss to the total amount of ALISH lands on Oahu and throughout the State.

There are other factors that must be incorporated into the equation determining the agricultural significance of the subject area. In our response to the State Land Use District Boundary amendment petition for the proposed project, we mentioned the efforts of the Land Evaluation and Site Assessment (LESA) Commission to identify "Important Agricultural Lands". The subject area has Land Evaluation (LE) and Site Assessment (SA) ratings of 88 and 81, and 59 within the gulches, on a scale of 15 to 100 (LE + SA Score by Soil Types, LE Ratings and SA Scores - Oahu, "A Draft Report of the State of Hawaii Land Evaluation and Site Assessment System", November 1985). By definition, these important lands include as a factor, those lands not currently in production but needed to attain desired projected levels of agricultural activities and income. One of the more important factors is the availability of land at prices that are supportive of agricultural activities. The mere fact that suitable lands elsewhere on Oahu are not in active cultivation does not imply that they are actually "available" for agriculture or affordable for agricultural activities.

We view important agricultural land as a valuable resource from a statewide perspective. Agricultural activities in Hawaii and elsewhere largely depend on an available supply of arable land at reasonable cost. Conditions such as scarcity and high cost of arable land and irrigation water, income from agricultural activities that is insufficient to meet production costs, and competing demands on the land and water resources by higher valued economic activities, may tend to reduce the economic viability of agriculture. However, the system of State land use and county zoning districts is itself a major factor in agricultural viability, by protecting agricultural land from price

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96843

November 19, 1985

XC: RST
LHH
SAKU
MJO

Mr. Chris Kanazawa
Vice President
Amfac Property Development Corp.
P. O. Box 3140
Honolulu, Hawaii 96802

Dear Mr. Kanazawa:

Subject: Your Letters of November 4 and 6, 1985 Requesting Water Allocation for the Waikele Development

Thank you for your letters concerning the proposed development.

We submitted an application to the Board of Land and Natural Resources for a permitted use of 2.1 million gallons daily for the proposed wells at the new Waipahu "228" Reservoir site. We shall notify you of the action taken by the Board.

If the permitted use is approved, AMFAC will be required to install an activated carbon water treatment facility if tests confirm the presence of EDB and other chemicals in the well water.

If you have any questions, please contact Albert Koga at 527-6123.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS • SURVEYORS
CONTINUING THE ENGINEERING PRACTICE FOUNDED BY H. A. R. AUSTIN IN 1934

DONALD S. AUSTIN PE
CAESAR S. TSUTSUMI PE
TED S. KAMAHELE PE
GEORGE M. NEUFER PE
KENNETH K. OKAHARA PE

#0-83-68

December 9, 1985

Mr. Fred Rodriguez
Environmental Communications, Inc.
1146 Fort Street Mall * Suite 200
Honolulu, Hawaii 96813

Dear Mr. Rodriguez:

Subject: Draft EIS for Waikele

Our response to comments made by the Office of Environmental Quality Control on the draft EIS for Waikele is as follows:

Recognizing the peak period traffic congestion on Kamehameha Highway and on the ramps at Waiawa Interchange, Amfac Property Development Corp. has committed its own resources to the planning and design for a new interchange facility at the Paiwa Street Undercrossing and the widening of Kamehameha Highway to a five lane facility along its frontage of Waikele.

The new interchange is expected to provide freeway access to Waipahu as well as Waikele; thereby reducing the existing ramp traffic demand at the Waiawa Interchange. The widening of Kamehameha Highway would provide additional highway capacity to accommodate existing traffic demands from developments in Central Oahu, as well as what can be expected from Waikele. Furthermore, Amfac Property Development Corp. is committed to support the construction of these improvements along with whatever government funding that can be made available. Finally, Waikele's contribution to "downstream" traffic congestion at the Pearl City screenline at Kalauao Stream is expected to be minimal. The cumulative impact of traffic generated by other developments in West Oahu and Central Oahu is a regional problem and, therefore, a governmental concern and not the responsibility of an individual developer.

If you have any questions, please do not hesitate to call us.

Very truly yours,

AUSTIN, TSUTSUMI & ASSOCIATES, INC.

By
RANDALL S. OKANEKU, P.E.

RSO:RMM
cc: R. Brian Tsujimura,
Amfac Property Development Corporation

DEC 11 1985

ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. RODRIGUEZ
PRESIDENT

January 7, 1986

Mr. Jack K. Suwa, Chairman
Department of Agriculture
P.O. Box 22159
Honolulu, Hawaii 96822

Dear Mr. Suwa:

We are in receipt of your department's comments dated December 17, 1985 and we respond as follows:

1. The Oahu Sugar Company Survival Plan was discussed at some length during the recently completed State Land Use Commission public hearings. Simply stated, the Plan will through it's implementation provide increased efficiency and cost reduction to the operation of Oahu Sugar Company. The Plan calls for land consolidation; reduction of planting and harvesting costs (drip irrigation, harvesting mobilization, etc.); fallowing of inefficient lands; reduction of impacts on adjacent urban residential sectors from noise and dust; and finally achieving a higher harvest (ton/acre) yield for Amfac. In conjunction with the Plan, Amfac has consolidated the financial reports of its Sugar and Land development Divisions. In this way, revenues generated from land development activities will assist Amfac in providing sufficient capital to meet the requirements of its agriculture division.

2. The agricultural significance of project lands was reviewed by Evaluation Research Consultants and they have provided their input to this response. We do not oppose the basic mission of your agency and respect the position you take on the preservation of lands in the Agricultural District. However, it should be noted also that taking of lands and the preservation of lands suitable for Agriculture remains a question of economic viability as well as agronomic feasibility.

   During the past five years (1980-1984) total cropland in the State has declined 25.4 thousand acres (Statistics of Hawaiian Agriculture - 1984). The majority of the decline was in sugar and pineapple plantings. During the same period, crop acreage on Oahu declined by 6.3 thousand acres. There are three basic reasons why this land has remained out of production:
   a. lack of market for feasible production possibilities
   b. availability of cheaper land and irrigation water on neighbor islands
   c. the high cost of subdividing the land for use by diversified agriculture

3. Economic potential of agriculture on the Waikele parcel was reviewed in great detail by Amfac who has conducted extensive studies for diversified agriculture plantings and also by Evaluation Research Consultants. There is agreement that pineapple for fresh fruit market consumption could be produced on the parcel; however, the future of the pineapple industry

is uncertain and it is unlikely that the demand for fresh pineapple produced in Hawaii will increase. Imports from the Caribbean under familiar labels as well as imports from Mexico are capturing a significant share of the fresh fruit market. Also, Libby McNeil and Libby have a small test plantation in southern Florida.

Irrigation water costs which have been one of the most significant factors in developing diversified agriculture or alternative crops has been acknowledged by your comments; we would feel that your water costs calculations reinforces our point that water costs are expensive and limits accordingly the potential profitability of diversified agriculture on the subject parcel. The references to chemical contamination will be deleted since the resolution of the problem insofar as post treatment of the water is under way and will be operational by June, 1986. The acreage discrepancies cited by the study prepared by H. Mogi Planning & Research, Inc. and Evaluation Research Consultants could be attributed to several possible reasons. These could include the method of calculation in which Mogi reported crop acres while Evaluation Research Consultants reported real acres; given that 3 to 4 crops a year are possible, the two numbers are relatively similar. The other possible reason is that Mogi was considering the entire State, while Evaluation Research was only considering the Oahu market.

It is recognized that nuisance and liability factors of operating farms adjacent to urban residential areas lead to incompatible situations. In the most favorable scenarios, having urban uses next to a farm makes farming more expensive. The problem is not just that the urban users consider normal farming activities a nuisance or a hazard, but the farmer finds that the urban users are a nuisance or a hazard to his operations and this makes farming more expensive. While the Right-to-Farm Act (Chapter 165 Hawaii Revised Statutes) has proven to be extremely useful to existing farming operations, the law does not protect against accidental or malicious fires. Oahu Sugar Company has experienced fires on many hundreds of acres over the past few years and has budgeted approximately $0.4 million annually for security.

Finally, the reference to the State Agricultural Functional Plan has been addressed in the Waikele State Land Use Petition and we are including it for your information.

Thank you for your continuing concern. F. J. Rodriguez

F. J. Rodriguez

FJR:ls

attachment

appreciation which makes continued agricultural use economically unfeasible. Once higher-valued activity replaces agricultural uses in an area, this precludes the use of the land and other resources for agriculture for all time.

ECONOMIC POTENTIAL OF AGRICULTURE

The Draft EIS identifies three factors that "...severely limit the economic potential of Waikele for the production of fruits and vegetables" (Draft EIS, Appendix D, pages 8-9; see also pages III-33,34 and VI-1,2). We generally agree that irrigation water costs can be significant. However, in consi- considering the alternative use of City and County water at agricultural rates ($0.84/1,000 for the first 13,000 gallons and $0.69/1,000 gallons thereafter), five acre/feet could cost about $1,136 per acre, or over double what the Draft EIS estimates the pumpage cost to be for the same quantity (Appendix D, page 8).

One alternative agricultural use that requires substantially less irrigation water than those listed in the Draft EIS is pineapple. Fresh pineapple, in particular, already has an established export market, contrary to the statement on page 9 of Appendix D that papaya is the only economically feasible export crop. The subject area appears to have the climatic and agronomic characteristics that favor the cultivation of pineapple for the fresh fruit market on similar lands in the immediate vicinity.

The Draft EIS suggests a scenario of pesticide contamination of domestic groundwater supplies in the area due to the use of pesticides on potential crops (Draft EIS, Appendix D, pages 8-9). This scenario is speculative and does not seem to be based on factual information.

Appendix D of the Draft EIS ("Economic Impact of the Proposed Waikele Development") analyzes the demand for several potential crops on Oahu, and the acreage requirements to replace Neighbor Island "unloads". The Statewide Agricultural Park Action Plan, Phase II (prepared by H. Mogi Planning and Research, Inc. for the State Department of Agriculture), identified suitable agricultural lands for State agricultural parks based in part on statewide demand and production potential of agricultural commodities. This report included, among other things, statewide additional acreage requirements to meet the projected 1990 market demand by replacing imports from out-of-state. Based on the Action Plan, the commodities listed in Appendix D, Table 2, page 12, would require 4,305 additional

acres, statewide (ginger and limes not included), which may be compared with the 1,151 acres stated in Appendix D, Table 3, page 14.

Finally, the Draft EIS indicates that the nuisance and liability factors of operating farms near a residential area may limit the economic potential of the subject property (Draft EIS, Appendix D, page 9). The potential problems posed by noise, dust, and trespassers are similar to those risks absorbed by other types of businesses in urban areas. The Hawaii Right-to-Farm Act (Chapter 165, Hawaii Revised Statutes) limits the circumstances under which existing farming operations may be deemed a nuisance.

STATE AGRICULTURE FUNCTIONAL PLAN

The Draft EIS should contain a reference to the State Agriculture Functional Plan and a complete discussion on how the proposed project conforms to its objectives and policies, in particular Implementing Action B(5)(c).

Thank you for the opportunity to comment.

Jack K. Suwa

JACK K. SUWA
Chairman, Board of Agriculture

cc: Environmental Communications, Inc.
OEQC

i). Reduced harvesting losses by V-cutting, improved scheduling and supervision, and one-field harvesting.

ii). Possible future factory scheduling for continuous grinding for 10 days then four days on instead of five days on and two days off, increasing low-grade juice processing capacity, shredding to improve cane preparation and hydraulic loading in the mill yard.

iii). Other improvements from reclaiming trash to generate more energy and increase sugar recoveries, improving ripening procedures, increasing bagasse storage capacity, improving water use and waste water disposal, bringing back into production selective low-cost acreage previously fallowed and completion of drip irrigation installation.

In conjunction with the above, five important additional conditions must be met in order to maintain Oahu Sugar Company's viability:

a. Oahu Sugar Company's cost must be contained to reasonable levels. Based on current results, it appears that these costs can be contained.

b. Federal support in the range of the 1981 Farm Act and import quotas on foreign sugar or its equivalent need to continue.

c. The Petition Area must be urbanized to generate the income and supply new capital in order that Oahu Sugar Company and other Amfac agriculture business activities will be able to continue. In particular, a substantial amount of capital is required in order to meet Oahu Sugar Company's equipment replacement requirements. Although there is no guarantee that the income from Waikele will be sufficient or timely, extensive financial and market analysis indicate that such an outcome is realistic given the petition area's strategic location, market acceptance and relatively low infrastructure cost.

d. Labor union support to seek methods to increase productivity and reduce cost must continue.

e. Oahu Sugar Company and its agriculture business endeavors must continue to receive sufficient allocations of water from the Pearl Harbor aquifer. Further, sufficient water for the Petition Area must also be committed.

If these five conditions are met, then internal projections indicate that there will be sufficient capital available for the Agriculture and Property Group to continue to operate Oahu Sugar Company on Oahu from now until 1995. After 1995, the leases must be renegotiated, perhaps on a 2-year rolling term, and the plantation would probably need to be redesigned.

SECTION III

AGRICULTURAL BENEFITS AND IMPACT

3-1. State of the Hawaii Sugar Industry.

As of this filing, the sugar industry in Hawaii is, at best, in limbo due to the current status of the proposed federal farm bill. The administration bill now calls for significant reductions in price supports, which, if enacted, would seriously jeopardize the future of the entire domestic U.S. sugar industry, including Hawaii.

3-2. Oahu Sugar Company Survival Plan.

In 1982, a plan was developed by Amfac to foster the continued operation of its subsidiary, Oahu Sugar Company. Basically, the survival program, which was revised in 1984, involves a phased reduction in crop size and a consolidation of operations at the plantation.

As of December 31, 1983, Oahu Sugar's acreage under cultivation was 13,865 acres. Since then, further withdrawals have reduced the total number of acres cultivated at year-end 1984 to slightly less than 13,700 acres. The plantation expects to harvest about 6,500 acres annually after 1984. The tons of sugar per acre can be expected to improve gradually due to increased use of drip irrigation, superior varieties of cane, and various agronomic improvements.

Manpower reductions have been realized by sizing down the plantation and streamlining operations, primarily through mechanization and consolidation. In addition, significant energy savings have come through the elimination of high cost fields and the resulting reduction in mechanical operations and water transportation costs. Other substantial savings are being or will be realized through measures including:

other capital investments. In order to justify additional capital investment, a level of return approximately twice the minimum is normally required.

Assuming that Waikele is urbanized in a timely manner and current sugar support levels remain the same, the Petitioner believes that Oahu Sugar Company could survive until 1995 when major leases expire, provided that current sugar support levels are not decreased or eliminated. Amfac is committed to do all it can to save sugar. However, it would be irresponsible for any public company to invest large amounts of capital to an operation without promise of an adequate return. Waikele will provide these much needed returns. However, as previously mentioned, should the upcoming farm bill drastically reduce support levels, future prices for sugar may make it economically unfeasible for any sugar plantation to continue to operate.

The demise of sugar in Hawaii would have drastic impact on the State's economic base. In perspective, the closure of Oahu Sugar Company would devastate the Leeward and Central Oahu areas and significantly reduce the viability of agriculture on Oahu. Of the current amount of land in agricultural production on the island, Oahu Sugar Company's cultivated lands represent approximately 20 percent of the total. Approximately $31.5 million would be

lost to the Oahu and State economies. Additionally, there would be an excess of 600 jobs directly lost along with a greater number of indirectly related jobs (multiplier is 2.3 for the sugar industry).

The conversion of Waikele to urban uses would reduce the amount of prime agricultural land (ALISH) by less than 1 percent on Oahu and 0.2 percent statewide. Although this is a relatively small loss, it is noted that much of the prime agricultural land on Oahu has been in active agricultural production until recently. This has changed primarily as a result of the approximate 4,200 acres withdrawn from sugar cane cultivation by Oahu Sugar Company. This withdrawal has now generated a surplus of agricultural land which may or may not be horticulturally utilized (i.e., intensively used as opposed to agronomically utilized). Current evaluations of the 4,200 acre inventory indicates that Waikele, of those lands withdrawn, contains excellent soils, but has serious drawbacks with regard to cultivation: 1) close proximity to urban areas creates operational problems for most agricultural endeavors such as dust, spray and burning control, 2) accessibility to surrounding urban areas poses serious security and vandalism problems, 3) proximity to urban areas eliminates the possibility of growing certain crops such as papaya, also

3-3. Impact of Waikele on Agriculture.

In December 1981, Amfac joined its sugar operations with its Hawaii property management and development operation to form the Agriculture and Property Group. This consolidation formally recognized the symbiotic relationship between Amfac's Hawaii land asset and sugar operations, i.e., profits from selected development and sale of sugar lands will help enhance sugar's profitability in good price years and offset losses during poor years. Realistically, Amfac cannot expect sugar cultivation and production to continue in some areas unless it utilizes and takes advantage of this relationship.

The Petitioner sees the urbanization of Waikele (since it is the only significant property the Petitioner owns in fee simple on Oahu) as the vehicle by which the Agriculture and Property Group's ("Group's") agriculture endeavors may be maintained and/or expanded on Oahu. Even with the successes experienced by Oahu Sugar Company in carrying out its survival plan to reduce losses, the financial picture looks at best as a low-profit or break even proposition. This projection does not include new capital investments needed to replace or upgrade equipment, which is necessary to increase efficiency and reduce production costs. Therefore, it is imperative that

Waikele's land resource be converted as soon as possible to income which may be used to enhance Oahu Sugar's economic viability. A similar relationship between land development and agricultural activities already exists on Maui with Kaanapali Resort and Pioneer Mill.

As a matter of background, the Agriculture and Property Group now comprises two major divisions--Amfac Properties, which is, among other things, responsible for the urbanization of Waikele, and Amfac Sugar, which oversees Oahu Sugar Company and Amfac Agribusiness. This combination of land development and agricultural activities has the net effect of creating one Group with one financial profit and loss statement.

In the long run, for Oahu Sugar Company to remain viable, a reasonable level of return must be achieved by the Group. Amfac has adopted a corporate policy that, for a business to be considered an ongoing part of the corporation (that is, for it not to be a business that should be divested or closed), it must on the average earn sufficient minimum profits to cover the after-tax interest cost of funds employed in that business. Achieving the minimum level of return would allow Oahu Sugar Company to stay in business, but it would not justify the investment of substantial capital to purchase new equipment or to fund

(P)1793.5

NOV 14 1985

Mr. John P. Whalen, Director
Department of Land Utilization
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Whalen:

Subject: Draft EIS for Waikele Development

We have reviewed the subject document and have no comments to offer.

Very truly yours,

D. Dominaga

TEUANE TOMINAGA
State Public Works Engineer

SM:jk
cc: Mr. F. J. Rodriguez

NOV 18 1985

due to security and vandalism, 4) lack of agricultural capital-intensive infrastructure such as a drip irrigation system, and 5) the very high cost of the existing water system which requires three separate pumping stations to irrigate the area, making it an extremely uneconomical area to cultivate. These factors along with the fact that Waikele is 1) the only large parcel of land owned in fee by the Petitioner on Oahu, 2) possesses an excellent urban location, and 3) has substantial urban infrastructure (e.g., water, sewer and transportation facilities) already in place leads to the conclusion that Waikele can provide a degree of support for Oahu Sugar Company.

Additionally, the urbanization of Waikele should not have major impact on the urbanization of other significantly large parcels of agricultural land. The urbanization of Waikele could eventually lead to the conversion of 253+ acres of land owned by Castle and Cooke directly north and adjacent to Waikele. This parcel of land is in pineapple use; however, at this time no plans to urbanize the acreage have been announced. The Waikele proposal is not dependent on the urbanization of the Castle and Cooke parcel; however, this 253+ acre parcel is possibly the only other agriculturally designated land which might be affected in the long term by the urbanization of Waikele.

Waikele and the Castle and Cooke property are bounded by Waikele Gulch and the Village Park development on the west; Kipapa Gulch to the north; Kamehameha Highway, Gentry Waipio and the Crestview and Seaview subdivisions to the east; and H-1 Freeway and Waipahu to the south.

When compared to other approved and proposed large-scale developments in Ewa and Central Oahu, Waikele represents a relatively small amount of land proposed for conversion to urban uses. The majority of other Ewa and Central Oahu developments are not contained by natural and man-made features as is Waikele. Also, the urbanization of Waikele is consistent with the Oahu Sugar Company's survival plan to eliminate all fields east of Waikele Gulch except Waipio Peninsula which is used mainly for wastewater disposal from the mill and sugar cane.

Although it may seem incongruous that urbanization of agricultural land may be in the best interests of agriculture, the Petitioner feels it is certainly justified in this particular instance. When combined with the benefits to be generated by urbanizing the land, the argument for the urbanization of Waikele becomes compelling.

GEORGE R. ARIYOSHI
GOVERNOR

Francis M. Hatanaka
[redacted]

LU 11/85 - 5402

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

OFFICE OF THE SUPERINTENDENT

November 26, 1985

1985 NOV 29 PM 1:05
DEPT. OF LAND UTILIZATION
CITY & COUNTY OF HONOLULU

Mr. John P. Whalen, Director
Department of Land Utilization
City and County of Honolulu
650 S. King Street
Honolulu, Hawaii 96813

Dear Mr. Whalen:

SUBJECT: Draft EIS for Waikele Development

We have no additional comments to offer on the Draft EIS for the Waikele Development.

Thank you for the opportunity to review the matter.

Sincerely,

Francis M. Hatanaka
Superintendent

FMH:jl

cc V. Honda, OBS
W. Araki, Leeward Dist.

State of Hawaii
DEPARTMENT OF DEFENSE
OFFICE OF THE ADJUTANT GENERAL
3949 Diamond Head Road
Honolulu, Hawaii 96816

HIENG

Mr. John P. Whalen, Director
Department of Land Utilization
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Whalen:

Waikele Development

Thank you for providing us the opportunity to review the proposed project, "Waikele Development" Environmental Impact Statement (Draft).

We have completed our review and have no comments to offer at this time.

Yours truly,

...ED

Jerry M. Matsuda
Major, Hawaii Air
National Guard
Contr & Engr Officer

cc: Env. Comm. Inc. (Mr. F. J. Rodrigues)
OEQC w/EIS (Draft)

NOV 18 1985

ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. RODRIGUEZ
PRESIDENT

January 7, 1986

Mr. James K. Ikeda
Department of Health
State of Hawaii
P.O. Box 3378
Honolulu, Hawaii 96801

Dear Mr. Ikeda:

We are in receipt of your department's comments dated December 10, 1985 and we respond in the following:

1. Availability of potable drinking quality water will be resolved by the Board of Water Supply in their role of County water manager to the State Department of Land & Natural Resources. The request for the required 2.1 MGD has been submitted to DLNR in a memo dated November 13, 1985 (see attachment).

2. Treatment of chemically contaminated well water sources in the Waipahu Well fields will be administered initially by the Board of Water Supply and subsequently by your agency for compliance with Section 11-20-29, 30 of Chapter 20, Title 11, Administrative Rules. As provided in the BWS memo to Amfac Property Development Corp. dated November 19, 1985, the installation of an activated carbon filtration system to treat well water is a requirement (see attachment). Please be assured that at the appropriate time when all land use policy changes have been processed and approved, the properly prepared engineering report will be submitted to all reviewing agencies for their review and approval prior to construction.

Thank you for your continuing interest and concern.

Very truly yours,

F. J. Rodriguez

F. J. Rodriguez

FJR:ls

attachment

TER SUPPLY
OF HONOLULU

COPY

November 13, 1985

Mr. Susumu Ono, Chairperson
Board of Land and Natural
Resources
State of Hawaii
P. O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Ono:

Subject: Application for 2.1 Million Gallons Daily (mgd)
Permitted Use from Wells 2400-05, 06

We submit the attached application for a permitted use of 2.1 mgd for Wells 2400-05, 06. The water will be used for the proposed Waikele development including a golf course. The proposed development will be located makai of Crestview. Waikele is already on the City's Development Plan and hearings on the reclassification of the lands have already been completed by the State Land Use Commission.

We attach a copy of the development schedule for Waikele.

If you have any questions, please contact Herbert H. Minakami at 527-6183.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

Attachment

cc: Community Planning, Inc.

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

LEIGH S. MATSUBARA
DIRECTOR OF HEALTH

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

In reply, please refer to:
EPHSO

December 10, 1985

MEMORANDUM

To: Mr. John P. Whalen, Director
Department of Land Utilization, City & County of Honolulu

From: Deputy Director for Environmental Health

Subject: Environmental Impact Statement (EIS) for Waikele Development, Ewa, Oahu

Thank you for the opportunity to review and comment on the Waikele Draft EIS. It is our understanding that the proposed project will consist of 2,700 residential units, a commercial center, office park, recreational facilities, and a school to be located in the Waipahu area mauka of Interstate Route H-1 between Kamehameha Highway and Waikele Stream/Kipapa Gulch. Since the existing potable water facilities in the area are inadequate to accommodate this project, a new water source, storage facilities, and transmission and distribution lines will be required. Based on our present understanding of this proposal, the Department of Health's Drinking Water Program has several comments.

The location of this project makes the question of water supply an extremely critical issue. The EIS states that the average daily water consumption of this project (2.1 million gallons) is less than is currently being used for sugarcane production. With sugarcane irrigation, much of the water used to irrigate the crops will eventually return to the aquifer. This is not the case with residential development.

It is a well publicized fact that some of the central Oahu wells are contaminated with organic compounds. The proposed project is in the vicinity of the Waipahu Wells which have been closed because of EDB contamination. The nearby Waipio Wells have trace levels of TCE. Trace levels of atrazine have been found in nearby Oahu Sugar Waipahu Wells. The EIS did not adequately address the issue of water supply for the project.

Section 11-20-29 of Chapter 20 requires all new sources of potable water serving public water systems to be approved by the Director of Health prior to their use to serve potable water. Such approval is based primarily upon the satisfactory submission of an engineering report which adequately addresses all concerns as set down in Section 11-20-29. The engineering report must be prepared by a registered professional engineer and bear his or her seal upon submittal.

Section 11-20-30 requires that new or substantially modified distribution systems for public water systems be approved by the Director of Health. Such approval depends upon the submission of plans and specifications for the project prior to construction and the demonstration that the new or modified portions of the system are capable of delivering

DEC 12 1985

potable water in compliance to all maximum contaminant levels as set down in Chapter 20 once the distribution system or modification is completed.

Should you have any questions regarding Chapter 20, Title 11, Administrative Rules, please contact the Drinking Water Program at 548-2235.

We realize that the statements are general in nature due to preliminary plans being the sole source of discussion. We, therefore, reserve the right to impose future environmental restrictions on the project at the time final plans are submitted to this office for review.

JAMES K. IKEDA

cc: OEQC
Mr. F. J. Rodriguez ✓

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

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

SUSUMU ONO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES

EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN

DIVISIONS:
AGRICULTURE DEVELOPMENT PROGRAMS
AQUATIC RESOURCES
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

DEC 23 1985

'85 DEC 26 P1 9:04
CITY & COUNTY OF HONOLULU

Honorable John P. Whalen, Director
Department of Land Utilization
City and County of Honolulu
650 So. King Street
Honolulu, Hawaii 96813

Dear Mr. Whalen:

Thank you for the opportunity to comment on the proposed urban development at Waikele covering about one square mile.

The development is located in the Pearl Harbor Ground Water Control Area (PHGWCA) and has an estimated water requirement of 2.1 million gallons per day. If the plans for the project call for the development of ground water within the PHGWCA, permits from this agency are required.

The draft mentions a reservoir where three Hawaiian Coots were seen. This may be the same reservoir for Oahu Sugar Company in Dole Co. field 4119, where seven Hawaiian Coots and two Hawaiian Gallinules were reported seen in July 1985. The draft statement mentions that the reservoir is proposed for golf course use, but more information should be provided as to how the reservoir will be used and developed since endangered species are found there.

Due to the lack of archaeological surveys in the vicinity, we are not aware that significant resources exist in the project area; however, this does not confirm the absence of historical, cultural, architectural and/or archaeological resources on the property. If any previously unidentified sites or remains (such as artifacts, shell, bone, or charcoal deposits, human burials, rock or coral alignments, pavings, or walls) are encountered, please direct the applicant to stop work and contact our historic sites office at 548-7460 immediately. Work in the immediate area should be stopped until the office is able to assess the impact and make further recommendations for mitigative activity, if warranted.

Sincerely,

SUSUMU ONO
Chairperson

DEC 30 1985

31

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96843

November 19, 1985

cc: RBT
LHH
Baker

Mr. Chris Kanazawa
Vice President
Amfac Property Development Corp.
P. O. Box 3140
Honolulu, Hawaii 96802

Dear Mr. Kanazawa:

Subject: Your Letters of November 4 and 6, 1985 Requesting Water Allocation for the Waikele Development

Thank you for your letters concerning the proposed development.

We submitted an application to the Board of Land and Natural Resources for a permitted use of 2.1 million gallons daily for the proposed wells at the new Waipahu "228" Reservoir site. We shall notify you of the action taken by the Board.

If the permitted use is approved, AMFAC will be required to install an activated carbon water treatment facility if tests confirm the presence of EDB and other chemicals in the well water.

If you have any questions, please contact Albert Koga at 527-6123.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

TABLE 2 - TRAFFIC PROJECTIONS WITHOUT PROJECT

FACILITY	EXISTING ADT	EXISTING AM PEAK	EXISTING PM PEAK	1990 ADT	1990 AM PEAK	1990 PM PEAK	1995 ADT	1995 AM PEAK	1995 PM PEAK
WAIPAHU SCREENLINE (EAST-WEST DIRECTION)									
INTERSTATE ROUTE H-1									
INBND	27431	3146	2186	34200	3920	2720	42500	4870	3390
OUTBND	24188	1644	2395	30100	2050	2980	37500	2550	3710
WAIPAHU STREET									
INBND	8859	826	628	8900	830	640	9000	840	640
OUTBND	6893	492	700	7000	500	710	7000	500	710
FARRINGTON HIGHWAY									
INBND	16982	1036	1188	17200	1050	1200	17400	1060	1220
OUTBND	19376	1361	1704	19600	1380	1730	19800	1390	1740
TOTAL									
INBND	53272	5008	4002	60300	5800	4560	68900	6770	5250
OUTBND	50457	3497	4799	56700	3930	5420	64300	4440	6160
CENTRAL OAHU SCREENLINE (NORTH-SOUTH DIRECTION)									
INTERSTATE ROUTE H-2									
INBND	21812	2660	1629	28600	3490	1920	32900	4020	2220
OUTBND	20411	1093	2403	27400	1200	3110	31700	1390	3600
KAM HIGHWAY									
INBND	12910	1579	706	11600	1420	780	13400	1630	900
OUTBND	13078	376	1400	11600	510	1320	13500	590	1530
KUNIA RD									
INBND	3155	205	421	3300	220	440	3400	230	460
OUTBND	3443	500	240	3600	520	250	3800	540	260
TOTAL									
INBND	37877	4444	2756	43500	5130	3140	49700	5880	3580
OUTBND	36932	1969	4043	42600	2230	4680	49000	2520	5390
PEARL CITY SCREENLINE (KALAUAO STREAM)									
INTERSTATE ROUTE H-1									
INBND	57449	7372	3279	63200	8100	3610	69353	8900	3960
OUTBND	54518	2640	6278	61000	2960	7020	68153	3300	7850
MOANALUA RD									
INBND	11706	1359	691	14100	1640	830	16897	1970	1000
OUTBND	13580	972	1678	15600	1110	1920	17754	1270	2200
KAMEHAMEHA HIGHWAY									
INBND	29534	3453	1598	29900	3490	1620	30175	3530	1640
OUTBND	27310	837	2917	28400	870	3030	29397	900	3140
TOTAL									
INBND	98689	12184	5568	107200	13230	6060	116424	14400	6600
OUTBND	95408	4449	10873	105000	4940	11970	115304	5470	13190

Drive Extension to Waipahu Street, as well as Interstate Route H-1 as shown on Exhibit 4.

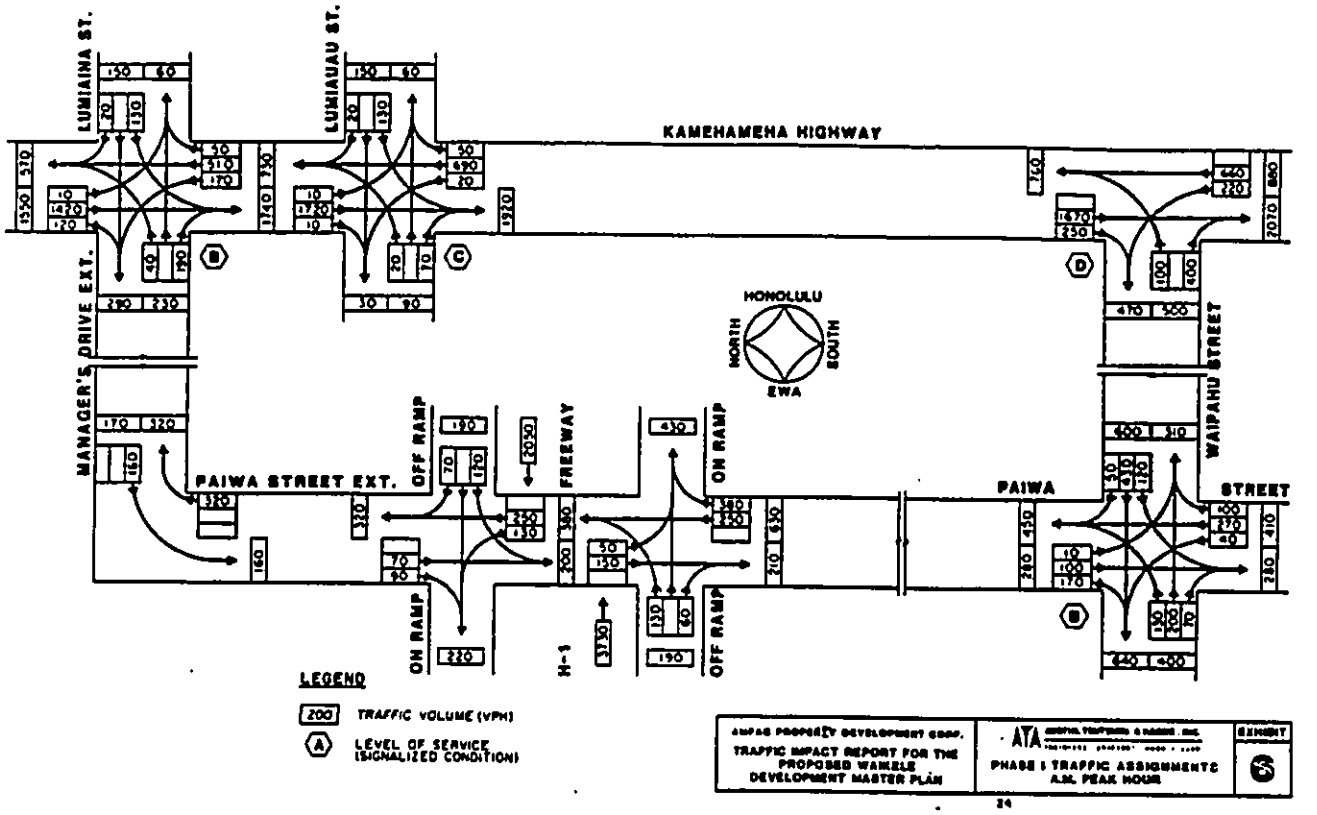
B. Phase I - Traffic Assignment

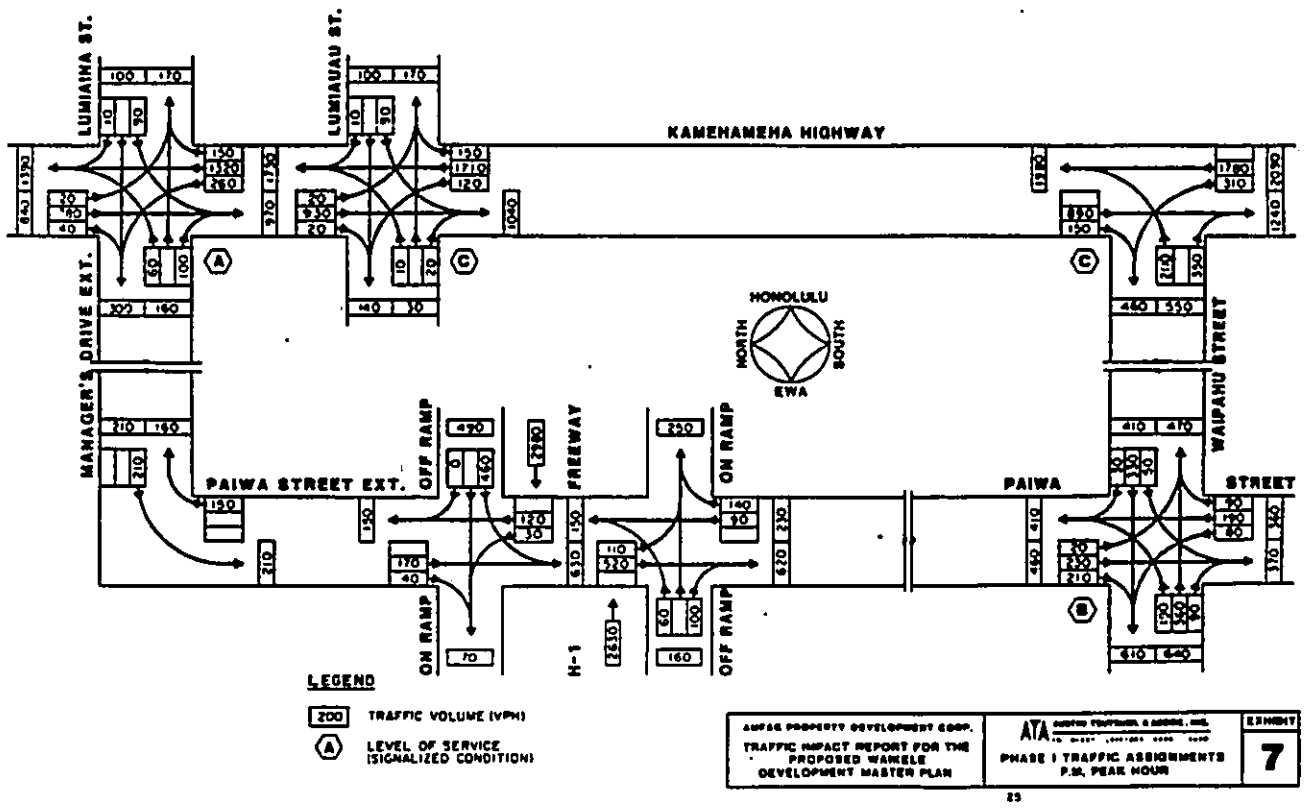
The traffic assignment network is shown on Exhibits 6 and 7 for the AM and PM peak hours, respectively. The proposed Waikele Development is expected to have a negligible impact on the 1990 traffic conditions on Kamehameha Highway at Waipahu Street.

The increased traffic from the proposed development is partially offset by the decrease in turning demand on Kamehameha Highway to and from Waipahu Street. The proposed Paiwa Interchange is expected to attract these Waipahu trips since it provides more direct access to and from the Freeway.

Similarly, the diverted traffic, from Waipahu Town to the Paiwa Interchange, should partially offset the increased demand on the Eastbound H-1 on ramp at Waiawa Interchange during the AM peak hour and on the westbound H-1 off ramp at Waiawa Interchange during the PM peak hour resulting from the development of East Waikele.

The net increase in traffic, eastbound (inbound) on Interstate Route H-1 during the AM peak hours, is expected to be 6.1% over the projected 1990 conditions between the proposed Paiwa Interchange and the Waiawa Interchange, of which only about 1.3% is attributable to site-generated traffic from the proposed Waikele Development. The remaining 4.8% is comprised of Waipahu Town trips diverted from the Waiawa Interchange. In the westbound (outbound) direction on Interstate Route H-1 during the PM


LUMIAINA ST.
LUMIAUAU ST.
KAMEHAMEHA HIGHWAY
MANAGER'S DRIVE EXT.
PAIWA STREET EXT.
OFF RAMP
FREEWAY
ON RAMP
H-1
PAIWA
STREET
WAIPAHU STREET
HONOLULU
NORTH
SOUTH
EWA
LEGEND
200 TRAFFIC VOLUME (VPH)
A LEVEL OF SERVICE (SIGNALIZED CONDITION)
TRAFFIC IMPACT REPORT FOR THE PROPOSED WAIKELE DEVELOPMENT MASTER PLAN
PHASE I TRAFFIC ASSIGNMENTS A.M. PEAK HOUR
EXHIBIT 6


LUMIAINA ST.
LUMIAUAU ST.
KAMEHAMEHA HIGHWAY
MANAGER'S DRIVE EXT.
PAIWA STREET EXT.
OFF RAMP
FREEWAY
ON RAMP
H-1
PAIWA
STREET
WAIPAHU STREET
HONOLULU
NORTH
SOUTH
EWA
LEGEND
200 TRAFFIC VOLUME (VPH)
A LEVEL OF SERVICE (SIGNALIZED CONDITION)
TRAFFIC IMPACT REPORT FOR THE PROPOSED WAIKELE DEVELOPMENT MASTER PLAN
PHASE I TRAFFIC ASSIGNMENTS P.M. PEAK HOUR
EXHIBIT 7

Transferable Parameters, User's Guide". These empirical rates are based upon commonly used independent variables which define land use intensity in terms of trip generation potential.

Because of the magnitude of the proposed development and the nature of a planned development, a certain amount of trip interaction among land use activities within the development is assumed; that is, a proportion of the total trips generated is assumed to remain within the study area and not impact the external highway system. Furthermore, the commercial-retail center is expected to be a neighborhood-oriented shopping center and is not expected to attract external trips. Finally, employment opportunities are expected to attract trips from within Waikele itself and nearby residential areas in Leeward and Central Oahu.

Development of the proposed Waikele project is expected to be a continuous process. However, for discussion purposes, the total development is divided into two phases, each representing about one-half of the overall master plan.

The trip generation characteristics for Phases I and II are shown in Table 1.

8. Phase I - Trip Generation

Phase I consists of the development of the eastern half of the project site, which includes 370 single family (low density) dwelling units; 436 townhouse and clustered (medium density) dwelling units and 375 garden apartment type (high density) dwelling units, for a total of 1181 dwelling units; a 135 acre

TABLE 1 - TRIP GENERATION TABLE

LAND USE	IND. VAR.	UNITS	AVG. TRIP RATE	AVG. DAILY TRIPS	AM PEAK HOUR RATE IN	AM PEAK HOUR RATE OUT	AM PEAK HOUR TRIPS IN	AM PEAK HOUR TRIPS OUT	PM PEAK HOUR RATE IN	PM PEAK HOUR RATE OUT	PM PEAK HOUR TRIPS IN	PM PEAK HOUR TRIPS OUT
PHASE I EAST												
SINGLE FAMILY	DU	370	10.0	3700	0.21	0.55	78	203	0.63	0.37	233	137
TOWN-HOUSE	DU	436	5.2	2267	0.07	0.34	31	148	0.34	0.17	148	74
GARDEN APT.	DU	288	5.2	1498	0.07	0.34	20	98	0.34	0.17	98	49
PHASE I CENTRAL												
GARDEN APT.	DU	87	5.2	452	0.07	0.34	6	30	0.34	0.17	30	15
OFFICE	1000 SF	223	14.0	3122	2.48	0.25	553	56	0.31	2.31	69	515
SUBTOTAL-PHASE I				11039			688	535			578	790
PHASE II EAST												
SINGLE FAMILY	DU	88	10.0	880	0.21	0.55	18	48	0.63	0.37	55	33
PHASE II CENTRAL												
TOWN-HOUSE	DU	182	5.2	946	0.07	0.34	13	62	0.34	0.17	62	31
GARDEN APT.	DU	162	5.2	842	0.07	0.34	11	55	0.34	0.17	55	28
OFFICE	1000 SF	94	14.0	1316	2.48	0.25	233	24	0.31	2.31	29	217
RETAIL	1000 SF	150	67	10005	0.90	0.80	135	120	2.85	3.05	427	457
PHASE II WEST												
SINGLE FAMILY	DU	398	10.0	3980	0.21	0.55	84	219	0.63	0.37	251	147
TOWN-HOUSE	DU	353	5.2	1836	0.07	0.34	25	120	0.34	0.17	120	60
GARDEN APT.	DU	345	5.2	1794	0.07	0.34	24	117	0.34	0.17	117	59
SUBTOTAL-PHASE II				21599			543	765			1116	1032
PROJECT TOTAL				32638			1231	1300			1694	1822

golf course, and a 30 acre office park with 223,000 square feet of floor area.

The construction of the proposed Paiwa Interchange, along with improvements to the existing feeder street systems makai of the freeway, and the widening of Kamehameha Highway are included in Phase I to accommodate the increased traffic demand.

C. Phase II - Trip Generation

Phase II consists of the development of the remainder of the 577± acre site, which includes 486 single family (low density) dwelling units, 535 townhouse and clustered (medium density) dwelling units, and 507 garden apartment type (high density) dwelling units, for a total of 1528 dwelling units; a commercial-retail center consisting of 150,000 square feet of floor space; a 9 acre recreation center; and the remainder of the office park containing an additional 94,000 square feet of floor area.

The construction of the community-proposed Bypass Road for Waipahu Street is assumed, completing the street collector system for Waipahu Town.

V. TRAFFIC ASSIGNMENT

A. General

The traffic assignment techniques are based upon traditional methods of assigning traffic flows onto the highway network based upon major destination points and the shortest path to each destination. Secondary destinations such as shopping attractions were considered in the route diversion from the minimum path. Perceived trip desires are based upon directional traffic demands

observed on the highway network during the peak periods and quantified by traffic counts at key highway junctions. Actual origin and destination data obviously cannot be obtained from a "proposed" development; however the techniques described above usually suffice in obtaining the order of magnitude for traffic demand on the highway network.

Phase I and Phase II traffic generation are superimposed over the Year 1990 and the Year 1995 travel demand forecasts derived from the State Department of Transportation along the major highway corridors in the vicinity. The projected traffic demand is discussed in terms of peak hour characteristics by converting the projected average daily traffic volumes to peak hour volumes using peak hour and directional distribution factors developed from existing travel patterns. Finally, these projections are distributed over the individual facilities on each corridor. Table 2 shows the background traffic demand for the existing conditions, the Year 1990 and the Year 1995. Although it is acknowledged that several of the highway facilities will be at capacity, particularly in the Pearl City Corridor, it is not the intent of this report to resolve these problems. This report only addresses the relative impact of traffic resulting from the proposed Waikele Development.

The traffic assignment network, for the purpose of this study, includes Kamehameha Highway from Lumiaina Street to the Waiawa Interchange and Paiwa Street from the proposed Manager's

Oahu. Other roadway facilities directly affected by the proposed interchange facility at Paiwa Street are Paiwa Street itself and Waipahu Street.

Paiwa Street is a 60-foot right-of-way, fully improved roadway between the Freeway undercrossing and Farrington Highway, with the exception of a short 44-foot right-of-way segment just makai of Waipahu Street. Paiwa Street terminates at the Freeway undercrossing. The existing H-1 bridge structure provides twin 60-foot span openings aligned with Paiwa Street and the haul cane road running parallel to Paiwa Street, from the Freeway to the Sugar Mill. Paiwa Street proceeds in the makai direction past Waipahu Street and connects to Farrington Highway.

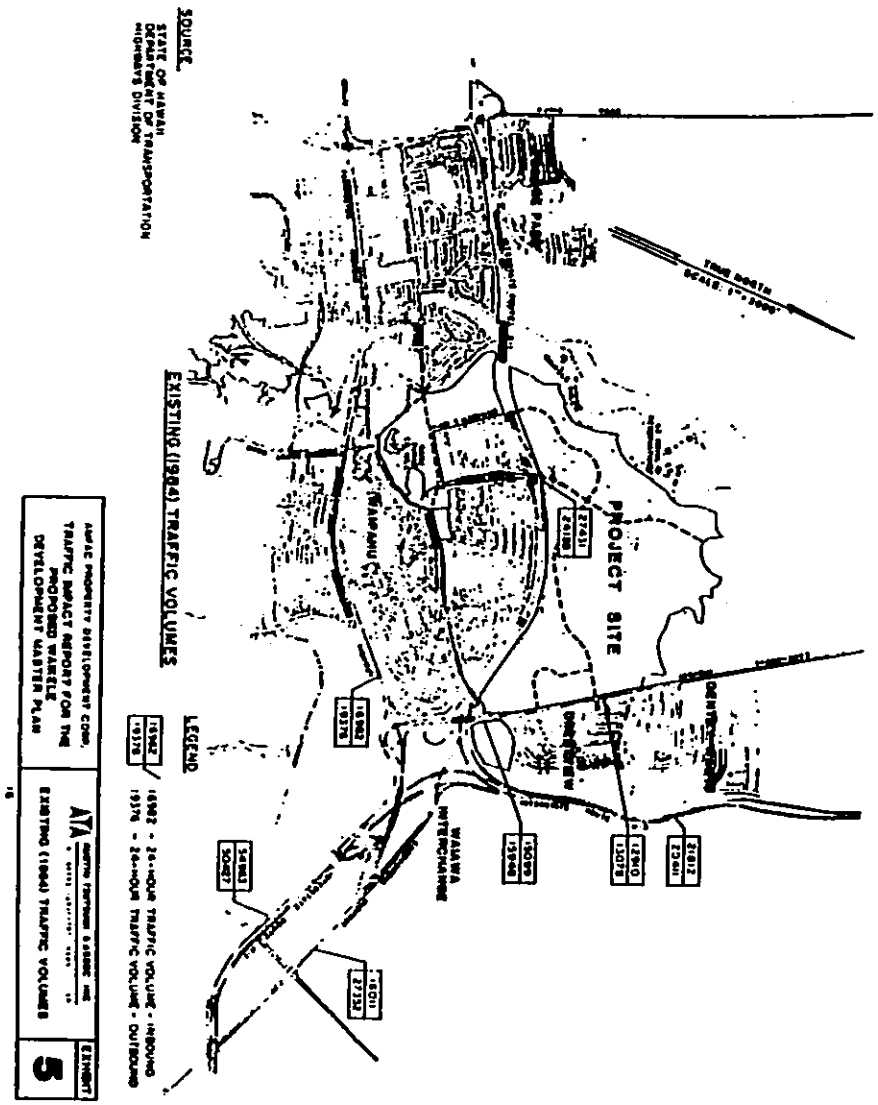
Waipahu Street varies from a 60-foot right-of-way, fully improved collector street to a variable right-of-way roadway through "Old Waipahu Town" fronting the Sugar Mill. Several geometric alignment problems restrict Waipahu Street's function as a collector roadway. The Waipahu Street alignment at Waikele Stream crossing consists of a "switchback", that is, the roadway turns at an acute angle in one direction, followed by another sharp turn in the reverse direction. Another severe alignment problem occurs just east of Paiwa Street where Waipahu Street makes a sharp turn as it continues eastward to Kamehameha Highway. Some operational and alignment problems occur in the Sugar Mill area, where left turn traffic and driveway traffic interfere with the through traffic flow and where curvilinear alignment further restricts operational speeds.

C. Traffic

Twenty-four hour traffic count data were obtained from the State Department of Transportation on all major highways in the affected area. Additional count data were obtained from the City and County Department of Transportation Services on City streets in the Waipahu area. These data are shown on Exhibit 5. Finally, manual traffic counts were conducted for the purpose of this study at key intersections during the morning and afternoon peak periods.

Interstate Route H-1, between Kunia Interchange and Waiawa Interchange carries about 52,000 vehicles per day total for both directions. East of Waiawa Interchange, Interstate Route H-1 carries 105,000 vehicles per day total for both directions. The freeway facility, during peak hours of traffic, eastbound in the morning and westbound in the afternoon, operates at Level of Service "A" between Kunia Interchange and Waiawa Interchange, and at Level of Service "D" between Waiawa Interchange and Moanalua Road Interchange for both peak periods. (Level of Service definitions can be found in the Appendix.)

The on ramp from, and off ramp to, Kamehameha Highway and Farrington Highway at the Waiawa Interchange operate at Level of Service "E" during the morning and afternoon peak hours, respectively. Traffic count data show 1800 vph on the H-1 on ramp eastbound during the morning peak hour and 1900 vph on the H-1 off ramp westbound during the afternoon peak hour. Under these conditions, the right lane of the freeway facility is dominated by merging and diverging traffic.



ATA

Kamehameha Highway, north of Waipahu Street, carries over 31,000 vehicles per day. Kamehameha Highway/Waipahu Street intersection operates at Level of Service "E" during the morning peak period and Level of Service "D" during the afternoon peak period. Traffic flow is generally southbound during the morning peak, including a heavy right turn movement from Waipahu Street onto Kamehameha Highway. During the afternoon peak, the northbound flow is the dominant movement, including a heavy left turn movement into Waipahu Street.

The Waipahu Street/Paiwa Street intersection operates at Level of Service "B" during the morning peak period and at Level of Service "C" during the afternoon peak period, with 1400 vph and 1700 vph entering the intersection, respectively. However, traffic operations during the peak periods are typified by stoppages on Waipahu Street resulting from left turning vehicles queued in the through lanes and buses stopping in the traveled way to load and unload passengers.

IV. TRIP GENERATION

A. General

The trip generation resulting from the proposed Waikele Development is based upon generally accepted rates developed by the Institute of Transportation Engineers (ITE) and published in the informational report on "Trip Generation, Third Edition - 1982"; and the Transportation Research Board and published in the National Cooperative Highway Research Program (NCHRP) Report No. 187 "Quick-Response Urban Travel Estimation Techniques and

and connects to Kamehameha Highway at Lumiaina Street, opposite the Crestview Subdivision. Therefore the roadway master plan radiates from its primary access at the proposed Paiwa Interchange, with another major access connection at Kamehameha Highway.

On the other hand, at present the Waipahu Town street system does not support a Paiwa Street access to the Freeway. With minor improvements, Paiwa Street makai of the Freeway can be upgraded to provide a mauka-makai connector from Farrington Highway to the proposed Paiwa Interchange. Furthermore, Waipahu Street, which runs east-west from Kamehameha Highway to Kunia Road, can be upgraded, as proposed by the City, between Pupukahi Street and Mahoe Street to provide a full 60-foot wide right-of-way with a 44-foot wide roadway. As an alternative, Waipahu Street can be realigned via a Bypass Road between Waikele Stream and Mahoe Street, as proposed by the community in Waipahu 2000 Master Plan. Either of these alternatives provides a continuous collector roadway feeding the proposed Paiwa Interchange at Paiwa Street.

In addition to the State-proposed Waipio Interchange on Interstate Route H-2, the State has proposed to construct an additional lane on the on ramp from Farrington Highway to Interstate Route H-1, eastbound, at the Waiawa Interchange.. The State is also proposing to add another lane in the eastbound direction between Waiawa Interchange and Waiau Interchange on Interstate Route H-1. This improvement should increase the inbound

capacity of the Freeway and alleviate some of the morning peak period congestion on the Interstate Route H-1 Pearl City Viaduct.

Exhibit 4 shows a map of these area-wide improvements.

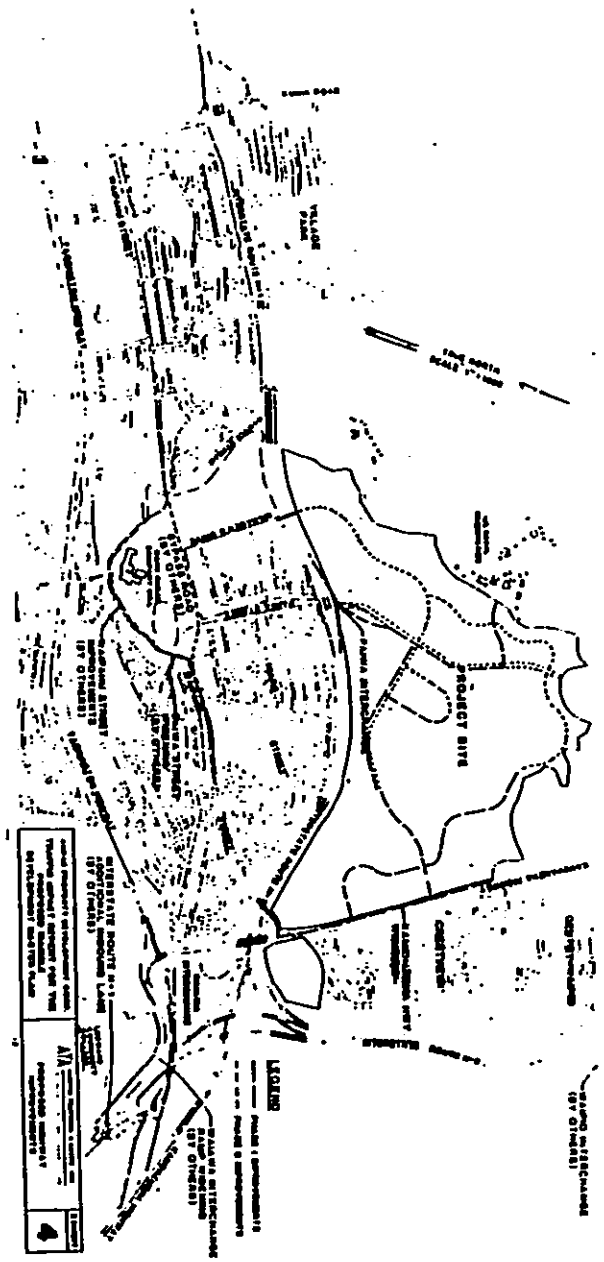
III. EXISTING CONDITIONS

A. General

The existing site has been taken out of agriculture by Oahu Sugar Co. and is in fallow with some ground cover for erosion control. The Oahu Sugar Company manager's residence is located on the west end of the site. To the south lies Waipahu Town, originally a plantation town, which has grown in the path of the westward urbanization of Oahu, along with the Crestview Subdivision east of the project site. Village Park Development to the west and Gentry-Waipio to the northeast represent Waipahu's growth potential in the immediate future. To the north of the proposed Waikele Development lies the 253± acre Castle and Cooke property currently in pineapple cultivation.

B. Roadways

The existing roadways within the proposed project site are primarily haul cane roads leading to the Oahu Sugar Mill via the existing Paiwa Street Undercrossing on Interstate Route H-1. Manager's Drive provides another existing H-1 crossing for access to the project site. The only other roadway is the Naval Access Road, running east-west across the site from Kamehameha Highway to the U.S. Naval Reservation along Kipapa Gulch. These access connections at existing public roadways are expected to be utilized by the proposed Waikele Development.



At the present time, site accessibility to a major arterial is provided only along Kamehameha Highway, with the only other arterial fronting the project site being Interstate Route H-1, a fully-controlled-access freeway facility.

Kamehameha Highway is a three lane arterial highway providing one lane in each direction with the third lane providing a passing lane or exclusive turning lane at key intersections. At Waipahu Street, Kamehameha Highway becomes a four lane, divided highway facility as it connects to the Waiawa Interchange. Southbound past Waipahu Street, Kamehameha Highway splits; one lane continuing eastbound on Kamehameha Highway through the Pearl City area, and one lane merging with on ramp traffic from Farrington Highway to eastbound Interstate Route H-1. There is also an auxiliary lane south of Waipahu Street formed by the eastbound H-1 off ramp and connection from southbound Kamehameha Highway to westbound Farrington Highway. There is no direct connection from southbound Kamehameha Highway to westbound Interstate Route H-1.

The off ramp from Interstate Route H-1, westbound, to Waipahu is a single lane diverging ramp which merges with westbound Kamehameha Highway and then splits to Farrington Highway to Waipahu Town and on to another single lane connector to northbound Kamehameha Highway to Crestview and Waipio-Gentry.

Fronting the makai side of the project site, Interstate Route H-1 is an eight-lane freeway providing access to Waipahu at Waiawa Interchange and at Kunia Interchange. Interstate Route H-1 is the primary arterial between Central Honolulu and West

POLICE DEPARTMENT

CITY AND COUNTY OF HONOLULU

FRANK F. FASI
MAYOR

DOUGLAS G. GIBB
CHIEF

MARSHALL K. MATSUDA
DEPUTY CHIEF

IN REPLY REFER TO: DI-JS

July 24, 1985

Environmental Communications, Inc.
P. O. Box 536
Honolulu, Hawaii 96809

Gentlemen:

Subject: Rezoning Proposal for 577.2 Acres from AG-1 to Residential Single Family Detached, Low, Medium and High Density Apartment and Commercial at TMK 9-4-2: 3, 10, 11, 12 (por.), 31 and 41 and 9-4-7: 10, 12, 13, and 32
Waikele, Oahu

The Honolulu Police Department is not in favor of residential development that has the potential of adding significantly increased vehicular traffic to the present roads connecting Central Oahu to Honolulu proper. We believe that significant increases of traffic will negatively impact traffic safety if development is encouraged prior to an increase in road capacity and improved mass transportation between the development area and Honolulu.

The present thoroughfare leading into Honolulu from Central Oahu (H-1), does not appear to be capable of handling significant increases of traffic from both Central Oahu and Ewa.

It would be desirable if a determination could be made of the total traffic impact on the existing and planned arteries serving Honolulu from the Central Oahu and Ewa areas. This determination, based on all planned and proposed developments, would greatly assist in determining the traffic safety impact of the individual developments.

While a development as large as the Waikele Development Project would result in increased calls for police service, and would add extensively to our patrol area, we are prepared to provide police services for the area, assuming that necessary resources are made available to us.

DOUGLAS G. GIBB
Chief of Police

JUL 26 1985

ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. RODRIGUEZ,
PRESIDENT

October 9, 1985

Chief Douglas G. Gibb
Honolulu Police Department
1455 South Beretania Street
Honolulu, Hawaii 96814

Dear Chief Gibb:

We are in receipt of your department's comments dated July 24, 1985 on the EIS Preparation Notice for the proposed Waikele project and we respond in the following:

Traffic - Your concerns over the ability of the existing arterials to adequately provide capacity for future projects like Waikele will be discussed in specific detail in the draft EIS currently under preparation. We recognize that your department's concerns focus on traffic safety, particularly on the overloading of thoroughfares into Honolulu from Central Oahu via H-1. Mitigative measures are being developed in conjunction with the State Department of Transportation that are designed to mitigate these overloading factors to a practicable extent. We would welcome your agency's review of our proposed plans to alleviate the traffic loading and also, other ways to reduce this vital concern.

Police Service - We have met with your Central Oahu District administrative personnel and have provided them with an initial preview of the Waikele project's scope of development and phasing schedule.

Discussions on the availability and need for an onsite resources are being planned and we will maintain contact with your Waipahu Station staff.

Thank you for your comments and continuing concern and we look forward to your department's review of the draft EIS.

Very truly yours,

F. J. Rodrigues

F. J. Rodrigues

FJR:ls

DEPARTMENT OF PARKS AND RECREATION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU HAWAII 96813

July 29, 1985

Mr. F. J. Rodrigues
Environmental Communications, Inc.
P.O. Box 536
Honolulu, Hawaii 96809

Dear Mr. Rodrigues:

Subject: Environmental Impact Statement Preparation Notice
Waikele Development
TMK: 9-4-02: 3, 10, 11, por. 12, 31 and 41
9-4-07: 1, 12, 13, and 32

We have reviewed the Environmental Impact Statement Preparation Notice for the proposed Waikele Development and offer the following comments and recommendations.

Our preliminary assessment of the proposed project indicates that private and public parks are being provided, however, the public parks may not meet our Department's standards and requirements. Also, based on the proposed 2,640 residential units, 16± acres of land would be required to comply with the Park Dedication Ordinance. The notice states that only two parks totalling nine acres are being provided for public park use.

We recommended that the applicant contact our Department to discuss the recreational needs and park dedication requirements for the project as soon as possible. The number, size, configuration and types of parks are not satisfactory and should be adjusted.

Thank you for the opportunity to comment on the preparation notice. Should you have any question, please contact Mr. Jason Yuen of our Advance Planning Section at 527-6315

Tom Nekota
TOM T. NEKOTA, Director

TTN:as

AUG 1 1985

ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. RODRIGUEZ,
PRESIDENT

October 9, 1985

Mr. Tom T. Nakota, Director
Department of Parks and Recreation
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Nekota:

We are in receipt of your department's comments dated July 29, 1985 on the EIS Preparation Notice for the proposed Waikele project and we respond in the following:

Your agency's comments on the availability of public parks for the Waikele project has been provided to the client's land planner for their review in terms of compliance with the Park Dedication Ordinance. Please be assured that as this project proceeds through the various land use policy change procedures, compliance with the Ordinance will be met. Measures to meet your department's requirements will be provided in the draft EIS currently under preparation.

Thank you for your comments and continuing concern.

Very truly yours,

F. J. Rodrigues

FJR:ls

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

RUSSELL L. SMITH JR.
DIRECTOR AND CHIEF ENGINEER

ENV 85-203

August 1, 1985

Environmental Communications, Inc.
P. O. Box 536
Honolulu, Hawaii 96809

Gentlemen:

Re: EISPN for Waikele Development,
Waipahu, Ewa, Oahu, Hawaii

In response to your letter of July 18, 1985, concerning the subject project, we submit the following comments.

1. Drainage should be discussed in the EIS. In this respect, a drainage report should be submitted to the Division of Engineering's Drainage Section for review and approval.

2. Existing municipal sewers are adequate to serve the project as proposed. Two trunk sewers can be utilized, the Paiwa Street sewer and the Gentry-Waipio offsite sewer. To prevent surcharging any sewers, wastewater flows from the development should be divided between the two trunk sewers. This aspect should be discussed in the EIS.

Very truly yours,

RUSSELL L. SMITH, JR.
Director and Chief Engineer

AUG 7 1985

ENVIRONMENTAL
COMMUNICATIONS
INC.

F J RODRIGUEZ
PRESIDENT

October 9, 1985

Mr. Russell L. Smith, Jr.
Director and Chief Engineer
Department of Public Works
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Smith:

We are in receipt of your department's comments dated August 1, 1985 on the EIS Preparation Notice for the proposed Waikele project and we respond in the following:

1. Drainage will be discussed in the draft EIS currently under preparation; the Drainage report will be provided to your Drainage Section when it has been finalized and completed.

2. Sewerage capacity and development of transmission lines will also be provided to your Wastewater Treatment Division as soon as it has been finalized and completed. We acknowledge the comment that there is adequate capacity for this project.

Thank you for your comments and continuing concern.

Very truly yours,

F. J. Rodriguez

FJR:ls

1136 FORT STREET MALL, SUITE 208 • P. O. BOX 536 • HONOLULU, HAWAII 96809 • TELEPHONE (808) 521-8461

DEPARTMENT OF TRANSPORTATION SERVICES

CITY AND COUNTY OF HONOLULU

HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALDI, JR.
DEPUTY DIRECTOR

TE7/85-3231
PL 1.0040

July 30, 1985

Environmental Communications, Inc.
P.O. Box 536
Honolulu, Hawaii 96809

Gentlemen:

Subject: Environmental Impact Statement
Preparation Notice for the Proposed
Waikele Development Project
TMK: 9-4-2: 3, 10, 11, 12 (Por.), 31 & 41
9-4-7: 10, 13, 13 & 32

This is in response to your letter of July 18, 1985, regarding the preparation of an EIS for the above project.

The EIS should address the traffic impact of the project on the surrounding street and arterial system that will be affected.

The interior roadway system should be designed in accordance with city standards. The design of intersections at Kamehameha Highway and the H-1 Freeway should be coordinated with the State Department of Transportation which has jurisdiction over these facilities.

Thank you for providing us this opportunity to review and comment on the project.

Sincerely,

for JOHN E. HIRTEN

JUL 30 1985

ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. RODRIGUEZ
PRESIDENT

October 9, 1985

Mr. John E. Hirten, Director
Department of Transportation
Services
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Hirten:

We are in receipt of your department's comments dated July 30, 1985 on the EIS Preparation Notice for the proposed Waikele project and we respond in the following:

A complete traffic impact study will be provided that will address the concerns you have expressed in your comments. The traffic consultant firm, Austin, Tsutsumi & Associates has been in several discussions with the State Department of Transportation and will be providing that department with their planned measures of traffic management.

Thank you for your comments and continuing concern.

Very truly yours,

F. J. Rodrigues

FJR:ls

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
REGION NINE
Hawaii Division
Box 50206
Honolulu, Hawaii 96850

September 5, 1985

IN REPLY REFER TO
HDA-HI

Environmental Communications, Inc.
P. O. Box 536
Honolulu, Hawaii 96809

Gentlemen:

Subject: EIS Preparation Notice, Waikele Development Project

Thank you for the opportunity to comment on this project. We have reviewed the EIS Preparation Notice and are particularly concerned with the proposed interchange at Paiwa Street and the H-1 freeway.

We feel that it is premature to show the interchange in the plans since additional access points to the Interstate System must first be requested by the Hawaii Department of Transportation for the eventual approval of the Federal Highway Administrator. Such a request should contain a traffic analysis that would show impacts of the added interchange on the existing freeway and should also discuss funding for the proposed interchange.

We are also concerned with the eventual extension of Paiwa Street to the North and its ultimate connection with Kamehameha Highway. Plans should be developed to assure that this future addition can be at the most desirable location.

Sincerely yours,

H. Kusumoto
Division Administrator

SEP 6 1985

F. J. RODRIGUEZ,
PRESIDENT

ENVIRONMENTAL
COMMUNICATIONS
INC.

October 9, 1985

Mr. H. Kusumoto
Division Administrator
U.S. Department of Transportation
Federal Highway Administration
Region Nine, Hawaii Division
Box 50206
Honolulu, Hawaii 96850

Dear Mr. Kusumoto:

We are in receipt of your agency's comments dated September 5, 1985 and we note for the record that it was received beyond the deadline date of August 22, 1985. We respond as follows:

1. The depiction of the project's transportation management system which includes a possible interchange at Paiwa Street was included at this early stage to allow decision making agencies such as FHWA, State DOT, and other interested and involved governmental agencies the opportunity to review and comment on traffic mitigative measures being considered by the applicant. It was not meant to be included as a facility that has been finally determined. Discussions with appropriate local transportation agencies are underway and studies such as those described in your letter are being circulated for review and comment.

   Please be assured that mitigative measures to reduce traffic loading attributable to this project's phased program of development will be included with all proposals for major improvements such as an interchange at Paiwa Street.

   The applicant and their retained traffic consultants are working towards a mutually agreeable solution to the existing and future traffic patterns on H-1 and Kamehameha Highway.

Thank you for your comments and continuing interest.

Very truly yours,

F. J. Rodrigues

FJR:ls

1164 FORT STREET MALL, SUITE 208 • P. O. BOX 536 • HONOLULU, HAWAII 96809 • TELEPHONE (808) 521-2361

United States Department of Agriculture

Soil Conservation Service

P.O. Box 50004
Honolulu, HI
96850

August 5, 1985

Environmental Communications
P.O. Box 536
Honolulu, Hawaii 96809

Subject: Environmental Impact Statement Preparation Notice,
Proposed Waikele Development, Waikele, Oahu

The subject document has been reviewed as you requested.

Enclosed please find a copy of the comments that we supplied to the Department of Planning and Economic Development in reference to the rezoning application for the land in the proposed project area. They reflect our concerns about the project.

Sincerely,

FRANCIS C.H. LUM
State Conservationist

Enclosure

AUG 1 2 1985

The Soil Conservation Service is an agency of the United States Department of Agriculture

50

UNITED STATES DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

P. O. BOX 50004
HONOLULU, HAWAII
96850

May 1, 1985

Mr. Kent M. Keith, Director
Department of Planning and
Economic Development
P.O. Box 2359
Honolulu, HI 96804

Dear Mr. Keith:

Subject: Petition for an Amendment to the State Land Use District Boundary - A85-594 (AMFAC Property Development Corp.)
Waikele, Oahu

The problems facing sugarcane, pineapple, and diversified agriculture are of vital concern to the Soil Conservation Service. We are deeply concerned that the proposed request for a district boundary change in Waikele will contribute to the demise of agriculture in Central Oahu. This area has the best soils, water, climate, and proximity to the market, making it one of the best areas suited for agriculture in Hawaii.

While we sympathize with the economic plight facing Oahu Sugar Company, we believe that other lands less suited to agriculture, such as the lands along the slopes of Waianae Mountains toward Makakilo, would be better suited for conversion to urban uses. In comparison, the Waikele lands have higher yields, lower production costs, lower pumping cost for irrigation, uses less fuel and energy for cultivation, lower transportation cost, and have less erosion and sedimentation problems.

The Central Oahu area, bounded by H-1, the sloping lands on both the Waianae and Koolau Mountain ranges, and Wheeler Field and Mililani, should be kept in agriculture. In the long run, we feel that developing the sloping lands and keeping the flatter lands of Central Oahu in agriculture will be in the best interest of the state.

Thank you for the opportunity to review this document.

Sincerely,

FRANCIS C.H. LUM
State Conservationist

bc: Strat Whiting, DC, Honolulu FO

HiSato:ht

ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. RODRIGUEZ,
PRESIDENT

October 9, 1985

Mr. Francis C.H. Lum
State Conservationist
Soil Conservation Service
U.S. Department of Agriculture
P.O. Box 50004
Honolulu, Hawaii 96850

Dear Mr. Lum:

We are in receipt of your department's comments dated August 5, 1985 in which you have transmitted copies of comments submitted to DPED May 1, 1985 on the proposed Waikele project. We respond in the following to your comments:

1. We concur with your office's analysis that Waikele's agricultural elements of soils, water, climate, and proximity to the market make it one of the best areas for agriculture in Hawaii. It should also be pointed out however, that extensive study on alternative crops that could effectively use Waikele's acreage have been conducted by Amfac. Further, the continued survival of Oahu Sugar Company is predicated on the use of Waikele in an urban framework. Amfac Sugar testified at recent public hearings held before the State Land Use Commission that operational costs to harvest crops on a single field basis, made Waikele less cost effective in today's economic climate. Further, installation of drip irrigation systems for the Waikele fields and the extremely expensive water transmission costs due to pumping from the basal lens source or the Waiahole Ditch have imposed increased costs that have made sugar cultivation at Waikele less than attractive from an economic standpoint. The draft EIS will include the Oahu Sugar Company Survival Plan as an attachment and references will be made from that document.

2. The possible use of other lands that you describe along the slopes of the Waianae Mountains towards Makakilo are not in fee ownership by Amfac and would lend themselves in an economic sense for urbanization and development. Unfortunately, the same reasons that make Waikele an attractive and viable site for agriculture, prevail for urbanization via residential and commercial usage.

3. We recognize your agency's role in maintaining agricultural lands in the prescribed use and also acknowledge the concerns being expressed are towards that goal. We will provide in the Draft EIS the Oahu Sugar Company's plan for survival that will demonstrate Amfac's efforts to achieve these same goals by urbanizing Waikele. We look forward to your comments on the Draft EIS.

Very truly yours,

F. J. Rodriguez

FJR:ls

United States Department of the Interior

FISH AND WILDLIFE SERVICE
300 ALA MOANA BOULEVARD
P O BOX 50167
HONOLULU, HAWAII 96850

IN REPLY REFER TO:
ES
Room 6307

AUG 22 1985

Environmental Communications, Inc.
P.O. Box 536
Honolulu, Hawaii 96809

Re: Environmental Impact Statement Preparation Notice, Waikele Development Project, Waikele, Oahu

Dear Sir:

The U.S. Fish and Wildlife Service has reviewed the referenced project and offers the following comment.

The Environmental Impact Statement should discuss the potential impacts on the water quality and nehu (Stolopherus purpureus) fishery in Pearl Harbor from the increased runoff and storm water discharge from the proposed development.

We appreciate the opportunity to comment.

Sincerely,

for Ernest Kosaka
Project Leader
Office of Environmental Services

cc: NMFS - WPFO
DLNR
OEQC

AUG 23 1985

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve America!

ENVIRONMENTAL COMMUNICATIONS INC.

F. J. RODRIGUEZ
PRESIDENT

October 9, 1985

Mr. Ernest Kosaka
Project Leader
Office of Environmental Services
U.S. Dept. of the Interior
Fish and Wildlife Service
P.O. Box 50167
Honolulu, Hawaii 96850

Dear Mr. Kosaka:

We are in receipt of your department's comments dated August 22, 1985 on the EIS Preparation Notice for the proposed Waikele project and we respond in the following:

There will be a surface/drainage analysis provided in the draft EIS currently under preparation that will provide data on the runoff quantity and quality constituent value. We would refer your agency to this report so that impacts on the water quality of Pearl Harbor and the more specific references to the nehu bait fishery can be evaluated.

We look forward to your comments on the draft EIS. Thank you for your comments at this time and continuing concern.

Very truly yours,

F. J. Rodrigues

F. J. Rodrigues

FJR:ls

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

IN REPLY REFER TO
9510
Ser 002(09P2)/1412

6 AUG 1985

Environmental Communications, Inc.
P. O. Box 536
Honolulu, Hawaii 96809

Dear Sirs:

ENVIRONMENTAL IMPACT STATEMENT
(EIS) PREPARATION NOTICE FOR THE WAIKELE DEVELOPMENT

We have reviewed the EIS Preparation Notice for the proposed Waikele Development Project forwarded to us on 18 July 1985, and provide the following comments for your consideration.

Since water conservation measures are encouraged by the Board of Water Supply, would this additional development increase the likelihood of water rationing in the future? Imposition of water rationing would adversely impact the Navy's mission in Hawaii.

The Waiawa Interchange is already extremely congested. The proposed development will add to this traffic volume. What are the Waikele developers proposing in order to address this problem?

A Navy owned access road to the Waikele Branch of the Naval Magazine, Lualualei, traverses the development site. Occasionally the road is used to haul ammunition. The Navy and AMFAC are evaluating the possibility of entering into a land exchange whereby the present Navy road would be conveyed to AMFAC for use in the development in exchange for a road easement to be provided to the Navy for access on Paiwa Street through the development. The EIS should assess this proposal.

Because U.S. Navy property at Waikele is adjacent to the proposed development, two copies of the EIS should be provided for review. In addition to the copy to this Command, please mail one EIS direct to Commanding Officer, Naval Magazine, Lualualei, Hawaii 96792.

The U.S. Navy appreciates the opportunity of providing guidance at this early stage in preparation of the EIS on the Waikele Development.

Sincerely,

P. O'CONNOR
Captain, U.S. Navy
Chief of Staff

Copy to: w/ 18 Jul 85 ltr
NAVMAG Lualualei
PACNAVFACENGCOM

AUG 8 1985

F J RODRIGUEZ
PRESIDENT

ENVIRONMENTAL
COMMUNICATIONS
INC.

October 9, 1985

Captain P. O'Connor
U.S. Navy Chief of Staff
Department of the Navy
Headquarters
Naval Base Pearl Harbor
Box 110
Pearl Harbor, Hawaii 96860-2020

Dear Captain O'Connor:

We are in receipt of your agency's comments dated August 6, 1985 on the EIS Preparation Notice for the proposed Waikele project and we respond in the following:

1. Water availability to the proposed project is a matter of serious concern to all involved not only on this project, but also to the adjacent land users. Please be assured that the Board of Water Supply and the Department of Land & Natural Resources will assure continuing water service to all current and future users in the Pearl Harbor Basin Water Control District.

2. A comprehensive traffic impact study is being prepared for inclusion in the Draft EIS currently under preparation. This document and it's analysis will be reviewed by both the State and City agencies managing the traffic for Central Oahu and Ewa. We welcome your agency's comments on this traffic analysis.

3. The EIS will address to the extent possible, the negotiations between Amfac and the Navy on the Navy owned access traversing the development site. The final determination of the easement negotiations will in turn, determine the environmental impacts due to the Navy hauling of ammunition since the location of the access easement exchange on Paiwa Street will relocate potential impact areas.

Thank you for your comments and we will advise the Environmental Quality Office that two copies of the Draft EIS need to be provided to the Navy for their review.

Very truly yours,

F. J. Rodriguez

FJR:ls

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

REPLY TO ATTENTION OF

July 31, 1985

Mr. F. J. Rodriguez
Environmental Communications, Inc.
P. O. Box 536
Honolulu, Hawaii 96809

Dear Mr. Rodriguez:

Thank you for the opportunity to review and comment on the EIS Preparation Notice for the proposed Waikele Development Project at Waikele, Oahu. The following comments are offered:

a. The Department of the Army permit requirements are not applicable.

b. The proposed Waikele Development Project is in an area where the flood hazard potential has not been identified and is therefore classified Zone D under the Flood Insurance Study for the City and County of Honolulu prepared by the Federal Insurance Administration.

Sincerely,

Kisuk Cheung
Chief, Engineering Division

AUG 5 1985

F J RODRIGUEZ
PRESIDENT

ENVIRONMENTAL
COMMUNICATIONS
INC.

October 9, 1985

Mr. Kisuk Cheung
Chief, Engineering Division
U.S. Army Engineer District, Honolulu
Ft. Shafter, Hawaii 96858-5440

Dear Mr. Cheung:

We are in receipt of your office's comments dated July 31, 1985 on the EIS Preparation Notice for the Waikele project and we respond in the following:

a. No response required

b. We will identify the Flood Insurance Study designation of "Zone D" as indicated in your letter.

Thank you for your comment and continuing concern.

Very truly yours,

F. J. Rodriguez

FJR:ls

HAWAIIAN ELECTRIC COMPANY, INC. · PO BOX 2750 · HONOLULU, HAWAII 96840

ENV 2-1
NV/G

HEI

Brenner Munger, Ph.D., P.E.
Manager
Environmental Department
(808) 548-6880

August 21, 1985

Mr. F. J. Rodriguez, President
Environmental Communications, Inc.
P. O. Box 536
Honolulu, Hawaii 96809

Dear Mr. Rodriguez:

Subject: Environmental Impact Statement Preparation Notice for the Proposed Waikele Development Project, Waikele, Oahu

We have reviewed the above EIS Preparation Notice and offer the following comments:

On Page 8, reference is made that electric systems can be found in adjacent residential communities. This may be true; however, the existing system may not be adequate for this new development. This comment was highlighted in a letter to you dated May 3, 1985, which we quote:

> "Electrical service to the subject project will be made available, however, in view of the magnitude of the electrical load anticipated for the project, it is very likely that our company will require a substation site within the project development. The approximate dimensions of the substation site are 100' x 170'. The route of our 44 kv transmission line to the substation site needs to be resolved between HECO and AMFAC. The lead time to design and construct the substation and to purchase the substation transformer is approximately 1-1/2 years."

Thank you for the opportunity to comment on this project.

Sincerely,

Brenner Munger

Brenner Munger, Ph.D., P.E.
Manager, Environmental Department

cal

A Hawaiian Electric Industries Company

AUG 22 1985

F. J. RODRIGUEZ,
PRESIDENT

ENVIRONMENTAL
COMMUNICATIONS
INC.

October 9, 1985

Dr. Brenner Munger
Manager, Environmental
Department
Hawaiian Electric Company, Inc.
P.O. Box 2750
Honolulu, Hawaii 96840

Dear Mr. Munger:

We are in receipt of your company's comments dated August 21, 1985 on the EIS Preparation Notice for the proposed Waikele project and we respond in the following:

Your prior comments dated May 3, 1985 have been provided to Amfac as well as the retained civil engineering firm who has included your comments in their future planning schedule. Please be assured that there will be more than adequate time in the future to meet and discuss this matter with HEI as the project continues through the lengthy land use policy review schedule.

Thank you for your comments and continuing concern.

Very truly yours,

F.J. Rodrigues

FJR:la

CASTLE & COOKE, INC.

POST OFFICE BOX 2990 • HONOLULU, HAWAII 96802
TELEPHONE (808) 548-6611 TELEX 7430017

July 30, 1985

Environmental Communications, Inc.
1146 Fort Street Suite 200
Honolulu, Hawaii 96813

Gentlemen:

We note on the Register of Chapter 343, HRS Documents in the Office of Environmental Quality Control Bulletin No. 14 the proposed action on the Waikele development at Waipahu, Oahu by Amfac Property Development Company.

Castle & Cooke, Inc. is the owner of adjacent property and requests to be consulted in the preparation of the EIS.

Please call the undersigned at 548-2905 if you have any questions.

Very truly yours,

CASTLE & COOKE LAND COMPANY

George Yim
President

FJR:ls

cc: Wallace Miyahira

FINANCIAL PLAZA OF THE PACIFIC
130 MERCHANT STREET, HONOLULU, HAWAII 96813

AUG 1 1985

ENVIRONMENTAL COMMUNICATIONS INC.

F J RODRIGUEZ
PRESIDENT

October 9, 1985

Mr. George Yim, President
Castle & Cooke, Inc.
P.O. Box 2990
Honolulu, Hawaii 96802

Dear Mr. Yim:

We are in receipt of your request to be a consulted party during the EIS process for the proposed Waikele project. We will be requesting the Environmental Quality Office to include your firm on the draft EIS distribution list.

Very truly yours,

F. J. Rodrigues

Finally, the peak traffic characteristics resulting from trips generated from and attracted to the Ewa area can be expected to result in a broader peak period rather than the higher peak hour traffic conditions due to the nature of trip-making behavior of a "secondary urban center", resulting in "destination-type" peak traffic characteristics and shorter origin to destination trip lengths generally occurring later during the morning peak period and earlier during the afternoon peak period.

2. A Priori Highway Improvements

Because of the magnitude of the proposed development and the limited existing accessibility to the site from major arterial highways, some a priori improvements, i.e., improvements assumed without analysis, to the highway network were taken as given conditions to accommodate growth in this area. Given this premise, the master plan concept could be developed based upon certain requirements for accessibility to major arterial highways in the vicinity. It is not within the scope of this study to generate alternative schemes for comparison purposes, nor is its intent to provide a detailed analysis of each proposed highway improvement. Preliminary cost estimates for the proposed highway improvements can be found in the "Site Construction Cost Estimates for the Waikele Development", November 1983 by Community Planning, Inc. The proposals contained herein are discussed conceptually on a system-wide basis, within

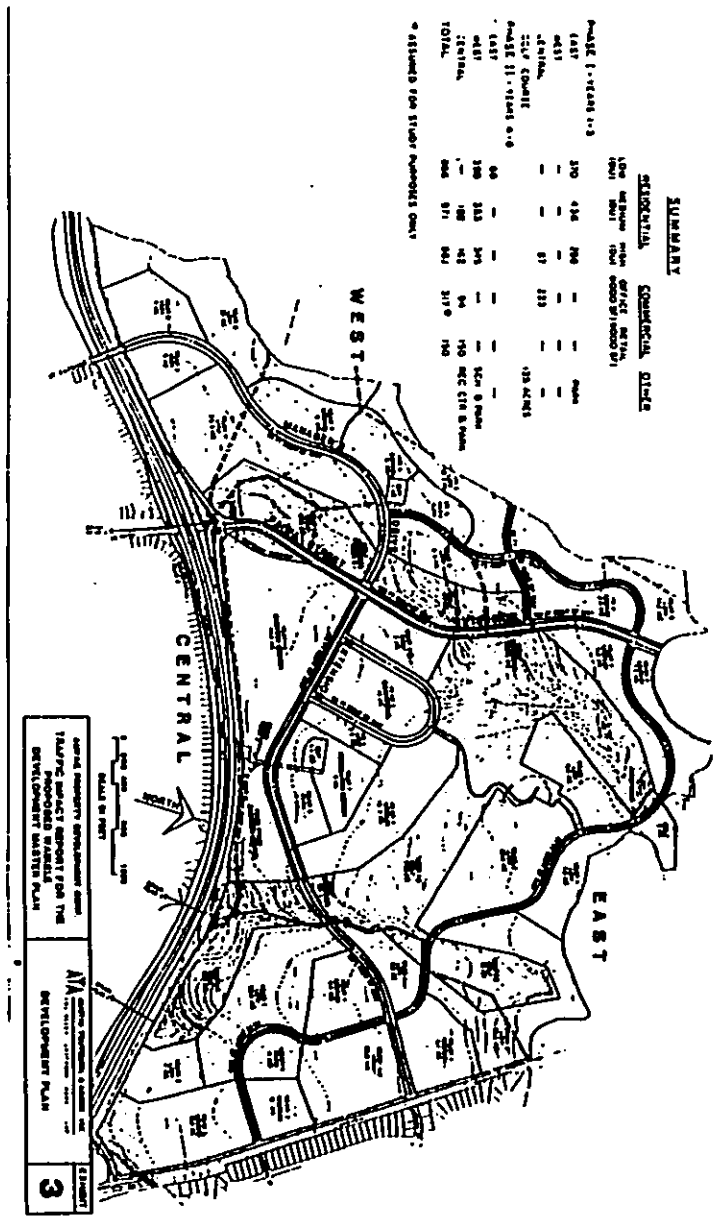
the context of an overall traffic master plan. While each improvement is analyzed as an integral part of the overall system, more detailed design analyses should be carried out on an individual basis.

II. PROJECT DESCRIPTION

A. Waikele

The proposed Waikele Development is a totally planned community providing a wide range of residential dwelling types, including single family detached units at 5 dwelling units per acre (DU/AC), townhouse and clustered units at 10 DU/AC, and low-rise garden apartments at 23 DU/AC; a commercial development, including a 150,000 square foot neighborhood shopping center and a 42.6 acre office park containing 317,000 square feet of office space; and recreational facilities including an 18 hole golf course. Exhibit 3 shows the overall development master plan. For discussion purposes, the Waikele Development is divided into three areas: East Waikele, West Waikele and Central Waikele, roughly delineated by the proposed golf course.

The master plan concept consists of a core commercial/ community Village Center surrounded by a golf course, serving as a buffer to the residential areas on the periphery of the development. The development master plan is expected to span 8 years to completion, generally beginning from the east side along Kamehameha Highway and spreading westward to Waikele Stream. For the purposes of this study, the development is divided into two phases: Phase I (Years 1 through 3) includes the golf course,



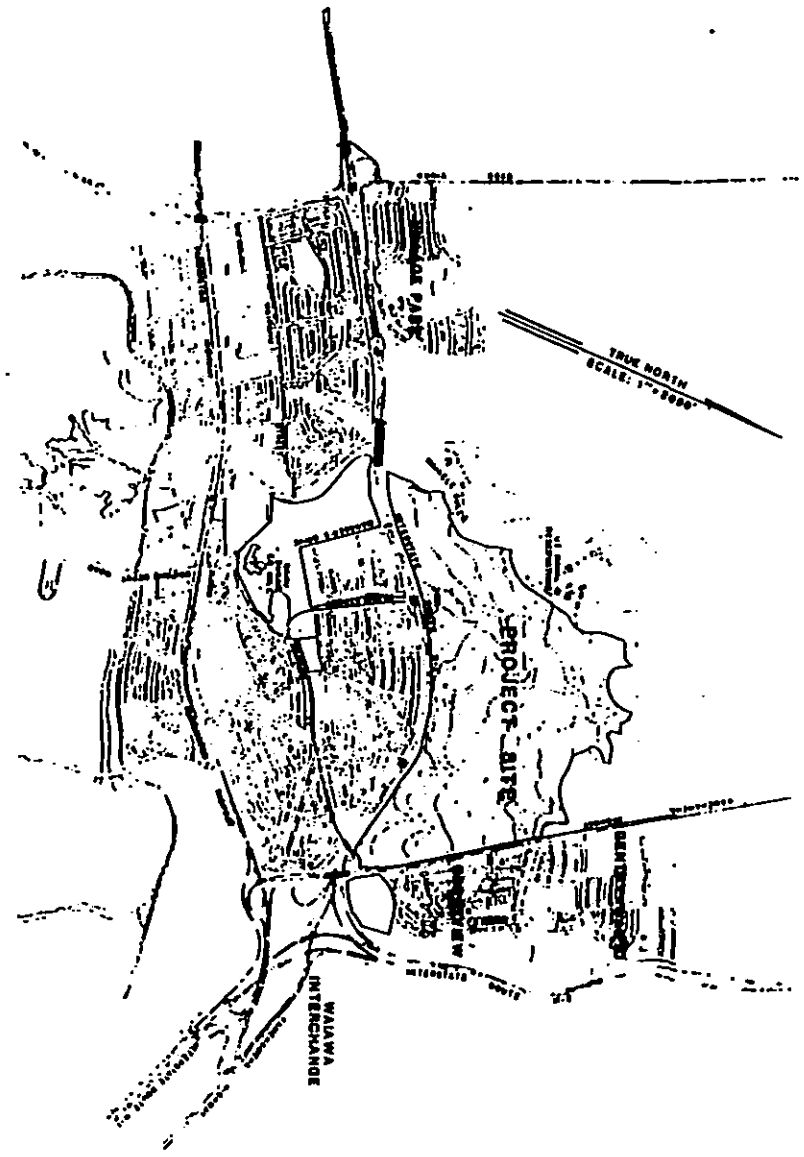
part of the office park in Central Waikele and about one-half total residential development planned for Waikele; Phase II (Years 4 through 8) includes the commercial-retail center and the remainder of the business park in Central Waikele, the remaining residential areas in Waikele.

B. Proposed Improvements to the Highway Network

The a priori highway improvements proposed in this report are discussed within the context of other proposals not yet realized. One such proposal involves the State-proposed Waipio Interchange on Interstate Route H-2 at the Mililani Cemetery Road Overcrossing. This facility, which is intended to service the Gentry-Waipio Development, can be expected to divert 1000 vehicles per hour from Kamehameha Highway to Interstate Route H-2, southbound during the AM peak hour and northbound during the PM peak hour.

In a similar situation, a full service interchange facility on Interstate Route H-1 at the existing Paiwa Street Undercrossing, proposed by this study, is intended to service the proposed Waikele Development in addition to the established community of Waipahu Town. The improvement of Kamehameha Highway is proposed to provide a second major access for the proposed Waikele Development.

The master plan for the proposed Waikele Development spreads outward from an extension of Paiwa Street mauka of the Freeway to the north end of the site. An east-west collector roadway extends from Manager's Drive at the existing Freeway overcrossing



AMFAC PROPERTY DEVELOPMENT CORP.
TRAFFIC IMPACT REPORT FOR THE PROPOSED WAIKELE DEVELOPMENT MASTER PLAN

ATA AUSTIN TSUTSUMI & ASSOCIATES, INC

VICINITY MAP

EXHIBIT 2

Significant considerations for the future include the expansion of residential developments in Central Oahu. In order to support this growth, an interchange facility on the Interstate Route H-2 is being proposed by the State Department of Transportation (DOT) at the Mililani Cemetery Road. Central Honolulu and the Pearl Harbor area are expected to remain the primary employment centers. West Oahu has been designated as the island's "secondary urban center" by the City and County of Honolulu's General Plan. Therefore, the Waipahu area will be located at the hub of the future growth on the island of Oahu.

In general, the development of West Oahu should result in a more balanced distribution between eastbound and westbound traffic on Interstate Route H-1 during the peak periods of traffic. That is, the typical inbound (Honolulu bound) morning peak traffic and outbound (Ewa bound) afternoon peak traffic should be less pronounced with increasing traffic demand to and from destinations in Ewa. As employment opportunities develop in the "secondary urban center", many of the trips generated from future residential growth in West Oahu should remain in West Oahu, rather than be attracted to Honolulu as under the present travel patterns. Furthermore, because of its marketing potential, the proposed Waikele Development represents a reallocation of housing supply, under projected housing market conditions, from West Oahu to a more viable location in the Waipahu area.

ATA

B. Location

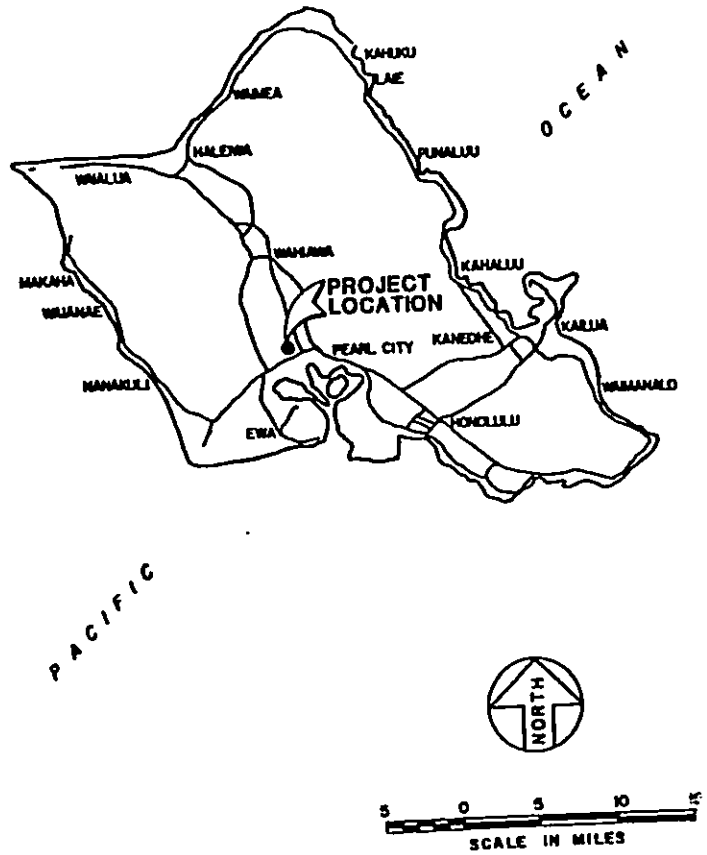
The proposed Waikele Development is located in the Waipahu-Waipio area on the island of Oahu. The 577± acre site identified as Tax Map Key 9-4-02:3, 10 and 11, Portions 12, 31 and 41; and 9-4-07:10, 12, 13 and 32, is situated north of Interstate Route H-1 between Kamehameha Highway and Waikele Stream/Kipapa Gulch. Exhibits 1 and 2 show the project location and its immediate vicinity.

C. Basis of This Study

1. Transportation Forecast

Because of the time frame over which the proposed development will occur, the background traffic conditions, over which the traffic generated by the proposed development will be superimposed, are taken from the most recent State Department of Transportation traffic projections available at this writing.

HALI 2000, prepared by the Oahu Metropolitan Planning Organization (OMPO) is intended to update Oahu's long range transportation plan. The traffic forecasts used in this study are derived from corridor projections taken from the OMPO Study; specifically Interstate Route H-1, Waipahu Street and Farrington Highway for the east-west direction in Waipahu; Interstate Route H-1, Moanalua Road and Kamehameha Highway for the east-west direction in Pearl City; and Kunia Road, Kamehameha Highway and Interstate Route H-2 for the north-south direction in Central Oahu.



AMFAC PROPERTY DEVELOPMENT CORP. TRAFFIC IMPACT REPORT FOR THE PROPOSED WAIKELE DEVELOPMENT MASTER PLAN	ATA AUSTIN, TSUTSUMI, & ASSOC., INC. LOCATION MAP	EXHIBIT 1

APPENDIX

LEVEL OF SERVICE DEFINITIONS[1]

1. GENERAL

"Level of Service" (LOS) is a term which, broadly interpreted, denotes any one of an infinite number of differing combinations of operating conditions that may occur on a given lane or roadway when it is accommodating various traffic volumes. Level of Service is a qualitative measure of the effect of a number of factors, which include speed and travel time, traffic density, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience, and operating costs.

Each "Level of Service" definition has two applications; the first is for continuous uninterrupted flow on a highway and the second is for signalized intersections.

2. LEVEL OF SERVICE "A"

A. Level of Service "A" describes completely free-flow conditions. The operation of vehicles is virtually unaffected by the presence of other vehicles, and operations are constrained only by the geometric features of the highway and driver preferences. Vehicles are spaced at an average of 440 feet, or 22 car lengths, at a maximum density of 12 passenger cars per mile per lane (pc/mi/ln). The ability to maneuver within the traffic stream is high. Minor disruptions to flow are easily absorbed at this level without causing significant delays or queuing.

B. At Level of Service "A", there are no loaded cycles (i.e., the load factor[2] is 0.0) and few are even close to loaded. No approach phase is fully utilized by traffic and no vehicle waits

[1] Excerpts taken from the Highway Research Board Special Report 87, Highway Capacity Manual 1965, the Transportation Research Circular Number 212, Interim Materials on Highway Capacity, January 1980, and Transportation Research Circular Number 281, Proposed Chapters for the 1985 Highway Capacity Manual, June 1984.

[2] The "load factor" is a measure of this degree of utilization of an intersection approach roadway during one hour of peak traffic flow. It is the ratio of the number of green phases that are loaded, or fully utilized, by traffic (usually during the peak hour) to the total number of green phases available for that approach during the same period.

longer than one red indication. Typically, the approach appears quite open, turning movements are easily made, and nearly all drivers find freedom of operation, their only concern being the chance that the light will be red, or turn red, when they approach.

3. LEVEL OF SERVICE "B"

A. Level of Service "B" is also indicative of free flow, although the presence of other vehicles begins to be noticeable. Average travel speeds are somewhat diminished from LOS "A", but are still generally over 42 mph on sections with 50 mph design speed. Vehicles are spaced at an average of approximately 264 feet, or 13 car lengths, at a maximum density of 20 pc/mi/ln. Minor disruptions are still easily absorbed at this level, although local deterioration in LOS will be more obvious.

B. Level of Service "B" represents stable operation, with a load factor of not over 0.1; an occasional approach phase is fully utilized and a substantial number are approaching full use. Many drivers begin to feel somewhat restricted within platoons of vehicles. Under typical rural conditions, this frequently will be suitable operation for rural design purposes.

4. LEVEL OF SERVICE "C"

A. Level of Service "C" represents a range in which the influence of traffic density on operations becomes marked. The ability to maneuver within the traffic stream, and to select an operating speed, is now clearly affected by the presence of other vehicles. Average travel speeds are reduced to about 39 mph on 50 mph design speed sections, and the average spacing of vehicles is reduced to approximately 175 feet, or 9 car lengths, at a maximum density of 30 pc/mi/ln. Minor disruptions may be expected to cause serious local deterioration in service, and queues may form behind any significant traffic disruption. Severe or long-term disruptions may cause the facility to operate at LOS "F".

B. In Level of Service "C", stable operation continues. Loading is still intermittent, but more frequent, with the load factor ranging from 0.1 to 0.3. Occasionally drivers may have to wait through more than one red signal indication, and back-ups may develop behind turning vehicles. Most drivers feel somewhat restricted, but not objectionably so. This is the level typically associated with urban design practice.

5. LEVEL OF SERVICE "D"

A. Level of Service "D" borders on unstable flow. Speeds and ability to maneuver are severely restricted because of traffic congestion. Average travel speeds are approximately 35 mph on 50 mph design speed sections, while the average spacing of vehicles

is 125 feet, or 6 car lengths, at a maximum density of 42 pc/mi/ln. Only the most minor of disruptions can be absorbed without the formation of extensive queues and the deterioration of service to LOS "F".

B. Level of Service "D" encompasses a zone of increasing restriction approaching instability in the limit when the load factor reaches 0.70. Delays to approaching vehicles may be substantial during short peaks within the peak period, but enough cycles with lower demand occur to permit periodic clearance of developing queues, thus preventing excessive back-ups.

6. LEVEL OF SERVICE "E"

A. Level of Service "E" represents operations at or near capacity, and is quite unstable. At capacity, vehicles are spaced at only 80 feet, or 4 car lengths, at a maximum density of 67 pc/mi/ln. This is the minimum spacing at which uniform flow can be maintained, and effectively defines a traffic stream with no usable gaps. Thus, disruptions cannot be damped or dissipated, and any disruption, no matter how minor, will cause queues to form and service to deteriorate to LOS "F". Average travel speeds at capacity are approximately 30 mph.

B. Capacity occurs at Level of Service "E". It represents the most vehicles that any particular intersection approach can accommodate. Although theoretically a load factor of 1.0 would represent capacity, in practice full utilization of every cycle is seldom attained, no matter how great the demand, unless the street is highly friction-free. A load factor range of 0.7 to 1.0 is more realistic. In the absence of a local determination, use of 0.85 is recommended for isolated intersections. For interconnected signals a higher factor may be appropriate. At capacity there may be long queues of vehicles waiting upstream of the intersection and delays may be great (up to several signal cycles).

7. LEVEL OF SERVICE "F"

A. Level of Service "F" represents forced or breakdown flow. It occurs at a point where vehicles arrive either at a rate greater than that at which they are discharged, or at a point on a planned facility where forecasted demand exceeds the computed capacity. While operations at such points (and on immediately downstream sections) will appear to be at capacity or better, queues will form behind these breakdowns. Operations within queues are highly unstable, with vehicles experiencing short spurts of movement followed by stoppages. Average travel speeds within queues are generally under 30 mph, with densities higher than 67 pc/mi/ln.

B. Level of Service "F" represents jammed conditions. Back-ups from locations downstream or on the cross street may restrict or prevent movement of vehicles out of the approach under consideration; hence, volumes carried are not predictable. No load factor can be established, because full utilization of the approach is prevented by outside conditions.

DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT

KAMAMALU BUILDING, 250 SOUTH KING ST, HONOLULU, HAWAII
MAILING ADDRESS: P.O. BOX 2359, HONOLULU, HAWAII 96804 • TELEX: 7430220 HIPED

GEORGE R. ARIYOSHI
GOVERNOR
KENT M. KEITH
DIRECTOR
MURRAY E. TOWILL
DEPUTY DIRECTOR
LINDA KAPUNIAI ROSEHILL
DEPUTY DIRECTOR

DIVISIONS
BUSINESS AND INDUSTRY DEVELOPMENT DIVISION
ENERGY DIVISION
220 Mamalahoa St., Room 101, Hilo, Hawaii 96720
FOREIGN TRADE ZONE DIVISION
Rm 3, Honolulu Airport 96819
LAND USE DIVISION
PLANNING DIVISION
RESEARCH AND ECONOMIC ANALYSIS DIVISION

OFFICES
ADMINISTRATIVE SERVICES OFFICE
INFORMATION OFFICE

Ref. No. P-3204

December 19, 1985

The Honorable John P. Whalen
Director
Department of Land Utilization
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Whalen:

Subject: DEIS for Waikele Development, Ewa District, Oahu

We have reviewed the subject draft environmental impact statement (DEIS) and offer the following comments for your consideration.

Chapter II, Section A.3. identifies the soil classification and describes its qualities at the proposed project site. We note, however, that there is no discussion of the soil's susceptibility to erosion, although erosion is identified as a probable impact. Increased surface runoff can be expected from the land clearing and grading operations, which will flow to nearby streams and ultimately to the ocean. The coastal impacts may be significant and should be addressed in the report.

We also note that the applicant has not identified the Naval Magazine (NAVMAG) Lualualei (Waikele Branch) which is located along the western boundary of the project area. It encompasses 520 acres. Since sensitive arms, ammunition, and explosives are received, renovated, maintained, stored and issued at the NAVMAG, the existence of this facility should be indicated in the DEIS in the interest of public safety.

Thank you for the opportunity to review and comment on the subject document.

Very truly yours,

Kent M. Keith

Kent M. Keith

cc: Mr. F. J. Rodriguez

DEC 27 1985

ENVIRONMENTAL COMMUNICATIONS INC.

F. J. RODRIGUEZ
PRESIDENT

January 7, 1986

Mr. Kent M. Keith, Director
Department of Planning and
Economic Development
P.O. Box 2359
Honolulu, Hawaii 96804

Dear Mr. Keith:

We are in receipt of your department's comments dated December 19, 1985 and we respond in the following:

1. Increased surface runoff has been examined in detail by the study conducted by Dr. Gordon L. Dugan, Ph.D. and Dr. Michael J. Chun, Ph.D. The results of their work and the anticipated impacts on the receiving waters (Waikele Stream and Pearl Harbor) are discussed in section IV-2,3, 4,5 section B. Impact on Hydrological Characteristics. Their conclusions are "Impacts to water quality resulting from operations of the project are anticipated to be minimal, because biocides currently in use that may potentially adversely affect water quality tend to break down more readily in comparison to the more lasting types of a few years ago. Lead concentrations originating from automobiles should be steadily decreasing, since new automobiles have been designed to only utilize unleaded gasoline. Therefore, though the amount of runoff would increase, adverse water quality impacts resulting from increased constituents should not be significant."

2. The presence of the Naval facility located in Waikele Gulch will be acknowledged in the Project Description section.

Thank you for your concerns and continuing interest.

Very truly yours,

F. J. Rodriguez

FJR:ls

GEORGE R. ARIYOSHI
Governor

STATE OF HAWAII
DEPARTMENT OF SOCIAL SERVICES AND HOUSING
HAWAII HOUSING AUTHORITY
P. O. BOX 17907
HONOLULU, HAWAII 96817

RUSSELL N. FUKUMOTO
Executive Director

IN REPLY REFER
TO:
85:DEV/6260

November 14, 1985

Mr. John P. Whalen, Director
Department of Land Utilization
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Gentlemen:

Subject: Draft EIS to Waikele Development -
Aulii, Waikele,, Ewa District, Oahu

The Authority has reviewed subject draft EIS and has no further comments to offer relative to the proposed action at this time. Our previous comments during the preparation notice have been satisfactorily addressed by Environmental Communications, Inc.

Thank you for the opportunity to comment.

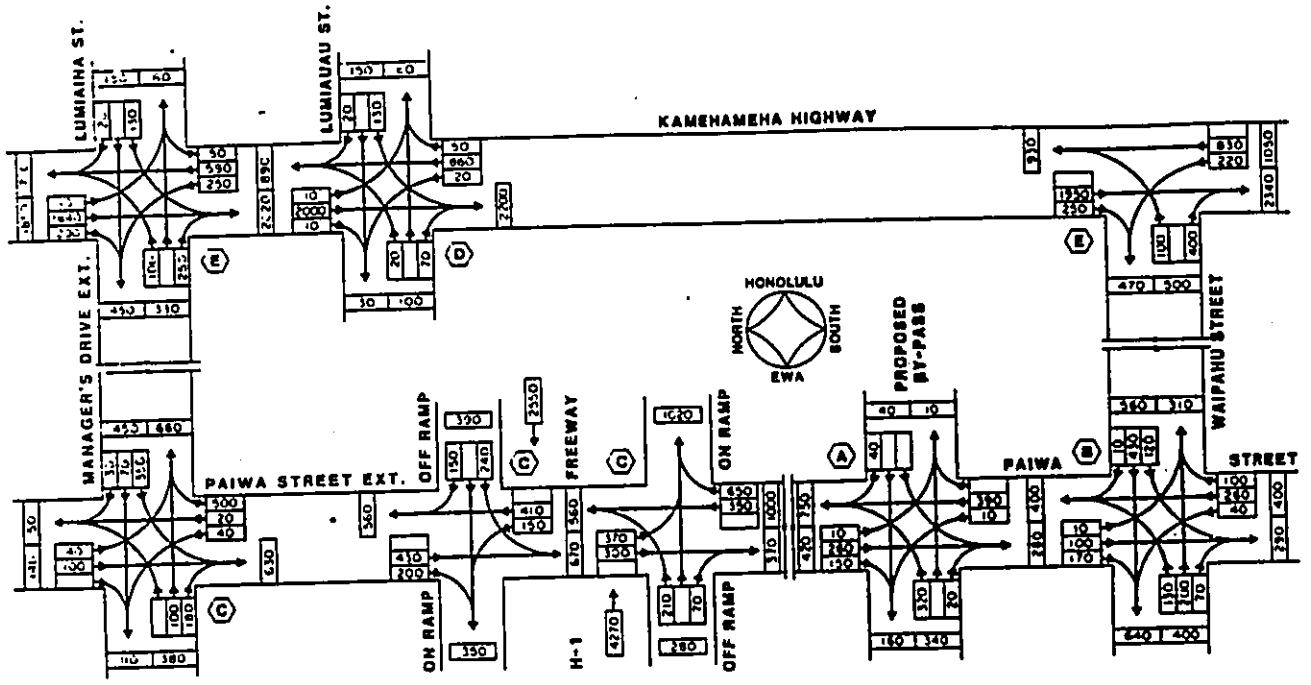
Sincerely,

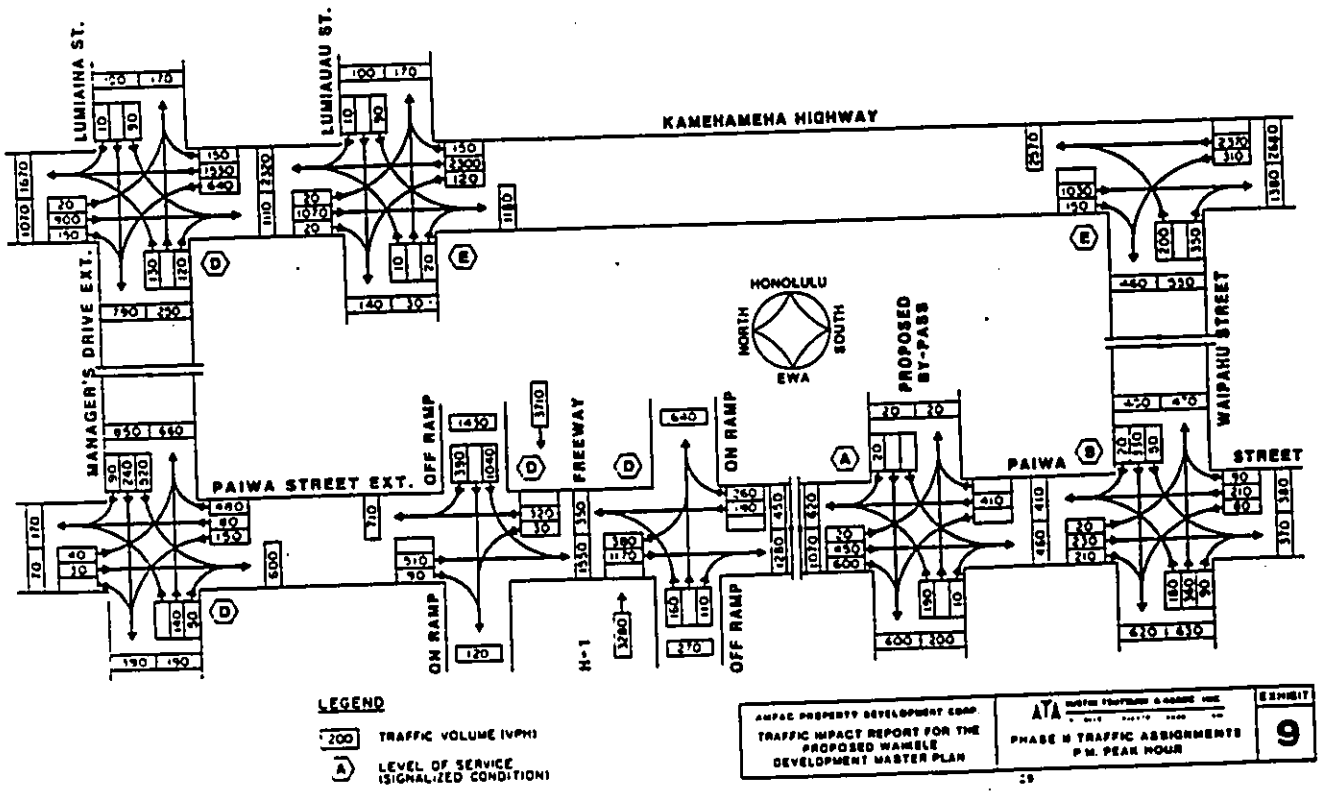
Russell N. Fukumoto

Russell N. Pukumoto
Executive Director

cc: DSSH
✓Environmental Communications, Inc.

NOV 25 1985


KAMEHAMEHA HIGHWAY
LUMIAINA ST.
LUMIAUAU ST.
MANAGER'S DRIVE EXT.
PAIWA STREET EXT.
OFF RAMP
ON RAMP
FREEWAY
H-1
HONOLULU
NORTH
SOUTH
EWA
PROPOSED BY-PASS
PAIWA
WAIPAHU STREET
LEGEND
200 TRAFFIC VOLUME (VPH)
(A) LEVEL OF SERVICE (SIGNALIZED CONDITION)
AMFAC PROPERTY DEVELOPMENT CORP.
TRAFFIC IMPACT REPORT FOR THE PROPOSED WAIMELE DEVELOPMENT MASTER PLAN
ATA
PHASE II TRAFFIC ASSIGNMENTS A.M. PEAK HOUR
EXHIBIT 8


KAMEHAMEHA HIGHWAY
LUMIAINA ST.
LUMIAUAU ST.
MANAGER'S DRIVE EXT.
PAIWA STREET EXT.
OFF RAMP
ON RAMP
FREEWAY
H-1
HONOLULU
NORTH
SOUTH
EWA
PROPOSED BY-PASS
PAIWA
WAIPAHU STREET
LEGEND
200 TRAFFIC VOLUME (VPH)
(A) LEVEL OF SERVICE (SIGNALIZED CONDITION)
AMFAC PROPERTY DEVELOPMENT CORP.
TRAFFIC IMPACT REPORT FOR THE PROPOSED WAIMELE DEVELOPMENT MASTER PLAN
ATA
PHASE II TRAFFIC ASSIGNMENTS P.M. PEAK HOUR
EXHIBIT 9

peak hour, the expected 16.8% increase over 1990 traffic conditions is primarily a result of Waipahu Town traffic (15.4%) diverted from Waiawa Interchange.

Most of the increased traffic demand resulting from Phase I of the proposed Waikele Development is expected to affect Kamehameha Highway. The State-proposed Waipio Interchange on Interstate Route H-2 is assumed as part of the Phase I traffic assignment network. State DOT planning studies estimate about 1000 vph diverted from Kamehameha Highway to Interstate Route H-2 during AM and PM peak hours in the inbound and outbound directions, respectively. The proposed development is expected to increase traffic on Kamehameha Highway makai of Waipahu Street by a net 1.2% inbound (southbound) and 6.7% outbound (northbound), during the AM and PM peak hours, respectively. The increase in traffic generated by the proposed project is partially offset by the decrease in Waipahu traffic turning on and off Kamehameha Highway at Waipahu Street. These decreases are expected to result from Waipahu traffic diverted to the proposed Paiwa Interchange.

At Kalauao Stream, the Interstate Route H-1-Moanalua Road-Kamehameha Highway corridor is expected to increase by a net 2.4% eastbound during the AM peak hour, and 3.4% westbound during the PM peak hour over the projected 1990 traffic demands.

During the peak periods, Phase I of the proposed Waikele Development is not expected to have significant increase in demand at the Waiawa Interchange; a small increase can be

expected on the Interstate Route H-1/Kamehameha Highway corridor in Pearl City; and an increase in demand on Interstate Route H-1, west of Waiawa Interchange can be expected, primarily due to Waipahu Town traffic diverted from the Waiawa Interchange to the proposed Paiwa Interchange.

C. Phase II - Traffic Assignment

Most of the increase in peak period traffic resulting from Phase II of the Waikele Development, shown on Exhibits 8 and 9, is realized at the proposed Paiwa Interchange due to three reasons: first of all, the remaining area to be developed is on the west half of the site and will utilize the Paiwa Interchange as the primary access; secondly, the expected development in the West Beach area should attract more employment opportunities and, therefore, work trips; and finally, the commercial-retail center should attract the after-work shopping trips made by Waikele residents.

The community-proposed realignment of Waipahu Street to a Bypass Road, mauka of the Sugar Mill, is expected to provide increased access for West Waipahu (west of Waikele Stream) to the proposed Paiwa Interchange. This traffic is diverted from the adjacent interchanges at Waiawa and Kunia. This redistribution is particularly significant during the PM peak hour.

The increase of traffic over the Year 1995 projection on the Interstate Route H-1 west of Waiawa Interchange is expected to be about 8.6% eastbound, and 38.5% westbound during the AM and PM

Highway. However, widening is still necessary to facilitate access to and from the proposed Waikele Development.

C. Proposed Paiwa Interchange

At the present time, Kamehameha Highway is the only arterial highway providing direct access to the proposed Waikele site. There has been a growing need to improve Kamehameha Highway with the development of Gentry-Waipio and Mililani. However, even with the improvement of Kamehameha Highway, "bottleneck" conditions would continue to exist at the Waiawa Interchange.

The one-lane eastbound on ramp, and westbound off ramp, on Interstate Route H-1 at the Waiawa Interchange, are presently at capacity and therefore cannot handle the increased traffic flow onto the Freeway in the AM peak period, nor can it adequately feed an improved Kamehameha Highway to utilize its increased capacity during the PM peak period.

As a result of this preliminary investigation, it was decided that further investigation of improvements for Waiawa Interchange cease, and that only the Paiwa Interchange be pursued to provide direct access to the Interstate Route H-1 for the proposed Waikele Development as well as Waipahu Town.

The location of an interchange facility at Paiwa Street appears to be the most cost-effective alternative. The existing undercrossing provides twin 60-foot span openings; therefore, a bridge structure is not involved in its construction. Furthermore, Paiwa Street is the only mauka-makai collector roadway between the Freeway and Farrington Highway. The Paiwa Street

Undercrossing and the Kamehameha Highway Overcrossing at the Waiawa Interchange are in excess of the minimum one mile spacing on freeways suggested by the American Association of State Highway and Transportation Officials (AASHTO) Policy on Design of Urban Highways and Arterial Streets, 1973. Finally, its location is central to the project site where Paiwa Street can be extended to function as a collector roadway for the proposed development and provide a direct link to Waipahu Town.

The diamond design for the proposed Paiwa Interchange, shown in Exhibit 10, is the most feasible and economical configuration, due to the developed areas makai of the Freeway restricting right-of-way. The primary disadvantage of this type of design is the traffic signal requirement at the intersection of the ramps and the surface street under heavy traffic conditions. Examples of problems that can occur from a combination of a heavy off ramp demand, inadequate deceleration ramp length and inadequate storage at ramp traffic signals can be seen along Interstate Route H-1 where traffic backs up onto the Freeway. A preliminary layout for the proposed Paiwa Interchange is shown on Exhibit 10. The ramp lengths, and lane requirements shown, are adequate to allow diverging motorists to decelerate and come to a complete stop without affecting the operating speed of the freeway lanes, in addition to providing enough storage length to store the maximum queue that can be expected per signal cycle.

During the early stages of development, the Paiwa Interchange ramp intersections with Paiwa Street would only require

peak periods, respectively. However, only 7.6% in the morning peak hour and 10.5% in the afternoon peak hour are directly attributable to the proposed Waikele Development.

The increase in traffic demand on Kamehameha Highway, makai of Waipahu Street, is 4.0% inbound during the AM peak hour and 23.7% outbound during the PM peak hour.

Due to the proposed project, the increase in eastbound traffic during the AM peak hour on the Interstate Route H-1-Moanalua Road- Kamehameha Highway corridor at Kalauao Stream is expected to be about 5.4% over the projected Year 1995 traffic conditions. Due to the Waikele Development, the increase in westbound traffic during the PM peak hour at this location is expected to be 9.0% over the projected Year 1995 traffic conditions.

VI. IMPACTS ON TRAFFIC AND ACTIONS TAKEN TO ALLEVIATE THESE IMPACTS

A. General

The traffic impacts resulting from the proposed Waikele Development and its accompanying improvements to the highway network are twofold in nature; first is the increase in overall traffic demand due to site-generated traffic and the second is the diversion of existing traffic patterns, relieving demand at certain stress points but increasing demand at other points. Level of Service conditions under various scenarios are shown in Exhibits 6 through 9.

As discussed earlier, the a priori highway improvements were necessary since access is one of the prerequisites in proceeding with the planning and design of the proposed development. An

assessment of the existing conditions shows that freeway access at Waiawa Interchange is already at capacity. Therefore, an analysis of a "do-nothing" scenario would not be worthwhile. Furthermore, the proposed Paiwa Interchange would change the traffic patterns in Waipahu Town from a polarized distribution between Waiawa and Kunia Interchanges to a more centralized distribution about the Paiwa Interchange. Therefore, the collector street system would require some improvements to facilitate use of the proposed interchange by the existing Waipahu community.

B. Kamehameha Highway Improvements

The widening of Kamehameha Highway to four through lanes with an exclusive left turn lane has been a necessary improvement even after the opening of Interstate Route H-2, with the growth in the Gentry-Waipio area. This improvement should be extended from Waipahu Street to the Manager's Drive Extension to accommodate the proposed traffic signal at this location. The five lane configuration on Kamehameha Highway between Manager's Drive Extension and Waipahu Street would require a minimum 100-foot right-of-way, as compared to the existing 70-foot right-of-way. The State Department of Transportation has preliminary design plans for this improvement. The Crestview Subdivision has already been set back in anticipation of this highway widening.

The State-proposed H-2 Waipio Interchange near the Mililani Cemetery Overcrossing, mentioned earlier in this report, is expected to alleviate much of the through traffic on Kamehameha

the construction of the proposed Paiwa Interchange, an east-west collector street becomes a more essential part of the street feeder system for Waipahu Town.

2. Waipahu Street Improvements

The City and County of Honolulu is proposing a realignment of existing Waipahu Street to correct two hazardous locations, one at Waikele Stream and the other just east of Paiwa Street, discussed earlier. The City-proposed upgrading of Waipahu Street would include a 60-foot right-of-way, 44-foot roadway, and concrete curbs, gutters and sidewalks.

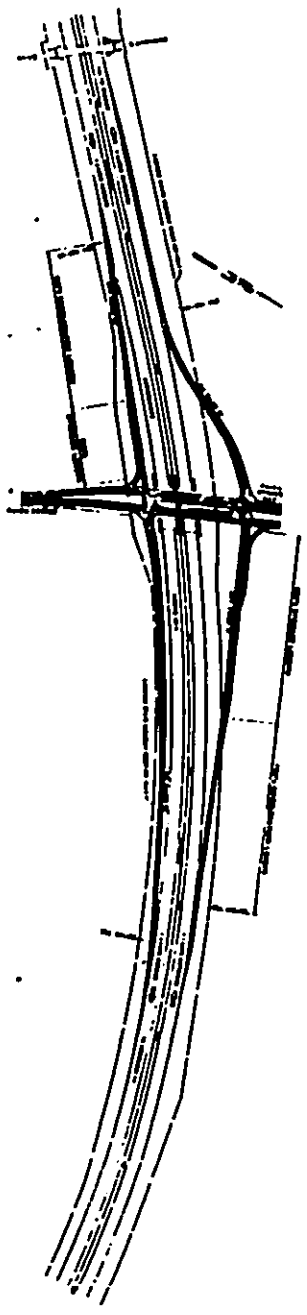
The Waipahu Street eastbound approach at Kamehameha Highway is a single lane except for a short section where the paved shoulder is used as a right-turn lane. Left-turn vehicles sometimes queue up beyond this section, thereby preventing the "right-turn-on-red movement". Widening this approach to provide two full lanes, facilitating the right-turn movements, would improve operations at this intersection.

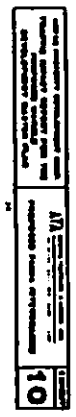
While these improvements to Waipahu Street should improve operation, they do not fully provide for an efficient east-west collector roadway through Waipahu. The City-proposed four-lane widening should further improve its operation and function as a collector roadway; however, operating speeds will remain relatively low due to alignment constraints and roadside friction from driveway traffic in the Sugar Mill area.

With the inclusion of the Bypass Road as part of the Waipahu Community Master Plan, Waipahu Street can retain its two lane configuration with spot improvements such as, exclusive left turn lanes at cross streets and bus bays to permit buses to pull out of the main stream of traffic to load and unload passengers. Where right-of-way is available, additional curve widening would also be desirable in the Sugar Mill area. These improvements can be accomplished within the City-proposed 60-foot right-of-way shown on the current Development Plan.

3. Bypass Realignment

The Bypass Road through the Sugar Mill area, proposed by the Waipahu community in the Waipahu 2000 Master Plan, would provide a high quality collector street from Kamehameha Highway to Kunia Road, as shown on Exhibit 3. The proposed Bypass will increase accessibility of the proposed Paiwa Interchange to and from West Waipahu by providing a more direct route, thus reducing congestion at both the Waiawa and Kunia Interchanges. The proposed alignment provides a safer route for the motorist, avoiding the curvilinear alignment of Waipahu Street. Furthermore, by separating through traffic to and from the proposed Paiwa Interchange from local traffic in Waipahu Town, traffic congestion is reduced and pedestrian safety is enhanced in the Sugar Mill area.





stop sign control. During the latter stages of development, both ramp intersections with Paiwa Street may require traffic signalization. Signal coordination would be necessary to minimize vehicular queues between these ramp connections.

The proposed Paiwa Interchange is expected to have a two-fold effect on traffic circulation in the vicinity. First, it fulfills Waikele's access requirements to the Freeway. Second, it diverts Waipahu Town traffic currently using Waiawa Interchange. This reduction in traffic demand at the Waiawa Interchange ramps, along with the proposed improvements on Kamehameha Highway, should produce available highway capacity to accommodate the increase in demand resulting from the development of Waikele.

D. Waipahu Street Improvements and Bypass Road

1. General

The traffic impacts and the improvements discussed here are attributable to the proposed Paiwa Interchange, as a result of the redistribution of Waipahu traffic to and from the proposed interchange. Many of the operational and safety improvements on Waipahu Street are needed even without the proposed Paiwa Interchange. The community-proposed Bypass Road represents a long-term alternative to Waipahu Street's function as a collector roadway between Waikele Stream and Mahoe Street. The Bypass alignment separates through traffic from local traffic and reduces the existing Waipahu Street in "Old Waipahu Town" to a local street. With

B. Recommendations

The recommendations of this report are as follows:

1. Kamehameha Highway, fronting the project site, be widened to provide two through lanes and exclusive left-turn lanes in both directions at project access points at Lumiaina Street and Lumiauau Street. Traffic signals be provided at these locations.
2. A new interchange facility on Interstate Route H-1 be constructed at the existing Paiwa Street Undercrossing. Ramp connections be signalized at Paiwa Street.
3. The City-proposed improvement of Waipahu Street be implemented with the initial phase including left turn lanes at key intersections and bus bays at MTL bus stops. Waipahu Street at Kamehameha Highway be widened to provide separate left turn and right turn lanes. The substandard section of Paiwa Street, makai of Waipahu Street, be widened to provide a full 60-foot right-of-way and City standard roadway cross section.
4. The Community-proposed Bypass Road be considered as an alternative to the full improvement of Waipahu Street as proposed by the City.

APPENDIX

The proposed Bypass Road requires the acquisition of new rights-of-way mauka of the Sugar Mill. A 60-foot right-of-way is recommended to match the fully improved section of Waipahu Street in West Waipahu. The new Bypass Road would cut across existing mauka access roads to the Sugar Mill.

The intersection of the Bypass Road and Paiwa Street should be signalized and future traffic signal synchronization along Paiwa Street should be considered, should conditions warrant such an action.

Acquiring new right-of-way for the proposed Bypass Road, maintaining accessibility from haul cane trucks to the Sugar Mill from the north, and funding for this capital improvement still need to be addressed.

VII. CONCLUSIONS AND RECOMMENDATIONS

A. Conclusions

1. The eastbound on ramp and the westbound off ramp to Interstate Route H-1 at the Waiawa Interchange from Waipahu are presently at capacity during the AM and PM peak periods, respectively.
2. The proposed Paiwa Interchange is expected to divert the Waipahu traffic demand from the Waiawa Interchange, providing available capacity for the traffic demand from the completed and fully-occupied Waikele Development.
3. Paiwa Street Undercrossing is the most cost-effective interchange location on Interstate Route H-1 fronting the proposed project site.

4. The existing Waipahu Town traffic circulation system will not adequately feed a Freeway access at Paiwa Street, primarily due to restricted capacity at the intersection of Waipahu Street and Paiwa Street and Waipahu Street's limited function as a collector street.
5. Development of Central and West Oahu is expected to continue, resulting in increasing traffic demand on the existing highways. However, with the establishment of a "secondary urban center" in West Oahu, the increase in demand should result in a more balanced inbound/outbound distribution of traffic during the peak periods.
6. The traffic projections, obtained from the State Department of Transportation and used in this study, indicate the worsening of already congested conditions, particularly along the Pearl City corridor. The proposed project's relative impact on these conditions are minimal. Furthermore, these traffic problems are regional in nature and, therefore, are a governmental concern and not the responsibility of a single developer.
7. The highway improvements proposed by various government agencies and community groups, as discussed herein, are compatible with those proposed in this study. Implementation of the recommendations proposed in this report should accommodate the increased traffic demand resulting from the completion and full occupancy of the proposed Waikele Development.

ATA

CONTENTS
(Contd.)

ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS • SURVEYORS
CONTINUING THE ENGINEERING PRACTICE FOUNDED BY H. A. R. AUSTIN IN 1934

DONALD S. AUSTIN PE
CAESAR S. TSUTSUMI PE
LEO S. HAMAMOTO PE
GEORGE M. NEUFFER PE
KENNETH K. KUROKAWA PE

TRAFFIC IMPACT REPORT
FOR THE
PROPOSED WAIKELE DEVELOPMENT MASTER PLAN

I. INTRODUCTION

A. Purpose and Scope

The purpose of this study is to identify and assess the impacts of traffic generated by the Waikele Development proposed by Amfac Property Development Corp. in the Waipahu area on the island of Oahu. This report presents the findings and recommendations of this traffic study which covers: (1) a brief description of the proposed development; (2) an assessment of the existing conditions; (3) trip generation characteristics of the proposed development; (4) an assessment of the projected conditions on the highway network; (5) an evaluation of the traffic generated by the proposed development superimposed over these projected conditions; and (6) recommendations to mitigate or alleviate any adverse impacts resulting from the proposed development.

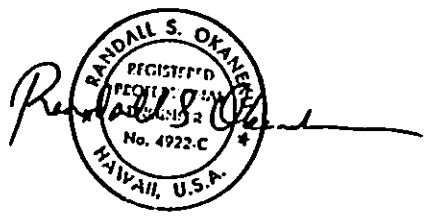
TRAFFIC IMPACT REPORT

FOR THE

PROPOSED WAIKELE DEVELOPMENT MASTER PLAN

PREPARED FOR

AMFAC PROPERTY DEVELOPMENT CORP.



BY

AUSTIN, TSUTSUMI & ASSOCIATES, INC.

ENGINEERS * SURVEYORS

HONOLULU, HAWAII

SEPTEMBER 1985

ATA AUSTIN TSUTSUMI & ASSOCIATES INC

CONTENTS

characteristics, climate, and location. In brief, the majority of the subject lands are designated "Prime Agricultural Lands" by State of Hawaii Department of Agriculture and consist of fairly flat to gently and moderately sloping terrain; the prevailing winds are gentle, averaging about 5 mph; the area is exposed to long hours of direct sunlight for the greater portion of the year, and receives an average of 26 inches of rain per year. The location is important in that it is near the major market in the State. The remainder of the the subject lands, classified as "Other Important Agricultural Lands," are gullies.

Currently, the majority of the parcel is fallow. However, 186 acres of the subject lands were planted with sugarcane as a soil erosion and flood control measure. Previous to 1982, the subject lands were used for sugarcane production by the Oahu Sugar Company.

The agricultural significance of the subject lands can be examined in terms of the total amount of existing lands of similar quality. As shown in Table 1, the subject lands constitute a very small percentage of such lands. The "Prime" lands are about 0.3 percent of the "Prime" lands on Oahu and the "Other Important Lands" are about 0.4 percent of the lands in this category on Oahu.

TABLE 1

Agricultural Land Designations Related to the Subject Lands

Agricultural Land Designations	Statewide	Oahu	Subject Lands
Prime	304,310	55,563	466
Unique	31,320	9,006	0
Other Important	642,544	29,990	120
TOTAL	978,174	94,559	586

The "Prime" designation means that the property has all the physical and climatic conditions which permit sustained high yields under economically advantageous operating conditions. Such lands are characterized by high yields with relatively low costs and little risk of damage to the physical environment. The category of "Other Important Lands" exhibits production problems such as flooding, erosion, etc. that require greater production costs, such as more drainage, more fertilizers, etc., and result in reduced yields.

The acreage in question appears slightly more significant when viewed as a percentage of the lands currently being used for crop production. The acreage currently being used for crop production on Oahu would increase by 0.9 percent if the lands currently fallow were put back into production, and the sugarcane acreage on Oahu would increase by 3.3 percent. The lands currently planted to cane on the subject parcel represent less than one percent (0.7) of the sugarcane lands on Oahu.

In terms of the importance of the subject parcels relative to the total acreages in the State, the percentages become very small. If the fallow lands were returned to sugarcane production, the land in sugarcane would increase 0.2 percent and total land in crops would increase 0.15 percent. Removing the 186 acres currently planted to sugarcane would reduce sugarcane land and total land in crops by less than 0.1 percent.

The Economic Impact of Removing 186 Acres from Sugarcane Production

The removal of 186 acres from the production of sugarcane will decrease the total tonnage of cane produced in Hawaii slightly and have an equally small impact on the labor force employed in the sugar industry. The reduction in cane production will be about 8,000 tons a year or less than 0.1 percent of the State total, and the direct decrease in employment will be about 4 full-time workers. The total direct, indirect, and induced

the mainland. Adults residing here are less likely to have attended college than the typical Oahu resident. The structure of household and per capita income reflect the age and employment structure of the population, the median income is about the island median but the average income in the Waipahu CDP is lower ($23,559 versus $25,180). With the exceptions of the residents of census tracts 87.03 and 89.01, the residents of Waipahu are much more likely to own their own home than household on Oahu in general.

Table 1. Household Characteristics

	Waipahu	Oahu
Household Size	4.19	3.30
Percent Age Distribution		
Under 10 Years	19%	8%
10-19 years	19%	17%
20-54 years	48%	53%
Over 54 years	13%	17%
Place of Birth		
Hawaii	57%	55%
Mainland	15%	30%
Foreign	28%	15%
Education		
Percent Completing		
High School	36%	36%
1-3 Yrs College	15%	18%
≥ Yrs College	9%	22%

The most common occupations for residents of Waipahu are: technical or sales positions, service related jobs, crafts and repairs, or in the wholesale and retail trades. This is quite similar to the distribution of occupations on Oahu, except that there a proportionally more persons employed in managerial, professional, and technical positions on Oahu in general than in Waipahu.

Table 2: Percentage Distribution of Occupations

	Waipahu	Oahu
Managerial and Professional	12	25
Technical, Sales and Adm. Support	29	34
Service Occupations	20	18
Farming and Fishing	3	2
Craft and Repair	17	11
Operators and Labors	19	11
Manufacturing	13	8
Wholesale and Retail	26	25
Professional	11	18

Over forty percent of the people from Waipahu who travel to work are employed in Honolulu, with about 4 percent employed in the Honolulu Business District and 38 percent in the remainder of Honolulu. About 15 percent are employed in Waipahu, about 6 percent in Pearl City, and about 3 percent in Aiea. A higher portion of the work force residing in Waipahu works in the private sector than is typical for Oahu (74 versus 71 percent, respectively).

Unemployment

The unemployment rate in Waipahu is lower than it is in many of the nearby neighborhoods, but it is still higher than the rate for Oahu as a whole.

Table 3: Percentage of the Civilian Labor Force Unemployed in 1980 - Waipahu and Neighboring Communities.

Location	Rate
Pearl City	4.1
Ewa	8.0
Waianae Coast	7.7
Mililani/Waipio	4.1
Waipahu	5.9
Oahu	4.6

Agriculture

The agricultural significance of the subject lands can be evaluated by examining the past and present use of the lands and their physical

"Get your facts first, then you can distort them as much as you please" - Mark Twain

I. Introduction

Growth and development both necessitate changes. These changes involve costs and benefits. Whether the changes are considered to be "good" or "bad", however, depends not only on the magnitudes of the benefits and costs, but also to whom they accrue. The objective of economic analysis is to give an impartial accounting of these benefits and costs. The determination of the virtue of the development, therefore, is not the job of the economist, but rather, that of the appointed decision maker, who uses the results of the analysis, along with other information, to assess the project.

In an economic analysis, the benefits derived from a project are measured by the extent to which the project contributes to the achievement of professed societal goals, while the costs associated with the project reflect the degree to which the achievement of those objectives is sacrificed by diverting resources from alternative productive uses. The purpose of the economic analysis is to determine whether the project is consistent with societal objectives. If, in the trade-off, the benefits outweigh the costs, the indication is that the project would make a positive net contribution towards societal goals.

The direct economic benefits and costs of a project are relatively easy to identify and quantify. However, the indirect effects are frequently not amenable to accurate prediction and a good deal of reliance needs to be placed upon the subjective, but nevertheless well-informed, judgment of the economist. Often projects involve intangibles, for which it is extremely difficult to adequately assign economic costs and benefits. In fact, not only are some benefits of some projects unquantifiable in

monetary terms, the unquantifiable elements of projects may dwarf those effects that can be estimated in monetary terms. In this analysis, all costs and benefits will be identified and quantified as much as possible, and all non-quantifiable effects will be identified and described qualitatively.

Demographic data for the proposed development areas and the State are relied upon heavily in this analysis to give a profile of the community:

(1) as a basis for comparison with the general population; and

(2) as a basis for prediction of the probable effects of the proposed development. The appendices contain summary tables of all demographic data used in this study.

II. Demographic Profile of the Area

A. Residential Population

The resident population of the City and County of Honolulu was approximately 787,000 as of January 1, 1983 as compared with 762,565 at the time of the 1980 census. The population growth rate for the period was 3.3 percent. During this same period there was a 4.1 percent increase in housing units on Oahu from 252,327 in 1980 to 262,695 in 1983.

In the Ewa District (census tracts 73 to 89.03 on the accompanying map), the 1980 population of 191,051 increased 5.3 percent to 201,238 in 1983. The 1983 population in Waipahu census designated place (CDP) (census tracts 87.01 to 89.01, 89.03) was 36,700, 9.5 percent more than in 1980. The growth was completely contained in census tracts 88 and 89.03.

Compared to the Oahu average, the typical household in the Waipahu CDP will be larger (See Table 1.) and will be composed on younger adults and children. The residents are more likely to be of either foreign or Hawaii birth than the average for the island and less likely to have been born on

Economic Impact of the Proposed Waikele Development

September 25, 1984

Evaluation Research Consultants
826 19th. Avenue
Honolulu, Hawaii 96816

for

Environmental Communications, Inc.

APPENDIX C

TABLE 2

SUMMARY OF AIR POLLUTANT MEASUREMENTS AT NEAREST MONITORING STATIONS

POLLUTANT	1978	1979	1980	1981	1982	1983	1984
PARTICULATE MATTER							
No. of Samples	60	58	60	59	53	55	56
Range of Values	20-81	20-48	22-93	19-71	19-54	17-57	16-45
Average Value	37	33	36	34	31	30	28
No. of Times State AQS Exceeded	0	0	0	0	0	0	0
SULFUR DIOXIDE							
No. of Samples	58	56	52	56	43	49	42
Range of Values	5-74	5-63	5-15	5- 5	5-10	5- 5	5- 5
Average Value	15	10	5	5	5	5	5
No. of Times State AQS Exceeded	0	0	0	0	0	0	0
CARBON MONOXIDE							
No. of Samples	365	207		286	311	173	318
Range of Values	0-20.7	0-17.3		1.2-13.8	0-4.6	0-8.6	.6-10.9
Average Value	3.1	2.9		5.1	1.2	2.3	2.4
No. of Times State AQS Exceeded	19	10		13	0	0	1
OXIDANT (OZONE)							
No. of Samples	284	338	295	314	335	349	296
Range of Values	10-84	10-80	10-84	10-104	0-151	0-123	0-104
Average Value	33	39	48	37	32	46	44
No. of Times State AQS Exceeded	0	0	0	1	2	2	1

OTHERS:	NITROGEN DIOXIDE	LEAD
No. of Samples	46	52
Range of Values	6-77	.5-.8
Average Value	25	0.6
No. of Times State AQS Exceeded	0	0

NOTES: See text for locations of monitoring stations. Carbon monoxide reported in milligrams per cubic meter; other pollutants in micrograms per cubic meter. Carbon monoxide and ozone are daily peak one hour values; lead is quarterly; other pollutant values are for a 24 hour sampling period.

SOURCE: State of Hawaii Department of Health

TABLE 3

RESULTS OF PEAK HOUR CARBON MONOXIDE ANALYSIS
(Milligrams Per Cubic Meter)

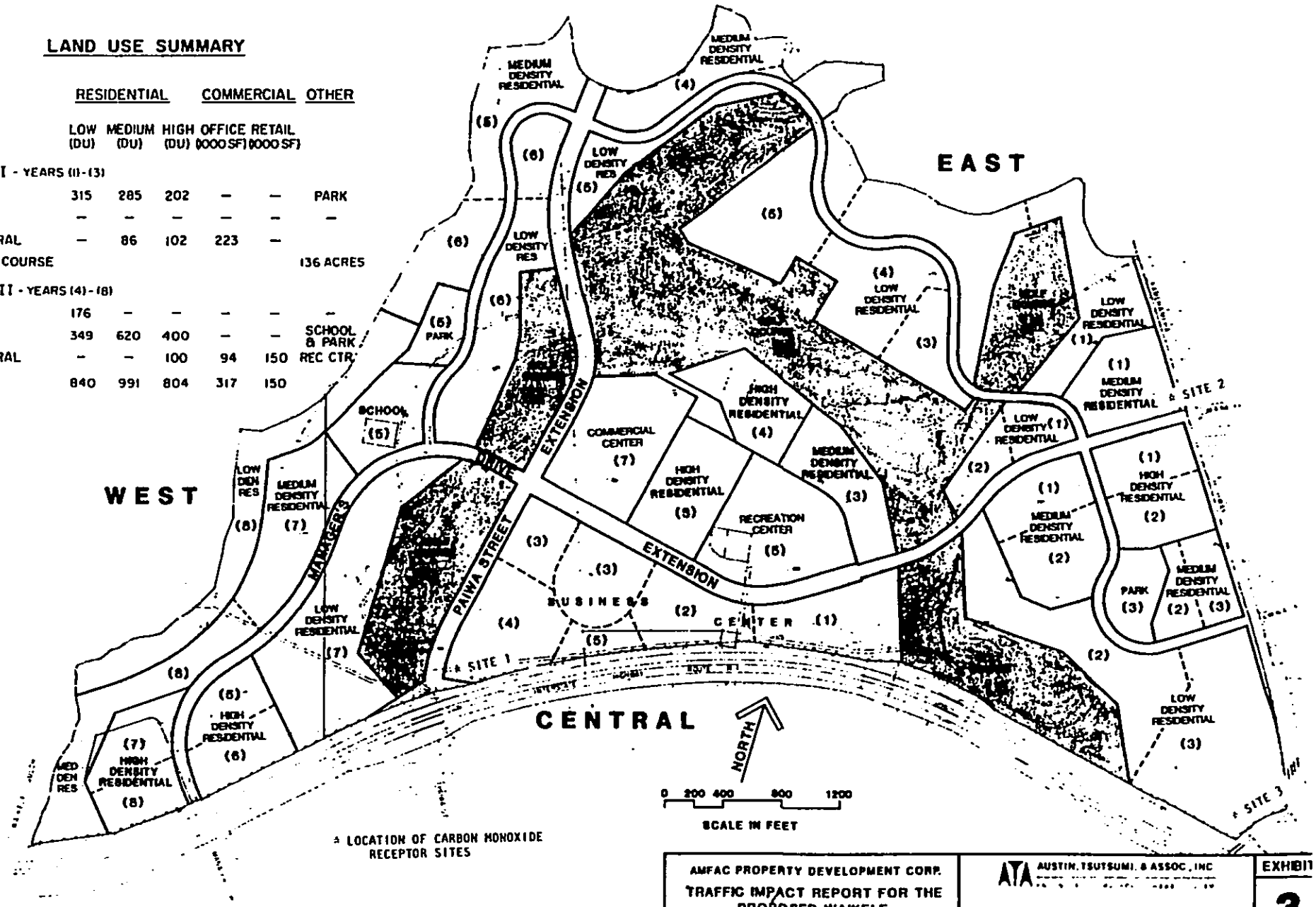
SITE 1	1990 A.M.	1990 P.M.	1995 A.M.	1995 P.M.
Without Waikele Development	3.2	2.7	4.3	2.3
With Waikele Development	4.6	4.1	6.3	5.4
SITE 2				
Without Waikele Development	2.0	1.6	1.6	1.2
With Waikele Development	3.4	2.6	3.0	2.8
SITE 3				
Without Waikele Development	4.1	3.3	5.0	2.8
With Waikele Development	5.0	4.3	5.6	4.9

STATE OF HAWAII AQS: 10
NATIONAL AQS: 40

Note: See Exhibit 3 for location of receptor sites.

LAND USE SUMMARY

	RESIDENTIAL			COMMERCIAL		OTHER
	LOW (DU)	MEDIUM (DU)	HIGH (DU)	OFFICE (000 SF)	RETAIL (000 SF)	
PHASE I - YEARS (1)-(3)						
EAST	315	285	202	–	–	PARK
WEST	–	–	–	–	–	–
CENTRAL	–	86	102	223	–	
GOLF COURSE						136 ACRES
PHASE II - YEARS (4)-(8)						
EAST	176	–	–	–	–	–
WEST	349	620	400	–	–	SCHOOL & PARK
CENTRAL	–	–	100	94	150	REC CTR
TOTAL	840	991	804	317	150	



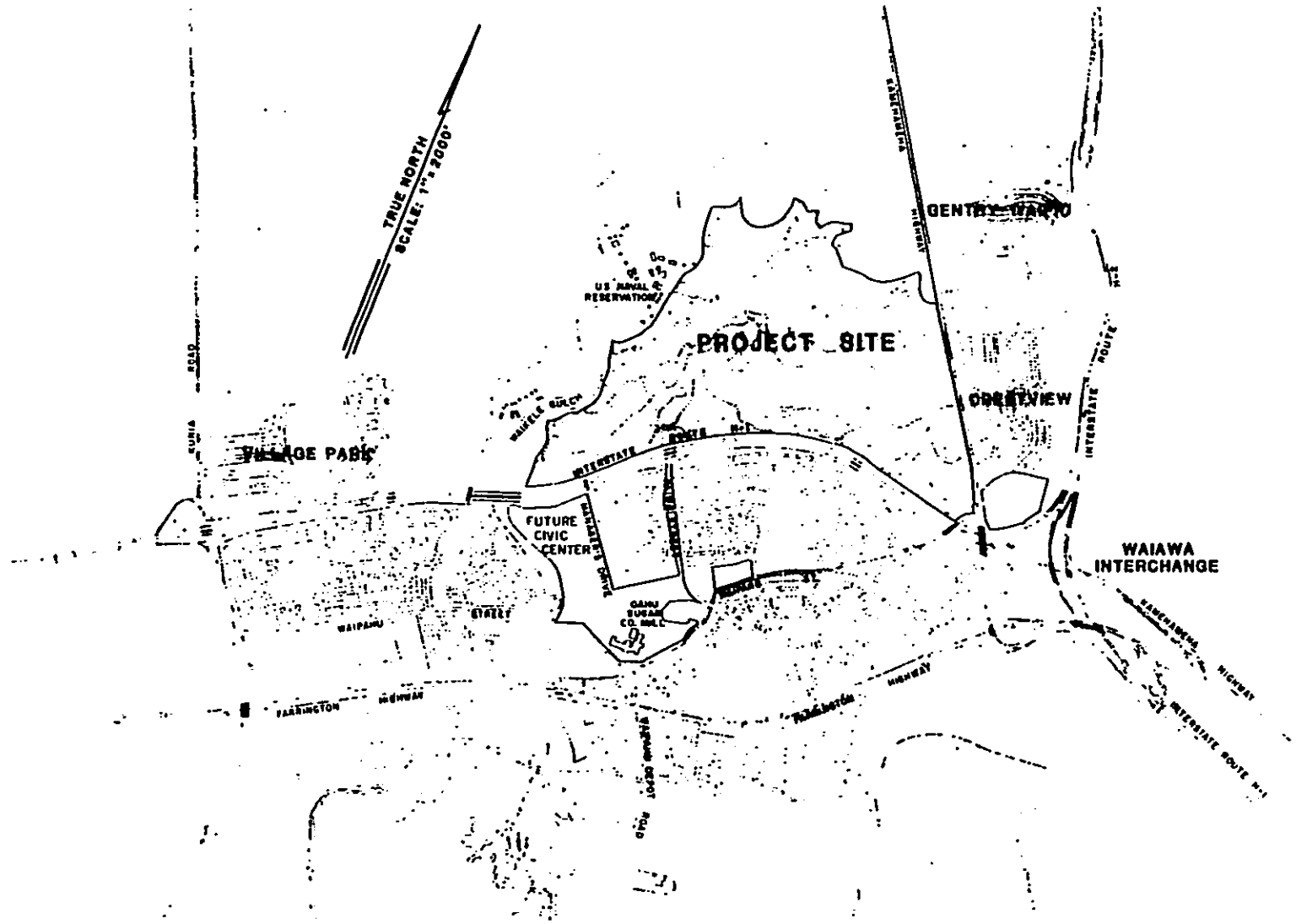
AMFAC PROPERTY DEVELOPMENT CORP. TRAFFIC IMPACT REPORT FOR THE PROPOSED WAIKELE DEVELOPMENT MASTER PLAN	ATA AUSTIN, TSUTSUMI, & ASSOC., INC LAND USE PLAN	EXHIBIT 3

TABLE 1

SUMMARY OF HAWAII AND NATIONAL AMBIENT AIR QUALITY STANDARDS
(Micrograms per Cubic Meter)

		AMBIENT AIR QUALITY STANDARDS		
		NATIONAL		HAWAII
POLLUTANT	SAMPLING PERIOD	Primary	Secondary	
Particulates	Annual Geometric Mean	75	60	--
	Annual Arithmetic Mean	--	--	55
	Maximum 24-Hour Average	260	150	100
Sulfur Dioxide	Annual Arithmetic Mean	80	--	20
	Maximum 24-Hour Average	365	--	80
	Maximum 3-Hour Average		1300	400
Nitrogen Dioxide	Annual Arithmetic Mean	100		70
Ozone	Maximum 1-Hour Average	240		100
Carbon Monoxide	Maximum 8-Hour Average	10		5
	Maximum 1-Hour Average	40		10
Lead	Calendar Quarter	1.5		1.5

Notes: 1. Carbon monoxide standards are in milligrams per cubic meter.
2. National standards based on 40 CFR Part 50; Hawaii standards based on Title 11, Administrative Rules, Chapter 59.



AMFAC PROPERTY DEVELOPMENT CORP. TRAFFIC IMPACT REPORT FOR THE PROPOSED WAIKELE DEVELOPMENT MASTER PLAN	ATA AUSTIN, TSUTSUMI, & ASSOC., INC VICINITY MAP	EXHIBIT 2

REFERENCES

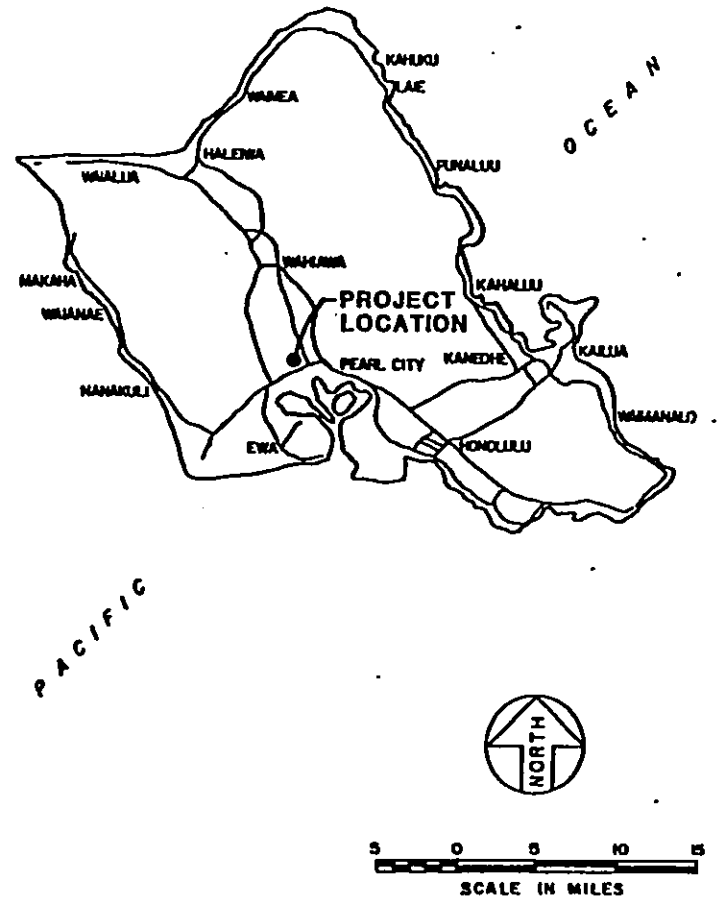
1. U.S. ENVIRONMNETAL PROTECTIOON AGENCY, User's Guide to MOBILE 2: Mobile Source Emissions Model, February, 1981.

2. U.S. ENVIRONMNETAL PROTECTION AGENCY, User's Guide to HIWAY 2, A Highway Air Pollution Model, May, 1980.

3. U.S. ENVIRONMENTAL PROTECTION AGENCY, Guidelines for Air Quality Maintenance Planning and Analysis, Volume 9: Evaluating Indirect Sources, January, 1975.

4. CALIFORNIA DEPARTMENT OF TRANSPORTATION, Energy and Transportation Systems, December, 1978.

5. AUSTIN, TSUTSUMI AND ASSOCIATES, Traffic Impact Report for the Proposed Waikele Development Master Plan, May 1, 1985.



AMFAC PROPERTY DEVELOPMENT CORP. TRAFFIC IMPACT REPORT FOR THE PROPOSED WAIKELE DEVELOPMENT MASTER PLAN	AUSTIN, TSUTSUMI, & ASSOC., INC. LOCATION MAP	EXHIBIT 1

Carbon monoxide modeling conducted as a part of this report indicates that the roadway improvements described in the Traffic Impact Report for the project will be adequate to ensure compliance with State and National air quality standards even under worst case traffic and meteorological dispersion conditions.

Because the stringent national vehicular emissions reduction program now being pursued is entirely the product of eminently changeable government regulations, it is always possible that economic conditions or other factors could lead to an early abandonment of this program. If that were to occur, then the projected pollutant levels presented in this study could be too optimistic. On the other hand, this analysis did not consider the possibility that technological innovation may lead to new vehicular power systems that produce few or none of the currently regulated atmospheric pollutants.

In any case, this study indicates that currently proposed mitigative measures for traffic congestion in the project area should be sufficient to meet existing air quality requirements and no further air pollution mitigation measures are proposed. It is noted, however, that tall, dense vegetation can provide some screening of residential areas from larger airborne particulates generated along roadways and near construction areas. It is thus recommended that whereever possible such vegetative cover be included in landscaping plans with plantings occuring as early in the development process as practicable.

9. SUMMARY

1. The proposed Waikele Development Master Plan involves site preparation and construction of a residential/commercial community on a large parcel of former sugar cane lands near the intersection of Kamehameha Highway and the H-1 Freeway in the Waipahu-Waipio area of Oahu.

2. Present air quality in the project area is estimated to be very good since nearby long term monitoring stations have consistently been recording airborne particulate and sulfur dioxide levels that are well within allowable State of Hawaii Air Quality Standards.

3. Except for short term dust emissions during the construction phase of the development, no significant direct air quality impacts are expected. Adequate control measures exist to limit the scope of this impact, but special care will have to be exerted to insure that previously developed residential areas are not subjected to excessive levels of particulate pollution from construction activities.

4. Indirect air quality impacts are expected to result from new demands for electrical energy. This impact is most likely to occur in the vicinity of existing power plants such as the Kahe Plant on the Waianae coast where increased levels of particulates and sulfur dioxide can be expected. Maximum use of solar energy designs in project development can at least partially mitigate the magnitude of this impact. New methods of generating electrical power such as wind or ocean thermal energy conversion may eventually also play a mitigative role in this regard.

5. Increased traffic generated by the Waikele Development will increase emissions of carbon monoxide and nitrogen dioxide in the project area, but detailed carbon monoxide modeling carried out as a part of this study indicates that even under worst case traffic and meteorological conditions projected concentrations are expected to be well within allowable State and National Ambient Air Quality Standards. For that reason no particular air pollution mitigation measures are deemed to be necessary.

Results of the carbon monoxide study are presented in Table 3. For all three critical receptor sites projected worst case carbon monoxide levels for both morning and evening peak traffic hours are well within allowable State of Hawaii Ambient Air Qaulity Standards with or without the proposed Waikele Development.

Average one hour traffic volumes during the peak eight hour period are about 80 percent of the peak hour level. Eight hour carbon monoxide levels are estimated by multiplying the peak hourly values by this traffic volume ratio and a 'meteorological persistence factor' of 0.6 which is recommended in EPA modeling guidelines to account for the fact that meteorological dispersion conditions are more variable (and hence more favorable) over an eight hour period than they are for a one hour period. Multiplying projected peak hour carbon monoxide levels by this combined factor of about 0.5 will yield values that are about half those shown in Table 2. The State of Hawaii eight hour AQS for carbon monoxide is also one half the one hour standard. Thus the conclusion reached above regarding the State of Hawaii one hour standard will hold with respect to the eight hour standard as well.

All carbon monoxide concentrations calculated in the foregoing analysis are well within the less stringent National one and eight hour AQS whether the proposed Waikele Development Master Plan is implemented or not.

8. MITIGATIVE MEASURES

A. SHORT TERM

As previously indicated the only direct adverse air quality impact that the proposed project is likely to create is the emission of fugitive dust during construction. State of Hawaii regulations stipulate the control measures that are to be employed to reduce this type of emissions. Primary control consists of wetting down loose soil areas. An effective watering program can reduce particulate emission levels from construction sites by as much as 50 percent. Other control measures include good housekeeping on the job site and pavement or landscaping of bare soil areas as quickly as possible.

B. LONG TERM

Once completed, the proposed Waikele Development is expected to have little direct impact on the air quality of the surrounding region. Indirect long term impacts in the form of increased air pollutant emissions from power plants serving new residences in the project area can be mitigated somewhat by planning and implementing solar energy design features to the maximum extent possible.

Other indirect long term air quality impacts are expected in those areas where traffic congestion can potentially be worsened by the addition of vehicles traveling to and from the proposed project. Project planners can do very little to reduce the emission levels of individual vehicles, but the Traffic Impact Report for the project describes several proposed or planned roadway improvements that could significantly increase highway traffic capacity and facilitate entry and exit from the proposed development with a minimum of increased traffic congestion.

7. CARBON MONOXIDE DIFFUSION MODELING

In order to evaluate the future air quality impact of projected increases in traffic associated with the proposed Waikele Development in view of the previously discribed government-mandated decreasing emission rates per vehicle it was necessary to carry out a detailed carbon monoxide modeling study. The study was designed to yield carbon monoxide concentration values which could be compared directly to allowable State and National Ambient Air Quality Standards.

Three critical receptor sites were selected for micro analysis. Site 1 is on the mauka side of the H-1 Freeway in the Central Waikele Business Park near the proposed new Paiwa Interchange. This interchange was selected for analysis because it is expected to be the main entry/exit point to the completed Waikele Development. The particular position of site 1 with respect to the interchange was selected because that spot would be most likely to have the highest levels of automobile-generated air pollutants, specifically carbon monoxide, under worst case meteorological diffusion conditions.

Site 2 is located on the mauka side of Manager's Drive Extension near the existing Kamehameha Highway intersection with Lumiaina Street, where most Kamehameha Highway-bound traffic congestion from the Waikele Development would be likely to occur.

Site 3 is located on the mauka side of Waipahu Street in the proposed low density residential area that will be nearest to the major intersection between Waipahu Street, Kamehameha Highway, and the H-1 Freeway. The locations of all three critical receptor sites are shown in Exhibit 3.

Expected worst case morning and evening peak hour carbon monoxide concentrations at these receptor sites were computed for study years 1990 and 1995. Computations were made for traffic conditions with and without the proposed Waikele Development using traffic volume predictions contained in the Traffic Impact Report for the project.

The existing peak hour vehicle mix in the project area is estimated to be 80% gasoline-powered automobiles, 13% light duty gasoline-powered trucks and vans, 1% heavy duty gasoline-powered vehicles, 2% diesel-powered automobiles, 1% diesel-powered light duty trucks, 2% diesel-powered trucks and buses, and 1% motorcycles. The same vehicle mix was assumed for 1990 and 1995 emission rate calculations.

Where signal lights would control traffic flow, average vehicle speeds were assumed to be 5 mph upstream from red signal lights and 15 mph downstream from signals or turns. On the H-1 Freeway average vehicle speeds were assumed to be 35 mph when traffic volumes per lane were predicted to be less than 1000 vehicles per hour (vph); 25 mph for lane volumes between 1000 and 1200 vph; and 15 mph for volumes greater than 1200 vph.

For morning rush hour an average temperature of 58 degrees F was assumed with 48% of vehicles operating in a 'cold start' mode. For evening rush hour a temperature of 68 degrees F was assumed with only 20 percent of vehicles operating in the 'cold start' mode. The EPA computer model MOBILE 2 was run using the above parameters to produce vehicular carbon monoxide emission estimates for each of the years studied.

The EPA computer model HIWAY 2 was used to calculate carbon monoxide concentrations at each of the selected critical receptor sites for each scenario studied. Stability category 4 was used for determining diffusion coefficients. This stability category represents the most stable (least favorable) atmospheric condition that is likely to exist in a suburban area such as this.

To simulate worst case wind conditions a uniform wind speed of one meter per second was assumed with the worst case wind direction for site 1 from the southwest; that for site 2 from the southeast; and for site 3 from the south. For each receptor site concentrations were computed at a height of 1.5 meters to simulate levels that would exist within the normal human breathing zone. Background contributions of carbon monoxide from sources or distant roadways not directly considered in the analysis were assumed to be 0.8 milligrams per cubic meter for 1990 and 0.5 for 1995.

5. AIR QUALITY IMPACT OF INCREASED ENERGY UTILIZATION

Estimating about 1,800 square feet average size for the 840 low density residential units and 1,500 square feet average size for the 991 medium density units yields a single family floor space of about 3 million square feet. Estimating about 1000 square feet for the 804 high density units yields 804,000 square feet of high density residential units. Office space is projected to be about 317,000 square feet, and retail space to be about 150,000 square feet. Energy consumption rates at the power plant for single family residential units with all-electric kitchens and water heaters are about 55,000 BTU per square foot; for similarly equipped apartments the rate is 45,000 BTU per square foot; for air conditioned offices the rate is 350,000 BTU per square foot; and for retail establishments the rate is 450,000 BTU per square foot. Thus this project would require about 380 billion BTU of energy per year at the power plant, or about 65,500 barrels of oil if the demand were to be met totally by burning fuel oil.

The major impact of burning fuel oil to meet this increased energy demand will be increased levels of sulfur dioxide and particulates in the vicinity of existing power plants, primarily the Kahe Power Plant on the Waianae coast.

This energy requirement could be reduced substantially by the installation of solar water heating on all new units. It is also possible that the new demand could be met by means other than burning fuel oil. Generation of electrical energy by wind power and by using ocean thermal energy conversion are two such possibilities.

6. INDIRECT AIR QUALITY IMPACT OF INCREASED TRAFFIC

Once construction is completed the proposed project will not in itself constitute a major direct source of air pollutants. By serving as an attraction for increased motor vehicle traffic in the area, however, the project must be considered to be a significant indirect air pollution source.

Motor vehicles, especially those with gasoline-powered engines, are prodigious emitters of carbon monoxide. Motor vehicles also emit some nitrogen dioxide and those burning fuel which contains lead as an additive contribute some lead particles to the atmosphere as well. The major control measure designed to limit lead emissions is a Federal law requiring the use of unleaded fuel in most new automobiles. As older cars are removed from the vehicle fleet lead emissions should continue to fall. In fact, the Federal Environmental Protection Agency is currently advocating that lead be removed from all automobile fuel as soon as possible.

Federal control regulations also call for increased efficiency in removing carbon monoxide and nitrogen dioxide from vehicle exhausts. By 1995 carbon monoxide emissions from the vehicle fleet then operating are mandated to be little more than half the amounts now emitted.

Concentrations of carbon monoxide are more directly related to vehicluar emissions and tend to be highest during periods of rush hour traffic. Carbon monoxide would thus be the pollutant most likely to cause difficulty in meeting allowable State of Hawaii AQS as a result of new residential development on Oahu.

There are power plants and other potential sources of industrial pollutants along the central portion of the leeward coast to the south of the project site, but the generally low readings of particulates and sulfur dioxide at the Pearl City monitoring station just to the south of the project indicate that these sources are not likely to cause any air pollution problems at Waikele. Likewise pineapple cultivation to the north could generate some particulates and carbon monoxide when fields are burned after harvest (about once every three years for any given field), but the consistently low readings of particulates at Pearl City indicate that this source is not likely to present any significant air pollution problems either. It is also worth noting that since the pineapple fields are to the north and the H-1 Freeway to the south, it is relatively unlikely that carbon monoxide from both these source could be carried over Waikele at the same time.

Finally, natural air pollutant producers which could affect air quality in the Waikele project area include the ocean (sea spray), plants (aero-allergens), dust, and perhaps a distant volcanic eruption on the Island of Hawaii. Concentrations of air pollutants from these kinds of sources should be fairly uniform for most Oahu locations.

4. DIRECT AIR QUALITY IMPACT OF PROJECT CONSTRUCTION

During the site preparation and construction phases of this project it is inevitable that a certain amount of fugitive dust will be generated. Field measurements of such emissions from apartment and shopping center construction projects has yielded an estimated emission rate of 1.2 tons of dust per acre of construction per month of activity. This figure assumes medium level activity in a semi-arid climate with a moderate soil silt content. Actual emissions of fugitive dust from this project can be expected to vary daily depending upon the amount of activity and the moisture content of exposed soil in work areas.

One major generator of fugitive dust is heavy construction equipment moving over unpaved roadways. This problem can be substantially mitigated by completing and paving roadways and parking areas as early in the development process as possible. Because some construction will be taking place in close proximity to existing residential areas, dust control will have to be an item of special concern throughout the construction phase of the project.

Heavy equipment at construction sites will also emit some air pollutants in the form of engine exhausts. The largest equipment is usually diesel-powered. Carbon monoxide emissions for large diesel engines are generally about equal to those from a single automobile, but nitrogen dioxide emissions from this type of engine can be quite high. Fortunately, nitrogen dioxide emissions from other sources in the area should be relatively low and the overall impact of pollutant emissions from construction equipment should be minor compared to levels generated on major roadways nearby.

2. AIR QUALITY STANDARDS

State of Hawaii and National Ambient Air Quality Standards (AQS) have been established for six classes of pollutants as shown in Table 1. An AQS is a pollutant concentration level not to be exceeded over a specified sampling period which varies for each pollutant depending upon the type of exposure neceessary to cause adverse effects. Each of the regulated pollutants has the potential to cause some form of adverse health effect or to produce environmental degradation when present in sufficiently high concentration.

National AQS have been divided into primary and secondary levels. Primary AQS are designed to prevent adverse health impacts while secondary AQS refer to welfare impacts such as decreased visibility, diminished comfort levels, damage to vegetation, animals or property, or a reduction in the overall aesthetic quality of the atmosphere. State of Hawaii AQS have been set at a single level which is in most cases significantly more stringent than the lowest comparable national limit.

The State of Hawaii Department of Health has proposed that Hawaii State AQS for particulates and sulfur dioxide be changed to match Federal limits. Public hearings were held on the proposed changes in May, 1984, but to date these changes have not been made official.

3. PRESENT AIR QUALITY

A summary of air pollutant measurements from State of Hawaii long term monitoring stations located nearest to the project is presented in Table 2. Data from several different sampling stations are included in the tabulation.

The sampling station for particulates and carbon monoxide is located in Pearl City, less than two miles east southeast of the project area. Until September 1979, and after June 1983, carbon monoxide monitoring was conducted at the Department of Health building at Punchbowl and Beretania Streets in urban Honolulu. This site is about 12 miles southeast of the project. During 1981 carbon monoxide was measured at Fort DeRussy in Waikiki (13 miles southeast of the project), and in 1982 carbon monoxide was monitored at Leahi Hospital in Kaimuki, about 15 miles southeast of the project.

Ozone levels were also measured at the Department of Health building in urban Honolulu until December 1980, when the monitor was relocated to Sand Island (about 10 miles southeast of the project site). During 1981 nitrogen dioxide was also monitored at the Sand Island location, but all nitrogen dioxide monitoring has since been discontinued. Lead measurements for 1984 are from Liliha Street in Kalihi, about 11 miles southeast of the project site.

From the data presented in Table 2 it appears that State of Hawaii ambient air quality standards for particulates, sulfur dioxide, nitrogen dioxide, and lead are currently being met at nearest monitoring stations to the project area.

On the other hand, carbon monoxide and ozone readings from urban Honolulu indicate that allowable State of Hawaii standards for these vehicle-related air pollutants are being violated at a rate of about once or twice a year. Ozone is an indicator of the formation of photochemical pollutants in the air, a condition which tends to develop if the air mass over the islands has been fairly stable with little wind flow for a period stretching over several days.

1. PROJECT DESCRIPTION

The proposed Waikele Development project involves site preparation and construction of a residential and commercial complex on about 577 acres of land near the intersection of the H-1 Freeway and Kamehameha Highway in the Waipahu-Waipio area of Oahu as shown in Exhibits 1 and 2. The Land Use Plan for the site is presented in Exhibit 3. The existing site was formerly used for sugar cane growing, but it has been taken out of agricultural use by Oahu Sugar Company and is currently fallow with some ground cover for erosion control. The Oahu Sugar Company manager's residence is located on the west end of the site. With Village Park to the West, Waipahu Town to the south, Crestview to the east and Gentry-Waipio to the northeast, the proposed development is nearly surrounded by existing residential development. The area to the noth consists of about 253 acres of pineapple cultivation.

Existing roadways within the proposed project site are primarily cane haul roads leading to the Oahu Sugar Mill via the existing H-1 undercrossing at Paiwa Street. Manager's Drive provides another existing H-1 crossing for access to the manager's residence. Naval Access Road runs east-west across the site from Kamehameha Highway to the Naval Reservation along Kipapa Gulch.

These roadway connections to public rights-of-way are expected to be utilized by the proposed Waikele Development, but it is also necessary to assume that some a priori highway improvements will be initiated and completed in time to provide service to future residents of the project. The Traffic Impact Report for the project details specific improvements which will be required in order to provide adequate highway capacity for projected traffic volumes associated with project development. Specifically, a full service interchange facility on Interstate Route H-1 at the Paiwa Street undercrossing is proposed to serve both the Waikele Development and the established community of Waipahu Town.

Additionally, the State has proposed a Waipio Interchange on Interstate Route H-2 at or near Hililani Cemetery Road Overcrossing. This facility would divert a substantial amount of traffic from Kamehameha Highway to H-2 and considerably increase available Kamehameha Highway capacity for use by project-related traffic. Additional widening and improvemnet of Kamehameha Highway from the proposed project access point at the Lumiaina Street intersection to the Waipahu Street/H-1 junction is also proposed in the Traffic Impact Report for the project.

The purpose of this study is to describe existing ambient air quality in the project area, to estimate and evaluate the impact of any increase in short or long term air pollutant concentrations resulting from actions related to the proposed project, and to suggest potential mitigative measures that might be employed to alleviate any adverse air quality impacts that could be directly or indirectly attributed to the project as proposed.

The development master plan for Waikele is expected to span eight years, generally beginning from the east side along Kamehameha Highway and spreading westward to Waikele Stream. For purposes of this study, the development is divided into two phases: Phase I, including the golf course, part of the office park in Central Waikele and most of the residential area in East Waikele, is expected to be completed by 1990; Phase II, including the commercial-retail center and the remainder of the business park in Central Waikele as well as the remaining residential areas in East and West Waikele is expected to be completed by 1995.

AIR QUALITY STUDY

FOR THE

PROPOSED WAIKELE DEVELOPMENT

MASTER PLAN

OAHU, HAWAII

Prepared by

Barry D. Root
Kaneohe, Hawaii

July 28, 1985

TABLE OF CONTENTS

ENV 2-1
NV/G

HEI

Brenner Munger, Ph.D., P.E.
Manager
Environmental Department
(808) 548-6880

December 3, 1985

Mr. John P. Whalen, Director
Department of Land Utilization
City & County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Whalen:

Subject: Draft Environmental Impact Statement Waikele Development

We have reviewed the above Draft Environmental Impact Statement and find that, except for inclusion of our comment letter dated August 21, 1985, found in Section X, the draft EIS is not responsive to our comments made on the EIS Preparation Notice and is thus inadequate from HECO's perspective.

I am sure you can appreciate the commitment of time and staff resources necessary to review and comment on EIS documents. Consequently, I am also sure you can understand our position that merely including comment letters, without addressing the substance of the comments, can not be considered responsive.

Thank you for the opportunity to comment on this project.

Sincerely,

Brenner Munger

JMP:RBM:gs

cc: F. J. Rodriguez

DEC 5 1985

F. J. RODRIGUEZ
PRESIDENT

ENVIRONMENTAL
COMMUNICATIONS
INC.

January 7, 1986

Mr. Brenner Munger
Environmental Department
Hawaiian Electric Industries Company
P.O. Box 2750
Honolulu, Hawaii 96840

Dear Mr. Munger:

We are in receipt of your company's comments dated December 3, 1985 and we respond in the following:

1. We concur that the discussion on the availability of electrical power to the Waikele project could have been more explicit. Community Planning, Inc. and their technical consultant Ronald N.S. Ho and Associates have been in communications with your firm to define more clearly the extent of participation. However, the Developer has agreed to provide the site for the requested substation whose location and boundaries will be established shortly after the development plan is completed.

   Please be assured that there will be direct and more explicit communication with HEI as the project continues through the design and review process.

Thank you for your continuing interest and concern.

Very truly yours,

F. J. Rodriguez

FJR:ls

F. J. RODRIGUEZ
PRESIDENT

ENVIRONMENTAL
COMMUNICATIONS
INC.

January 7, 1986

Mr. Ernest Kosaka
Project Leader
Office of Environmental Services
Fish and Wildlife Service
P.O. Box 50167
Honolulu, Hawaii 96850

Dear Mr. Kosaka:

We are in receipt of your office's comments dated December 6, 1985 and we respond in the following:

1. Storm Drainage - The recommendation to facilitate retention of storm runoff onsite via the use of retention ponds in various open space locations has been provided to the land planner and golf course design team for their review and consideration. Amfac has indicated that these are worthwhile considerations and will be used in an urban setting (golf course, residential, commercial landscaping). These uses are lesser in quantity than had been previously practiced in agricultural land use. Further, the biocides currently approved for use by the EPA tend to break down more readily than those chemicals used in the past.

2. Fauna - The presence of three Hawaiian coots within an irrigation reservoir was noted by Dr. Andrew J. Berger, Ph.D. who was retained as the technical consultant on terrestrial mammals. Berger stated that "although the birds were observed within the reservoir, it is not expected that the reservoir is a habitation site, but probably served as a resting place for the birds in transit" (p. IV-6). Final golf course design has not been completed at this early stage, but it is strongly felt that there will be open water spaces in the golf course plan for use as storm water runoff ponds, and possibly, water storage reservoirs. Site inspection to determine the possibility of nesting habitat existing can be done pending approval by Oahu Sugar Company who is still legally the user of the property. It is suggested that this site inspection trip be accomplished during the period after land use policy hearings have been completed.

Thank you for your continuing concern and interest.

Very truly yours,

F. J. Rodriguez

FJR:ls

United States Department of the Interior

FISH AND WILDLIFE SERVICE
300 ALA MOANA BOULEVARD
P O BOX 50167
HONOLULU, HAWAII 96850

IN REPLY REFER TO:
ES
Room 6307
DEC 6 1985

Mr. John P. Whalen, Director
Department of Land Utilization
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Re: Draft Environmental Impact Statement (DEIS), Waikele Development, Waikele, Oahu

Dear Mr. Whalen:

The U.S. Fish and Wildlife Service has reviewed the referenced DEIS and offers the following comments for your consideration.

General Comments

The Service's primary concerns with the proposed project are increased urban surface runoff into Waikele Stream and Pearl Harbor and the potential loss of an irrigation reservoir that provides habitat for the Federally endangered Hawaiian coot (Fulica americana alai).

Specific Comments

a. Page IV-4. Storm Drainage. The proposed drainage system would collect storm runoff from the western portion of the site and ultimately discharge the runoff into Waikele Stream. The Service is concerned that the stormwater runoff from the urban areas would introduce increased levels of petroleum products, heavy metals, and biocides into Waikele Stream and Pearl Harbor. The Service recommends the drainage system be modified to maximize on-site storage of storm runoff by using golf courses, parks, landscaped areas, and sediment basins as temporary ponding areas.

b. Pages III-10 and IV-6. Fauna. The DEIS states that three Federally endangered Hawaiian coots (Fulica americana alai) were observed within an irrigation reservoir at the north end of the project area. The DEIS states that this reservoir is "proposed for golf course use in the Master Plan." It is not clear if the reservoir would be incorporated into the golf course as a water hazard or if it is being eliminated. The Service strongly recommends that the reservoir be incorporated into the golf course.

DEC 11 1985

Summary Comments

The Service recommends that on-site use of temporary ponding basins be used to control stormwater runoff into Waikele Stream and Pearl Harbor. The Service strongly recommends that a site visit to the irrigation reservoir be conducted by biologists from the Department of Land and Natural Resources, Division of Forestry and Wildlife, and the U.S. Fish and Wildlife Service to determine if nesting endangered Hawaiian coots are present, and to verify the value of the reservoir as endangered waterbird habitat.

We appreciate the opportunity to comment.

Sincerely,

for William E. Kramer
Ernest Kosaka
Project Leader
Office of Environmental Services

cc: DPW
✓Environmental Communications

U.S. Department of Transportation
United States Coast Guard

Commander (dpl)
Fourteenth Coast Guard District

Prince Kalanianaole
Federal Building
300 Ala Moana Blvd.
Honolulu, Hawaii 96850
Phone: (808)546-2861
SILBERMAN

16475.2/5-85
Serial No. 6/028
November 13, 1985

Mr. John P. Whalen, Director
Department of Land Utilization,
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Whalen:

The Fourteenth Coast Guard District has reviewed the Draft Environmental Impact Statement for the Waikele Development and has no objection or constructive comments to offer at the present time.

Sincerely,

Jay Silberman
Environmental Protection Specialist
District Planning Office
By direction of Commander,
Fourteenth Coast Guard District

Copy: Mr. P. J. Rodriguez,
Environmental Communication Inc.

NOV 19 1985

LU"85- 5322

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

REPLY TO ATTENTION OF

November 20, 1985

Mr. John P. Whalen, Director
Department of Land Utilization
City and County of Honolulu
650 South King St.
Honolulu, Hawaii 96819

Dear Mr. Whalen:

Thank you for the opportunity to review and comment on the draft EIS for Waikele Development, Aulii, Waikele, Ewa, Oahu. The following comments are offered:

a. Any storm drainage channel improvements below ordinary high water mark for Kipapa Stream will require a Department of the Army permit. Coordination of drainage outlet structures with the Operation Branch (438-9258) is recommended.

b. Page III-9. Flood hazard Zone D definition should read, "areas of undetermined, but possible flood hazards."

Sincerely,

Kisuk Cheung
Chief, Engineering Division

1985 NOV 25 AM 9:03

ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. RODRIGUEZ,
PRESIDENT

January 7, 1986

Mr. Kisuk Cheung
Chief, Engineering Division
Department of the Army
U.S. Army Engineering District, Honolulu
Ft. Shafter, Hawaii 96858-5540

Dear Mr. Cheung:

We are in receipt of your agency's comments dated November 20, 1985 and we respond in the following:

1. We acknowledge the Department of the Army permit requirements in the event that there is any storm drainage channel improvements built below the high water mark for Kipapa Stream.

2. We will revise the reference to Zone D to read "areas of undetermined, but possible flood hazards."

Thank you for your concern and interest.

Very truly yours,

F. J. Rodrigues

F. J. Rodrigues

FJR:ls

1148 FORT STREET MALL, SUITE 200 • P. O. BOX 536 LIHU, HAWAII 96809 • TELEPHONE (808) 521-6361

UNITED STATES
DEPARTMENT OF
AGRICULTURE

SOIL
CONSERVATION
SERVICE

P. O. BOX 50004
HONOLULU, HAWAII
96850

November 25, 1985

Mr. John P. Whalen, Director
Department of Land Utilization
City and County of Honolulu
650 South King Street
Honolulu, HI 96813

Dear Mr. Whalen:

Subject: Draft EIS - Waikele Development, Amfac Property Development Corp
Auulii, Waikele, Ewa District, Oahu

We reviewed the subject draft environmental impact statement and have no comments to add to those made in our letter of August 5, 1985.

Thank you for the opportunity to review the document.

Sincerely,

FRANCIS C.H. LUM
State Conservationist

cc:
Mr. F. J. Rodriguez
Environmental Communications, Inc.
P.O. Box 536
Honolulu, HI 96809

NOV 29 1985

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALDI, JR.
DEPUTY DIRECTOR

TE11/85-5276
PL1.0150

December 27, 1985

MEMORANDUM

TO: JOHN P. WHALEN, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

FROM: JOHN E. HIRTEN, DIRECTOR

SUBJECT: WAIKELE DEVELOPMENT
DRAFT ENVIRONMENTAL IMPACT STATEMENT
TMK: 9-4-2; 3, 10, 11,
POR. 12, 31 AND 41
9-4-7: 10, 12, 13 AND 32

This is in response to OEQC's letter of November 7, 1985. We have reviewed the Draft EIS for the subject development and offer the following comments:

1. Improvements to Kamehameha Highway and construction of the Paiwa Interchange should be completed within the early stages of the development;

2. Measures to mitigate impacts to traffic within Waipahu Town should not assume that improvements to Waipahu Street, Paiwa Street and construction of the Waipahu Bypass Road will be completed within the second half of the project's development unless the costs of these improvements can be borne by the developer and that all proper approvals can be obtained within this time span;

3. All new streets within the proposed development should be constructed to full right-of-way widths and not phased in one-half widths, as proposed;

DEC 31 1985

4. Manager's Drive to the south of the H-1 Freeway should also be improved and connected to a major collector street at the time the Manager's Drive Bridge is reconstructed and widened;

5. Impacts of traffic along the interior streets should be assessed and the widths of these internal roadways should be designed to provide for the smooth flow of traffic;

6. The perimeter roadway generally following the northerly boundary of the project between Manager's Drive and/or Paiwa Street to Kamehameha Highway should be realigned to follow standard roadway design criteria.

7. Expected traffic volumes along the internal roadways should be assessed and traffic signals should be installed at all locations, where warranted;

8. Compliance to all applicable highway design standards and criteria must be maintained;

9. Bus service provided by the City will be based on regional demand and subject to availability of equipment and operating funds.

If you have any questions, please contact Kenneth Hirata of my staff at Local 5009.

(for) JOHN E. HIRTEN

cc: Mr. F. J. Rodriguez
Environmental Communication Inc.

ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. RODRIGUEZ,
PRESIDENT

January 7, 1986

Mr. Russell L. Smith, Jr.
Director and Chief Engineer
Department of Public Works
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Smith:

We are in receipt of your department's comments dated December 4, 1985 and we respond in the following as provided by the retained civil engineering consultant, Community Planning, Inc.

1. Desilting ponds for storm water runoff are being considered by the project design planner as an integral part of the erosion control plan for Waikele. When the golf course master plan has been completed, it will be submitted for review to the City departments for compliance with Section 11-54-04(a) (6) of Chapter 54, Title 11, Administrative Rules of the Department of Health.

2. The preliminary storm drainage master plan has been submitted, reviewed and comments returned to Community Planning, Inc. by the DPW. The impacts of the discharge into Waikele are considered in the master plan. Regarding discharge makai of Waipahu Street Bridge, Community Planning, Inc. studies indicate that the water surface in the present flood area will rise about 1 to 2 inches and, therefore, have an insignificant effect. Also, traffic on Waipahu Street would only be affected during the construction of the drainage culvert. The drain outlet itself would be located near the stream's invert which is a considerable distance below the present street. Of course, it is anticipated that working during off-peak hours and use of detours will reduce the impact and maintain traffic flow on Waipahu Street during construction.

3. Community Planning, Inc. is in the process of preparing and submitting the sewerage master plan for Waikele to the DPW.

Thank you for your continuing concern and interest.

Very truly yours,

F. J. Rodriguez

FJR:ls

RR

POLICE DEPARTMENT

CITY AND COUNTY OF HONOLULU

1455 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96814 AREA CODE 808 PHONE (808) 955-1111

FRANK F. FASI
MAYOR

LEIGHLEY C. GIBB
CHIEF

RAMSEY E. ESPINDA
DEPUTY CHIEF

OUR REFERENCE DI-JS

November 19, 1985

TO: JOHN P. WHALEN, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

FROM: DOUGLAS G. GIBB, CHIEF OF POLICE
HONOLULU POLICE DEPARTMENT

SUBJECT: DRAFT EIS FOR WAIKELE DEVELOPMENT

The concerns expressed in our July 24, 1985 as documented in Section X, Organizations and Agencies Consulted for the Waikele Development Project, of the Draft EIS for Waikele Development are still current. We do not have anything further to add at this time.

Douglas G. Gibb
DOUGLAS G. GIBB
Chief of Police

cc: Mr. F. J. Rodriguez
Environmental Communication Inc.
P.O. Box 536
Honolulu, Hawaii 96809

NOV 25 1985

December 27, 1985

TO : MR. JOHN P. WHALEN, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

FROM : FRANK K. KAHOOHANOHANO, FIRE CHIEF

SUBJECT: ZONE CHANGE FROM AG-1 RESTRICTED AGRICULTURAL DISTRICT TO VARIOUS ZONING DISTRICTS IN WAIKELE, TAX MAP KEYS 9-4-02: 3, 10, 11, POR. 12, 13, 41 AND 9-04-07: 10, 12, 13 AND 32

We have reviewed the information provided for the above subject proposal and have no objections to the zone change inasmuch as the accesses, fire service lines and proposed building constructions satisfactorily comply with our standards.

We request that a fire station site of approximately 25,000 square feet be deeded to the City and County of Honolulu within the business park or the right to negotiate a lease be reserved.

Should you have any questions, you may direct your staff to contact Captain John P. Souza of our Fire Prevention Bureau at 523-4186.

FRANK K. KAHOOHANOHANO
Fire Chief

FKK:JPS:smn

cc: Mr. F. J. Rodriguez,
Environmental Communications, Inc.

DEC 3 1 1985

ENV 85-312

December 4, 1985

MEMORANDUM

TO: MR. JOHN P. WHALEN, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

FROM: RUSSELL L. SMITH, JR., DIRECTOR AND CHIEF ENGINEER
DEPARTMENT OF PUBLIC WORKS

SUBJECT: DRAFT EIS FOR WAIKELE DEVELOPMENT, AULII,
WAIKELE, EWA DISTRICT, OAHU, HAWAII

We have reviewed the subject Draft EIS and have the following comments:

1. The State water quality standards (page IV-4) have been reformated as Chapter 54 of Title 11, Administrative Rules of the Department of Health. To meet the requirements of Section 11-54-04(a)(6) of the Standards, desilting ponds for storm runoff should be considered because of the large areas and the prolong period of construction activities.

2. The construction of a new culvert system to Waikele Stream to drain the western portion of the tributary areas is described on page IV-5. The outlet structures at the two (2) alternative discharge segments of the culvert into Waikele Stream and their associated impacts are not discussed. If the outlet is located to discharge makai of Waipahu Street Bridge as shown on Figure 7, what are the probable impact on the stream and the traffic on Waipahu Street.

3. A sewerage master plan report for the Waikele Development should be submitted to the Division of Wastewater Management for review and approval.

for RUSSELL L. SMITH, JR.
Director and Chief Engineer

cc: Environmental Communication, Inc.

DEC 6 1985

DEPARTMENT OF PARKS AND RECREATION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

November 22, 1985

TO: JOHN P. WHALEN, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

FROM: TOM T. NEKOTA, DIRECTOR

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT
WAIKELE DEVELOPMENT - EWA
TMK 9-4-2: 3 etal and 9-4-7: 10 etal

We have determined that the Draft Environmental Impact Statement for the Waikele Development is generally acceptable.

The applicant is coqrdinating with our Department to establish a recreational system to serve the proposed development. Park lands to be dedicated to the City will be required to meet City standards and Park Dedication requirements.

Should you have any questions, please call Mr. Jason Yuen at extension 6315.

Tom Nekota
TOM T. NEKOTA, Director

TTN:ei

cc: Mr. D. J. Rodriguez, Environmental Communications, Inc.
Mr. Allan Gatzke, ROMA

NOV 25 1985

EXHIBIT I

OAHU SUGAR COMPANY, LTD.
Applications for Permits to Use Water
In Exchange for Reduction in Preserved Use

Station Name	State Well Number	Present Preserved Use (mgd)	Requested Preserved Use Reduction (mgd)	Requested Permitted Use (mgd)	Revised Total Preserved & Permitted Use (mgd)
Kalauao Subarea					
WPS	2203-01 to 06	8.891		+ 1.386*	10.277*
EP10	2006-01 to 11	11.563	- 4.563		7.000
Subtotal		20.454	- 4.563	+ 1.386	17.277
Koolau Subarea					
EP2	2201-03, 06, 07	1.110	- 0.610		0.500
EP3, 4	2102-02, 04 to 22	7.566	- 2.204		5.362
EP5, 6	2202-03 to 14	11.195		+ 0.501	11.696
EP7, 8	2202-15 to 28	6.411		+ 2.103	8.514
EP15, 16	2202-21	14.873			14.873
WP1	2301-01 to 10	1.931	- 0.431		1.500
WP2A, 2B	2301-21 to 26	6.361		+ 0.389	6.750
WP2C, 4C	2301-27 to 32	5.421		+ 0.829	8.250
WP4A, 4B	2301-11 to 20	6.135		+ 0.343	6.478
WP6A, 6B	2458-01 to 14	0.000			0.000
WP7A, 7B, 7C	2300-07 to 09	11.043		+ 1.957	13.000
WP17A, 17B	2658-01, 02	0.000		+ 0.300	0.300
Subtotal		72.045	- 3.245	+ 6.422	75.223
TOTAL		92.500	- 7.808	+ 7.808	92.500

*Use is subject to completion of WPS study and mutual agreement between Oahu Sugar Co. and Campbell Estate. If such agreement is not reached, there will be a subsequent action by the Board to maintain Oahu Sugar Company's present allotted use of 92.5 mgd.

EXHIBIT II

HONOLULU BOARD OF WATER SUPPLY
Applications for Permits to Use Water
Pearl Harbor Ground Water Control Area

Station Name/State Well No.		Projected Growth 6 Years (mgd)	Present Preserved Use (mgd)	Requested Permitted Use (mgd)	Revised Total Preserved & Permitted Use (mgd)
Kalauao Subarea					
Makakilo Well/2004-04	West Beach	1.251	0	+ 1.5	1.5
	JCIP	0.167			
	Makakilo	1.140			
	Ewa Plantation	1.006			
	Ewa Village	0.324			
	Ewa Marina	1.048			
	Others	4.840			
Barbers Point/New	Others	1.000	0	+ 1.0	1.0
Subtotal				+ 2.5	2.5
Koolau Subarea					
Kunia I/2302-01 to 04	West Beach	1.251	4.81	+ 1.19	6.0
	JCIP	0.167			
	Makakilo	1.140			
	Ewa Plantation	1.006			
	Ewa Village	0.324			
	Ewa Marina	1.048			
	Others	4.840			
Waipahu/2400-01 to 04	Village Park	1.710	4.88	+ 1.12	6.0
	Waipahu Estates	0.318			
	Others	1.930			
Waipio Heights II/ 2500-01, 02	Gentry Ind.	0.440	0	+ 2.00	2.00
	Waikele	1.167			
	Others	1.360			
Mililani II/2858-01, 02	Mililani Town	1.890	0	+ 2.00	2.00
	Others	0.910			
Honouliuli/New	West Beach	1.251	0	+ 2.00	2.00
	JCIP	0.167			
	Makakilo	1.140			
	Ewa Plantation	1.006			
	Ewa Village	0.324			
	Ewa Marina	1.048			
	Others	4.840			
Wahiawa II/New	Wahiawa III	0.440	0	+ 1.00	1.00
	High Tech	0.460			
	Others	1.150			
Subtotal			9.69	+ 9.31	19.00
TOTAL			9.69	+11.81	21.50

instead of increasing the use at EP15,16. Campbell Estate has offered to make a study of this alternative to determine if it is economically feasible for them to pay the cost of upgrading and share pro rata in the cost of pumping WP5 with Oahu Sugar Co.

The use of WP5 in place of EP15,16 to meet the 4.277 mgd request of Oahu Sugar Co. has significant merit in making best use of slightly lower quality (above 150 ppm) water from the Waianae aquifer for agricultural purposes and preserving potable water (100 to 150 ppm) in the Koolau aquifer for municipal use. In addition, the use of WP5, located in the Waianae Subarea, would help preserve the higher use of potable water and help relieve the heavy pumpage of water in the western sector of the Koolau Subarea.

Summary of Recommended Allocations, IIGWCA

Based on staff's recommendation, the total use (preserved and permitted) in the Koolau Subarea will be 191.697 mgd, 8.303 mgd less than the sustainable yield of 200.000 mgd; and the total use (preserved and permitted) in the Waianae Subarea will be 22.029 mgd, 2.971 mgd less than the sustainable yield of 25.000 mgd.

	Koolau Subarea (mgd)	Waianae Subarea (mgd)	IIGWCA Total (mgd)
• Sustainable Yield	200.000	25.000	225.000
• Present preserved use	179.287	22.786	201.913
• Requested preserved use reductions:			
Oahu Sugar Co.	-3.245	-4.563*	- 7.808*
Subtotal, Preserved Use	175.962	18.143	194.105
• Requested permitted use additions:			
Oahu Sugar Co.	+ 6.422*	+1.386	+ 7.808*
Board of Water Supply	+ 9.310	+2.500	+11.810
Church of the Nazarene	+ 0.003	--	+ 0.003
Subtotal, Permitted Use	+15.735	+3.886	+19.621
• Total (Preserved and Permitted Use)	191.697	22.029	213.726
Balance available	8.303	2.971	11.274

*See Exhibit 1.

RECOMMENDATION:

That the Board:

(1) Conditionally approve the request of Oahu Sugar Co. for 7.808 mgd of permitted use for eight of its existing sources in exchange for 7.808 mgd reduction in preserve use from five other existing sources, according to Exhibit 1.

(2) Approve the request of Honolulu Board of Water Supply for 11.81 mgd permitted use, according to Exhibit 1.

(3) Approve the request of Hawaii Pacific Division, Church of the Nazarene for 0.003 mgd permitted use.

(4) Approve the issuance of permits for a period of 20 years subject to review and adjustment every 5 years.

Respectfully submitted,

MASARU TAGOMORI
Manager-Chief Engineer

Attach.

APPROVED FOR SUBMITTAL:

SUSUMU ONO, Chairperson

[redacted]

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96843

FRANK F. FASI Mayor

ERNEST A. WATARI Chairman
MILTON J. AGADER Vice Chairman
DONNA B. GOTH
RYOKICHI HIGASHIONNA
PAULA R. RATH
RUSSELL L. SMITH JR.
WAYNE J. YAMASAKI

KAZU HAYASHIDA
Manager and Chief Engineer

November 19, 1985

XC: RBT
LHH
DAKW

Mr. Chris Kanazawa
Vice President
Amfac Property Development Corp.
P. O. Box 3140
Honolulu, Hawaii 96802

Dear Mr. Kanazawa:

Subject: Your Letters of November 4 and 6, 1985 Requesting Water Allocation for the Waikele Development

Thank you for your letters concerning the proposed development.

We submitted an application to the Board of Land and Natural Resources for a permitted use of 2.1 million gallons daily for the proposed wells at the new Waipahu "228" Reservoir site. We shall notify you of the action taken by the Board.

If the permitted use is approved, AMFAC will be required to install an activated carbon water treatment facility if tests confirm the presence of EDB and other chemicals in the well water.

If you have any questions, please contact Albert Koga at 527-6123.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

State of Hawaii
DEPARTMENT OF LAND AND NATURAL RESOURCES
Division of Water and Land Development
Honolulu, Hawaii

July 11, 1985

Approved by the Board of Land & Natural Resources at the meeting held on JUL 11 1985

Chairperson and Members
Board of Land and Natural Resources
State of Hawaii
Honolulu, Hawaii

Gentlemen:

Applications for Permits to Use Water
In the Pearl Harbor Ground Water Control Area, Oahu

Background

In December 1984, the Board of Land and Natural Resources re-certified the total preserved use in the Pearl Harbor Ground Water Control Area (PHGWCA), downward, to 281.813 mgd; resulting in approximately 22} mgd being made available for allocation out of a total sustainable yield of 325 mgd.

Subsequently, on March 22, 1985, the Board subdivided the PHGWCA into three subareas, namely the Koolau, Waianae, and Caprock Subareas, and assigned a sustainable yield of 200 mgd to the Koolau Subarea and 25 mgd to the Waianae Subarea. The sustainable yield of the Caprock Subarea was left undetermined for a later time.

The 200 mgd sustainable yield, minus a present preserved use of 179.267 mgd results in 20.733 mgd available for allocation in the Koolau Subarea and the 25 mgd sustainable yield minus a present preserved use of 21.706 mgd results in 3.294 mgd available for allocation in the Waianae Subarea.

Applications for Water Use

The Department has received three applications requesting permits for water use in the PHGWCA from Oahu Sugar Co., Honolulu Board of Water Supply, and Church of the Nazarene as follows:

(1) Oahu Sugar Co. is requesting 18.699 mgd of permitted use for eight existing sources, in exchange for a reduction of 18.699 mgd of preserved use from five other existing sources, according to attached Exhibit I. Oahu Sugar Co.'s total allocation in the PHGWCA will remain unchanged at 97.5 mgd and the water will continue to be used for agricultural purposes.

(2) The Honolulu Board of Water Supply is requesting 11.81 mgd of permitted use for five existing and three new sources, according to attached Exhibit II. The water will be used for anticipated increases in municipal water uses.

(3) The Church of the Nazarene, Hawaii Pacific District, is requesting 0.003 mgd of permitted use for its existing well 2358-59. The water will be used to supply Church needs and a dwelling.

HPS Study

Oahu Sugar Co. initially requested an increase of 4.277 mgd in use from its source, EP15,16, located in the Koolau Subarea. However, the Campbell Estate has proposed the possibility of upgrading and utilizing its

Treatment of chemically contaminated well water sources in the Waipahu Well fields will be administered initially by the Board of Water Supply and subsequently by the State Department of Health for compliance with Section 11-20-29, 30 of DOH Chapter 20, Title 11, Administrative Rules. As provided in the BWS memo to Amfac Property Development Corp. dated November 19, 1985, the installation of an activated carbon filtration system to treat well water is a requirement. Please be assured that at the appropriate time when all land use policy changes have been processed and approved, the properly prepared engineering report will be submitted to all reviewing agencies for their review and approval prior to construction.

4. Sewerage

A Sewerage Master Plan is being prepared by Community Planning, Inc. for submittal to the Department of Public Works. Included in this Plan will be the phased development schedule for Waikele and the effective sewerage management to be provided by DPW for Waikele.

5. Housing

The 40% of units described in the DEIS will be marketed at prices that are competitive to the residential projects adjacent to Waikele. These include Gentry-Waipio, Makakilo, Mililani, and other Central Oahu locations. These units are projected to be sold at prices affordable to the middle income market, in a range from $80,000 to $150,000, in constant 1983 dollars.

The 10% committment to the Department of Housing & Community Development is subject to the final review of Department policy that is being finalized at this point. Amfac is working with DHCD to determine the best solution to this committment.

Thank you for your continuing concern and interest.

Very truly yours,

F. J. Rodrigues

FJR:ls

Attachment

COPY

November 13, 1985

Mr. Susumu Ono, Chairperson
Board of Land and Natural
Resources
State of Hawaii
P. O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Ono:

Subject: Application for 2.1 Million Gallons Daily (mgd)
Permitted Use from Wells 2400-05, 06

We submit the attached application for a permitted use of 2.1 mgd for Wells 2400-05, 06. The water will be used for the proposed Waikele development including a golf course. The proposed development will be located makai of Crestview. Waikele is already on the City's Development Plan and hearings on the reclassification of the lands have already been completed by the State Land Use Commission.

We attach a copy of the development schedule for Waikele.

If you have any questions, please contact Herbert H. Minakami at 527-6183.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

Attachment

cc: Community Planning, Inc.

Speaking of the downstream operating condition of the H-1 Freeway, the Keehi Interchange is also scheduled for completion in 1986. This will also cause some redistribution of traffic at Halawa Interchange by diverting traffic from Moanalua Freeway in both the A.M. and P.M. peak periods of traffic. The result will be better lane utilization at Halawa Interchange (less crowding in the right lanes H-1 to Moanalua Freeway in the A.M. and from Moanalua Freeway to H-1 in the P.M.) as more motorists continue on the H-1 Freeway to Keehi Interchange on their eastbound trip and from Keehi Interchange on their westbound trip. Better lane utilization will improve the through-put of the present bottleneck just west of the Halawa Interchange.

Similarly, the P.M. westbound peak period traffic at the Kalauao Stream screenline should also benefit from the implementation of the improvement projects and the completion of the Keehi Interchange. The projected 1995 peak volume is less than the A.M. peak volume and, therefore, improvement in the quality of traffic flow can be expected.

4. The duration of the peak period becomes meaningful only when traffic demand exceeds the capacity of the roadway for some period of time. Generally, when the roadway is operating at Level of Service (LOS) "C" or "D", the traffic demand is not yet at the capacity of the roadway.

Currently, the traffic demand does not exceed the capacity of the Waiawa Interchange. The queueing that at times reaches back to or near the Waiawa Interchange in the morning peak hour of traffic is caused by the bottleneck created by the heavy on-ramp demand at the Waiau Interchange (Pearl City on-ramp). Simply, the capacity of the freeway at the Waiau Interchange is exceeded when the on-ramp traffic is added to the through traffic approaching from the Waiawa Interchange. The additional lane to be implemented by SDOT this year will provide the added capacity to accommodate this on-ramp traffic demand.

In the P.M. peak, the heavy off-ramp demand at the Waiawa Interchange by motorists desiring to access either Farrington Highway or Kamehameha Highway exceeds the capacity of this single-lane off-ramp, thereby causing traffic to queue in the right lane of the freeway for a distance of nearly a mile. This condition has been observed to last from 1 hour to 1-3/4 hours. The completion of the Paiwa Interchange will divert a significant amount of the traffic away from this off-ramp. When the interchange on the H-2 Freeway is completed, still more traffic will be diverted from this off-ramp.

As briefly discussed in Item 3 above, the roadway improvements that are scheduled to be implemented by SDOT and the City, as well as the roadway improvements recommended in the Traffic Impact Report* (Kamehameha Highway widening and the Paiwa Interchange) will most likely accommodate the projected traffic volumes as furnished by the OMPO Hali 2000 Study and the traffic generated by the Waikele Development. The projected

volumes generated by the Waikele Development in and of itself will not significantly increase the duration of the peak period. Five hundred vehicles will add some 5.5 minutes to pass a point for a roadway operating at capacity with 2 seconds headway.

Exhibits 6, 7, 8 and 9 show the Levels of Service (LOS) for both the A.M. and P.M. peak hours of traffic for Phase I and Phase II with the Waikele Development assumed to be completed and fully occupied for each of the phases

The LOS without the project would be significantly worse, in our opinion, especially in 1995 at the Waiawa Interchange because, without the project, most probably the Kamehameha Highway improvement, and more importantly the Paiwa Interchange, would not be in place. The single-lane ramps at Waiawa Interchange is already operating at Capacity with long queues waiting to enter the freeway in the morning and long queues waiting to exit the freeway in the evening. Both conditions present a high potential for rear-end collisions as well as driver aggravation.

3. Water

The Waikele Water Master Plan (under preparation by Community Planning, Inc.), is being completed and will be submitted to the Board of Water Supply for their review in January, 1986. The water phase demand will also be included.

Location of existing water reservoirs, transmission lines, and deep wells proposed for use at the Waikele project will be identified on the project infrastructure map (Figure 7). All proposed water source and storage facilities will also be mapped on Figure 7.

We are attaching correspondence from the Board of Water Supply dated November 13, 1985 to the Department of Land & Natural Resources requesting permitted use for Wells 2400-05 and 06. We are also providing correspondence from the Board of Water Supply dated November 19, 1985 to Amfac advising BWS actions for a permitted use of 2.1 million gallons daily for the proposed wells at the new Waipahu "228" Reservoir site. These copies are provided to indicate the processing of Waikele's water source from DLNR by the Board of Water Supply. This request from Board of Water Supply to DLNR is to be drawn from the balance available of 11.274 MGD. We are also attaching a memorandum request from Manabu Tagomori, Manager-Chief Engineer, Division of Water and Land Development, DLNR dated July 11, 1985 to the Board of Land and Natural Resources. This request identifies current conditions in the PHGWCA and application requests for withdrawal. All requested listings are identified on the Exhibits I and II. We trust this will suffice for your request.

Contaminated well water sources are identified in your comments; we have identified our requested source as Wells 2400-05, 06, and a proposed third well on the same site.

> substantial acreage designated and available for housing, the support of public policy and the demonstrated preference over other areas by consumers with respect to residential location. In other words, this growth potential is dictated by market realities and this leads to its numerical inconsistency with the GP population range. It can be argued that the inconsistency reflects more on the viability of the population GP policy. Formulated in 1982, Central Oahu's population range is based on the fact that its existing population share, in 1980, was 13.3%. In the ensuring years, a disproportionate amount of growth occurred in Central Oahu, raising its population share to 14.2% by 1984. In light of this market trend, and the future expectations of the area, it may be appropriate to re-examine the GP's population policy for Central Oahu."

Recently, the Chief Planning Officer has indicated publicly that he will shortly initiate a GP amendment which would facilitate directing some major growth and development on Oahu to Central Oahu. In that event, Central Oahu may then be able to absorb one or more of the three major pending DP proposals consistent with the GP.

2. <u>Traffic</u>

Responses provided in this section were prepared by Austin, Tsutsumi & Associates, the retained Traffic consultants.

1. Funding for the proposed highway improvements at Kamehameha Highway and the Palwa Interchange will utilize Federal funds wherever available. At this early time, State DOT has advised that there are no funds available for Kamehameha Highway, but that it is still not clear as to Federal funds availability for the Palwa Street Interchange. They will advise us as soon as they know for sure.

Both proposed improvements will be funded by Amfac to the extent necessary so that the total Master Plan can be developed.

2. Interchange Spacing Criteria - The minimum spacing between arterial interchanges (distance between intersecting streets with ramps) is determined by weaving volumes, the ability to sign the interchange and the required lengths of speed change lanes. The Federal guideline for interchange spacing is one mile on urban freeways. The proposed Palwa Interchange meets this guideline for interchange spacing. The State Department of Transportation concurs with the location of the interchange and recommends approval to the Federal Highway Administration.

3. Not only will the Palwa Interchange and Kamehameha Highway improvements alleviate some of the local traffic problems, they will also benefit traffic operations at Waiawa Interchange. For example, the Palwa Interchange, by redistributing the traffic demands that enter and exit the H-1 Freeway at Waiawa Interchange, will cause traffic to move better through the interchange by reducing the A.M. on-ramp demand and the P.M. off-ramp demands, which cause, in both cases, the right lane of the freeway to break down. Further, there will be immediate benefits when the Palwa Interchange is completed because it will be some time before the Waikele Development would be completed and fully occupied.

When these improvements are coupled with the State Department of Transportion's (SDOT) project to add an additional traffic lane in each direction on the H-1 Freeway east of Waiawa Interchange to the Halawa Interchange, and the upgrading and interconnecting of the existing traffic signals on Kamehameha Highway from Pearl City to Aiea, as well as the City's project to improve Moanalua Road from Kalauao Stream to Aloha Stadium, traffic operations on the arterial highways at the Kalauao Stream screenline should be better than they are today.

The SDOT project to add an additional traffic lane on the H-1 Freeway will be implemented in 1986; and the traffic signal upgrading and interconnect project is currently under design and will be ready for implementation by mid-1986. The City's Moanalua Road improvement project is also currently under design. These projects will add vehicular capacity in the transportation corridor east of the Waiawa Interchange.

In addition, SDOT has under design the Waipio Interchange on the H-2 Freeway at the Mililani Cemetary Road. This new interchange is projected to attract approximately 1,000 vph during the peak periods of traffic, which will reduce the demand on both Kamehameha Highway south of the Waipio-Gentry/Waikele Development, and on the on- and off-ramps at the Waiawa Interchange.

Referring to "Table 2 - Traffic Projections Without the Project" of the Traffic Impact Report (Page 22), the existing A.M. peak hour volume inbound on the H-1 Freeway at Kalauao Stream is approximately 7,400 vehicles per hour (vph). In the Year 1995, the peak hour volume is projected to increase to 8,900 vph at this location on the H-1 Freeway. The volume of traffic generated by the Waikele Development and projected to be on the H-1 Freeway at the Kalauao Stream screenline in 1995 is approximately 490 vph, for a total of 9,390 vph (8900+490). The added inbound lane will provide anywhere from 1,800 to 2,200 vph in added capacity at this location, depending upon the downstream (Halawa Interchange) traffic operations. This added capacity will accommodate the projected 1995 traffic demand, including the traffic generated by Waikele.

percentage range for Central Oahu is 12.8 - 14.2% of the total islandwide population.

Before the official update by the State Department of Planning and Economic Development (DPED) of the projected total population for Oahu from a year-2000 horizon (917,400 persons) to a year 2005 horizon (954,500 persons), Waikele's proposed addition of 8,100 persons to Central Oahu's population would have required adding 0.9% to the GP's upper limit (14.2%) for Central Oahu in order to accommodate the project .[4]

The official DPED update of the projected Oahu population from 917,400 (year 2000) to 954,500 (year 2005) established once more a 20-year time frame for the GP as required by the Plan itself. As a result, the GP's population capacity[5] for Central Oahu became large enough to accommodate Waikele's 8,100 persons without a need to increase the planned population distribution percentage range for that area (12.8 - 14.2%) set by the GP

For the year-2000, the GP population projection for Oahu of 917,400 persons meant that a maximum of 130,270 people ("population capacity") for Central Oahu (14.2% x 917,400 = 130,270) allowable under the GP. Using the year-2005 projected population for Oahu of 954,400 persons, Central Oahu's population capacity increases to 135,500 persons.

The present land development capacity[6] for Central Oahu, established by the Central Oahu Development Plan (DP), allows for approximately 127,900 persons in that area. The difference between GP population capacity and DP development capacity represents the amount of future population growth permissible. Where GP population capacity exceeds DP development capacity, more growth is permissible. If the situation is reversed, or if capacities match each other, no more additional growth for the area in question is permissible.

After the recent update of GP's population projection for Oahu to the State's year-2005 projections, Central Oahu's population capacity (135,500) exceeded its development capacity (127,900) by about 7,600 persons. Waikele's proposed 8,100 basically could be accommodated under the new GP population capacity for Central Oahu without any need to increase the upper limits of the area's population distribution percentage range of 12.8 - 14.2% set by the GP. However, City DP approval of Waikele obtained last year effectively used up the remaining population development capacity.

4. All other aspects of Waikele raised land use and urban design considerations relegated by City law and practice to Development Plan review.

5. "Population capacity" means the amount of people allowed by the General Plan in each Development Plan areas based on applicable GP population distribution percentages.

6. "Development capacity" is derived from the current amount of land available for urban use as established by the DGP's ongoing "Land Supply Review" studies.

for Central Oahu generated by the GP's 12.8 - 14.2% range for Central Oahu as applied to the updated, year-2005 islandwide projection of 954,500 people.

Because Waikele's 8,100 persons can be accommodated under the present GP, Waikele does not conflict with continued City pursuit of major new growth within the Primary Urban Center and Secondary Urban Center. Waikele is a suburban development which is consistent in intensity, scale, character and tenor with those Urban-Fringe areas in Central Oahu (i.e. Waipahu, Village Park, Waipio-Gentry, etc.) now set in the GP. As an Urban-Fringe development, Waikele will not detract from any City effort to direct major new growth to the Secondary Urban Center as called for in the GP.

3. The addition of Waikele to the planned Central Oahu DP land use pattern does not, itself, prevent the development of other major proposals for Central Oahu now pending in the 1985-86 DP Annual Review: Village Park Expansion (85/CO-1 and 85/CO-1A); "Waiawa Community Development" (85/CO-2); and Mililani Town Expansion (85/CO-7). Each of these proposals would add an amount of additional population to Central Oahu which exceeds the 135,500 population capacity set by the GP, even if Waikele was not counted in the calculations. Therefore, each proposal would seem to require a GP amendment on its own before it can be approved at the DP level.[7]

A recently-issued DGP Report[8] by the DGP concluded that Central Oahu is deficient by 1,100 housing units (3,850 persons at 3.5 persons/unit) in meeting the year-1985 through year-2005 housing requirements for the area. It also concluded that:

> "A substantial demand for growth is also expected in Central Oahu. It is believed that a gain of 25,400 people is plausable which would bring the area's population to 139,800 by the year 2005. This population would mean that Central Oahu would house 14.7% of the island's population, which exceeds the GP guideline. This demand is expected because Central Oahu has

7.

Pending Projects	Additional Units	Additional Population	Amount Above GP Capacity With Waikele	Amount Above GP Capacity Without Waikele
Village Park Exp.	3,300	10,000	10,000	2,400
Waiawa Ridge	11,000	31,000	31,000	23,400
Mililani Town Exp.	6,600	21,000	21,000	13,400

8. DGP, RESIDENTIAL DEVELOPMENT IMPLICATIONS OF THE DEVELOPMENT PLANS, August, 1985.

be mapped. The location of proposed water reservoirs, transmission lines, and deep wells should also be mapped.

Of particular concern is the supply of water available within the DLNR established ground water control district in which the proposed project is located. A listing of existing wells together with declared capacities and DLNR Preserved Use amounts should be noted, together with data on exported or imported water to establish the water supply available within the ground water control district. Existing water usage and proposed water usage should be noted. Proposed water deep wells should also be noted with capacities.

There is concern regarding wells which have pesticide contamination. These are specifically Kunia Wells I and II, Waipahu Wells, and Waipio Heights Wells II. Also, some wells have produced brackish water such as Makakilo Wells.

Which water sources will be used for the project?

D. Sewerage

A sewerage master plan should be submitted. Of particular concern is the capacity of the Honouliuli Wastewater Treatment Plant to accommodate the flows from the Waikele project, together with the flows from other committed and proposed projects within the Honouliuli WWTP tributary system.

E. Housing

The 40 percent of the units which will be sold at "prices affordable to the middle income market" referred to on pages II-11 and II-30 needs to be defined. Is this "gap-group housing" as defined by the Department of Housing and Community Development (DHCD)? Also, is the ten percent of the units which will be provided per City and County unilateral agreement "low cost housing," "moderate cost housing" or a combination of the two (as defined by DHCD)?

If you have any questions, please contact Bennett Mark of our staff at 527-5038.

Very truly yours,

JOHN P. WHALEN
Director of Land Utilization

JPW:sl
2597A

F J RODRIGUEZ
PRESIDENT

ENVIRONMENTAL
COMMUNICATIONS
INC.

January 7, 1986

Mr. John P. Whalen, Director
Department of Land Utilization
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Whalen:

We are in receipt of your agency's comments dated December 20, 1985 and we respond in the following:

1. General Plan/Development Plan

These responses were prepared by Patrick A. Ribellia, consultant to Amfac, Inc. for GP/DP matters.

The Waikele project area is designated by the revised Oahu General Plan (GP)[1] as an "Urban-Fringe" area -- an area where urban growth and development is to be managed so that "an undesirable spreading of development is prevented; and [the] proportion of the islandwide population therein remain unchanged."[2] The Waikele project ("Waikele") conforms with the GP policy manifested by "Urban-Fringe" designations for the following reasons:

1. Waikele is planned and designed to be merely a suburban community. The GP contemplates some suburban growth within appropriate locations within Urban-Fringe areas. As such, Waikele is in full developmental harmony with the "Secondary Urban Center" GP designation for West Beach-Makakilo in Ewa to which major, new urban growth is to be directed.

Under the present GP, some urban growth within Urban-Fringe areas is allowed. However, that growth is to be "managed" in terms of scale, location and intensity in order to avoid undesirable spreading of development and to keep the proportions of islandwide population in the Urban-Fringes within applicable GP population distribution percentages. Through such growth and development "management" within the Urban-Fringes, major new developments and growth are effectively directed to both the Primary Urban Center and Secondary Urban Center as contemplated by the GP.

2. Waikele is fully consistent with the GP's present population distribution Policy[3] for reasons explained below. The GP's population distribution

1. Reso. No. 82-188, Amended Dr. 2 (1982)
2. Objective C, Policy 3, Population Section, Revised Oahu General Plan
3. Objective C, Policy 4, Population Section, REVISED GENERAL PLAN FOR THE CITY AND COUNTY OF HONOLULU, Reso. No. 82-188, Amended Dr. No. 2, Dec. 1982.

1148 FORT STREET MALL SUITE 208 • P O [illegible] • HONOLULU HAWAII 96808 • TELEPHONE (808) 521 0381

DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813 • (808) 523-4432

FRANK F. FASI
MAYOR

JOHN P. WHALEN
DIRECTOR

(BWM)

December 20, 1985

Mr. Fred J. Rodriguez
Environmental Communications, Inc.
P.O. Box 536
Honolulu, Hawaii 96809

Dear Mr. Rodriguez:

Draft EIS for Waikele Development

We have reviewed the Draft EIS and have the following comments to offer:

A. General Plan/Development Plan

The Waikele area is designated in the General Plan as an "Urban-Fringe" area, an area where physical growth and development is to be managed so that "an undesirable spreading of development is prevented; and their proportion of the island-wide population remains unchanged." The incorrect impression one gets from Page III-14, "Existing Population and Growth Characteristics" is that the Waipahu-Waipio area is the area targetted for major growth by the City. More correctly, the area targetted for growth is the Secondary Urban Center in the West Beach - Makakilo area to relieve development pressures in the urban fringe areas of which Waikele is a part. This should be more clearly articulated.

By the addition of the Waikele project alone, the Central Oahu Development Plan (DP) area population may be within the limits prescribed in the General Plan. However, what will be the effects upon other proposals? The analysis should indicate the Central Oahu DP area Year 2000 population limits as well as the Year 2005 population limits. The analysis should also indicate the permissable population growth with the Waikele project, as well as with other proposed projects. What is the current population of the Central Oahu DP area?

DEC 23 1985

B. Traffic

The Waikele development's connection to the H-1 highway and the widening of Kamehameha Highway are major concerns. While the developer has proposed an interchange with the H-1 Highway, the State Department of Transportation has requested that the developer indicate if these projects are to be entirely developer funded.

Are the proposed Paiwa Interchange and the Kamehameha Highway widening to be totally or partially funded by the developer? If so, by what percentage?

Does the proposed Paiwa Interchange meet Federal standards for separation distance between interchanges? Is the one mile minimum spacing of freeway crossings, suggested by the American Association of State Highway and Transportation Officials "Policy on Design of Urban Highways and Arterial Streets, 1973", applicable to spacing of interchanges on grade separated, limited access highways?

The proposed Paiwa Interchange and Kamehameha Highway widening may alleviate some of local traffic problems; however, what will be the effect upon the level of service for traffic down stream at the Waiawa Interchange, and beyond on the Interstate H-1 and Kamehameha Highway during the peak periods?

What is the current duration of the peak period at Level of Service "C", "D", and "E", at Waiawa Interchange, and on Interstate H-1 and Kamehameha Highway east of Waiawa Interchange? What effect will the Interstate H-1 improvements within the right-of-way, have upon the Level of Service and the duration of the peak period? What effect will the Waikele development have upon the duration of the peak period?

With the estimates of eastbound traffic volume from Waikele during the AM peak, and westbound traffic volume to Waikele during the PM peak at each phase of the project (Appendix A, Traffic Impact Report, Exhibits 6, 7, 8 and 9), what will be the Level of Service with the project as compared to without the project (Traffic Impact Report, p. 22)?

C. Water

A water master plan should be submitted.

The location of existing water reservoirs, transmission lines, and deep wells which are to be used for the development should

If the Waikele Development were not to proceed, it is most likely that the Paiwa Interchange would not be constructed. Therefore, it can be anticipated that the on- and off-ramps at Waiawa Interchange will continue to operate at LOS "E", accompanied with some increase in the duration of the congestion. Downstream (east) of the Waiawa Interchange, traffic flow should be about the same as described above with the Waikele Development implemented. The reason for this is that the added traffic lanes on the H-1 Freeway, improvements to Moanalua Road, and the traffic signal improvements on Kamehameha Highway, will all be in place and functioning. The projected traffic from the Waikele Development, when completed and fully occupied, adds less than 800 vehicles per hour (vph) during the A.M. peak hour and less than 1,200 vph during the P.M. peak hour to the 14,400 vph and 13,190 vph projected for the same peak hours, respectively, for this corridor. The H-1 Freeway will have approximately 9,400 vph in the A.M. and 8,660 vph at this location, including the traffic projected for the Waikele Development. Capacity for 5 freeway lanes could range from 1,800 vph to 2,200 vph each. Using 1,900 vph per lane, the capacity of the freeway would be 9,500 vph in each direction, which is slightly greater than the projected demands. The LOS will most likely be "E", with traffic flowing at 30-35 mph.

Thank you for your continuing interest and concern.

Very truly yours,

F. J. Rodrigues

FJR:ls

DEPARTMENT OF GENERAL PLANNING
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

DONALD A. CLEGG
CHIEF PLANNING OFFICER

GENE CONNELL
DEPUTY CHIEF PLANNING OFFICER

WL/DGP 11/85-4829

December 13, 1985

MEMORANDUM

TO: JOHN P. WHALEN, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

FROM: DONALD A. CLEGG, CHIEF PLANNING OFFICER
DEPARTMENT OF GENERAL PLANNING

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT
FOR THE WAIKELE DEVELOPMENT
TAX MAP KEYS: 9-4-2: 3, 10, 11, Por. of 12, 31 and 41
9-4-7: 10, 12, 13 and 32

We have reviewed the subject Draft Environmental Impact Statement (EIS). The final EIS should indicate the traffic service levels at the various screenlines with regard to the traffic projections with and without the Waikele Development. This would provide us with an overall traffic impact to the areas surrounding the Waikele project.

Donald Clegg
DONALD A. CLEGG
Chief Planning Officer

cc: Mr. F.J. Rodrigues
Environmental Communications, Inc.

DEC 18 1985

ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. RODRIGUEZ
PRESIDENT

January 7, 1986

Mr. Donald A. Clegg
Department of General Planning
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Clegg:

We are in receipt of your department's comments dated December 13, 1985 on the Waikele Draft Environmental Impact Statement. Austin, Tsutsumi & Associates have prepared the following responses to your comments.

Exhibits 6, 7, 8 and 9 of the Traffic Impact Report show the Levels of Service (LOS) for both the A.M. and P.M. peak hours of traffic for Phase I and Phase II with the Waikele Development assumed to be completed and fully occupied. The LOS for the Waipahu and Central Oahu Screenlines are shown on these exhibits for the roadways immediately affected by the Waikele Development.

The LOS with projected traffic volumes on the H-2 Freeway and at the Kalauao Stream Screenline are not given because there are several ongoing roadway improvement projects by State DOT and the City Department of Public Works on the arterial highways that affect these locations. Specifically, State DOT will be adding an additional traffic lane in each direction on the H-1 Freeway between Waiawa Interchange and Halawa Interchange, as well as upgrading and interconnecting the traffic signal systems on Kamehameha Highway between Pearl City and Aiea. In addition, the City has under design, plans to widen Moanalua Road from Kalauao Stream to Aloha Stadium.

On the H-2 Freeway, State DOT has under design, the Waipio Interchange at the Mililani Cemetery Road.

These improvements, when coupled with the traffic improvements recommended in the Traffic Impact Report for the Waikele Development (specifically the Kamehameha Highway improvements and the Paiwa Interchange) will provide for improved traffic operations at Waiawa Interchange and east towards the Halawa Interchange.

Traffic operations just west of the Halawa Interchange on the H-1 Freeway deteriorates in the right lanes during both the A.M. and P.M. peak periods because of the heavy demand on the connector roads between the H-1 Freeway and Moanalua Freeway. When the Keehi Interchange is completed in 1986, it is anticipated that some traffic will be diverted away from Moanalua Freeway via the H-1/Keehi Interchange so that there will be better utilization of the freeway lanes just west of the Halawa Interchange. In addition, the new traffic lane in each direction on the H-1 Freeway will also increase the capacity of the freeway between Waiawa Interchange and Halawa Interchange.

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4191

FRANK F. FASI
MAYOR

ALVIN K.H. PANG
DIRECTOR

December 10, 1985

MEMORANDUM

TO: John P. Whalen, Director
Department of Land Utilization

FROM: Alvin K. H. Pang

SUBJECT: Draft EIS for Waikele Development
Auiii, Waikele, Ewa District, Oahu

As stated in our initial response for the draft EIS, it is the Department's policy to require that 10% of the housing units provided be set aside for low- and moderate-income families as a condition of rezoning actions. As you know, we are currently reviewing this policy, redefining the criteria to satisfy the affordable housing requirement and ensuring the equitable treatment of all developments.

For your information, the current median income limits for Honolulu, as established by the U.S. Department of Housing and Urban Development, are as follows:

Household Size	Annual Income
1	$23,000
2	$26,300
3	$29,600
4	$32,900
5	$35,500

Please contact Mr. James Miyagi of our Housing Division at 523-4264 who will assist the developer in formulating a program to meet the affordable housing requirements.

for ALVIN K. H. PANG

cc: Mr. F. J. Rodriguez
Environmental Communications
P. O. Box 536
Honolulu, Hawaii 96809

62

DEC 12 1985

ENVIRONMENTAL
COMMUNICATIONS
INC.

F J RODRIGUEZ
PRESIDENT

January 7, 1986

Mr. Alvin K.H. Pang, Director
Department of Housing and Community
Development
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Pang:

We are in receipt of your department's comments dated December 10, 1985 and we respond in the following:

The 10% low-moderate income housing requirement will be complied with by the applicant Amfac Property Development Corp. As you know, the State Land Use Commission recently completed their findings on this proposed project and in the approval of the Urban Boundary redesignation attached a 10% affordable housing requirement as a condition.

The applicant has advised that they will be in contact with your office to work on the details of the requirement during the ensuing zoning review process.

Thank you for your continuing interest and concern.

Very truly yours,

F. J. Rodriguez

FJR:ls

63

1146 FORT STREET MALL SUITE 200 • P O BOX 3380 HONOLULU HAWAII 96802 • TELEPHONE (808) 521-2361

REVENUE-COST ANALYSIS SUMMARY	AMOUNT	
PUBLIC REVENUES		$61,158,625
General Excise Tax/Development	$7,887,009	
General Excise Tax/Operations	$18,926,657	
General Excise Tax/Golf Course	$439,412	
General Excise Tax/Personal	$4,451,582	
Corporate Income Tax/Development	$604,202	
Corporate Income Tax/Operations	$2,766,128	
Personal Income Tax	$12,551,675	
Property Tax: Commercial	$3,509,453	
Property Tax: Golf Course	$269,707	
Property Tax/Residential	$9,752,801	
PUBLIC COSTS		$30,473,237
Basic Education	$16,319,134	
Higher Education	$8,773,601	
Police Services	$1,322,535	
Fire Services	$1,133,601	
Transportation Services	$767,542	
Health Care Services	$507,759	
Highway Maintenance	$56,042	
Capital Investment Expenditures	$964,179	
Sanitation Services	$625,844	
REVENUE - COST RATIO	2.0 to 1.0	

F. J. RODRIGUEZ
PRESIDENT

ENVIRONMENTAL COMMUNICATIONS INC.

January 7, 1986

Mrs. Jacquelin N. Miller
Acting Associate Director
Environmental Center
Crawford 317
2550 Campus Road
Honolulu, Hawaii 96822

Dear Mrs. Miller:

We are in receipt of the Center's comments dated December 23, 1985 and we respond in the following:

1. The City Department of Housing and Community Development is currently reviewing their policy program guidelines on affordable housing. We are attaching a letter dated December 10, 1985 from that agency that specifies their position on that subject and also their guidelines for income requirements.

2. The possible use of public lands and funds for traffic improvements and a navy access road has not been finalized or approved at this early stage. Amfac is committed to early planning and design for a new interchange at Palwa Street across H-1 Freeway and the naval access road relocation are being developed. There are no final agreements as to approved alignments, land acquisitions, construction costs, and cost sharing of these traffic improvements. There will be the requirements imposed by State Department of Transportation and the Federal Highways Administration to review these items prior to final approval.

3. Hydrological characteristics that were described in the attachments provided with your comments were forwarded to Community Planning, Inc. who are the retained civil engineering firm in charge of design and plans for the improvements to Waikele. All site improvements will need to be reviewed by the City Department of Public Works for compliance with the City's building code standards for excavaton and grading.

4. Water - Similar comments on the water source of existing as well as proposed wells were received by our office. We will be revising Figure 7 to reflect the location of both existing, as well as, proposed well sources and reservoir sites.

5. The development of Waikele would have a positive impact upon the continued viability of Oahu Sugar Company. This would result in the "saving of a substantial number of sugar related jobs" by Oahu Sugar Company and Amfac through a variety of cost saving features augmented by projected financial returns from Waikele's urbanization. Included in this program of Oahu Sugar Company assistance was the practice of cost savings measures by the plantation. This would include more efficient use of labor force, reduced costs

due to irrigation savings, reduction in harvesting mobilization, and reduced costs for noise and dust control measures necessary to minimize impacts on urban residential sectors adjacent to Waikele.

The 2.0 to 1.0 revenue-cost ratio was developed as follows:

a. Identification of the kinds of revenue and cost elements to consider.

b. Estimation of the dollar amount that should be associated with each revenue and cost element.

c. Comparison of the discounted present values of the various revenue and cost totals.

This methodology indicated that an additional $2.00 in public revenue benefits would accrue to the State of Hawaii and/or the City & County of Honolulu for each dollar of public cost caused by the proposed development. This would be a definite financial gain to the State and City should this project be implemented.

The cumulative discounted public revenues totalled $61.1 million, in constant 1983 dollars. The cumulative discounted public cost totalled $30.4 million in constant 1983 dollars. Thus, the 2-1 revenue-cost ratio.

There was no consideration for secondary impacts or "externalities." The attached Table is provided to show revenue sources and public cost allocations. This is provided in the State Land Use Commission petition and is identified as Exhibit E-1 "Public Revenue/Cost Analysis by Environmental Capital Managers, Inc."

Thank you for your continuing interest and concern.

Very truly yours,

F. J. Rodriguez

FJR:ls

attachment

- include exploration for new uncontaminated sources, an activated carbon filtration system to treat onsite well water, or off-site water availability. A final decision will be made by the BWS.

Thank you for your continuing interest and concern.

Very truly yours,

F. J. Rodrigues

FJR:ls

University of Hawaii at Manoa

Water Resources Research Center
Holmes Hall 283 • 2540 Dole Street
Honolulu, Hawaii 96822

9 December 1985

Mr. John P. Whalen, Director
Department of Land Utilization
City & County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Whalen:

SUBJECT: Draft Environmental Impact Statement for Waikele, Aualii, Waikele, Ewa District, Oahu, Hawaii, November 1985

We have reviewed the subject DEIS and offer the following comments:

1. Contrary to the statement on p. III-24, 1. Water System, that the existing on-site municipal reservoir and deep wells attributed to be serving Waipahu Town have in fact been out of operation since July 1983 when traces of the pesticide EDB had been found in the water. This would be BWS Waipahu Wells (DLNR No. 2400-01, 02, 03, & 04). The on-site Amfac wells No. 1 and No. 2 (DLNR No. 2400-05 & 06) are similarly contaminated.

2. The locations of the existing municipal reservoir and deep wells and the proposed Amfac 1 MGD reservoir with related wells are not shown on Fig. 7 which illustrates infrastructure improvements (only water mains are shown). The locations are blocked-off but not labeled in Fig. 4. It would be helpful to have these wells and reservoirs identified since they are mentioned in the EIS.

3. The water source(s) for this project is/are not identified since the on-site wells mentioned in pp. III-24, 26 are contaminated and not operating as described.

Thank you for the opportunity to comment.

Sincerely,

Edwin T. Murabayashi
EIS Coordinator

DEC 13 1985

cc: F.J. Rodriguez, Env. Com., Inc.
bc: Inv. Ctr

ENVIRONMENTAL COMMUNICATIONS INC.

F. J. RODRIGUEZ
PRESIDENT

January 7, 1986

Mr. Edwin T. Murabayashi
EIS Coordinator
Water Resources Research Center
University of Hawaii Manoa
Holmes Hall 283
2540 Dole Street
Honolulu, Hawaii 96822

Dear Mr. Murabayashi:

We are in receipt of your office's comments dated December 9, 1985 and we respond in the following:

1. Discussions with the Board of Water Supply (BWS) Environmental Section indicate that wells servicing Waipahu Town at the present time are the Kunia I and Hoaeae wells. This is due to, as you have stated, the EDB contamination of wells previously providing service. The construction of a water treatment facility by BWS for these wells is nearing completion and is scheduled to be operational by June, 1986. At that time, the sources for Waipahu Town will be restored. Further, the Amfac wells onsite have also been found to be contaminated and Amfac will provide the required Department of Health (DOH), Department of Land and Natural Resources (DLNR), and BWS approved levels of purification to meet potable water standards.

2. All identification of either existing or proposed potable water system components were not shown on Infrastructure maps since the Water Master Plan had not been developed to that point. It should be noted here that until review and approval has been obtained by BWS, DLNR, and DOH, the Water Master Plan cannot be finalized. Figure 7 will be revised to show preliminary location of proposed well and reservoir locations. These will need to be reviewed and approved during the Zoning process.

3. Water sources are also to be discussed in the Water Master Plan currently under preparation; this plan will be submitted to the BWS sometime in January, 1986 for their review and approval. At the present time, Amfac is considering a number of alternatives subject to approval and these

1136 FORT STREET MALL SUITE 208 • P. O. BOX 57 • HONOLULU HAWAII 96809 • TELEPHONE (808) 521 8361

PB 85-1218

November 21, 1985

MEMO TO: MR. JOHN WHALEN, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

FROM: HERBERT K. MURAOKA
DIRECTOR AND BUILDING SUPERINTENDENT

SUBJECT: DRAFT EIS FOR WAIKELE DEVELOPMENT

We have reviewed the draft EIS for the Waikele Development and have no comments.

Thank you for the opportunity to review the draft EIS.

HERBERT K. MURAOKA
Director and Building Superintendent

TH:jo
cc: J. Harada
Environmental Communication, Inc.
(P. J. Rodriguez)

NOV 25 1985

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

December 11, 1985

TO: JOHN P. WHALEN, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

FROM: KAZU HAYASHIDA, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR WAIKELE DEVELOPMENT

We have the following comments on the environmental document for the proposed rezoning:

1. The developer should submit a water master plan for our review and approval.

2. The water demand for each phase of the development should be included in the document.

3. Based on the average water requirement of 2.1 million gallons per day, a 3.0 million gallon (mg) reservoir with an appropriately sized influent-effluent line will be required instead of the two 1.0 mg reservoirs mentioned on page IV-26.

4. If EDB or any other contaminants are found in the water, the developer shall install an activated carbon water treatment facility for the source.

If you have any questions, please contact Lawrence Whang at 527-6138.

For KAZU HAYASHIDA
Manager and Chief Engineer

cc: F.J. Rodrigues
Environmental Communications Inc.

DEC 16 1985

ENVIRONMENTAL COMMUNICATIONS INC.

F. J. RODRIGUEZ, PRESIDENT

January 7, 1986

Mr. Kazu Hayashida
Manager and Chief Engineer
Board of Water Supply
City & County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843

Dear Mr. Hayashida:

We are in receipt of your department's comments dated December 11, 1985 and respond in the following as provided by the retained engineering consultant, Community Planning, Inc.:

1. Preparation of the Water Master Plan is in progress and should be submitted to Board of Water Supply for review sometime in January, 1986.

2. The water demand for each phase will be included.

3. Computations for the size of the water reservoir will be included in the Water Master Plan. However, preliminary computations indicate a need for storage capacity of about 2.0 MG.

4. The developer has agreed to provide this requirement.

Thank you for your continuing interest and concern.

Very truly yours,

F. J. Rodriguez

FJR:ls

1146 FORT STREET MALL, SUITE 200 • P O BOX 3 • HONOLULU HAWAII 96809 • TELEPHONE (808) 521-6311

residential units in the development. This will attract home buyers into the area who currently would be shopping elsewhere. It also will provide current upwardly mobile residents of the area the opportunity to purchase the housing they require without moving out of the neighborhood.

One major factor that will impact on the lifestyle and the quality of life of the residents of Waipahu and adjacent areas is the increased vehicular traffic the additional residents will generate. The existing congestion on the H1 freeway is partly due to the current residents high dependence on private vehicle for transportation to work, 84 percent of the residents of Waipahu travel to work in a private vehicle as compared to a 76 percent average for Oahu. The impact on traffic, however, will be mitigated by the developers plans for another on-ramp to the freeway - which will serve all of Waipahu, not just residents of the proposed development, and the widening of Kam Highway.

4. Costs and Benefits. While it is not (yet) possible to determine the impact on the economy of the development, as exact plans and schedules are not yet finalized, it is obvious that a development of this magnitude will contribute millions to the economy through the moneys spend on labor, materials, and other development oriented expenses. In addition, the retail center and light industrial park are expected to create 2,000 jobs. The total impact of these employment possibilities of the economy as a whole will be the creation of approximately 3,600 jobs and an annual increase in the gross domestic product of several million dollars.

5. Benefit of having more houses available. A study of the demand for housing in the project area indicates that between 1983 and the year 2000, over 23,000 new units will be required. If these units are not forthcoming, the demand will be reflected in increased housing prices. The proposed

development will supply sufficient housing to meet about 12 percent of the projected demand.

6. As Waipahu is not a center of tourist activity, being primarily a residential and light industry community, the proposed development will have no or little impact on tourism.

7. Placing the subject lands in an urban use will have not significant impact on the agricultural sector of the county or of the State. Lands of similar quality and economic potential are currently lying fallow.

8. Arguments pro and con either status quo or growth can always be made. Both have advantages and disadvantages, with identifiable socio-economic benefits and costs. Which side and which argument is the most plausible will depend on an individuals or on a communities social and economic values.

One resolution is to have selective, high quality developments which will preserve those values considered to be the most valuable to the people affected, while simultaneously providing social and economic benefits. Such developments would include well-planned and implemented projects, architecturally and tastefully appropriate to the environment, which would have minimal negative social impact on the community.

Evaluated in the above context, the benefits of the proposed Waikele development clearly outweigh the costs. The integrity and commitment of AMFAC is evidenced by their long-term involvement in Hawaii and in Waipahu, and their record of well planned and executed development projects in Hawaii. Waikele is a logical location for the continued growth of Waipahu.

References

Hufschmidt, M.M., D. James, A.D. Meister, B.T. Bower, and J.A. Dixon, Environment, Natural Systems, and Development, An Economic Valuation Guide, John Hopkins University Press, Baltimore 1983.

Schwartz, H., and R. Berney, (editors) Social and Economic Dimensions of Project Evaluation, Inter-American Development Bank, Washington D.C. 1977.

Loose, V.W. (editor) Guidelines for Benefit-Cost Analysis, Province of British Columbia Environment and Land Use Committee Secretariat, Victoria, B.C. 1977.

Reeser, M. and J.J. Stern, The Appraisal of Development Projects, Praeger Publishers, New York 1977.

Hawaii State Census Statistical Areas Committee, "Population and Housing Unit Estimates for Oahu Census Tracts, 1980-1983," Report CTC-57, July 1984.

The State of Hawaii Data Book: 1984, Department of Planning and Economic Development, February 1985.

Statistics of Hawaiian Agriculture: 1983, Hawaii Agricultural Reporting Service, Honolulu, 1984.

1980 Census of Population, General Social and Economic Characteristics, OHawaii, PC80-1-C-13 (June 1983).

Appendix Table 1. Demographic Characteristic of the Waipahu CDP by Census Tracts - 1980

	Census Tracts							
	87.01	87.02	87.03	88	89.01	89.03	Waipahu	Honolulu
AGE								
Under 5 Years	552	364	648	320	908	184	2976	60154
5 - 9 Years	610	337	343	361	841	219	2711	56771
10 - 14 Years	731	322	171	399	783	262	2668	58528
15 - 19 Years	757	401	294	454	849	245	3000	69715
20 - 24 Years	677	436	760	389	1092	196	3550	89371
25 - 34 Years	1002	584	590	617	1268	345	4406	143456
35 - 44 Years	856	358	204	517	863	326	3124	89330
45 - 54 Years	802	375	141	572	718	235	2843	74775
55 - 64 Years	699	335	94	401	355	184	2068	65097
65 - 74 Years	407	230	39	280	127	127	1210	35932
75 and Over	191	112	22	142	57	59	583	19436
Total Population	7284	3854	3306	4452	7861	2382	29139	762565
Hshld Size	4.82	4.20	3.02	4.65	3.92	5.14	4.19	3.30
PLACE OF BIRTH								
Hawaii	4111	2221	2020	2594	4377	1266	16589	420120
Mainland	656	431	847	248	2102	145	4429	229234
Foreign	2517	1202	439	1610	1365	988	8121	113211
SCHOOL ENROLLMENT								
Total Enrolled	2217	1088	707	1351	2530	845	8738	214345
Nursery	42	47	56	46	66	13	270	10277
Public	12	11	21	12	20	0	76	2318
Private	30	36	35	34	46	13	194	7959
Kindergarten	82	52	90	89	121	63	507	11079
Public	33	37	90	119	94	36	408	8529
Private	8	15	0	22	27	27	99	2550
Elementary	1082	599	336	612	1334	401	4364	92879
Public	947	549	316	538	1246	375	3971	76200
Private	135	50	20	74	88	26	393	16679
High School	638	241	181	339	686	208	2293	51521
Public	586	216	181	321	623	196	2123	42131
Private	52	25	0	18	63	12	170	9390
College	373	139	44	265	323	160	1304	48589
SCHOOL COMPLETED								
Population >25 Yr	3962	1999	1079	2523	3387	1277	14227	428566
4 Yrs High School	1336	617	465	679	1665	317	5079	152346
1-3 Yrs College	493	229	90	444	563	304	2123	78386
>=4 Yrs College	359	104	54	323	227	171	1238	93201
JOURNEY TO WORK								
Workers >= 16 Yrs	3120	1573	1168	2081	3314	1066	12322	369523
Private Vehicle	2724	1195	946	1667	2825	974	10331	282479
Drive Alone	1780	840	533	1190	2059	624	7026	195727
Car Pool	944	355	413	477	766	350	3305	86752
Public Transport	287	249	135	299	328	51	1349	37042
Other	76	119	76	115	161	41	588	43622
Mean Travel Time	24.1	27.4	25.9	26	27.9	26.8	26.3	22.6

University of Hawaii at Manoa

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

December 23, 1985

RE:0430

Mr. John P. Whalen, Director
Department of Land Utilization
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Whalen:

Draft Environmental Impact Statement
Waikele Development
Ewa District, Oahu

We have reviewed the above cited document which describes the proposed rezoning of a 577.2± acre site for a planned community development. The project as proposed would include approximately 2700 residential units, a 150,000 square foot commercial center, an office/business park, a recreation center, an 18-hole golf course, neighborhood parks, fire station site, and an elementary school site. Requested zoning is from existing Ag-1 to R-6 residential, A-1 low density apartments, P-1 golf course/parks, and B-2 commercial center/and office/business park. Our review was prepared with the assistance of Paul Ekern, Agronomy and Soils; Eileen Anthony and Martha Diaz, Environmental Center.

The major concerns expressed by our reviewers are water availability, traffic, drainage, and infrastructure needs especially with regard to the cummulative impacts of this development and the Ewa Marina and West Beach developments.

Statement of Objectives

Page II-11: States that the Waikele development goals were established to ensure that the proposed action will accommodate those land uses which are mutually supportive to the Waipahu community at large, the City of Honolulu and State of Hawaii, and other affected groups such as Oahu Sugar Company and AmFac Property Development Corp.

The committment to providing more middle income residential uses by designating 40 percent of the units to be sold at "affordable prices" presumably reflects both the housing market demand as well as offering partial justification for rezoning of agricultural lands. What qualifies as "affordable housing" and how is "middle income" defined?

Page II-18: States "public funds and land may be utilized in development of traffic improvements and a navy access road crossing the project site." The justification for the use of public funds to rectify traffic inadequacies directly attributable to private development should be provided. The Final EIS should include a discussion of the cost analysis to the community of these required traffic improvements.

Hydrological Characteristics

The section on soils is generally accurate, however it might be helpful for planning purposes to take into account the attached paper by Ruhe, R.V. et al. on the Nature of Soil Parent Materials in Ewa-Waipahu Area, Oahu, Hawaii. It is unclear if the development will be sited on the Molokai soil over the original basalt or if some of the project will be underlain by transported soils on the caprock. If information from the drill cores on the site surveyed by the Soil Conservation Service as referenced in the Ruhe paper are available, they should clarify the underlying geomorphic province. Drainage from developments sited over Molokai soils may affect the basal ground water.

Page III-3-5: The Mililani interfluve in the Waikele-Kipapa triangle just Wahiawa from the Waikele Naval depot has a perched water table. The statement that no groundwater was encountered as determined from the bore holes by PSC Associates, Inc. would be further strengthened if examination of the SCS sites revealed that their drill cores extended deeply enough to reach a potential perched water table.

The Molokai soil as evidenced in the Kunia substation of the HSPA does contain many large boulders at depths near the surface. Increased grading costs and possible structural modifications should be anticipated. Note the attached references.

Water

Page III-24: The Draft EIS makes reference to existing water facilities which are attributed to serving the Waipahu town. It is our understanding that the on-site municipal reservoir and deep wells have been out of operation since July 1983, due to traces of ethylenedibromide EDB in the water. The BWS Waipahu Wells (DLNR No. 2400-01, 02, 03 and 04), the on-site AmFac Wells No 1 and No. 2 (DLNR No. 2400-05, and 06) are contaminated, as well.

Similarly, page III-27, Figure 7 (Infrastructure Improvements), does not show the locations of the existing municipal reservoir, deep wells, nor the proposed AmFac reservoir with related wells. Since these sources are cited in the Draft EIS it would be helpful, for review purposes, if the sources of water were identified. Sources of uncontaminated water for this proposed project are inconclusive as presented in the Draft EIS.

NF Vee'd

GEORGE R. ARIYOSHI
GOVERNOR

LETITIA R. UYEHARA
DIRECTOR

TELEPHONE NO.
548-6915

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
550 HALEKAUWILA STREET
ROOM 301
HONOLULU, HAWAII 96813

November 7, 1985

Dear Reviewer:

Attached for your review is an Environmental Impact Statement (EIS) that was prepared pursuant to the National Environmental Policy Act (NEPA) of 1969, Public Law 91-190, Chapter 343, Hawaii Revised Statutes and the Rules and Regulations of the Environmental Quality Commission:

Title: Draft EIS for Waikele Development

Location: Aulii, Waikele, Ewa District, Oahu

Classification: Applicant Action

Your comments or acknowledgement of no comments on this draft revised final EIS are welcomed. Please submit your reply to the accepting authority or approving agency:

Mr. John P. Whalen, Director
Department of Land Utilization, C&C Hnl.
650 South King Street
Honolulu, Hawaii 96813

Please send a copy of your reply to the proposing party:

Mr. F. J. Rodrigues
Environmental Communication Inc.
P.O. Box 536
Honolulu, HI 96809

Your comments must be received or postmarked by: December 23, 1985

If you have no further use for this EIS, please return it to the Office of Environmental Quality Control.

Thank you for your participation in the EIS process. DEC 2 1985

Recommendation: Return EIS to OEQC with the notation: "Reviewed. No adverse comments." Takeshi Yoshihara, Energy Program Administer

properties. These sediments are slightly acid to slightly alkaline, have oxide contents similar to the marine group but lack calcium carbonate and are dominated by 2:1 lattice clay.

The materials of the groups differ in origin and age (Table 3). The oldest interior group of pre mid-Pleistocene age is essentially a product of *in situ* weathering of basalt or locally derived basaltic detritus. The coastal group of mid-Pleistocene age is a product of terrestrially derived detritus of a basaltic terrain that was deposited in a near-shore marine environment. The intermediate group of late Pleistocene age is a product of detritus both derived and deposited terrestrially. Some of the different properties of these materials are related to their environmental histories, and soils formed in the materials inherit some of the geomorphically evolved parent-material differences.

LITERATURE CITED

1. Aguilera, N. H., and M. L. Jackson. 1953. Iron oxide removal from soils and clays. Soil Sci. Soc. Amer. Proc. 17:359–364.
2. Cline, M. G. 1939. Soil survey of the territory of Hawaii. U. S. Dept. Agr. Soil Surv. Ser. 1939, no. 28 611 p.
3. Daniels, R. B., J. F. Brasfield, and F. F. Riecken. 1962. Distribution of sodium hydroxalbite extractable manganese in some Iowa soil profiles. Soil Sci. Soc. Amer. Proc. 26:75–78.
4. Frye, J. C., and H. B. Willman. 1960. Classification of the Wisconsinan stage in the Lake Michigan glacial lobe. Ill. Geol. Surv. Circ. 83:16 p.
5. Kilmer, V. J. 1960. The estimation of free iron oxides in soils. Soil Sci. Soc. Amer. Proc. 24:420–421.
6. Roukby, H. P. 1961. Oxides and hydroxides of aluminum and iron. *In* G. Brown [ed.] The X-ray identification and crystal structure of clay minerals. Mineral. Soc. London. p. 354–392.
7. Rubin, M., and S. M. Berthold. 1961. U. S. Geological Survey radiocarbon dates VI. Radiocarbon 3:86–98.
8. Stearns, H. T. 1935. Geology and ground water resources of the island of Oahu, Hawaii. Hawaii Div. Hydrography Bull. 1, pt. 1. 198 p.
9. ———. 1939. Geologic map and guide of the island of Oahu, Hawaii. Hawaii Div. Hydrography Bull. 2. 75 p.
10. ———. 1961. Eustatic shorelines on Pacific islands. Zeit. Geomorphologie, supp. 3:3–16.
11. Uehara, G., K. W. Flach, and G. D. Sherman. 1962. Genesis and micromorphology of certain soil structural types in Hawaiian Latosol and their significance to agricultural practice. Int. Soc. Soil Sci. Conf., Trans. Comm. 5 (New Zealand) A7, 8 p.
12. U. S. Salinity Laboratory, L. A. Richards [ed.] 1954. Diagnosis and improvement of saline and alkali soils. U. S. Dept. Agr. Handbook 60. 160 p.

DIVISION S-6—SOIL AND WATER MANAGEMENT AND CONSERVATION

Nitrogen and Phosphorus in Tile Drainage Effluent [1]

WILLIAM R. JOHNSTON, F. ISHIHARA, RICHARD M. DAUM AND ARTHUR F. PILLSBURY[2]

ABSTRACT

Tile drainage effluent from systems on irrigated land in the San Joaquin Valley of California was analyzed for nitrogen and phosphorus and the quantity of each element found was correlated with the quantity of N and P applied for four different cropping patterns. Large percentages of applied N were found to be lost in tile drainage effluent. Phosphorus losses were not significant.

UNDER CALIFORNIA conditions, with an intensive irrigated agriculture, nitrogen and phosphorus are the two elements that must be applied to crops in large quantities to assure that maximum yields are attained. The amounts of these elements appearing in drainage waters are important (i) as an indication of the efficiency with which applied fertilizers are utilized, and (ii) as an indication of the nutrients provided for a chain of aquatic plant and animal life in the drainage waters downstream.

Evidence obtained by Chapman and others (1, 6) indicate that nitrates are highly soluble and high leaching losses should be expected. Research and development work is under way on slowly available fertilizers (3, 5), and this may some day cause improvement in utilization efficiency. Also, there has been at least a suspicion that the higher level of nutrients in drainage water may encourage the growth of algae (7, 9). This algae might be considered a source of animal food, if harvested, or the triggering mechanism for a chain of aquatic biological activity which might have either a favorable or unfavorable effect for man on the downstream ecology. In connection with a recent study of tile drainage and waste water management in the San Joaquin Valley of California, some data were obtained on N and P applied to the land, and the amounts found in tile drainage water.

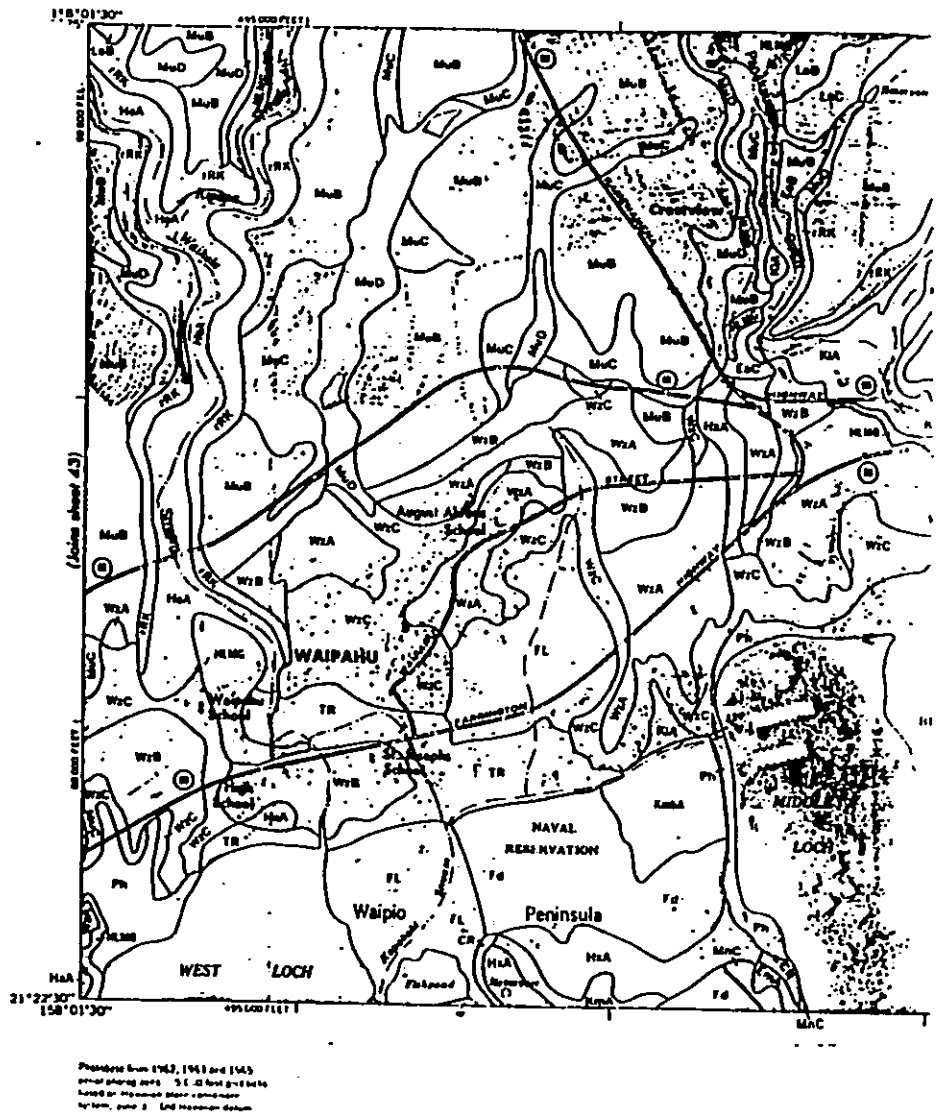
The objectives of this study were to determine (i) the percentage of applied N and P discharged in tile effluent under different cropping programs and (ii) the concentration of nutrients available for aquatic life downstream from the drainage systems.

METHODS

Four tile drainage systems were included in this study, and they were selected because of the variety of crops grown over the systems and the resultant variation in fertilizer applications. Physical data on the tile systems are presented in Table 1 along with a list of the crops grown. The soils drained were relatively heavy Panoche and Orestimba silty clays which are deep, permeable, alluvial fan and basin rim soils, respectively (2). They are calcareous and originally had slight to strong alkali accumulations. Each field had

[1] Joint contribution, Department of Irrigation and Soil Science and the Water Resources Center, University of California, Los Angeles, California, and the State Department of Water Resources, Sacramento. Received Sept. 28, 1961. Approved Dec. 1, 1961.

[2] Associate Specialist, (Irrigation and Drainage) University of California, Los Angeles; Assistant Civil Engineer, California State Department of Water Resources, Fresno; Water Resources Engineering Associate, California State Department of Water Resources, Sacramento, and Professor of Irrigation and Engineering, University of California, Los Angeles, respectively.



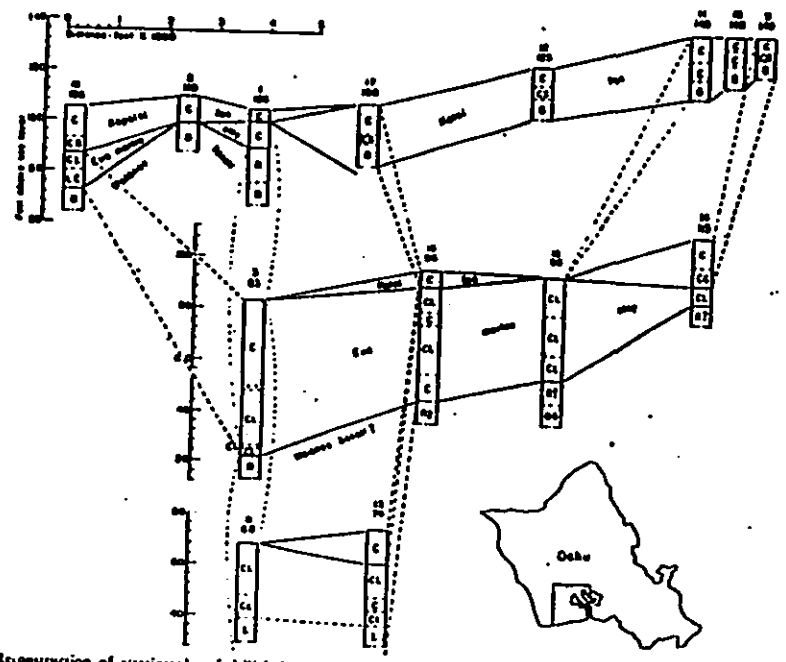


Fig. 3—Reconstruction of stratigraphy of drill holes. See Fig. 1 for locations. Symbols same as Fig. 2 with additions as S—sand, and G—gravel.

at 7.2, 4.42, 3.57, 2.52, 2.34, 1.99, and 1.48A. Goethite peaks are at 4.15, 2.45, and 1.72A; hematite peaks are at 2.69, 2.21, 1.84, and 1.69A; goethite and/or hematite are 1.45A; and maghemite is at 2.95A (6, p. 386-387). Weathered materials in the Wahiawa Basin consist essentially of clay minerals and sesquioxides as the two main components (11).

Similarity of gross mineralogy of Ewa marine clay and Kaloi terrestrial sediments is attributable to derivation from weathered detritus as well as fresher rock material of the Waianae Mountains and Wahiawa Basin. In the Ewa and Kaloi sediments 2:1 lattice clay is more abundant than kaolinite (Table 2). In the weathered material in the source areas, kaolinite is dominant in the upper red weathering zone but 2:1 lattice clay may be more dominant than kaolinite as in the lower brown weathering zone of profile 19. However, in profile 1-1 kaolinite dominates 2:1 lattice clay in ratios of 10:1, 7:3, 4:3, 3:5, and 3:7 at depths of 0-2, 2-9, 9-16, 16-21, 21-30 feet, respectively. This dominance of kaolinite at depth in the Wahiawa Basin source area requires the addition of comminuted saprolite or rock material to the Ewa and Kaloi sediments, and occurrence of basalt fragments in the latter shows such additions.

In Ewa marine clay the intercalated coral limestones and the presence of calcite throughout the clay matrix reflect the near-shore marine environment in which the detritus from the land mass was deposited. However, the similarity of the clay-mineral suites in the marine clay and in the Kaloi terrestrial sediments suggests that the clay minerals were little altered diagenetically while in the marine environment.

The 2:1 lattice clay apparently is interlayered and poorly crystalline. Instead of sharply defined diffraction peaks such as those of kaolinite, peaks are broadly domal, spacing at 17A but extending from 14 to 22A. The lattice expands when glycerol solvated but apparently only partially collapses when heated to 400C (Fig. 5). In the latter case diffraction patterns do not show a sharply defined peak at 10A but a multileveled plateau extending from 10 to 17A. Apparently part of the 2:1 type clay is montmorillonite as cation-exchange capacities of the clay fractions are 31 to 43 meq/100g of soil (Table 2).

Chemical Properties

Organic carbon content of all sediments is low, being only a trace to several tenths of a per cent. Consequently the cation-exchange capacities reflect the clay-mineral assemblages of the sediments.

Sediments of marine environment, Ewa marine clay, have pH values of 7.3 to 8.4 (Table 2, samples 4-1 to 7, 6-1 to 6, 16-2 to 8, 18-4 to 5). Sediments of terrestrial environment, Kaloi alluvium (samples 12-1 to 4, 16-1) and Kapolei alluvium (samples 18-1 to 3) have pH values of

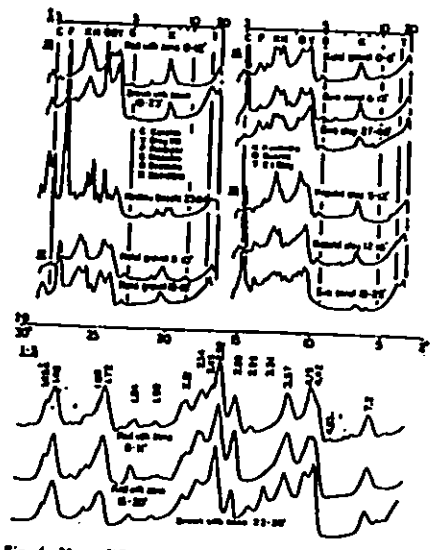


Fig. 4—X-ray diffraction patterns of untreated whole samples. Numbers underlined are drill holes. Series 19 and 1-5 are weathering zones over basalt on Wahiawa Basin surface. Others as labeled.

6.6 to 7.4. The higher values of the marine sediments reflect additions of alkaline earths and bases while in the near-shore marine environment, and the occurrence of coral limestone in these sediments corroborates this view.

The terrestrial sediments also were derived from the Wahiawa Basin and the Waianae Mountains. Although soils (Molokai, Lahaina, and Wahiawa) in these areas have lower pH values of 5.3 to 7.0,[6] subjacent regolithic materials may have higher values (Table 2, 19-1 to 5). Gulches from which Kaloi sediments debouch were incised in the regolithic materials. Consequently the pH values of Kaloi sediment (samples 12-1 to 4, 16-1) are reasonably somewhat higher than those of source-area material but also lower than those of sediments subjected to marine influences. Kaloi and Kapolei sediments also are mixed with marine sediment where they overlie Ewa marine clay (samples 16-1, 18-1 to 3) as indicated by presence of coral fragments and measurable calcium carbonate (Table 2). This may also account for higher pH values in the terrestrial sediments.

Free iron oxide and free manganese oxide contents are uniform, slightly decrease, or slightly increase to considerable depths in Ewa marine clay. There is no repetitive, systematic, orderly arrangement that might be developed in a weathering profile such as in samples 19-1 to 5. These uniform distributions probably are features of the sediments formed as high iron- and manganese-content detritus was deposited in the near-shore marine environment. Soils on the part of the land mass that existed during the Kaena sea stand currently have 11 to 21% free iron oxide.[6]

[6] Data from Soil Survey Laboratory, SCS, Hilo, HI.

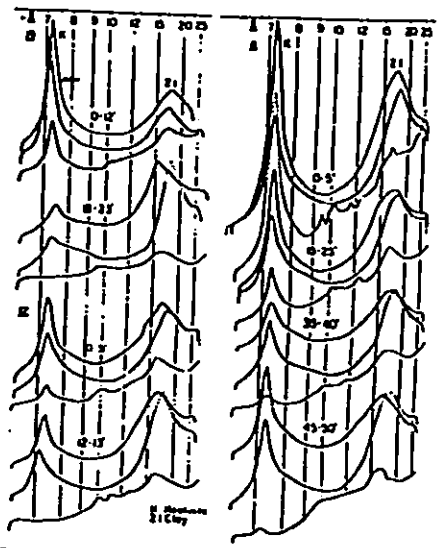


Fig. 5—X-ray diffraction patterns of samples with iron oxides removed. Numbers underlined are drill holes. Three patterns per horizon: upper air-dried, middle glycerol-solvated; lower heated to 400C.

Undoubtedly, they had reasonably high content when they served as a source of sediment for the marine clays.

Distributions of free iron and manganese oxides in Kaloi sediment (Table 2, 12-1 to 4) also may be a depositional feature of the material rather than reflective of a weathering profile. The oxides in Kapolei alluvium (Table 2, 18-1 to 2) certainly are features of the detritus of the fan derived from the higher lying red Latosols.

SUMMARY

Soil parent materials in the Ewa-Waipahu area occur in three landscape groups. The interior Wahiawa Basin surfaces have more acid materials that have high iron and manganese oxide contents and are dominated by kaolinitic clay. Ewa coastal plain sediments along the shore are alkaline materials that have uniform but lower oxide content, have appreciable calcium carbonate, and are dominated by 2:1 lattice clay. Between these two groups is a sedimentary body, marked by the Kaloi surface, that has intermediate

Table 3—Ages of sediments, landscapes, and soils

APPENDIX D

HOUR	SPEED (MPH)	VPH	% AUTOS	% MT	% HT	**** LEQ(H) IN dB @ 50' **** AUTO	MT	HT	ALL VEH
0000-0100	40	322	97	2	1	55.7	50.2	52.5	58.2
0100-0200	40	137	97	2	1	52.0	46.5	48.8	54.5
0200-0300	40	127	97	2	1	51.7	46.2	48.5	54.1
0300-0400	40	78	97	2	1	49.6	44.1	46.4	52.0
0400-0500	40	192	97	2	1	53.5	48.0	50.3	55.9
0500-0600	40	1,153	97	2	1	61.3	55.8	58.1	63.7
0600-0700	40	2,229	97	2	1	64.1	58.6	60.9	66.6
0700-0800	40	2,328	97	2	1	64.3	58.8	61.1	66.8
0800-0900	40	1,619	97	2	1	62.7	57.3	59.5	65.2
0900-1000	40	1,479	97	2	1	62.3	56.9	59.1	64.8
1000-1100	40	1,386	97	2	1	62.1	56.6	58.9	64.5
1100-1200	40	1,337	97	2	1	61.9	56.4	58.7	64.4
1200-1300	40	1,336	97	2	1	61.9	56.4	58.7	64.4
1300-1400	40	1,457	97	2	1	62.3	56.8	59.1	64.7
1400-1500	40	1,742	97	2	1	63.0	57.6	59.8	65.5
1500-1600	40	2,218	97	2	1	64.1	58.6	60.9	66.6
1600-1700	40	2,462	97	2	1	64.5	59.1	61.3	67.0
1700-1800	40	2,415	97	2	1	64.5	59.0	61.3	66.9
1800-1900	40	2,086	97	2	1	63.8	58.4	60.6	66.3
1900-2000	40	1,608	97	2	1	62.7	57.2	59.5	65.2
2000-2100	40	1,132	97	2	1	61.2	55.7	58.0	63.6
2100-2200	40	1,076	97	2	1	61.0	55.5	57.8	63.4
2200-2300	40	702	97	2	1	59.1	53.6	55.9	61.6
2300-2400	40	426	97	2	1	56.9	51.5	53.7	59.4

KAMEHAMEHA HWY @ WAIPAHU ST., STA C-13-K, (4/23-24/84)

TOTAL VPD: 31,047 LDN @ 50 FT: 65.8 60.4 62.6 68.3

APPENDIX C. WORKSHEET #3

LANE	SPEED (MPH)	VPH	% AUTOS	% MT	% HT	*** HOURLY LEQ IN dB @ AUTO	MT	HT	100 FT ALL VEH
MAUKA SIDE:									
Waianael	55	493	96	2.5	1.5	63.9	58.9	60.7	66.4
Waianae2	55	493	96	2.5	1.5	61.8	56.8	58.6	64.3
Waianae3	55	493	96	2.5	1.5	60.2	55.2	57.0	62.7
				SUBTOTAL:		67.0	62.0	63.8	69.5
Honolulu1	55	1,213	96	2.5	1.5	60.7	55.6	57.4	63.2
Honolulu2	55	1,213	96	2.5	1.5	59.9	54.9	56.6	62.4
Honolulu3	55	1,213	96	2.5	1.5	59.2	54.2	55.9	61.7
				SUBTOTAL:		64.7	59.7	61.5	67.2
				MAUKA TOT:		69.0	64.0	65.8	71.5
MAKAI SIDE:									
Honolulu1	55	1,213	96	2.5	1.5	67.8	62.8	64.6	70.3
Honolulu2	55	1,213	96	2.5	1.5	65.7	60.7	62.5	68.2
Honolulu3	55	1,213	96	2.5	1.5	64.1	59.1	60.9	66.7
				SUBTOTAL:		70.9	65.9	67.7	73.4
Waianael	55	493	96	2.5	1.5	56.8	51.7	53.5	59.3
Waianae2	55	493	96	2.5	1.5	56.0	50.9	52.7	58.5
Waianae3	55	493	96	2.5	1.5	55.3	50.2	52.0	57.8
				SUBTOTAL:		60.8	55.8	57.6	63.3
				MAKAI TOT:		71.3	66.3	68.1	73.8

H-1 FREEWAY, AM PK. HR., LEVEL VS. DIST.

APPENDIX C. WORKSHEET #4

IINA.

TEXT

APPENDIX B

EXCERPTS FROM EPA'S ACOUSTIC TERMINOLOGY GUIDE

Descriptor Symbol Usage

The recommended symbols for the commonly used acoustic descriptors based on A-weighting are contained in Table I. As most acoustic criteria and standards used by EPA are derived from the A-weighted sound level, almost all descriptor symbol usage guidance is contained in Table I.

Since acoustic nomenclature includes weighting networks other than "A" and measurements other than pressure, an expansion of Table I was developed (Table II). The group adopted the ANSI descriptor-symbol scheme which is structured into three stages. The first stage indicates that the descriptor is a level (i.e., based upon the logarithm of a ratio), the second stage indicates the type of quantity (power, pressure, or sound exposure), and the third stage indicates the weighting network (A, B, C, D, E.....). If no weighting network is specified, "A" weighting is understood. Exceptions are the A-weighted sound level and the A-weighted peak sound level which require that the "A" be specified. For convenience in those situations in which an A-weighted descriptor is being compared to that of another weighting, the alternative column in Table II permits the inclusion of the "A". For example, a report on blast noise might wish to contrast the L_{Cdn} with the L_{Adn}.

Although not included in the tables, it is also recommended that "L_{PN}" and "L_{EPN}" be used as symbols for perceived noise levels and effective perceived noise level, respectively.

It is recommended that in their initial use within a report, such terms be written in full, rather than abbreviated. An example of preferred usage is as follows:

The A-weighted sound level (LA) was measured before and after the installation of acoustical treatment. The measured LA values were 85 and 75 dB respectively.

Descriptor Nomenclature

With regard to energy averaging over time, the term "average" should be discouraged in favor of the term "equivalent". Hence, L_{eq} is designated the "equivalent sound level". For L_d, L_n, and L_{dn}, "equivalent" need not be stated since the concept of day, night, or day-night averaging is by definition understood. Therefore, the designations are "day sound level", "night sound level", and "day-night sound level", respectively.

The peak sound level is the logarithmic ratio of peak sound pressure in a reference pressure and not the maximum root mean square pressure. While the latter is the maximum sound pressure level, it is often incorrectly labelled peak. In that sound level meters have "peak" settings, this distinction is most important.

"Background ambient" should be used in lieu of "background", "ambient", "residual", or "indigenous" to describe the level characteristic of the general background noise due to the contribution of many unidentifiable noise sources near and far.

With regard to units, it is recommended that the unit decibel (abbreviated dB) be used without modification. Hence, dBA, PNdB, and EPNdB are not to be used. Examples of this preferred usage are: the Perceived Noise Level (L$_{PN}$) was found to be 75 dB. (L_{PN} = 75 dB.) This decision was based upon the recommendation of the National Bureau of Standards, and the policies of ANSI and the Acoustical Society of America, all of which disallow any modification of bel except for prefixes indicating its multiples or submultiples (e.g., deci).

Noise Impact

In discussing noise impact, it is recommended that "Level Weighted Population" (LWP) replace "Equivalent Noise Impact" (ENI). The term "Relative Change of Impact" (RCI) shall be used for comparing the relative differences in LWP between two alternatives.

Further, when appropriate, "Noise Impact Index" (NII) and "Population Weighted Loss of Hearing" (PHL_x) shall be used consistent with CHABA Working Group 69 Report Guidelines for Preparing Environmental Impact Statements (1977).

TABLE I: A-Weighted Recommended Descriptor List

	Term	Symbol
1.	A-Weighted Sound Level	L_A
2.	A-Weighted Sound Power Level	L_{WA}
3.	Maximum A-Weighted Sound Level	L_{max}
4.	Peak A-Weighted Sound Level	L_{Apk}
5.	Level Exceeded x% of the time	L_x
6.	Equivalent Sound Level	L_{eq}
7.	Equivalent Sound Level over Time (T) (1)	$L_{eq(T)}$
8.	Day Sound Level	L_d
9.	Night Sound Level	L_n
10.	Day-Night Sound Level	L_{dn}
11.	Yearly Day-Night Sound Level	$L_{dn(y)}$
12.	Sound Exposure Level	L_{SI}

(1) Unless otherwise specified, time is in hours (e.g. the hourly equivalent level is $L_{eq(1)}$). Time may be specified in non-quantitative terms (e.g., could be specified a $L_{eq(WASH)}$ to mean the washing cycle noise for a washing machine.)

TABLE II: Recommended Descriptor List

	TERM	A-WEIGHTING	ALTERNATIVE(1) A-WEIGHTING	OTHER WEIGHTING (2)	UNWEIGHTED
1.	Sound (Pressure) (3) Level	L_A	L_{pA}	L_B, L_{pB}	L_p
2.	Sound Power Level	L_{WA}		L_{WB}	L_W
3.	Max. Sound Level	L_{max}	L_{Amax}	L_{Bmax}	L_{pmax}
4.	Peak Sound (Pressure) Level	L_{Apk}		L_{Bpk}	L_{pk}
5.	Level Exceeded x% of the time	L_x	L_{Ax}	L_{Bx}	L_{px}
6.	Equivalent Sound Level	L_{eq}	L_{Aeq}	L_{Beq}	L_{peq}
7.	Equivalent Sound Level Over Time(T) (4)	$L_{eq(T)}$	$L_{Aeq(T)}$	$L_{Beq(T)}$	$L_{peq(T)}$
8.	Day Sound Level	L_d	L_{Ad}	L_{Bd}	L_{pd}
9.	Night Sound Level	L_n	L_{An}	L_{Bn}	L_{pn}
10.	Day-Night Sound Level	L_{dn}	L_{Adn}	L_{Bdn}	L_{pdn}
11.	Yearly Day-Night Sound Level	$L_{dn(y)}$	$L_{Adn(Y)}$	$L_{Bdn(Y)}$	$L_{pdn(Y)}$
12.	Sound Exposure Level	L_S	L_{SA}	L_{SB}	L_{Sp}
13.	Energy Average value over (non-time domain) set of observations	$L_{eq(e)}$	$L_{Aeq(e)}$	$L_{Beq(e)}$	$L_{peq(e)}$
14.	Level exceeded x% of the total set of (non-time domain) observations	$L_{x(e)}$	$L_{Ax(e)}$	$L_{Bx(e)}$	$L_{px(e)}$
15.	Average L_x value	L_x	L_{Ax}	L_{Bx}	L_{px}

(1) "Alternative" symbols may be used to assure clarity or consistency.

(2) Only B-weighting shown.. Applies also to C,D,E,..... weighting.

(3) The term "pressure" is used only for the unweighted level.

(4) Unless otherwise specified, time is in hours (e.g., the hourly equivalent level is $L_{eq(1)}$). Time may be specified in non-quantitative terms (e.g., could be specified as $L_{eq(WASH)}$ to mean the washing cycle noise for a washing machine)).

- D -

tigation measures will probably be required to mitigate traffic noise impacts along the Crestview/Kamehameha Highway and H-1 Freeway Rights-of-Way. These possible traffic noise impacts were discussed previously. The use of sound attenuating walls is the most likely mitigation measure to be applied in these two situations, and Federal-aid will probably be available for these noise mitigation measures.

A. REFERENCES

(1) Barry, T. and J. Reagan, "FHWA Highway Traffic Noise Prediction Model," FHWA-RD-77-108, Federal Highway Administration, Washington, D.C., December 1978.

(2) Austin, Tsutsumi & Associates, Inc., "Traffic Impact Report for the Proposed Waikele Development Master Plan," August, 1985.

(3) February 28-March 1, 1983 Vehicle Type Classification, Station C-13-J, Kamehameha Highway at Kipapa Stream, State Department of Transportation.

(4) July 25-27, 1983 Vehicle Type Classification, Station C-7-L, H-1 Freeway at Kaonohi Overpass, State Department of Transportation.

(5) April 9-10, 1984 24-Hour Traffic Counts, Station H-8-A, H-1 Freeway at Waikele Bridge, State Department of Transportation.

(6) April 23-24, 1984 24-Hour Traffic Counts, Station C-13-K, Kamehameha Highway at Waipahu Street, State Department of Transportation.

(7) "Guidelines for Considering Noise in Land Use Planning and Control," Federal Interagency Committee on Urban Noise, June 1980.

(8) American National Standard, "Sound Level Descriptors for Determination of Compatible Land Use," ANSI S3.23-1980, Acoustical Society of America.

(9) "Environmental Criteria and Standards, Noise Abatement and Control, 24 CFR, Part 51, Subpart B," U.S. Department of Housing and Urban Development, July 12, 1979.

(10) "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety," Environmental Protection Agency, EPA 550/9-74-004), March 1974.

available at the writing of this noise study, existing traffic noise contours from this noise study were provided to the project planners for building siting purposes. Therefore, it is anticipated that the majority of the Waikele residential/apartment units will be in the "Acceptable" and "Unconditionally Acceptable" noise exposure categories.

VII. POSSIBLE NOISE MITIGATION MEASURES

Possible noise mitigation measures which would minimize noise impacts from roadway traffic noise include measures such as: the use of buffer zones of sufficient depth as indicated in FIGURES 3A thru 3E and TABLE 4; construction of sound attenuation berms or walls where adequate setbacks cannot be achieved; incorporating sound attenuating window design features in upper-story homes which cannot be shielded by sound attenuating barriers; and air conditioning affected spaces. The applicability of each mitigation measure depends upon other considerations besides noise, such as economic cost, aesthetics, and technical feasibility.

The approximately 150 FT wide greenbelt fronting the existing Gentry development along Kamehameha Highway is an example of using setback as a noise mitigation measure. The construction of sound attenuation walls or berms is also a standard mitigation measure, particularly for single-story homes. Wall height requirements become excessive (in the order of 10-plus FT) when multi-story residences are involved in traffic noise mitigation efforts. For this reason, the use of walls or berms as a traffic noise mitigation measure is generally limited to ground-floor residential units.

Where none of the above mitigation measures are feasible, the remaining options are air conditioning the affected residential spaces or sound-treating ventilation openings (windows). The use of air conditioning within residences is not common, and is not generally considered a practical option for subdivision residences. The use of sound-treated windows has been applied at selected mid-rise structures in Hawaii for the purpose of meeting FHA/HUD noise standards, and is a possible noise mitigation option for any new home of the project.

If the Kamehameha Highway widening and Paiwa Interchange projects are implemented, and particularly if Federal Highway Administration approvals are required for these projects, noise mi-

TABLE 5

PROJECT AND NON-PROJECT TRAFFIC NOISE INCREASES

LOCATION	EXISTING LDN	FUTURE LDN PHASE I	FUTURE LDN PHASE II
H-1 Freeway (Hauka Side)	71.5	72.4	72.6
H-1 Freeway (Makai Side)	73.8	74.7	74.9
Kamehameha Hwy. @ Lumiaina	67.4	67.6	68.5
Kamehameha Hwy. @ Waipahu	68.2	68.9	68.7
Manager's Dr. @ Lumiaina	-	59.7	64.1
Paiwa St. @ H-1 Fwry.	-	59.8	65.3

Note: Ldn values calculated at 100 FT from H-1 Freeway centerline, and at 50 FT from other roadways' centerlines.

VI. DISCUSSION OF FUTURE TRAFFIC NOISE IMPACTS

As indicated previously, differential traffic noise impacts along Kamehameha Highway and H-1 Freeway attributable to the proposed Waikele Master Plan are predicted to be in the order of 0.5 Ldn (or dB), and will be difficult to measure. Total increases in traffic noise along these two roadways following completion of the project as proposed will be in the order of 1 Ldn.

Although traffic noise increases associated with the overall increases in traffic volumes are expected to be small, secondary noise impacts associated with improvements to the highway system are possible. These improvements are the widening of Kamehameha Highway between Waipahu Street and the future Manager's Drive, and the construction of the Paiwa Interchange.

The widening of Kamehameha Highway from 70 FT to 100 FT Right-of-Way, with the centerline displaced 15 FT toward the existing Crestview area, will increase traffic noise levels by an additional 1.1 Ldn along the new Crestview Right-of-Way, and will decrease traffic noise levels by 1.5 Ldn along the existing Waikele Right-of-Way. These changes in traffic noise levels are in addition to those indicated in TABLES 3 thru 5, which only reflect future changes in traffic volume and level of service.

The construction of the Paiwa Interchange, and the makai on-ramp in particular, is anticipated to increase H-1 Freeway noise at existing residential lots east (Honolulu side) of Paiwa Street by approximately 3 Ldn. Total traffic noise level along the Right-of-Way adjacent to the on-ramp is predicted to be 75 Ldn. The off-ramp west of Paiwa Street is not anticipated to generate significant noise impacts due to the low volume (280 VPH) of traffic anticipated.

Traffic noise impacts on future Waikele residents can be minimized by location of residential and apartment units beyond the future 65 Ldn contour line, and, if possible, beyond the 60 Ldn contour line. Although the final development plans were not

TABLE 4

EXISTING AND FUTURE DISTANCES TO 60, 65, AND 70 Ldn CONTOURS

STREET SECTION	60 Ldn SETBACK (FT) EXISTING	60 Ldn SETBACK (FT) FUTURE	65 Ldn SETBACK (FT) EXISTING	65 Ldn SETBACK (FT) FUTURE	70 Ldn SETBACK(FT) EXISTING	70 Ldn SETBACK(FT) FUTURE
H-1 Freeway (Mauka Side)	559	656	264	310	125	147
H-1 Freeway (Makai Side)	720	839	352	410	172	201
Kamehameha Hwy. @ Lumiaina	155	184	72	85	33	39
Kamehameha Hwy. @ Waipahu	175	190	81	88	38	41
Manager's Dr. @ Lumiaina	-	95	-	44	-	20
Paiwa St. @ H-1 Fwy.	-	112	-	52	-	24

Notes: All setback distances are to the roadway centerlines. See TABLE 3 for traffic assumptions. Ldn assumed to be equal to AM Peak Hour Leq for H-1 Freeway, and 1 dB greater than PM Peak Hour Leq for other roadways. Setback distances are for unobstructed Line-of-Sight conditions.

used to estimate the future locations of 60, 65, & 70 Ldn contours. The future location of the 55 Ldn contour is difficult to determine without prior knowledge of the man-made structures planned within the development.

TABLE 5 presents the existing and future traffic noise levels at reference distances of 100 FT and 50 FT from the roadways' centerlines. Traffic noise levels represent project plus non-project Ldn at the completion of the Phase I and Phase II increments.

Future traffic noise levels along the two major interior streets of the proposed development are expected to be in the "Acceptable" noise exposure category. As long as the total number of heavy vehicles (diesel trucks and buses) are not greater than 1 percent of the total traffic volume, future traffic noise levels are predicted to be below 65 Ldn at 55 FT setback distances from the centerlines of the internal roadways.

TABLE 3

COMPARISONS OF EXISTING AND FUTURE TRAFFIC NOISE LEVELS IN PROJECT ENVIRONS

LOCATION	SPEED (MPH)	VPH	*** HOURLY LEQ IN DB @ 50'*** AUTO	MT	HT	ALL VEH	DB INCREASE
EXISTING PEAK HR. TRAFFIC:							
H-1 Freeway (Mauka Side)*	55	5,118	69.0	64.0	65.8	71.5	-
H-1 Freeway (Makai Side)*	55	5,118	71.3	66.3	68.1	73.8	-
Kamehameha Hwy. @ Lumiaina	40	2,116	63.9	58.4	60.7	66.4	-
Kamehameha Hwy. @ Waipahu	40	2,546	64.7	59.2	61.5	67.2	-
Manager's Dr. @ Lumiaina		(None)					
Paiwa St. @ H-1 Fwry.		(None)					
FUTURE (PHASE II) PEAK HR.TRAFFIC:							
H-1 Freeway (Mauka Side)*	52	7,840	69.9	65.0	67.1	72.6	1.1
H-1 Freeway (Makai Side)*	52	7,840	72.2	67.3	69.3	74.9	1.1
Kamehameha Hwy. @ Lumiaina	40	2,740	65.0	59.5	61.8	67.5	1.1
Kamehameha Hwy. @ Waipahu	37	3,730	65.1	59.7	62.3	67.7	0.5
Manager's Dr. @ Lumiaina	40	1,010	60.7	55.2	57.5	63.1	63.1
Paiwa St. @ H-1 Fwry.	40	1,310	61.8	56.3	58.6	64.3	64.3

*Noise levels are at 100 FT from center (Baseline) of H-1 Freeway.

Assumed traffic mix of 96% Autos, 2.5% Medium Trucks, and 1.5% Heavy Vehicles on H-1 Fwry., and 97% Autos, 2% Medium Trucks, and 1% Heavy Vehicles on internal streets and Kamehameha Hwy.

V. FUTURE TRAFFIC NOISE ENVIRONMENT

Predictions of future traffic noise levels were made using the traffic volume predictions for the Phase I and II development increments contained in Reference 2. Future traffic noise levels were calculated for total (project plus non-project) traffic. By Reference 2, project traffic on H-1 Freeway and Kamehameha Highway will be in the order of 10 percent greater than non-project traffic. Traffic noise level increases attributable to the project traffic are anticipated to be less than 0.5 dB for a 10 percent increase in traffic volume.

The predicted increases in traffic noise levels from the present to the completion of Phase II development are shown in TABLE 3. Because the total width of the H-1 Freeway lanes is greater than 100 FT, a reference distance of 100 FT, rather than 50 FT, from the center of the freeway was used. The predicted noise level increases along the freeway and Kamehameha Highway are in the order of 0.5 to 1.1 dB (or Ldn unit). This degree of increase will be difficult to measure, and is well within the accuracy limits of this study.

TABLE 4 presents the predicted increases in the setback distances to the 60, 65, and 70 Ldn traffic noise contours under worst case sound propagation conditions, and following the ultimate Phase II development of the project. Increases in the setback distances to the 65 Ldn contour are predicted to be approximately 50 FT along H-1 Freeway, and approximately 10 FT along Kamehameha Highway. Although the distances to the 60 Ldn contour appear to be very large under the worst case propagation conditions, the presence of intervening natural or man-made noise barriers between the receptor and roadway is more probable at the larger setback distances, and actual distances to the 60 Ldn contour are significantly shorter (see FIGURES 3A thru 3E). However, the increases in setback distances for each contour shown in TABLE 4, plus the Base Year contours shown in FIGURES 3A thru 3B, can be

applicable for the case where no intervening, man-made, structures (noise shielding barriers) exist between the receptor location and the highways. As will be shown later, these figures can be used to site future residential/apartment units of the development, since future traffic noise levels are predicted to be within 1 Ldn unit of existing noise levels depicted by the contour lines in the figures.

TABLE 2

MAY 19, 1984 TRAFFIC NOISE MEASUREMENTS

Location	Time of Day (HRS)	Ave.Speed (MPH)	Equivalent Hourly Traffic Volume — Auto	Med.Truck	Heavy Truck	Measured Leq (dB)	Predicted Leq (dB)
1. 15 FT from fenceline of H-1 Freeway at Waipahu Gardens.	1157 TO 1207	55	2,716	70	0	66.8	65.8
2. 115 FT from fenceline of H-1 Freeway at Waipahu Gardens.	1208 TO 1216	55	2,716	70	0	62.7	62.5
3. 195 FT from center of H-1 Freeway at Manager's Drive near residence; partially shielded by top of roadway cut.	1111 TO 1122	55	2,716	70	0	59.0	60.0
4. Near Location #3, but 245 FT from center of H-1 Freeway.	1123 TO 1131	55	2,716	70	0	54.9	54.0
5. Near Location #3 & #4, but 295 FT from center of H-1 Freeway.	1135 TO 1148	55	2,716	70	0	49.0*	53.0
6. 85 FT from centerline of Kamehameha Highway at Lumiaina St.	1226 TO 1241	40	1,871	38	0	62.1	61.1

*Lower than predicted measured level may be due to shielding from plant nursery.

funding assistance from federal agencies (FHA/HUD and VA), an exterior noise level of 65 Ldn or lower is considered acceptable. This standard is applied nationally (see Reference 9), including Hawaii. Because of our open-living conditions, the predominant use of naturally ventilated dwellings, and the relatively low exterior-to-interior sound attenuation afforded by these naturally ventilated structures, an exterior noise level of 65 Ldn does not eliminate all risks of noise impacts. For these reasons, and as recommended in Reference 10, a lower level of 55 Ldn is considered as the "Unconditionally Acceptable" (or "Near-Zero Risk") level of exterior noise. However, after considering the cost and feasibility of applying the lower level of 55 Ldn, government agencies such as FHA/HUD and VA have selected 65 Ldn as a more appropriate regulatory standard.

For commercial, industrial, and other non-noise sensitive land uses, exterior noise levels as high as 75 Ldn are generally considered acceptable. Exceptions to this occur when naturally-ventilated office and other commercial establishments are exposed to exterior levels which exceed 65 Ldn.

IV. EXISTING TRAFFIC NOISE ENVIRONMENT

The existing traffic noise environment along H-1 Freeway in the area of the project is in the "Significant Exposure, Normally Unacceptable" category, with traffic noise at 70 Ldn along the north (or mauka) Right-of-Way. On the opposite (or makai) side of the freeway, traffic noise levels are higher due to the directional characteristics of the traffic, and the noise levels are 71 Ldn along the makai Right-of-Way. Behind man-made or natural shielding features, where line-of-sight to the freeway is completely or partially blocked, the traffic noise levels diminish rapidly with increasing distance from the freeway centerline. But because the Right-of-Way width of the freeway is in the order of 260 to 300 FT, the first row of any residential development on either side of the freeway is in the "Significant Exposure, Normally Unacceptable" category. Exceptions would occur only if terrain shielding features or buffer lands exist between the development and the freeway.

Along Kamehameha Highway, existing traffic noise levels are also in the "Significant Exposure, Normally Unacceptable" category along the highway Right-of-Way. Existing setback distances to the 65 Ldn contour line varies from 72 to 81 FT from the centerline of the highway, while the distances to the Right-of-Way varies from approximately 35 to 65 FT.

The results of the May 19, 1985 traffic noise measurements are summarized in TABLE 2. The locations of the measurements and shown in FIGURES 3A, 3B, and 3E. In general, the agreement between measured and calculated (predicted) noise levels was good. The large discrepancy between measured and predicted levels at Location #5 was probably attributable to excess attenuation caused by plant nursery structures in the area.

FIGURES 3A thru 3E depict the Base Year traffic noise contours over the proposed development area. The Ldn descriptor was used in generating these contours. The contours shown are

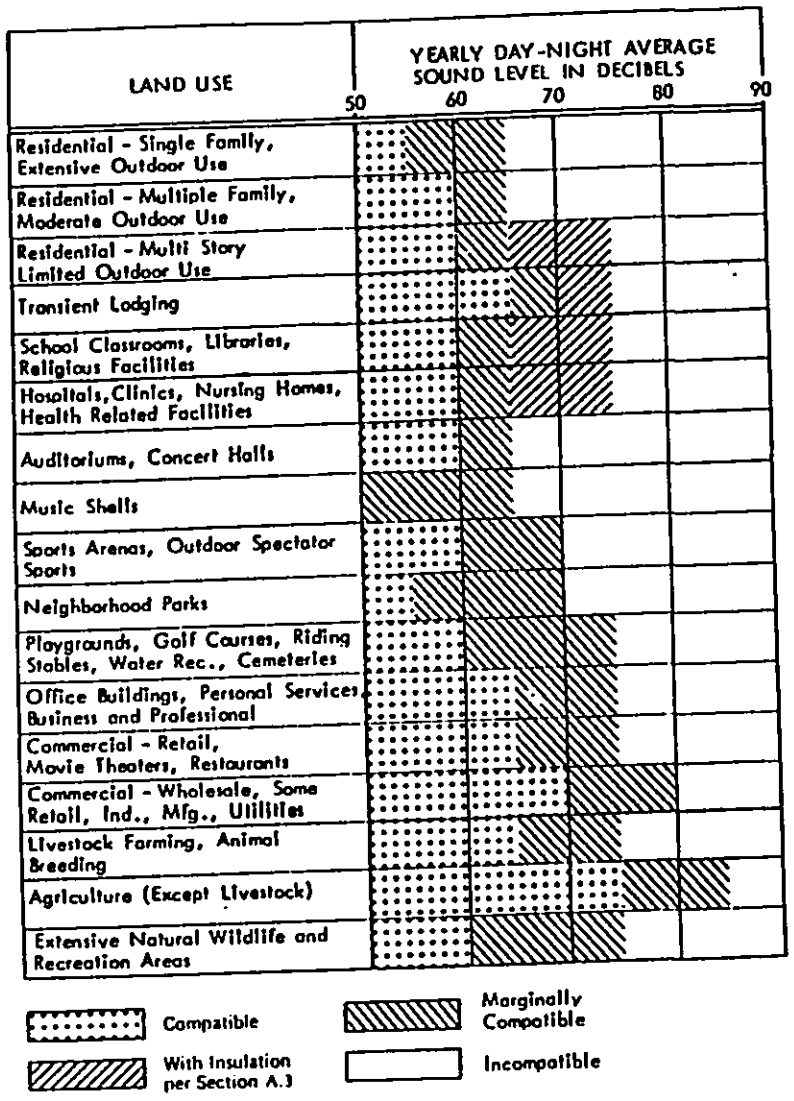
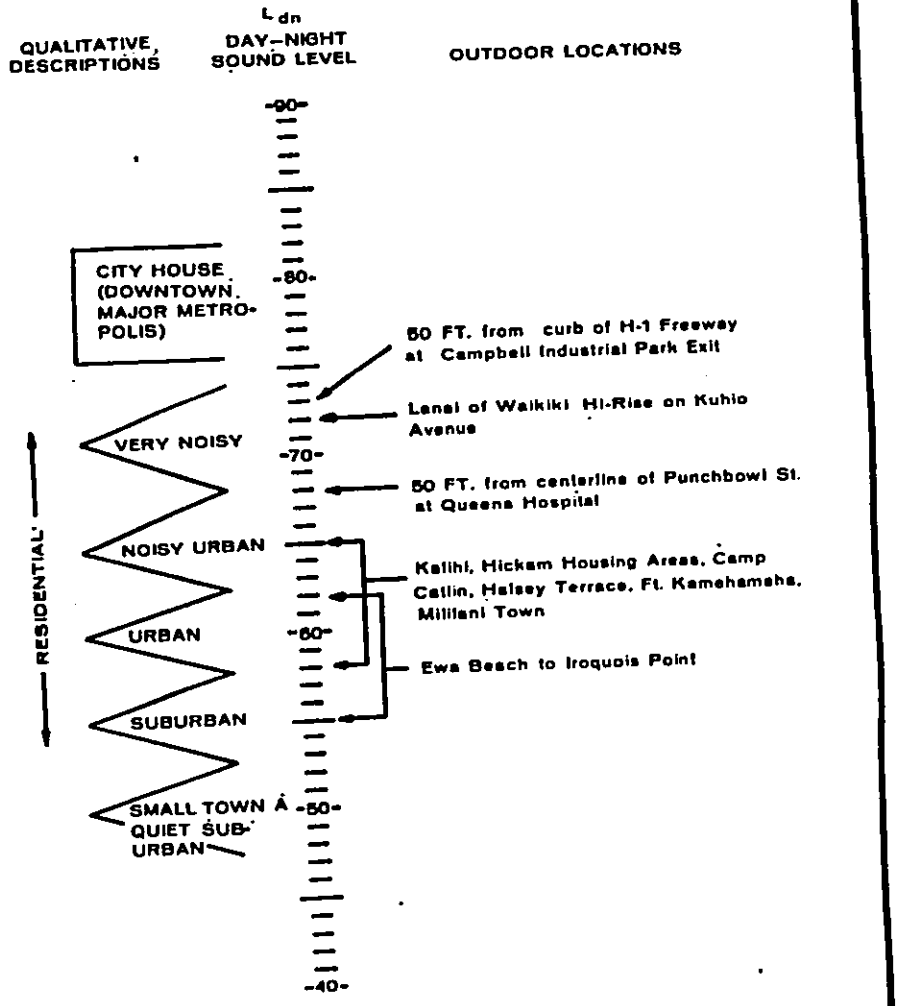


FIG. 1. Land use compatibility with yearly day-night average sound level at a site for buildings as commonly constructed. [For information only; not a part of American National Standard for Sound Level Descriptors for Determination of Compatible Land Use S3.23-1980.]

FIGURE 2

RANGE OF EXTERIOR BACKGROUND AMBIENT NOISE LEVELS



III. NOISE DESCRIPTORS AND THEIR RELATIONSHIP TO LAND USE COMPATIBILITY

Two noise descriptors currently used to relate traffic noise levels to land use compatibility, and to assess environmental noise in general, are the Equivalent Noise Level (Leq) and the Day-Night Average Sound Level (Ldn). Both of these descriptors are averages of instantaneous A-Weighted Sound Levels as read on a standard Sound Level Meter. In traffic noise evaluations, the averaging period for the Leq descriptor is usually an hour, and more specifically, the peak hour of traffic. In all evaluations, the minimum averaging period for the Ldn descriptor is 24 hours (by definition). Additionally, sound levels which occur during the nighttime hours of 10:00 PM to 7:00 AM are increased by 10 decibels (dB) prior to computing the 24-hour average by the Ldn descriptor. A more complete list of noise descriptors is provided in APPENDIX B to this report.

TABLE 1, derived from Reference 7, presents current federal standards and acceptability criteria for residential land uses exposed to various levels of environmental noise. FIGURE 1, extracted from Reference 8, presents suggested land use compatibility guidelines for residential and non-residential land uses. As a general rule, noise levels of 55 Ldn or less occur in rural areas, or urbanized areas which are shielded from high volume streets. Noise levels typical of communities on Oahu are shown in FIGURE 2. In urbanized areas, Ldn levels generally range from 55 to 65 Ldn, and are usually controlled by motor vehicle traffic noise. Residences which front major roadways are generally exposed to levels of 65 Ldn, and as high as 72 Ldn when the roadway is a high speed freeway. Due to noise shielding effects from intervening structures, residences which are located within interior lots are usually exposed to lower noise levels of 55 Ldn or less.

For the purposes of determining noise acceptability for

TABLE 1

EXTERIOR NOISE EXPOSURE CLASSIFICATION
(RESIDENTIAL LAND USE)

Noise Exposure Class	Day-Night Sound Level	Equivalent Sound Level	Federal Standard (1)
Minimal Exposure	Not Exceeding 55 Ldn	Not Exceeding 55 Leq	Unconditionally Acceptable
Moderate Exposure	Above 55 Ldn But Not Above 65 Ldn	Above 55 Leq But Not Above 65 Leq	(2) Acceptable
Significant Exposure	Above 65 Ldn But Not Above 75 Ldn	Above 65 Leq But Not Above 75 Leq	Normally Unacceptable
Severe Exposure	Above 75 Ldn	Above 75 Leq	Unacceptable

Note: (1) Federal Housing Administration, Veterans Administration, Department of Defense, and Department of Transportation.

(2) FHWA uses the Leq instead of the Ldn descriptor. For planning purposes, both are equivalent if: (a) heavy trucks do not exceed 10 percent of total traffic flow in vehicles per 24 hours, and (b) traffic between 10:00 PM and 7:00 AM does not exceed 15 percent of average daily traffic flow in vehicles per 24 hours.

Source: Reference 7.

II. PURPOSE AND METHODOLOGY

The objectives of this study were to describe the existing and future traffic noise environment in the environs of the Waikele development as proposed under the Waikele Master Plan. Potential traffic noise impacts associated with the proposal were to be isolated within the development as well as along H-1 Freeway and Kamehameha Highway. A specific objective was to determine setback requirements of proposed residential units for minimizing future noise impacts from the increased volume of traffic, and for compliance with federal standards.

Traffic noise predictions were performed using the Federal Highway Administration (FHWA) Noise Prediction Model (Reference 1). Traffic data and forecasts used in the noise prediction model were obtained from the traffic study for the project (Reference 2). Historical traffic counts obtained by the State Department of Transportation at stations on H-1 Freeway and Kamehameha Highway (References 3 thru 6) were used to develop the relationship between peak hour Leq(h) and daily Ldn traffic noise levels, and to develop the assumed traffic mixes. (Also, see worksheets in APPENDIX C.)

Existing traffic noise measurements along Kamehameha Highway and H-1 Freeway were made in May, 1985 to calibrate the FHWA Noise Prediction Model, and to refine predictions of future traffic noise levels. These existing traffic noise measurements were also used to describe the Base Year ambient noise levels along roadways in the project environs. For the purposes of the noise study, 1984 was used as the project Base Year, with changes in the ambient noise levels between 1984 and 1985 believed to be insignificant. Calibration of the FHWA Noise Prediction Model was performed by measuring traffic noise levels at 140 and 225 FT distances from the center of H-1 Freeway at Waipahu Gardens under flat terrain conditions. Additionally, traffic noise levels were measured at 195, 245, and 295 FT distances from the center of the

freeway, but behind the top edge of the cut mauka of the freeway. Traffic noise measurements were also made at 85 FT from the centerline of Kamehameha Highway at Lumiaina Street.

For the Base Year (existing) and future years to the ultimate project development under the Phase II increment, traffic noise vs. distance tables and contours were developed to numerically and graphically depict the traffic noise along internal and external roadways. Setback distances from the roadways' centerlines to the 60, 65, and 70 Ldn iso-noise contour lines were also calculated and presented in table format for the worst case condition of unobstructed line-of-sight to the traffic lanes.

Traffic noise contours were developed along H-1 Freeway and Kamehameha Highway. The Base Year noise contours were developed by including terrain features and roadway elevations in the highway noise model. Receptor elevations were assumed to be 5 FT above ground level. Because the proposed development maps and grading plans were not available in the same degree of detail as the maps of the existing conditions, and because predicted traffic noise increases following Phase II implementation were relatively small, the future year noise contours were not developed. However, estimates of the expansion of the Base Year contours were made from the worst case setback distance calculations. Along the internal roadways of the project, the width of the iso-noise zones were relatively small, and, therefore, were not shown in the maps.

For existing and planned noise sensitive (residential and apartment) developments within traffic noise impact zones, possible noise mitigation measures are described. These measures included the use of increasing setback distances, the use of sound attenuating berms or walls, and the use of window sound attenuators to reduce future traffic noise at affected areas.

LIST OF TABLES

I. SUMMARY

The existing and future traffic noise levels in the vicinity of the proposed Waikele development were evaluated for their potential impact on present and future residences. The future traffic noise level increases on Kamehameha Highway, H-1 Freeway, and on internal roadways of the development were calculated for the entire development period. Increases in traffic noise of 0.5 to 1.1 Ldn (or dB) are predicted to occur between now and the period of ultimate development as a result of project plus non-project traffic. Project-related traffic noise increases on existing roadways are predicted to be in the order of 0.5 Ldn.

Future traffic noise impacts on Waikele residents can be minimized by the use of buffer zones of adequate depth on the Waikele side of Kamehameha Highway and H-1 Freeway, and along the internal roadways of the development. In order to not preclude Federal assistance on the project, it is suggested that minimum setback distances to the 65 Ldn noise contours be used in siting future residential/apartment units. And, if feasible, use of setback distances to the 60 Ldn noise contours should be considered.

Traffic noise impacts on existing residences along Kamehameha Highway and H-1 Freeway are expected to increase as a result of necessary improvements to both roadways. If these improvement projects are undertaken with Federal aid, it is very likely that mitigation measures will be applied to reduce both existing and future noise levels.

TABLE OF CONTENTS

LIST OF FIGURES

TRAFFIC NOISE STUDY
FOR THE PROPOSED
WAIKELE DEVELOPMENT MASTER PLAN

PREPARED FOR
ENVIRONMENTAL COMMUNICATIONS, INC.

BY
Y. EBISU & ASSOCIATES

SEPTEMBER 4, 1985

GEORGE R. ARIYOSHI
GOVERNOR

JACK K. SUWA
CHAIRPERSON, BOARD OF AGRICULTURE

SUZANNE D. PETERSON
DEPUTY TO THE CHAIRPERSON

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

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

August 21, 1985

Mr. F. J. Rodriguez, President
Environmental Communications, Inc.
P. O. Box 536
Honolulu, Hawaii 96809

Dear Mr. Rodriguez:

Re.: Environmental Impact Statement Preparation
Notice for the Proposed Waikele Development
Project; Waikele, Oahu
TMK: 9-4-02: 3, 10, 11, 12 (por.), 31 and 41
9-4-07: 10, 12, 13, and 32

This is to inform you that the Department of Agriculture would like to be a consulted party in the preparation of the subject Environmental Impact Statement (EIS). We will be providing comments upon our receipt and review of the the Draft EIS.

Sincerely,

Jack K. Suwa

JACK K. SUWA
Chairman, Board of Agriculture

AUG 22 1985

F. J. RODRIGUEZ
PRESIDENT

ENVIRONMENTAL
COMMUNICATIONS
INC.

October 9, 1985

Mr. Jack K. Suwa
Chairman, Board of Agriculture
Department of Agriculture
1428 So. King Street
Honolulu, Hawaii 96814

Dear Mr. Suwa:

We are in receipt of your request to be a consulted party in the preparation of the Draft EIS for the proposed Waikele project. We look forward to your department's comments during your review of the draft EIS.

Thank you for your continuing interest.

Very truly yours,

F. J. Rodrigues

F. J. Rodrigues

FJR:ls

GEORGE R. ARIYOSHI
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE ADJUTANT GENERAL
3949 DIAMOND HEAD ROAD, HONOLULU, HAWAII 96816 [illegible]

ALFRED T. LUM
MAJOR GENERAL
ADJUTANT GENERAL

DANIEL K. C. AU
COLONEL
DEPUTY ADJUTANT GENERAL

JUL 24 1985

HIENG

Environmental Communications, Inc.
P. O. Box 536
Honolulu, HI 96809

Gentlemen:

Waikele Development Project
Waikele, Oahu

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

We have completed our review and have no comments to offer at this time.

Yours truly,

Jerry M. Matsuda

Jerry M. Matsuda
Major, Hawaii Air
National Guard
Contr & Engr Officer

NO RESPONSE NEEDED

JUL 31 1985

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

LESLIE S. MATSUBARA
DIRECTOR OF HEALTH

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

In reply, please refer to:
EPHSD

August 19, 1985

Mr. F. J. Rodriguez, President
Environmental Communications, Inc.
P. O. Box 536
Honolulu, Hawaii 96809

Dear Mr. Rodriguez:

Subject: EIS Preparation Notice for the Proposed Waikele Development Project

Thank you for allowing us to review and comment on the subject EIS preparation notice. Our staff has reviewed the material sent and does not have any additional concerns at this time. Please find attached our earlier comments, dated May 20, 1985, which were made on the rezoning request for this project. These comments are still applicable.

Sincerely,

CALVIN MASAKI
Acting Director of Health

Attachment

AUG 22 1985

May 20, 1985

MEMORANDUM

To: Mr. Donald A. Clegg, Chief Planning Officer
Department of General Planning, City & County of Honolulu

From: Director of Health

Subject:

Petition No:	A85-594
Petitioner:	AMFAC Property Development Corp.
Requested Change:	Agricultural to Urban
Proposed Use:	Residential Community
Location:	Waikele, Oahu, TMK 9-4-02: 3, 10, 11, 12p, 31, 41 9-4-07: 10, 12, 13, 32
Area:	577.210 acres

Thank you for allowing us to review and comment on the subject State Land Use Commission petition. We submit the following comments for your consideration:

Wastewater Treatment

Recently, there have been many proposed projects for West Oahu such as Ewa Marina, West Beach and the subject project. The accompanying reports all state that the sewage flows will be directed to the Honouliuli WWTP which has a capacity of 25 MGD. At the present, the average daily flow is about 16 MGD. It is estimated that the design capacity will be reached by 1992. The City should be asked whether the Honouliuli WWTP has sufficient capacity to accommodate all of these projects.

Drinking Water

The developer proposes to construct a drinking water system which appears to be subject to our drinking water regulations (Chapter 20, Title 11, Administrative Rules). Section 11-20-29 of Chapter 20 requires all new sources serving public water systems to be approved by the Director of Health. Such approval is based primarily upon the satisfactory submission of an engineering report which adequately addresses all concerns as set forth in Section 11-20-29. The engineering report must be prepared by a registered professional engineer and must bear his or her seal upon submittal.

In addition, Section 11-20-30 requires that new or substantially modified distribution systems for public water systems be approved by the Director of Health. Such approval depends upon the submission of plans and specifications for the project prior to construction and the demonstration that the new or modified portions of the system are capable of delivering potable water in compliance with all maximum contaminant levels (MCLs) as required in Chapter 20, Title 11, Administrative Rules.

GEORGE R. ARIYOSHI
GOVERNOR

FRANCIS M. HATANAKA
SUPERINTENDENT

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

OFFICE OF THE SUPERINTENDENT

July 31, 1985

Mr. F. J. Rodriguez
Environmental Communications, Inc.
P.O. Box 536
Honolulu, Hawaii 96809

Dear Mr. Rodriquez:

SUBJECT: EIS Preparation Notice
Waikele Development Project

Our review of the proposed Waikele Development project with its approximately 2,640 residential units indicates that the following student enrollment may be generated:

SCHOOL	GRADE	APPROXIMATE ENROLLMENT
Kanoelani/Waikele Elementary	K-6	300 - 500
Highlands/Waipahu Intermediate	7-8	80 - 140
Pearl City/Waipahu High	9-12	150 - 250

The assignment of schools to service the Waikele students is subject to determination by our Leeward District Office. Enrollment growth will be monitored and assessed before any final commitment is made on the schools to service these students.

Should there be any questions, please contact Mr. Howard Lau at 737-4743.

Sincerely,

Margaret Y. Oda
for Francis M. Hatanaka
Superintendent

FMH:jl

cc V. Honda, OBS
W. Araki, Leeward Dist.

AN EQUAL OPPORTUNITY EMPLOYER

AUG 5 1985

ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. RODRIGUEZ
PRESIDENT

October 9, 1985

Mr. Francis M. Hatanaka
Superintendent
Department of Education
P.O. Box 2360
Honolulu, Hawaii 96804

Dear Mr. Hatanaka:

We are in receipt of your department' comments dated July 31, 1985 on the EIS Preparation Notice for the proposed Waikele project and we respond in the following:

We have met with your department's planning staff to provide them with an initial preview of the proposed Waikele project development plan. We will maintain contact with them and also provide in the Draft EIS currently under preparation, a phasing schedule for development which should prove helpful to your planning personnel. We look forward to your comments on the draft EIS and thank you for your comments and continuing concern.

Very truly yours,

F. J. Rodrigues

FJR:ls

It is a well publicized fact that some of the central Oahu wells are contaminated with organic compounds (e.g., EDB, DBCP, TCP, TCE, and PCE). The EA should indicate the proposed new wells and reservoir locations with respect to other contaminated wells known to be contaminated. In addition, the EA should discuss the possibility of the new wells being located in an area of known groundwater contamination.

As a final note, page 63 of the Land Use Petition document should be revised to reflect current potable water use practices. The Waipahu wells described on this page have been closed due to EDB contamination.

Noise

1. The proposed project must be designed to comply with the provisions of Title II, Administrative Rules Chapter 43, Community Noise Control for Oahu. Noise from equipment, such as air conditioning/ventilation units and exhaust units, must be attenuated to meet the allowable noise levels of the regulations based on zoning districts.

2. Noise associated with the following areas or activities may have adverse impacts on the residents of the proposed project:

   a. Noise from agricultural activities, specifically from Castle and Cooke pineapple growing operations north of the proposed project.

   b. Noise from grounds maintenance activities on the proposed golf course.

   c. Noise from vehicular traffic travelling along Interstate Highway H-1.

   d. Noise from activities associated with the proposed commercial center, recreation center, planned recreation areas and elementary school.

   Various mitigative measures, such as barriers, berms, and other means of land separation should be implemented in order to minimize noise disturbances.

3. Construction activities must comply with the provisions of Title II, Administrative Rules Chapter 43, Community Noise Control for Oahu:

   a. The contractor must obtain a noise permit if the noise levels from the construction activities are expected to exceed the allowable levels of the regulations.

   b. Construction equipment and on-site vehicles or devices requiring an exhaust of gas or air must be equipped with mufflers.

   c. The contractor must comply with the conditional use of the permit as specified in the regulations and conditions issued with the permit.

4. Traffic noise from heavy vehicles travelling to and from the construction site must comply with the provisions of Title II, Administrative Rules Chapter 42, Vehicular Noise Control for Oahu.

We realize that the statements are general in nature due to preliminary plans being the sole source of discussion. We, therefore, reserve the right to impose future environmental restrictions on the project at the time final plans are submitted to this office for review.

Melvin K. Hoizumi

for LESLIE S. MATSUBARA

ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. RODRIGUEZ,
PRESIDENT

October 9, 1985

Mr. Leslie S. Matsubara
Director of Health
Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801

Dear Mr. Matsubara:

We are in receipt of your department's comments dated May 20, 1985 previously transmitted to the Department of General Planning, City & County of Honolulu for the proposed Waikele project. We respond in the following:

1. Wastewater Treatment - The Department of Public Works has advised in their letter dated August 1, 1985 that sewers are adequate to provide service to Waikele.

2. Drinking Water - It is recognized that due to the location of the proposed project, the safe drinking water considerations for all new sources must be reviewed and approved by the Department of Health. The locations of the source of water to be developed for use by Waikele is being investigated and coordinated with both the Board of Water Supply and the Department of Land & Natural Resources, Division of Land & Water Development. To the extent possible, a Water plan will be provided in the Draft EIS so that source and storage can be identified for your review. All appropriate Title 11 Public Health requirements will be complied with during the appropriate review of water master plan engineering.

3. Noise - The general subject of compliance with the Title 11, Chapter 43 Community Noise Control for Oahu will be met in terms of land use planning and attenuation measures. It can be stated that external noise impact sources impinging on the Waikele community would parallel the Mililani community from the standpoint of adjacent pineapple cultivation and harvesting, golf course maintenance, vehicular traffic (H-2 and Kamehameha Highway), commercial and educational facilities, etc. The land use plan will contain extensive landscaping elements to buffer the noise impacts from the external noise sources and also, there will be space corridors to further attenuate these impacts. A noise study will be provided in the draft EIS and will address these concerns.

   Construction related noise will be the primary responsibility of the construction forces onsite during this phase; since it will be ongoing

during the project, compliance with the construction related noise rules will be met by the general contractor and his subcontractor associates during their work schedule.

Thank you for your comments and we look forward to your review and comments during the Draft EIS.

Very truly yours,

F. J. Rodrigues

F. J. Rodrigues

FJR:ls

GEORGE R. ARIYOSHI
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF SOCIAL SERVICES AND HOUSING
HAWAII HOUSING AUTHORITY
P. O. BOX 17907
HONOLULU, HAWAII 96817

RUSSELL N. FUKUMOTO
EXECUTIVE DIRECTOR

F. J. RODRIGUEZ
PRESIDENT

IN REPLY REFER

TO: 85:DEV/4031

July 23, 1985

Environmental Communications, Inc.
P. O. Box 536
Honolulu, Hawaii 96809

Gentlemen:

Subject: Environmental Impact Statement Preparation Notice - Waikele Development

We have reviewed subject matter and offer the following comments for inclusion into the final EIS:

1. That housing for the low-moderate-gap group families be considered for this development.

2. That the specific types of housing units and the proposed sales prices be listed.

3. That the types of proposed long-term financing be listed, if known.

Thank you for the opportunity to comment.

Sincerely,

Russell N. Fukumoto
Executive Director

JUL 26 1985

ENVIRONMENTAL COMMUNICATIONS INC.

October 9, 1985

Mr. Russell N. Fukumoto
Executive Director
Department of Social Services
and Housing
Hawaii Housing Authority
P.O. Box 17907
Honolulu, Hawaii 96817

Dear Mr. Fukumoto:

We are in receipt of your department's comments dated July 23, 1985 on the EIS Preparation Notice for the proposed Waikele project and we respond in the following:

1. Housing for the low-moderate-gap group families are being discussed with the City & County Department of Housing & Community Development. At the present time, a definitive policy to meet this need is being formulated by that agency. As Waikele proceeds through the Land Use Commission hearings and the City's Zoning process, please be assured that this subject will not be overlooked.

2. Specific housing types and sales prices have not been finalized to the point where they are available for review at this early stage. Again, as the land use policy review process is implemented, these specific details will be more clearly defined in terms of demand and prevailing financing costs for the market group involved.

3. At this early stage, this item is unresolved.

Thank you for your comments and wherever possible, the data requested in this EIS Preparation Notice will be provided to the best of our ability.

Very truly yours,

F. J. Rodrigues

FJR:ls

DEPARTMENT OF PLANNING
AND ECONOMIC DEVELOPMENT
KAMAMALU BUILDING, 250 SOUTH KING ST, HONOLULU, HAWAII
MAILING ADDRESS: P.O. BOX 2359 HONOLULU, HAWAII 96804 • TELEX: 723-8150 HIDPED

GEORGE R. ARIYOSHI
GOVERNOR
KENT M. KEITH
DIRECTOR
MURRAY E. TOWILL
DEPUTY DIRECTOR
LINDA KAPUNIAI ROSEHILL
DEPUTY DIRECTOR

DIVISIONS
BUSINESS AND INDUSTRY DEVELOPMENT DIVISION
ENERGY DIVISION
FOREIGN TRADE ZONE DIVISION
LAND USE DIVISION
PLANNING DIVISION
RESEARCH AND ECONOMIC ANALYSIS DIVISION
OFFICES
ADMINISTRATIVE SERVICES OFFICE
INFORMATION OFFICE

Ref. No. P-2508

August 15, 1985

Mr. F. J. Rodriguez
Environmental Communications, Inc.
P. O. Box 536
Honolulu, Hawaii 96809

Dear Mr. Rodriguez:

Subject: EIS Preparation Notice for the Proposed Waikele Development Project, Waipahu, Oahu

We have reviewed the subject environmental impact statement preparation notice (EISPN) and have the following comments.

The subject document fails to identify a number of aspects of the proposed project which will have significant effects on the environment. The first is the agricultural productivity of the soils within the project area. According to the Department of Agriculture, approximately two-thirds of the project site possesses some of the qualities that constitute the working definition of "important agricultural land." Practically speaking, the urban development proposed by this project will involve an irrevocable commitment to loss of this important agricultural resource. Sections II.A.3. and II.A. of the preparation notice can be expanded to include a discussion of these impacts.

The second aspect of the proposed project which should be discussed is population change and its effect on the surrounding communities, especially Waipahu, and on the development of the secondary urban center at Ewa.

The third area which should be discussed relates to the Coastal Zone Management's (CZM) objective for coastal ecosystems: Protect valuable coastal ecosystems from disruption and minimize adverse impacts on all coastal ecosystems. On page 7 (II.B.1.), EISPN states: "The site is currently fallow and covered with ratoon sugar cane for erosion control." Furthermore, on page 8 (II.C.) we note that: "Waikele Stream flows by the western face of the project site." In order to minimize possible adverse impacts on Waikele Stream and West Loch, Pearl Harbor, mitigating measures should be proposed for the period during which the fallow fields will be cleared for development.

We note that the Navy uses the adjacent Waikele and Kipapa Gulches for ammunition storage. This concern should be addressed in the Preparation Notice. The Navy/Marine Corps Activities: Hawaii Regional Profile, states on page F-14: ". . . Waikele is presently being used to meet the new requirements for storage of sensitive arms, ammunition and explosives."

The draft EIS should also assess the relationship of the proposed project to the relevant objectives and policies of the Hawaii State Plan and State Functional Plans.

Thank you for the opportunity to review and comment on the subject preparation notice.

Very truly yours,

Kent M. Keith

cc: Office of Environmental Quality Control

AUG 21 1985

F. J. RODRIGUEZ
PRESIDENT

ENVIRONMENTAL
COMMUNICATIONS
INC.

October 9, 1985

Mr. Kent M. Keith, Director
Department of Planning and
Economic Development
P.O. Box 2359
Honolulu, Hawaii 96804

Dear Mr. Keith:

We are in receipt of your department's comments dated August 15, 1985 on the EIS Preparation Notice for the proposed Waikele project and we respond in the following:

1. The definitions for characteristics attributed to "important agricultural lands" will be included in the draft EIS currently under preparation. These will include the agricultural productivity of the soils as well as alternative crops that Amfac has explored as to use and economic viability. In addition to agricultural productivity, economic viability must be included in the total equation.

2. Impacts on adjacent communities from the standpoint of population increases will be discussed in terms of compliance with the population projections allocated to the District in the City & County Development Plan Land Use Policy Ordinance for Central Oahu and Ewa.

3. Mitigation measures for anticipated drainage via Waikele Stream to West Loch and other receiving waters will be described in the Drainage Master Plan that is required to meet building code for the City & County of Honolulu. All drainage will be in compliance with applicable City standards.

4. The relationship between Amfac and the Navy who is an adjacent neighbor in the Waikele and Kipapa Gulches is under review by both parties. It will be included to the extent possible, in the Draft EIS.

5. Relationships to the Hawaii State Plan and State Functional Plans will be provided in the Draft EIS.

Thank you for your comments and we look forward to your office's review and further comments on the draft EIS.

Very truly yours,

F. J. Rodriguez

FJR:ls

GEORGE R ARIYOSHI
GOVERNOR

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

WAYNE J YAMASAKI
DIRECTOR

DEPUTY DIRECTORS
JONATHAN K SHIMADA PH D
WALTER T M HO
CHERYL D SOON
ADAM D VINCENT

IN REPLY REFER TO
STP 8.10788

August 20, 1985

Mr. F.J. Rodriguez, President
Environmental Communications, Inc.
P.O. Box 536
Honolulu, Hawaii 96809

Dear Mr. Rodriguez:

Waikele Development
EIS Preparation Notice
TMK: 9-4-2: 3,10,11,12 (Portion)
9-4-7: 10,12,13 and 32

Interstate Route H-1 and Kamehameha Highway are already congested in this area and the Waikele development will contribute to further deterioration of operating conditions.

The EIS, in its discussion of traffic impacts, should contain a traffic analysis of the problems and mitigation measures based on the full development of Waikele and the other major proposals for the Ewa area (i.e., Ewa Marina, West Beach).

The analysis may show that adequate access to the Waikele Development may only be provided through an interchange at Paiwa Street and a widening of Kamehameha Highway. If so, the developer should be prepared to fully fund these improvements and should so state his intentions in the EIS.

Very truly yours,

Cheryl D. Soon
for Wayne J. Yamasaki
Director of Transportation

AUG 22 1985

F J RODRIGUEZ
PRESIDENT

ENVIRONMENTAL
COMMUNICATIONS
INC.

1164 FIRST STREET MALL SUITE 210 • P O BOX 536 • HONOLULU HAWAII 96809 • TELEPHONE (808) 521-2161

October 9, 1985

Mr. Wayne J. Yamasaki, Director
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Yamasaki:

We are in receipt of your department's comments dated August 20, 1985, on the EIS Preparation Notice for the Waikele project and we respond in the following:

There will be a traffic impact analysis conducted by the retained traffic consultant, Austin, Tsutsumi & Associates in the draft EIS. This document will discuss the current traffic conditions on H-1 and the thoroughfares into Honolulu and the mitigative measures that can be developed to meet these conditions.

Regarding the Paiwa Street Interchange and the widening of Kamehameha Highway, this matter will be discussed with your office and the Highways Division staff in terms of timing and scheduling of the proposed facilities to insure availability of improvements to meet the anticipated increases in traffic attributable to the full development of Waikele.

Payment of the recommended improvements by the developer will be discussed in the draft EIS currently under preparation.

Thank you for comments and continuing concern.

Very truly yours,

F.J. Rodriguez

FJR:ls

University of Hawaii at Manoa

Water Resources Research Center
Holmes Hall 283 • 2540 Dole Street
Honolulu, Hawaii 96822

20 August 1985

Environmental Communications, Inc.
P. O. Box 536
Honolulu, Hawaii 96809

Gentlemen:

SUBJECT: Environmental Impact Statement Preparation Notice, Waikele Development Project, Waikele, Oahu

We have reviewed the subject EISPN and offer the following comments:

1. The traffic impact on the 2-lane Waipahu Street from Paiwa Street access needs to be addressed.

2. Just a suggestion—Fig. 2 Site Plan places the residential area immediately adjacent to the H-1 freeway and the golf course at the upper end. By reversing this so that the golf course is along the freeway would allow the golf course to serve as a noise buffer between the freeway and residential, as well as visually enhance the view downslope toward Pearl Harbor.

Thank you for the opportunity to comment. This material was reviewed by WRRC personnel.

Sincerely,

Edwin T. Murabayashi
EIS Coordinator

ETM:jm

AUG 22 1985

AN EQUAL OPPORTUNITY EMPLOYER

ENVIRONMENTAL COMMUNICATIONS INC.

F. J. RODRIGUEZ, PRESIDENT

October 9, 1985

Mr. Edwin T. Murabayashi
EIS Coordinator
Water Resources Research Center
University of Hawaii
Holmes Hall 283
2540 Dole Street
Honolulu, Hawaii 96822

Dear Mr. Murabayashi:

We are in receipt of your Center's comments dated August 20, 1985 on the EIS Preparation Notice for the proposed Waikele project and we respond in the following:

1. Traffic will be discussed in a Traffic Impact Analysis being developed by the retained traffic consultant, Austin, Tsutsumi & Associates. We welcome your review and comments on this study.

2. Your suggested planning recommendation has been provided to the planning consultant for their consideration.

Thank you for your comments and continued interest.

Very truly yours,

F. J. Rodrigues

FJR:ls

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96843

August 6, 1985

FRANK F. FASI, Mayor

ERNEST A. WATARI, Chairman
MILTON J. AGADER, Vice Chairman
RYOKICHI HIGASHIONNA
PAULA R. RATH
RUSSELL L. SMITH, JR.
WAYNE J. YAMASAKI
DONNA S. COTH
KAZU HAYASHIDA
Manager and Chief Engineer

Mr. F. J. Rodriguez, President
Environmental
Communications, Inc.
P. O. Box 536
Honolulu, Hawaii 96809

Dear Mr. Rodriguez:

Subject: Your Letter of July 18, 1985 on the Environmental Impact Statement (EIS) Preparation Notice for the Proposed Waikele Development Project, TMK: 9-4-02:3, 10, 11, 12, 31, & 4 and 9-4-07:10, 12, 13 & 32

Thank you for the opportunity to review and comment on the proposed development. We have no objections to the project; however, we have the following comments:

1. The Water Master Plan for the Waikele Development must be submitted for our review and approval.

2. The developer will be required to install a complete water system including source, storage, and transmission facilities.

3. The project is located in our designated "no-pass zone" where on-site disposal of wastewaters is unacceptable. All wastewater disposal must be via the municipal sewerage system serving the area.

If you have any questions, please contact Lawrence Whang at 527-6138.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

AUG 12 1985

ENVIRONMENTAL COMMUNICATIONS INC.

F. J. RODRIGUEZ, PRESIDENT

October 9, 1985

Mr. Kazu Hayashida
Manager and Chief Engineer
Board of Water Supply
630 South Beretania Street
Honolulu, Hawaii 96843

Dear Mr. Hayashida:

We are in receipt of your department's comments dated August 6, 1985 on the EIS Preparation Notice for the proposed Waikele project and we respond in the following:

1. The Water Master Plan will be provided to your agency for review and comment upon the finalising and completion of the document.

2. The applicant, Amfac will be in discussion and negotiation with your staff on these items for a complete water system (source, storage, and transmission facilities).

3. Department of Public Works has indicated that there is adequate capacity for wastewater treatment and disposal via City facilities. There will be no onsite disposal of wastewater.

Thank you for your comments and we look forward to your office's review and comments of the Draft EIS.

Very truly yours,

F. J. Rodrigues

FJR:ls

1164 FORT STREET MALL, SUITE 208 • P. O. BOX 536 • HONOLULU, HAWAII 96809 • TELEPHONE (808) 521-2161

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4181

FRANK F. FASI
MAYOR

ALVIN K.H. PANG
DIRECTOR

August 8, 1985

Environmental Communications, Inc.
P. O. Box 536
Honolulu, Hawaii 96809

Gentlemen:

Subject: Environmental Impact Statement
Project: Waikele
TMKs: 9-4-02: 3, 10, 22, 12 (Portion), 31, 41
9-4-07: 10 12, 13, 32
Area: 577.21 Acres
Owner: Amfac Corporation
Proposal: To create a new planned community which will include: 310 acres of residential use; 12-acre commercial center; 43-acre office center; 136-acre golf course; and 20 public facilities.

We appreciate the opportunity to comment during the preparation of the Environmental Impact Statement for the proposed Waikele Development project.

The proposed development of residential units in the agricultural district of the State Land Use District Map has been reviewed by the Department of Housing and Community Development. The Department is mandated to provide housing units for the low- and moderate-income families on Oahu. We note that a zoning change is needed, and in accordance with the current Departmental policy, we wish to request that at least ten (10) percent of all residential developments to be set aside for these groups. This request applies to all zone changes, cluster and planned development-housing applications. Establishing such a requirement is a reasonable means of recapturing the economic benefit conferred by favorable land use allocations and distributing that benefit for the general public benefit.

We request that Amfac Property Development Corporation specify the location of the units, as well as the type of unit (1-bedroom, 2-bedroom, etc.) to be provided for the low- and moderate-income families.

If you have any questions, please contact Mr. James Miyagi of our Housing Division at 523-4264, who will assist the developer in formulating a program to provide these units.

Sincerely,

ALVIN K. H. PANG

AUG 13 1985

ENVIRONMENTAL
COMMUNICATIONS
INC.

P. J. RODRIGUEZ
PRESIDENT

October 9, 1985

Mr. Alvin K.H. Pang, Director
Department of Housing and
Community Development
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Pang:

We are in receipt of your department's comments dated August 8, 1985 on the EIS Preparation Notice for the proposed Waikele project and we respond in the following:

Amfac recognizes the 10% housing requirement for low and moderate income families on Oahu as mandated by your department. The availability of these housing units to meet your agency's requirements are being formulated at the present time in terms of unit mix, pricing levels, and site location. The draft EIS currently under preparation will provide to the extent possible, this data for your office's review and comment. Please be assured that as the project proceeds through the lengthy land use policy review schedule, this committment will be met by Amfac.

Thank you for your comments and continuing concern.

Very truly yours,

F. J. Rodrigues

FJR:le

FIRE DEPARTMENT

CITY AND COUNTY OF HONOLULU

1455 S. BERETANIA STREET, ROOM 305
HONOLULU, HAWAII 96814

FRANK F. FASI
MAYOR

FRANK K. KAHOOHANOHANO
FIRE CHIEF

LYNNETTE T. TAMARA
DEPUTY FIRE CHIEF

August 21, 1985

Environmental Communications, Inc.
P. O. Box 536
Honolulu, Hawaii 96809

Gentlemen:

Due to the nature and scope of the Waikele development and the surrounding areas, the Honolulu Fire Department is requesting a 20,000 square foot fire station site be set aside within the development. Preliminary discussions have been held with AMFAC Property Development Corporation on this matter.

Development plans are subject to applicable fire codes.

We request further consultation during the preparation of the Environmental Impact Statement. Should you have any questions, please contact Battalion Chief Kenneth Word of our Administrative Services Bureau at 943-3838.

Very truly yours,

FRANK K. KAHOOHANOHANO
Fire Chief

FKK:lm/KAW
cc: Administrative Services Bureau

AUG 23 1985

ENVIRONMENTAL COMMUNICATIONS INC.

F. J. RODRIGUEZ, PRESIDENT

October 9, 1985

Chief Frank K. Kahoohanohano
Honolulu Fire Department
1455 S. Beretania Street, Room 305
Honolulu, Hawaii 96814

Dear Chief Kahoohanohano:

We are in receipt of your department's comments dated August 21, 1985 on the EIS Preparation Notice for the proposed Waikele project and we respond in the following:

We acknowledge the preliminary discussions which were held with you and Amfac Property Development staff on the availability of a fire station site on the Waikele project. There will be continuing discussion on this matter and to the extent possible at this early planning stage. We will include in the draft EIS, a reference to this fire station site.

Thank you for your comments and continuing concern.

Very truly yours,

F. J. Rodrigues

FJR:ls